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Manufacturing and Mechanical Engineering Technology
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Final Project

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Full Description of System:

What is the purpose of the system?

The purpose of this system is to open and close the garage door automatically and safely. The user will have the option to use either of the two keypads, or a remote FOB to open or close the garage door by pressing the green or red square buttons on the keypad or remote FOB. The green button opens the garage, and the red button will close it. If the user needs to stop the garage while it is opening or closing, the remote FOB and each keypad has a circular red button which will automatically stop the motor. Each time the garage door opens or closes, it counts as one cycle. When 8 cycles have been completed, the system will be disabled, and a red light will appear. This means that maintenance is needed to reset the cycles for the system to become operational again.

Working environment of the system?

This system would be used outdoors at a user's home. This system will automatically open or close the garage door until it has reached its maximum cycle count. Once it has reached its maximum cycle count, a red light will turn on and the system will be disabled until maintenance has been done to reset the cycle counter.

System Graphic:

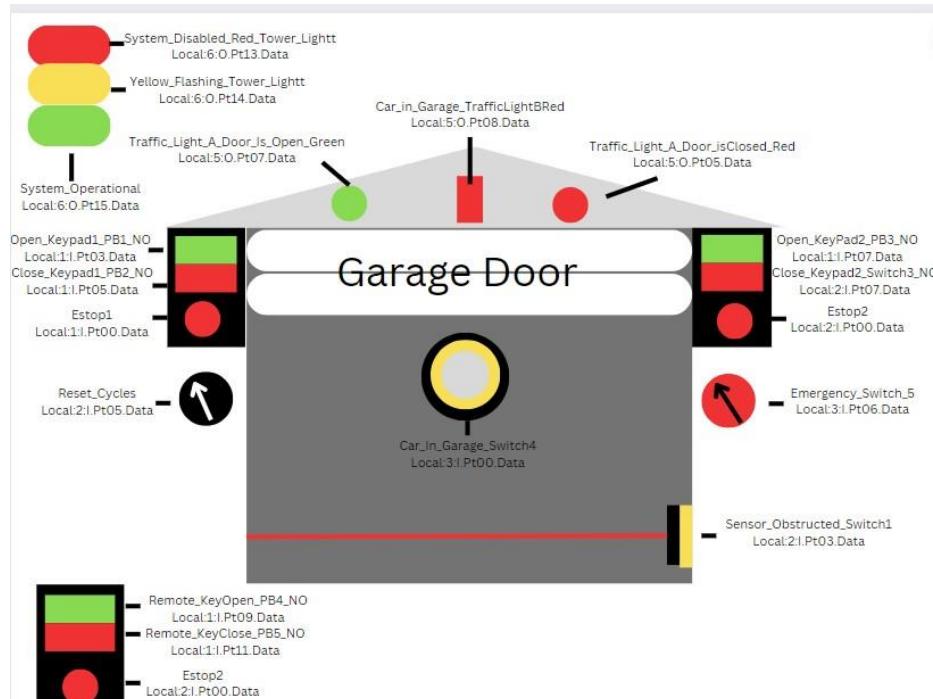


Figure 1: Schematic of Garage Door System with Components and Alias Tags

Safety Description:

This system prioritizes the safety of the user as there are several conditions set specifically for this. To start, there are multiple estops which can be used to stop the motor opening or closing while operating. The ladder logic also uses seal in contacts for the pushbuttons which start the motor so that the motor will not start up again in case there is a main power outage which is then restored. There is also an emergency override switch which the user can use to open the garage door, while the car is in a charging cycle, in case of a current situation. This way the user can have a way out of the garage if needed. Finally, there is a photo electric sensor which can detect if there is an object right underneath the garage door. If there is an object in the way, for example, a car, the garage door will reverse open automatically, even though it was closing, and will flash a yellow light.

Logic Flow Chart:

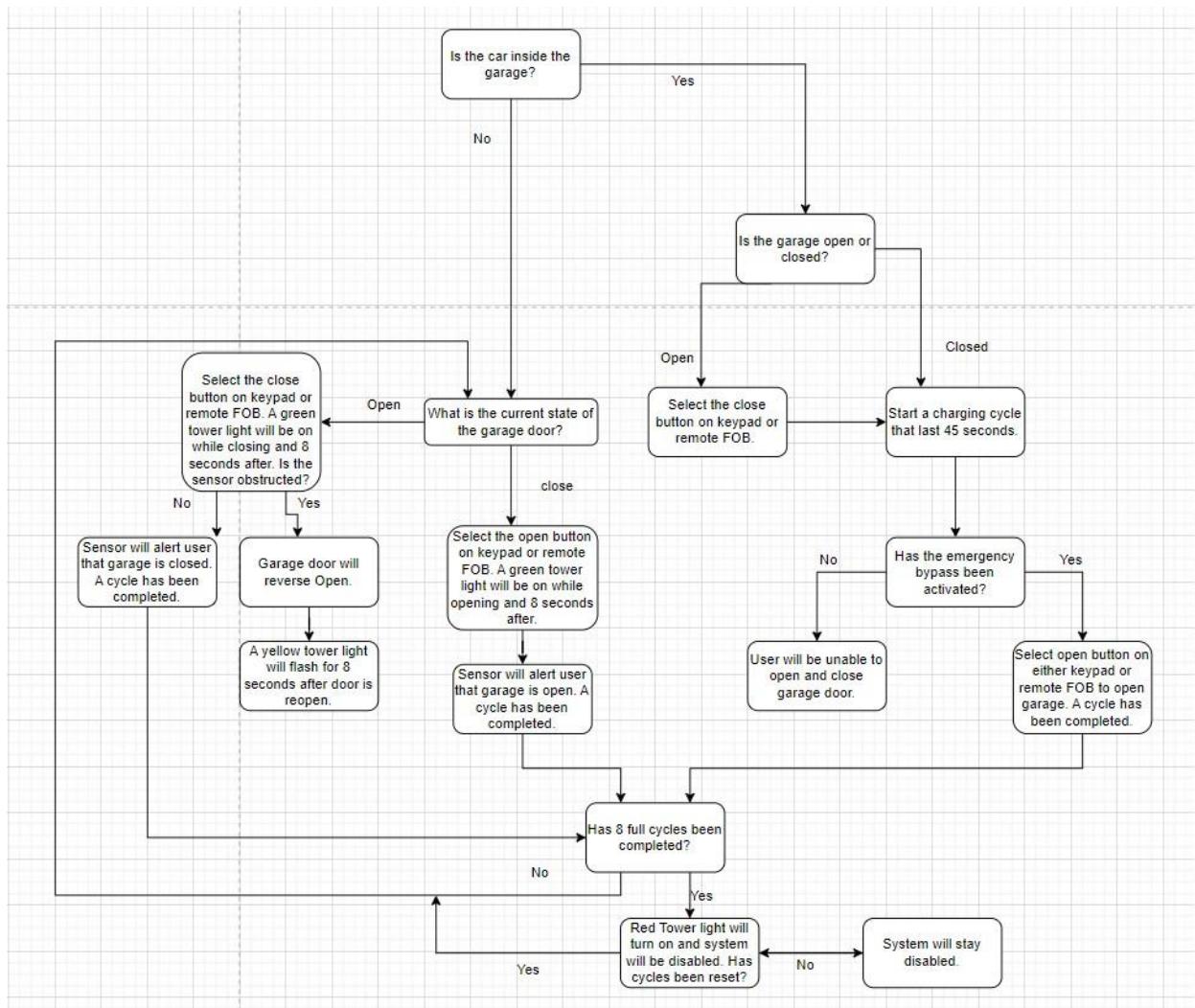


Figure 2: Flow Chart of Conveyor System

Use of Development Spread Sheet:

	Logic Function (2)	Alias Tag (1)	Base Tag (10)	I/O (3)	Slot (9)	Device Type (4)	Manufacturer (5)	Device PN (6)	Contact(s) (7)	Notes (8)
1	Will activate motor to open garage door.	Open Keypad1_PB1_NO	Local:1:I.Pt03.Data	Input	1	Push Button 1	AutomationDirect	CGK1150	NO	The top square green button.
2	Will activate motor to open garage door.	Open Keypad2_PB3_NO	Local:1:I.Pt07.Data	Input	1	Push Button 3	AutomationDirect	CGK1150	NO	The top square green button.
3	Will activate motor to open garage door.	Remote KeyOpen_PB4_NO	Local:1:I.Pt09.Data	Input	1	Push Button 4	AutomationDirect	CGK1150	NO	The top square green button.
4	Will activate motor to close garage door.	Close Keypad1_PB2_NO	Local:1:I.Pt05.Data	Input	1	Push Button 2	AutomationDirect	CGK1150	NO	The bottom square red button.
5	Will activate motor to close garage door.	Close Keypad2_Switch3_NO	Local:2:I.Pt07.Data	Input	2	Push Button	AutomationDirect	CGK1150	NO	The bottom square red button.
6	Will activate motor to close garage door.	Remote KeyClose_PB5_NO	Local:1:I.Pt11.Data	Input	1	Push Button 5	AutomationDirect	CGK1150	NO	The bottom square red button.
7	Will detect if there is anything in the way while closing the garage door.	Sensor_Obstructed_Switch1	Local:2:I.Pt03.Data	Input	2	Photo-electric Sensor	Banner Engineering	Q39FF200QPM	NO	Has a range of 200 meters and so will detect objects up to 200 m.
8	Will stop the motor from opening or closing the door during anytime it is operating	Estop1	Local:1:I.Pt00.Data	Input	1	Stop Push Button	AutomationDirect	GCX1106	NO	Red 30 mm round button with "O" text.
9	Will stop the motor from opening or closing the door during anytime it is operating	Estop2	Local:2:I.Pt00.Data	Input	2	Stop Push Button	AutomationDirect	GCX1106	NO	Red 30 mm round button with "O" text
10	Will reset the counters if 8 cycles have been completed.	Reset_Cycles	Local:2:I.Pt05.Data	Input	2	Selector Switch 2	AutomationDirect	CGK1300	NO or NC	2 positions maintained switch.
11	Will determine if there is a car in the garage.	Car_in_Garage_Switch4	Local:3:I.Pt00.Data	Input	3	Radar Sensor	Banner Engineering	T30R-1515-LKDQ	NO	Should be installed at an angle where it should only detect the car.
12	Will override charging cycle and allow closing and opening operations to function.	Emergency_Switch_5	Local:3:I.Pt06.Data	Input	3	Selector Switch 5	AutomationDirect	AR22PL-010L3RZA	NO or NC	2 positions red maintained switch.
13	Motor will open garage door.	Open_Garage_Door_Motor1	Local:4:O.Pt14.Data	Output	4	DC Motor 1	AutomationDirect	MTPM-P33-1118		90 VDC, 1800 RPM
14	Motor will close garage door.	Close_Garage_Door_Motor2	Local:4:O.Pt15.Data	Output	4	DC Motor 2	AutomationDirect	MTPM-P33-1118		90 VDC, 1800 RPM
15	A red pilot light will turn on if the garage door is closed.	Traffic_Light_A_Door_isClosed_Red	Local:5:O.Pt05.Data	Output	5	Traffic Light Red A	AutomationDirect	ECK2051-127L		30 mm red indicator light.
16	A red pilot light will turn on if there is a car in the garage.	Car_in_Garage_TrafficLightBRed	Local:5:O.Pt08.Data	Output	5	Traffic Light Red B	AutomationDirect	DR16FON-E3R		square red indicator light.
17	A green pilot light will turn on if the garage door is opened.	Traffic_Light_A_Door_Is_Open_Green	Local:5:O.Pt07.Data	Output	5	Traffic Light Green A	AutomationDirect	ECK2052-24L		30 mm green indicator light.
18	The red tower indicates that the system is disabled and that it needs to be reset.	System_Disabled_Red_Tower_Light	Local:6:O.Pt13.Data	Output	6	Tower light Red	Banner Engineering	TL30BGYRXAXC1		Tower light.
19	The yellow tower light will flash after the garage door reverse opens.	Yellow_Flashing_Tower_Light	Local:6:O.Pt14.Data	Output	6	Tower light Yellow	Banner Engineering	TL30BGYRXAXC1		Tower light.
20	The green tower light indicates that the motor is on and operational.	System_Operational	Local:6:O.Pt15.Data	Output	6	Tower light Green	Banner Engineering	TL30BGYRXAXC1		Tower light.

Figure 3: Development Spreadsheet of Garage System

PLC Defined/Specified:

Correct use of current lab PLC:

The current lab PLC used to automate this system is the Allen Bradley Compact GuardLogix 5380, serial number: 5069-L306ERMS2. This PLC uses the Allen Bradley input and output modules with 16 points starting from 0 – 15 for each of them. The serial number for the input module is: 5069-IB16F. The serial number for the output module is: 5069-OB16.

Input modules selected and defined:

Device PN: 5069-IB16F

Manufacturer: Allen Bradley

Points: 16



Output modules selected and defined:

Device PN: 5069-OB16

Manufacturer: Allen Bradley

Points: 16



Input and Output Devices Specified:

- Push Button, Green and Red
Manufacturer: Automation Direct
Device PN: CGX1150
Quantity: 3



- Push Button, Red
Manufacturer: Automation Direct
Device PN: CGX1106
Quantity: 3



- Maintained Selector Switch, 2 Position Knob, 1NO 1NC, Black
Manufacturer: Automation Direct
Device PN: CGX1300
Quantity: 1



- Maintained Selector Switch, 2 Position Knob, 1NO 1NC, Red
Manufacturer: Automation Direct
Device PN: AR22PL-010L3RZA
Quantity: 1



- Radar Sensor
Manufacturer: Banner Engineering
Device PN: T30R-1515-LKDQ
Quantity: 1



- Photo-electric Sensor
Manufacturer: Banner Engineering
Device PN: QS30FF200QPMA
Quantity: 1



- DC Motor
Manufacturer: Automation Direct
Device PN: MTPM-P33-1L18
Quantity: 2



- Red Indicator Light
Manufacturer: Automation Direct
Device PN: ECX2051-127L
Quantity: 1



- Red Indicator Light Square
Manufacturer: Automation Direct
Device PN: DR16F0N-E3R
Quantity: 1



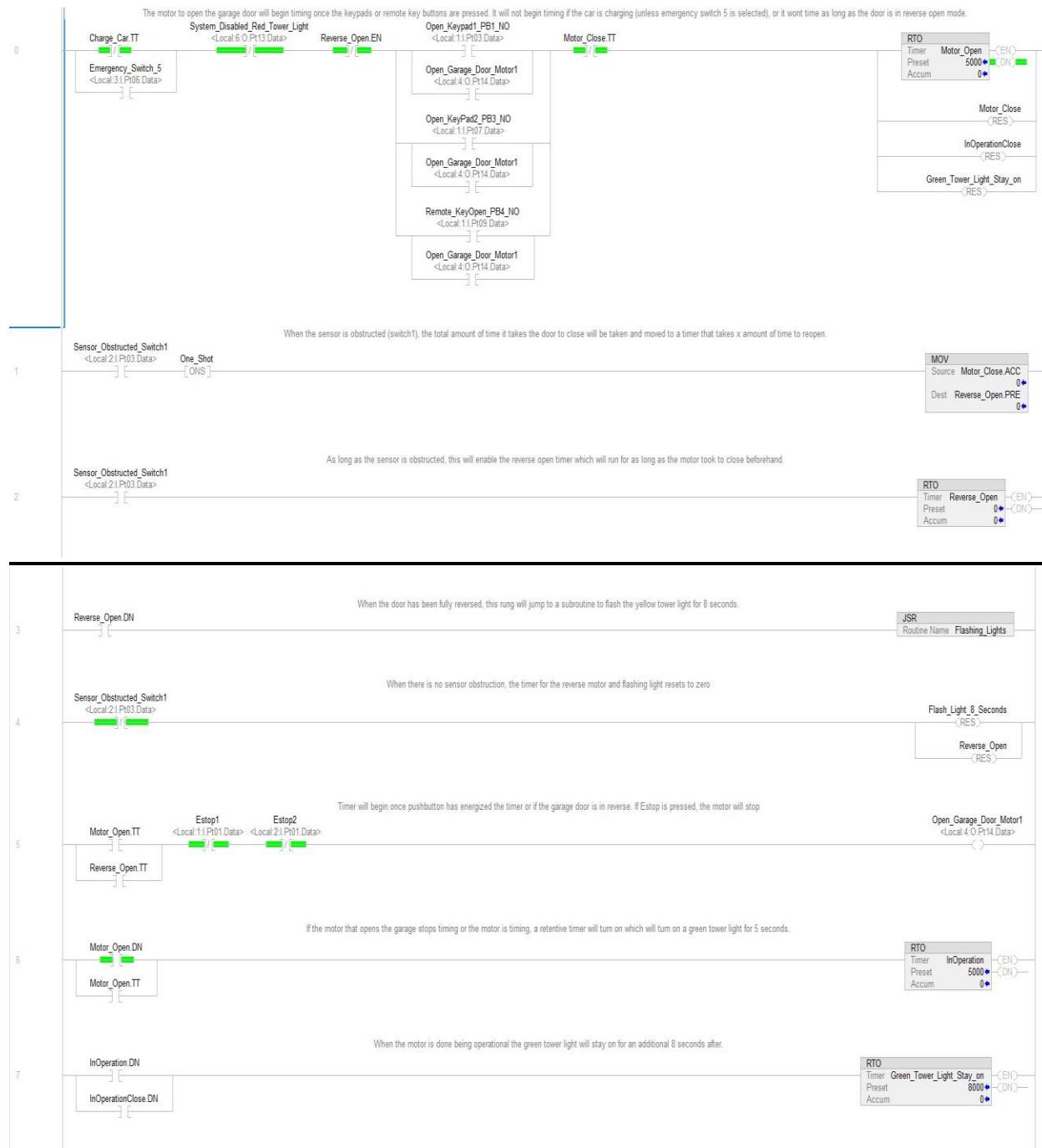
- Green Indicator Light
Manufacturer: Automation Direct
Device PN: ECX2052-24L
Quantity: 1

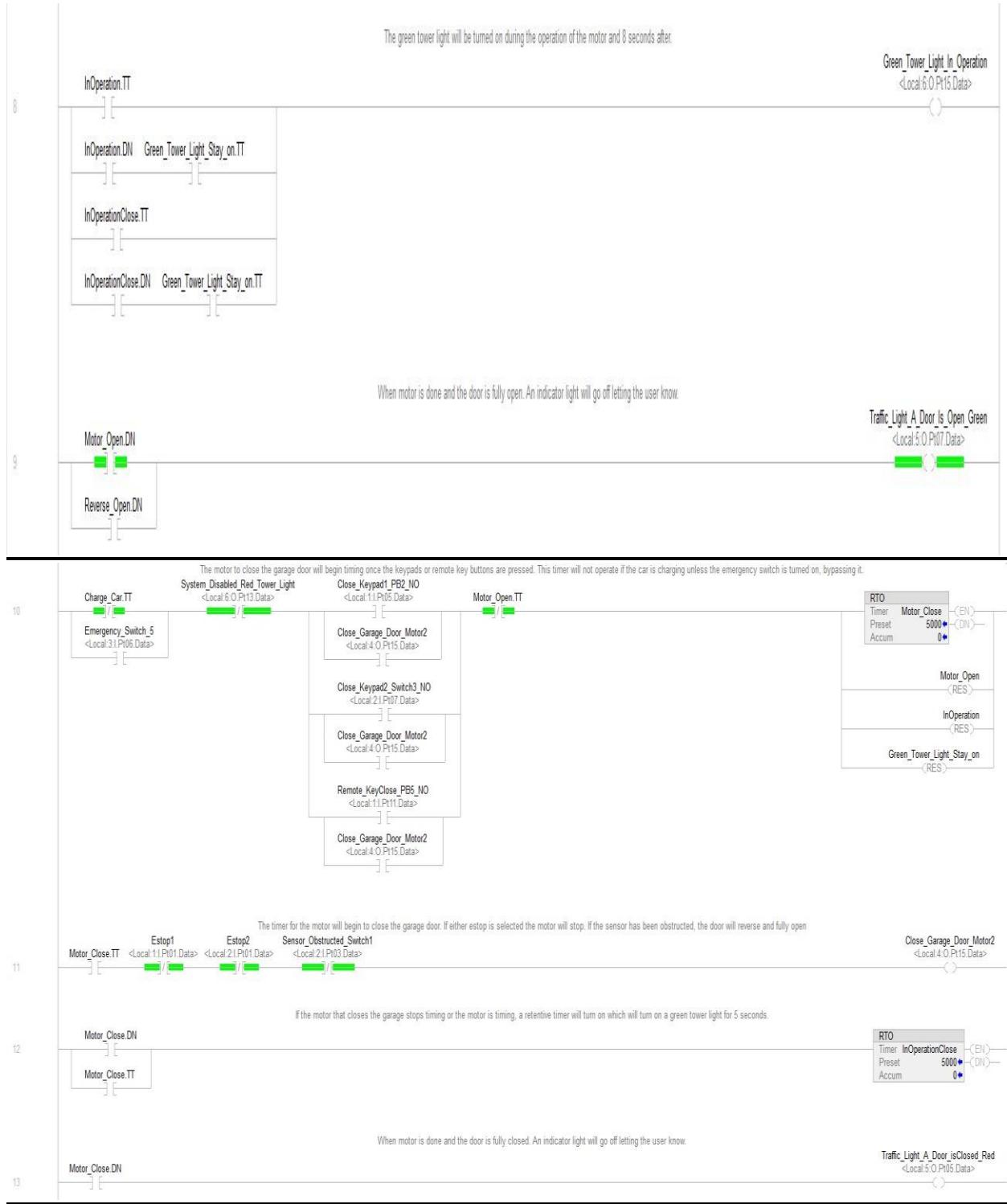


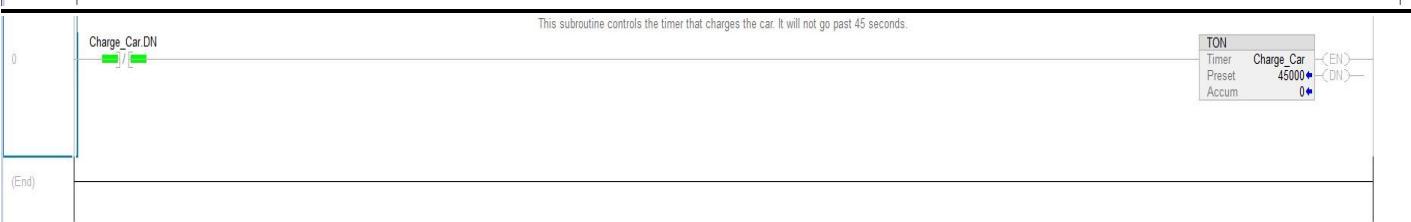
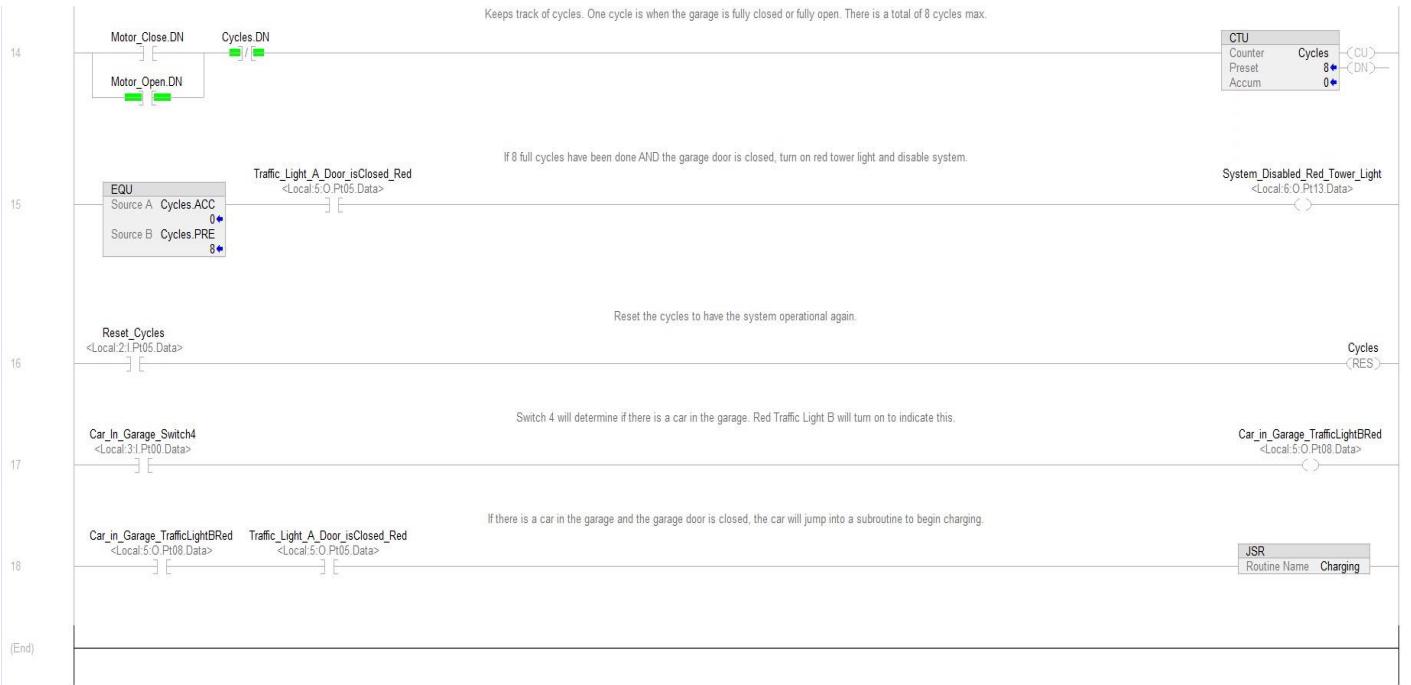
- LED Tower Light
Manufacturer: Banner Engineering
Device PN: TL30BGYRXXAXC1
Quantity: 1



Logic of System







Startup Configuration:

Startup assumptions of the system devices is stated:

As the user begins to use the garage door system, a few assumptions are made. Assumption 1: The door is either fully opened or fully closed. Assumption 2: The photo-electric sensor has not been obstructed so the garage should not reverse open. Assumption 3: It is assumed that the cycle counter is at zero since the user is starting the system up.

Any special requirements assumed?

There are no special requirements assumed for this system.

Potential System Issues:

Safety issues addressed:

Some concerning safety issues that need to be addressed is that the photo-electric sensor only works if an object is obstructing it. Since this sensor is low to the ground and consists of only one laser beam, it is very easy to avoid it. This means that if the object has not obstructed the sensor, the garage door will close on it. Another safety issue involves personal security. Since the keypads aren't locked away, anyone can easily come up and mess with the garage door system or steal from the garage.

Power loss:

In the event of a power loss, there are seals in contacts within the logic that will not allow the motors to start up again when the power has gone back on. In order for the whole system to be restarted after a power loss, the maintenance switch must be activated to reset the cycle count. This will reset all the counters to zero, which in turn will turn the system back to normal.

Emergency shutdown:

In the event where there needs to be an emergency shutdown, there are three Estops placed on the system. These Estops are placed strategically on the ladder logic to make sure the whole system stops, specifically the motors. If the power came back on, the motors would not run until there is a full reset.

Personnel safety situations:

Personal safety is ensured by having emergency shutdown buttons on multiple locations of the system as well as having a failsafe. There is also a photo-electric sensor which will detect if there is someone, or an object, in the way of the door closing.

Situations where input or output devices are faulty:

In the case where the user attempts to close the garage door while it is currently being opened, the motor will not reverse unless the door is fully opened and vice versa. If the photo electric sensor is not working properly, the system should be stopped immediately, and maintenance should be called to fix the issue. In

the event where the motor is not working, the user will be prompted to call the maintenance team to reset the cycle counter.

Safety hardware:

To ensure the safety of the operator, there are three stop buttons. There is a stop button on each keypad as well as the remote FOB in the case the user cannot reach the keypad on time. As soon as one of these buttons is selected, the motors will stop running. There is also a cycle count which will allow the garage door to be opened or closed 8 times at which point the system will disable and a red tower light will turn on to indicate to the user to call for maintenance. The photo-electric sensor is placed towards the bottom of the garage to detect if there is an object or person in the way of the garage closing to prevent injury. Finally, there is an emergency bypass switch which will allow the user to open the garage door while the car is charging in case of a situation.

Does the system failsafe?

In the case of an emergency, the system will shut down power to all utilized hardware. The motors will be powered off and as a result of the seal in contact, it will not turn back on until the system has reset. This failsafe ensures that the system is not in a position to cause any harm as well as allows the issue to be resolved without worrying about any injury.

Appendix:

Technical Data

Original Instructions

Catalog Numbers

Digital I/O Modules

Analog I/O Modules

High-speed Counter Module 5069-HSC2xOB4

Safety I/O Modules

Serial Module 5069-SERIAL

Field Potential Distributor 5069-FPD

Address Reserve Module 5069-ARM



Compact 5000 I/O Modules and EtherNet/IP Adapters

5069A16, 5069-IB16, 5069-IB16F, 5069-IB16K, 5069-IB6F-3W, 5069-OA16, 5069-OB8, 5069-OB16F, 5069-OB16K, 5069-OW4I, 5069-OW16, 5069-5069F8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF8, 5069-OF4K, 5069-OF8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK, 5069AENTR, 5069-AENTRK, 5069-

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EtherNet/IP Adapters

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

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

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

Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data

Summary of Changes

The publication was revised for the following changes.

Topic	Pages
Updated Module Artwork	Throughout

Power Compact 5000 I/O Modules

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

Power Type	Description	Related Specifications	
		Name	Description
Module (MOD) Power	System-side power that is used to operate a local or remote system. Power passes across a Mod power bus. Modules draw current from the bus and pass the remaining current to the next module.	MOD Power	Level of Mod power current that the module draws from the Mod power bus
		MOD Power Passthrough max	Maximum level of Mod power current that the module can pass to the next module.
Sensor/Actuator (SA) Power	Field-side power that some modules use to power field-side devices. Power passes across an SA Power bus. Some modules draw current from the bus and pass the remaining current to the next module. Other modules do not draw current from the bus but do pass the current to the next module. You use 5069-FPD field potential distributors to establish new SA Power buses in a system. IMPORTANT: Remember the following: <ul style="list-style-type: none"> If the system includes DC type modules and AC type modules, you must use a field potential distributor to install them on separate SA Power buses. You cannot install AC type modules directly next to a Compact GuardLogix 5380 controller. You must first install a field potential distributor. 	SA Power	Level of SA Power current that the module draws from the SA Power bus
		SA Power Passthrough max	Maximum level of SA Power current that the module can pass to the next module.

Local Actuator (LA) Power	Field-side power that some Compact 5000 I/O modules use instead of SA power. Modules that use LA power do not use SA power . They only pass SA power to the next to the next I/O module in the system. You must install modules that use LA Power on an SA Power bus with the same module type. For example, you must install a 5069-OB8 module on an SA Power bus that includes DC type modules.	LA Power	Maximum level of LA Power current that you can apply to the module, by channel, group, or module.
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For more information on Mod power, SA power, and LA power, see the user manuals that are listed in [Additional Resources on page 137](#).

Digital I/O Modules

I/O Type	Cat. No.	Description	Pages
AC digital input	5069-IA16	79...264V AC 16-point, input module	4
DC digital input	5069-IB16	10...32V DC 16-point, sinking input module	9
	5069-IB16K	10...32V DC 16-point, conformal coated sinking input module	
	5069-IB16F	10...32V DC 16-point, sinking fast input module	
	5069-IB6F-3W	10...32V DC 6-point, 3-wire, sinking fast input module	14
AC digital output	5069-OA16	85...264V AC 16-point, output module	19
DC digital output	5069-OB8	10...32V DC 8-point, sourcing high-current output module	24
	069-OB16	10...32V DC 16-point, sourcing high-current output module	29
	5069-OB16K	10...32V DC 16-point, conformal coated sourcing output module	
	5069-OB16F	10...32V DC 16-point, sourcing fast output module	
Relay output	5069-OW4I	5...264V AC /125V DC 4-point, isolated normally open relay output module	35
	5069-OW16	5...264V AC/125V DC 16-point, normally open relay output module	40
	5069-OX4I	5...264V AC /125V DC 4-point, isolated normally open/normally closed relay output module	45

5069-IA16 Digital 16-point 120/240V AC Input Module

The following figure shows a wiring diagram for the 5069-IA16 module.

5069-IA16 Wiring Diagram

the SA power RTB.

If you install modules in a system that

- use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.

No Connect

No Connect

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 AC, on the second SA power bus.

Channel Connections

The diagram shows devices that are connected to channels 0, 2, 4, 6, 8, and 10. You aren't restricted to using only those channels.

You can connect devices to any channel or combination 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
- CompactLogix 5480 controller

- 5069-AENTR or 5069-AEN2TR EtherNet/IP™ adapter
- 5069-FPD field potential distributor

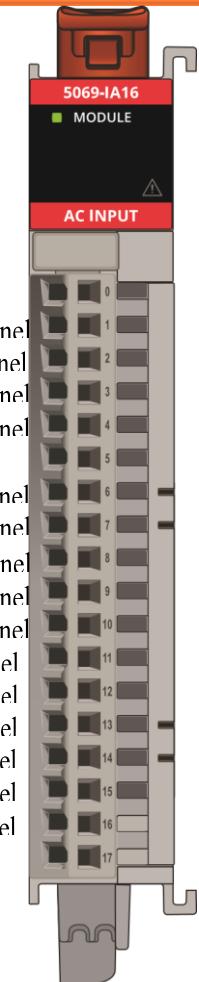
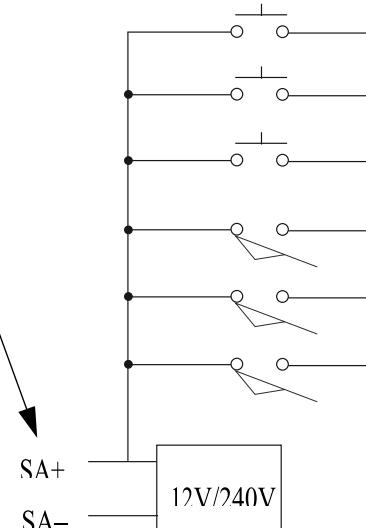
IMPORTANT: Remember the following:

- The 5069-IA16 module uses AC SA power. You must connect AC power to the component, that is, CompactLogix 5380 controller, adapter, or field potential distributor, that provides SA power to the module.
- If you install a **5069-IA16 module as a local I/O module in a Compact GuardLogix 5380 controller system**, you must install a field potential distributor that has AC power that is connected to it and install the 5069-IA16 module next to the field potential distributor.

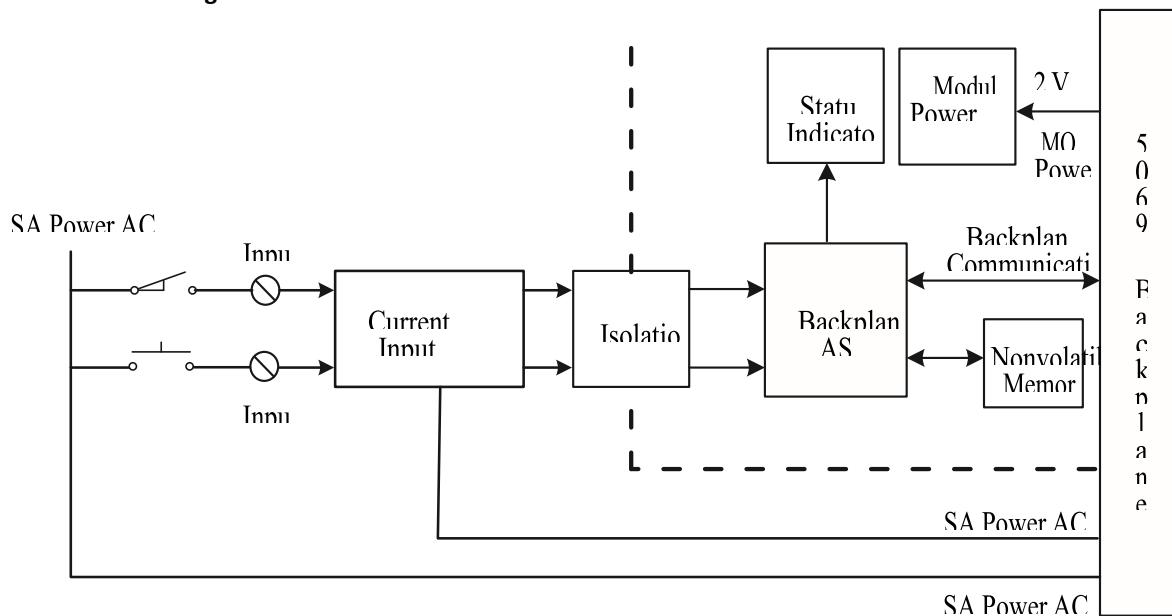
You can't install modules that draw AC SA power next to a Compact GuardLogix 5380 controller. Compact GuardLogix 5380 controllers do not support AC power on their SA power RTBs.

- The 5069-IA16 module inputs use a shared common. The inputs have a return through internal module circuitry to the SA (-) terminal on

The following figure shows a functional block diagram for the 5069-IA16 module.



Off to On	ms (typ) @ 0...60 °C (32...140 °F)
On to Off	ms (typ) @ 0...60 °C (32...140 °F)

5069-IA16 Functional Block Diagram**Technical Specifications - 5069-IA16**

Attribute	5069-IA16
On-state voltage, min	79V AC
On-state voltage, nom	120/240V AC
On-state voltage, max	264V AC
Off-state voltage, max	40V AC
Input current per channel, max	15 mA @ 264V AC
On-state current, min	2 mA @ 79V AC 3 mA @ 164V AC
On-state current, nom	5 mA @ 120V AC/50 Hz 6 mA @ 120V AC/60 Hz 9 mA @ 240V AC/50 Hz 11 mA @ 240V AC/60 Hz
On-state current, max	15 mA @ 264V AC
Off-state current, max	2 mA
Input impedance, nom	24 kΩ @ 120V AC/50 Hz 20 kΩ @ 120V AC/60 Hz 27 kΩ @ 240V AC/50 Hz 22 kΩ @ 240V AC/60 Hz
Input impedance, min	17.6 kΩ @ 264V AC/63 Hz
Inrush current, max	600 mA
Input delay time	

Technical Specifications - 5069-IA16

Attribute	5069-IA16
Input filter times	<p>Hardware delay: 10 ms (typ) + filter time User-selectable filter times: • 120V AC input - 1 ms • 240V AC input - 1 ms, 2 ms, 5 ms</p>
Off to On	<p>Hardware delay: 10 ms (typ) + filter time User-selectable filter times: • 120V AC input - 10 ms, 20 ms • 240V AC input - 5 ms, 10 ms, 20 ms</p>
On to Off	

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

General Specifications - 5069-IA16

Attribute	5069-IA16
Number of inputs	16 (One group of 16)
Voltage category	120/240V AC
Voltage and current ratings	
Input voltage range	79...264V AC
Input voltage frequency	47...63 Hz
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA Power	240 mA @ 79...264V AC
SA Power Passthrough, max ⁽²⁾	9.975 A @ 79...264V AC
Do not exceed 10 A MOD or SA power (Passthrough) current draw.	
The 5069-IA16 module complies to ATEX/IECEx when used at or below 125V AC.	
Power dissipation, max	3.5 W
Thermal dissipation, max	11.9 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1800V AC for 60 s No isolation between individual channels
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 16 yellow/red I/O status indicators
Slot width	1
Dimensions (HxWxD)	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire category	<p>2 - input ports 2 - power ports 1 wire per terminal for each signal port</p>

General Specifications - 5069-IA16

Attribute	5069-IA16
Wire size	
5069-RTB18-SPRING connections	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.
5069-RTB18-SCREW connections	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.)
5069-RTB18-SCREW connections	12 mm (0.47 in.)
Weight, approx	175 g (0.39 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4
IEC Input Compatibility	Type 1

- (1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

Environmental Specifications - 5069-IA16

Attribute	5069-IA16
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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)

Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4

Environmental Specifications - 5069-IA16

Attribute	5069-IA16
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±4 kV @ 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Corrosion resistance classification	ISA S71.04 G2

Certifications - 5069-IA16

Certification ⁽¹⁾	5069-IA16
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. 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	<p>European Union 2014/30/EU EMC Directive, compliant with:</p> <ul style="list-style-type: none"> EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) <p>European Union 2014/35/EU LVD, compliant with:</p> <ul style="list-style-type: none"> EN 61010-2-201; Control Equipment Safety Requirements <p>European Union 2011/65/EU RoHS, compliant with:</p> <ul style="list-style-type: none"> EN 50581; Technical documentation
RCM	<p>Australian Radiocommunications Act, compliant with:</p> <ul style="list-style-type: none"> EN 61000-6-4; Industrial Emissions
Ex	<p>European Union 2014/34/EU ATEX Directive, compliant with:</p> <ul style="list-style-type: none"> EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc DEMKO 15 ATEX 1484X
IECEx	<p>IECEx System, compliant with:</p> <ul style="list-style-type: none"> IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc IECEx UL 15.0055X
KC	<p>Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3</p>
EAC	<p>Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation</p>

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

5069-IB16, 5069-IB16K, and 5069-IB16F Digital 16-point Sinking Input Modules

The following figure shows a wiring diagram for the 5069-IB16, 5069-IB16K, and 5069-IB16F modules.

5069-IB16, 5069-IB16K, and 5069-IB16F Wiring Diagram

Channel Connections

The example shows devices that are connected to channels 0, 3, and 6.

You aren't restricted to using only those channels.

You can connect devices to any channel or combination 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 Input 0
- Compact GuardLogix 5380 controller Input Channel 1
- CompactLogix 5480 controller Input Channel 2 • 5069-AENTR or AEN2TR EtherNet/IP Adapter
- 5069-FPD field potential distributor Input Channel 3

IMPORTANT: Remember the following: Input Channel 4

- The 5069-IB16, 5069-IB16K, and 5069-IB16F modules use DC SA power. Input Channel 5

You must connect DC power to the component, that is, controller,

Input Channel 6 adapter, or field potential distributor, that provides SA power to the modules. Input Channel 7

- The 5069-IB16, 5069-IB16K, and 5069-IB16F module inputs use a shared Input Channel 8 common. The inputs have a return through internal module circuitry to Input Channel 9 the SA (-) terminal on the SA power RTB. Input Channel 10
- If you install modules in a system that use AC SA power and DC SA Input Channel 11 power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA Input Channel 12 power bus in a system. SA power buses are isolated from each other. Input Channel 13

To keep the modules on separate SA power buses, complete these Input Channel 14 steps.

Input Channel 15

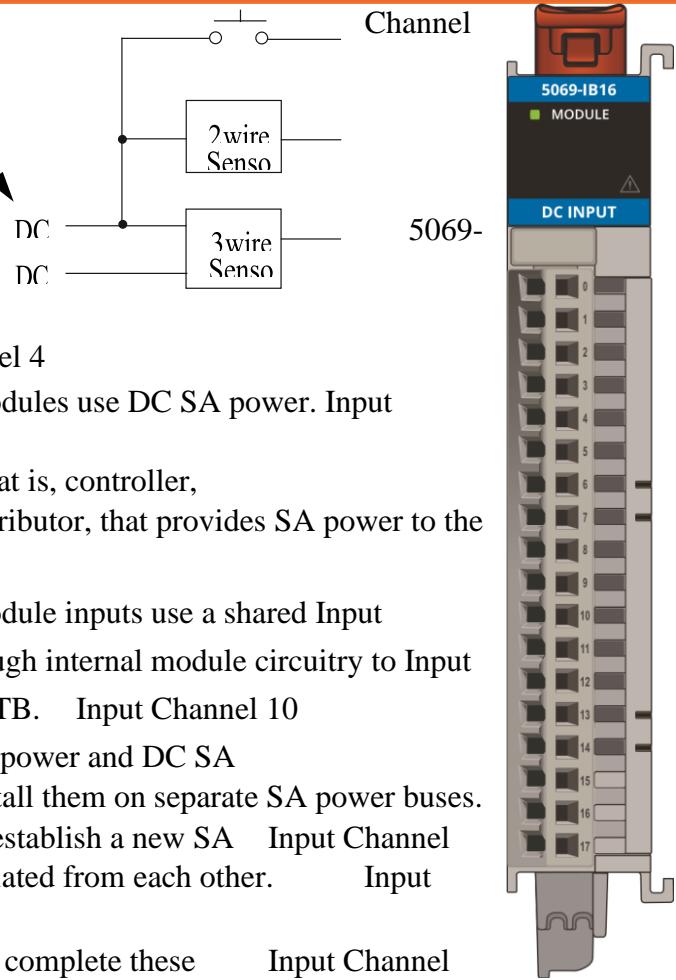
1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA No Connect power bus.
No Connect

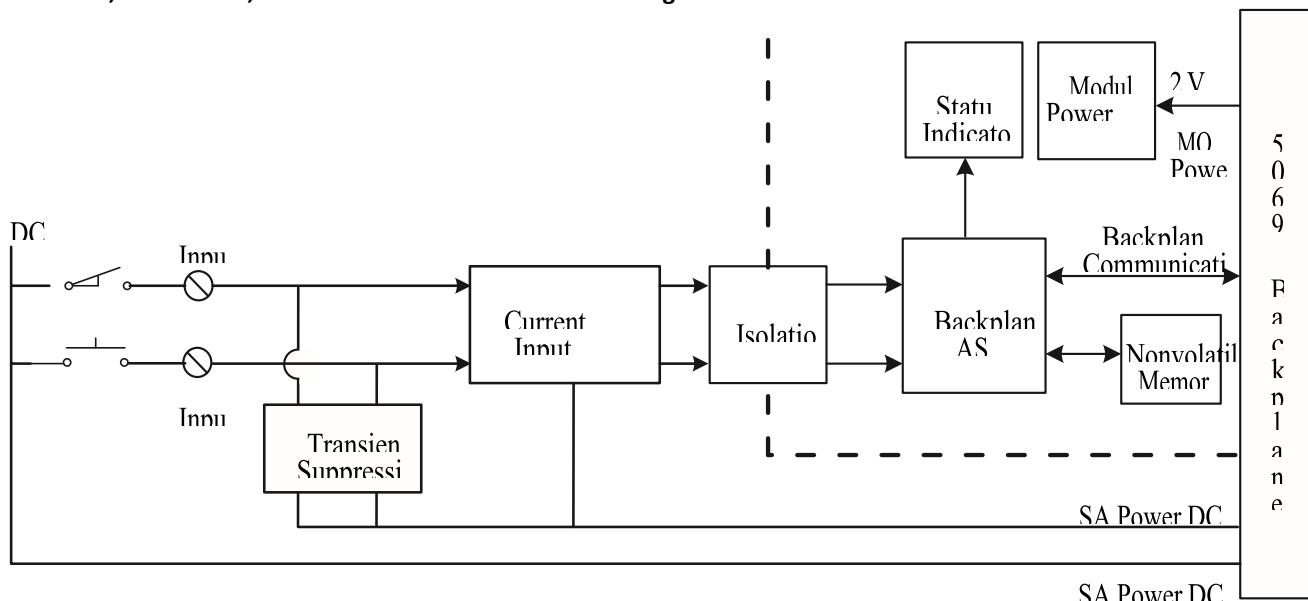
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.

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

IMPORTANT: The 5069-IB16K and 5069-IB16F modules are wired the same as the wiring diagram that is shown for the 5069-IB16 module.

The following figure shows a functional block diagram for the 5069-IB16, 5069-IB16K, and 5069-IB16F modules.



5069-IB16, 5069-IB16K, and 5069-IB16F Functional Block Diagram**Technical Specifications - 5069-IB16, 5069-IB16K, and 5069-IB16F**

Attribute	5069-IB16, 5069-IB16K	5069-IB16F
On-state voltage, min	10V DC	
On-state voltage, nom	24V DC	
On-state voltage, max	32V DC	
On-state current, min	4 mA @ 10V	
On-state current, nom	6 mA @ 24V DC	
On-state current, max	7.4 mA @ 32V DC	
Off-state voltage, max	5V DC	
Off-state current, max	1.5 mA	
Input impedance, min	1.33 kΩ	
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)		
Off to On	≤ 100 µs, ±10 µs @ 25 °C (77 °F)	≤ 10 µs, ±1 µs @ 25 °C (77 °F)
On to Off	≤ 100 µs, ±10 µs @ 25 °C (77 °F)	≤ 10 µs, ±1 µs @ 25 °C (77 °F)
Input drift over temperature span	±100 ns/°C (55.6 ns/°F) from 0...60 °C (32...140 °F)	< 10 ns/°C (5.56 ns/°F) from 0...60 °C (32...140 °F)
Input On to Off minimum pulse width	60 µs	6 µs
Input Off to On minimum pulse width	60 µs	6 µs

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

	5069-IB16, 5069-IB16K	5069-IB16F
Attribute		
Input filter time		
Off to On	Hardware delay: 50 µs + filter time User-selectable filter time: 0...50 ms	Hardware delay: 2 µs + filter time User-selectable filter time: 0...50 ms
On to Off	Hardware delay: 50 µs + filter time User-selectable filter time: 0...50 ms	Hardware delay: 3 µs + filter time User-selectable filter time: 0...50 ms
Reverse polarity protection	Yes	
Overshoot protection, max	36V (fuse protected)	
Pulse and period measurements	Not supported	±2 µs
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)
Time stamp of inputs	Not supported	±10 µs accuracy 1 ns resolution
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	
General Specifications - 5069-IB16, 5069-IB16K, and 5069-IB16F		
Attribute	5069-IB16, 5069-IB16K	5069-IB16F
Inputs	16 Channels (1 group of 16), sinking	
Voltage category	12/24V DC Sink	
Voltage and current ratings		
Input ratings	4...7.4 mA per channel @ 10...32V DC	
Mod power	75 mA @ 18...32V DC	
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC	
SA Power	200 mA @ 10...32V DC	
SA Power Passthrough, max ⁽²⁾	9.95 A @ 10...32V DC	
Power dissipation, max	3.9 W	
Thermal dissipation, max	13.3 BTU/hr	
Isolation voltage	250V (continuous), Basic Insulation Type No isolation between SA power and input ports No isolation between individual input ports	

Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 16 yellow/red I/O status indicators
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

General Specifications - 5069-IB16, 5069-IB16K, and 5069-IB16F

Attribute	5069-IB16, 5069-IB16K	5069-IB16F
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.	
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb-in)	
RTB keying	None	
Wire category ⁽³⁾	2 - input ports 2 - power ports 1 wire per terminal for each signal port	
Wire size		
5069-RTB18-SPRING connections	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.	
5069-RTB18-SCREW connections	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.) 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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

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

Environmental Specifications - 5069-IB16, 5069-IB16K, and 5069-IB16F

Attribute	5069-IB16, 5069-IB16K, 5069-IB16F
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)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz

Environmental Specifications - 5069-IB16, 5069-IB16K, and 5069-IB16F

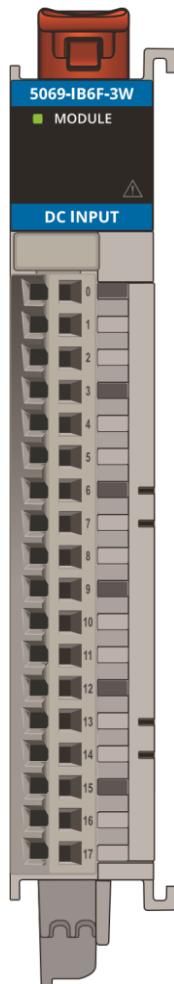
Attribute	5069-IB16, 5069-IB16K, 5069-IB16F
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on input ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on input ports

Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port
Certifications - 5069-IB16, 5069-IB16K, and 5069-IB16F	
Certification⁽¹⁾	5069-IB16, 5069-IB16K, 5069-IB16F
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 60101-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(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

The following figure shows a wiring diagram for the 5069-IB6F-3W module.

5069-IB6F-3W Wiring Diagram1. I
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h**Channel Connections**

The diagram shows devices that are connected to channels 0 and 2. You aren't restricted to using only those channels. You can connect devices to any channel or combination of channels as needed.

SA Power

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

- CompactLogix 5380 controller
 - Compact GuardLogix 5380 controller
 - CompactLogix 5480 controller
 - 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter • 5069-FPD field potential distributor
- IMPORTANT:** Remember the following:
- The 5069-IB6F-3W module uses DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the module.
 - If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
 - You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

at use one type of SA power, for example DC, 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 AC, on the second SA power bus.

Input Channel 0

SA+ (24V DC)

SA- (24V DC Return)

Input Channel 1

SA+ (24V DC)

SA- (24V DC Return)

Input Channel 2

SA+ (24V DC)

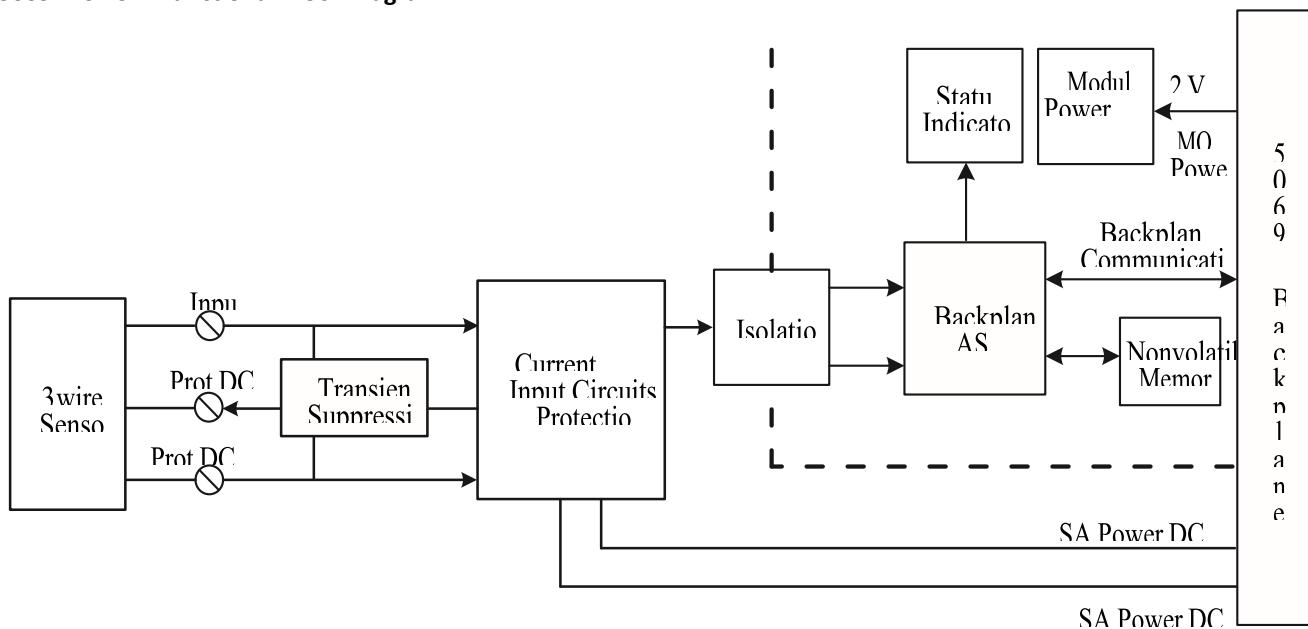
SA- (24V DC Return)

Input Channel 3

SA+ (24V DC)

The following figure shows a functional block diagram for the 5069-IB6F-3W module.

5069-IB6F-3W Functional Block Diagram



Technical Specifications - 5069-IB6F-3W

Attribute	5069-IB6F-3W
-----------	--------------

On-state voltage, min	10V DC
On-state voltage, nom	24V DC
On-state voltage, max	32V DC
Off-state voltage, max	5V DC
On-state current, min	4 mA @ 10V DC
On-state current, nom	6 mA @ 24V DC
On-state current, max	7.4 mA @ 32V DC
Off-state current, max	1.5 mA
Input impedance, nom	4.1 kΩ
Input impedance, max	7.0 kΩ
Inrush current, max	< 250 mA peak (decaying to, 37% in 22 ms, without activation)
Input delay time (screw to backplane)	≤ 10 µs, ±1 µs @ 25 °C (77 °F) ≤ 10 µs, ±1 µs @ 25 °C (77 °F)
Input drift over temperature span	±10 ns/°C (5.56 ns/°F) from 0...60 °C (32...140 °F)
Input On to Off minimum pulse width	6 µs
Input Off to On minimum pulse width	6 µs

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

Attribute	5069-IB6F-3W
Input filter time	
Off to On	Hardware delay: 2 µs + filter time User-selectable filter time: 0...50 ms
On to Off	Hardware delay: 3 µs + filter time User-selectable filter time: 0...50 ms
Reverse polarity protection	Yes
Overshoot protection, max	36V (fuse protected)
Pulse width and period measurements	±2 µs
Simple counters	
Counter frequency	0 - f _{max} = 30 kHz (Inv period 33.3 µs)
Frequency counter	0 - f _{max} = 30 kHz (Inv period 33.3 µs)
Time stamp of inputs	±10 µs accuracy 1 ns resolution
Overrides	Not supported
Pulse latching	Supported
Events	4 events supported (triggered by any input or simple counters)
Pattern matching	Supported
Extended counters	Not supported

General Specifications - 5069-IB6F-3W

Attribute	5069-IB6F-3W
Inputs	6 Channels (1 group of 6), sinking
Voltage category	12/24V DC Sink
Voltage and current ratings	
Input ratings	4...7.4 mA per channel @ 10...32V DC
Output supply ratings	150 mA per channel @ 10...32V DC 900 mA per module @ 10...32V DC
Mod power	75 mA @ 18V...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA Power	900 mA @ 10...32V DC
SA Power Passthrough, max ⁽²⁾	9.95 A @ 10...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw.	
Power dissipation, max	2.4 W
Thermal dissipation, max	8.1 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type No isolation between SA power and input ports No isolation between individual input ports
Module keying	Electronic, module keying, software configurable
Indicators	1 green/red module status indicator 6 yellow/red I/O status indicators
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

General Specifications - 5069-IB6F-3W

Attribute	5069-IB6F-3W
RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire category ⁽³⁾	<p>2 - input ports 2 - power ports 1 wire per terminal for each signal port</p>
Wire size	
5069-RTB18-SPRING removable terminal block	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.
5069-RTB18-SCREW removable terminal block	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.)
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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). **Environmental Specifications - 5069-IB6F-3W**

Attribute	5069-IB6F-3W
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0...60 °C (32...140 °F)
Temperature, surrounding air, maximum	60 °C (140 °F)

Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
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Environmental Specifications - 5069-IB6F-3W

Attribute	5069-IB6F-3W
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharge 8 kV air discharge
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on input ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on input ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

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. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety RequirementsEuropean Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions

Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-OA16 Digital 16-point 120/240V AC Output Module

The following figure shows a wiring diagram for the 5069-OA16 module.

5069-OA16 Wiring Diagram

Channel Connections

The diagram shows devices that are connected to channels 0, 4, 8, and 12. You aren't restricted to using only those channels. You can connect devices to any channel or combination of channels as needed.

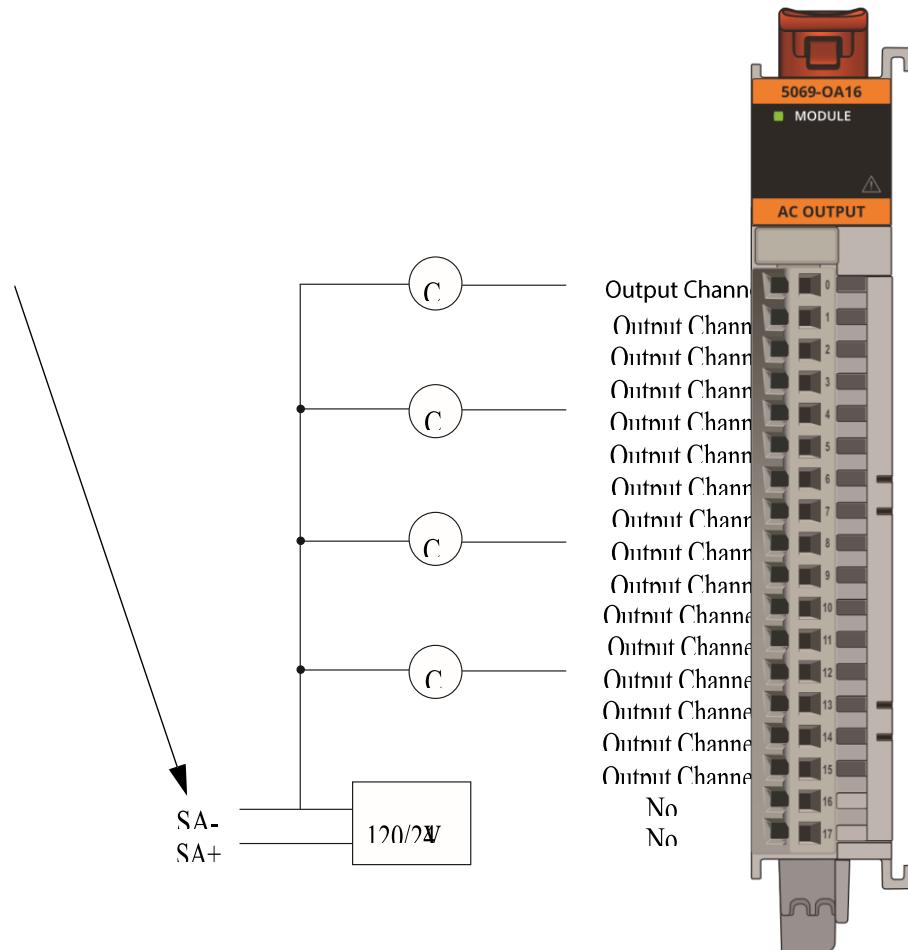
SA Power

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

- CompactLogix 5380 controller
- CompactLogix 5480 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP adapter
- 5069-FPD field potential distributor

IMPORTANT: The 5069-OA16 module uses AC SA power. You must connect AC power to the component, that is,

CompactLogix 5380 controller, adapter, or field potential distributor, that provides SA power to the module. If you install a **5069-OA16 module as a local I/O module in a Compact GuardLogix 5380 controller system**, you must install a field potential distributor that has AC power that is connected to



it and install the 5069-OA16 module next to it. You cannot install modules that draw AC

SA power next to a

Compact GuardLogix 5380 controller. Compact GuardLogix 5380 controllers do not support AC power on their SA power RTBs.

- The 5069-OA16 module outputs use a shared common. The outputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB.
- If you install modules in a 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 system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

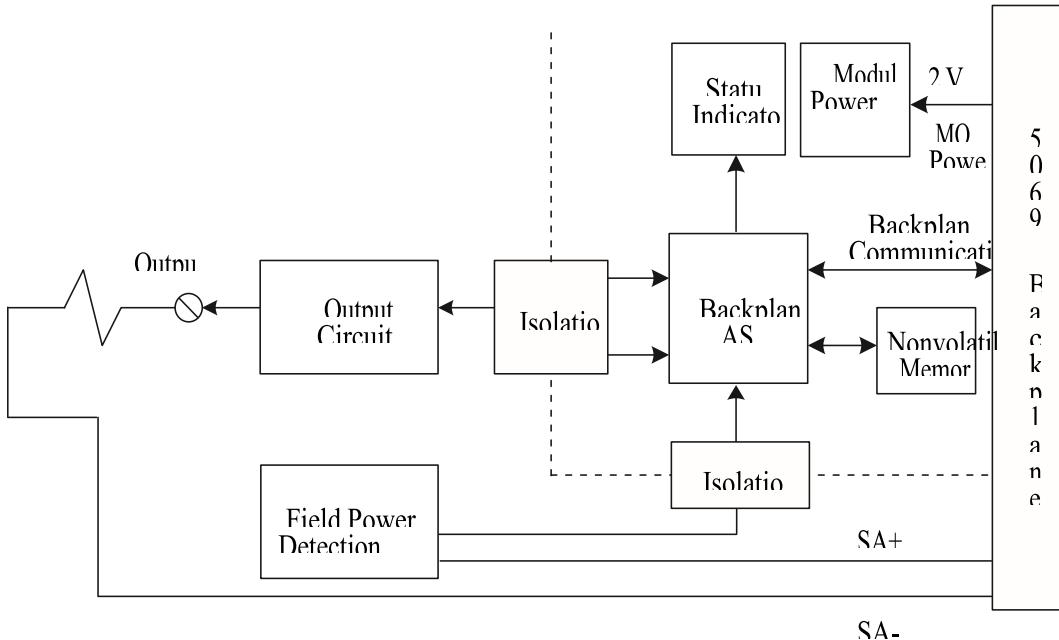
1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA power bus.

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 AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-OA16 module.

5069-OA16 Functional Block Diagram



Technical Specifications - 5069-OA16

Attribute	5069-OA16
On-state voltage, min	85V AC
On-state voltage, nom	120/240V AC
On-state voltage, max	264V AC

On-state voltage drop, max	1.5V AC @ 0.5 A
Output current per channel, max	0.5 A
Output current per module, max	4 A
Off-state leakage current, max ⁽¹⁾	1 mA
Surge current per point	5 A max for 25 ms per point, repeatable every 2 s
Output delay time (backplane to screw)	
Off to On	1/2 cycle time (typ) @ 0...60 °C (32...140 °F)
On to Off	1/2 cycle time (typ) @ 0...60 °C (32...140 °F)
Field power loss detection	Yes
No load detection diagnostics	Not supported
Output short circuit/overload/overtemp detection	Not supported
Output short circuit/overload protection	Not supported
Reverse polarity protection	Not supported
Oversupply protections, max	Not supported
Scheduled outputs	Not supported
Pilot duty rating	Resistive/General Pilot Duty 0.5 A pilot duty
Output control in fault state per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)

Technical Specifications - 5069-OA16

Attribute	5069-OA16
Output states in program mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default)

(1) Recommended Loading Resistor - To limit the effects of leakage current through solid-state outputs, you can connect a loading resistor in parallel with your load. For 120V AC operation, use a 15 KΩ, 2 W resistor. For 240V AC operation, use a 15 KΩ, 5 W resistor.

General Specifications - 5069-OA16

Attribute	5069-OA16
Number of outputs	16 (One group of 16)
Voltage category	120/240V AC
Voltage and current ratings	
Output voltage range	85...264V AC
Output voltage frequency	47...63 Hz
Mod power	100 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA Power	4 A @ 85...264V AC

SA Power Passthrough, max ⁽²⁾	9.975 A @ 85...264V AC
Do not exceed 10 A MOD or SA power (Passthrough) current draw.	
The 5069-OA16 module complies to ATEX/IECEx when used at or below 125V AC.	
Power dissipation, max	3.4 W
Thermal dissipation, max	11.6 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1800V AC for 60 s No isolation between individual channels
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 16 yellow/red I/O status indicators
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>

General Specifications - 5069-OA16

Attribute	5069-OA16
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire category	2 - output ports 2 - power ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SCREW connections	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.
5069-RTB18-SPRING connections	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.
Insulation-stripping length	
5069-RTB18-SPRING connections	10 mm (0.39 in.)
5069-RTB18-SCREW connections	12 mm (0.47 in.)
Weight, approx	175 g (0.39 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#),

CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

Environmental Specifications - 5069-OA16

Attribute	5069-OA16
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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g

Environmental Specifications - 5069-OA16

Attribute	5069-OA16
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±4 kV @ 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Corrosion resistance classification	ISA S71.04 G2

Certifications - 5069-OA16

Certification⁽¹⁾	5069-OA16
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. 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	<p>European Union 2014/30/EU EMC Directive, compliant with:</p> <ul style="list-style-type: none"> EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) <p>European Union 2014/35/EU LVD, compliant with:</p> <ul style="list-style-type: none"> EN 61010-2-201; Control Equipment Safety Requirements <p>European Union 2011/65/EU RoHS, compliant with:</p> <ul style="list-style-type: none"> EN 50581; Technical documentation
RCM	<p>Australian Radiocommunications Act, compliant with:</p> <ul style="list-style-type: none"> EN 61000-6-4; Industrial Emissions
Ex	<p>European Union 2014/34/EU ATEX Directive, compliant with:</p> <ul style="list-style-type: none"> EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc DEMKO 15 ATEX 1484X <p>When used at or below 125V DC or 30V DC</p>
IECEx	<p>IECEx System, compliant with:</p> <ul style="list-style-type: none"> IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc IECEx UL 15.0055X
KC	<p>Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3</p>
EAC	<p>Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation</p>

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

5069-OB8 Digital 8-point 24V DC Output Module

The following figure shows a wiring diagram for the 5069-OB8 module.

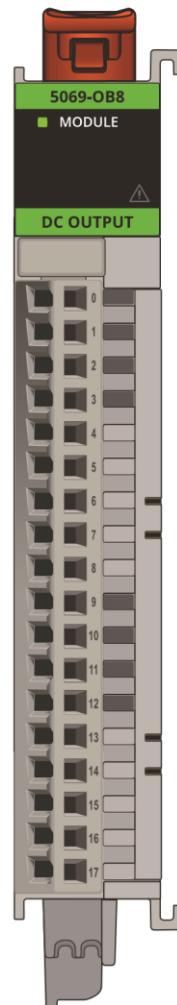
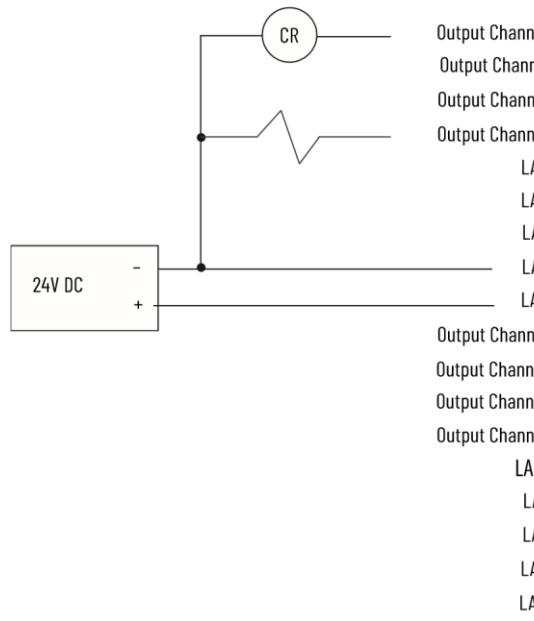
5069-OB8 Wiring Diagram

Channel Connections

The diagram shows devices that are connected to channels 0 and 3. You aren't restricted to using only those channels. You can connect devices to any channel or combination of channels as needed.

LA Power

The Local Actuator (LA+ and LA-) connections are used to supply field-side power to the module. Output channels 0...3 use LA0 +/-, and output channels 4...7 use LA1 +/-.



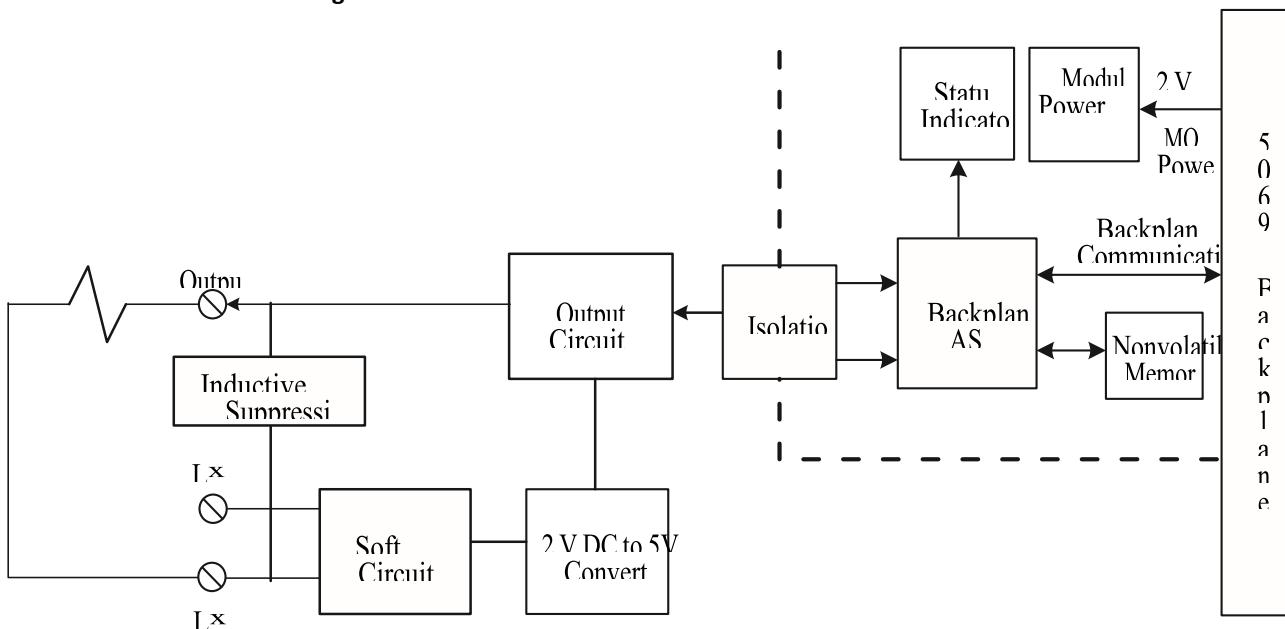
The 5069-OB8 module **does not draw current from the SA power bus**.

Still, the module is a DC-type module, and you must install it on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.
 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 AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-OB8 module.

5069-OB8 Functional Block Diagram



Technical Specifications - 5069-OB8

Attribute	5069-OB8
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⁾	0.25V DC
Off-state voltage, max ⁽¹⁾	< 10V DC
Off-state voltage, max ⁽¹⁾	5V DC
On-state current per channel, min ⁽¹⁾	1 mA
Off-state leakage current per point, max ⁽²⁾	0.5 mA
Output current per channel, max	2 A
Output current per group, max	8 A
Output current per module, max	16 A
Surge current per point	4 A max for 10 ms per point, repeatable every 2 s
Output delay time (backplane to screw)	
Off to On	≤ 100 µs @ 25 °C (77 °F) @ 2 A
On to Off	≤ 100 µs @ 25 °C (77 °F) @ 2 A
Pulse width, min	≤ 200 µs T _{on} min + T _{off} min @ 2 A @ 25 °C (77 °F)
Output drift over temperature span	±100 ns/°C (55.6 n/°F) from 0...60 °C (32...140 °F) @ 2 A
Field power loss detection	Yes
No 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 rating	Resistive/General Pilot Duty 2 A pilot duty
Output control in fault state per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)

Technical Specifications - 5069-OB8

Attribute	5069-OB8
Output states in program mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default)

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

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

General Specifications - 5069-OB8

Attribute	5069-OB8
Number of outputs	8 (Two groups of 4)
Voltage category	24V DC
Voltage and current ratings	
Output voltage range	10...32V DC
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
LA Power	2 A per channel @ 10...32V DC 8 A per group @ 10...32V DC 16 A per module @ 10...32V DC
SA Power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 10...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw.	
Power dissipation, max	3.2 W
Thermal dissipation, max	10.9 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1800V AC for 60 s No isolation between LA power and output ports No isolation between individual output ports
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 8 yellow/red I/O status indicators
Slot width	1
Dimensions (HxWxD)	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>
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General Specifications - 5069-OB8

Attribute	5069-OB8
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire category	<p>2 - output ports 2 - power ports 1 wire per terminal for each signal port</p>
Wire size	
5069-RTB18-SPRING connections	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.
5069-RTB18-SCREW connections	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.)
5069-RTB18-SCREW connections	12 mm (0.47 in.)
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
Weight, approx	175 g (0.39 lb)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

Environmental Specifications - 5069-OB8

Attribute	5069-OB8
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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)

Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz

Environmental Specifications - 5069-OB8

Attribute	5069-OB8
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±4 kV @ 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Corrosion resistance classification	ISA S71.04 G2

Certifications - 5069-OB8

Certification ⁽¹⁾	5069-OB8
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc

	<ul style="list-style-type: none"> • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-OB16, 5069-OB16K, and 5069-OB16F Digital 16-point Sourcing Output Modules

The following figure shows a wiring diagram for the 5069-OB16, 5069-OB16K, and 5069-OB16F modules.

5069-OB16, 5069-OB16K, and 5069-OB16F Wiring Diagram

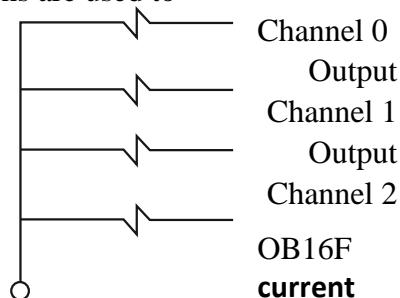
Channel Connections

The diagram shows devices that are connected to channels 0, 2, 4, and 6. You aren't restricted to using only those channels.

You can connect devices to any channel or combination of channels as needed.

LA Power

The Local Actuator (LA+ and LA-) connections are used to supply field-side power to the module. Output

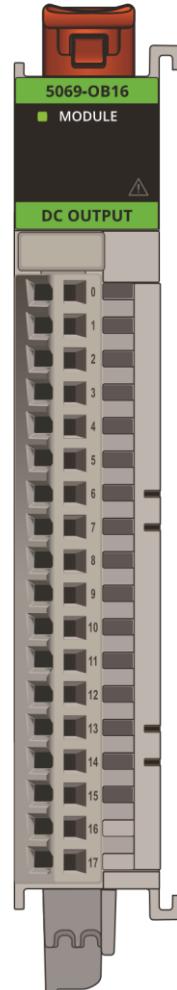
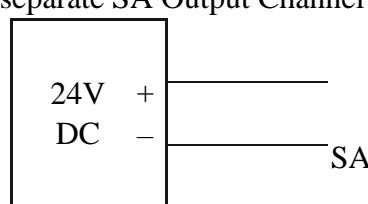


The 5069-OB16, 5069-OB16K, and 5069-OB16F modules **do** draw current from the SA power bus. Output Channel 4

Still, the modules are DC type modules, and you must install Output Channel 5 them on a DC SA power bus.

Output Channel 6 • If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA Output Channel 7 power buses. Output Channel 8

- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system.



Output Channel 10 buses are isolated from each other. To keep the modules on separate SA power buses, complete these Output Channel 11 steps.

Output Channel 12

1. Install the modules that use one type of SA power, for Output Channel 13 example DC, 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.LA+

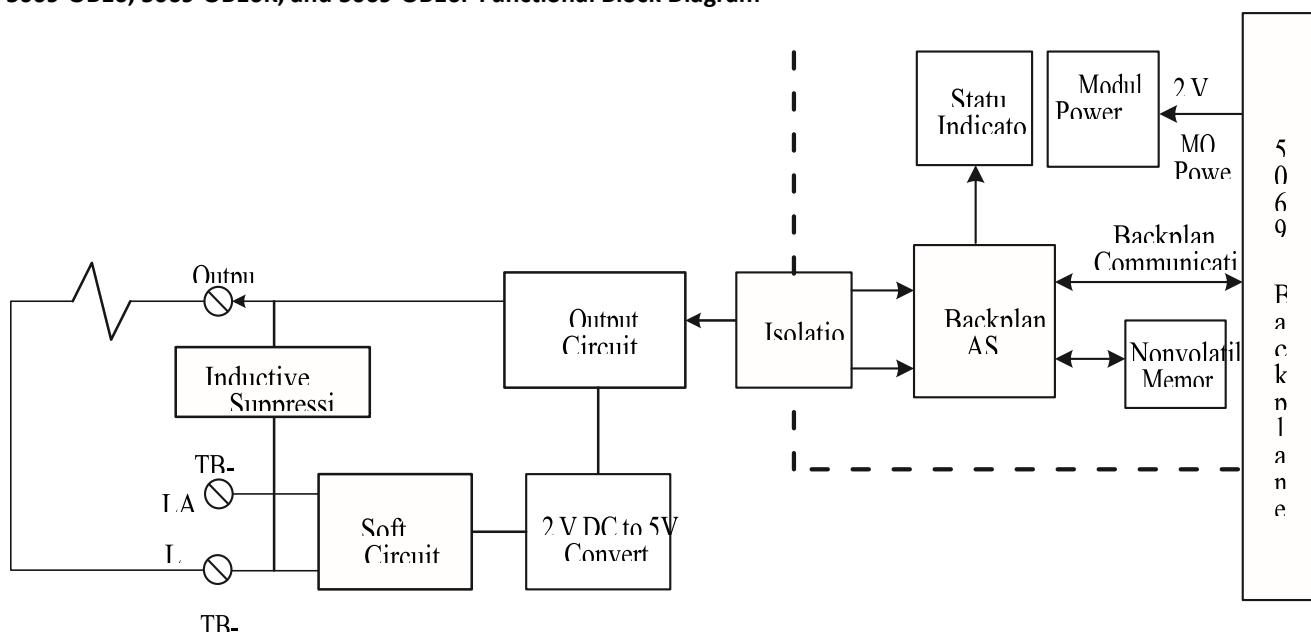
3. Install the modules that use the other type of SA LApower, for example AC, on the second SA power bus. **IMPORTANT:** The 5069-OB16K and 5069-OB16K modules are wired the same as the wiring diagram that is shown for the 5069-OB16 module.

Output Channel 14

Output Channel 15

The following figure shows a functional block diagram for the 5069-OB16, 5069-OB16K, and 5069-OB16F modules.

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



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

Attribute	5069-OB16, 5069-OB16K	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⁾	1 mA	
Off-state voltage, max ⁽¹⁾	5V DC with 1 mA min load	
Off-state leakage current per point, max ⁽²⁾	< 0.5 mA per point	

Output current rating	0.5 A resistive per channel @ 10...32V DC 8 A resistive per module @ 10...32V DC, max	
Surge current per point	1 A max for 10 ms per point, repeatable every 2 s	
Output delay time (backplane to screw)		
Off to On	$\leq 100 \mu\text{s}, \pm 10 \mu\text{s} @ 25^\circ\text{C} (77^\circ\text{F}) @ 0.5 \text{ A}$	$10 \mu\text{s}, \pm 1 \mu\text{s} @ 25^\circ\text{C} (77^\circ\text{F}) @ 0.5 \text{ A}$
On to Off	$\leq 100 \mu\text{s}, \pm 10 \mu\text{s} @ 25^\circ\text{C} (77^\circ\text{F}) @ 0.5 \text{ A}$	$10 \mu\text{s}, \pm 1 \mu\text{s} @ 25^\circ\text{C} (77^\circ\text{F}) @ 0.5 \text{ A}$
Pulse width, min	$200 \mu\text{s} @ 0.5 \text{ A} @ 25^\circ\text{C} (77^\circ\text{F})$	$20 \mu\text{s} @ 0.5 \text{ A} @ 25^\circ\text{C} (77^\circ\text{F})$
Output drift over temperature span	$\pm 100 \text{ ns}/^\circ\text{C} (55.6 \text{ ns}/^\circ\text{F})$ from 0...60 °C (32...140 °F) @ 0.5 A	$\pm 10 \text{ ns}/^\circ\text{C} (5.56 \text{ ns}/^\circ\text{F})$ from 0...60 °C (32...140 °F) @ 0.5 A
Field power loss detection ⁽³⁾	Yes	

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

Attribute	5069-OB16, 5069-OB16K	5069-OB16F
No 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 rating	0.5 A pilot duty rating per channel @ 10...32V DC	
Output control in fault state per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default) 	
Output states in program mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default) 	
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default) 	
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default) 	
Scheduled outputs	Not supported	$\pm 10 \mu\text{s}$ accuracy 1 ns resolution

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

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

(3) Supported only on Series B hardware.

General Specifications - 5069-OB16, 5069-OB16K, and 5069-OB16F

Attribute	5069-OB16, 5069-OB16K	5069-OB16F
Outputs	16 Channels (1 group of 16), sourcing	
Voltage category	12/24V DC source	
Voltage and current ratings		
Mod power	75 mA @ 18...32V DC	
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC	
LA Power	0.5 A per channel @ 10...32V DC 8 A per module @ 10...32V DC	
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 10...32V DC	
Do not exceed 10 A MOD or SA power (Passthrough) current draw		
Power dissipation, max	3.25 W (16 channels @ 0.5 A)	
Thermal dissipation, max	11.09 BTU/hr	

General Specifications - 5069-OB16, 5069-OB16K, and 5069-OB16F

Attribute	5069-OB16, 5069-OB16K	5069-OB16F
Isolation voltage		250V (continuous), Basic Insulation Type No isolation between LA power and output ports No isolation between individual output ports
Module keying		Electronic, module keying, software configurable
Indicators		1 green/red module status indicator 16 yellow/red I/O status indicators
Slot width		1
Dimensions (HxWxD), approx		144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail		Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB		One of these RTB types. <ul style="list-style-type: none"> • 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.
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)	
RTB keying	None	
Wire category ⁽³⁾		2 - output ports 2 - power ports 1 wire per terminal for each signal port
Wire size		
5069-RTB18-SPRING removable terminal block	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	
5069-RTB18-SCREW removable terminal block	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 connections	10 mm (0.39 in.)	

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 temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

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

Environmental Specifications - 5069-OB16, 5069-OB16K, and 5069-OB16F

Attribute	5069-OB16, 5069-OB16K, 5069-OB16F
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0...60 °C (32...140 °F)
Temperature, surrounding air, maximum	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges

Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on output ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on output ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

Certifications - 5069-OB16, 5069-OB16K, and 5069-OB16F

Certification⁽¹⁾	5069-OB16, 5069-OB16K, 5069-OB16F
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)European Union 2014/35/EU, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety RequirementsEuropean Union 2011/65/EU RoHS, compliant with: • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(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

The following figure shows a wiring diagram for the 5069-OW4I module.

5069-OW4I Wiring Diagram

Channel Connections

The diagram shows a device that is connected to channel 0.

You aren't restricted to using only this channel. You can connect devices to any channel or combination of channels as needed.

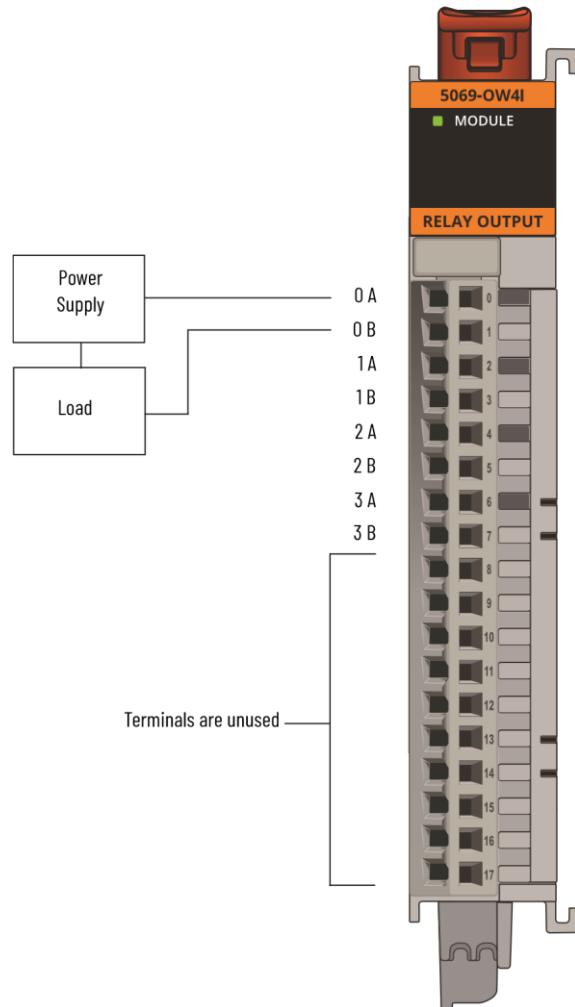
SA Power

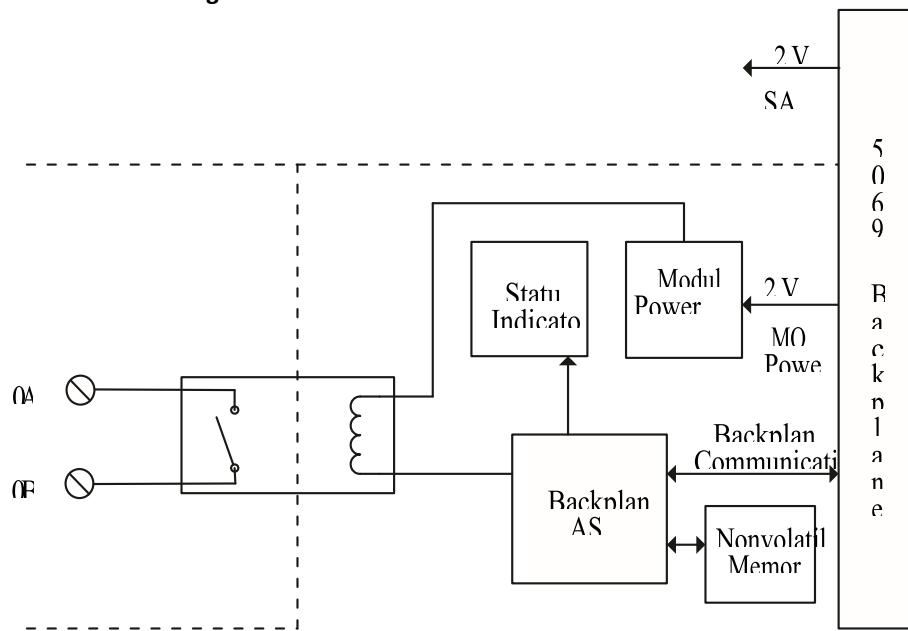
The 5069-OW4I module **does not draw current from the SA power bus**.

Still, the module is a DC-type module, and you must install it on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.
 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 AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-OW4I module.



5069-OW4I Functional Block Diagram**Technical Specifications - 5069-OW4I**

Attribute	5069-OW4I
Relay rating ⁽¹⁾	2 A resistive per channel @ 5...30V DC 2 A resistive per channel @ 5...264V AC, 50/60 Hz 2 A general use per channel @ 5...250V AC, 50/60 Hz 2 A @ 5...125V AC, ATEX/IECEx 8 A per module, max
Off-state leakage	0 mA (dry contact, no onboard snubbers)
Output current rating, max	2 A per channel 8 A per module
Output delay time, max	
Off to On	10 ms
On to Off	10 ms
Switching frequency	1 operation every 3 seconds (0.3 Hz at rated load)
Initial contact resistance, max	30 mΩ
Bounce time, mean	500 µs
Output control in fault state per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)
Output states in program mode per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default)

Delay to fault	Supported
Technical Specifications - 5069-OW4I	
Attribute	5069-OW4I
Fusing	Outputs aren't fused.
Minimum load current	1 mA
Expected contact life	300K cycles resistive, 100K cycles inductive
Pilot duty rating	5...240V AC, 50/60 Hz, C300 pilot duty per channel 5...125V DC, R150 pilot duty per channel

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

Relay Contact Ratings - 5069-OW4I

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

(1) Calculated based on the Rockwell Automation® component derating guideline: 90% of rated contact current, that is, 0.3 A at 125V DC.

(2) For DC voltage applications, the make/break ampere rating for relay contacts is determined by dividing 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

General Specifications - 5069-OW4I

Attribute	5069-OW4I
Outputs	4 - Form A (normally open)
Voltage and current ratings	
Output voltage range	5...125V DC 5...264V AC
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 0...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	2.3 W
Thermal dissipation, max	7.85 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type
Module keying	Electronic keying via programming software
Slot width	1

Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N•m (3.5 lb•in)
RTB keying	None
Indicators	1 green/red module status indicator 4 yellow/red I/O status indicators

General Specifications - 5069-OW4I

Attribute	5069-OW4I
Wire category ⁽³⁾	1- relay ports 2- power ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SPRING removable terminal block	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 Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
5069-RTB18-SCREW removable terminal block	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 Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
Insulation-stripping length	
5069-RTB18-SPRING connections	10 mm (0.39 in.)
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 temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). **Environmental Specifications - 5069-OW4I**

Attribute	5069-OW4I
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz

Environmental Specifications - 5069-OW4I

Attribute	5069-OW4I
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±4 kV @ 5 kHz on relay ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on relay ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

Certifications - 5069-OW4I

Certification⁽¹⁾	5069-OW4I
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584.

	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	<p>European Union 2014/30/EU EMC Directive, compliant with:</p> <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) <p>European Union 2014/35/EU LVD, compliant with:</p> <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements <p>European Union 2011/65/EU RoHS, compliant with:</p> <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	<p>European Union 2014/34/EU ATEX Directive, compliant with:</p> <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • DEMKO 15 ATEX 1484X <p>When used at or below 125V DC or 30V DC</p>
IECEx	<p>IECEx System, compliant with:</p> <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • IECEx UL 15.0055X <p>When used at or below 125V DC or 30V DC</p>
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-OW16 Digital 16-point Relay Output Module

The following figure shows a wiring diagram for the 5069-OW16 module.

5069-OW16 Wiring Diagram

The 5069-OW16 module **requires SA power** to function. The module is a DC-type module, so you must install it on an SA power bus that uses DC-type power.

You can connect AC-type devices, DC-type devices, or, as shown below, a combination of the two types to the module. Because the module has two commons, each shared across a set of eight output channels, make sure that you do not connect devices of different power types to the same set of commons. For example, you cannot connect a device that uses AC-type power to output channel 0 and a device that uses DC-type power to output channel 1.

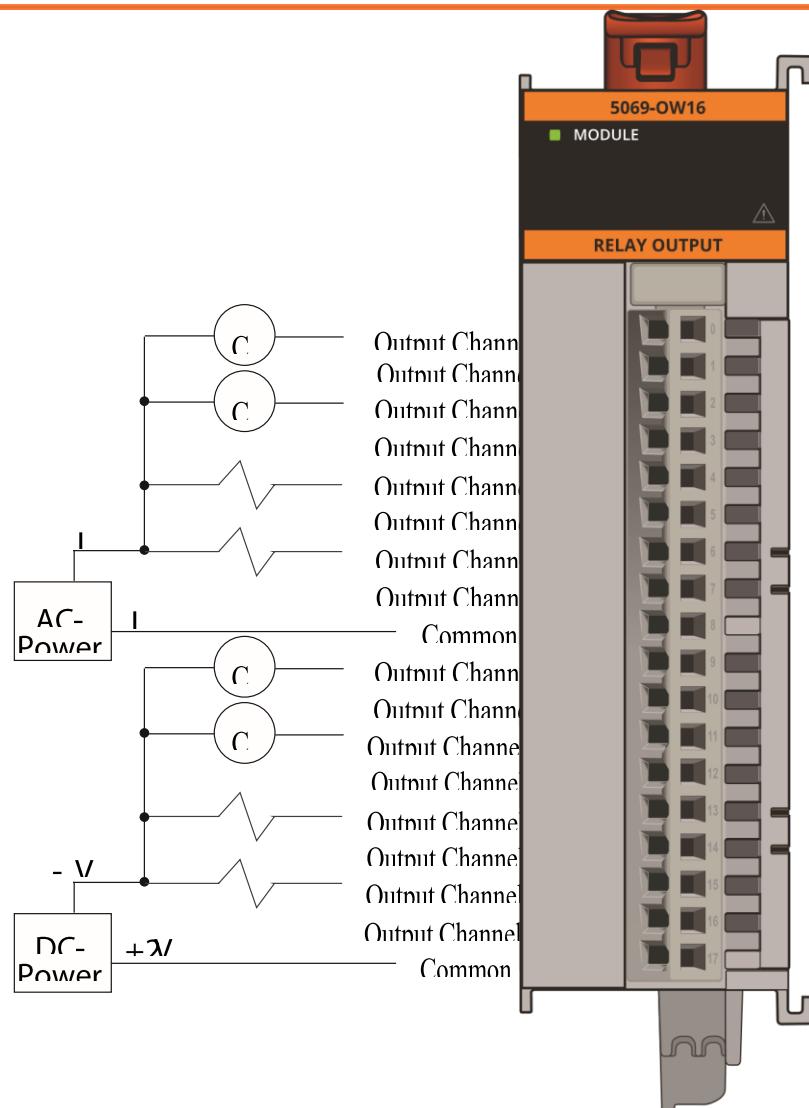
Channel Connections

The example shows devices connected to channels 0, 2, 4, 6, 8, 10, 12, and 14. You aren't restricted to using only those channels. You can connect devices to any channel or combination of channels as needed.

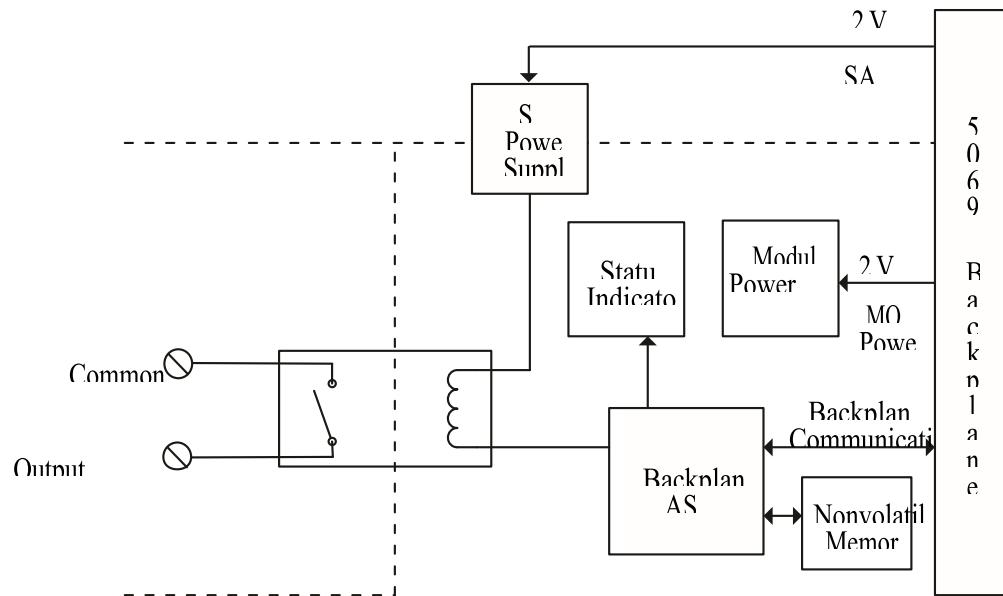
SA Power

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

- CompactLogix 5380 controller
 - Compact GuardLogix 5380 controller
 - CompactLogix 5480 controller
 - 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
 - 5069-FPD field potential distributor
- IMPORTANT:** Remember the following:
- The 5069-OW16 module requires DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the module.
 - If you install modules in a system that uses AC SA power and DC SA power, you must install them on separate SA power buses.



The following figure shows a functional block diagram for the 5069-OW16 module.

5069-OW16 Functional Block Diagram**Technical Specifications - 5069-OW16**

Attribute	5069-OW16
Relay ratings ⁽¹⁾	2 A resistive per channel @ 5...30V DC 2 A resistive per channel @ 5...264V AC, 50/60 Hz 2 A general use per channel @ 5...250V AC, 50/60 Hz 2 A @ 5...125V AC, ATEX/IECEx
Off-state leakage current per point, max	0 mA (dry contact, no onboard snubbers)
Output current per group, max	8 A
Output current per module, max	16 A
Output delay time, max	
Off to On	10 ms
On to Off	10 ms
Switching frequency	1 operation every 3 seconds (0.3 Hz at rated load)
Initial contact resistance, max	30 mΩ
Bounce time, mean	500 µs
Delay to fault	Supported
Fusing	Outputs aren't fused
Minimum load current	1 mA
Expected contact life	300K cycles resistive, 100K cycles inductive
Pilot duty rating	5...240V AC, 50/60 Hz, C300 pilot duty per channel 5...125V DC, R150 pilot duty per channel
Output control in fault state per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)

Technical Specifications - 5069-OW16

Attribute	5069-OW16
Output states in program mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)

Duration of fault mode per point	<ul style="list-style-type: none"> • 1 • 2 • 5 • 10 s • Forever (default)
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(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](#).

Relay Contact Ratings - 5069-OW16

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

(1) Calculated based on the Rockwell Automation component derating guideline: 90% of rated contact current, that is, 0.3 A at 125V DC.

(2) For DC voltage applications, the make/break ampere rating for relay contacts is determined by dividing 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

General Specifications - 5069-OW16

Attribute	5069-OW16
Outputs	16 (Two groups of 8) - Form A (normally open)
Voltage and current ratings	
Output voltage range	5...125V DC 5...264V AC
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	150 mA @ 18...32V DC
SA power Passthrough, max ⁽²⁾	9.95 A @ 18...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw. The 5069-OW16 module complies with ATEX/IECEx when used at or below 125V AC or 30V DC.	
Power dissipation, max	3.0 W
Thermal dissipation, max	10.2 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1800V AC for 60 s No isolation between individual channels
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 16 yellow/red I/O status indicators
Slot width	1.5
Dimensions (HxWxD), approx	144.57 x 36 x 105.42 mm (5.69 x 1.42 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

General Specifications - 5069-OW16

Attribute	5069-OW16
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RTB	<p>One of these RTB types.</p> <ul style="list-style-type: none"> • 5069-RTB18-SPRING RTB • 5069-RTB18-SCREW RTB <p>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.</p>
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire category ⁽³⁾	<p>1- relay ports 2- power ports 1 wire per terminal for each signal port</p>
Wire size	
5069-RTB18-SPRING connections	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. Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
5069-RTB18-SCREW connections	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. Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
Insulation-stripping length	
5069-RTB18-SPRING connections	10 mm (0.39 in.)
5069-RTB18-SCREW connections	12 mm (0.47 in.)
Weight, approx	240 g (0.53 lb.)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1. Environmental Specifications - 5069-OW16](#)

Attribute	5069-OW16
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 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)

Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g

Environmental Specifications - 5069-OW16

Attribute	5069-OW16
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on relay ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on relay ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Corrosion resistance classification	ISA S71.04 G2

Certifications - 5069-OW16

Certification ⁽¹⁾	5069-OW16
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> • EN 61000-6-4; Industrial Emissions

Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • DEMKO 15 ATEX 1484X When used at or below 125V DC or 30V DC
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • IECEx UL 15.0055X When used at or below 125V DC or 30V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(1) 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

The following figure shows a wiring diagram for the 5069-OX4I module.

5069-OX4I Wiring Diagram

Channel Connections

The diagram shows devices that are connected to channels 0 and 1. You aren't restricted to using only those channels. You can connect devices to any channel or combination of channels as needed.

SA Power

The 5069-OX4I module **does not draw current from the SA power bus**.

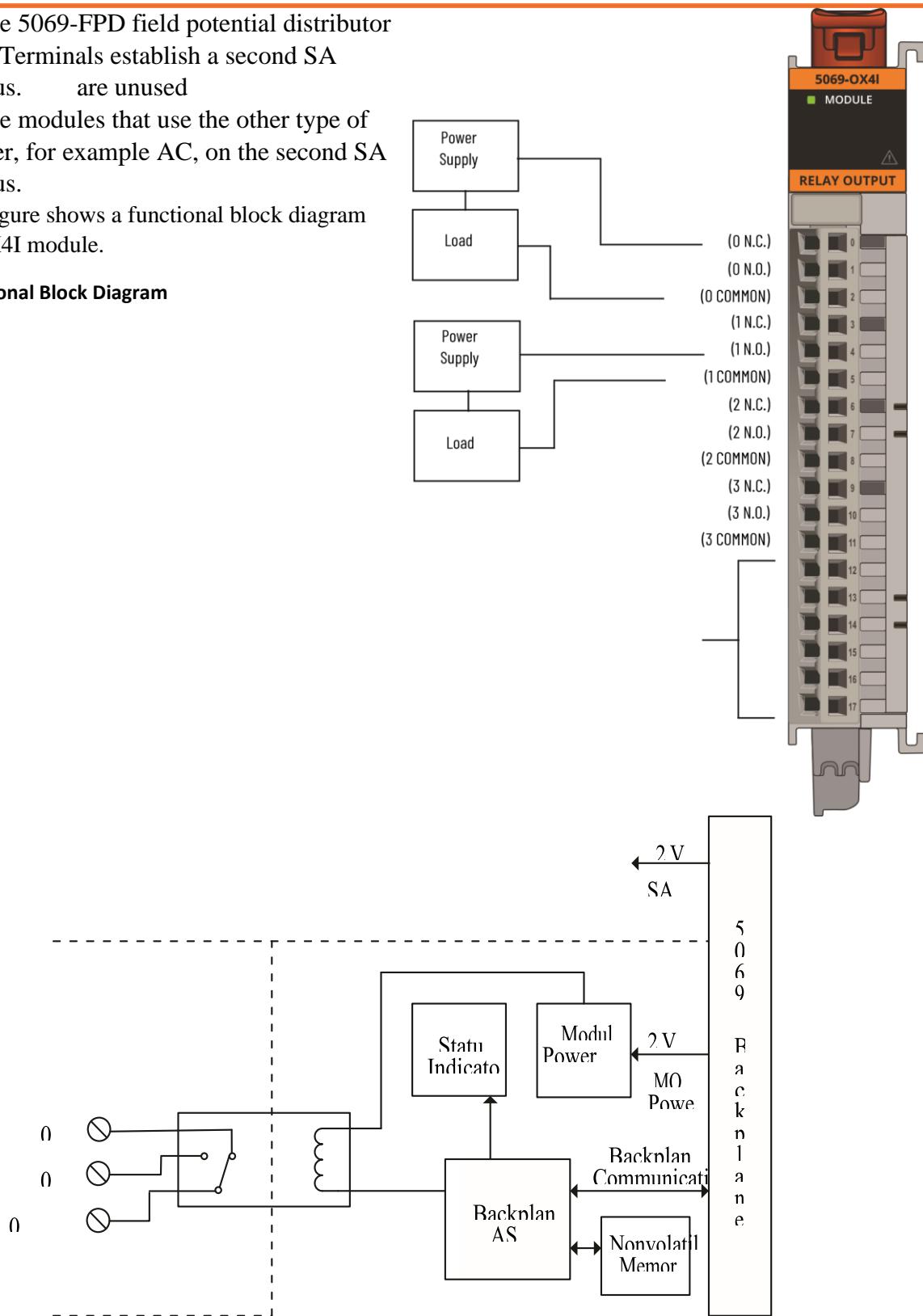
Still, the module is a DC-type module, and you must install it on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.

2. Install the 5069-FPD field potential distributor to terminals establish a second SA power bus. Terminals are unused
3. Install the modules that use the other type of SA power, for example AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-OX4I module.

5069-OX4I Functional Block Diagram



Technical Specifications - 5069-OX4I

Attribute	5069-OX4I
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Contact current rating ⁽¹⁾	2 A resistive per channel @ 5...30V DC 2 A resistive per channel @ 5...264V AC, 50/60 Hz 2 A general use per channel @ 5...250V AC, 50/60 Hz 2 A @ 5...125V AC, ATEX/IECEx 8 A per module, max
Off-state leakage	0 mA (dry contact, no onboard snubbers)
Output current rating	2 A per channel 8 A per module, max
Output delay time, max	
Off to On	15 ms
On to Off	15 ms
Switching frequency	1 operation every 3 seconds (.3 Hz at rated load)
Initial contact resistance, max	30 mΩ
Bounce time, mean	500 µs
Output control in fault state per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)
Output states in program mode per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)

Technical Specifications - 5069-OX4I

Attribute	5069-OX4I
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default)
Delay to fault	Supported
Fusing	Outputs aren't 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 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](#).

Relay Contact Ratings - 5069-OX4I

Volts, max	Continuous Amps per Point, max	Amperes		Voltamperes		NEMA ICS 2-125
		Make	Break	Make	Break	
240V AC	2 A	7.5 A	0.75 A	1800VA	180VA	C300
125V DC	0.225 A ⁽¹⁾	0.22 A ⁽²⁾		28VA		R150

24V DC	2.0 A	1.16 A ⁽²⁾	28VA	-
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- (1) Calculated based on the Rockwell Automation component derating guideline: 90% of rated contact current, that is, 0.25 A at 125V DC.
- (2) For DC voltage applications, the make/break ampere rating for relay contacts is determined by dividing 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A.

General Specifications - 5069-OX4I

Attribute	5069-OX4I
Outputs	4 - Form C (SPDT)
Voltage and current ratings	
Output voltage range	5...125V DC 5...264V AC
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 0...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	2.6 W
Thermal dissipation, max	8.88 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type
Module keying	Electronic keying via programming software
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.

General Specifications - 5069-OX4I

Attribute	5069-OX4I
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N•m (3.5 lb•in)
RTB keying	None
Indicators	1 green/red module status indicator 4 yellow/red I/O status indicators
Wire category ⁽³⁾	1- relay ports 2- power ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SPRING removable terminal block	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

	Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
5069-RTB18-SCREW removable terminal block	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 Use minimum 18 AWG, 105 °C (221 °F) rated wire for load connections to relay output modules.
Insulation-stripping length	
5069-RTB18-SPRING connections	10 mm (0.39 in.)
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 temp code	T4
IECEx temp code	T4

- (1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1. Environmental Specifications - 5069-OX4I](#)

Attribute	5069-OX4I
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)

Environmental Specifications - 5069-OX4I

Attribute	5069-OX4I
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat):	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz

Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±4 kV @ 5 kHz on relay ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on relay ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

Certifications - 5069-OX4I

Certification ⁽¹⁾	5069-OX4I
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • DEMKO 15 ATEX 1484X When used at or below 125V DC or 30V DC
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA nC IIC T4 Gc • IECEx UL 15.0055X When used at or below 125V DC or 30V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
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(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.	Description	Page
Analog input	5069-IF8	8-channel current/voltage input module	50
	5069-IY4	4-channel current/voltage/RTD/Thermocouple input module	58
	5069-IY4K	4-channel conformal coated current/voltage/RTD/Thermocouple input module	
Analog output	5069-OF4	4-channel current/voltage output module	73
	5069-OF4K	4-channel conformal coated current/voltage output module	
	5069-OF8	8-channel current/voltage output module	

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

The following table lists the devices that are supported with the 5069-IF8 module.

Device	Mode(s) ⁽¹⁾	Supported	Wiring Diagram Example
2-wire analog device 4-wire analog device ⁽²⁾	Current	Yes	page 51
	Voltage		page 52
	Combination of current and voltage	Yes	page 53
1-wire analog device 3-wire analog device	N/A - These devices aren't supported regardless of the channel mode configuration.	No	—
2-wire Thermocouple device			
2-wire RTD device 3-wire RTD device			

(1) Make sure that the channel configuration in your Logix Designer application project matches the input device type that is connected to the channel. You choose the input type in the Channels category on the Module Properties dialog box. For example, if a current input device is connected to channel 0 on the module, the module configuration for channel must be Input Type = Current.

(2) These devices are 2-wire current and voltage devices with 2-wire sensor power connections.

The following figure shows a wiring diagram for the 5069-IF8 module with channels configured for current mode.

5069-IF8 Wiring Diagram - Current Mode

Channel Connections

The diagram shows devices that are connected to channels 0, 2, 5, and 7. You aren't restricted to using only this channel. You can connect devices to any channel or combination of channels as needed.

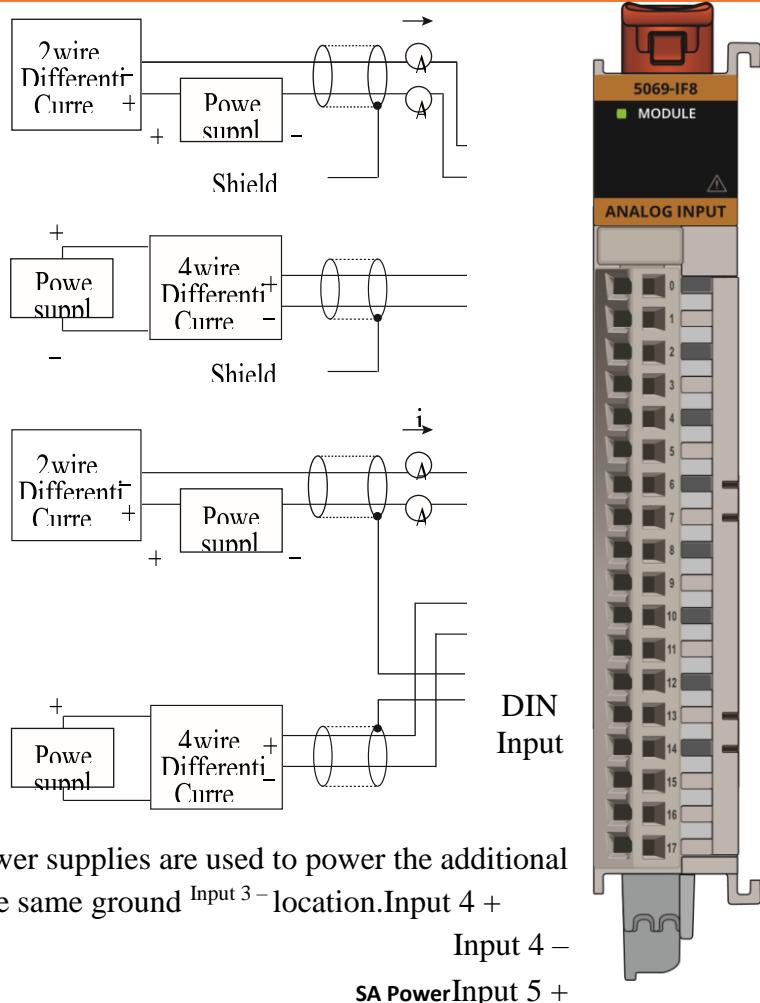
IMPORTANT: Remember the following:

- Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.
- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module. Input 0 +
- This module has only two shield terminals. Compact 5000 I/O Input 0 – module RTBs only support one wire per terminal.

Input 1 + • If you connect more than two devices to the module, you can ground two devices at the shield terminals. ^{Input 1 –}

You must ground the remaining devices somewhere else, such Input 2 + as, to the rail via a terminal strip. In this case, use the 2 – same power supply to power the additional devices. If

Input 3 + separate power supplies are used to power the additional devices, ground the power supplies at the same ground ^{Input 3 –} location. **Input 4 +**



Connections to an external power supply that provides SA power

Input 5 –

are made via the SA power RTB on one of the following:

Input 6 +

- CompactLogix 5380 controller
- Compact GuardLogix 5380 controller
- CompactLogix 5480 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter

Input 7 –

- 5069-FPD field potential distributor

IMPORTANT: Remember the following.

- The 5069-IF8 module uses DC SA power. You must connect DC Shield power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.

- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

1. 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.

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 AC, on the second SA power bus.

The following figure shows a wiring diagram for the 5069-IF8 module with channels configured for voltage mode.

5069-IF8 Wiring Diagram - Voltage Mode

Channel Connections

The diagram shows devices that are connected to channels 0, 2, 5,

and 7. You aren't restricted to using only this channel. Input 0 + You can connect devices

the system and to power external devices that are to any channel or combination of Input 0 – channels as needed.

IMPORTANT: Remember the following:

- Use separate external power supplies to provide SA power to

to the module.

Input 4 +

- This module has only two shield terminals.

Compact 5000 I/O + Input 4 – module RTBs only support one wire per terminal.

Input 5 +

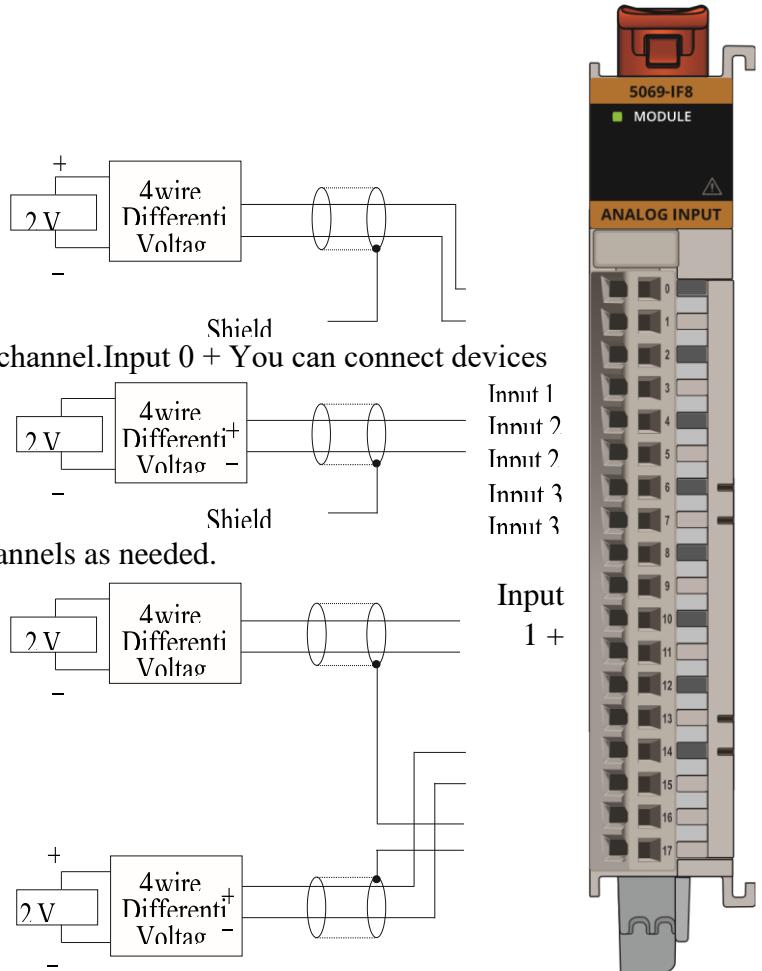
If you connect more than two devices to the module, you can ground two devices at the shield terminals. Input 5 –

You must ground the remaining devices somewhere else, such Input 6 + as, to the DIN rail via a terminal strip. In this case, use the Input 6 – same power supply to power the additional devices. If

Input 7 + separate power supplies are used to power the additional devices, ground the power supplies at the same ground location. Shield

Shield

The following figure shows a wiring diagram for the 5069-IF8 module with different device types connected to different channels. The device type and mode configuration for each channel must match.



5069-IF8 Wiring Diagram - Combination of Device Types Connected to the Module**Channel Connections**

The diagram shows devices that are connected to channels 0, 2, 5, and 7. You aren't restricted to using only this channel.

You can connect devices to any channel or combination of channels as needed.

IMPORTANT: Remember the following:

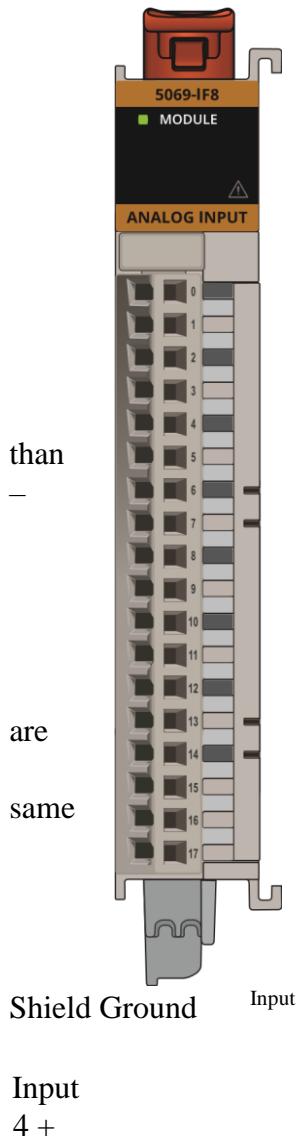
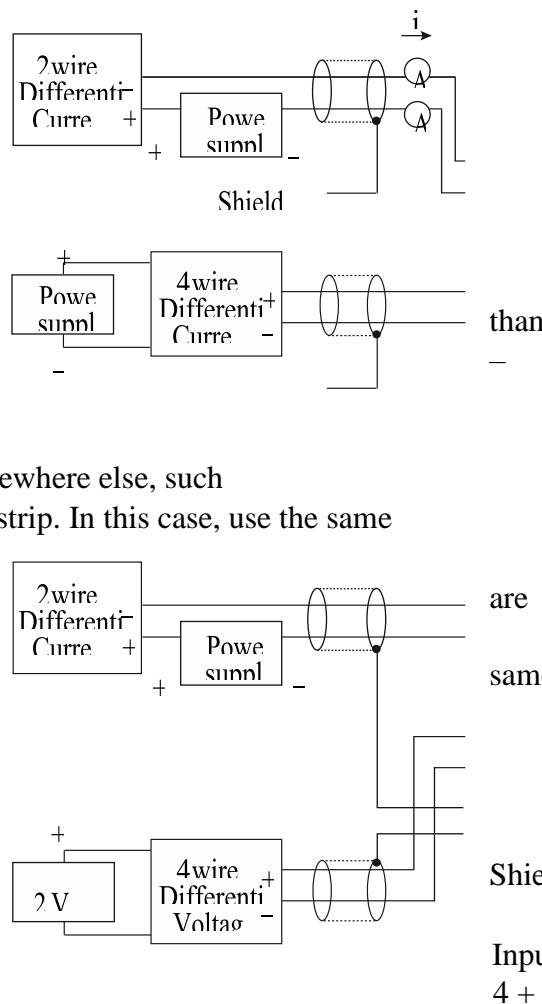
- Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.
- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals.

Compact 5000 I/O

module RTBs only support one wire per terminal. Input 0 + If you connect more than two devices to the module, you can ground two devices at the shield terminals. Input 1 +

You must ground the remaining devices somewhere else, such

Input 1 – as, to the DIN rail via a terminal strip. In this case, use the same power supply to power the additional devices. If separate power supplies used to power the additional devices, ground the Input 2 – power supplies at the ground location. Input 3 +



3 –

Connections to an external power supply that provides SA power are Input 5 + made via the SA power RTB on one of the following:

- CompactLogix 5380 controller Input 5 –
- Compact GuardLogix 5380 controller Input 6 +
- CompactLogix 5480 controller Input 6 –
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter Input 7 +
- 5069-FPD field potential distributor

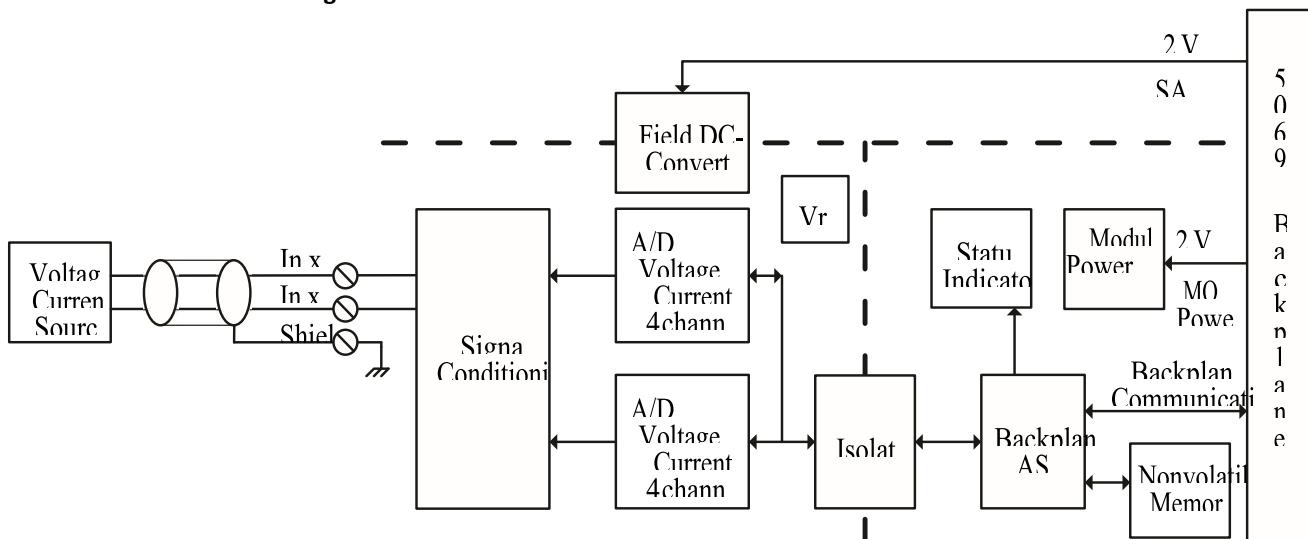
IMPORTANT: Remember the following:^{Input 7 –}

- The 5069-IF8 module uses DC SA power. You must connect DC Shield power to the component, that is, controller, adapter, or field Shield potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

1. 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.
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 AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-IF8 module.

5069-IF8 Functional Block Diagram



Technical Specifications - 5069-IF8

Attribute	5069-IF8
Inputs	8 differential
Input range, voltage	$\pm 10V$ 0...10V 0...5V
Input range, current	0...20 mA 4...20 mA

Input impedance	Voltage: >1 MΩ Current: 90 Ω typical, 70...110 Ω range
Common mode voltage (channel to channel)	±10V (Current mode) ±2V (Voltage mode)
Module conversion method	Sigma-Delta, Two 24-bit multiplexed ADC
Resolution, voltage ⁽¹⁾ (16 bits at 10 Hz notch filter)	±10.5V: <320 µV/count (15 bits plus sign bipolar) 0...10.5V: <160 µV/count (16 bits unipolar) 0...5.25V: <80 µV count (16 bits unipolar)
Resolution, current ⁽¹⁾ (16 bits at 10 Hz notch filter)	0...21 mA: <0.32 µA/count (16 bits) 3.6...21 mA: <0.27 µA/count (16 bits)
Calibrated accuracy at 25 °C	Voltage 0.10% full scale Current 0.10% full scale
Accuracy drift with temperature	Voltage 0.20% full scale Current 0.30% full scale
Input Total Unadjusted Error (TUE) ⁽²⁾ (Over full temperature range)	Voltage 0.30% full scale Current 0.40% full scale
Scan Time Per channel Per group (channel group 0...3 or channel group 4...7)	625 µs 2.5 ms
Notch filter at minimum RPI (0.2 ms, 1 channel enabled)	62.5 kHz

Technical Specifications - 5069-IF8

Attribute	5069-IF8
Minimum notch filter frequency at RPI of 2.5 ms	10 kHz
Step response time to 63% of value (Notch filter 10 kHz)	7.5 ms
Input notch filter (Hz) selections	5, 10 (50/60 Default), 15, 20, 50, 60, 100, 200, 500, 1000, 2500, 5000, 10000, 15625, 25000, 31250, 62500
Input anti-aliasing filter cutoff frequency, nom	500 Hz
Input digital filter	First order lag, 0 ms (Default)...32,767 ms (32.767 s)
HART handheld compliance	Add an external 250 Ω resistor into the current loop for HART transmitter compliance.
Overvoltage protection, max	Voltage and Current modes: ± 30V DC
Overcurrent protection, max	Current mode: ±30 mA
Data value during overload condition	Full scale, overrange flag, Data uncertain / data bad

Open circuit detection time	Voltage: + full scale, < 2 s Current: 4...20 mA range, <2 s
Onboard 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.

General Specifications - 5069-IF8

Attribute	5069-IF8
Voltage and current ratings	
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	100 mA @ 18...32V DC
SA power Passthrough, max ⁽²⁾	9.95 A @ 18...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw.	
Power dissipation, max	Voltage mode: 2.1 W Current mode: 2.4 W
Thermal dissipation, max	Voltage mode: 7.2 BTU/hr Current mode: 8.2 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type 50V Functional Isolation between SA power and input ports No isolation between individual Input ports
Calibration methods	Factory calibrated User-performed (optional)
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 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	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)

General Specifications - 5069-IF8

Attribute	5069-IF8
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.

RTB torque (5069-RTB18-SCREW RTB only)	0.4 N•m (3.5 lb•in)
RTB keying	None
Wire category ⁽³⁾	2 - shielded input ports 2 - power ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SPRING removable terminal block	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
5069-RTB18-SCREW removable terminal block	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 connections	10 mm (0.39 in.)
5069-RTB18-SCREW connections	12 mm (0.47 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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1. Environmental Specifications - 5069-IF8](#)

Attribute	5069-IF8
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing

Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Environmental Specifications - 5069-IF8	
Attribute	5069-IF8
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 880% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on shielded input ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on shielded input ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port
Certifications - 5069-IF8	
Certification ⁽¹⁾	5069-IF8
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X

KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-IY4 and 5069-IY4K Analog Input Modules

The following table lists the analog devices that are supported with the 5069-IY4 and 5069-IY4K modules.

Device	Mode(s) ⁽¹⁾	Supported	Wiring Diagram Example
1-wire analog device 2-wire analog device 4-wire analog device ⁽²⁾	Current	Yes	page 59 and page 60
	Voltage		
	Any combination of current, voltage, RTD, Thermocouple ⁽³⁾	Yes	page 64 and page 65
2-wire RTD device 3-wire RTD device	RTD	Yes	page 61 and page 62
	Any combination of current, voltage, RTD, Thermocouple ⁽³⁾	Yes	page 64 and page 65
2-wire Thermocouple device	Thermocouple ⁽⁴⁾	Yes	page 63
	Any combination of current, voltage, RTD, Thermocouple ⁽³⁾	Yes	page 64 and page 65

(1) Make sure that the channel configuration in your Logix Designer application project matches the input device type that is connected to the channel. You choose the input type in the Channels category on the Module Properties dialog box. For example, if a current input device is connected to channel 0 on the module, the module configuration for channel must be Input Type = Current.

(2) These devices are 2-wire current and voltage devices with 2-wire sensor power connections.

(3) You must use the 5069-RTB14CJC RTB if at least one thermocouple is connected to the module. If there are no thermocouples connected to the module, we recommend that you use the 5069-RTB18 RTB.

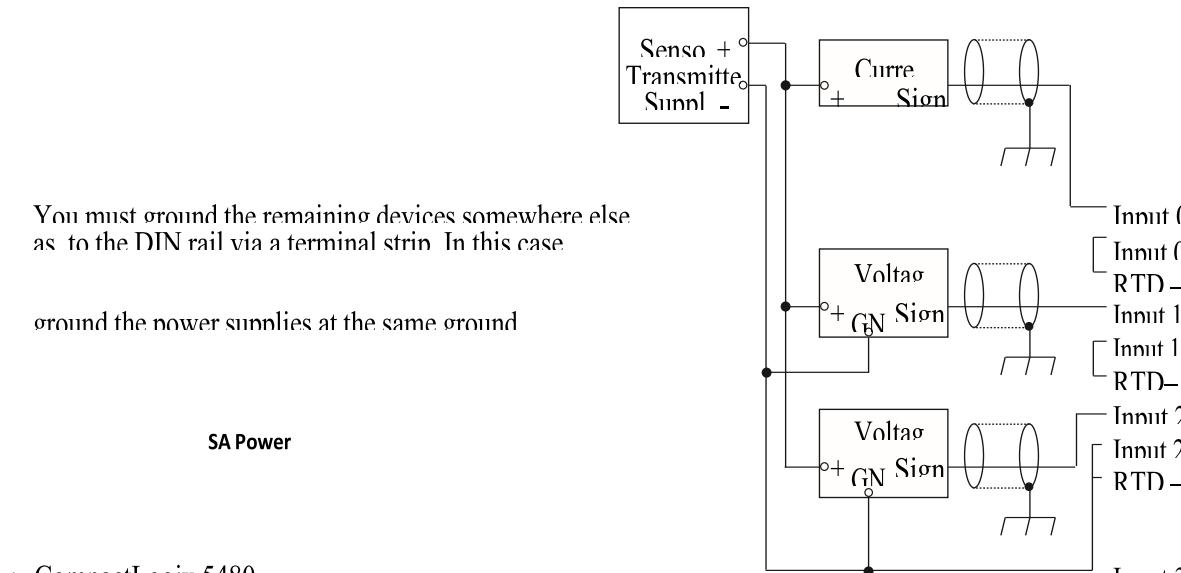
(4) You must use the 5069-RTB14CJC RTB.

The following figure shows a wiring diagram for a 5069-IY4 module with channels configured for current mode and voltage mode with single-ended inputs.

5069-IY4 and 5069-IY4K Wiring Diagram - Current Mode and Voltage Mode With Single-ended Inputs

Channel Connections

The diagram shows devices that are connected to channels 0, 1, and 2. You aren't restricted to using only this channel. You can connect devices to any channel or combination of channels as needed.



• CompactLogix 5480

IMPORTANT: Remember the following:

- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.

If you connect more than two devices to the module, you can ground two devices at the shield terminals.

same power supply to power the additional devices. If separate power supplies are used to power the additional devices,

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

- CompactLogix 5380 controller
- Compact GuardLogix 5380 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter Input 3 –
- 5069-FPD field potential distributor

RTD –/Com

IMPORTANT: Remember the following:

- The 5069-IF8 module uses DC SA power. You must connect DC ^{Shield} power to the component, that is, controller, adapter, or field ^{Shield} potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 - 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.
 - Install the 5069-FPD field potential distributor to establish a second SA power bus.
 - Install the modules that use the other type of SA power, for example AC, on the second SA power bus.

The following figure shows a wiring diagram for a 5069-IY4 module with channels configured for current mode and voltage mode with mixed transmitter inputs.

5069-IY4 and 5069-IY4K Wiring Diagram - Current Mode and Voltage Mode With Mixed Transmitter Inputs

Channel Connections

The diagram shows devices that are connected to channels 0, 1, 2, and 3. You aren't required to use all of the channels. You can connect devices to any channel or combination of channels as needed.

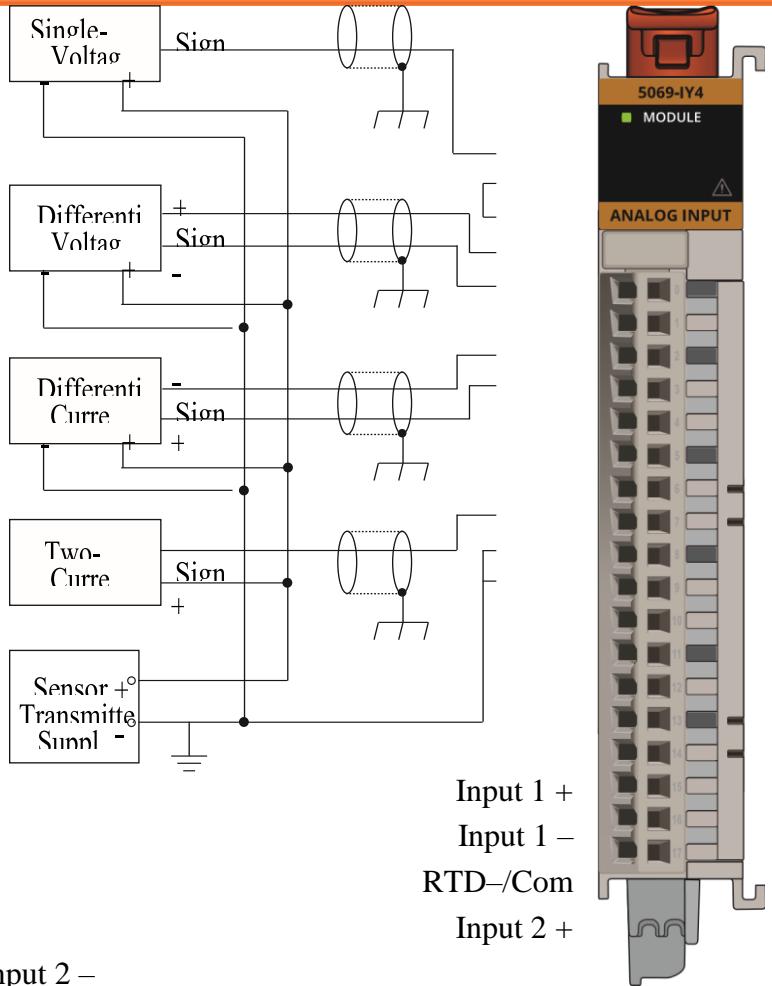
IMPORTANT: Remember the following:

- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.

If you connect more than two devices to the module, you can ground two devices at the shield terminals.

You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip. In this case, use the

Input 0 + same power supply to power the additional devices. If separate power supplies are used to power the additional devices, Input 0 – ground the power supplies at the same ground location. RTD –/Com



SA Power Input 2 –

Connections to an external power supply that provides SA power RTD –/Com are made via the SA power RTB on one of the following:

- CompactLogix 5380 controller
- Compact GuardLogix 5380 controller
- CompactLogix 5480 controller
- Input 3 +
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- Input 3 –
- 5069-FPD field potential distributor

RTD –/Com **IMPORTANT:** Remember the following:

- The 5069-IF8 module uses DC SA power. You must connect DC Shield power to the component, that is, controller, adapter, or field Shield potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.

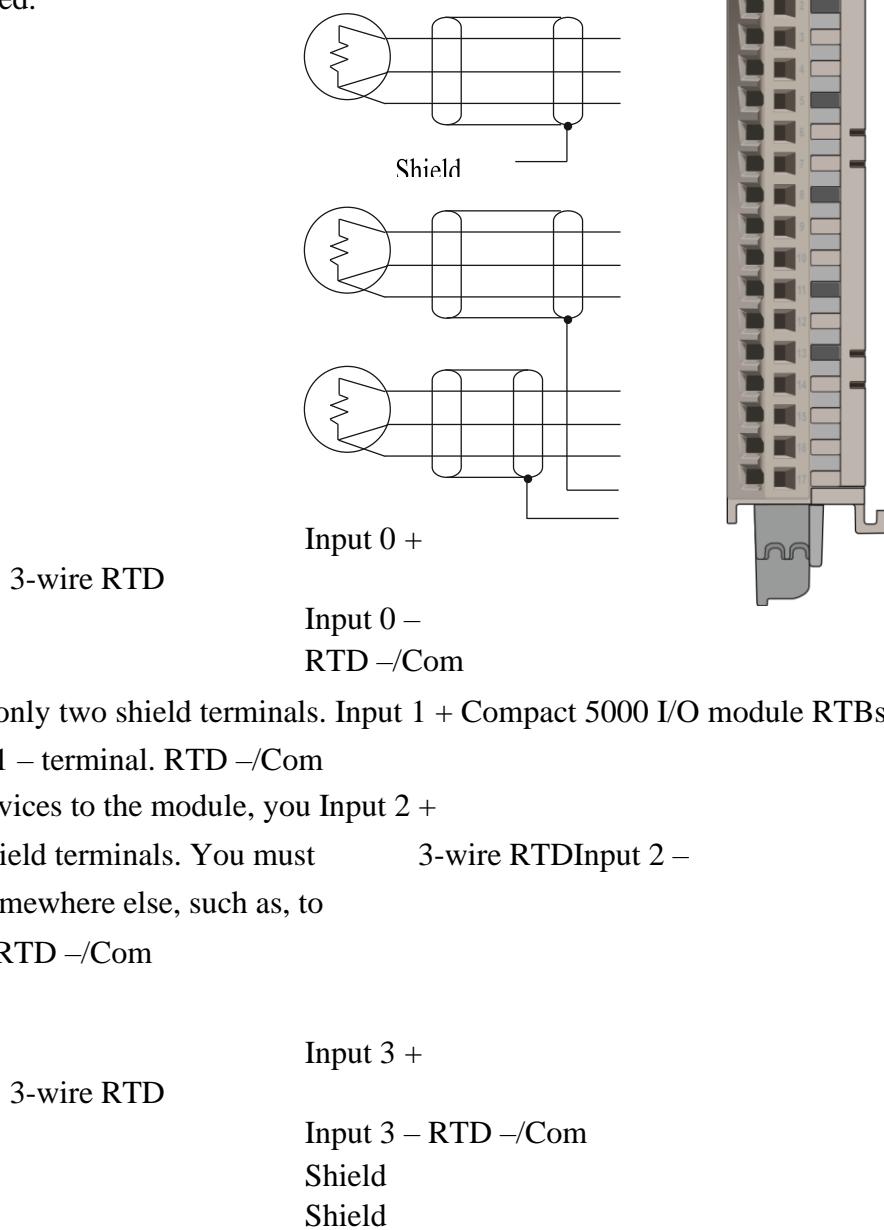
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.
3. Install the modules that use the other type of SA power, for example AC, on the second SA power bus.

The following figure shows a wiring diagram for a 5069-IY4 module with channels configured for RTD mode.

5069-IY4 and 5069-IY4K Wiring Diagram - 3-wire RTD

Channel Connections

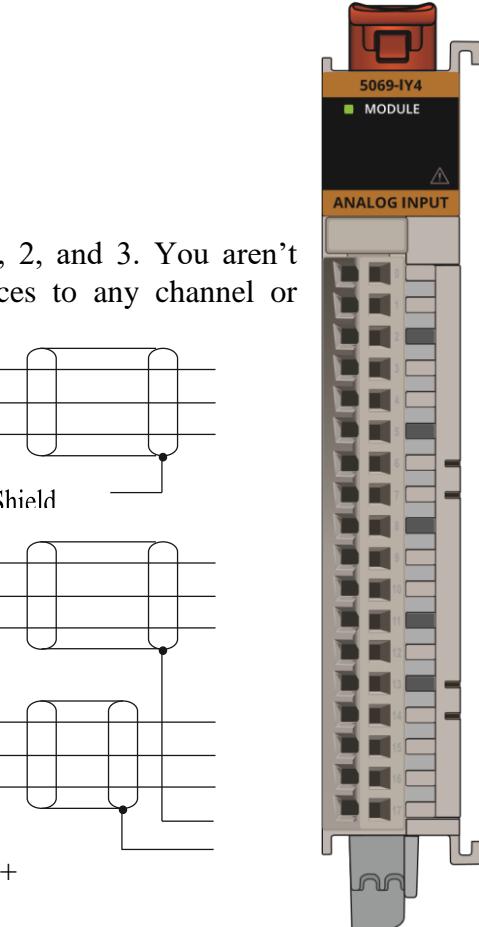
The diagram shows devices that are connected to channels 0, 2, and 3. You aren't restricted to using only this channel. You can connect devices to any channel or combination of channels as needed.



IMPORTANT - This module has only two shield terminals. Input 1 + Compact 5000 I/O module RTBs only support one wire per Input 1 – terminal. RTD –/Com

If you connect more than two devices to the module, you Input 2 +

can ground two devices at the shield terminals. You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip. RTD –/Com



The following figure shows a wiring diagram for a 5069-IY4 module with channels configured for RTD mode.

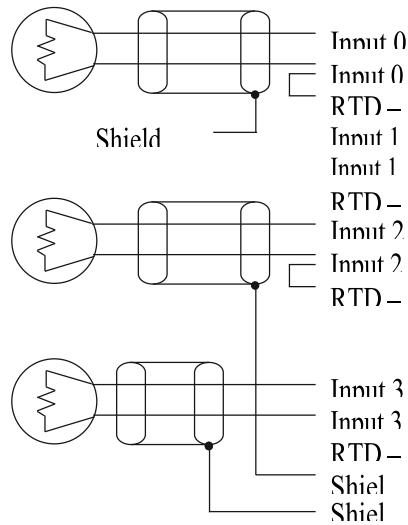
5069-IY4 and 5069-IY4K Wiring Diagram - 2-wire RTD

Channel Connections

The diagram shows a device that is connected to channels 0, 2, and 3. You aren't restricted to using only these channels.

You can connect devices to any channel or combination of channels as needed.

2-wire RTD
Using 3-
wire Mode



IMPORTANT: Remember the following:

- When you use a 2-wire RTD in 3-wire mode, as shown on the RTDs that are connected to channel 3, you must

jumper terminals Input x- and RTD x together. 2-wire RTD Using

- This module has only two shield terminals. Compact 3-wire Mode

5000 I/O module RTBs only support one wire per terminal.

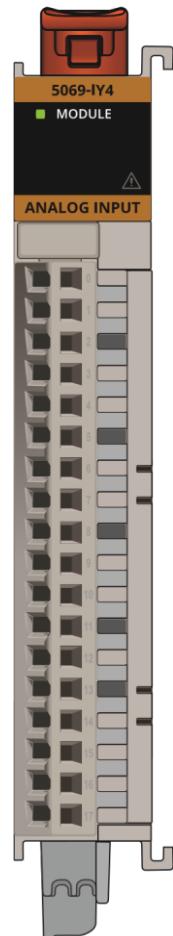
If you connect more than two devices to the module, you can ground two devices at the shield terminals.

You must ground the remaining devices somewhere

2-wire RTD Using else, such as, to the DIN

rail via a terminal strip.

2-wire Mode



The following figure shows a wiring diagram for a 5069-IY4 module with channels configured for thermocouple mode.

5069-IY4 and 5069-IY4K Wiring Diagram - Thermocouple Input

Channel Connections

The diagram shows a device that is connected to channel 0 and channel 2. You aren't restricted to using only these channels.

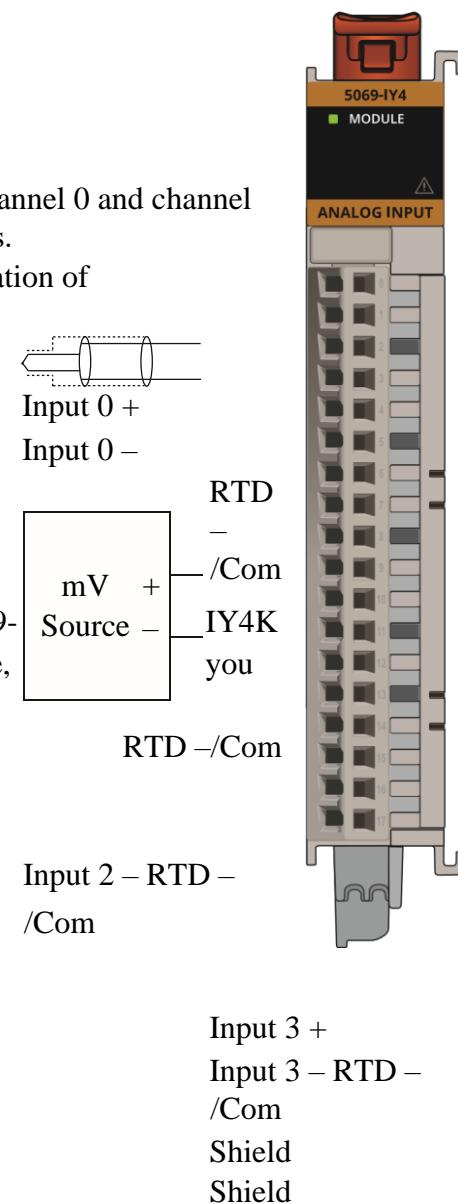
You can connect devices to any channel or combination of Thermocouple

channels as needed.

IMPORTANT: When you use the 5069-IY4 and 5069-analog Input 1 + input modules in Thermocouple mode, must use one of these Input 1 –

CJC type RTBs:

- 5069-RTB14CJC-SPRING (shown) Input 2 +
- 5069-RTB14CJC-SCREW



The following figure shows a wiring diagram for the 5069-IY4 module with different device types connected to different channels.

5069-IY4 and 5069-IY4K Wiring Diagram - Current, Voltage and RTD Device Types Connected to the Module

Channel Connections

The diagram shows an analog current device connected to channel 0, an analog voltage device connected to channel 1, and an RTD connected to channel 2. You aren't restricted to

using those devices with those channels.

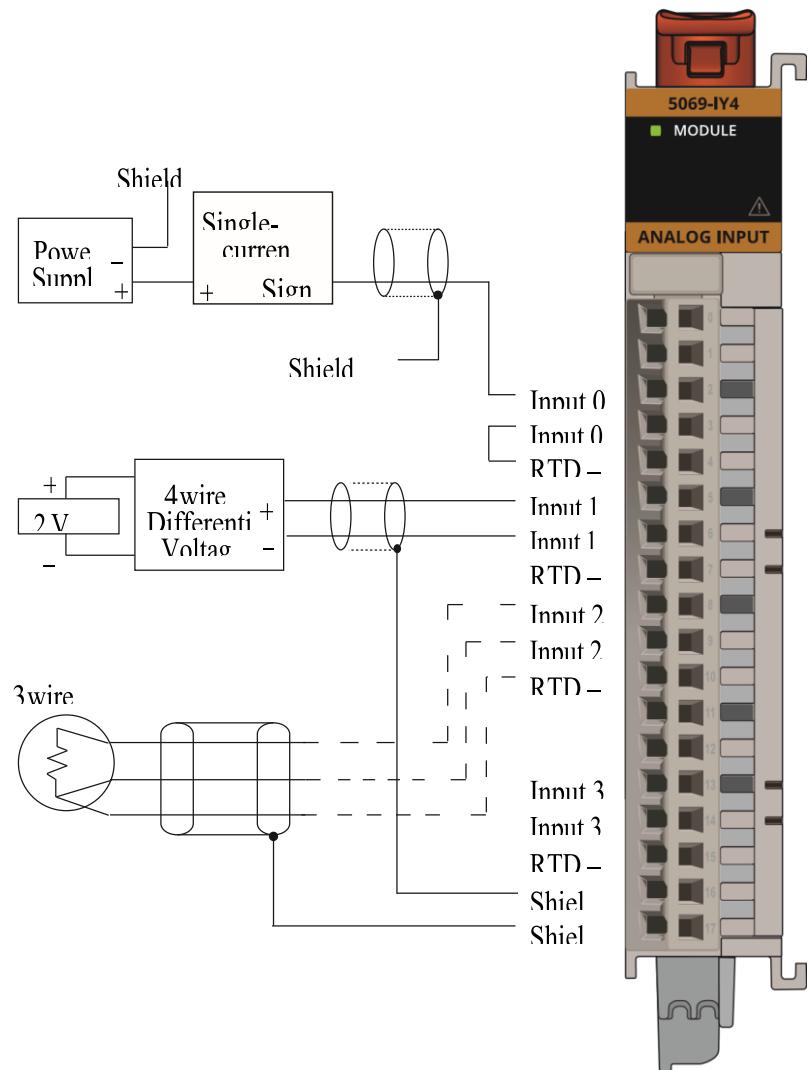
You can connect devices to any channel or combination of channels as needed.

IMPORTANT: Remember the following:

- In this example, the module can use a 5069-RTB18 RTB because no thermocouple devices are connected to the module.
- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.

If you connect more than two devices to the module, you can ground two devices at the shield terminals.

You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip. In this case, use the same power supply to power the additional devices. If separate power supplies are used to power the additional devices, ground the power supplies at the same ground location.



SA Power

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

- CompactLogix 5380 controller
- CompactLogix 5480 controller
- Compact GuardLogix 5380 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- 5069-FPD field potential distributor

IMPORTANT: Remember the following:

- The 5069-IY4 and 5069-IY4K modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

1. 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.
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 AC, on the second SA power bus.

The following figure shows a wiring diagram for 5069-a IY4 module with channels configured for current, voltage, RTD, and thermocouple modes.

5069-IY4 and 5069-IY4K Wiring Diagram - Current, Voltage, RTD, and Thermocouple Modes

Channel Connections

The diagram shows specific devices connected to channels 0, 1, 2, and 3, respectively. You aren't restricted to using those devices with those channels.

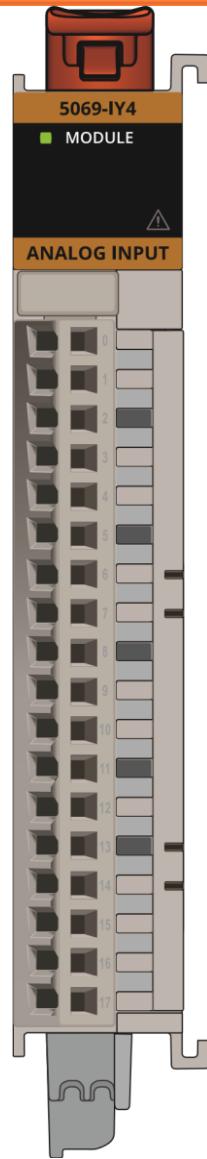
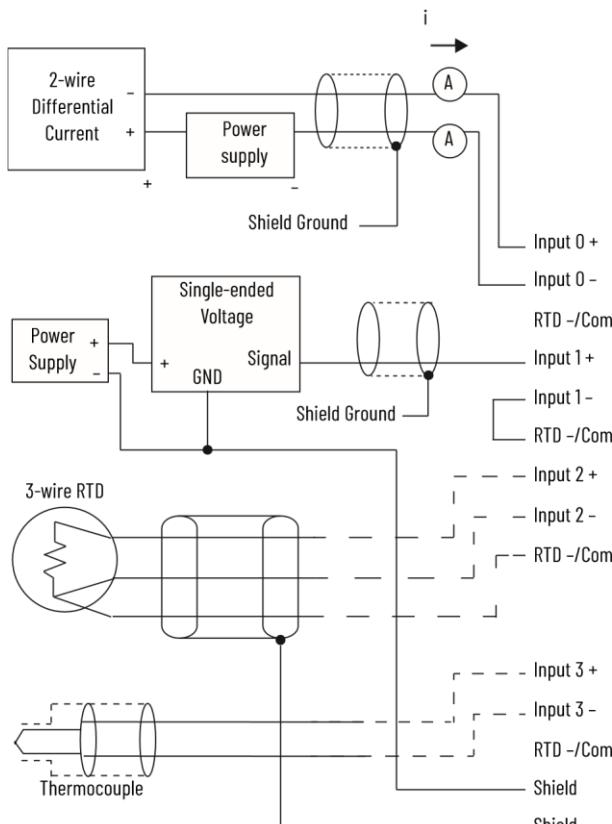
You can connect devices to any channel or combination of

channels as needed.

IMPORTANT: In this example, the module uses a 5069-RTB14CJC RTB because a thermocouple is connected to the module.

IMPORTANT: Remember the following:

- When an analog current device is connected to the module, place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.
- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.
- If you connect more than two devices to the module, you can ground two devices at the shield terminals. You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip. In this case, use the same power supply to power the additional devices. If separate power supplies are used to power the additional devices, ground the power supplies at the same ground location.



SA Power

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

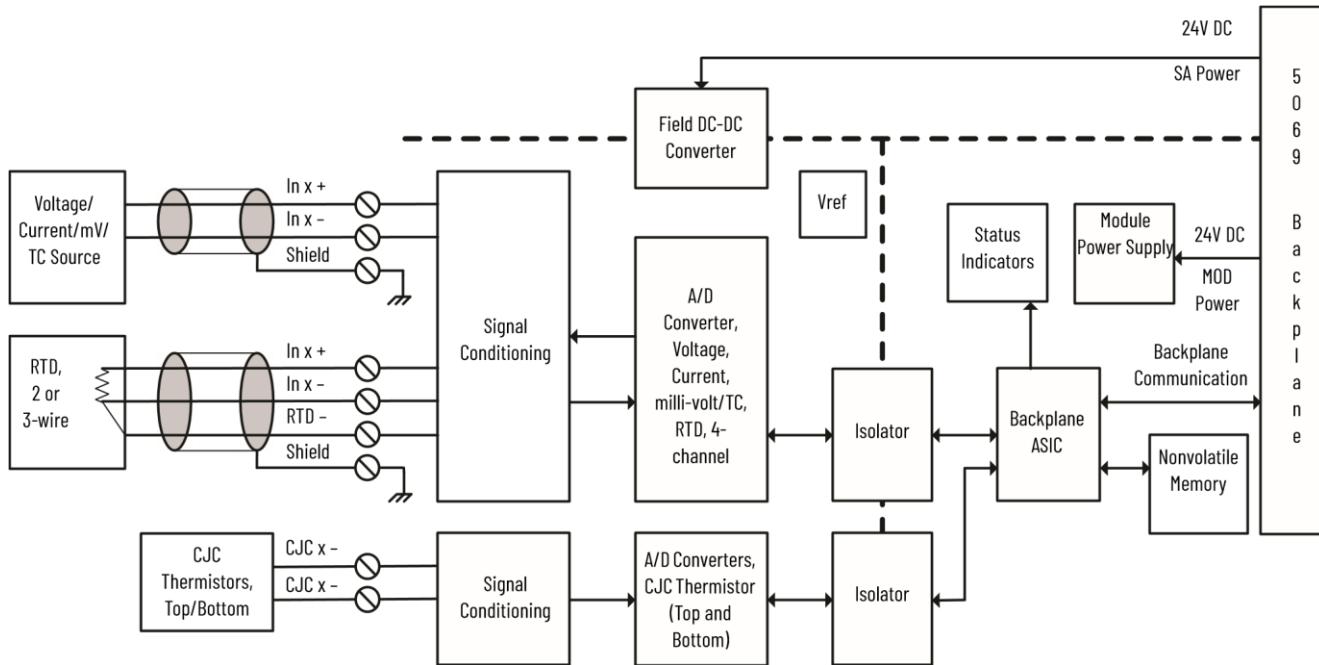
- CompactLogix 5380 controller
 - CompactLogix 5480 controller
 - Compact GuardLogix 5380 controller
 - 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter • 5069-FPD field potential distributor
- IMPORTANT:** Remember the following:
- The 5069-IY4 and 5069-IY4K modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
 - If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
 - You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
- 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.

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 AC, on the second SA power bus.

The following figure shows a functional block diagram for the 5069-IY4 and 5069-IY4K modules.

5069-IY4 and 5069-IY4K Functional Block Diagram



Technical Specifications - 5069-IY4 and 5069-IY4K

Attribute	5069-IY4, 5069-IY4K
Inputs	4 differential
Input range, voltage	$\pm 10V$ 0...10V 0...5V
Input range, current	0...20 mA 4...20 mA
Input range, resistive	1...500 Ω 2...1000 Ω 4...2000 Ω 8...4000 Ω
Input type, RTD	100, 200, 500, 1000 Ω platinum, alpha=385 100, 200, 500, 1000 Ω platinum, alpha=3916 120 Ω nickel, alpha=672 100, 120, 200, 500 Ω nickel, alpha=618 10 Ω copper 427
Input range, thermocouple / millivolt	± 100 mV

Input type, thermocouple	B, C, D, E, J, K, L (TXK/XK), N, R, S, T
Input impedance	Voltage: >1 MΩ Current: 90 Ω typical, 70...110 Ω range RTD: >1 MΩ Thermocouple/millivolt: >1 MΩ
Common mode voltage (channel to channel)	±10V (Current mode and 3-wire RTD mode) ±2V (Voltage mode)

Technical Specifications - 5069-IY4 and 5069-IY4K

Attribute	5069-IY4, 5069-IY4K
Attribute	5069-IY4, 5069-IY4K
Module conversion method	Sigma-Delta, One 24-bit multiplexed ADC
Resolution, voltage ⁽¹⁾ (16 bits at 10 Hz notch filter)	±10.5V: <320 µV/count (15 bits plus sign bipolar) 0...10.5V: <160 µV/count (16 bits unipolar) 0...5.25V: <80 µV count (16 bits unipolar)
Resolution, current ⁽¹⁾ (16 bits at 10 Hz notch filter)	0...21 mA: <0.32 µA/count (16 bits) 3.6...21 mA: <0.27 µA/count (16 bits)
Resolution, RTD ⁽¹⁾ (16 bits at 10 Hz notch filter) 3 Wire mode	< 7.9 mΩ/cnt in 1...500 Ω mode < 15.8 mΩ/cnt in 2...1000 Ω mode < 31.7 mΩ/cnt in 4...2000 Ω mode < 63.4 mΩ/cnt in 8...4000 Ω mode
Resolution, thermocouple / millivolt ⁽¹⁾ (16 bits at 10 Hz notch filter)	< 3.1 µV/cnt in ±100 mV mode
RTD excitation current	600 µA, 3 wire mode 100 µA, 2 wire mode
Wire impedance (3-wire RTD mode only)	25 Ω maximum for specified accuracy
RTD sensor types/temperature range: (Each sensor type in a cell supports all temperature ranges in the corresponding column to the right.)	
100, 200, 500, 1000 Ohm PT 385	-200...+870 °C -328...+1598 °F 73...1143 °K 132...2058 °R
100, 200, 500, 1000 Ohm PT 3916	-200...+630 °C -328...+1166 °F 73...903 °K 132...1626 °R
10 Ohm CU 247	-200...+260 °C -328...+500 °F 73...533 °K 132...960 °R
120 Ohm NI 672	-80...+320 °C - 112...+608 °F 193...593 °K 348...1068 °R
100, 120, 200, 500 Ohm NI 618	-60...+250 °C -76...+482 °F 213...523 °K 384...942 °R

Thermocouple type/temperature range

Technical Specifications - 5069-IY4 and 5069-IY4K

Thermocouple Type B	21...1820 °C 68...3308 °F 293...2093 °K 528...3768 °R
Thermocouple Type C	0...2320 °C 32...4208 °F 273...2593 °K 492...4668 °R
Thermocouple Type D	0...2320 °C 32...4208 °F 273...2593 °K 492...4668 °R
Thermocouple Type E	-270...+1000 °C -454...+1832 °F 3...1273 °K 6...2292 °R
Thermocouple Type J	-210...+1200 °C - 346...+2192 °F 63...1473 °K 114...2652 °R
Thermocouple Type K	-270...+1372 °C -454...+2502 °F 3...1645 °K 6...2961 °R
Thermocouple Type N	-270...+1300 °C - 454...+2372 °F 3...1573 °K 6...2832 °R
Thermocouple Type R	-50...+1768 °C -58...+3215 °F 223...2041 °K 402...3674 °R
Thermocouple Type S	-50...+1768 °C -58...+3215 °F 223...2041 °K 402...3674 °R
Thermocouple Type T	-270...+400 °C -454...+752 °F 3...673 °K 6...1212 °R
Thermocouple Type TXK/XK (L)	-200...+800 °C - 328...+1472 °F 73...1073 °K 132...1932 °R
Thermocouple linearization	ITS-90
Attribute	5069-IY4, 5069-IY4K

Technical Specifications - 5069-IY4 and 5069-IY4K

CJC inputs (for thermocouple mode use only)	Two CJC sensors 2 thermistors embedded in 5069-RTB14CJC-(SCREW or SPRING) RTB -or- 2 thermistors wired to 5069-RTB18-(SCREW or SPRING) RTB Thermistor type: Measurement Specialties, Inc. 10K3A1A
Local CJC sensor accuracy	± 0.3 °C
Remote CJC sensor accuracy (Based on specified thermistor)	± 0.3 °C
Calibrated accuracy at 25 °C	Voltage 0.100% full scale Current 0.100% full scale RTD 0.100% full scale Thermocouple/millivolt 0.100% full scale
Accuracy drift with temperature	Voltage 0.200% full scale Current 0.300% full scale RTD 0.200% full scale Thermocouple/millivolt 0.200% full scale
Input Total Unadjusted Error (TUE) ⁽²⁾ (Over full temperature range)	Voltage 0.300% Full Scale Current 0.400% Full Scale RTD 0.300% Full Scale Thermocouple/millivolt 0.300% Full Scale
Scan time • Per channel • Per group (channel group 0...3)	625 μ s 2.5 ms
Notch filter at minimum RPI (0.2 ms, 1 channel enabled)	62.5 kHz
Minimum notch filter frequency at RPI of 2.5 ms	10 kHz
Step response time to 63% of value (Notch filter 10 kHz)	7.5 ms
Input notch filter (Hz) selections	5, 10 (50/60 default), 15, 20, 50, 60, 100, 200, 500, 1000, 2500, 5000, 10000, 15625, 25000, 31250, 62500
Input anti-aliasing filter cutoff frequency, typical	500 Hz
Input digital filter	First Order Lag, 0 ms (Default)...32,767 ms (32.767 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: ± 30 V DC
Overcurrent protection, max	Current mode: ± 30 mA
Data value during overload condition	Full scale, overrange flag, Data uncertain / data bad

Technical Specifications - 5069-IY4 and 5069-IY4K

Open circuit detection time, nom	Voltage: + full scale, < 2 s Current: 4...20 mA range, < 2 s RTD: < 2 s Thermocouple / millivolt: + full scale, < 10 s
Onboard 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.

General Specifications - 5069-IY4 and 5069-IY4K

Attribute	5069-IY4, 5069-IY4K
Voltage and current ratings	
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	100 mA @ 18...32V DC
SA power Passthrough, max ⁽²⁾	9.95 A @ 18...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	Voltage mode: 1.8 W Current mode: 2.1 W RTD mode: 2.1 W Thermocouple / millivolt mode: 1.8 W
Thermal dissipation, max	Voltage mode: 6.1 BTU/hr Current mode: 7.2 BTU/hr RTD mode: 7.2 BTU/hr Thermocouple/millivolt: 6.1 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type 50V Functional Isolation between SA power and input ports No isolation between individual input ports
Calibration methods	Factory calibrated User-performed (optional)
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 4 yellow/red I/O status indicators 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	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	One of these RTB types. <ul style="list-style-type: none"> • 5069-RTB18-SCREW • 5069-RTB18-SPRING • 5069-RTB14CJC-SCREW (Thermocouple mode) • 5069-RTB14CJC-SPRING (Thermocouple mode) 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.

General Specifications - 5069-IY4 and 5069-IY4K

Attribute	5069-IY4, 5069-IY4K
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RTB torque (5069-RTB18-SCREW, 5069-RTB14CJC-SCREW)	0.4 N•m (3.5 lb•in)
RTB keying	None
Wire category ⁽³⁾	2 - shielded input ports 2 - power ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SPRING and 5069-RTB14CJC-SPRING connections	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.
5069-RTB18-SCREW and 5069-RTB14CJC-SCREW connections	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.)
5069-RTB18-SCREW connections	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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). **Environmental Specifications - 5069-IY4 and 5069-IY4K**

Attribute	5069-IY4, 5069-IY4K
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
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Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
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Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
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Environmental Specifications - 5069-IY4 and 5069-IY4K

Attribute	5069-IY4, 5069-IY4K
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on shielded input ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on shielded input ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

Certifications - 5069-IY4 and 5069-IY4K

Certification ⁽¹⁾	5069-IY4, 5069-IY4K
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. 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	<p>European Union 2014/30/EU EMC Directive, compliant with:</p> <ul style="list-style-type: none"> EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) <p>European Union 2014/35/EU LVD, compliant with:</p> <ul style="list-style-type: none"> EN 61010-2-201; Control Equipment Safety Requirements <p>European Union 2011/65/EU RoHS, compliant with:</p> <ul style="list-style-type: none"> EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	<p>European Union 2014/34/EU ATEX Directive, compliant with:</p> <ul style="list-style-type: none"> EN 60079-0; General Requirements EN 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc DEMKO 15 ATEX 1484X
IECEx	<p>IECEx System, compliant with:</p> <ul style="list-style-type: none"> IEC 60079-0; General Requirements IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" II 3 G Ex nA IIC T4 Gc IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-OF4, 5069-OF4K, and 5069-OF8 Analog Current/Voltage Output Modules

The following figure shows a wiring diagram for the 5069-OF4 and 5069-OF4K modules when used in current mode.

5069-OF4 and 5069-OF4K Wiring Diagram - Current Mode

Channel Connections

The diagram shows a device that is connected to channels 0, 2, and 3. You aren't restricted to using only these channels. You can connect devices to any channel or combination of channels as needed.

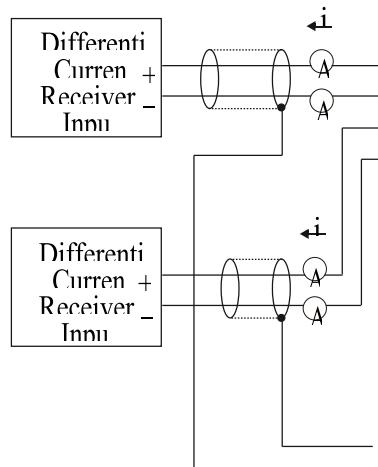
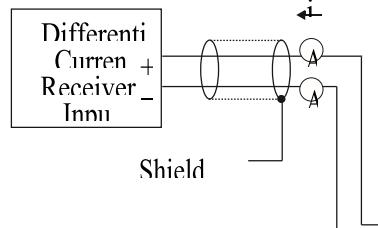
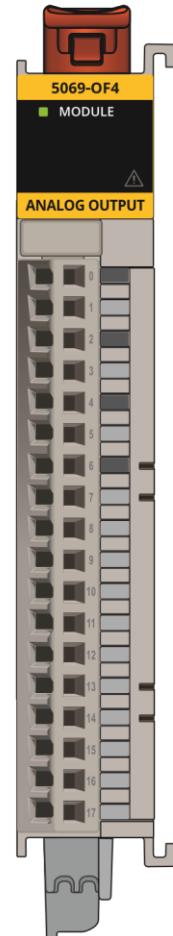
IMPORTANT: Remember the following:

- Place more loop devices, for example, strip chart recorders, at either **A** location in the current loop.
- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.
- If you connect more than two devices to the module, you can ground two devices at the shield terminals. You must ground

Output 0 + the remaining devices somewhere such as, to the DIN rail via a terminal strip

$i_{Output\ 0-}$

else,



Differenti
Curren +
Receiver -
Innu

Differenti
Curren +
Receiver -
Innu

Differenti
Curren +
Receiver -
Innu

SA Power

$i_{Output\ 1+}$
 $i_{Output\ 1-}$

$i_{Output\ 2+}$

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

- CompactLogix 5380 controller $i_{Output\ 3+}$
 - Compact GuardLogix 5380 controller $i_{Output\ 3-}$
 - CompactLogix 5480 controller
 - 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter • 5069-FPD field potential distributor
- IMPORTANT:** Remember the following:
- The 5069-OF4 module uses DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
 - If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
 - You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated Shield from each other. To keep the modules on separate SA power Shield buses, complete these steps.
1. 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.
 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 AC, on the second SA power bus.

The following figure shows a wiring diagram for the 5069-OF8 module when used in current mode.

5069-OF8 Wiring Diagram - Current Mode

channels as

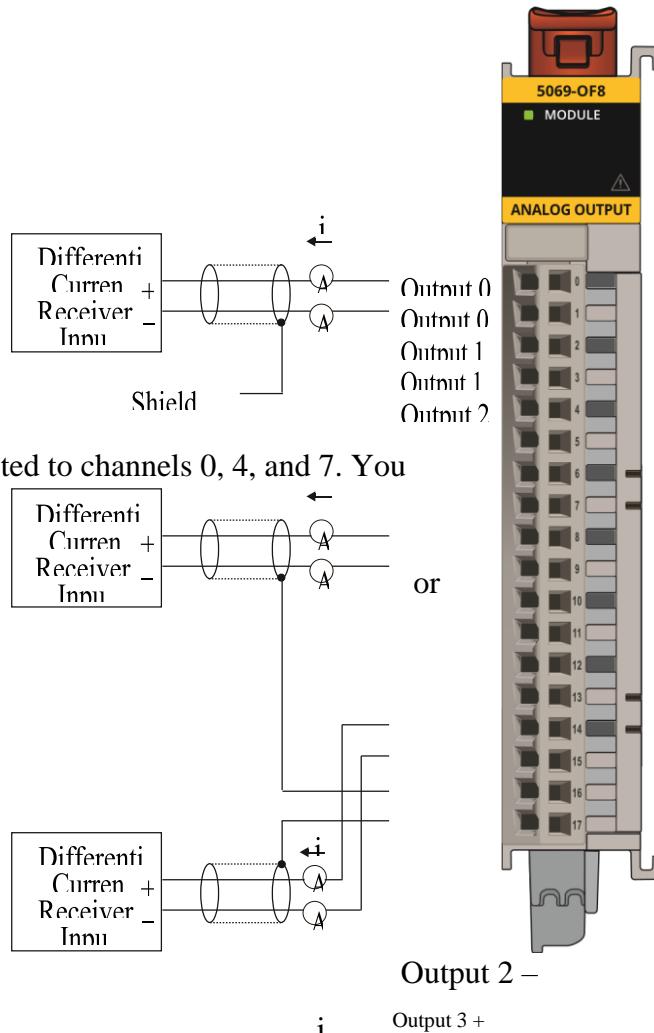
Channel Connections

The diagram shows devices that are connected to channels 0, 4, and 7. You

aren't restricted to using only those

channels.

You can connect devices to any channel combination of



IMPORTANT: Remember the following:

- Place more loop devices, for example, strip chart recorders, at Output 3 – either A location in the current loop. Output 4 +
- This module has only two shield terminals. Compact 5000 I/O Output 4 – module RTBs only support one wire per terminal.

Output 5 + • If you connect more than two devices to the module, you can ground two devices at the shield terminals. You must ground ^{Output 5 –} the remaining devices somewhere else, such as, to the DIN rail Output 6 + via a terminal strip. Output 6 –

Output 7 +
Output 7 –
Shield

Shield

The following figure shows a wiring diagram for the 5069-OF4 and 5069-OF4K modules when used in voltage mode.

5069-OF4 and 5069-OF4K Wiring Diagram - Voltage Mode

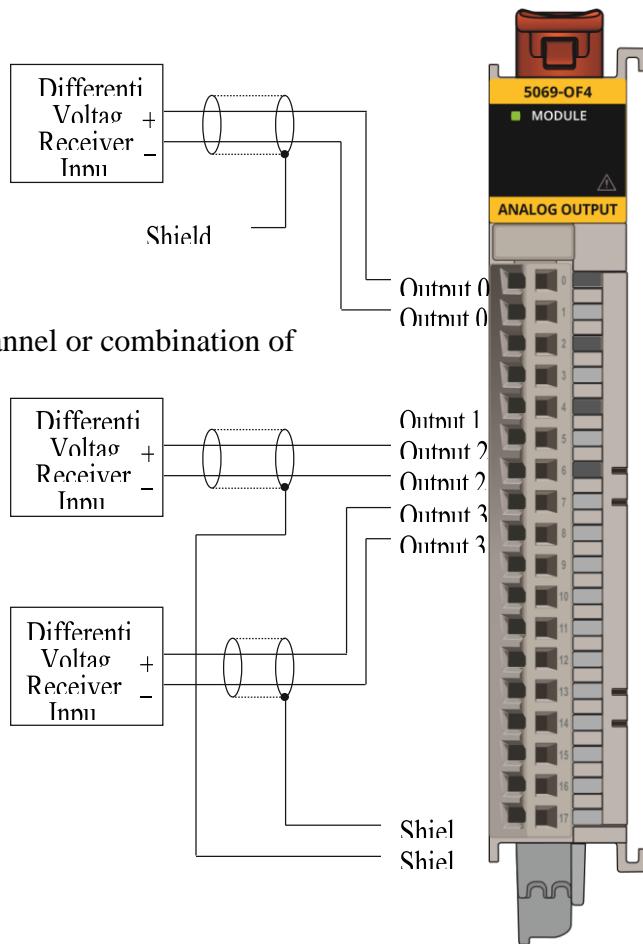
Channel Connections

The diagram shows a device that is connected to channels 0, 2, and 3. You aren't restricted to using only these channels. You can connect devices to any channel or combination of channels as needed.

Output 1 +

IMPORTANT: Remember the following:

- This module has only two shield terminals. Compact 5000 I/O module RTBs only support one wire per terminal.
- If you connect more than two devices to the module, you can ground two devices at the shield terminals. You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip.
- The 5069-OF4K module uses the same wiring diagram as shown for the 5069-OF4 module.



The following figure shows a wiring diagram for the 5069-OF8 module when used in voltage mode.

5069-OF8 Wiring Diagram - Voltage Mode

Channel Connections

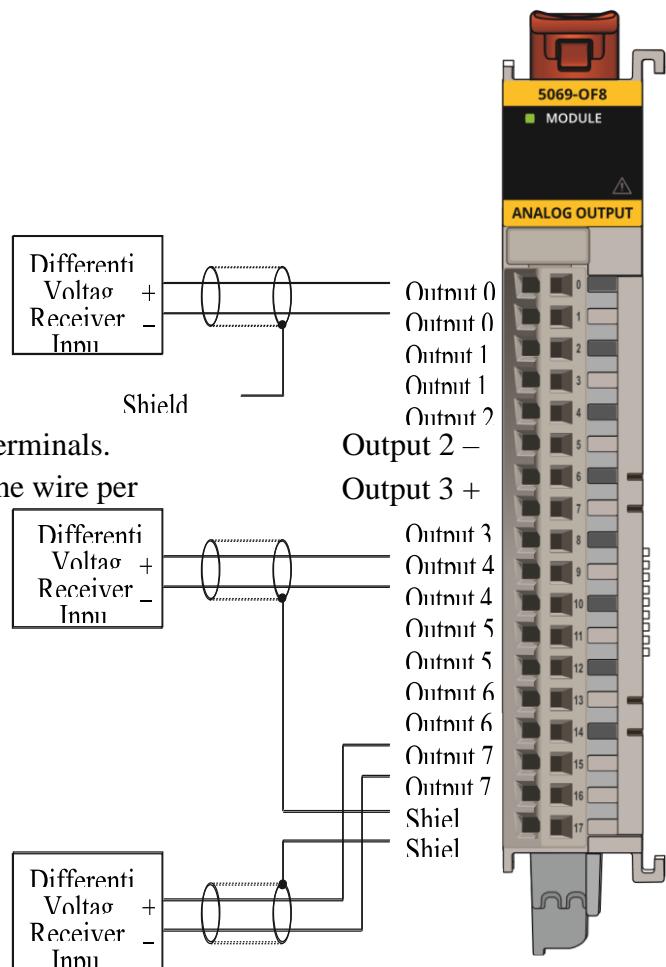
The diagram shows a device that is connected to channels 0, 2, and 3. You aren't restricted to using only these channels. You can connect

IMPORTANT: This module has only two shield terminals.

Compact 5000 I/O module RTBs only support one wire per devices to any channel or combination of channels as needed.

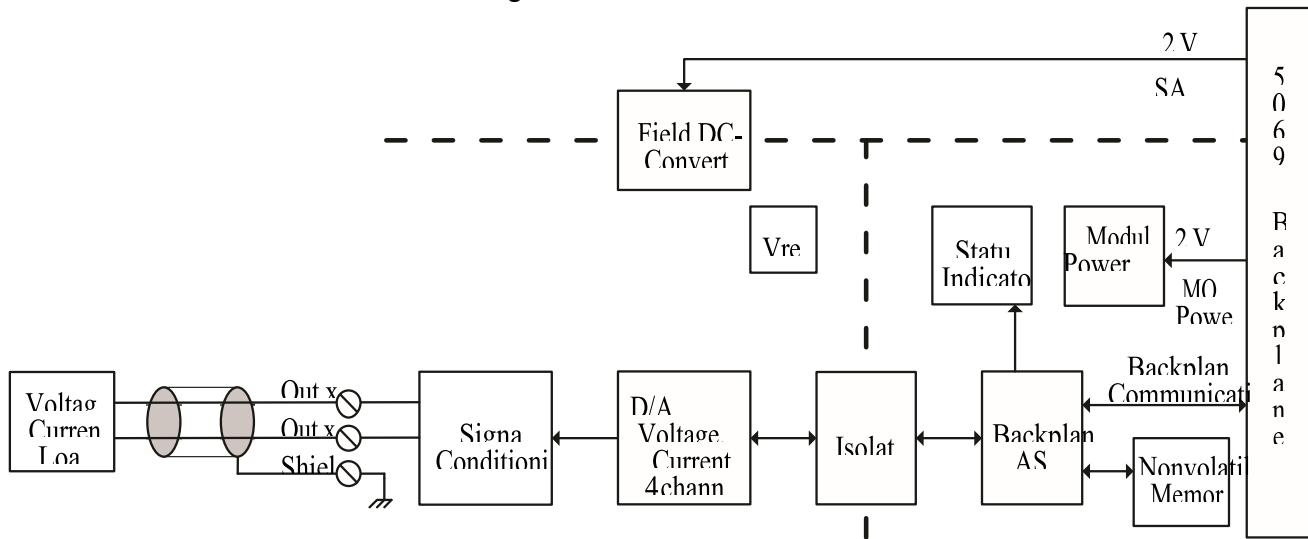
terminal.

If you connect more than two devices to the module, you can ground two devices at the shield terminals. You must ground the remaining devices somewhere else, such as, to the DIN rail via a terminal strip.



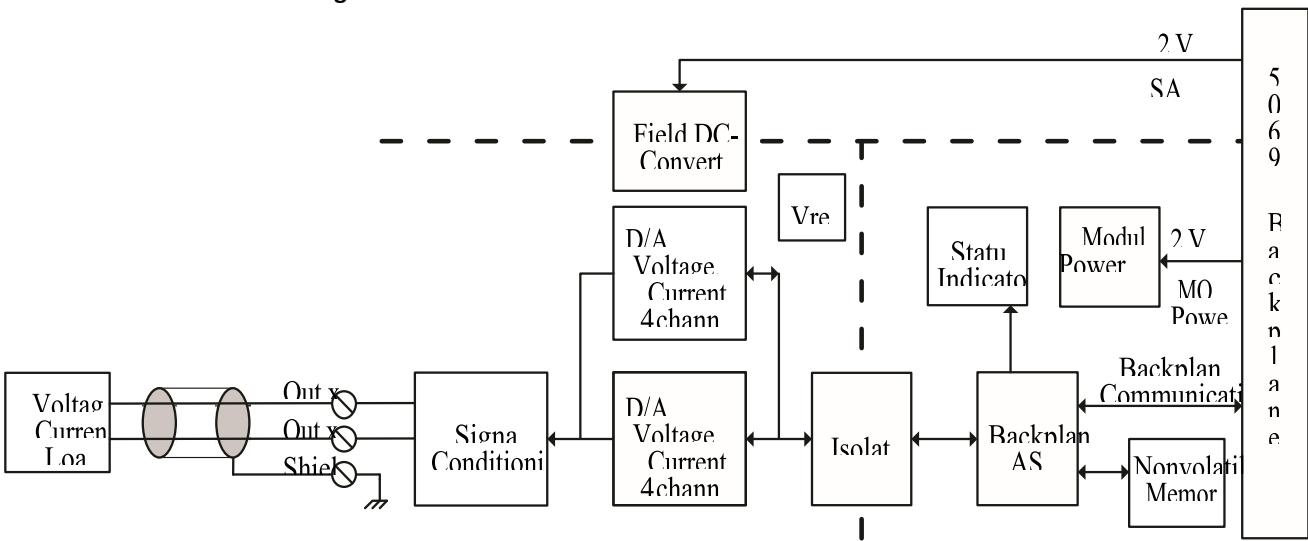
The following figure shows a functional block diagram for the 5069-OF4 and 5069-OF4K modules.

5069-OF4 and 5069-OF4K Functional Block Diagram



The following figure shows a functional block diagram for the 5069-OF8 module.

5069-OF8 Functional Block Diagram



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

Attribute	5069-OF4, 5069-OF4K	5069-OF8
Outputs	4 voltage or current	8 voltage or current
Output range, voltage	$\pm 10V$ 0...10V 0...5V	

Output range, current	0...20 mA 4...20 mA
Resolution	16 bits across $\pm 10.5V$ - 320 μV /bit 16 bits across 10.5V - 160 μV /bit 16 bits across 5.25V - 80 μV /bit 16 bits across 21 mA - 320 nA/bit
Drive capability	Voltage - 1000 Ω min Current - 500 Ω max
Capacitive load, max (voltage mode only)	1 μF
Inductive load, max (current mode only)	1 mH
Open circuit detection	Current mode only
Short circuit detection	Voltage mode only – output electronically limited to 16 mA or less
Data format	IEEE 32-bit floating point
Module conversion method	R-Ladder DAC, monotonicity with no missing codes
Conversion time per channel	25 μs
Scan time	
• Per group 0...3 (OF4/OF8)	1.0 ms
• Per group 0...7 (OF8 only)	2.0 ms
Step response time to 63% of value	Voltage mode – 18 μs max Current mode – 1 ms max
Oversupply protection, max	$\pm 32V$ DC
Repeatability	0.05%
Calibrated accuracy at 25 °C (77 °F)	Voltage - 0.10% full scale Current - 0.10% full scale
Accuracy drift with temperature	Voltage - 0.30% full scale Current - 0.50% full scale

General Specifications - 5069-OF4, 5069-OF4K, and 5069-OF8

Attribute	5069-OF4, 5069-OF4K	5069-OF8
Voltage and current ratings		
Analog output ratings	+/-10V DC, 0...20 mA per channel	
Mod power	75 mA @ 18...32V DC	
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC	
SA power	150 mA @ 18...32V DC	250 mA @ 18...32V DC

SA power Passthrough, max ⁽²⁾	9.95 A @ 18...32V DC	
Power dissipation, max	3.3 W	5.3 W
Thermal dissipation, max	11.3 BTU/hr	18.1 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type 50V Functional Isolation between SA power and output ports No isolation between individual output ports	
Calibration methods	Factory Calibrated User-performed (optional)	
Module keying	Electronic keying via programming software	
Indicators	1 green/red module status indicator 4 yellow/red I/O status indicators	1 green/red module status indicator 8 yellow/red I/O status indicators
Slot width	1	
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)	
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.	
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.	
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N•m (3.5 lb•in)	
RTB keying	None	
Wire category ⁽³⁾	2 - shielded input ports 2 - power ports 1 wire per terminal for each signal port	
Wire size		
5069-RTB18-SPRING removable terminal block	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	
5069-RTB18-SCREW removable terminal block	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 connections	10 mm (0.39 in.)	
5069-RTB18-SCREW connections	12 mm (0.47 in.)	
General Specifications - 5069-OF4, 5069-OF4K, and 5069-OF8		
Attribute	5069-OF4, 5069-OF4K	5069-OF8
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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

Environmental Specifications - 5069-OF4, 5069-OF4K, and 5069-OF8

Attribute	5069-OF4, 5069-OF4K, 5069-OF8
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4

ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...200 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz

Environmental Specifications - 5069-OF4, 5069-OF4K, and 5069-OF8

Attribute	5069-OF4, 5069-OF4K, 5069-OF8
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on shielded output ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on shielded output ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on Mod power port

Certifications - 5069-OF4, 5069-OF4K, and 5069-OF8

Certification ⁽¹⁾	5069-OF4, 5069-OF4K, 5069-OF8
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1484X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
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(1)When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

Safety I/O Modules

I/O Type	Cat. No.	Description	Page
DC safety sinking input	5069-IB8S	18...32V DC 8-point, safety sinking input module	82
	5069-IB8SK	18...32V DC 8-point, conformal coated safety sinking input module	
DC safety output	5069-OBV8S	18...32V DC 8-point, safety output module that can be used as a Bipolar output module or sourcing output module	90
	5069-OBV8SK	18...32V DC 8-point, conformal coated safety output module that can be used as a Bipolar output module or sourcing output module	

5069-IB8S and 5069-IB8SK Safety Sinking Input Modules

When the module is wired as shown, it is suitable for applications that are rated up to, and including, **Category 3** as defined in ISO 13849-1.

IMPORTANT: Remember the following:

- The switches are suitable for applications that are rated up to, and including, SIL CL 3, PLe, Cat. 3.
- The light curtain is suitable for applications that are rated up to, and including, SIL CL 3, PLe, Cat. 4.

Channel Connections

The diagram shows devices that are connected to safety input channels 0, 1, 6, and 7. You aren't restricted to using only those channels.

You can connect devices to any safety input channel or combination of channels as needed.

SA Power

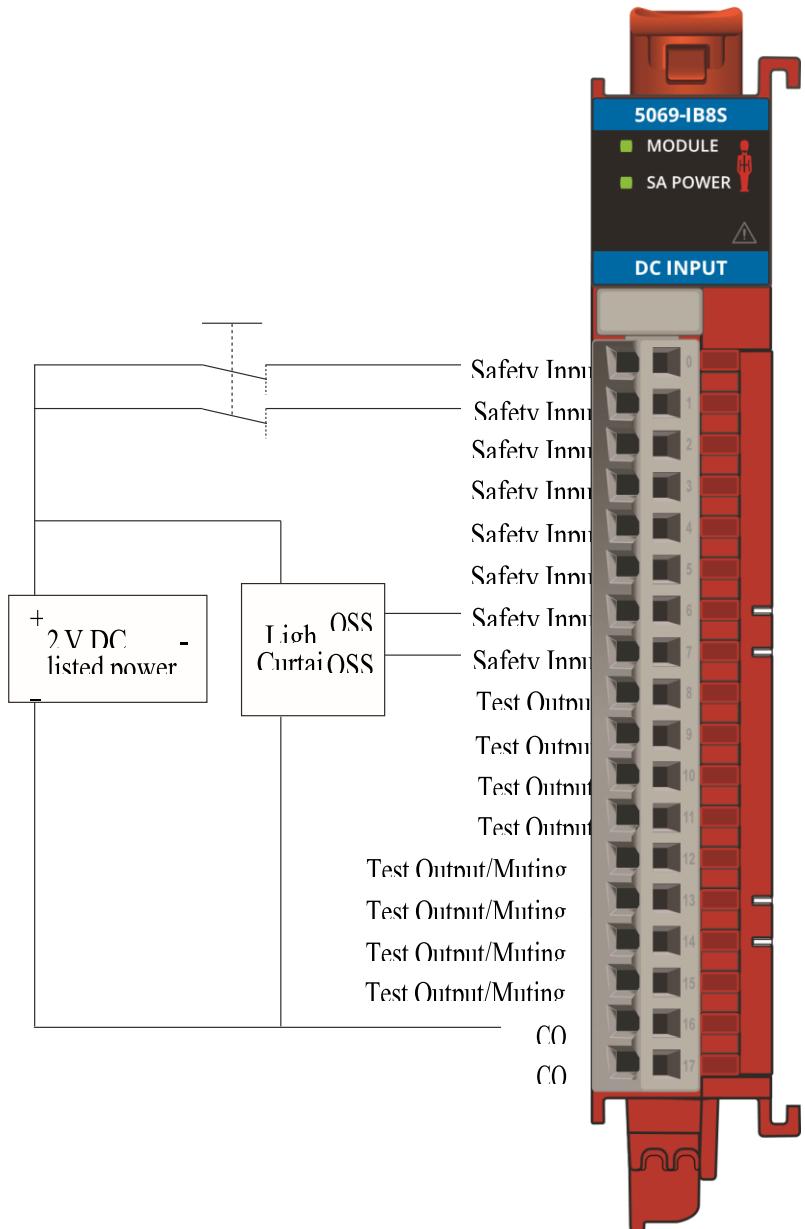
Connections to an external power supply that provides SA power via the SA power RTB on one of the following:

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

IMPORTANT:

Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a 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 DC, 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 AC, on the second SA power bus.

- The SA power to adjacent SA power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.

When the module is wired as shown, and the requirements listed are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1. To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function.

One diagnostic test method is to configure the safety input channel for Safety Pulse Test to test the circuit for short circuits to 24V DC. Safety input pairs must be associated with different Test Output sources.

Channel Connections

The diagram shows devices that are connected to safety input channels 0 and 1, and to test outputs 0 and 1. You aren't restricted to using only those safety input channels. You can connect devices to any channel or combination of channels as needed.

- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.

SA Power

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

- Compact GuardLogix 5380 controller

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

IMPORTANT:

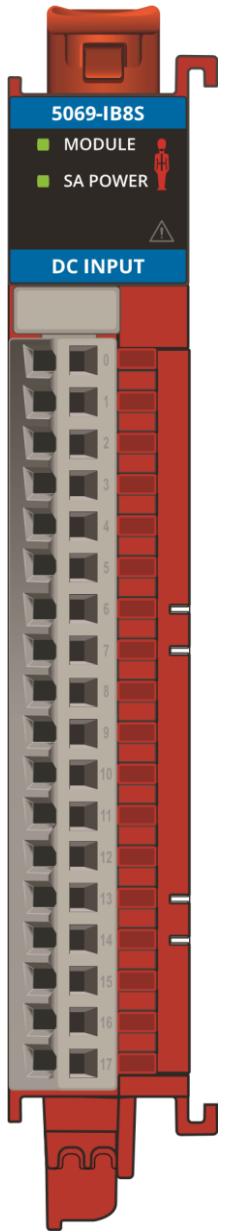
Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.

1. 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.

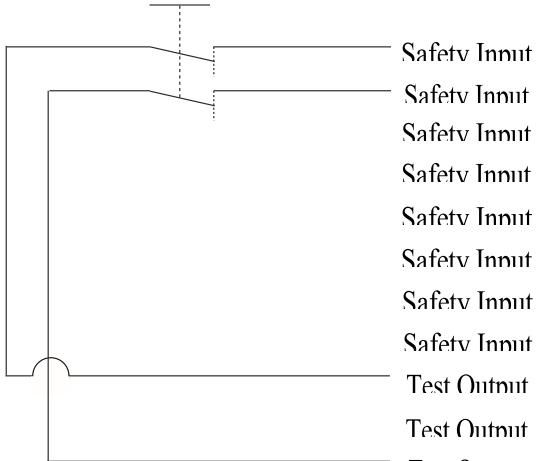
2. Install the 5069-FPD field potential distributor to establish a

- second SA bus.
3. Install the modules use the type of SA power, for example on the second SA bus.
- The SA to adjacent power



electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.

power
that
other
AC,
power
power
SA

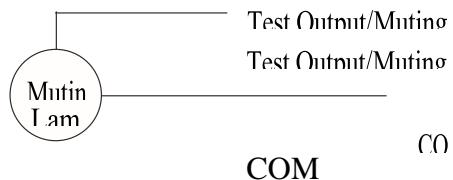


IMPORTANT:
When the power supply and muting lamp are configured for a test output, you must connect the return wire on the device to a COM point on the module.

Test
Outp
ut 1

Test
Output/Muting
Output 2

Test
Output/Muting
Output 2



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

To achieve that suitability rating, you must meet the following requirements:

- Fault Exclusion is External Wiring fault.

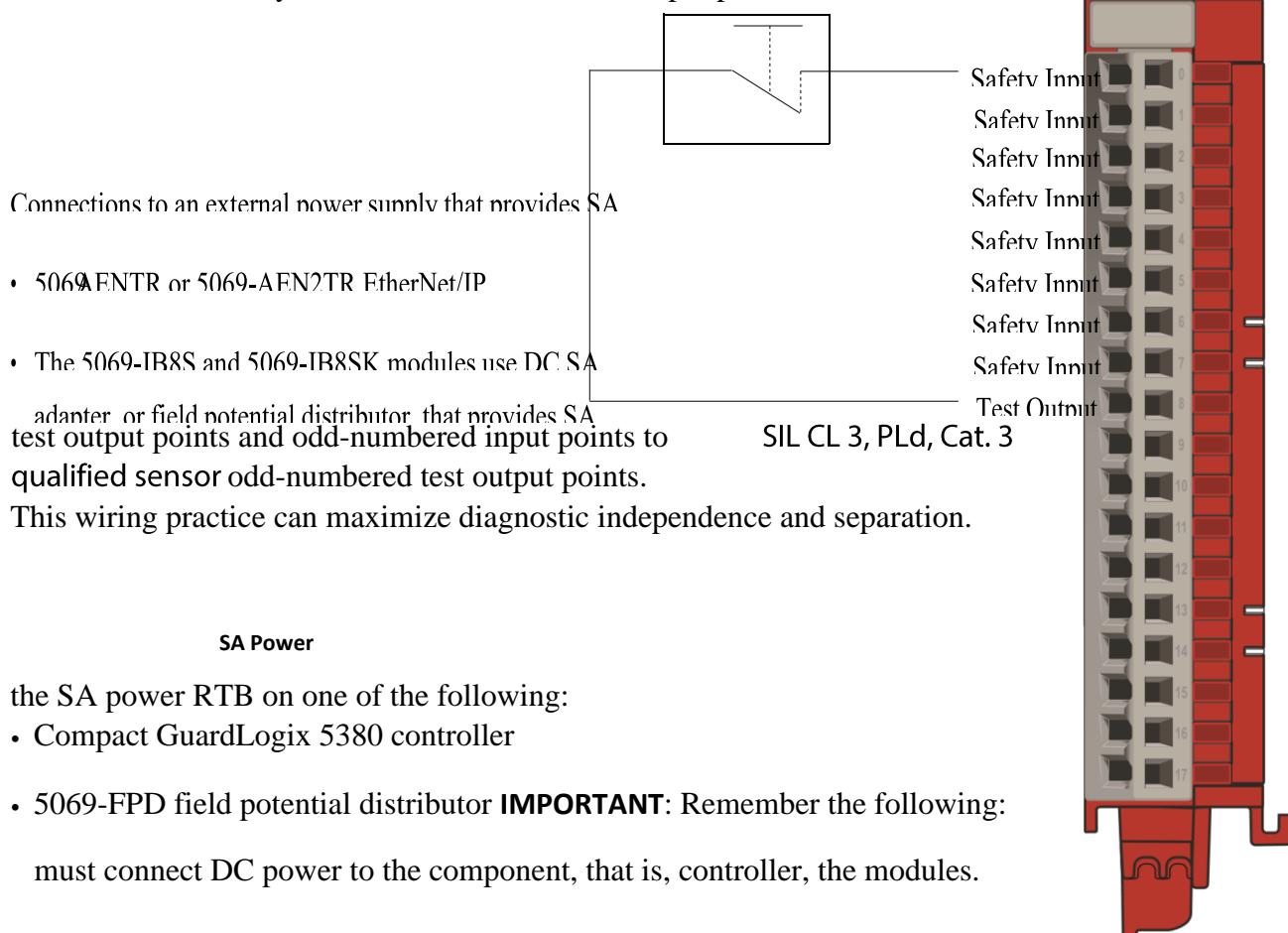
- Use a SIL CL 3, PLd, Cat. 3 qualified sensor.
- One of the following configuration combinations:
 - Input Point Mode = Safety Pulse Test
 - Test Output Mode = Pulse Test
 - Input Point Mode = Safety
 - Test Output Mode = Power Supply

Channel Connections

The diagram shows a device that is connected to safety input channel 0 and test output channel 0. You aren't restricted to using only those channels.

You can connect devices to any safety input channel or combination of channels as needed.

We recommend that you connect even-numbered input points to even-numbered



Output 0 • If you install modules in a system that uses AC SA power and DC SA power, you must install them on separate SA power buses.

• You use a 5069-FPD field potential distributor to establish a new

SA power bus in a system. SA power buses are isolated from each

other. To keep the modules on separate SA power buses, complete Test Output/Muting Output 2 these steps.

Test Output/Muting

Output 2 1. 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 Test Output/Muting Output 3 power bus.

Test Output/Muting

Output 3 2. Install the 5069-FPD field potential distributor to establish a second SA power bus.

COM

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

COM

- The SA power to adjacent SA power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.

Technical Specifications - 5069-IB8S and 5069-IB8SK

5069-IB8S, 5069-IB8SK	
Attribute Safety Inputs	
On-state voltage, min	10V DC
On-state voltage, nom	24V DC
On-state voltage, max	32V DC
On-state current, min	1.8 mA
On-state current, nom	2 mA
On-state current, max	2.2 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input delay time	
Off to On	User selectable time: 0 ms...50 ms Default is 0 ms
On to Off	User selectable time: 0 ms...50 ms Default is 0 ms
Safety integrity level (SIL)	SIL CL 3, PLe, Cat. 4
Safety reaction time (SRT)	6 ms
Test Outputs	
Output current per channel, max	0.3 A
Output current per group, max	1.2 A
Output current per module, max	1.2 A
Test output pulse width	< 700 µs
Test output pulse period	< 100 ms
Test output field capacitance, max	0.5 µF
Test output short circuit protection	Yes

Test output leakage current	1.5 mA
Test output overvoltage protection ⁽¹⁾	Yes
SA power reverse voltage protection	Yes
SA power overvoltage protection, max	36.5V DC
Time stamp of inputs	No
CIP Sync™	Yes
Overrides	No
Pulse latching	No
Events	No
Pattern matching	No
Extended counters	No
Scheduled outputs	No
Power consumption	3.8 W

(1)Also known as Thermal Shutoff.

General Specifications - 5069-IB8S, 5069-IB8SK

Attribute	5069-IB8S, 5069-IB8SK
Inputs	8 channels, safety sinking
Test Outputs	2 test output channels 2 test output/muting output channels
Voltage category	12/24V DC source
Voltage and current ratings - System is mounted in Horizontal orientation	
Input Rating	2.5 mA per channel
Test Output Rating	300 mA per channel
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	5 A @ 18...32V DC
SA power	100 mA @ 18...32V DC
SA power Passthrough, max ⁽²⁾	9.95 A @ 18...32V DC
Voltage and current ratings - System is mounted in any orientation other than Horizontal (module de-rating) ⁽³⁾	
Input Rating	2.5 mA per channel
Test Output Rating	200 mA per channel
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	5 A @ 18...32V DC
SA power	100 mA @ 18...32V DC
SA power Passthrough, max ⁽²⁾	5 A @ 18...32V DC

Do not exceed 5 A MOD or SA power Passthrough current draw in any orientation other than Horizontal.

Power dissipation, max	3.5 W
Thermal dissipation, max	4 W
Isolation voltage	250V (continuous), Basic Insulation Type
Module keying	Electronic module keying, software configurable
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 12 yellow/red I/O status indicators

General Specifications - 5069-IB8S, 5069-IB8SK

Attribute	5069-IB8S, 5069-IB8SK
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None
Wire type	Copper
Wire category ⁽⁴⁾	2 - signal ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SCREW removable terminal block	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
5069-RTB18-SPRING removable terminal block	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 connections	12 mm (0.47 in.)
5069-RTB18-SPRING connections	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⁾ Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#),

CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (3) The additional supported mounting orientations are Inverted Horizontal, Vertical, Inverted Vertical, Upside Down, and Upside Up.
- (4) Use this Conductor Category information for planning conductor routing. For more information, see the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#) and the appropriate system-level installation manual.

Environmental Specifications - 5069-IB8S, 5069-IB8SK

Attribute	5069-IB8S, 5069-IB8SK
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Temperature, surrounding air, maximum	
System is mounted in Horizontal orientation	60 °C (140 °F)
System is mounted in any orientation other than Horizontal (module de-rating) ⁽¹⁾	50 °C (122 °F)
Temperature, ambient, max	
System is mounted in Horizontal orientation	60 °C (140 °F)
System is mounted in any orientation other than Horizontal (module de-rating) ⁽¹⁾	50 °C (122 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	4.5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges

Radiated RF immunity IEC 61000-4-3	20V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 20V/m with 200 Hz 50% pulse 100% AM at 900 MHz 20V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on DC supply ports

(1)The additional supported mounting orientations are Inverted Horizontal, Vertical, Inverted Vertical, Upside Down, and Upside Up.

Certifications - 5069-IB8S, 5069-IB8SK

Certification ⁽¹⁾	5069-IB8S, 5069-IB8SK
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/42/EC MD, compliant with: <ul style="list-style-type: none"> • EN 60204-1; Electrical equipment of machines • EN ISO 13849-1; Safety-related parts of control systems • EN 62061; Functional safety of safety-related control systems • Cat. 4/PLe according to EN ISO 13849-1, and SIL 3 according to EN 626011/IEC 61508/IEC 62511 European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> • EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • Ex nA IIC T4 Gc • DEMKO 18 ATEX 2019X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • Ex nA IIC T4 Gc • IECEx UL 18.0014X
TÜV	TÜV Certified for Functional Safety; ⁽²⁾ <ul style="list-style-type: none"> • Capable of SIL 3, CAT. 4/PLe
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: <ul style="list-style-type: none"> • Article 58-2 of Radio Waves Act, Clause 3

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

- (2) When used with specified firmware revisions. See the Product Safety Certificate at <http://www.rockwellautomation.com/global/certification/overview.page> for a full list of safety-related certifications.

5069-OBV8S and 5069-OBV8SK Safety Output Modules

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

Bipolar Mode

When the module is wired as shown, and the requirements listed are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1.

To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.

- We **strongly recommend** that you connect separate shielded cables to the P terminal and the N terminal to reduce the possibility of a wire short between the terminals. If a wire-short fault is detected across the P-N pair, the module outputs are turned off, but the actuator that is connected to it remains on.
- Configure the application so that No Load and Overload conditions are only detectable at the P terminal.

For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of the following actions:

- Apply output monitoring at the actuator. The monitoring can be direct or indirect.
- Limit the safe state to no more than 24 hours.
- Conduct functional test if safe state dwell time increases.

Actuator LA Power

In this wiring configuration, you must connect the **LA+ terminal to an SELV/PELV-listed power supply**.

The LA+ and LA- on the actuator must be connected to the same power supply as the LA+ and LA- on the module.

Connection Pairs

The terminals for each channel function as a Bipolar connection pair when you use a 5069-OBV8S or 5069-OB8VSK module in Bipolar switching mode. For example, the Safety Output 0 P (Sourcing) terminal and Safety Output 0 N (Sinking) terminal are a Bipolar connection pair. That is, they are a P-N pair. When the module is in Bipolar switching mode, you must connect the device to both terminals.

Channel Connections

This wiring example shows connections to the P-N pair for Safety Output 0. You aren't limited to using channel 0 in this mode. You can use all channel pairs as determined by your application.

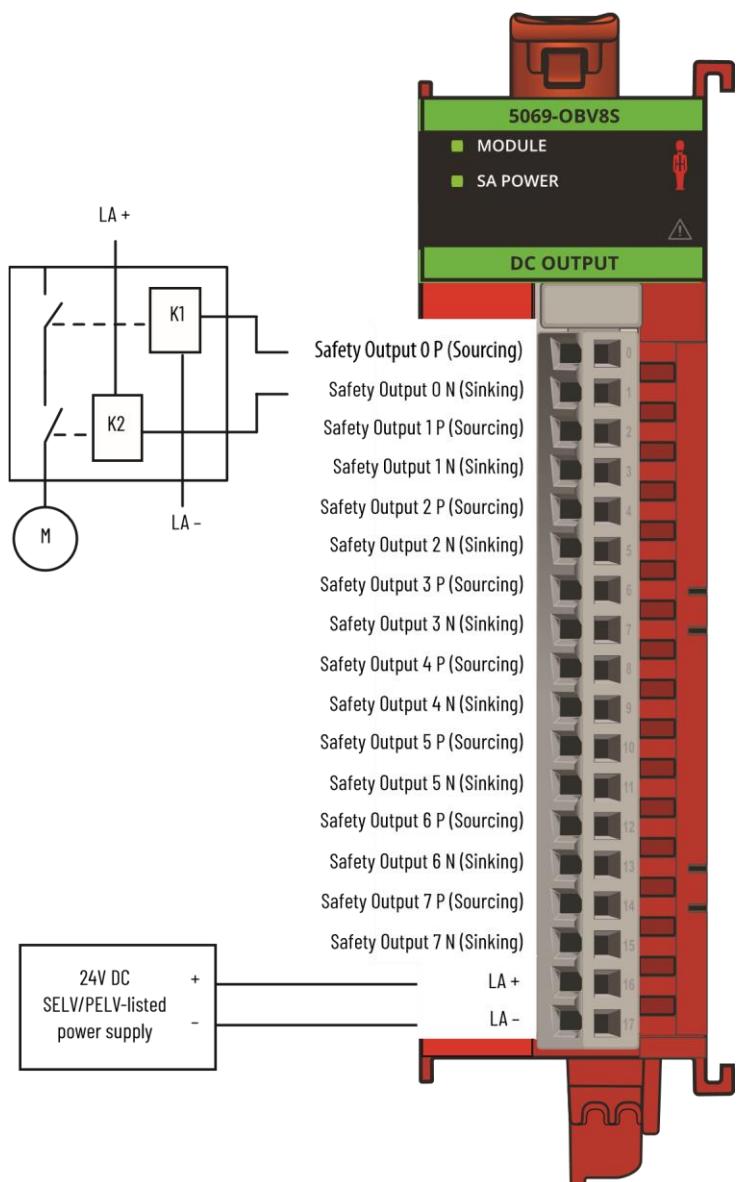
LA Power

The Local Actuator (LA+ and LA-) power connections are used to supply field-side power to the module.

- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus**.

Still, the modules are DC-type modules and you must install them on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a 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 DC, 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 AC, on the second SA power bus.



- We **strongly recommend** that, if you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.

When the module is wired as shown, and the requirements listed are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1.

To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC. Configure the application so that a No Load fault can only be detected if the wires from both the P- terminal and the N- terminal are disconnected.

For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of the following actions:

- Apply output monitoring at the actuator. The monitoring can be direct or indirect.
- Limit the safe state to no more than 24 hours.
- Conduct functional test if safe state dwell time increases.

Connection Pairs

The terminals for each channel function as a Bipolar connection pair when you use a 5069-OBV8S or 5069-OBV8SK module in Bipolar switching mode. For example, the Safety Output 0 P (Sourcing) terminal and Safety Output 0 N (Sinking) terminal are a Bipolar connection pair. That is, they are a P-N pair.

When the module is in Bipolar switching mode, you must connect the device to both terminals.

Channel Connections

This wiring example shows connections to the P-N pair for Safety Output 0. You aren't limited to using channel 0 in this mode. You can use all channel pairs as determined by your application.

LA Power

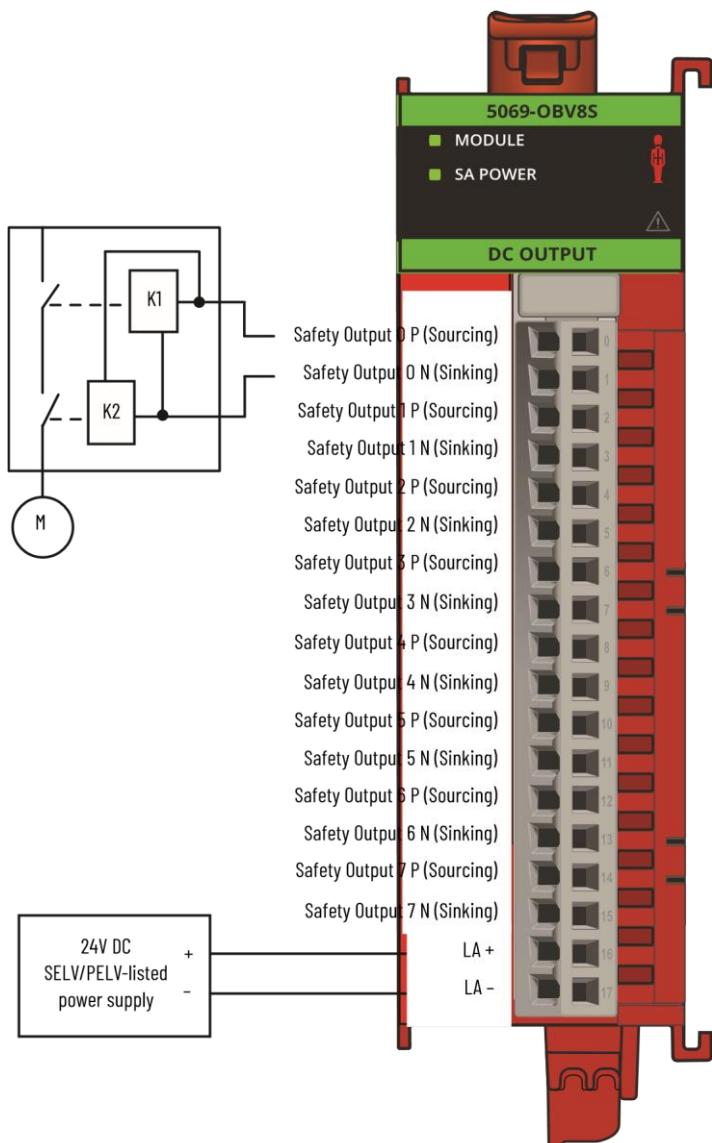
The Local Actuator (LA+) and LA-) power connections are used to supply field-side power to the module.

- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus.**

Still, the modules are DC type modules, and you must install them on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a 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 DC, 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 AC, on the second SA power bus.
- We **strongly recommend** that, if you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.

When the module is wired as shown, and the requirements listed are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1. To achieve that



suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.

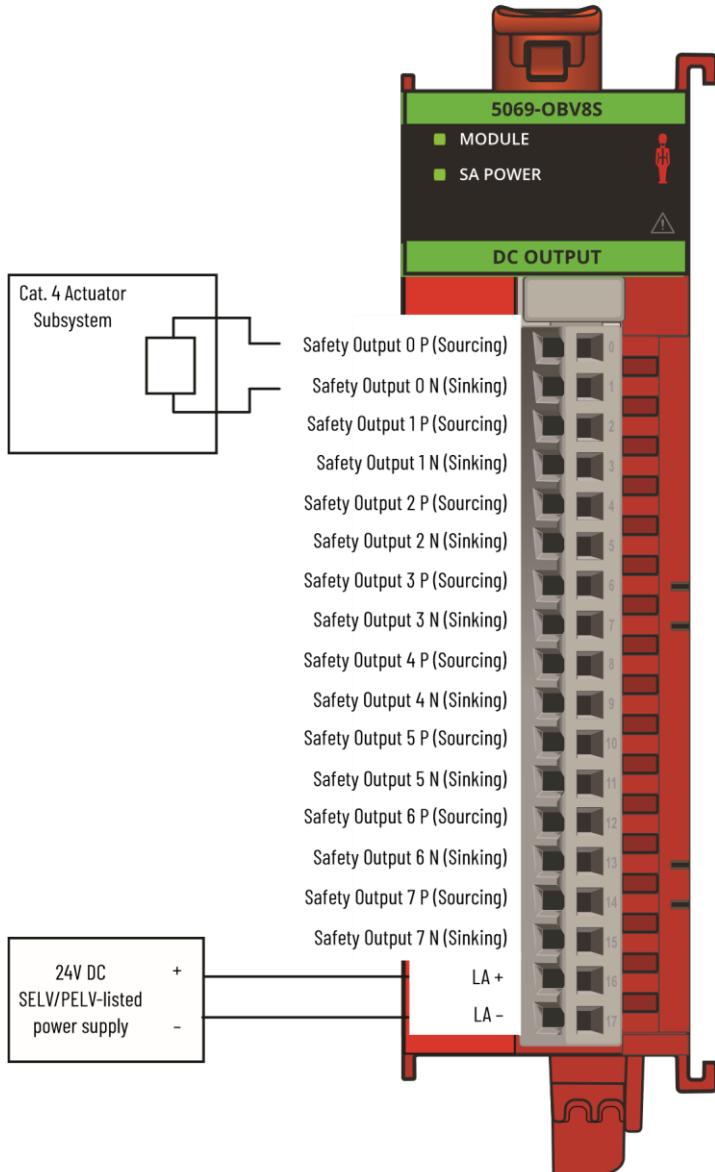
For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of the following actions:

- Apply output monitoring at the actuator. The monitoring can be direct or indirect.
- Limit the safe state to no more than 24 hours.
- Conduct functional test if safe state dwell time increases.
- A qualified actuator must be installed, for example, in accordance with IEC 60947.

Connection Pairs

The terminals for each channel function as a Bipolar connection pair when you use a 5069-OBV8S or 5069-OB8VSK module in Bipolar switching mode. For example, the Safety Output 0 P (Sourcing) terminal and Safety Output 0 N (Sinking) terminal are a Bipolar connection pair. That is, they are a P-N pair.

When the module is in Bipolar switching mode, you must connect the device to both terminals.



Channel Connections

This wiring example shows connections to the P-N pair for Safety Output 0. You aren't limited to using channel 0 in this mode. You can use all channel pairs as determined by your application.

LA Power

The Local Actuator (LA+ and LA-) power connections are used to supply field-side power to the module.

- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus.**

Still, the modules are DC type modules, and you must install them on a DC SA power bus

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.

- You use a 5069-FPD field potential distributor to establish a new SA power bus in a 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 DC, 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 AC, on the second SA power bus.
- We **strongly recommend** that if, you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.
- The SA power to adjacent SA power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.

Sourcing Mode

When the module is wired as shown, it is suitable for applications that are rated up to, and including, **Category 2** as defined in ISO 13849-1.

To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.

Channel Connections

This wiring example shows connection to Safety Output 0. You aren't limited to using channel 0 in this mode. You can use all channels as determined by your application.

LA Power

The Local Actuator (LA+ and LA-) power connections are used to supply field-side power to the module.

- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus.**

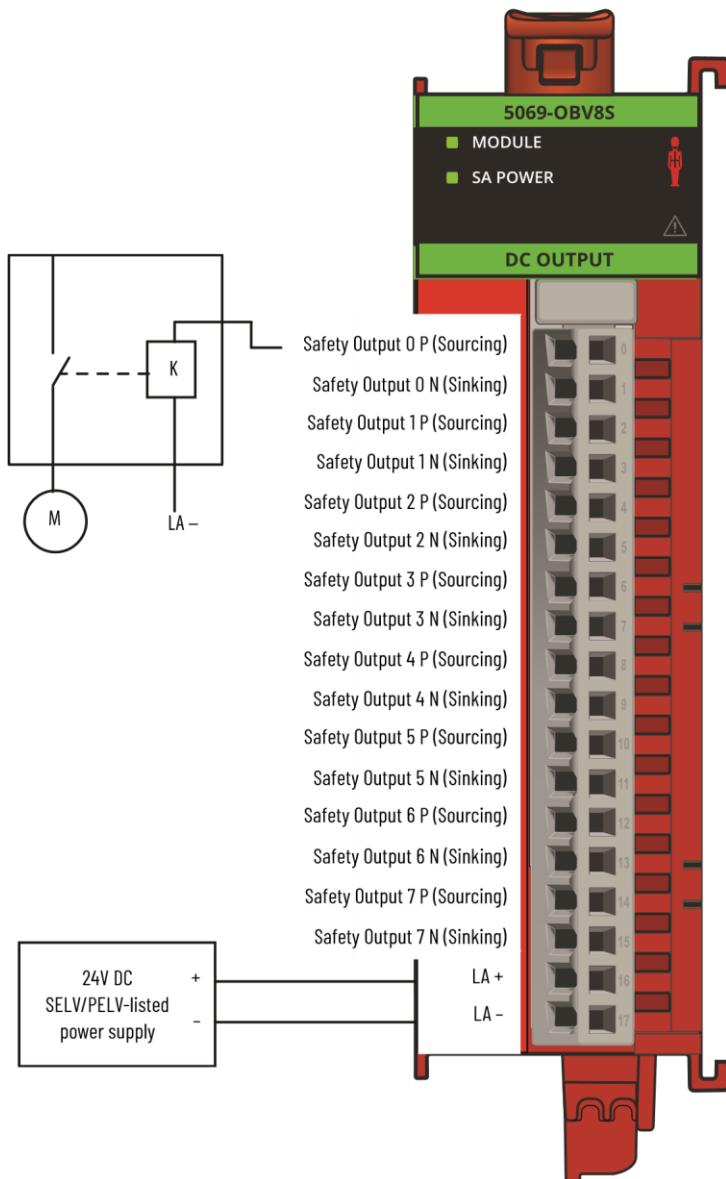
Still, the modules are DC type modules, and you must install them on a DC SA power bus

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a 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 DC, 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 AC, on the second SA power bus.
- We **strongly recommend** that, if you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.

When the module is wired as shown, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1.

To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.



For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of these actions:

- Apply output monitoring at the actuator. The monitoring can be direct or indirect.
- Limit the safe state to no more than 24 hours.
- Conduct functional test if safe state dwell time increases.

Connection Pairs

When you use dual-channel sourcing wiring on the 5069-OBV8S or 5069-OBV8SK module, you must connect the devices to dual-channel connection pairs. For example, the devices are connected to channels 4 and 5 because they are a connection pair. The following channels are dual-channel connection pairs:

- Channels 0 and 1 (shown)
- Channels 2 and 3
- Channels 4 and 5
- Channels 6 and 7

Channel Connections

This wiring example shows connections to Safety Output 0 P and Safety Output 1 P. You aren't limited to using channels 0 and 1 in this mode. You can use all channel pairs as determined by your application.

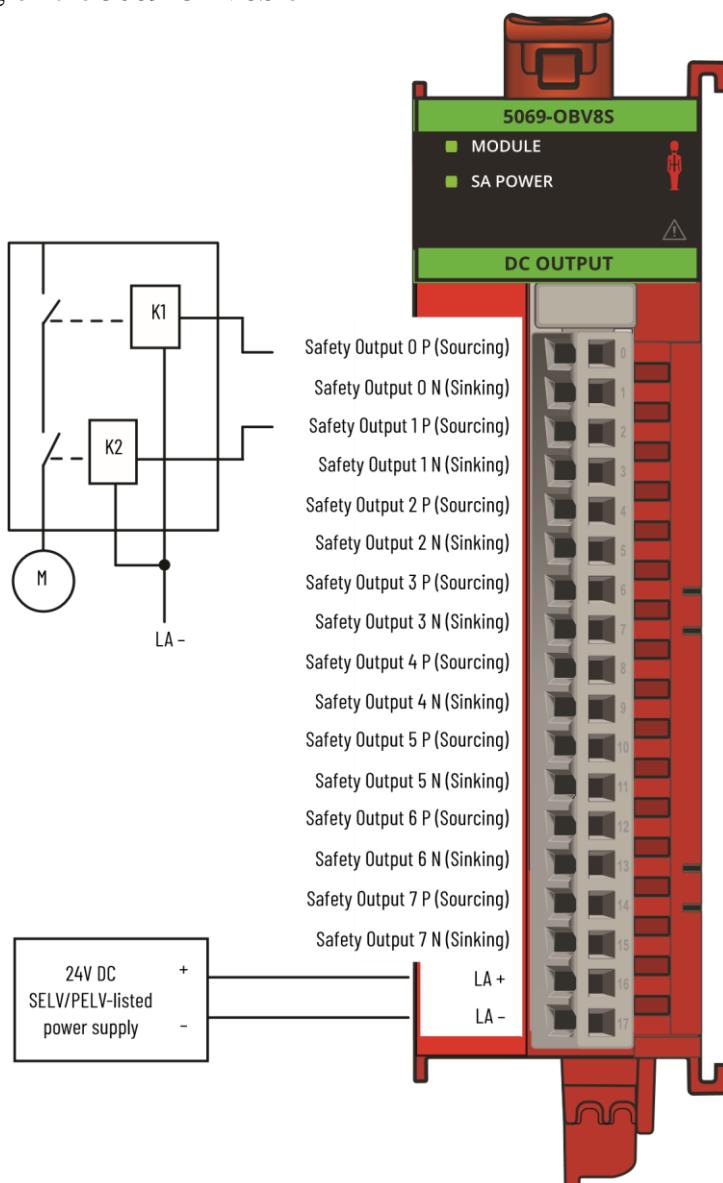
LA Power

The Local Actuator (LA+) and LA-) power connections are used to supply field-side power to the module.

- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus.**

Still, the modules are DC type modules, and you must install them on a DC SA power bus

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
 - You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
1. 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.



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 AC, on the second SA power bus.
 - We **strongly recommend** that, if you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.

When the module is wired as shown on [page 96](#), and the requirements listed are met in the project of the safety controller, it is suitable for applications that are rated up to, and including, **Category 4** as defined in ISO 13849-1.

To achieve that suitability rating, you may have to perform diagnostic testing and monitoring of the safety function. One diagnostic test method is to configure the safety output channel for Safety Pulse Test to test the circuit for short circuits to 24V DC.

- All power source cables must be installed separately, for example, with a separate cable duct or shielded cable. Power source cables are connections to the MOD+, SA+, or LA+ terminals. Otherwise, a Short Circuit condition between SA+ and P can be detected and the output is turned off but the actuator that is connected to it remains on.
- You must connect two ground terminals. Otherwise, the maximum residual current at signal 0 cannot be maintained if only one ground line is connected and it is interrupted.
- A qualified actuator must be installed, for example, in accordance with IEC 60947.

For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of these actions:

- Apply output monitoring at the actuator. The monitoring can be direct or indirect.
- Limit the safe state to no more than 24 hours.
- Conduct functional test if safe state dwell time increases.

Channel Connections

This wiring example shows connections to Safety Output 0. You aren't limited to using channel 0 in this mode. You can use all channels as determined by your application.

LA Power

The Local Actuator (LA+ and LA-) power connections are used to supply field-side power to the module.

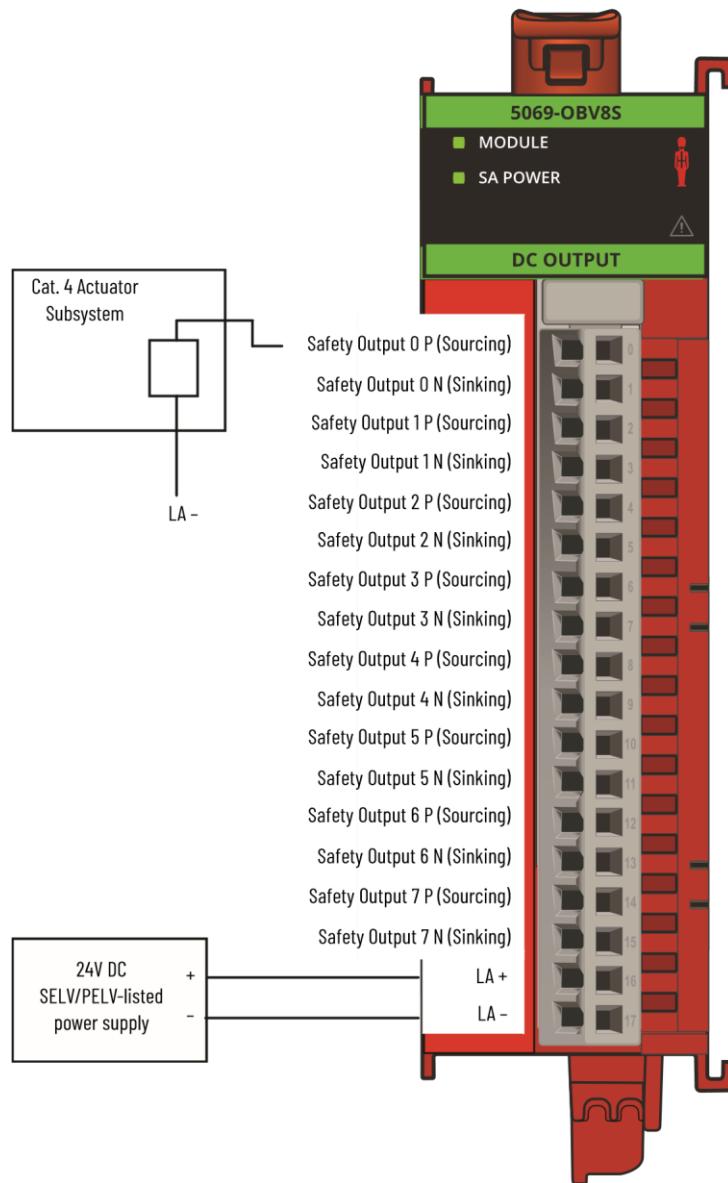
- The 5069-OBV8S and 5069-OBV8SK modules **do not draw current from the SA power bus.**

Still, the modules are DC type modules, and you must install them on a DC SA power bus

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.
 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 AC, on the second SA power bus.
- We **strongly recommend** that, if you have a direct connection between the safety output module and an input module and those modules are powered by separate power supplies, that you connect SA- and LA- together. This practice helps to eliminate grounding float from disrupting diagnostics.

Technical Specifications - 5069-OBV8S, 5069-OBV8SK

Attribute	5069-OBV8S, 5069-OBV8SK
On-state voltage, min ⁽¹⁾	17.5V DC
On-state voltage, nom ⁽¹⁾	24V DC



On-state voltage, max ⁽¹⁾	32V DC
On-state voltage drop, max ⁽¹⁾	0.5V DC
On-state current per channel, min ⁽¹⁾	10 mA
Off-state voltage, max ⁽¹⁾	0.5V DC
Off-state leakage current per point, max ⁽²⁾	1.5 mA
Output current rating per channel	1 A
Surge current per point, max	1.5 A
Output delay time (backplane to screw)	
Off to On	4 ms, max
On to Off	4 ms, max
Safety Integrity Level	SIL CL 3, PLe, Cat. 4
Safety reaction time (SRT)	4.5 ms
Pulse width, min	400 µs
Field power loss detection	Yes (per point)
No load detection diagnostics	Yes (per point)
Output short circuit/overload detection	Yes (per point)
Output short circuit/overload protection	Yes (per point)
Output overtemperature detection	Yes (per point)
Output overtemperature protection	Yes (per point)
Reverse voltage protection	Yes
Oversupply protection, max	Yes
CIP Sync	Yes
Output control in fault mode per point	No
Output states in program mode per point	Off
Output states in fault mode per point	Off
Duration of fault mode per point	Forever - Safety outputs turn off when the fault is detected and remain off until the cause of the fault is removed and the safety outputs are commanded into the safe state.

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

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

General Specifications - 5069-OBV8S, 5069-OBV8SK

Attribute	5069-5069-OBV8S, 5069-OBV8SK
Outputs	8

Voltage category	24V DC
Voltage and current ratings - System is mounted in Horizontal orientation	
Output Rating	1 A per channel
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	5 A @ 18...32V DC
LA Power	1 A per channel @ 18...32V DC 8 A per module @ 18...32V DC
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 18...32V DC
Do not exceed 5 A Mod power Passthrough current draw. Do not exceed 10 A or SA power Passthrough current draw.	
Voltage and current ratings - System is mounted in any orientation other than Horizontal (module de-rating) ⁽³⁾	
Output Rating	0.7 A per channel
Mod power	75 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	5 A @ 18...32V DC
LA Power	0.7 A per channel @ 18...32V DC 5.6 A per module @ 18...32V DC
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	5 A @ 18...32V DC
Do not exceed 5 A MOD or SA power Passthrough current draw in any orientation other than Horizontal.	
Power dissipation, max	6.5 W
Thermal dissipation, max	6.5 W
Isolation voltage	250V (continuous), Basic Insulation Type No isolation between LA power and output ports No isolation between individual output ports
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Slot width	1.5
Dimensions (HxWxD), approx	144.57 x 36 x 105.42 mm (5.69 x 1.42 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N·m (3.5 lb·in)
RTB keying	None

General Specifications - 5069-OBV8S, 5069-OBV8SK

Attribute	5069-5069-OBV8S, 5069-OBV8SK
Wire type	Copper
Wire category ⁽⁴⁾	2 - signal ports 1 wire per terminal for each signal port
Wire size	
5069-RTB18-SCREW connections	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 (9/64 in.) insulated max diameter
5069-RTB18-SPRING connections	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 (1/8 in.) insulated max diameter
Insulation-stripping length	
5069-RTB18-SCREW connections	12 mm (0.47 in.)
5069-RTB18-SPRING connections	10 mm (0.39 in.)
Weight, approx	240 g (0.53 lb.)
Enclosure type rating	None (open-style)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(3) The additional supported mounting orientations are Inverted Horizontal, Vertical, Inverted Vertical, Upside Down, and Upside Up.

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

Environmental Specifications - 5069-OBV8S, 5069-OBV8SK

Attribute	5069-OBV8S, 5069-OBV8SK
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)

Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Temperature, surrounding air, maximum	
System is mounted in Horizontal orientation	60 °C (140 °F)
System is mounted in any orientation other than Horizontal (module de-rating) ⁽¹⁾	50 °C (122 °F)
Temperature, ambient, max	
System is mounted in Horizontal orientation	60 °C (140 °F)
System is mounted in any orientation other than Horizontal (module de-rating) ⁽¹⁾	50 °C (122 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	4.5 g @ 10...500 Hz
Environmental Specifications - 5069-OBV8S, 5069-OBV8SK	
Attribute	5069-OBV8S, 5069-OBV8SK
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	20V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 20V/m with 200 Hz 50% pulse 100% AM at 900 MHz 20V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on signal ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29	10 ms interruption on DC supply ports

(1)The additional supported mounting orientations are Inverted Horizontal, Vertical, Inverted Vertical, Upside Down, and Upside Up.

Certifications - 5069-OBV8S, 5069-OBV8SK

Certification ⁽¹⁾	5069-OBV8S, 5069-OBV8SK
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/42/EC MD, compliant with: <ul style="list-style-type: none"> • EN 60204-1; Electrical equipment of machines • EN ISO 13849-1; Safety-related parts of control systems • EN 62061; Functional safety of safety-related control systems • Cat. 4/PLe according to EN ISO 13849-1, and SIL 3 according to EN 626011/IEC 61508/IEC 62511 European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> • EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • Ex nA IIC T4 Gc • DEMKO 18 ATEX 2019X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • Ex nA IIC T4 Gc • IECEx UL 18.0014X
TÜV	TÜV Certified for Functional Safety; ⁽²⁾ <ul style="list-style-type: none"> • Capable of SIL 3, CAT. 4/PLe
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: <ul style="list-style-type: none"> • Article 58-2 of Radio Waves Act, Clause 3

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

(2) When used with specified firmware revisions. See the Product Safety Certificate at <http://www.rockwellautomation.com/global/certification/overview.page> for a full list of safety-related certifications.

5069-HSC2xOB4 High-speed Counter Module

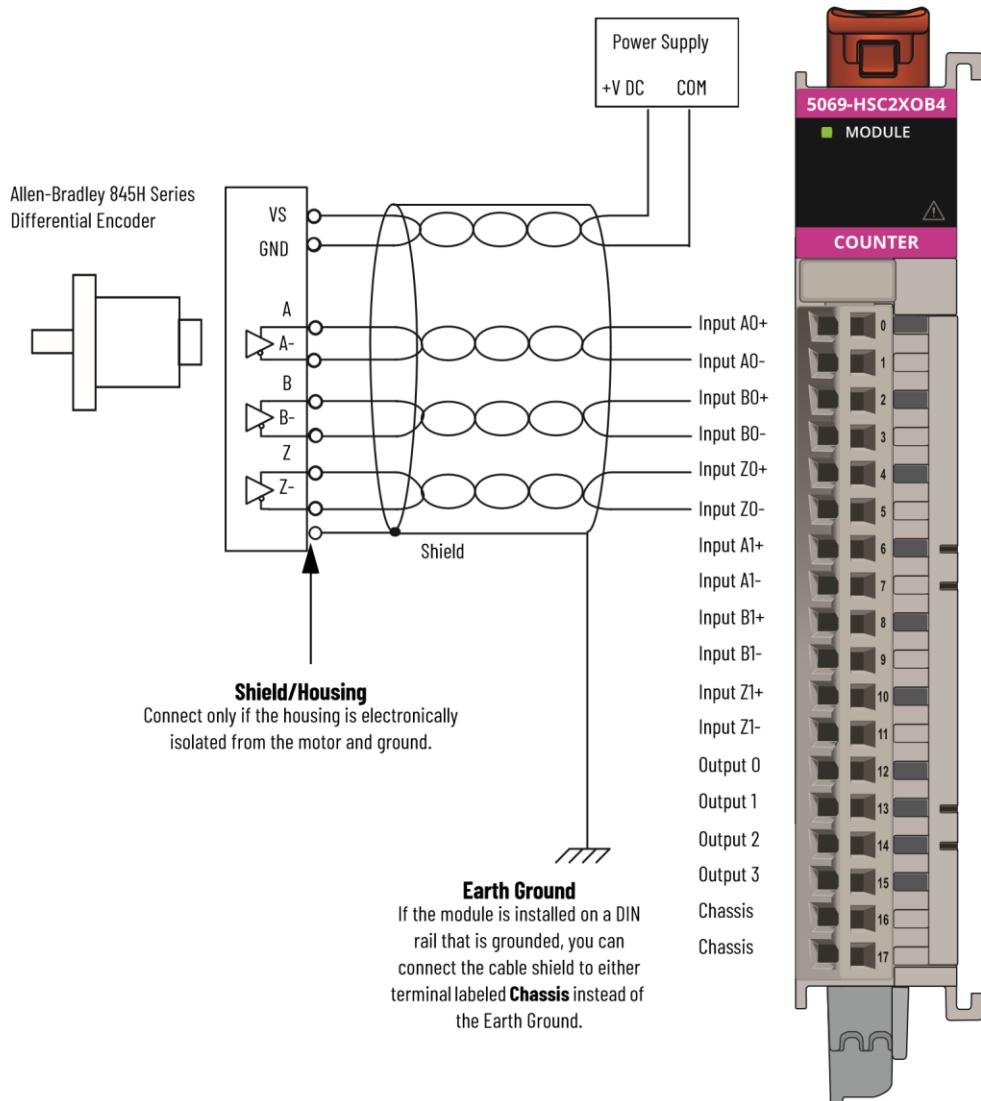
The following figure shows a wiring diagram for the 5069-HSC2xOB4 module connected to a differential encoder.

5069-HSC2xOB4 Wiring Diagram - Differential Encoder

Channel Connections
 The diagram shows connections to channel 0. You aren't restricted to using only that channel.
 You can connect to any channel or combination of channels as needed.

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.



The following figure shows a wiring diagram for the 5069-HSC2xOB4 module connected to a single-ended encoder.

5069-HSC2xOB4 Wiring Diagram - Single-ended Encoder

Channel Connections

The diagram shows connections to channel 0. You aren't restricted to using only that channel. You can connect to any channel or combination of channels as needed.

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.

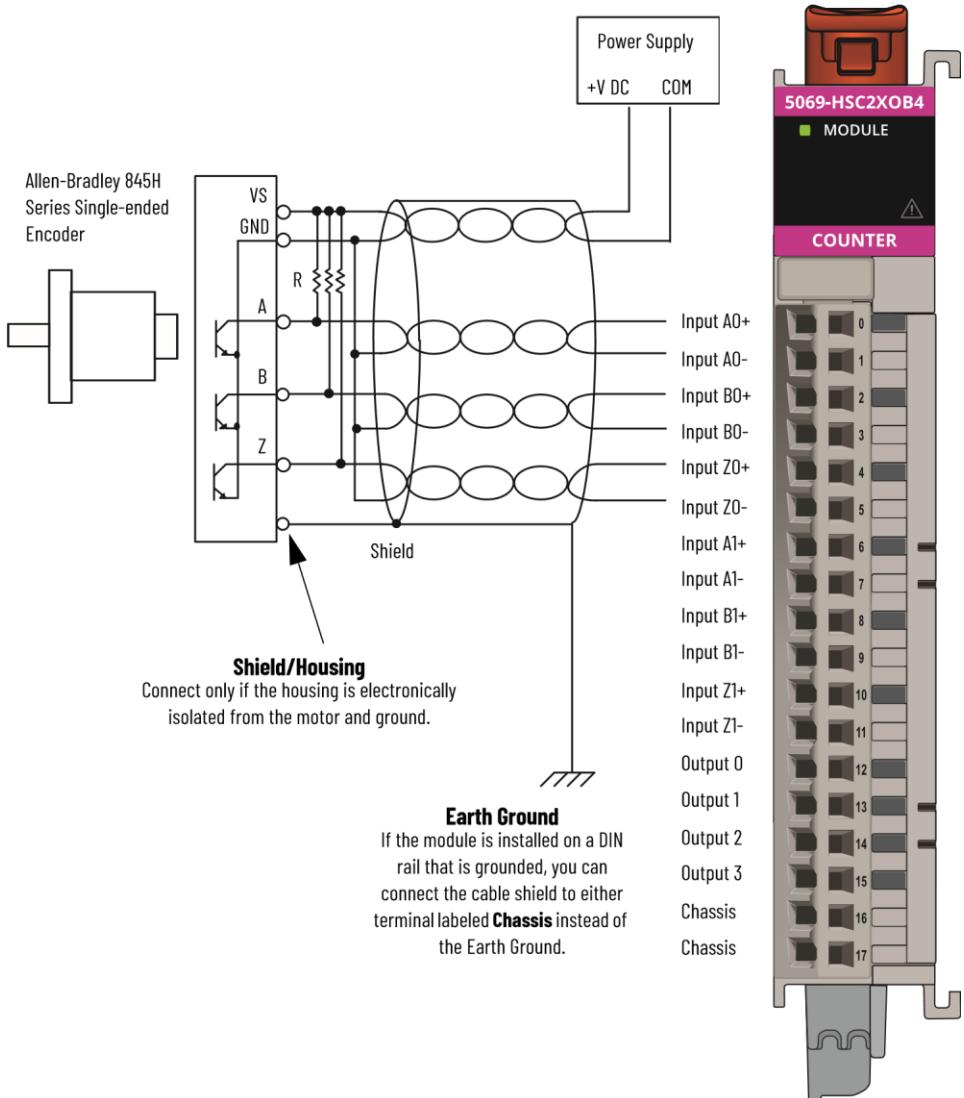
IMPORTANT: External resistors, as indicated in the R location, are required if they aren't internal to the encoder. The pull-up resistor (R) value depends on the power supply value. The following table shows the maximum resistor values for typical supply voltages. To calculate the maximum resistor value,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

$$R = \frac{V_{DC} - V_{min}}{I_{min}}$$

Where:
 R = Maximum pull-up resistor value
 V_{DC} = Power supply voltage
 V_{min} = 3.0V DC
 I_{min} = 4.0 mA

Power Supply Voltage (V DC)	Pull-up Resistor Value (R), Max ⁽¹⁾
5	500 Ω
12	2250 Ω
24	5250 Ω

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



The following figure shows a wiring diagram for the 5069-HSC2xOB4 module connected to a discrete input device.

5069-HSC2xOB4 Wiring Diagram - Discrete Input Devices

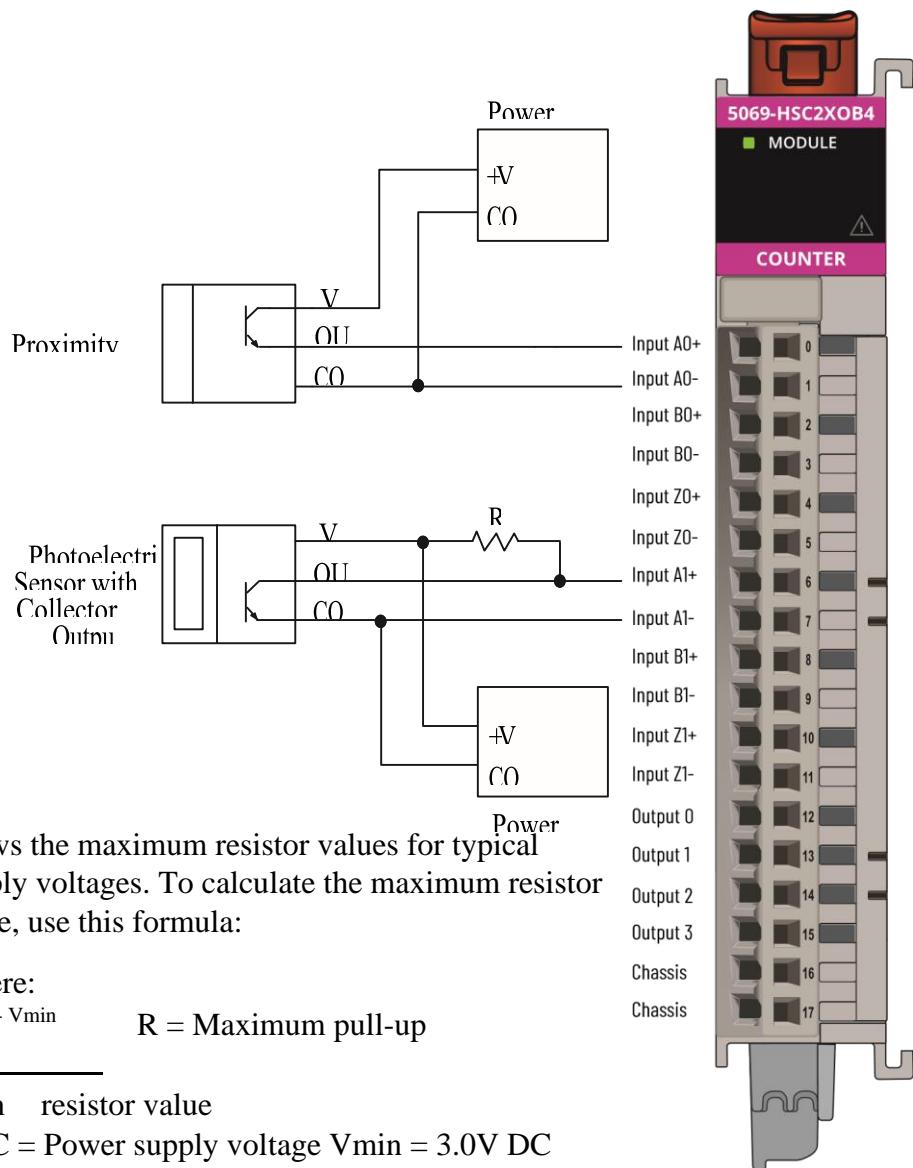
Channel Connections

The diagram shows connections to input channels 0 and 1. You aren't restricted to using only those input channels.

You can connect to any input channel or combination of input channels as needed.

IMPORTANT: External resistors, as indicated in the **R** location to the left, are required if they aren't internal to the encoder. The pull-up resistor (**R**) value depends on the power supply value. The following table

Power Supply DC	Pull-up Resistor Value (R), Max ⁽¹⁾	Shows the maximum resistor values for typical supply voltages. To calculate the maximum resistor value, use this formula: Where: $R = \frac{V_{DC} - V_{min}}{I_{min}}$ resistor value V_{DC} = Power supply voltage $V_{min} = 3.0V$ DC $I_{min} = 4.0$ mA
5	Ω	
12	Ω	$R = \underline{\hspace{2cm}}$
24	Ω	



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

The following figure shows a wiring diagram for the 5069-HSC2xOB4 module connected to a discrete output device.

5069-HSC2xOB4 Wiring Diagram - Discrete Output Devices

Channel Connections

The diagram shows connections to output channels 0 and 2. You aren't restricted to using only those output channels.

You can connect to any output channel or combination of output 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:

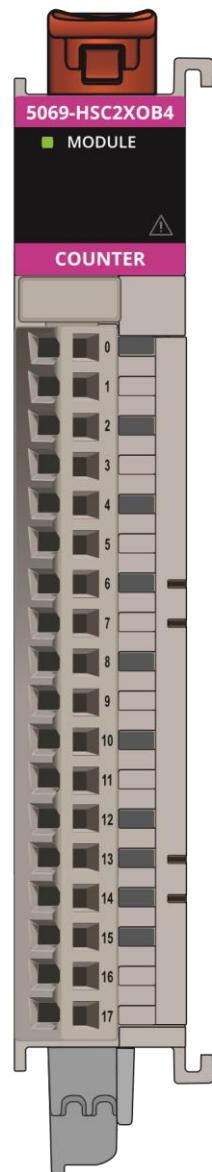
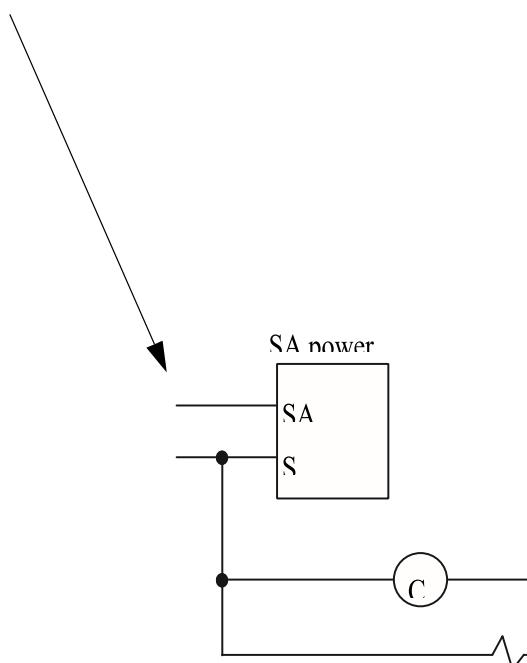
- CompactLogix 5380 controller

- Compact GuardLogix 5380 controller
- CompactLogix 5480 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- 5069-FPD field potential distributor

IMPORTANT:

Remember the following:

- The 5069-HSC2xOB4 module uses DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA power to the module.
- The 5069-HSC2xOB4 module outputs use a shared common. The outputs have a return through internal module circuitry to the SA (-) terminal on the SA power RTB.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.
 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 AC, on the second SA power bus.



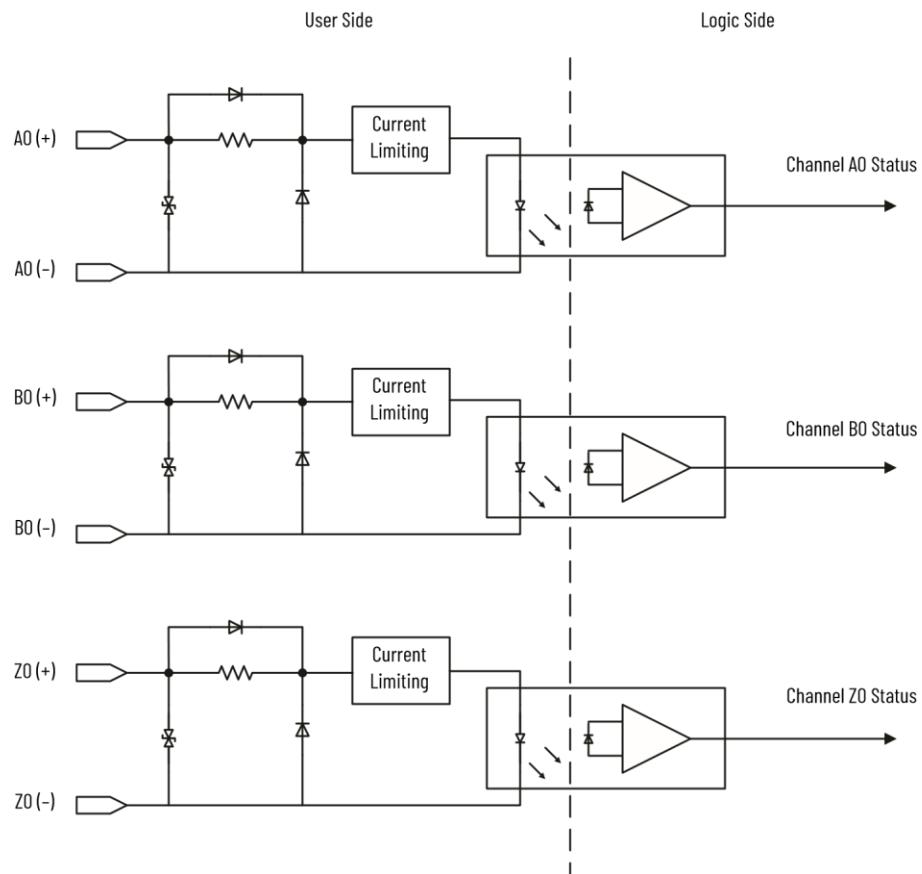
Recommended Surge Suppression

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](#).

The following figure shows functional block diagrams for the 5069-HSC2xOB4 module inputs and outputs.

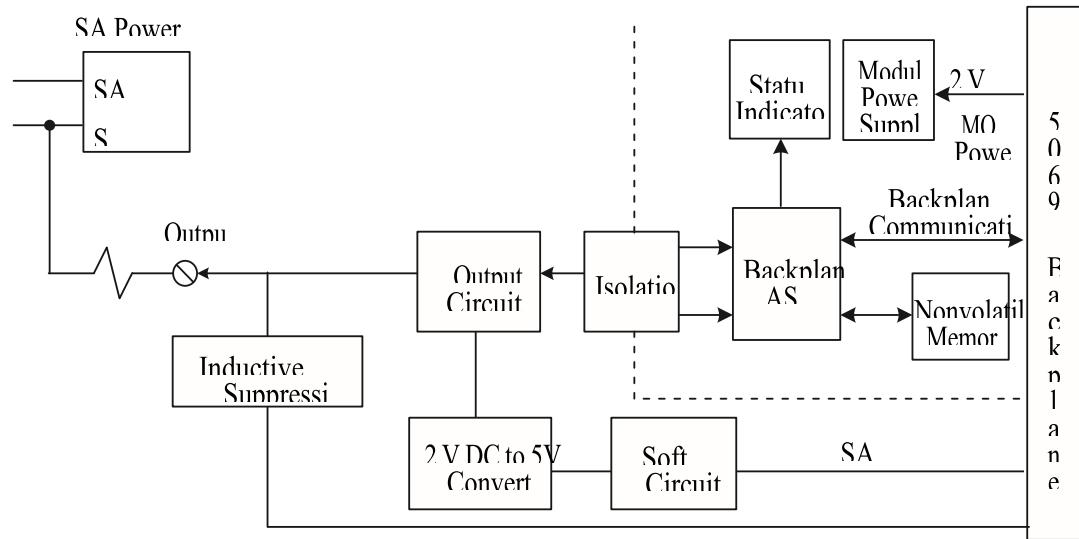
5069-HSC2xOB4 Functional Block Diagram



Module Inputs This graphic shows the diagram for Counter 0. Counter 1 uses the same design. Also, the modules only supports a DC power source.

Module Outputs

Connections to external power supply that provides SA power. For more information, see [page 104](#).



SA-

Technical Specifications - 5069-HSC2xOB4

Attribute	5069-HSC2xOB4
Input current, max	8 mA
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
Output voltage range	10...32V DC
On-state output current, min	1 mA per channel 4 mA per module
Pulse width, min	125 ns
Pulse separation, min	100 ns
No 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)
Output control in fault state per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)

Output states in program mode per point	<ul style="list-style-type: none"> • Hold last state • On • Off (default)
Output states in fault mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default)
Duration of fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default)

General Specifications - 5069-HSC2xOB4

Attribute	5069-HSC2xOB4
Inputs	2 quadrature (ABZ) differential inputs
Outputs	4 Channels (1 group of 4), sourcing
Voltage category	12/24V DC source
Voltage and current ratings	
Counter input ratings	4 mA @ 3...32V DC
Mod power	50 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	3 A @ 18...32V DC
SA power Passthrough, max ⁽²⁾	9.95 A @ 10...32V DC
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	3 W
Thermal dissipation, max	10.2 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type No isolation between SA power and I/O ports No isolation between individual I/O ports Type tested at 1500V AC for 60 s
Module keying	Electronic keying via programming software
Indicators	1 green/red module status indicator 10 yellow/red I/O status indicator
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. • You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	One of these RTB types. <ul style="list-style-type: none"> • 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.
RTB keying	None
RTB torque (5069-RTB18-SCREW RTB only)	0.4 N•m (3.5 lb•in)
Wiring category ⁽³⁾	2 - on shielded output ports 2 - on output power ports 2 - on shielded counter ports

Wire size

5069-RTB18-SPRING connections	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
5069-RTB18-SCREW connections	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
Insulation-stripping length	
5069-RTB18-SPRING connections	10 mm (0.39 in.)
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 temp code	T4
IECEx temp code	T4

- (1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

Environmental Specifications - 5069-HSC2xOB4

Attribute	5069-HSC2xOB4
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95 % noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g

Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on shielded output ports ±2 kV @ 5 kHz on shielded counter ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on shielded output ports ±2 kV line-earth (CM) on shielded counter ports
Conducted RF immunity IEC 61000-4-6	10Vrms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz
Voltage variation IEC 61000-4-29:	10 ms interruption on Mod power port

Certifications - 5069-HSC2xOB4

Certification⁽¹⁾	5069-HSC2xOB4
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1455X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection “n” • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0007X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
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(1)When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

5069-SERIAL Serial Module

The Compact 5000 I/O serial module provides a network interface to RS-232, RS-422, and RS-485 devices. The following figure shows the 5069-SERIAL serial module.

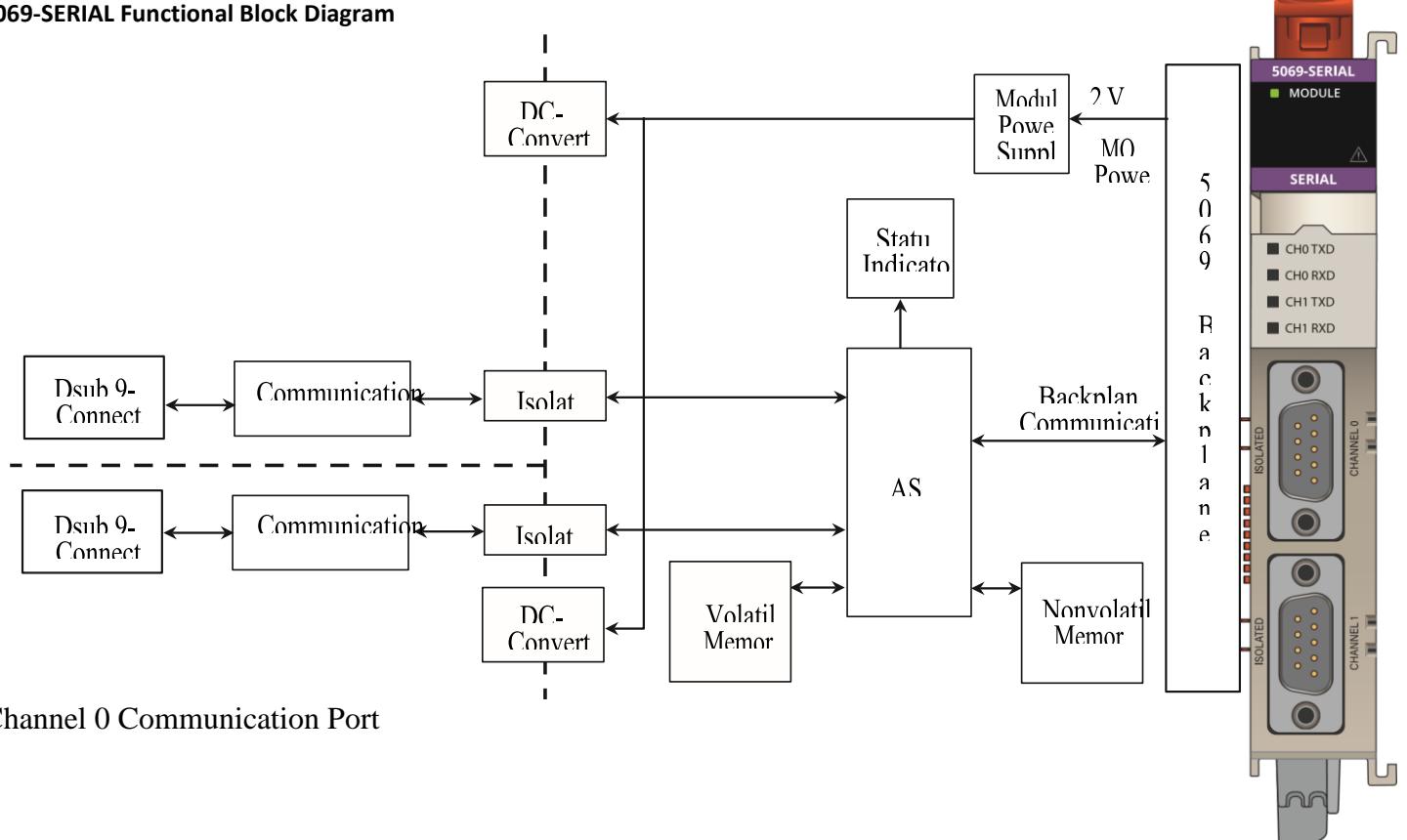
SA Power

The 5069-SERIAL module **does not draw current from the SA power bus.**

Still, the module is a DC-type module, and you must install it on a DC SA power bus.

- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power buses, complete these steps.
 1. 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.
 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 AC, on the second SA power bus.

5069-SERIAL Functional Block Diagram

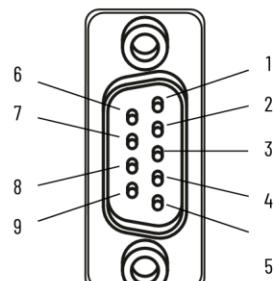


Channel 0 Communication Port

Channel 1 Communication Port

RS-232 Wiring Examples

Pins - RS-232C



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

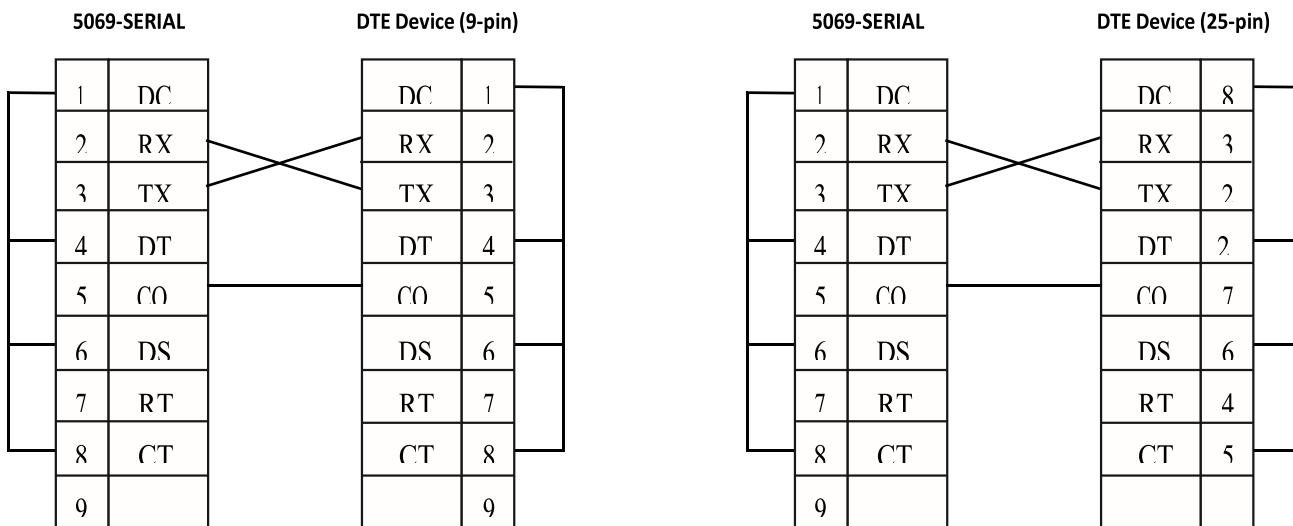
(1) From 5069-SERIAL

(2) A = Changing signal level (Active/Inactive)

(3) B = Fixing signal level (Active/Inactive)

The following graphics show RS-232 wiring.

5069-SERIAL to DTE Device (9-pin or 25-pin) without Hardware Handshaking



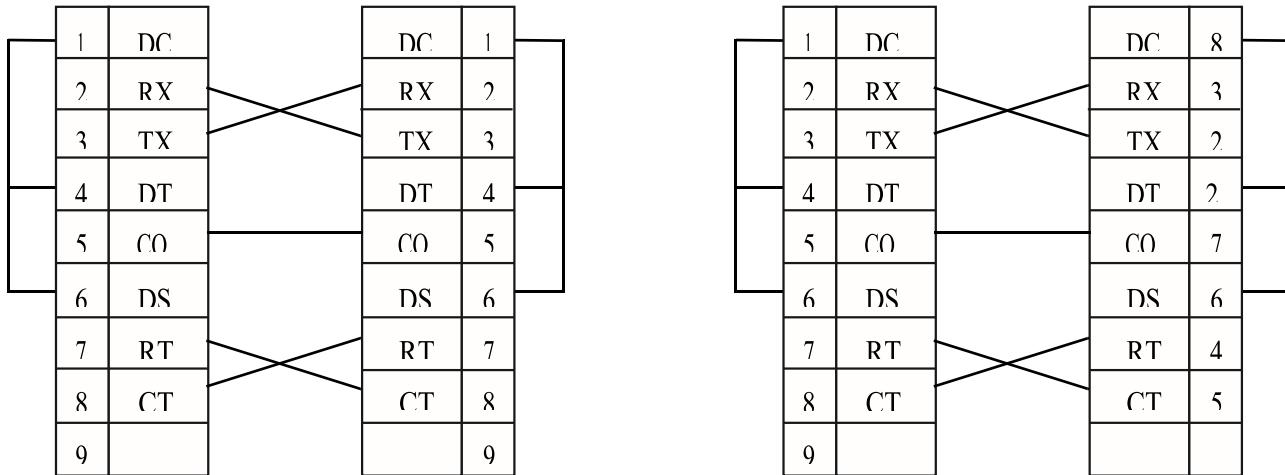
5069-SERIAL to DTE Device (9-pin or 25-pin) with "Half-duplex"

5069-SERIAL

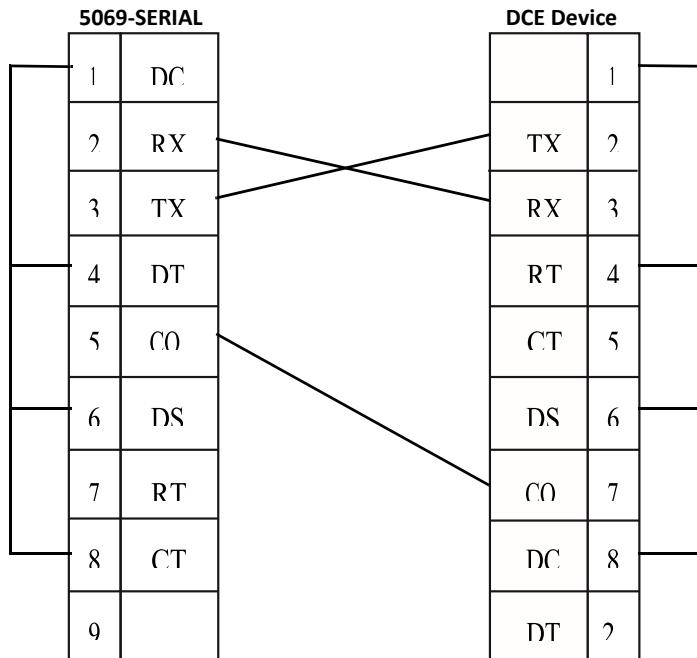
DTE Device (9-pin)

5069-SERIAL

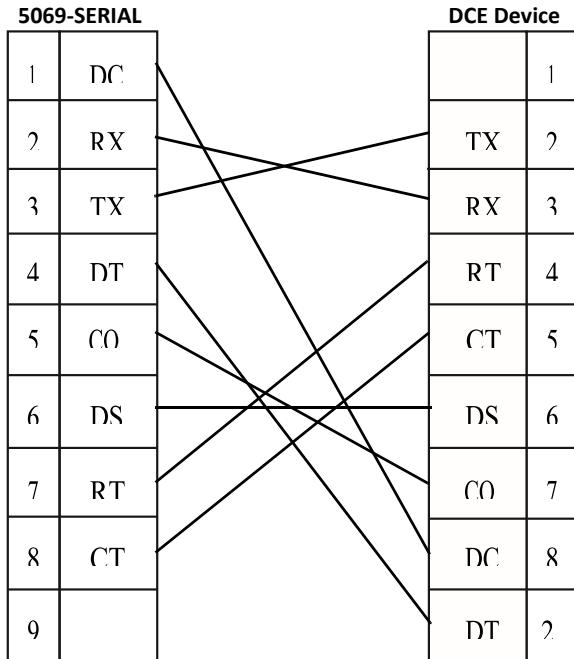
DTE Device (25-pin)



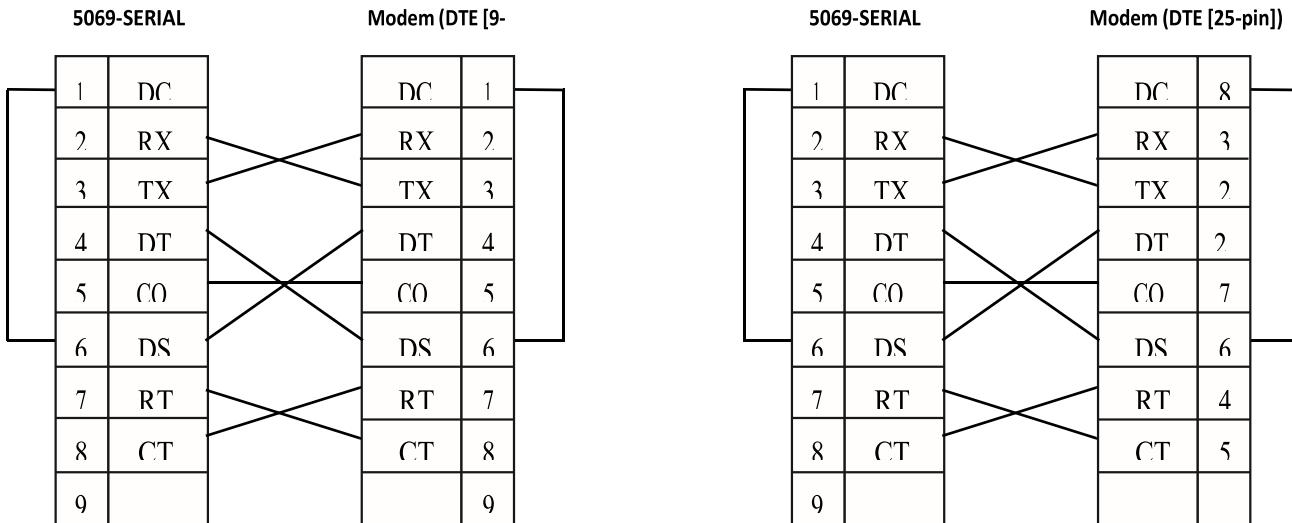
5069-SERIAL to DCE Device with "Full-duplex"



5069-SERIAL to DCE Device (Modem) with “Full or Half-duplex”



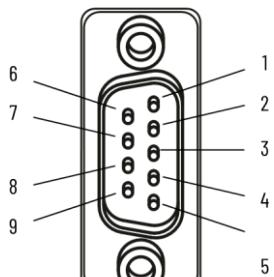
5069-SERIAL to DTE Device (9-pin or 25-pin) with “Full or Half-duplex” or Null Modem



RS-422 Wiring Example

Pins - RS-422

Pin	RS-422	Input (i)/Output (o) ⁽¹⁾	Wiring
1	-	-	-
2	Receive Data + (RXD+)	(i)	A(2)
3	Transmit Data + (TXD+)	(o)	A



4	-	-	B
5	Common (COM)	-	A
6	-	-	-
7	Transmit Data - (TXD-)	(o)	A
8	Receive Data - (RXD-)	(i)	A
9	-	-	-

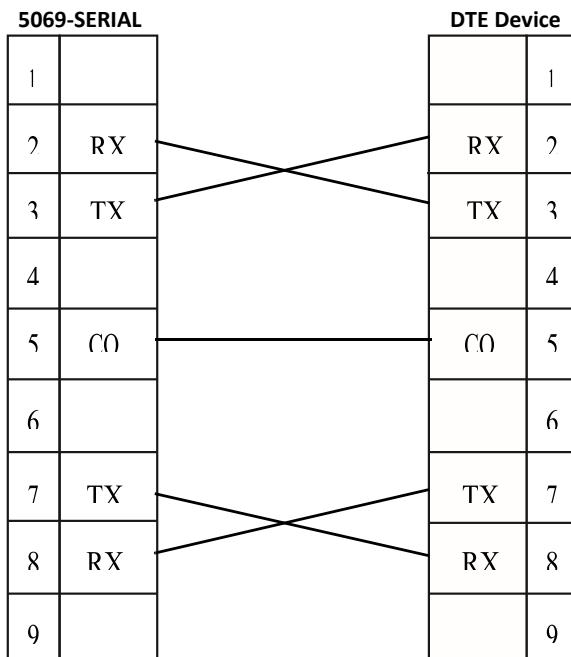
(1) From 5069-SERIAL

(2) A = Changing signal level (Active/Inactive)

The following graphic shows RS-422 wiring.

5069-SERIAL RS-422 Wiring

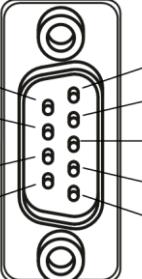
IMPORTANT Place the termination resistor between RxD+ and RxD- to implement this wiring.



RS-485 Wiring Example

Pins - RS-485

Pin	RS-485	Input (i)/Output (o) ⁽¹⁾	Wiring
1	-	-	-
2	-	-	-
3	Transmit/Receive Data + (TRXD+)	(i/o)	A(2)
4	-	-	-



5	Common (COM)	-	A
6	-	-	-
7	Transmit/Receive Data - (TRXD-)	(i/o)	A
8	-	-	-
9	-	-	-

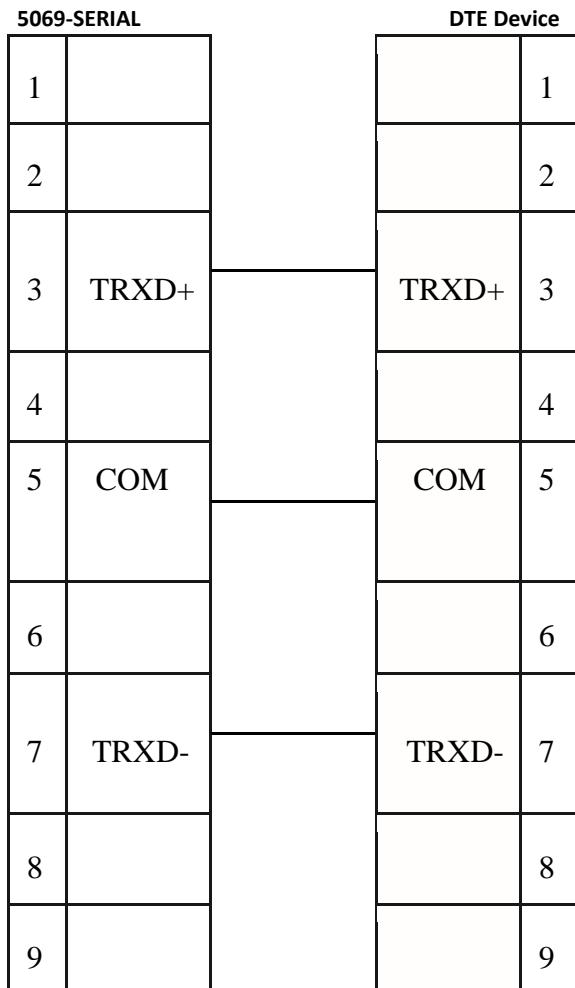
(1) From 5069-SERIAL

(2) A = Changing signal level (Active/Inactive)

The following graphic shows RS-485 wiring.

5069-SERIAL RS-485 Wiring

IMPORTANT Place the termination resistor between TRXD+ and TRXD- to implement this wiring.



Technical Specifications - 5069-SERIAL

Attribute	5069-SERIAL

Operating modes	<ul style="list-style-type: none"> • Generic ASCII• Modbus RTU • Modbus ASCII • DF1 (local Channel 1 only) • DH485 (local Channel 1 only)
Inputs	<ul style="list-style-type: none"> • 2 full-duplex (RS-232, RS-422) • 2 half-duplex (RS-485)
Serial input voltage signal	<ul style="list-style-type: none"> • 3...25V DC regarding signal ground (SG) 0, Asserted, ON, Space, Active • -3...-25V DC regarding signal ground (SG) 1, Disasserted, OFF, Mark, Inactive
Voltage and current ratings	
Mod power	100 mA @ 18...32V DC
Mod power Passthrough, max	9.55 A @ 18...32V DC ⁽¹⁾
SA power Passthrough, max The module does not draw SA power current.	9.95 A @ 0...32V DC ⁽²⁾
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	2.8 W
Thermal dissipation, max	9.6 BTU/hr
Isolation voltage	<p>250V (continuous), Basic Insulation Type, SA and Mod power to Backplane 250V (continuous), Basic Insulation Type, Backplane to Communication Channels 250V (continuous), Basic Insulation Type, Backplane to Chassis Ground 250V (continuous), Basic Insulation Type, Between Communication Channels 250V (continuous), Basic Insulation Type, SA to Mod power 250V (continuous), Basic Insulation Type, Communication Channels to Chassis Ground 250V (continuous), Basic Insulation Type, SA and Mod power to Chassis Ground 250V (continuous), Reinforced Insulation Type, SA and Mod power to Communication Channels Basic Insulation Type tested at 2100V DC for 60 s Reinforced Insulation Type tested at 4200V DC for 60 s</p>
Transmit transaction ID	0...255
Handshaking	RTS/CTS hardware handshake always enabled. RTS/CTS can be controlled by the user.
Module keying	None
Indicators	<p>1 green/red module status indicator 1 transmit data (TXD) and 1 receive data (RXD) yellow/red status indicator per channel</p>
Slot width	1
Dimensions (HxWxD), approx	137.85 x 22 x 105.42 mm (5.43 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB keying	None
Serial port connectors	Two DB-9 male with pins
Wire category ⁽³⁾ ⁽⁴⁾	<p>2 - power ports 2 - communication ports</p>
Weight, approx	175 g (0.39 lb.)
Enclosure type	None (open-style)
Corrosion resistance classification	ISA S71.04 G2
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

- (1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).
- (4) Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Environmental Specifications - 5069-SERIAL

Attribute	5069-SERIAL
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 °C < Ta < 60 °C (32 °F < Ta < 140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 10V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz

EFT/B immunity IEC 61000-4-4	± 4 kV @ 5 kHz on power ports ± 3 kV @ 5 kHz on communication ports
Surge transient immunity IEC 61000-4-5	± 1 kV line-line (DM) and ± 2 kV line-earth (CM) on power ports ± 2 kV line-earth (CM) on communication ports
Conducted RF immunity IEC 61000-4-6	10VRms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz

Certifications - 5069-SERIAL

Certifications ⁽¹⁾	5069-SERIAL
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> • EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4X Gc • DEMKO15ATEX1484X

Certifications - 5069-SERIAL

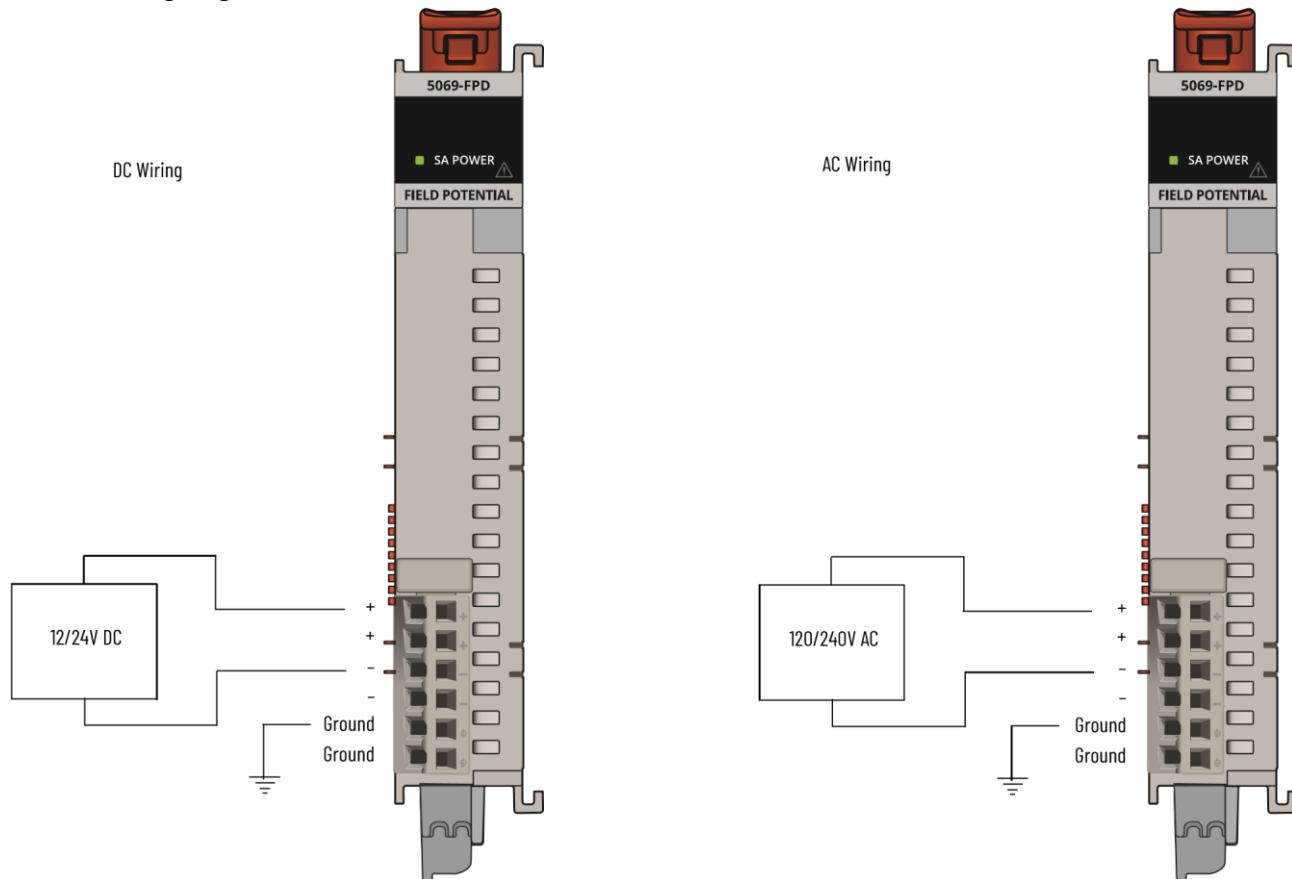
Certifications ⁽¹⁾	5069-SERIAL
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4X Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: <ul style="list-style-type: none"> • Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation

(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

The following figure shows wiring diagrams for the 5069-FPD field potential distributor connected to a discrete input device.

5069-FPD Wiring Diagrams



Technical Specifications - 5069-FPD

Attribute	5069-FPD
Voltage and current ratings	
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	10 mA @ 0...32V DC 25 mA @ 0...240V AC, 47...63 Hz ATEX/IECEX, 125V AC, max
SA power Passthrough, max ⁽²⁾	9.99 A @ 0...32V DC 9.975 A @ 0...240V AC, 47...63 Hz ATEX/IECEX, 125V AC, max
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	4.0 W
Thermal dissipation, max	13.6 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1500V AC for 60 s
Module keying	None
Indicators	1 green module status indicator
Slot width	1
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
RTB	5069-RTB6-SCREW 5069-RTB6-SPRING

RTB torque (5069-RTB4-SCREW RTB only)	0.4 N•m (3.5 in•lb)
RTB keying	None
Wire category ⁽³⁾	2 - on power ports
Wire size	
5069-RTB6-SPRING connections	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.
5069-RTB6-SCREW connections	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-RTB6-SPRING connections	10 mm (0.039 in.)
5069-RTB6-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 temp code	T4
IECEx temp code	T4

(1) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

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

Environmental Specifications - 5069-FPD

Attribute	5069-FPD
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing

Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports
Conducted RF immunity IEC 61000-4-6	10Vrms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz

Certifications - 5069-FPD

Certifications ⁽¹⁾	5069-FPD
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1455X When used at or below 125V AC
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0007X When used at or below 125V AC

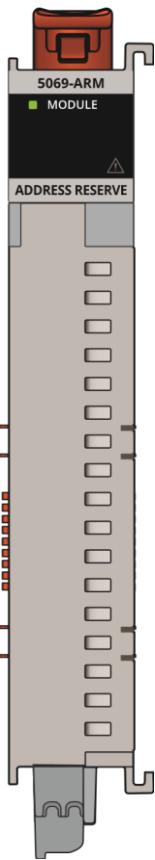
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(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

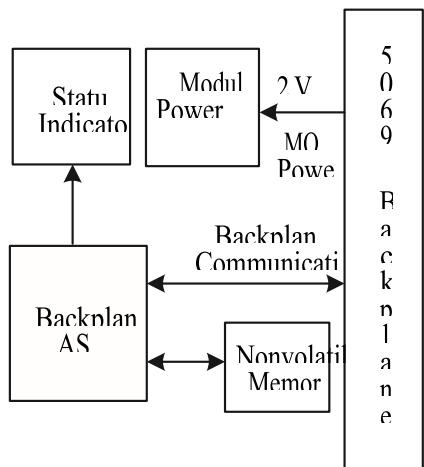
The following figure shows the 5069-ARM module.

5069-ARM Module



The following figure shows a functional block diagram for the 5069-ARM module.

5069-ARM Functional Block Diagram



Technical Specifications - 5069-ARM

Attribute	5069-ARM
Voltage and current ratings	
Mod power	45 mA @ 18...32V DC
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power Passthrough, max ⁽²⁾ The module does not draw SA power current.	9.95 A @ 0...32V DC 9.975 A @ 0...240V AC, 47...63 Hz ATEX/IECEX, 125V AC, max
Do not exceed 10 A MOD or SA power (Passthrough) current draw	
Power dissipation, max	1.0 W
Thermal dissipation, max	3.4 BTU/hr
Module keying	None
Indicators	1 green/red module status indicator
Dimensions (HxWxD), approx	144.57 x 22 x 105.42 mm (5.69 x 0.87 x 4.15 in.)
DIN rail	Compatible zinc-plated chromate-passivated steel DIN rail. You can use the EN50022 - 35 x 7.5 mm (1.38 x 0.30 in.) DIN rail.
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) Level of Mod power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

(2) Level of SA power current that passes through the module depends on the system configuration, such as, module slot location and the other module types that are used in the system. For more information, see the CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, [5069-UM001](#), CompactLogix 5480 Controllers User Manual, [5069-UM002](#), and Compact 5000 EtherNet/IP Adapters User Manual, [5069-UM004](#).

Environmental Specifications - 5069-ARM

Attribute	5069-ARM
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock):	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat):	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating):	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock):	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock):	50 g
Emissions	IEC 61000-6-4

Environmental Specifications - 5069-ARM

Attribute	5069-ARM
ESD immunity IEC61000-4-2:	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
Voltage variation IEC 61000-4-29:	10 ms interruption on DC supply ports

Certifications - 5069-ARM

Certifications⁽¹⁾	5069-ARM
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation

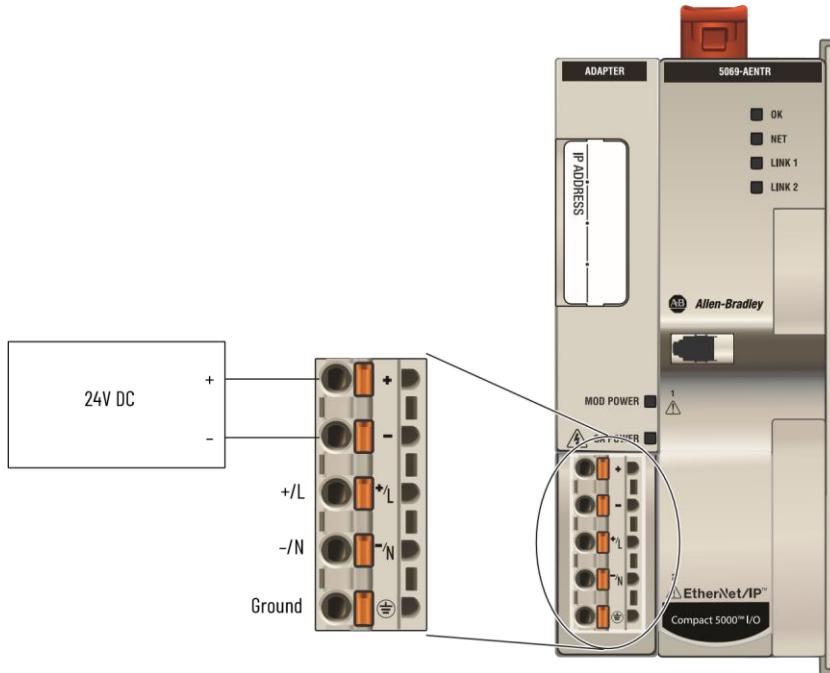
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1455X When used at or below 125V AC
IECEx	IECEx System, compliant with: • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • IECEx UL 15.0007X When used at or below 125V AC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

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

5069-AENTR and 5069-AENTRK EtherNet/IP Adapters

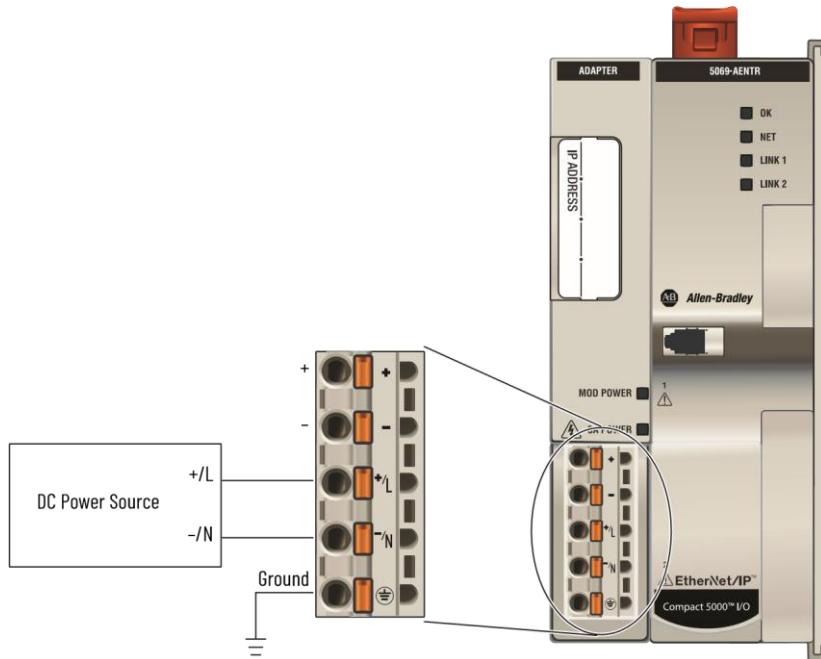
The following figure shows a wiring diagram for how to connect Mod power to the 5069-AENTR and 5069-AENTRK EtherNet/IP™ adapters.

5069-AENTR and 5069-AENTRK Wiring Diagram - MOD Power (DC)



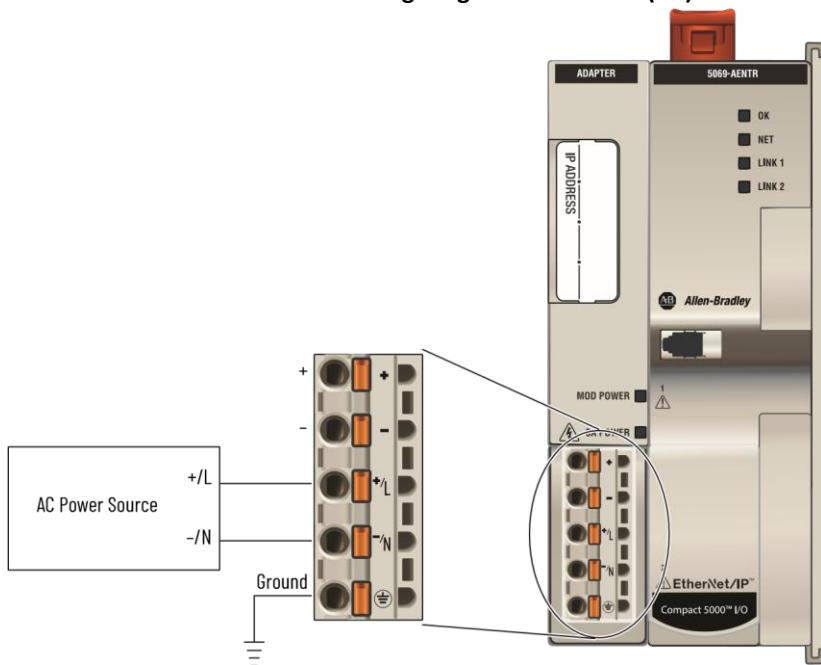
The following figure shows a wiring diagram for how to connect SA power (DC) to the 5069-AENTR and 5069-AENTRK EtherNet/IP adapters.

5069-AENTR and 5069-AENTRK Wiring Diagram - SA Power (DC)



The following figure shows a wiring diagram for how to connect SA power (AC) to the 5069-AENTR and 5069-AENTRK EtherNet/IP adapters.

5069-AENTR and 5069-AENTRK - Wiring Diagram - SA Power (AC)



Technical Specifications - 5069-AENTR and 5069-AENTRK

Attribute	5069-AENTR, 5069-AENTRK
Enclosure type rating	None (open-style)
Voltage and current ratings	
Mod power	220 mA @ 18...32V DC
Mod power inrush	1750 mA for 70 ms

Mod power Passthrough, max ⁽¹⁾	9.78 A @ 18...32V DC
SA power	5 mA @ 0...32V DC 2 mA @ 0...240V AC, 47...63 Hz ATEX/IECEx, 125V AC Max
SA power Passthrough, max ⁽²⁾	9.95 A @ 0...32V DC 9.975 A @ 0...240V AC, 47...63 Hz ATEX/IECEx, 125V AC Max
Do not exceed 10 A current draw at the MOD or SA power RTB.	
Recommended external overcurrent protection	Mod power: 10...12A @ 22.5...43.2 A2t, Fast Acting SA power: 20 A @ 250V AC
Power dissipation, max	8.5 W
Thermal dissipation, max	29 BTU/hr

Technical Specifications - 5069-AENTR and 5069-AENTRK

Attribute	5069-AENTR, 5069-AENTRK
Isolation voltage	250V (continuous), Basic Insulation Type, SA, and Mod power to Backplane 250V (continuous), Basic Insulation Type, SA to Mod power 250V (continuous), Basic Insulation Type, Ethernet to Backplane Type tested at 1500V AC for 60 s 250V (continuous), Double Insulation Type, Ethernet to Mod power 250V (continuous), Double Insulation Type, Ethernet to SA power Type tested at 4242V DC for 60 s No isolation between Ethernet ports
Module keying	Electronic keying via programming software
Dimensions (HxWxD), approx	138 x 56 x 105 mm (5.43 x 2.20 x 4.15 in.)
RTB	We recommend that you order only the RTB type that your system requires. RTBs are available in separately ordered 5069 RTB kits. The following kits are available: <ul style="list-style-type: none"> • Kit catalog number 5069-RTB5-SCREW kit contains two 5069-RTB5-SCREW RTBs. • Kit catalog number 5069-RTB5-SPRING kit contains two 5069-RTB5-SPRING RTBs. IMPORTANT: You must order RTBs separately. RTBs do not ship with Compact 5000 I/O EtherNet/IP adapters. We recommend that you order only the RTB type that your system requires.
RTB torque (5069-RTB5-SCREW RTB only)	0.5...0.6 N•m (4.4...5.3 lb•in)
RTB keying	None
Wiring category ^{(3), (4)}	2 - on signal ports 1 - on power ports 2 - on Ethernet ports
Wire size	0.25...2.5 mm ² (22...14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 1.2 mm (3/64 in.) insulation m, single wire connection only. Grounding: 2.5 mm ² (14 AWG) solid or stranded copper wire rated at 105 °C (221 °F), or greater, 3.5mm (0.14in) max diameter including insulation, single wire connection only. Ethernet connections: Ethernet Cabling and Installation according to IEC 61918 and IEC 61784-5-2.
Insulation-stripping length	
5069-RTB5-SPRING connections	10 mm (0.39 in.)
5069-RTB5-SCREW connections	10 mm (0.39 in.)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

⁽¹⁾ Maximum level of Mod power current that the adapter can pass through to the next module in the system.

- (2) Maximum level of SA power current that the adapter can pass through to the next module in the system.
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).
- (4) Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Environmental Specifications - 5069-AENTR, 5069-AENTRK

Attribute	5069-AENTR, 5069-AENTRK
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0 °C < Ta < +60 °C (+32 °F < Ta < +140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	CISPR 11/22, Class A
ESD immunity IEC61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 10V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz on power and Ethernet ports

Certifications - 5069-AENTR and 5069-AENTRK

Certifications ⁽¹⁾	5069-AENTR, 5069-AENTRK

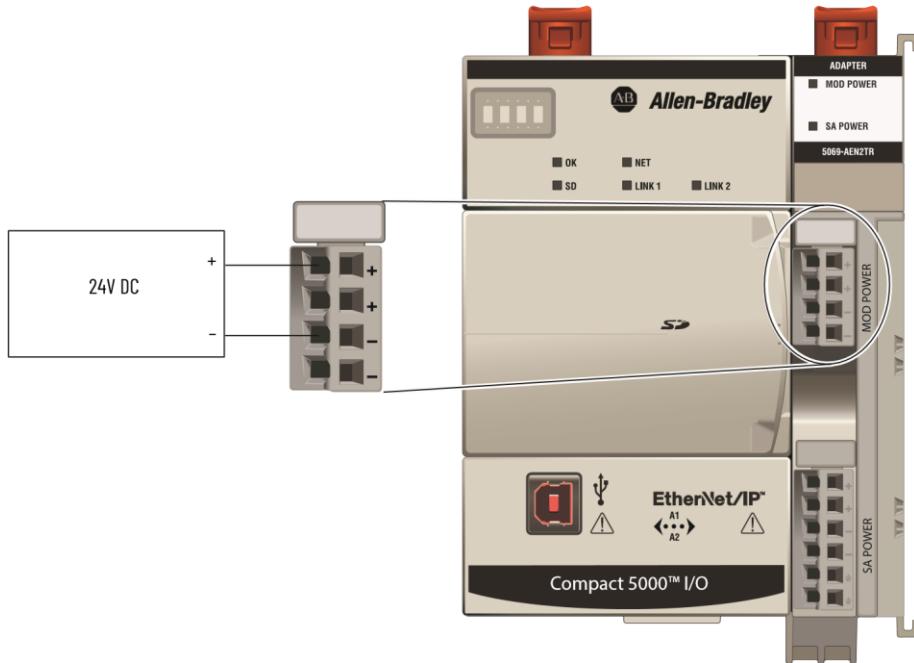
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: none"> • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2014/35/EU LVD, compliant with: <ul style="list-style-type: none"> • EN 61010-2-201; Control Equipment Safety Requirements European Union 2011/65/EU RoHS, compliant with: <ul style="list-style-type: none"> • EN 50581; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: <ul style="list-style-type: none"> • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc • DEMKO 16 ATEX 1758X
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • IEC 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc • IECEx UL 16.0124X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation
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.

5069-AEN2TR EtherNet/IP Adapter

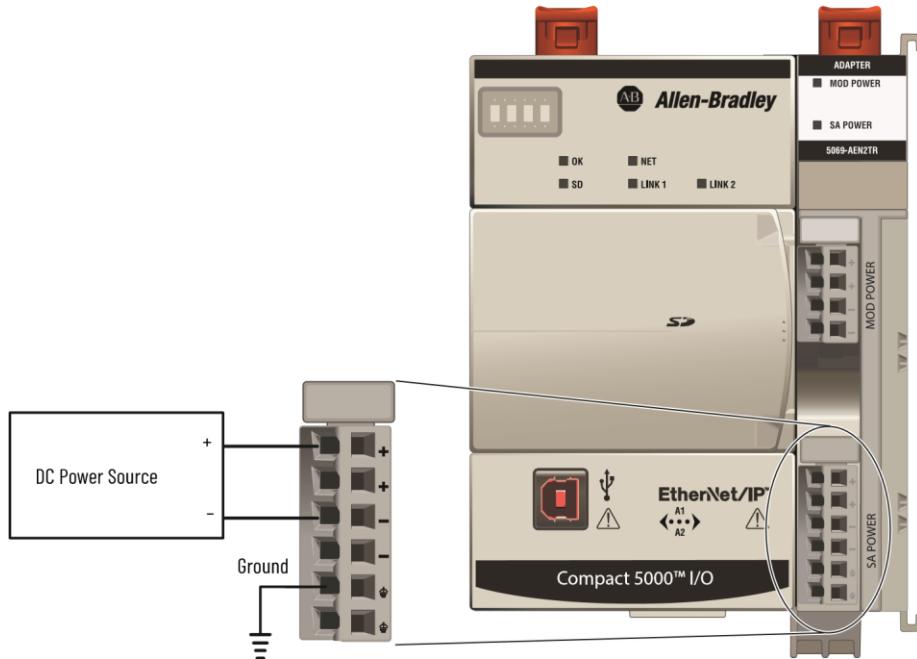
The following figure shows a wiring diagram for how to connect Mod power to the 5069-AEN2TR EtherNet/IP adapter.

5069-AEN2TR Wiring Diagram - MOD Power (DC)



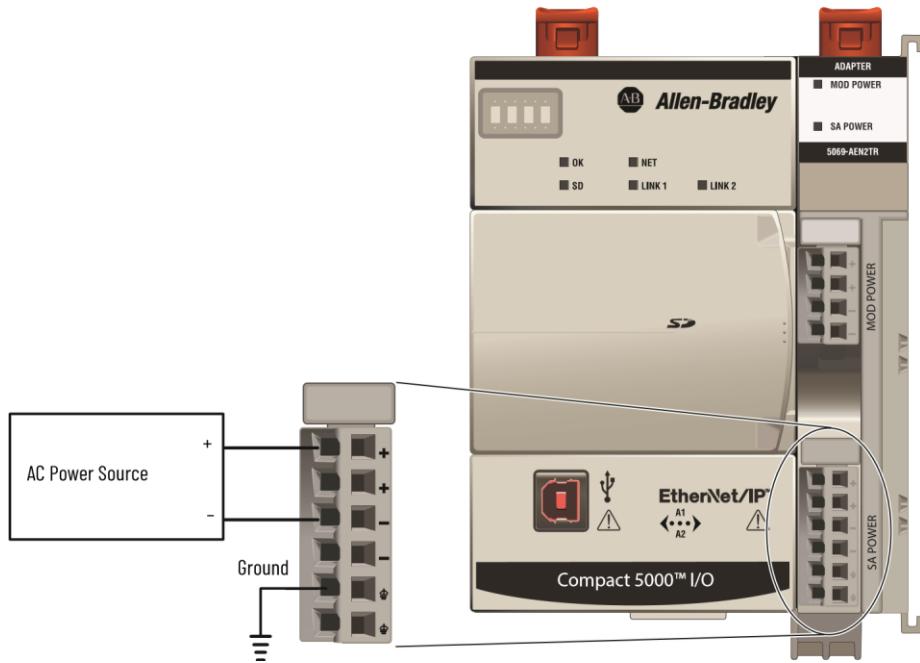
The following figure shows a wiring diagram for how to connect SA power (DC) to the 5069-AEN2TR EtherNet/IP adapter.

5069-AEN2TR Wiring Diagram - SA Power (DC)



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

5069-AEN2TR - Wiring Diagram - SA Power (AC)



Technical Specifications

Attribute	5069-AEN2TR
Enclosure type rating	None (open-style)
Voltage and current ratings	
Mod power	450 mA @ 18...32V DC
Mod power inrush	850 mA for 125 ms
Mod power Passthrough, max ⁽¹⁾	9.55 A @ 18...32V DC
SA power	10 mA @ 0...32V DC 25 mA @ 0...240V AC, 47...63 Hz ATEX/IECEx, 125V AC Max
SA power Passthrough, max ⁽²⁾	9.95 A @ 0...32V DC 9.975 A @ 0...240V AC, 47...63 Hz ATEX/IECEx, 125V AC Max Do not exceed 10 A current draw at the MOD or SA power RTB.
Recommended external overcurrent protection	N/A
Power dissipation, max	8.5 W
Thermal dissipation, max	29 BTU/hr
Isolation voltage	250V (continuous), basic insulation type, SA, and Mod power to backplane 250V (continuous), basic insulation type, SA to Mod power 250V (continuous), basic insulation type, Ethernet to backplane 250V (continuous), double insulation type, Ethernet to Mod power 250V (continuous), double insulation type, Ethernet to SA power 50V (continuous), functional insulation type, Ethernet to USB 250V (continuous), basic insulation type, USB to backplane 250V (continuous), double insulation type, USB to Mod power 250V (continuous), double insulation type, USB to SA power

	No isolation between Ethernet ports Type tested at 1500V AC for 60 s
Module keying	Electronic keying via programming software
Dimensions (HxWxD), approx	138 x 98 x 137 mm (5.43 x 3.86 x 5.39 in.)

Technical Specifications

Attribute	5069-AEN2TR
RTB	<p>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:</p> <ul style="list-style-type: none"> Kit catalog number 5069-RTB64-SCREW contains RTB catalog numbers 5069-RTB6-SCREW and 5069-RTB4-SCREW Kit catalog number 5069-RTB64-SPRING contains RTB catalog numbers 5069-RTB6-SPRING and 5069-RTB4-SPRING <p>IMPORTANT: You must order RTBs separately. RTBs do not ship with Compact 5000 I/O EtherNet/IP adapters. We recommend that you order only the RTB type that your system requires.</p>
RTB torque (5069-RTB4-SCREW and 5069-RTB6SCREW only)	0.4 N•m (3.5 lb•in)
RTB keying	None
Wiring category ⁽³⁾	<p>3 - on USB port</p> <p>2 - on power ports</p> <p>2 - on Ethernet ports</p>
Wire size	
5069-RTB4-SPRING, 5069-RTB6-SPRING	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
5069-RTB4-SCREW, 5069-RTB6-SCREW	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
Ethernet connections	Ethernet Cabling and Installation according to IEC 61918 and IEC 61784-5-2
Insulation-stripping length	
5069-RTB4-SPRING, 5069-RTB6-SPRING connections	10 mm (0.39 in.)
5069-RTB4-SCREW, 5069-RTB6-SCREW connections	12 mm (0.47 in.)
North American temp code	T4
ATEX temp code	T4
IECEx temp code	T4

(1) Maximum level of Mod power current that the adapter can pass through to the next module in the system.

(2) Maximum level of SA power current that the adapter can pass through to the next module in the system.

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

Environmental Specifications

Attribute	5069-AEN2TR
Temperature, operating IEC 60068-2-1 (Test Ab, Operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), 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 IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions	IEC 61000-6-4
ESD immunity IEC61000-4-2	6 kV contact discharges 8 kV air discharges

Environmental Specifications

Attribute	5069-AEN2TR
Radiated RF immunity IEC61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±4 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4- 5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity 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 IEC 61000-4-29	10 ms interruption on Mod power port

Certifications

Certifications ⁽¹⁾	5069-AEN2TR
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. 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	<p>European Union 2014/30/EU EMC Directive, compliant with:</p> <ul style="list-style-type: none"> EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) <p>European Union 2014/35/EU LVD, compliant with:</p> <ul style="list-style-type: none"> EN 61010-2-201; Control Equipment Safety Requirements <p>European Union 2011/65/EU RoHS, compliant with:</p> <ul style="list-style-type: none"> EN 50581; Technical documentation
RCM	<p>Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions</p>
Ex	<p>European Union 2014/34/EU ATEX Directive, compliant with:</p> <ul style="list-style-type: none"> EN 60079-15; Potentially Explosive Atmospheres, Protection "n" EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc DEMKO 15 ATEX 1455X <p>When used at or below 125V AC</p>
IECEx	<p>IECEx System, compliant with:</p> <ul style="list-style-type: none"> IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" IEC 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc IECEx UL 15.0007X <p>When used at or below 125V AC</p>
KC	<p>Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3</p>
EAC	<p>Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation</p>
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.

Minimum Spacing Requirements

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

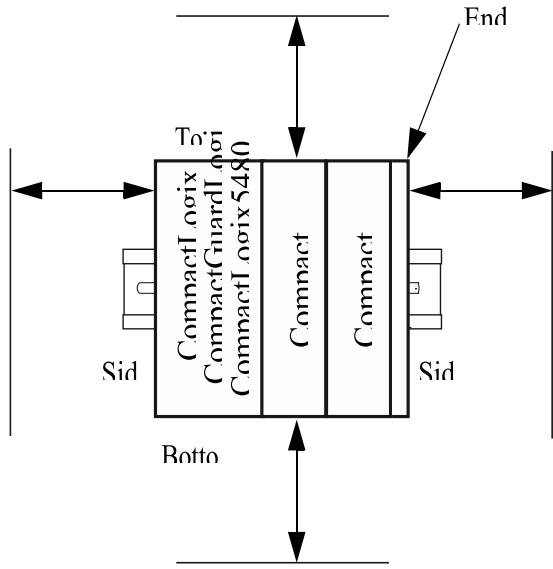
Controller Minimum Spacing Requirements

The minimum distance between the controller system and enclosure walls, wireways, and adjacent equipment varies based on current operating temperatures.

The minimum distances on all sides of the system are as follows:

- CompactLogix 5380 Controllers
 - 50.80 mm (2.00 in.) at 55 °C (131 °F)
 - 101.60 mm (4.00 in) at 60 °C (140 °F)
- Compact GuardLogix 5380 Controllers - 50.80 mm (2.0 in.) at 50 °C (122 °F)
 - 101.7 mm (4.00 in.) at 55 °C (131 °F)
 - 152.4 mm (6.00 in) at 60 °C (140 °F)

- CompactLogix 5480 Controllers
 - 25.00 mm (0.98 in.) between the sides and the cabinet
 - 25.00 mm (0.98 in.) between the front of the controller and the cabinet
 - 50.00 mm (1.96 in.) between the top and bottom and the cabinet



For more information on how to install a CompactLogix 5380, Compact GuardLogix 5380, and CompactLogix 5480 controller system, see these publications:

- CompactLogix 5380 Controllers Installation Instructions, publication [5069-IN013](#)
- Compact GuardLogix 5380 SIL 2 Controllers Installation Instructions, publication [5069-IN014](#)
- CompactLogix 5480 Controllers Installation Instructions, publication [5069-IN019](#)

Adapter Minimum Spacing Requirements

The minimum distances on all sides of the adapter system are as follows:

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

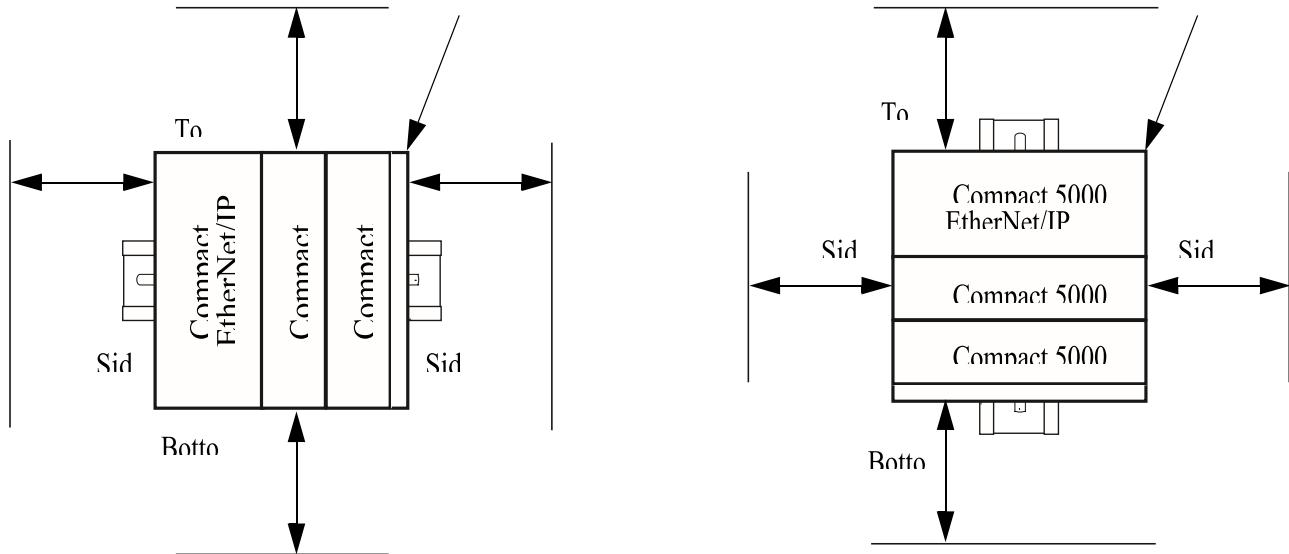
Horizontal Mounting

Vertical Mounting

Only the 5069-AENTR adapter supports vertical mounting.

End cap

End cap



For more information on how to install a Compact 5000 I/O EtherNet/IP adapter system, see the Compact 5000 I/O EtherNet/IP Adapters Installation Instructions, publication [5069-IN003](#).

Notes:

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

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

You can view or download publications at [rok.auto/literature](#).

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)	Get help determining how products interact, check features and capabilities, and find associated firmware.	rok.auto/pcdc

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Rockwell Automation maintains current product environmental information on its website at rok.auto/pec.

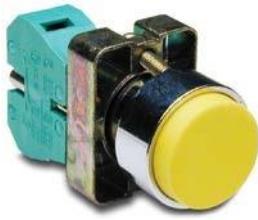
Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752, İçerenkÖy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

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GCX Series 22mm Metal Pushbuttons

Momentary extended pushbuttons

Momentary Extended Pushbuttons				
Part Number	Color	Price	Drawing Link	Description
GCX1110	Black	\$8.25	PDF	One N.O. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1111	Red	\$8.25	PDF	One N.C. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1112	Green	\$8.25	PDF	One N.O. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1113	Yellow	\$8.25	PDF	
GCX1114	Blue	\$8.25	PDF	
GCX1115	White	\$8.25	PDF	

[GCX1113](#)

Double-headed momentary pushbuttons



[GCX1152](#) (with on/off symbols)

[GCX1151-24](#)

Double-headed Momentary Pushbuttons

Part Number	Price	Drawing Link	Description
GCX1150	\$14.50	PDF	Double-headed for on/off control, One N.O. and one N.C. contact block, fits in 22mm dia. hole, without symbols
GCX1151-24	\$21.50	PDF	24VDC/VAC double-headed with indicator, faces without symbols. One N.O. and one N.C. contact block, fits in 22mm dia. hole
GCX1151-120	\$22.50	PDF	120VDC/VAC double-headed with indicator, faces without symbols. One N.O. and one N.C. contact block, fits in 22mm dia. hole
GCX1152	\$15.50	PDF	Double-headed for on/off control. One N.O. and one N.C. contact block, fits in 22mm dia. hole. With ON(1) and OFF (0) symbols
GCX1153-24*	\$22.50	PDF	24VDC/VAC double-headed with indicator, with ON (1) and OFF (0) symbols. One N.O. and one N.C. contact block
GCX1153-120*	\$23.50	PDF	120VDC/AC double-headed with indicator, with ON (1) and OFF (0) symbols. One N.O. and one N.C. contact block

* Note: Lamp data in 22 mm Metal Pilot Accessories in this section.

For accessories, see 22mm Metal Pilot Device Accessories in this section.

tPIL-28

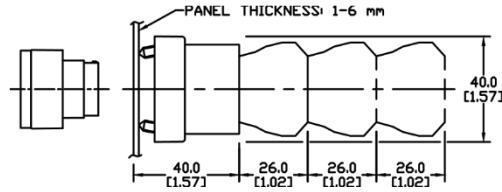
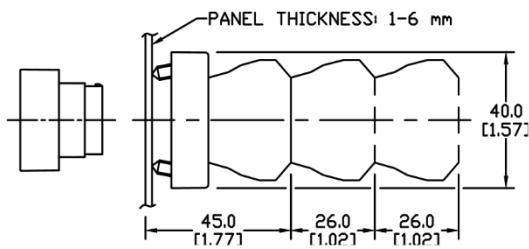
GCX Series 22mm Metal Pilot Devices Specifications

Assembly information

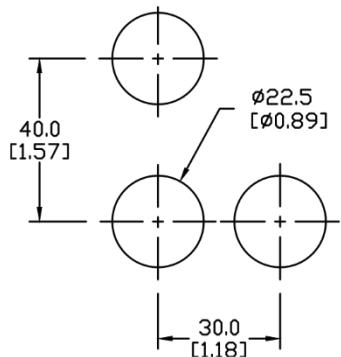
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Pushbuttons and selector switches

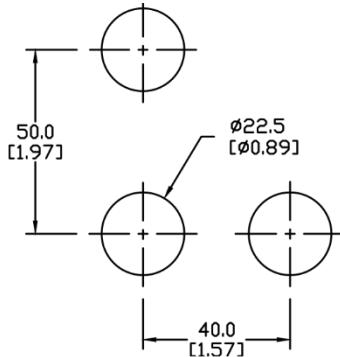
Illuminated pushbuttons and selector switches/pilot lights



Mounting



This layout is suitable if all switches are 230V or less and the same polarity.

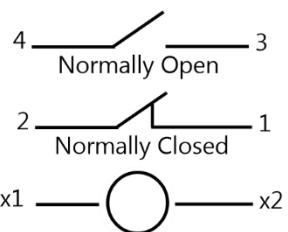


This layout is suitable if all switches are 400V or less and different polarity.

NOTE: Contact blocks can be arranged up to three deep by two wide.



Typical
Wiring



Dimensions: mm [inches]

Specifications

These specifications apply to all GCX and ECX 22 mm metal pushbuttons and switches.

Indicator

Physical Specifications		Electrical Specifications	
Standards Reference	CEI EN 60947-5-1, C E189258	Rated Thermal Current (contact block)	A300, Q300 (Refer to E22 Series mounting/ contact rating section for details)
Approvals	CSA, IMQ (where specified)	Rated Insulation Voltage	Ui 660V according to CEI EN 60947-5-1, 300V according to CSA C22-2 n.14
Enclosure Material	Zn + Al + Mg alloy, clear	Dielectric Strength	3kV (1 second)
Contacts Material	Silver	Insulation Resistance	2MΩ min. (500VDC)
Protection Degree	IP40 for GCX3151-2 GCX3153-24 and GCX3153-24 for all others. (See Appendix of this explanation of IP ratings IEC 144 CEI 70-1.)	Initial Contact Resistance	≤ 25mΩ
Temperature Ratings	Storage: -40 to 80°C Operating: -25 to +70°C	Short-Circuit Protection*	Cartridge fuses gl 10A - 500V 10,3x3811 100kA
Working Positions	All working positions	Terminal Markings	According to CENELEC EN 50013
Mechanical Life	Pushbuttons, selector switches: Joy stick switches: 1, Mushroom pushbutton operations	Connections	Single screw with non-loosening plate clamp, 14AWG max.
		Contacts Operation	Self-cleaning types EN01 (N.C.) EN 10 (N.O.) slow-action, positive opening
		Operation Frequency	3600 operations per hour max. AC15 (Control of AC electromagnetic loads) 24 volts AC at 10 amps 130 volts AC at 6.5 amps DC13 (Control of DC electromagnetic loads) 24 volts DC at 1.5 amps 110 volts DC at 0.5 amps
		Utilization Category	

*Note: Recommended, not supplied

tPIL-26

Replacement Incandescent Bulbs						Replacement incandescent bulbs
Part Number	Quantity	Price	Rating			Description
ECX1900-5	5	\$9.50	6V@ 1.2			6V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
ECX1902-5	5	\$9.50		24V@ 80mA 2 watts		24V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
ECX1904-5	5	\$20.00		130V@20mA 2.6 watts		120V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4



[ECX1902-5](#)

Note: *Bulb removal tool available. Order part number HT8LAMPTOOL.*

Replacement LED lamps

Replacement LED Lamps					
Part Number	Color	Quantity	Price	Rating	Description
ECX1911-2	Red		\$17.50		
ECX1912-2	Green		\$22.00		
ECX1913-2	Yellow		\$17.50	24V@26mA 0.6 watts	LED replacement lamp for miniature bayonet bases Works with 22mm switches and indicators, but illumination will not be as even when used with the ECX 22mm indicators Note: Will not replace sealed Cutler-Hammer monoblock LED indicators.
ECX1914-2	Blue		\$23.50		
ECX1915-2	White		\$28.00		
ECX1921-2	Red	2	\$17.50		
ECX1922-2	Green		\$22.00		
ECX1923-2	Yellow		\$17.50	120V@5mA 0.6 watts	
ECX1924-2	Blue		\$23.50		
ECX1925-2	White		\$28.00		



[ECX1 2](#)

Hole Plug

Part Number	Color	Price	Description

<u>ECX1490</u>	Black	\$2.75	Plastic hole plug for 22.5 mm openings in panels and enclosures; supplied with O-ring and mounting screw. Two plugs per package.
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Hole plug

Pilot Light Replacement Lens

Part Number	Lamp Color	Price	Description	Use with
<u>PL1170PR-5</u>	Red	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	Part numbers starting with GCX123
<u>PL1170PV-5</u>	Green	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PG-5</u>	Yellow	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PB-5</u>	Blue	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PN-5</u>	Clear	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PW-5</u>	White	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	



[ECX1490](#)

Pilot Light replacement lens

[PL1170PR-5](#)

Protective covers for pushbuttons

Protective Covers for Pushbuttons				
Part Number	Color	Quantity	Price	Description
ECX1700-5	Black	5	\$7.50	Silicone protective covers for use with 22mm standard-size flush pushbuttons. Will not work with Cutler-Hammer pushbuttons, 22mm plastic illuminated or extended pushbuttons, or 22mm plastic pushbuttons with 40mm actuator face.
ECX1701-5	Red		\$7.50	
ECX1702-5	Green		\$7.50	
ECX1703-5	Yellow		\$7.50	
ECX1704-5	Blue		\$7.50	
ECX1705-5	Clear		\$7.50	
ECX1706-5	Clear		\$13.00	Clear silicone protective covers for use with 2 mm illuminated and extended pushbuttons only. Will not work with Cutler-Hammer pushbuttons or 22mm mushroom pushbuttons.



[ECX1703-5](#)

Replacement 22mm



support base

Replacement 22mm Support Base

Part Number	Quantity	Price	Drawing Link	Description
ECX1029-2	1	\$7.00	PDF	22mm metal support base Note: This item is supplied as a replacement part and is not required with any switch assembly. Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect

[ECX1029-2](#)

Replacement contact blocks

Replacement Contact Blocks					
Part Number	Quantity	Price	Drawing Link	Contacts	Description
ECX1030-2	2	\$7.25	PDF	Red, normally-closed (N.C.)	Replacement contact block for 22mm pushbuttons and selector switches. Tightening Torque, terminal screw: 0.8Nm max mounting screw: 0.5Nm max Note: Will not work with Cutler-Hammer 22mm switches.
ECX1030-5	5	\$17.00	PDF	Green, normally-open (N.O.)	Replacement normally open push-push contact blocks for 22mm pushbutton and selector switches, pack of 2. Note: Will not work with Cutler-Hammer 22mm switches.
ECX1040-2	2	\$7.25	PDF	Brown, normally-open (N.O.), push-push	Replacement normally open push-push contact blocks for 22mm pushbutton and selector switches, pack of 2. Note: Will not work with Cutler-Hammer 22mm switches.
ECX1040-5	5	\$17.00	PDF		
ECX1042-2	2	\$7.25	PDF		



[ECX1030-2](#)

Note: See electrical specifications on ECX Series 22mm Metal Pilot Devices Specifications page at beginning of this section.

Replacement Keys			
Part Number	Quantity	Price	Description
ECX1067-2	Pkg of 2 sets (2 keys per set)	\$6.50	Replacement key for GCX series key-actuated selector switches, pack of 2 sets (2 keys each). NOTE: Will not work with Cutler-Hammer 22mm switches.



Replacement keys

[ECX1067-2](#)

Note: All key-actuated 22mm metal selector switches are keyed alike.

EMERGENCY STOP legend

EMERGENCY STOP Legend Plate				
Part Number	Quantity	Price	Drawing Link	Description
ECX1651	1	\$2.75	PDF	Oversize yellow circular EMERGENCY STOP legend plate for 22mm E-stop type mushroom pushbuttons, 60mm outside diameter.



[ECX1651](#)

plate

Knockout Punches

Ruko's knockout punch hole-cutting tool includes punch, die and draw bolt (without ball bearing). Use for sheet steel, stainless-steel sheets, non-ferrous and light metals, and plastics up to 0.16" (8 ga.) thick.

Replacement bolts are offered in three of the most popular sizes.

[109225](#)

Note: Part number [109225](#) is recommended when punching holes for 22mm pilot devices.



Two-position short lever operator

2-Position Short Lever Replacement Operator

Part Number	Lamp Color	Price	2-Position	Use with
<u>GR1172PR-5</u>	Red	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX124, GCX125 GCX324, GCX325
<u>GR1172PV-5</u>	Green	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PG-5</u>	Yellow	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PB-5</u>	Blue	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PN-5</u>	Clear	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1172PR-5](#)

Three-position short lever operator

3-Position Short Lever Replacement Operator

Part Number	Lamp Color	Price	3-Position	Use with
<u>GR1288PR-5</u>	Red	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX126, GCX128 GCX326, GCX328
<u>GR1288PV-5</u>	Green	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PG-5</u>	Yellow	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PB-5</u>	Blue	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PN-5</u>	Clear	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1288PR-5](#)

Mushroom switch replacement operator



[PL1298P-5](#)

Mushroom Switch Replacement Operator

Part Number	Lamp Color	Price	Description	Use with
<u>PL1171PR-5</u>	Red	\$7.25	22mm, illuminated momentary Mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1221, GCX3221 mushroom-style illuminated pushbuttons
<u>PL1298P-5</u>	Red	\$7.25	22mm illuminated twist-to-release mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1226, GCX3226 mushroom-style illuminated pushbuttons

**Flush pushbutton
replacement operator**

Flush Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
GR1168PR-5	Red	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	Part numbers starting with GCX119, GCX120, GCX319, GCX320
GR1168PV-5	Green	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PG-5	Yellow	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PB-5	Blue	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PN-5	Clear	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PW-5	White	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	



[GR1168PR-5](#)

Extended pushbutton replacement operator

Extended Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
PL1308PR-5	Red	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	Part numbers starting with GCX121, GCX321
PL1308PV-5	Green	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PG-5	Yellow	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PB-5	Blue	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PN-5	Clear	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PW-5	White	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	



[PL130 5](#)

Legend plates

Aluminum legend plates for use with 22mm pilot devices. Black or red field with silver background. O-ring included.



[ECX1670A-B04](#)

[ECX1670A-R03](#)

Aluminum Legend Plates

Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link

AUTO OFF HAND	Blac k	Blac k	Silver	<u>ECX1670A -B46</u>	\$3.7 5	PDF
Blank Plate	Blac k	-	Silver	<u>ECX1670A-B</u>	\$3.7 5	PDF
Blank Plate	Red	-	Silver	<u>ECX1670A-R</u>	\$3.7 5	PDF
CLAMP	Blac k	Blac k	Silver	<u>ECX1670A -B24</u>	\$3.7 5	PDF
CLOSE	Blac k	Blac k	Silver	<u>ECX1670A -B01</u>	\$3.7 5	PDF
DOWN	Blac k	Blac k	Silver	<u>ECX1670A -B02</u>	\$3.7 5	PDF
EMERG. STOP	Red	Red	Silver	<u>ECX1670A -R03</u>	\$3.7 5	PDF
EXTEND	Blac k	Blac k	Silver	<u>ECX1670A -B51</u>	\$3.7 5	PDF
FEEDER OFF	Blac k	Blac k	Silver	<u>ECX1670A -B26</u>	\$3.7 5	PDF
FEEDER ON	Blac k	Blac k	Silver	<u>ECX1670A -B25</u>	\$3.7 5	PDF
FOR OFF REV	Blac k	Blac k	Silver	<u>ECX1670A -B19</u>	\$3.7 5	PDF
FOR REV	Blac k	Blac k	Silver	<u>ECX1670A -B13</u>	\$3.7 5	PDF
FORWAR D	Blac k	Blac k	Silver	<u>ECX1670A -B04</u>	\$3.7 5	PDF
GRIP	Blac k	Blac k	Silver	<u>ECX1670A -B53</u>	\$3.7 5	PDF
HAND-AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B14</u>	\$3.7 5	PDF
HAND OFF AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B20</u>	\$3.7 5	PDF
HIGH	Blac k	Blac k	Silver	<u>ECX1670A -B27</u>	\$3.7 5	PDF
HIGH LOW	Blac k	Blac k	Silver	<u>ECX1670A -B43</u>	\$3.7 5	PDF
IN	Blac k	Blac k	Silver	<u>ECX1670A -B28</u>	\$3.7 5	PDF
INCH	Blac k	Blac k	Silver	<u>ECX1670A -B29</u>	\$3.7 5	PDF
JOG	Blac k	Blac k	Silver	<u>ECX1670A -B05</u>	\$3.7 5	PDF
JOG FOR	Blac k	Blac k	Silver	<u>ECX1670A -B30</u>	\$3.7 5	PDF
JOG REV	Blac k	Blac k	Silver	<u>ECX1670A -B31</u>	\$3.7 5	PDF
JOG RUN	Blac k	Blac k	Silver	<u>ECX1670A -B15</u>	\$3.7 5	PDF
LOW	Blac k	Blac k	Silver	<u>ECX1670A -B32</u>	\$3.7 5	PDF
LOWER	Blac k	Blac k	Silver	<u>ECX1670A -B33</u>	\$3.7 5	PDF
MAN AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B44</u>	\$3.7 5	PDF

Note: Legend plate text is 3mm in height

Continued on next page



[ECX1670A-B48](#)

[ECX1670A-R11](#)

Aluminum Legend Plates (continued)

Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link
MAN OFF AUTO	Black	Black	Silver	ECX1670A-B47	\$3.75	PDF
MOTOR RUN	Black	Black	Silver	ECX1670A-B22	\$3.75	PDF
MOTOR STOP	Black	Black	Silver	ECX1670A-B23	\$3.75	PDF
OFF	Black	Black	Silver	ECX1670A-B34	\$3.75	PDF
OFF ON	Black	Black	Silver	ECX1670A-B16	\$3.75	PDF
ON	Black	Black	Silver	ECX1670A-B06	\$3.75	PDF
OPEN	Black	Black	Silver	ECX1670A-B07	\$3.75	PDF
OPEN OFF CLOSE	Black	Black	Silver	ECX1670A-B48	\$3.75	PDF
OPEN CLOSE	Black	Black	Silver	ECX1670A-B17	\$3.75	PDF
OUT	Black	Black	Silver	ECX1670A-B35	\$3.75	PDF
POWER ON	Black	Black	Silver	ECX1670A-B21	\$3.75	PDF
PULL ON PUSH OFF	Black	Black	Silver	ECX1670A-B50	\$3.75	PDF
RAISE	Black	Black	Silver	ECX1670A-B36	\$3.75	PDF
READY	Black	Black	Silver	ECX1670A-B37	\$3.75	PDF
RELEASE	Black	Black	Silver	ECX1670A-B54	\$3.75	PDF
RESET	Black	Black	Silver	ECX1670A-B38	\$3.75	PDF
RETRACT	Black	Black	Silver	ECX1670A-B52	\$3.75	PDF
REVERSE	Black	Black	Silver	ECX1670A-B08	\$3.75	PDF
RUN	Black	Black	Silver	ECX1670A-B09	\$3.75	PDF
SAFE RUN	Black	Black	Silver	ECX1670A-B45	\$3.75	PDF

START	Black	Black	Silver	ECX1670A-B10	\$3.75	PDF
STOP	Black	Black	Silver	ECX1670A-B11	\$3.75	PDF
STOP	Red	Red	Silver	ECX1670A-R11	\$3.75	PDF
TEST	Black	Black	Silver	ECX1670A-B39	\$3.75	PDF
TRANSFER	Black	Black	Silver	ECX1670A-B40	\$3.75	PDF
TRIP	Black	Black	Silver	ECX1670A-B41	\$3.75	PDF
UNCLAMP	Black	Black	Silver	ECX1670A-B42	\$3.75	PDF
UP	Black	Black	Silver	ECX1670A-B12	\$3.75	PDF
UP OFF DOWN	Black	Black	Silver	ECX1670A-B49	\$3.75	PDF
UP DOWN	Black	Black	Silver	ECX1670A-B18	\$3.75	PDF

Note: Legend plate text is 3mm in height



[ECX1680A-B17](#)

[ECX1680A-R03](#)

Jumbo Aluminum Legend Plates						
Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link
Blank Plate	Black	-	Silver	ECX1680A-B	\$4.25	PDF
Blank Plate	Red	-	Silver	ECX1680A-R	\$4.25	PDF
EMERG. STOP	Red	Red	Silver	ECX1680A-R03	\$4.25	PDF
HAND OFF AUTO	Black	Black	Silver	ECX1680A-B20	\$4.25	PDF
JOG	Black	Black	Silver	ECX1680A-B05	\$4.25	PDF
OFF ON	Black	Black	Silver	ECX1680A-B16	\$4.25	PDF

<i>OPEN CLOSE</i>	Black	Black	Silver	<u>ECX1680A-B17</u>	\$4.25	PDF
<i>POWER ON</i>	Black	Black	Silver	<u>ECX1680A-B21</u>	\$4.25	PDF
<i>START</i>	Black	Black	Silver	<u>ECX1680A-B10</u>	\$4.25	PDF
<i>STOP</i>	Red	Red	Silver	<u>ECX1680A-R11</u>	\$4.25	PDF

Note: Legend plate text is 3mm in height

E22 Series Cross-reference Tables

Pushbutton, Indicator Light, and Selector Switch Cross Reference				
Cutler-Hammer	Allen-Bradley	Telemecanique XB2B (chrome bezel) XA2B (black bezel)	GE C-2000	Siemens
<i>Non-Illuminated Pushbuttons</i>				
E22PB1A	800EPF2 800E3LX10	ZA2BA2 ZA2BZ101	P9XPNNNG10N0	3SB1000-0AB01 3SB02-CBH 3SB1400-0B
E22PB3A	800EPF3 800E3LX10	ZA2BA3 ZA2BZ101	P9XPNVG10N0	3SB1000-0AE01 3SB02-CBH 3SB1400-0B
E22EB2B	800EPE4 800E3LX01	ZA2BL4 ZA2BZ102	P9XPNRNS20N0	3SB1000-0LC01 3SB02-CBH 3SB1400-0B
E22ASB204	ENCLSR: 800E-2P 800EP-F3 800E-2LX10 800EP-E4 800E-2LX01 800E- 34BE208 800E- 34R212	XALB211 Both flush - stop is not extended	P9CPNRSN20NO P9CPNVGN10NO P9EPB02 P9AEPN201 P9AEPN202	3SB02-S21
<i>Illuminated Pushbuttons</i>				
E22TB2X4B	800EPLE4 800E3DL3 800E3X01	ZA2BW14 ZA2BW06224	P9XPLRSDN12NADI	3SB1001-OLC01 3SB02-CBH 3SB1400-0C 3SB1400-2H
E22TB3X4A	800EPLE3 800E3DL3 800E3X10	ZA2B213 AZ2B206124	P9XPLVSDN12NADI	3SB1001-OLE01 3SB02-CBH 3SB1400-0B 3SB1440-2H
E22TB9X4A	800EPLE5 800E3DL3 800E3X10	ZA2BW15 ZA2BW06124	P9XPLASDN12NADI	3SB1001-OLD01 3SB02-CBH 3SB1400-0B 3SB1400-2H
E22TB2X10B	800EPLE4 800E2RL5 800E3X01	ZA2BW14 ZA2BW062120	P9XPLRSB P9PRNVJ P9PDNVD	3SB1001-OLC01 3SB02-CBH 3SB1400-0C
E22TB3X10A	800EPLE3 800E2RL5 800E3X10	ZA2BW13 ZA2BW061120	P9XPLVSD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DE 3SB1400-OB
E22TB9X10A	800DPLE5 800E2RL5 800E3X10	ZA2BW15 ZA2B2061120	P9XPLASD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DD 3SB1400-OB

tPIL-99

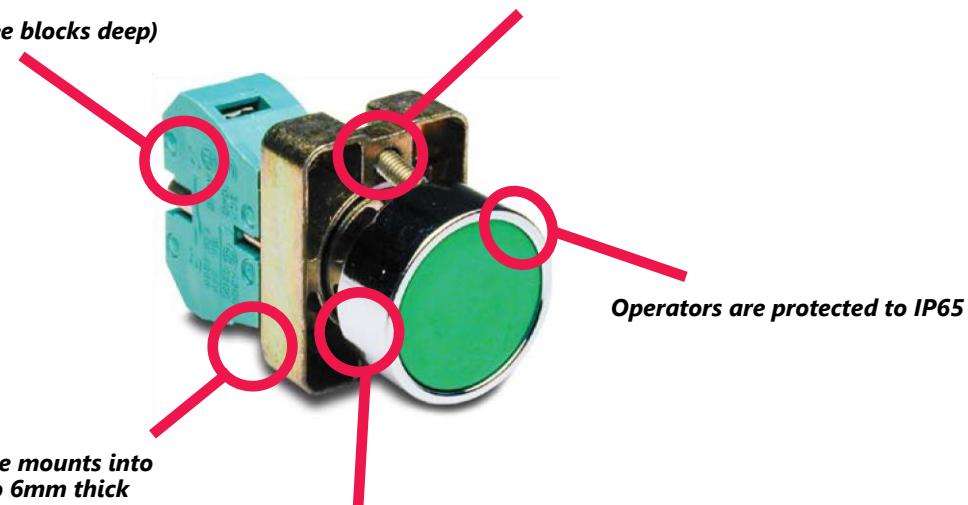
GCX Series 22mm Metal Pilot Devices

Features

Secure mounting method eliminates

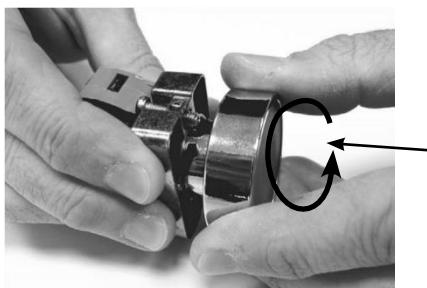
Any combination of contact blocks is allowed, up to a total of six (two blocks wide and three blocks deep)

twisting in mounting hole

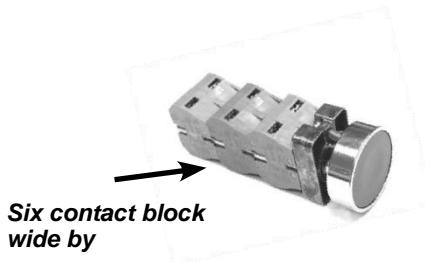


Chrome-plated alloy bezel is not only corrosion-resistant, but also attractive

Easy installation



To remove operator, press toward support base and twist



Six contact block wide by



To install switch, place support base against rear of panel (not shown here), insert the operator and twist clockwise until it clicks into place. Carefully tighten the securing screws. Do not over-tighten.

counterclockwise.

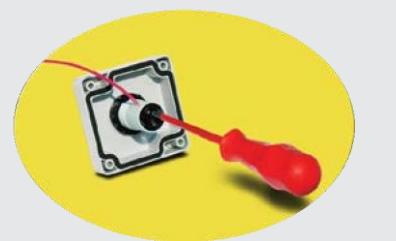
Self-cleaning silver reliable, low-

**Contacts
(Refer to
mounting/cont
section)**

**Clear contact block for illustration purposes.
contact blocks are not available for sale
Automation**

**Pressure
terminals for easy,
accepting up to**

**Minimum
rating 15mA @**



**All indicators offer side
entry with back
terminals for easy**

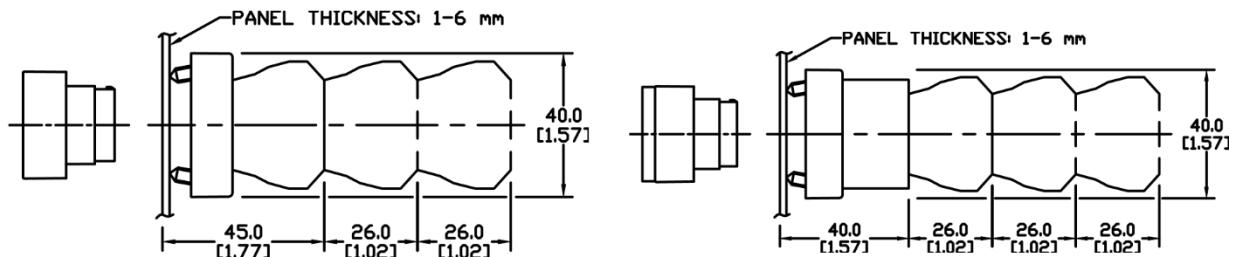
GCX Series 22mm Plastic Pilot Devices Specifications

Assembly information

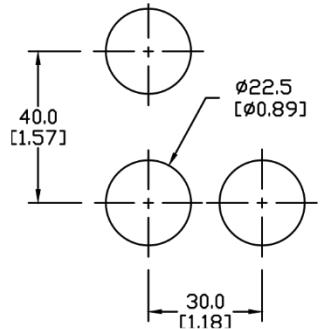
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

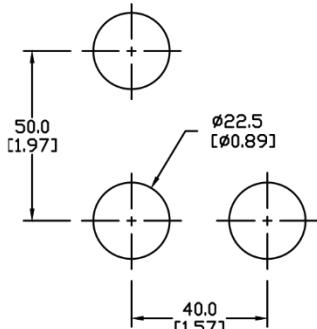
mm
[inches]



Mounting



This layout is suitable if all switches are 230V or less and the same polarity.

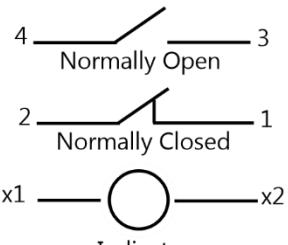


This layout is suitable if all switches are 400V or less and different polarity.

NOTE: Contact blocks can be arranged up to three deep by two wide.



Typical Wiring



Indicator

Specifications

These specifications apply to all the GCX and ECX 22mm plastic pushbuttons and switches.

Physical Specifications

Standards Reference CEI EN 60947-5-1, CSA C22-2 n.14

Approvals UL File E189258, IMQ (where specified)

Enclosure Material Fiberglass reinforced thermoplastic

Contacts Material Silver

IP40 for [GCX3151-24](#), [GCX3151-120](#), [GCX3153-24](#) and
[GCX3153-120](#). IP65 for all others.(See Appendix of this

Protection Degree catalog for explanation of IP ratings according to IEC 144 CEI 70-1.)

Electric Shock Protection

IEC 536, Class II

Storage: -40 to 80°C (-40 to 176°F)

Temperature Ratings

Operating: -25° to +70°C (-13° to 158°F)

Working Positions

All working positions are allowed

Pushbuttons, selector switches, joy stick switches:

1,000,000 operations **Mechanical Life**

Emergency mushrooms and push-push pushbuttons:

300,000 operations

(according to IEC 947-5-1)

Positive Opening Operation

All functions incorporating an NC contact are positive

opening operation

Electrical Specifications

Rated Thermal A300, Q300 (Refer to E22 Series mounting/contact **Current (contact block)** rating section for details)

Ui 660V according to CEI EN 60947-5-1,

Rated Insulation Voltage

300V according to CSA C22-2 n.14 and UL 508

Dielectric Strength 3kV (1 second) **Insulation Resistance** 2MΩ min. (500VDC) **Initial Contact Resistance** ≤ 25mΩ

Short-Circuit Protection*Cartridge fuses gl 10 A-500V 10, 3x38I1 100 KA

Terminal Markings According to CENELEC EN 50013

Single screw with non-loosening plate clamp, 14AWG

Connections

max., Tighten to 0.8Nm max

Contacts Operation Self-cleaning types EN01 (N.C.) EN 10 (N.O.) slow-

action, positive opening

Operation Frequency 3600 operations per hour max.

AC15 (Control of AC electromagnetic loads)

24 volts AC at 10 amps

130 volts AC at 6.5 amps

Utilization Category

DC13 (Control of DC electromagnetic loads)

24 volts DC at 1.5 amps

110 volts DC at 0.5 amps *Note: Recommended, not supplied

Command Illuminated

22mm Metal Selector Switches

Command LED Illuminated 22mm Metal Selector Switches



[AR22PL-010E3RZA](#)



[AR22PL-210E3GZA](#)

[AR22PL-322E3YZA](#)

[AR22PL-322E3SZA](#)

Part Number	Color	Price	Drawing Link	Operation	Contacts	Lamp Voltage
<u>AR22PL-010E3RZA</u>	Red	\$22.50	PDF	2-pos spring return	N.O.	24V AC/DC
<u>AR22PL-010E3GZA</u>	Green	\$22.50	PDF			
<u>AR22PL-010E3YZA</u>	Yellow	\$22.50	PDF			
<u>AR22PL-010E3SZA</u>	Blue	\$32.00	PDF			
<u>AR22PL-210E3RZA</u>	Red	\$22.50	PDF	2-pos maintained	N.O.	24V AC/DC
<u>AR22PL-210E3GZA</u>	Green	\$22.50	PDF			
<u>AR22PL-210E3YZA</u>	Yellow	\$22.50	PDF			
<u>AR22PL-210E3SZA</u>	Blue	\$32.00	PDF			
<u>AR22PL-322E3RZA</u>	Red	\$34.00	PDF	3-position maintained	2 N.O. + 2 N.C.	24V AC/DC
<u>AR22PL-322E3GZA</u>	Green	\$34.00	PDF			
<u>AR22PL-322E3YZA</u>	Yellow	\$34.00	PDF			
<u>AR22PL-322E3SZA</u>	Blue	\$34.00	PDF			
<u>AR22PL-611E3RZA</u>	Red	\$32.00	PDF	3-position spring/manual return (left to center)	1 N.O. + 1 N.C.	24V AC/DC
<u>AR22PL-611E3GZA</u>	Green	\$32.00	PDF			
<u>AR22PL-611E3YZA</u>	Yellow	\$32.00	PDF			
<u>AR22PL-611E3SZA</u>	Blue	\$32.00	PDF			
<u>AR22PL-010L3RZA</u>	Red	\$29.50	PDF	2-pos spring return	N.O.	115-127 VAC
<u>AR22PL-010L3GZA</u>	Green	\$29.50	PDF			
<u>AR22PL-010L3YZA</u>	Yellow	\$29.50	PDF			
<u>AR22PL-010L3SZA</u>	Blue	\$39.50	PDF			
<u>AR22PL-210L3RZA</u>	Red	\$26.50	PDF	2-pos maintained	N.O.	115-127 VAC
<u>AR22PL-210L3GZA</u>	Green	\$26.50	PDF			
<u>AR22PL-210L3YZA</u>	Yellow	\$26.50	PDF			
<u>AR22PL-210L3SZA</u>	Blue	\$39.50	PDF			
<u>AR22PL-311L3RZA</u>	Red	\$32.00	PDF	3-position maintained	1 N.O. + 1 N.C.	115-127 VAC
<u>AR22PL-311L3GZA</u>	Green	\$32.00	PDF			
<u>AR22PL-311L3YZA</u>	Yellow	\$32.00	PDF			
<u>AR22PL-311L3SZA</u>	Blue	\$39.50	PDF			
<u>AR22PL-611L3RZA</u>	Red	\$34.00	PDF	3-position spring/manual return (left to center)	1 N.O. + 1 N.C.	115-127 VAC
<u>AR22PL-611L3GZA</u>	Green	\$34.00	PDF			
<u>AR22PL-611L3YZA</u>	Yellow	\$34.00	PDF			
<u>AR22PL-611L3SZA</u>	Blue	\$39.50	PDF			

2-Position Replacement Knobs

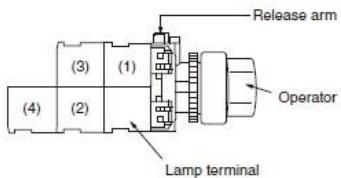
Color	Drawing Link	Part Number	Qty	Price
Red	PDF	<u>AR9M005-R</u>	5	\$3.50
Green	PDF	<u>AR9M005-G</u>		\$3.50
Yellow	PDF	<u>AR9M005-Y</u>		\$3.50
Blue	PDF	<u>AR9M005-S</u>		\$3.50

Selector Switch Type: AR22PL-0 (2-position)

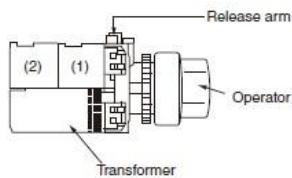
Transformer	Contact Arrangement	Contact Block		Operator Position	
		Mounting Position	Type	Left	Right
				Ⓐ	Ⓑ
With/without	1 N.O.	1	N.O.	-	•
Without	1 N.C.	1	N.C.	•	-
	1 N.O. + 1 N.C.	1	N.O.	-	•
		2	N.C.	•	-
With	1 N.O. + 1 N.C.	1	N.C.	•	-
		2	N.O.	-	•
	2 N.O.	1	N.O.	-	•
		2	N.O.	-	•
With/without	2 N.C.	1	N.C.	•	-
		2	N.C.	•	-
	3 N.O.	1	N.O.	-	•
		2	N.O.	-	•
		3	N.O.	-	•
Without	2 N.O. + 1 N.C.	1	N.O.	-	•
		2	N.C.	•	-
		3	N.O.	-	•
Without	1 N.O. + 2 N.C.	1	N.O.	-	•
		2	N.C.	•	-
		3	N.C.	•	-
Without	3 N.C.	1	N.C.	•	-
		2	N.C.	•	-
		3	N.C.	•	-

● Position of contact block

Without transformer



With transformer

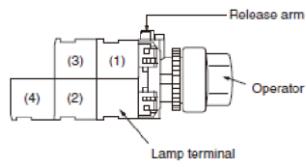


Selector Switch Type: AR22PL-2 (2-position)

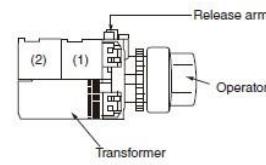
Transformer	Contact Arrangement	Contact Block		Operator Position	
		Mounting Position	Type	Left	Right
With/without	1 N.O.	1	N.O.	—	●
	1 N.C.	1	N.C.	●	—
Without	1 N.O. + 1 N.C.	1	N.O.	—	●
		2	N.C.	●	—
With	1 N.O. + 1 N.C.	1	N.C.	●	—
		2	N.O.	—	●
With/without	2 N.O.	1	N.O.	—	●
		2	N.O.	—	●
With/without	2 N.C.	1	N.C.	●	—
		2	N.C.	●	—
With/without	3 N.O.	1	N.O.	—	●
		2	N.O.	—	●
Without	2 N.O. + 1 N.C.	1	N.O.	—	●
		2	N.C.	●	—
With	2 N.O. + 1 N.C.	3	N.O.	—	●
		1	N.C.	●	—
Without	1 N.O. + 2 N.C.	2	N.C.	—	●
		3	N.C.	●	—
With	1 N.O. + 2 N.C.	1	N.C.	●	—
		2	N.C.	●	—
With/without	3 N.C.	3	N.O.	—	●

● Position of contact block

Without transformer



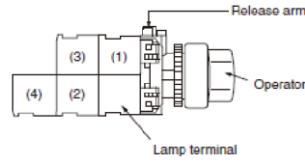
With transformer



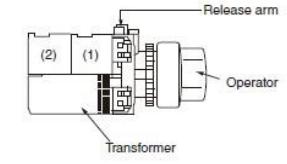
<i>Without</i>	4 N.O.	2	N. C.	•	-
		3	N. C.	•	-
		1	N. O.	-	•
		2	N. O.	-	•
		3	N. O.	-	•
		4	N. O.	-	•
		1	N. O.	-	•
		2	N. C.	•	-
		3	N. O.	-	•
		4	N. O.	-	•
<i>Without</i>	2 N.O. + 2 N.C.	1	N. O.	-	•
		2	N. C.	•	-
		3	N. O.	-	•
		4	N. C.	•	-
		1	N. O.	-	•
		2	N. C.	•	-
		3	N. O.	-	•
		4	N. C.	•	-
<i>Without</i>	1 N.O. + 3 N.C.	1	N. O.	-	•
		2	N. C.	•	-
		3	N. C.	•	-
		4	N. C.	•	-
<i>Without</i>	4 N.C.	1	N. C.	•	-
		2	N. C.	•	-
		3	N. C.	•	-
		4	N. C.	•	-

- Position of contact block

Without transformer



With transformer



Transformer	Contact Arrangement	Contact Block		Operator Position		
		Mounting Position	Type	Left	Center	Right
				↖	↑	↗
With/without	1 N.O.	1	N.O.	•	—	—
With/without	1 N.C.	1	N.C.	—	—	•
	1 N.O. + 1 N.C.	1	N.O.	•	—	—
With		2	N.C.	—	—	•
1 N.O. + 1 N.C.	1	N.C.	—	—	•	
	With/without		2	N.O.	•	—
2 N.O.	1	N.O.	•	—	—	
	2	N.O.	•	—	—	
With/without	2 N.C.	1	N.C.	—	—	•
		2	N.C.	—	—	•
With/without	3 N.O.	1	N.O.	•	—	—
		2	N.O.	•	—	—
		3	N.O.	•	—	—
Without	2 N.O. + 1 N.C.	1	N.O.	•	—	—
		2	N.C.	—	—	•
		3	N.O.	•	—	—
With	2 N.O. + 1 N.C.	1	N.C.	—	—	•
		2	N.O.	•	—	—
		3	N.O.	•	—	—
Without	1 N.O. + 2 N.C.	1	N.O.	•	—	—
		2	N.C.	—	—	•
		3	N.C.	—	—	•
With	1 N.O. + 2 N.C.	1	N.C.	—	—	•
		2	N.C.	—	—	•
		3	N.O.	•	—	—
With/without	3 N.C.	1	N.C.	—	—	•
		2	N.C.	—	—	•
		3	N.C.	—	—	•
Without	4 N.O.	1	N.O.	•	—	—
		2	N.O.	•	—	—
		3	N.O.	•	—	—
		4	N.O.	•	—	—
Without	3 N.O. + 1 N.C.	1	N.O.	•	—	—
		2	N.C.	—	—	•
		3	N.O.	•	—	—
		4	N.O.	•	—	—
Without	2 N.O. + 2 N.C.	1	N.O.	•	—	—
		2	N.C.	—	—	•
		3	N.O.	•	—	—
		4	N.C.	—	—	•
Without		1	N.O.	•	—	—

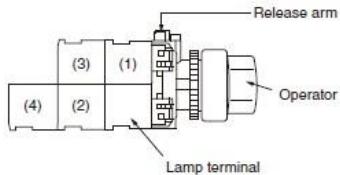
	1 N.O. + 3 N.C.	2	N.C.	–	–	•
		3	N.C.	–	–	•
		4	N.C.	–	–	•
<i>Without</i>	4 N.C.	1	N.C	–	–	•
		2	N.C	–	–	•
		3	N.C	–	–	•
		4	N.C	–	–	•

Selector Switch Type: AR22PL-6 (3-position)

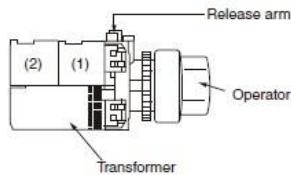
Transformer	Contact Arrangement	Contact Block		Operator Position		
		Mounting Position	Type	Left	Center	Right
With/without	1 N.O.	1	N.O.	●	—	—
With/without	1 N.C.	1	N.C.	—	—	●
Without	1 N.O. + 1 N.C.	1	N.O.	●	—	—
		2	N.C.	—	—	●
With	1 N.O. + 1 N.C.	1	N.C.	—	—	●
		2	N.O.	●	—	—
With/without	2 N.O.	1	N.O.	●	—	—
		2	N.O.	●	—	—
With/without	2 N.C.	1	N.C.	—	—	●
		2	N.C.	—	—	●
Without	3 N.O.	1	N.O.	●	—	—
		2	N.O.	●	—	—
		3	N.O.	●	—	—
Without	2 N.O. + 1 N.C.	1	N.O.	●	—	—
		2	N.C.	—	—	●
		3	N.O.	●	—	—
Without	1 N.O. + 2 N.C.	1	N.O.	●	—	—
		2	N.C.	—	—	●
		3	N.C.	—	—	●
Without	3 N.C.	1	N.C.	—	—	●
		2	N.C.	—	—	●
		3	N.C.	—	—	●

● Position of contact block

Without transformer



With transformer



Accessories for 22mm Command Series Pilot Devices



Contact Blocks for Command Series 22mm Pushbuttons

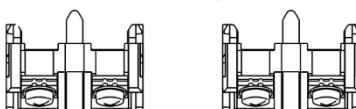
Part Number	Qty	Price	Drawing Link	Color	Contacts



AR9B290	1	\$6.25	PDF	Blue	N.O.
AR9B291	1	\$6.25	PDF	Red	N.C.

[AR9B290](#)

Minimum current requirement AC/DC is 5mA
Terminal Layout



Terminal No.3, 4

Terminal No.1, 2



Max 5 contacts for illuminated momentary devices.
Max 3 for alternate action illuminated devices. *Exceeding the maximum number of contacts could affect the mechanical durability of the operators.

[AR9B291](#)

[AR9B290 AR9B291](#)



Max 6 contacts for non-illuminated momentary devices. Max 4 for alternate action non-illuminated

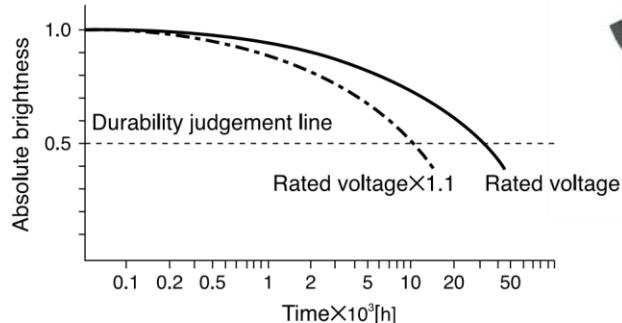
[APX510-24R](#)

*Lamp base: Ba9s/13

LED Bulbs for Command Series 22mm Pilot Devices

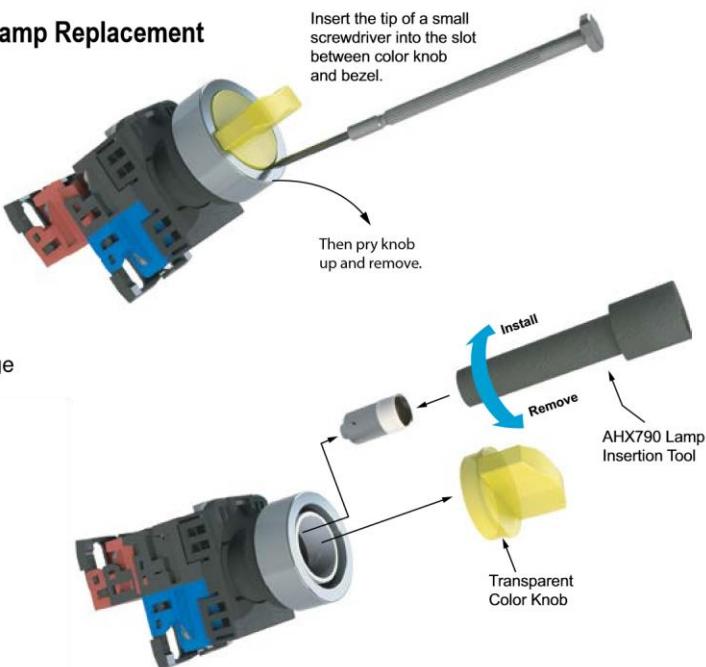
Part Number	Color	Qty	Price	Use With	Lamp Voltage	Current Consumption	Power Consumption	I
APX510-24R	Red	2	\$15.50	AR22 / DR22 Series	24V AC/DC	12mA AC 11mA DC	0.8 W	I
APX510-24G	Green	2	\$15.50					
APX510-24Y	Yellow	2	\$15.50					
APX510-24S	Blue	2	\$58.00					
APX510-24O	Orange	2	\$15.50					

Estimated durability for LED lamps



- Notes:
- Durability at $T_a=25^\circ C$
 - Durability is affected by temperature, humidity, and voltage fluctuation.

Lamp Replacement



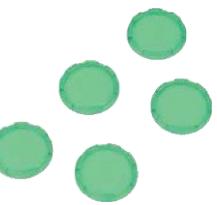
devices.



Accessories for 22mm

Lenses for Command Series 22mm Illuminated Pushbuttons					
Part Number	Color	Qty	Price	Drawing Link	Use With
AR9C016-R	Red	5	\$4.75	PDF	AR22MOL, AR22M5L AR22VOR, AR22VOL AR22FOL AR22F5L AR22EOL
AR9C021-R	Red	5	\$14.50	PDF	
AR9C011-R	Red	5	\$2.25	PDF	
AR9C011-G	Green	5	\$2.25	PDF	
AR9C011-Y	Yellow	5	\$2.25	PDF	
AR9C011-S	Blue	5	\$2.25	PDF	
AR9C011-C	Clear	5	\$2.25	PDF	
AR9C012-R	Red	5	\$2.25	PDF	
AR9C012-G	Green	5	\$2.25	PDF	
AR9C012-Y	Yellow	5	\$2.25	PDF	
AR9C012-S	Blue	5	\$2.25	PDF	
AR9C012-C	Clear	5	\$2.25	PDF	

Command Series Pilot Devices



[AR9C016-R](#)
[AR9C011-G](#)



[AR9C021-R](#)

[AR9C012-S](#)



Tools and Lock Nut for Use with Command Series 22mm Pilot Devices



[AHX790](#)

Part Number	Qty	Price	Drawing Link	Description
<u>AHX790</u>	1	\$3.50	<u>PDF</u>	Bulb removal tool
<u>AHX702</u>	1	\$6.00	N/A	Wrench/lamp removal tool
<u>AR9A004</u>	1	\$4.75	N/A	Wrench
<u>AR9R744</u>	5	\$2.25	<u>PDF</u>	Lock nut

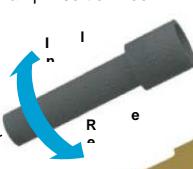


[AHX702](#)

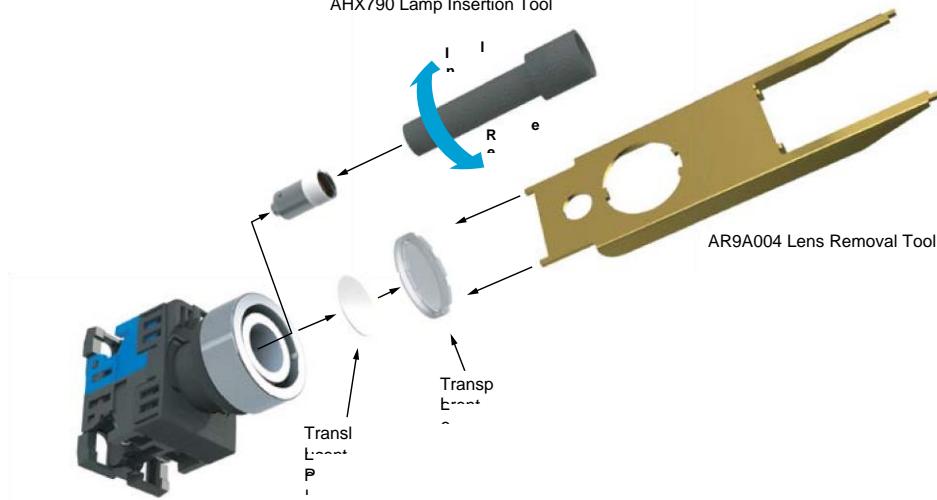
[AR9A004](#)

[AR9R744](#)

AHX790 Lamp Insertion Tool



AR9A004 Lens Removal Tool





Command Series 22mm

Pilot Devices Specifications

Specifications (Indoor Use)			
	Pushbuttons Emergency stop pushbuttons Selector switches	Joysticks	Pilot Lights
Rated thermal current (contact block)	A600 / P600	—	—
Mechanical durability	See durability table below	250,000 operations	—
Electrical durability	500,000 operations at 220V AC 6A 1 million operations at 220V AC 3A	100,000 operations at 220V AC 1A (Res. load)	—
Operating frequency	1200 operations/hour (On-load factor: 40%)		
Operating force (Avg)	9N – Pushbuttons 30-45 N – Emergency stop pushbuttons 0.15 - 0.1 N·m – Selector switches	Less than 100N	
Positive opening operation	All functions incorporating a N.C. contact are positive-opening operation.		
Dielectric strength	2,500VAC, 1 minute (w/o transformer 2000VAC)	2000VAC, 1 minute (Pilot light with transformer: 2500 VAC, 1minute)	
Insulation resistance	100MΩ or more (500VDC megger)		
Rated impulse dielectric strength	6kV	—	6kV
Conditional short-circuit current	1000A		
Short-circuit protective device	Fuse 15A (recommended, not supplied)	Fuse 1A (recommended, not supplied)	—
Pollution degree	3		
Vibration	Resonance: 10 to 55Hz, double amplitude 0.1 mm* / Constant: 16.7 Hz, double amplitude 3mm		
Shock	Malfuction durability: 100 m/s ² ** / m/s ²	Mechanical durability: 500	Mechanical durability: 500 m/s ²
Ambient temperature (no condensation or no icing)	-20 to +70°C [-4 to +158°F] Illuminated type: -20 to -50°C [-4 to -58°F]	-5 to +60°C [+23 to +140°F]	-2 to +50°C [-4 to +122°F]
Temperature ratings	Storage: -40 to +80°C [-40 to +176°F]		
Humidity	45 to 85% RH (within -5° to +40°C)		
Degree of protection	IP65		
Initial contact resistance	≤ 50mΩ	—	—
Terminal markings	IEC 60445	—	—
Connections	AWG 18 to AWG 14; Stripping length: 8mm to 11mm / Tightening torque: 0.8 to 1.0 N·m, 7.1 in·lb to 8.8 in·lb		
Contacts operation	Self-cleaning types. Slow action. Positive opening.		
Operation frequency	1,200 cycle/hour (Application ratio 40%)	—	—
Utilization category/contact ratings	AC-15: 24VAC at 6A, 110VAC at 6A DC-13: 24VDC at 4A, 110VDC at 1.3 A	AC-1: 110VAC at 0.3 A DC-13: 24VDC at 0.7 A, 110VDC at 0.15 A	—
Rated insulation voltage	600V AC/DC***	250V AC/DC	250V AC/DC (w/transformer 600VAC)
Materials	Enclosure: Polyamide / Contacts: silver, nickel		
Standards	UL 508, CSA C22.2, No.14, TUV - EN60947-5-1		
Approvals	UL file E44592, CSA file LR20479		

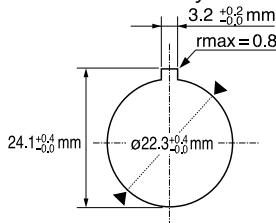
* Emergency stop type: 10 to 500 Hz, double amplitude 0.7mm(acceleration 50m/s²), according to test condition of EN60947-5-5 (1998) ** Emergency stop type: 150 m/s² ***Illuminated type without transformer

Mechanical Durability		
		Operations
Pushbutton switch Illuminated pushbutton switch E-stop pushbutton switch E-stop illuminated pushbutton	Momentary action Alternate action Push-lock, turn-reset Push-lock, pull-reset	million million 100,000 30,000
Selector switch	Maintained 1, 2, 3, 4-contact Maintained 5, 6-contact Spring return, spring/manual return	million 500,000 200,000
Illuminated selector switch	Maintained Without transformer 1, 2, 3-contact With transformer contact 4-contact Spring return, spring/manual return	million 500,000 million 500,000 200,000

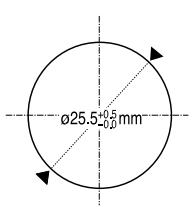
22mm Pilot Devices Cutouts

AR22 pilot devices can be mounted in either 22.3 or 25.5 mm diameter holes as shown in the figure

below without any extra adapter.



Note: If



key washer or legend plate is not used, 3.2 mm-wide location holes
Note: Key insertion/removal durability for selector switch key types • Key type 10,000 out.

FE 22mm Pilot

Devices

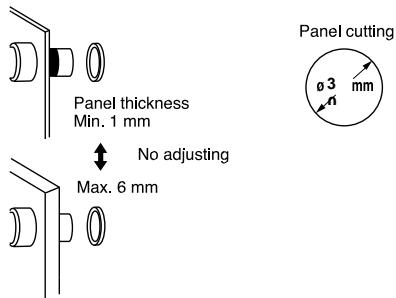
Overview

Pushbuttons, Selectors, Pilot Lights, Joysticks, Buzzers

Fuji Electric AR22 pilot devices can be mounted on panels up to 6mm thick by securing the operator with a locking nut from behind the panel without needing any adjustment.

Easy mounting

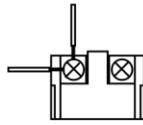
Fuji AR22 pilot devices can be mounted on panels between 1 and 6mm thick and are mountable in panel cutouts of 22.3 or 25.5 mm. The button and lens can be mounted on a panel while the operator is engaged.



Wiring

These pilot devices can be wired in both vertical and lateral directions making wiring in narrow spaces easier. Contact block color coding

1N.O. Blue, 1N.C. Red
Lamp terminal and transformer unit: black



Short depth

Fuji AR22 pilot devices are designed to occupy less space than traditional 22mm devices.

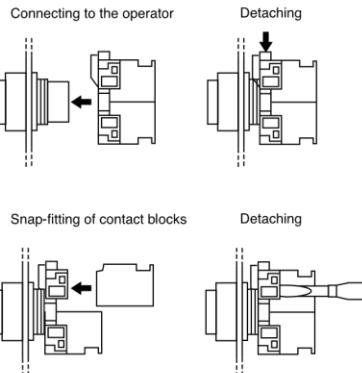
AR22V0R-01R

AR22PR-210BZA

DR22B8-EB

Quick contact block and transformer replacement

Fuji AR22 pilot devices have a snap-on



Safety

from moving until the button is pushed and locked.

Protection

AR22 pilot devices feature oil and dust-tight operator construction (IP65), except for buzzers DR22B5 (IP00), DR22B8 (IP54).



makes wiring even easier.

Pushbuttons Pushbuttons



[AR22F0R-01RZA](#)
E-Stop
Pushbuttons

Illuminated Pilot Lights



[AR22F0L-10E3YZA](#)
Selector
Switches



[DR22E3L-E3SZA](#)

Buzzers



mounting that makes replacing or adding

covers a contact block and transformer unit easier. Emergency

AR22 pilot devices include terminal

for added safety and

stop pushbuttons include a trigger action mechanism that prevents the contacts

. Command 16mm LED Plastic Indicating Lights



[DR16F0N-E3G](#)

[DF16F0N-E3S](#)

[DR16E0L-E3A](#)

Command 16mm LED Plastic Indicating Lights										
Part Number	Color	Price	Drawing Link	Operator	Type*	Protection	Voltage	Power Consumption	Material	
DR16F0N-E3G	Green	\$12.00	PDF	Permanent, flush, 24.0 x 18.0 mm rectangular	Standard	IP65	24 VAC/VDC full voltage	Green, Red, Amber, Blue: 7.5 mA AC, 7.5 mA DC Orange, Yellow: 9 mA AC, 8.5 mA DC	Base: Plastic Bezel: Plastic	
DR16F0N-E3R	Red	\$12.00	PDF							
DR16F0N-E3W	Orange	\$12.00	PDF							
DR16F0N-E3Y	Yellow	\$12.00	PDF							
DR16F0N-E3A	Amber	\$12.00	PDF							
DR16F0N-E3S	Blue	\$12.00	PDF							
DF16F0N-E3G	Green	\$17.00	PDF							
DF16F0N-E3R	Red	\$17.00	PDF							
DF16F0N-E3W	Orange	\$17.00	PDF							
DF16F0N-E3Y	Yellow	\$17.00	PDF							
DF16F0N-E3A	Amber	\$17.00	PDF							
DF16F0N-E3S	Blue	\$17.00	PDF							
DR16E0L-E3G	Green	\$12.00	PDF	Permanent, extended, 18.0 mm, round	Standard					
DR16E0L-E3R	Red	\$12.00	PDF							
DR16E0L-E3W	Orange	\$12.00	PDF							
DR16E0L-E3Y	Yellow	\$12.00	PDF							
DR16E0L-E3A	Amber	\$12.00	PDF							
DR16E0L-E3S	Blue	\$12.00	PDF							

* Type: Standard = 28.4 mm deep, Thin - 35.9 mm deep



. Command Series 16mm/19mm

Pilot Devices Specifications

Specifications (Indoor Use)		
	Pushbuttons / Selector Switches / Indicating Lights	Emergency Stop Pushbuttons
Rated thermal current (contact block)	D300	C300 / R300
Mechanical durability	Pushbuttons: Momentary 1 million operations Alternate: 250,000 operations Selector Switch: 250,000 operations Indicating Lights: NA	100,000 operations
Electrical durability	100,000 operations (220 VAC 0.7A)	100,000 operations (AC-15, AC-13, AC-12, DC-13, DC-12)
Operating frequency	1200 operations/hour (On-load factor: 40%)	
Operating force (Avg)	Pushbuttons: 10N max Selector switches 0.1 N·m max	Push to lock: 25N max Pull to reset: 20N max Turn to reset: 0.3 N·m max
Dielectric strength	2000 VAC for 1 min	
Insulation resistance	100MΩ (500 VDC megger)	
Rated impulse dielectric strength	2.5kV	
Conditional short-circuit current	1000A	
Short-circuit protective device	2A	6A
Pollution degree	3 (inside the enclosure 2)	
Vibration	Resonance: 10 to 55Hz, double amplitude 0.1 mm* / Constant: 16.7 Hz, double amplitude 3mm	
Shock	Malfunction: 100 m/s ² Mechanical: 500 m/s ²	Malfunction:150m/s ² Durability: 1000 m/s ²
Ambient temperature	-10 to +55°C [+14 to +131°F] (no icing or no condensation)	
Temperature ratings	Storage: -40 to +70°C [-40 to +158°F]	
Humidity	45 to 85% RH (within -5° to +40°C) (no icing or no condensation)	
Degree of protection	IP65	
Initial contact resistance	50mΩ max 6VDC 1A voltage drop	
Connections	0.3 to 0.75 mm ² (22 to 18 AWG) Stripping length: 11 ± 1mm Solder connection or 2.8 mm crimp-on disconnect connector	
Mounting tightening torque	0.6 to 1.0 N·m, 5.3 to 8.8 in·lb	
Contacts operation	Self-cleaning types. Slow action. Positive opening.	
Operation frequency	1,200 cycle/hour (Application ratio 40%)	
Utilization category/contact ratings	120 VAC 1A (AC-13), 24 VDC 0.7 A (DC-13, to 0.95 = 21ms) 240 VAC 0.7 A (AC-13), 125 VDC 0.15 A (DC-13, to 0.95 = 21ms)	—
Rated insulation voltage	250V AC/DC	
Materials	Enclosure: Polyamide / Contacts: silver, nickel	

Standards	UL 508, CSA C22.2, No.14, TUV - EN60947-5-1 Pushbutton, Illuminated pushbutton: R50116757 Selector: R50116759 Pilot lights: R50116762
Approvals	cURus File Number E44592, CE

To obtain the most current agency approval information, see the **Agency Compliance & Certifications Checklist** section on the specific part number's web page.

tPIL-130



. Command Series Pilot Devices

Fuji Electric Command Series pilot devices are used in machine tools, industrial machines, control panels, distribution panels, instrumentation panels. Pushbuttons improve interfacing allowing better layout and wiring, easier installation and increased safety. Reliability is also built in to handle complex multi-functional controls.

heads, and mushroom style heads. Other 16mm, 22mm and 30mm pilot devices available include emergency stop by pushbuttons, selector switches, pilot lights, joystick selector switches, and buzzers.

The AR16, AR22 and AR30 series are configurable with a wide range of choices. Our selection of 16mm, 19mm, 22mm and 30mm pushbuttons include non-illuminated as well as

We also offer a wide array of accessories to complement our selection of Fuji 16mm, 19mm, 22mm and 30mm Command Series pilot devices.

AR16 Series Features

- 16.2 or 19.2 mm diameter hole
- 22.3 mm diameter hole
- Fits 1 to 6mm max panel thickness
- Integrated structure with built-in contacts
- Offered in Thin-type profile with only (except for joysticks and buzzers) 2mm of panel protrusion for high-density mounting and attractive panel designs
- Bright LED-illuminated surface with less consumption directions
- Gold-plated contacts and snap-action mechanism with low 1mA at 5V switching
- Oil- and dust-proof operator modules (IP65)
- 2.23 mm diameter hole
- Fits 1 to 6mm max panel thickness
- Mountable in either a 22.3 or 25.5 mm that reduce control panel depth diameter cutout
- Provided with release arm
- Wiring possible in vertical and horizontal power directions
- Oil- and dust-proof operator modules (IP65), except for buzzers DR22B5 (IP00), DR22B8 (IP54)

AR22 Series Features

AR30 Series Features

- 30.5 mm diameter hole
- Fits 1mm to 6mm max panel thickness
- Quick snap-on replacement of contact blocks
- Double-break self-cleaning contacts
- Terminal cover included for added safety
- Wiring possible in vertical and horizontal directions
- Oil- and dust-proof operator modules (IP65) except for buzzer DR30B5 (IP00)



Pushbuttons



E-Stop Pushbuttons



Selector Switches



Pilot Lights



Electronic Buzzers



Joysticks

Command Series Accessories



*TO OBTAIN THE MOST CURRENT AGENCY APPROVAL INFORMATION, SEE
THE AGENCY COMPLIANCE & CERTIFICATIONS CHECKLIST SECTION ON
THE SPECIFIC PART NUMBER'S WEB PAGE.*

tPIL-122

ECX Series 22mm Plastic Indicator Lights

Plastic incandescent indicator lights

These indicators have a key to prevent rotation when mounted.

12 models available:

- Available in six colors wiring and maintenance
- 24V and 120V models • IP20 rated before installation
- Incandescent bulbs included • IP65 rated after installation [ECX1051-24](#)
- Accepts LED replacement lamps **Note: When using LED replacement lamps with these indicators, it may be necessary to remove the frosted diffuser for enhanced illumination.**
- Monoblock design for easy mounting



Plastic Incandescent Indicator Lights						
Part Number	Lamp Color	Price	Drawing Link	Description	Replacement Incandescent Bulb [5 per pack]	Replacement Lamp [2 per pack]
ECX1051-24	Red	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1911-2, 26mA
ECX1051-120	Red	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1921-2, 5mA
ECX1052-24	Green	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1912-2, 26mA
ECX1052-120	Green	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1922-2, 5mA
ECX1053-24	Yellow	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1913-2, 26mA
ECX1053-120	Yellow	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1923-2, 5mA
ECX1054-24	Blue	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1914-2, 26mA
ECX1054-120	Blue	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1924-2, 5mA
ECX1055-24	Clear	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1915-2, 26mA
ECX1055-120	Clear	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1925-2, 5mA
ECX1056-24	White	\$6.25	PDF	22mm monoblock incandescent indicator light, 24VDC/VAC	ECX1902-5, 80mA	ECX1915-2, 26mA
ECX1056-120	White	\$7.50	PDF	22mm monoblock incandescent indicator light, 120VDC/VAC	ECX1904-5, 20mA	ECX1925-2, 5mA

Plastic LED indicator lights



10 models available:

- Available in five colors
- 24V and 120V models
- Non-replaceable LEDs
- Side wire entry with back screw terminals for easy wiring and maintenance
- IP20 rated before installation
- IP65 rated after installation
- 16mA @ 127V, 18mA @ 24V

Plastic LED Indicator Lights				
Part Number	Lamp Color	Price	Drawing Link	Description
ECX2051-24L	Red	\$5.75	PDF	22mm non-metal monoblock LED indicator light, 24VDC/VAC
ECX2051-127L	Red	\$7.00	PDF	22mm non-metal monoblock LED indicator light, 120VDC/VAC
ECX2052-24L	Green	\$5.75	PDF	22mm non-metal monoblock LED indicator light, 24VDC/VAC
ECX2052-127L	Green	\$7.00	PDF	22mm non-metal monoblock LED indicator light, 120VDC/VAC
ECX2053-24L	Yellow	\$5.75	PDF	22mm non-metal monoblock LED indicator light, 24VDC/VAC
ECX2053-127L	Yellow	\$7.00	PDF	22mm non-metal monoblock LED indicator light, 120VDC/VAC
ECX2054-24L	Blue	\$9.50	PDF	22mm non-metal monoblock LED indicator light, 24VDC/VAC
ECX2054-127L	Blue	\$9.50	PDF	22mm non-metal monoblock LED indicator light, 120VDC/VAC
ECX2055-24L	Clear	\$9.50	PDF	22mm non-metal monoblock LED indicator light, 24VDC/VAC
ECX2055-127L	Clear	\$9.50	PDF	22mm non-metal monoblock LED indicator light, 120VDC/VAC

For accessories, see 22mm Plastic Pilot Device Accessories in this section.

Replacement incandescent bulbs



[ECX1902-5](#)

Replacement

Note: Bulb removal tool available. Order part number HT8LAMPTOOL.

Replacement Incandescent Bulbs				
Part Number	Quantity	Price	Rating	Description
ECX1900-5	5	\$9.50	6V@ 200mA 1.2 watts	6V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
			24V@ 80mA watts	24V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
ECX1904-5	5	\$20.00	130V@20mA 2.6 watts	120V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4



LED lamps

ECX1915-2

Hole plug



Note: LED modules have very low current draw and should not be used with triac output devices like PLC triac output modules. It is

Replacement LED Lamps					
Part Number	Color	Quantity	Price	Rating	Description
ECX1911-2	Red	2	\$17.50	24V@26mA 0.6 watts	LED replacement lamp for miniature bayonet bases. Works with 22mm switches and indicators, but illumination will not be as even when used with the ECX 22mm indicators.
ECX1912-2	Green		\$22.00		
ECX1913-2	Yellow		\$17.50		
ECX1914-2	Blue		\$23.50		
ECX1915-2	White		\$28.00		
ECX1921-2	Red		\$17.50		
ECX1922-2	Green		\$22.00		
ECX1923-2	Yellow		\$17.50		
ECX1924-2	Blue		\$23.50		
ECX1925-2	White		\$28.00		

Hole Plug

Part Number	Color	Price	Description
ECX1490	Black	\$2.75	Plastic hole plug for 22.5 mm openings in panels and enclosures; supplied with O-ring and mounting screw. Two plugs per package.

recommended that dry contact outputs be used to switch 120 volt AC LED modules.

[ECX1490](#)

Protective covers for pushbuttons



ECX1703-5

Knockout Punches

Ruko's knockout punch hole-cutting tool includes punch, die and draw bolt (without ball bearing). Use for sheet steel, stainless-steel sheets, non-ferrous and light metals, and plastics up to 0.16" (8 ga.) thick.

Replacement bolts are offered in three of the most popular sizes. See the Tools section of the catalog for details.

Protective Covers for Pushbuttons				
Part Number	Color	Quantity	Price	Description
ECX1700-5	Black	5	\$7.50	Silicone protective covers for use with 22mm standard-size flush pushbuttons. Will not work with Cutler-Hammer pushbuttons, 22mm plastic illuminated or extended pushbuttons, or 22mm plastic pushbuttons with 40mm actuator face.
ECX1701-5	Red		\$7.50	
ECX1702-5	Green		\$7.50	
ECX1703-5	Yellow		\$7.50	
ECX1704-5	Blue		\$7.50	
ECX1705-5	Clear		\$7.50	
ECX1706-5	Clear		\$13.00	Clear silicone protective covers for use with 22mm illuminated and extended pushbuttons only. Will not work with Cutler-Hammer pushbuttons or 22mm mushroom pushbuttons.

Note: Part number [109225](#) is recommended when punching holes for 22mm pilot devices.

[109225](#)

Replacement keys



Note: All key-actuated 22mm plastic selector switches are keyed alike.

[ECX1067-2](#)

Replacement Keys			
Part Number	Quantity	Price	Description
ECX1067-2	2	\$6.50	Replacement key for GCX series key-actuated selector switches, pack of 2 sets (2 keys each). NOTE: Will not work with Cutler-Hammer 22mm switches.

Replacement 22mm support base

Replacement 22mm Support Base				
Part Number	Quantity	Price	Drawing Link	Description
ECX3029-2	1	\$1.75	PDF	22mm plastic support base Note: This item is supplied as a replacement part and is not required with any switch assembly. Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect



[ECX3029-2](#)

Replacement contact blocks

Replacement Contact Blocks					
Part Number	Quantity	Price	Drawing Link	Contacts	Description
ECX1030-2	2	\$7.25	PDF	Red, normally-closed (N.C.)	Replacement contact block for 22mm pushbuttons and selector switches. Tightening Torque, terminal screw: 0.8 N·m max
ECX1030-5	5	\$17.00	PDF	Green, normally-open (N.O.)	mounting screw: 0.5 N·m max Note: Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect
ECX1040-2 ECX1040-5	2	\$7.25	PDF	Brown, normally-open (N.O.), push-push	Use on lighted Push-push button only
ECX1042-2	2	\$7.25	PDF		



[ECX1030-2](#)

Note: See electrical specifications on GCX Series 22mm Plastic Pilot Devices

EMERGENCY STOP

legend plate

EMERGENCY STOP Legend Plate				
Part Number	Quantity	Price	Drawing Link	Description
ECX1651	1	\$2.75	PDF	Oversize yellow circular EMERGENCY STOP legend plate for 22mm E-stop type mushroom pushbuttons, 60mm outside diameter.



[ECX1651](#)

Two-position short lever operator

Short Lever Replacement Operator				
Part Number	Lamp Color	Price	2-Position	Use with
GR1172PR-5	Red	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX124, GCX125, GCX324, GCX325
GR1172PV-5	Green	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
GR1172PG-5	Yellow	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
GR1172PB-5	Blue	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
GR1172PN-5	Clear	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1172PR-5](#)

Three-position short lever operator

Short Lever Replacement Operator				
Part Number	Lamp Color	Price	3-Position	Use with
GR1288PR-5	Red	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX126, GCX128, GCX326, GVX328
GR1288PV-5	Green	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
GR1288PG-5	Yellow	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
GR1288PB-5	Blue	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
GR1288PN-5	Clear	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1288PR-5](#)

Mushroom switch

Mushroom Switch Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
PL1171PR-5	Red	\$7.25	22mm, illuminated momentary Mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1221, GCX3221 mushroom-style illuminated pushbuttons
PL1298P-5	Red	\$7.25	22mm illuminated twist-to-release mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1226, GCX3226 mushroom-style illuminated pushbuttons

replacement operator



[PL1298P-5](#)

Flush pushbutton replacement operator

Flush Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
<u>GR1168PR-5</u>	Red	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
<u>GR1168PV-5</u>	Green	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
<u>GR1168PG-5</u>	Yellow	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
<u>GR1168PB-5</u>	Blue	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
<u>GR1168PN-5</u>	Clear	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
<u>GR1168PW-5</u>	White	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	Part numbers starting with GCX119, GCX120, GCX319, GCX320



[GR116 5](#)

Extended pushbutton replacement operator

Extended Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
<u>PL1308PR-5</u>	Red	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
<u>PL1308PV-5</u>	Green	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
<u>PL1308PG-5</u>	Yellow	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
<u>PL1308PB-5</u>	Blue	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
<u>PL1308PN-5</u>	Clear	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
<u>PL1308PW-5</u>	White	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	Part numbers starting with GCX121, GCX321



[PL130 5](#)

Legend plates

Plastic legend plates for use with 22mm pilot devices. White engraved text on colored background. O-ring included.



[ECX1670-B07ECX1670-R03](#)

Plastic Legend Plates

Legend	Color of Field	Part Number	Price	Drawing Link
MAN AUTO	Black	ECX1670-B44	\$3.75	PDF
MAN OFF AUTO	Black	ECX1670-B47	\$3.75	PDF
MOTOR RUN	Black	ECX1670-B22	\$3.00	PDF
MOTOR STOP	Black	ECX1670-B23	\$3.00	PDF
OFF	Black	ECX1670-B34	\$3.75	PDF
OFF-ON	Black	ECX1670-B16	\$3.00	PDF
ON	Black	ECX1670-B06	\$3.00	PDF
OPEN	Black	ECX1670-B07	\$3.00	PDF
OPEN OFF CLOSE	Black	ECX1670-B48	\$3.75	PDF
OPEN-CLOSE OUT	Black	ECX1670-B17	\$3.00	PDF
	Black	ECX1670-B35	\$3.75	PDF
POWER ON	Black	ECX1670-B21	\$3.00	PDF
PULL ON PUSH OFF RAISE	Black	ECX1670-B50	\$3.75	PDF
	Black	ECX1670-B36	\$3.75	PDF
READY	Black	ECX1670-B37	\$3.75	PDF
RELEASE	Black	ECX1670-B54	\$3.75	PDF
RESET	Black	ECX1670-B38	\$3.75	PDF
RETRACT	Black	ECX1670-B52	\$3.75	PDF
REVERSE	Black	ECX1670-B08	\$3.00	PDF
RUN	Black	ECX1670-B09	\$3.00	PDF
SAFE RUN	Black	ECX1670-B45	\$3.75	PDF
START	Black	ECX1670-B10	\$3.00	PDF
STOP	Black	ECX1670-B11	\$3.00	PDF
STOP	Red	ECX1670-R11	\$3.00	PDF
TEST	Black	ECX1670-B39	\$3.75	PDF
TRANSFER	Black	ECX1670-B40	\$3.75	PDF
TRIP	Black	ECX1670-B41	\$3.75	PDF
UNCLAMP	Black	ECX1670-B42	\$3.75	PDF
UP	Black	ECX1670-B12	\$3.00	PDF
UP OFF DOWN	Black	ECX1670-B49	\$3.75	PDF

Note: Legend plate text is 3mm in height

UP-DOWN	Black	ECX1670-B18	\$3.00	PDF
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Plastic Legend Plates				
Legend	Color of Field	Part Number	Price	Drawing Link
AUTO OFF HAND	Black	ECX1670-B46	\$3.75	PDF
Blank Plate	Black	ECX1670-B	\$3.00	PDF
		ECX1670-R	\$3.00	PDF
CLAMP	Black	ECX1670-B24	\$3.75	PDF
CLOSE	Black	ECX1670-B01	\$3.00	PDF
DOWN	Black	ECX1670-B02	\$3.00	PDF
EMERG. STOP	Red	ECX1670-R03	\$3.00	PDF
EXTEND	Black	ECX1670-B51	\$3.75	PDF
FEEDER OFF	Black	ECX1670-B26	\$3.75	PDF
		ECX1670-B25	\$3.75	PDF
FOR OFF REV	Black	ECX1670-B19	\$3.00	PDF
FOR-REV	Black	ECX1670-B13	\$3.00	PDF
FORWARD	Black	ECX1670-B04	\$3.00	PDF
GRIP	Black	ECX1670-B53	\$3.75	PDF
HAND-AUTO	Black	ECX1670-B14	\$3.00	PDF
HAND OFF AUTO	Black	ECX1670-B20	\$3.00	PDF
HIGH	Black	ECX1670-B27	\$3.75	PDF
HIGH LOW	Black	ECX1670-B43	\$3.75	PDF
		ECX1670-B28	\$3.75	PDF
IN	Black	ECX1670-B29	\$3.75	PDF
JOG	Black	ECX1670-B05	\$3.00	PDF
		ECX1670-B30	\$3.75	PDF
JOG REV	Black	ECX1670-B31	\$3.75	PDF
JOG-RUN	Black	ECX1670-B15	\$3.00	PDF
LOW	Black	ECX1670-B32	\$3.75	PDF
LOWER	Black	ECX1670-B33	\$3.75	PDF



[ECX1690-B16](#)



[ECX169_1](#)

Jumbo Plastic Legend Plates

<i>Legend</i>	<i>Color of Field</i>	<i>Part Number</i>	<i>Price</i>	<i>Drawing Link</i>
Blank Plate	Black	<u>ECX1690- B</u>	\$3.75	PDF
Blank Plate	Red	<u>ECX1690- R</u>	\$3.75	PDF
EMERG. STOP	Red	<u>ECX1690- R03</u>	\$3.75	PDF
HAND- OFF- AUTO	Black	<u>ECX1690- B20</u>	\$3.75	PDF
JOG	Black	<u>ECX1690- B05</u>	\$3.75	PDF
OFF-ON	Black	<u>ECX1690- B16</u>	\$3.75	PDF
OPEN- CLOSE	Black	<u>ECX1690- B17</u>	\$3.75	PDF
POWER ON	Black	<u>ECX1690- B21</u>	\$3.75	PDF
START	Black	<u>ECX1690- B10</u>	\$3.75	PDF
STOP	Red	<u>ECX1690- R11</u>	\$3.75	PDF

Note: Legend plate text is 3mm in height

GCX Series 22mm Plastic Pilot Devices

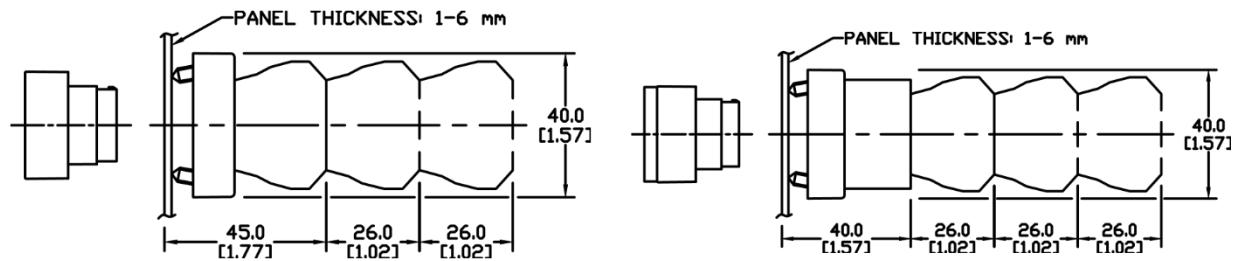
Specifications

Assembly information

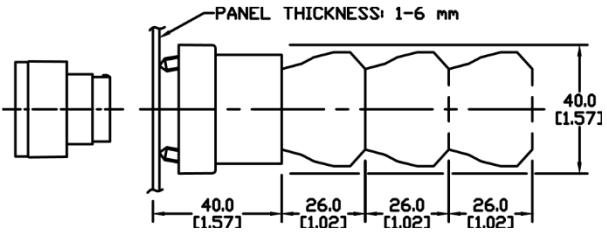
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

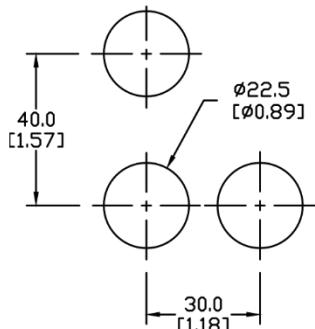
mm
[inches]



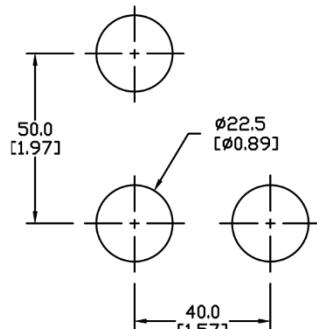
Illuminated pushbuttons and selector switches/ indicator lights



Mounting



This layout is suitable if all switches are 230V or less and the same polarity.

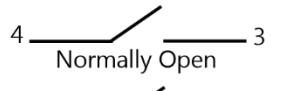


This layout is suitable if all switches are 400V or less and different polarity.

NOTE: Contact blocks can be arranged up to three deep by two wide.



Typical Wiring



Indicator

Specifications

These specifications apply to all the GCX and ECX 22mm plastic pushbuttons and switches.

Physical Specifications

Standards Reference CEI EN 60947-5-1, CSA C22-2 n.14

Approvals UL File E189258, IMQ (where specified)

Enclosure Material Fiberglass reinforced thermoplastic

Contacts Material *Silver*

IP40 for [GCX3151-24](#), [GCX3151-120](#), [GCX3153-24](#) and
[GCX3153-120](#). IP65 for all others.(See Appendix of this

Protection Degree

catalog for explanation of IP ratings according to IEC 144 CEI 70-1.)

Electric Shock Protection

IEC 536, Class II

Storage: -40° to 80°C (-40° to 176°F)

Temperature Ratings

Operating: -25° to +70°C (-13° to 158°F)

Working Positions

All working positions are allowed

Pushbuttons, selector switches, joy stick switches:

1,000,000 operations **Mechanical Life**

Emergency mushrooms and push-push pushbuttons:

300,000 operations

(according to IEC 947-5-1)

Positive Opening Operation

All functions incorporating an NC contact are positive

opening operation

Electrical Specifications

Rated Thermal A300, Q300 (Refer to E22 Series mounting/contact **Current (contact block)** rating section for details)

Rated Insulation Voltage Ui 660V according to CEI-EN-60947-5-1,

300V according to CSA C22-2 n.14 and UL 508

Dielectric Strength 3kV (1 second) **Insulation Resistance**

2MΩ min. (500VDC) **Initial Contact Resistance** ≤ 25mΩ

Short-Circuit Protection*Cartridge fuses gl 10 A-500V 10, 3x3811 100 KA

Terminal Markings According to CENELEC EN 50013

Connections Single screw with non-loosening plate clamp, 14AWG

max., Tighten to 0.8Nm max

Contacts Operation Self-cleaning types EN01 (N.C.) EN 10 (N.O.) slow-

action, positive opening

Operation Frequency 3600 operations per hour max.

AC15 (Control of AC electromagnetic loads)

24 volts AC at 10 amps

130 volts AC at 6.5 amps

Utilization Category

DC13 (Control of DC electromagnetic loads)

24 volts DC at 1.5 amps

110 volts DC at 0.5 amps ***Note: Recommended, not supplied**

tPIL-3

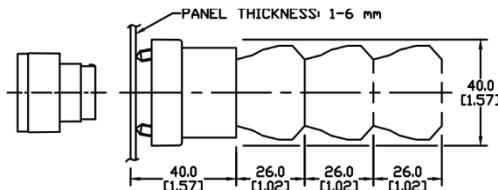
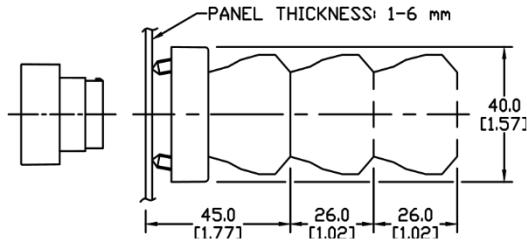
GCX Series 22mm Metal Pilot Devices Specifications

Assembly information

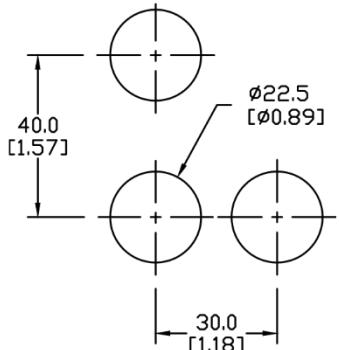
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Pushbuttons and selector switches

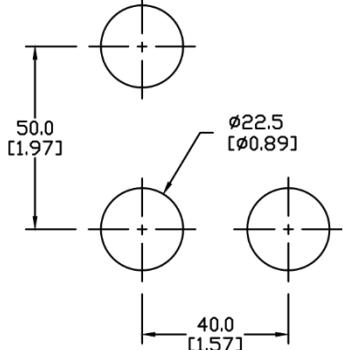
Illuminated pushbuttons and selector switches/pilot lights



Mounting



This layout is suitable if all switches are 230V or less and the same polarity.



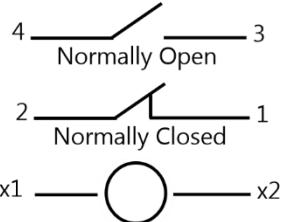
This layout is suitable if all switches are 400V or less and different polarity.

Dimensions: mm [inches]

NOTE: Contact blocks can be arranged up to three deep by two wide.



Typical
Wiring



Indicator

Specifications

These specifications apply to all GCX and ECX 22 mm metal pushbuttons and switches.

Physical Specifications

Standards Reference	CEI EN 60947-5-1, CSA C22-2 n.14
Approvals	CSA, IMQ (where specified), UL File E189258
Enclosure Material	Zn + Al + Mg alloy, chromium plated
Contacts Material	Silver
Protection Degree	IP40 for GCX3151-24 , GCX3151-120 , GCX3153-24 and GCX3153-120 . IP65 for all others. (See Appendix of this catalog for explanation of IP ratings according to IEC 144 CEI 70-1.)
Temperature Ratings	Storage: -40 to 80°C (-40 to 176°F) Operating: -25 to +70°C (-13 to 158°F)
Working Positions	All working positions are allowed

Electrical Specifications

Rated Thermal Current (contact block)	A300, Q300 (Refer to E22 Series mounting/ contact rating section for details)
Rated Insulation Voltage	Ui 660V according to CEI EN 60947-5-1, 300V according to CSA C22-2 n.14
Dielectric Strength	3kV (1 second)
Insulation Resistance	2MΩ min. (500VDC)
Initial Contact Resistance	≤ 25mΩ
Short-Circuit Protection*	Cartridge fuses gl 10A - 500V 10,3x38I1 100kA
Terminal Markings	According to CENELEC EN 50013
Connections	Single screw with non-loosening plate clamp, 14AWG max.
Contacts Operation	Self-cleaning types EN01 (N.C.) EN 10 (N.O.) slow-action, positive opening
Operation Frequency	3600 operations per hour max.

Mechanical Life	Pushbuttons, selector switches: Joy stick switches: 1,000,000 operations Mushroom pushbuttons: 300,000 operations	Utilization Category	AC15 (Control of AC electromagnetic loads) 24 volts AC at 10 amps 130 volts AC at 6.5 amps DC13 (Control of DC electromagnetic loads) 24 volts DC at 1.5 amps 110 volts DC at 0.5 amps
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*Note: Recommended, not supplied

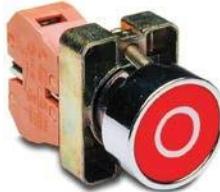
GCX Series 22mm Metal Pushbuttons

Momentary flush pushbuttons with protective metal ring (30mm dia. actuator)

[GCX1102](#)



Momentary Flush
ON/OFF pushbuttons
with protective metal
ring (30mm dia.
actuator)



[GCX1106](#)



[GCX1107](#)

Momentary Pushbuttons Flush with Protective Metal Ring

Part Number	Color	Price	Drawing Link	Description
GCX1100	Black	\$7.50	PDF	One N.O. contact block, 30mm dia. actuator, mounts in 22mm hole
GCX1101	Red	\$7.50	PDF	One N.C. contact block, 30mm dia. actuator, mounts in 22mm hole
GCX1102	Green	\$7.50	PDF	
GCX1103	Yellow	\$7.50	PDF	One N.O. contact block, 30mm dia. actuator, mounts in 22mm hole
GCX1104	Blue	\$7.50	PDF	
GCX1105	White	\$7.50	PDF	

Momentary Pushbuttons Flush ON/OFF

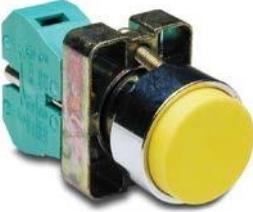
Part Number	Color	Price	Drawing Link	Description
GCX1106	Red with "Off" symbol (O) on actuator	\$8.25	PDF	One N.C. contact block, 30mm dia. actuator, mounts in 22mm hole
GCX1107	Green with "On" symbol (I) on actuator	\$8.25	PDF	One N.O. contact block, 30mm dia. actuator, mounts in 22mm hole

Momentary Pushbuttons with protective metal ring (40mm dia. actuator)

GCX1121



Note: Protective silicone covers are not available for this pushbutton.



GCX Series

22mm Metal Pushbuttons

Momentary extended pushbuttons

Momentary Pushbuttons with Protective Metal Ring

Part Number	Color	Price	Drawing Link	Description
GCX1120	Black	\$8.75	PDF	One N.O. contact block, 40mm dia. actuator, mounts in 22mm hole
GCX1121	Red	\$8.75	PDF	One N.C. contact block, 40mm dia. actuator, mounts in 22mm hole
GCX1122	Green	\$8.75	PDF	One N.O. contact block, 40mm dia. actuator, mounts in 22mm hole
GCX1123	Yellow	\$8.75	PDF	
GCX1124	Blue	\$8.75	PDF	
GCX1125	White	\$8.75	PDF	

GCX1113

Double-headed momentary pushbuttons

Momentary Extended Pushbuttons

Part Number	Color	Price	Drawing Link	Description
GCX1110	Black	\$8.25	PDF	One N.O. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1111	Red	\$8.25	PDF	One N.C. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1112	Green	\$8.25	PDF	One N.O. contact block, extended 30mm dia. actuator, mounts in 22mm hole
GCX1113	Yellow	\$8.25	PDF	
GCX1114	Blue	\$8.25	PDF	
GCX1115	White	\$8.25	PDF	



GCX1152 (with on/off symbols)

GCX1151-24

Double-headed Momentary Pushbuttons

Part Number	Price	Drawing Link	Description
GCX1150	\$14.50	PDF	Double-headed for on/off control, One N.O. and one N.C. contact block, fits in 22mm dia. hole, without symbols
GCX1151-24	\$21.50	PDF	24VDC/VAC double-headed with indicator, faces without symbols. One N.O. and one N.C. contact block, fits in 22mm dia. hole
GCX1151-120	\$22.50	PDF	120VDC/VAC double-headed with indicator, faces without symbols. One N.O. and one N.C. contact block, fits in 22mm dia. hole
GCX1152	\$15.50	PDF	Double-headed for on/off control. One N.O. and one N.C. contact block, fits in 22mm dia. hole. With ON(1) and OFF (0) symbols

GCX1153-24*	\$22.50	PDF	24VDC/VAC double-headed with indicator, with ON (1) and OFF (0) symbols. One N.O. and one N.C. contact block
GCX1153-120*	\$23.50	PDF	120VDC/AC double-headed with indicator, with ON (1) and OFF (0) symbols. One N.O. and one N.C. contact block

* Note: Lamp data in 22 mm Metal Pilot Accessories in this section.

GCX Series 22mm Metal Pushbuttons without Contact Block

Momentary flush pushbutton operator (without contact block) (30mm dia. actuator)

Momentary Flush Pushbuttons Operators (without contact block)				
Part Number	Color	Price	Drawing Link	Description
GCX1100-SC	Black	\$5.00	PDF	22mm metal pushbutton operator, flush, includes 30mm dia. operator and support base ONLY. Contact blocks sold separately, mounts in 22mm hole.
GCX1101-SC	Red	\$5.00	PDF	22mm metal pushbutton operator, flush, includes 30mm dia. operator and support base ONLY. Contact blocks sold separately, mounts in 22mm hole.
GCX1102-SC	Green	\$5.00	PDF	22mm metal pushbutton operator, flush, includes 30mm dia. operator and support base ONLY. Contact blocks sold separately, mounts in 22mm hole.



[GCX11 C](#)

Momentary extended pushbutton operator (without contact block) (30mm dia. actuator)

Momentary Extended Pushbutton Operators (without contact block)				
Part Number	Color	Price	Drawing Link	Description
GCX1110-SC	Black	\$5.00	PDF	22mm metal pushbutton operator, extended, includes 30mm dia. operator and support base ONLY. Contact block sold separately, mounts in 22mm hole
GCX1111-SC	Red	\$5.00	PDF	22mm metal pushbutton operator, extended, includes 30mm dia. operator and support base ONLY. Contact block sold separately, mounts in 22mm hole
GCX1112-SC	Green	\$5.00	PDF	22mm metal pushbutton operator, extended, includes 30mm dia. operator and support base ONLY. Contact block sold separately, mounts in 22mm hole



[GCX11 C](#)

Contact blocks are available for these products.



ECX1042-2

ECX1030-2

Replacement Incandescent Bulbs					
Part Number	Quantity	Price	Rating	Description	
ECX1900-5	5	\$9.50	6V@ 1.2	6V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	
ECX1902-5	5	\$9.50	24V@ 80mA 2 watts	24V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	
ECX1904-5	5	\$20.00	130V@20mA 2.6 watts	120V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	

Replacement incandescent bulbs



[ECX1902-5](#)

Note: *Bulb removal tool available. Order part number HT8LAMPTOOL.*

Replacement LED lamps

Replacement LED Lamps					
Part Number	Color	Quantity	Price	Rating	Description
ECX1911-2	Red	2	\$17.50	24V@26mA 0.6 watts	LED replacement lamp for miniature bayonet bases Works with 22mm switches and indicators, but illumination will not be as even when used with the ECX 22mm indicators Note: Will not replace sealed
ECX1912-2	Green		\$22.00		
ECX1913-2	Yellow		\$17.50		
ECX1914-2	Blue		\$23.50		
ECX1915-2	White		\$28.00		



[ECX1 2](#)

<u>ECX1921-2</u>	Red	\$17.50	120V@5mA 0.6 watts	Cutler-Hammer monoblock LED indicators.
<u>ECX1922-2</u>	Green	\$22.00		
<u>ECX1923-2</u>	Yellow	\$17.50		
<u>ECX1924-2</u>	Blue	\$23.50		
<u>ECX1925-2</u>	White	\$28.00		



Hole plug

Hole Plug			
<i>Part Number</i>	<i>Color</i>	<i>Price</i>	<i>Description</i>
<u>ECX1490</u>	Black	\$2.75	Plastic hole plug for 22.5 mm openings in panels and enclosures; supplied with O-ring and mounting screw. Two plugs per package.

Pilot Light Replacement Lens

<i>Part Number</i>	<i>Lamp Color</i>	<i>Price</i>	<i>Description</i>	<i>Use with</i>
<u>PL1170PR-5</u>	Red	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	Part numbers starting with GCX123
<u>PL1170PV-5</u>	Green	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PG-5</u>	Yellow	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PB-5</u>	Blue	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PN-5</u>	Clear	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	
<u>PL1170PW-5</u>	White	\$7.00	22mm metallic series pilot light replacement lens, 5/pk	



[ECX1490](#)

Pilot Light replacement lens

[PL1170PR-5](#)

Protective covers for pushbuttons

Protective Covers for Pushbuttons				
Part Number	Color	Quantity	Price	Description
ECX1700-5	Black	5	\$7.50	Silicone protective covers for use with 22mm standard-size flush pushbuttons. Will not work with Cutler-Hammer pushbuttons, 22mm plastic illuminated or extended pushbuttons, or 22mm plastic pushbuttons with 40mm actuator face.
ECX1701-5	Red		\$7.50	
ECX1702-5	Green		\$7.50	
ECX1703-5	Yellow		\$7.50	
ECX1704-5	Blue		\$7.50	
ECX1705-5	Clear		\$7.50	
ECX1706-5	Clear		\$13.00	Clear silicone protective covers for use with 2 mm illuminated and extended pushbuttons only. Will not work with Cutler-Hammer pushbuttons or 22mm mushroom pushbuttons.



[ECX1703-5](#)

Replacement 22mm



support base

Replacement 22mm Support Base

Part Number	Quantity	Price	Drawing Link	Description
ECX1029-2	1	\$7.00	PDF	22mm metal support base Note: This item is supplied as a replacement part and is not required with any switch assembly. Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect

[ECX1029-2](#)

Replacement contact blocks

Replacement Contact Blocks					
Part Number	Quantity	Price	Drawing Link	Contacts	Description
ECX1030-2	2	\$7.25	PDF	Red, normally-closed (N.C.)	Replacement contact block for 22mm pushbuttons and selector switches. Tightening Torque, terminal screw: 0.8Nm max mounting screw: 0.5Nm max Note: Will not work with Cutler-Hammer 22mm switches.
ECX1030-5	5	\$17.00	PDF	Green, normally-open (N.O.)	Replacement normally open push-push contact blocks for 22mm pushbutton and selector switches, pack of 2. Note: Will not work with Cutler-Hammer 22mm switches.
ECX1040-2	2	\$7.25	PDF	Brown, normally-open (N.O.), push-push	Replacement normally open push-push contact blocks for 22mm pushbutton and selector switches, pack of 2. Note: Will not work with Cutler-Hammer 22mm switches.
ECX1040-5	5	\$17.00	PDF		
ECX1042-2	2	\$7.25	PDF		



[ECX1030-2](#)

Note: See electrical specifications on ECX Series 22mm Metal Pilot Devices Specifications page at beginning of this section.

Replacement Keys			
Part Number	Quantity	Price	Description
ECX1067-2	Pkg of 2 sets (2 keys per set)	\$6.50	Replacement key for GCX series key-actuated selector switches, pack of 2 sets (2 keys each). NOTE: Will not work with Cutler-Hammer 22mm switches.



Replacement keys

[ECX1067-2](#)

Note: All key-actuated 22mm metal selector switches are keyed alike.

EMERGENCY STOP legend

EMERGENCY STOP Legend Plate				
Part Number	Quantity	Price	Drawing Link	Description
ECX1651	1	\$2.75	PDF	Oversize yellow circular EMERGENCY STOP legend plate for 22mm E-stop type mushroom pushbuttons, 60mm outside diameter.



[ECX1651](#)

plate

Knockout Punches

Ruko's knockout punch hole-cutting tool includes punch, die and draw bolt (without ball bearing). Use for sheet steel, stainless-steel sheets, non-ferrous and light metals, and plastics up to 0.16" (8 ga.) thick.

Replacement bolts are offered in three of the most popular sizes.

[109225](#)

Note: Part number [109225](#) is recommended when punching holes for 22mm pilot devices.



Two-position short lever operator

2-Position Short Lever Replacement Operator

Part Number	Lamp Color	Price	2-Position	Use with
<u>GR1172PR-5</u>	Red	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX124, GCX125 GCX324, GCX325
<u>GR1172PV-5</u>	Green	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PG-5</u>	Yellow	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PB-5</u>	Blue	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1172PN-5</u>	Clear	\$16.50	22mm 2-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1172PR-5](#)

Three-position short lever operator

3-Position Short Lever Replacement Operator

Part Number	Lamp Color	Price	3-Position	Use with
<u>GR1288PR-5</u>	Red	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	Part numbers starting with GCX126, GCX128 GCX326, GCX328
<u>GR1288PV-5</u>	Green	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PG-5</u>	Yellow	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PB-5</u>	Blue	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	
<u>GR1288PN-5</u>	Clear	\$16.50	22mm 3-position selector switch illuminated short lever replacement operator, 5/pk	



[GR1288PR-5](#)

Mushroom switch replacement operator



[PL1298P-5](#)

Mushroom Switch Replacement Operator

Part Number	Lamp Color	Price	Description	Use with
<u>PL1171PR-5</u>	Red	\$7.25	22mm, illuminated momentary Mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1221, GCX3221 mushroom-style illuminated pushbuttons
<u>PL1298P-5</u>	Red	\$7.25	22mm illuminated twist-to-release mushroom switch replacement operator, red, 5/pk	Part numbers starting with GCX1226, GCX3226 mushroom-style illuminated pushbuttons

**Flush pushbutton
replacement operator**

Flush Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
GR1168PR-5	Red	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	Part numbers starting with GCX119, GCX120, GCX319, GCX320
GR1168PV-5	Green	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PG-5	Yellow	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PB-5	Blue	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PN-5	Clear	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	
GR1168PW-5	White	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	



[**GR1168PR-5**](#)

Extended pushbutton replacement operator

Extended Pushbutton Replacement Operator				
Part Number	Lamp Color	Price	Description	Use with
PL1308PR-5	Red	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	Part numbers starting with GCX121, GCX321
PL1308PV-5	Green	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PG-5	Yellow	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PB-5	Blue	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PN-5	Clear	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
PL1308PW-5	White	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	



[**PL130 5**](#)

Legend plates

Aluminum legend plates for use with 22mm pilot devices. Black or red field with silver background. O-ring included.



[**ECX1670A-B04**](#)

[**ECX1670A-R03**](#)

Aluminum Legend Plates

Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link

AUTO OFF HAND	Blac k	Blac k	Silver	<u>ECX1670A -B46</u>	\$3.7 5	PDF
Blank Plate	Blac k	-	Silver	<u>ECX1670A- B</u>	\$3.7 5	PDF
Blank Plate	Red	-	Silver	<u>ECX1670A- R</u>	\$3.7 5	PDF
CLAMP	Blac k	Blac k	Silver	<u>ECX1670A -B24</u>	\$3.7 5	PDF
CLOSE	Blac k	Blac k	Silver	<u>ECX1670A -B01</u>	\$3.7 5	PDF
DOWN	Blac k	Blac k	Silver	<u>ECX1670A -B02</u>	\$3.7 5	PDF
EMERG. STOP	Red	Red	Silver	<u>ECX1670A -R03</u>	\$3.7 5	PDF
EXTEND	Blac k	Blac k	Silver	<u>ECX1670A -B51</u>	\$3.7 5	PDF
FEEDER OFF	Blac k	Blac k	Silver	<u>ECX1670A -B26</u>	\$3.7 5	PDF
FEEDER ON	Blac k	Blac k	Silver	<u>ECX1670A -B25</u>	\$3.7 5	PDF
FOR OFF REV	Blac k	Blac k	Silver	<u>ECX1670A -B19</u>	\$3.7 5	PDF
FOR REV	Blac k	Blac k	Silver	<u>ECX1670A -B13</u>	\$3.7 5	PDF
FORWAR D	Blac k	Blac k	Silver	<u>ECX1670A -B04</u>	\$3.7 5	PDF
GRIP	Blac k	Blac k	Silver	<u>ECX1670A -B53</u>	\$3.7 5	PDF
HAND- AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B14</u>	\$3.7 5	PDF
HAND OFF AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B20</u>	\$3.7 5	PDF
HIGH	Blac k	Blac k	Silver	<u>ECX1670A -B27</u>	\$3.7 5	PDF
HIGH LOW	Blac k	Blac k	Silver	<u>ECX1670A -B43</u>	\$3.7 5	PDF
IN	Blac k	Blac k	Silver	<u>ECX1670A -B28</u>	\$3.7 5	PDF
INCH	Blac k	Blac k	Silver	<u>ECX1670A -B29</u>	\$3.7 5	PDF
JOG	Blac k	Blac k	Silver	<u>ECX1670A -B05</u>	\$3.7 5	PDF
JOG FOR	Blac k	Blac k	Silver	<u>ECX1670A -B30</u>	\$3.7 5	PDF
JOG REV	Blac k	Blac k	Silver	<u>ECX1670A -B31</u>	\$3.7 5	PDF
JOG RUN	Blac k	Blac k	Silver	<u>ECX1670A -B15</u>	\$3.7 5	PDF
LOW	Blac k	Blac k	Silver	<u>ECX1670A -B32</u>	\$3.7 5	PDF
LOWER	Blac k	Blac k	Silver	<u>ECX1670A -B33</u>	\$3.7 5	PDF
MAN AUTO	Blac k	Blac k	Silver	<u>ECX1670A -B44</u>	\$3.7 5	PDF

Note: Legend plate text is 3mm in height

Continued on next page



[ECX1670A-B48](#)

[ECX1670A-R11](#)

Aluminum Legend Plates (continued)

Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link
MAN OFF AUTO	Black	Black	Silver	ECX1670A-B47	\$3.75	PDF
MOTOR RUN	Black	Black	Silver	ECX1670A-B22	\$3.75	PDF
MOTOR STOP	Black	Black	Silver	ECX1670A-B23	\$3.75	PDF
OFF	Black	Black	Silver	ECX1670A-B34	\$3.75	PDF
OFF ON	Black	Black	Silver	ECX1670A-B16	\$3.75	PDF
ON	Black	Black	Silver	ECX1670A-B06	\$3.75	PDF
OPEN	Black	Black	Silver	ECX1670A-B07	\$3.75	PDF
OPEN OFF CLOSE	Black	Black	Silver	ECX1670A-B48	\$3.75	PDF
OPEN CLOSE	Black	Black	Silver	ECX1670A-B17	\$3.75	PDF
OUT	Black	Black	Silver	ECX1670A-B35	\$3.75	PDF
POWER ON	Black	Black	Silver	ECX1670A-B21	\$3.75	PDF
PULL ON PUSH OFF	Black	Black	Silver	ECX1670A-B50	\$3.75	PDF
RAISE	Black	Black	Silver	ECX1670A-B36	\$3.75	PDF
READY	Black	Black	Silver	ECX1670A-B37	\$3.75	PDF
RELEASE	Black	Black	Silver	ECX1670A-B54	\$3.75	PDF
RESET	Black	Black	Silver	ECX1670A-B38	\$3.75	PDF
RETRACT	Black	Black	Silver	ECX1670A-B52	\$3.75	PDF
REVERSE	Black	Black	Silver	ECX1670A-B08	\$3.75	PDF
RUN	Black	Black	Silver	ECX1670A-B09	\$3.75	PDF
SAFE RUN	Black	Black	Silver	ECX1670A-B45	\$3.75	PDF

START	Black	Black	Silver	<u>ECX1670A-B10</u>	\$3.75	PDF
STOP	Black	Black	Silver	<u>ECX1670A-B11</u>	\$3.75	PDF
STOP	Red	Red	Silver	<u>ECX1670A-R11</u>	\$3.75	PDF
TEST	Black	Black	Silver	<u>ECX1670A-B39</u>	\$3.75	PDF
TRANSFER	Black	Black	Silver	<u>ECX1670A-B40</u>	\$3.75	PDF
TRIP	Black	Black	Silver	<u>ECX1670A-B41</u>	\$3.75	PDF
UNCLAMP	Black	Black	Silver	<u>ECX1670A-B42</u>	\$3.75	PDF
UP	Black	Black	Silver	<u>ECX1670A-B12</u>	\$3.75	PDF
UP OFF DOWN	Black	Black	Silver	<u>ECX1670A-B49</u>	\$3.75	PDF
UP DOWN	Black	Black	Silver	<u>ECX1670A-B18</u>	\$3.75	PDF

Note: Legend plate text is 3mm in height



[ECX1680A-B17](#)

[ECX1680A-R03](#)

Jumbo Aluminum Legend Plates						
Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link
Blank Plate	Black	-	Silver	<u>ECX1680A-B</u>	\$4.25	PDF
Blank Plate	Red	-	Silver	<u>ECX1680A-R</u>	\$4.25	PDF
EMERG. STOP	Red	Red	Silver	<u>ECX1680A-R03</u>	\$4.25	PDF
HAND OFF AUTO	Black	Black	Silver	<u>ECX1680A-B20</u>	\$4.25	PDF
JOG	Black	Black	Silver	<u>ECX1680A-B05</u>	\$4.25	PDF
OFF ON	Black	Black	Silver	<u>ECX1680A-B16</u>	\$4.25	PDF

<i>OPEN</i>	Black	Black	Silver	<u>ECX1680A-B17</u>	\$4.25	PDF
<i>POWER ON</i>	Black	Black	Silver	<u>ECX1680A-B21</u>	\$4.25	PDF
<i>START</i>	Black	Black	Silver	<u>ECX1680A-B10</u>	\$4.25	PDF
<i>STOP</i>	Red	Red	Silver	<u>ECX1680A-R11</u>	\$4.25	PDF

Note: Legend plate text is 3mm in height

E22 Series Cross-reference Tables

Pushbutton, Indicator Light, and Selector Switch Cross Reference				
Cutler-Hammer	Allen-Bradley	Telemecanique XB2B (chrome bezel) XA2B (black bezel)	GE C-2000	Siemens
<i>Non-Illuminated Pushbuttons</i>				
E22PB1A	800EPF2 800E3LX10	ZA2BA2 ZA2BZ101	P9XPNNNG10N0	3SB1000-0AB01 3SB02-CBH 3SB1400-0B
E22PB3A	800EPF3 800E3LX10	ZA2BA3 ZA2BZ101	P9XPNVG10N0	3SB1000-0AE01 3SB02-CBH 3SB1400-0B
E22EB2B	800EPE4 800E3LX01	ZA2BL4 ZA2BZ102	P9XPNRNS20N0	3SB1000-0LC01 3SB02-CBH 3SB1400-0B
E22ASB204	ENCLSR: 800E-2P 800EP-F3 800E-2LX10 800EP-E4 800E-2LX01 800E- 34BE208 800E- 34R212	XALB211 Both flush - stop is not extended	P9CPNRSN20NO P9CPNVGN10NO P9EPB02 P9AEPN201 P9AEPN202	3SB02-S21
<i>Illuminated Pushbuttons</i>				
E22TB2X4B	800EPLE4 800E3DL3 800E3X01	ZA2BW14 ZA2BW06224	P9XPLRSDN12NADI	3SB1001-OLC01 3SB02-CBH 3SB1400-0C 3SB1400-2H
E22TB3X4A	800EPLE3 800E3DL3 800E3X10	ZA2B213 AZ2B206124	P9XPLVSDN12NADI	3SB1001-OLE01 3SB02-CBH 3SB1400-0B 3SB1440-2H
E22TB9X4A	800EPLE5 800E3DL3 800E3X10	ZA2BW15 ZA2BW06124	P9XPLASDN12NADI	3SB1001-OLD01 3SB02-CBH 3SB1400-0B 3SB1400-2H
E22TB2X10B	800EPLE4 800E2RL5 800E3X01	ZA2BW14 ZA2BW062120	P9XPLRSB P9PRNVJ P9PDNVD	3SB1001-OLC01 3SB02-CBH 3SB1400-0C
E22TB3X10A	800EPLE3 800E2RL5 800E3X10	ZA2BW13 ZA2BW061120	P9XPLVSD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DE 3SB1400-OB
E22TB9X10A	800DPLE5 800E2RL5 800E3X10	ZA2BW15 ZA2B2061120	P9XPLASD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DD 3SB1400-OB

tPIL-99

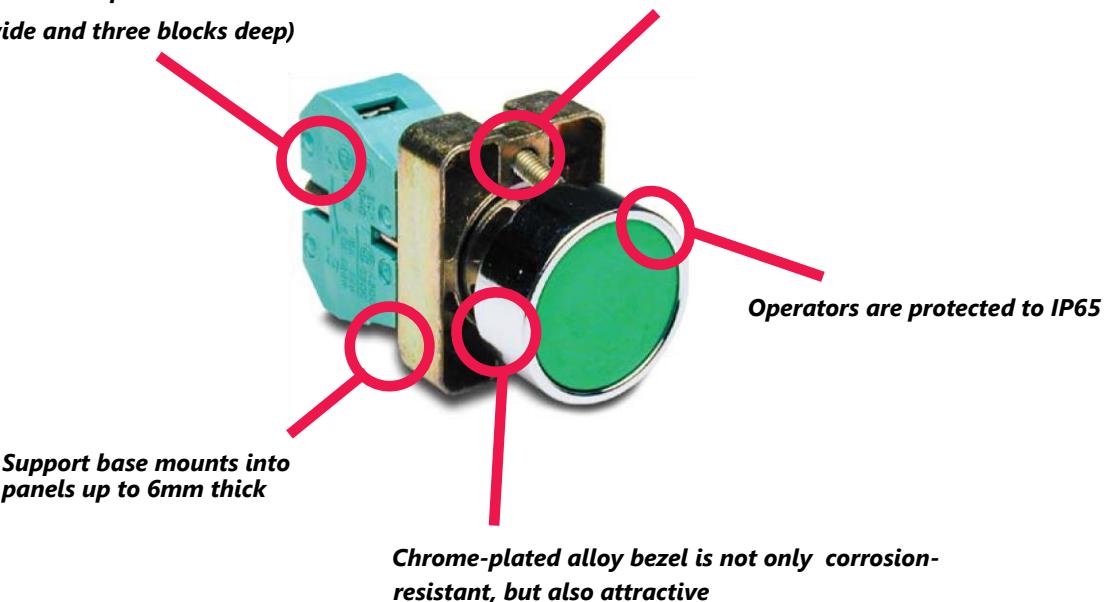
GCX Series 22mm Metal Pilot Devices

Features

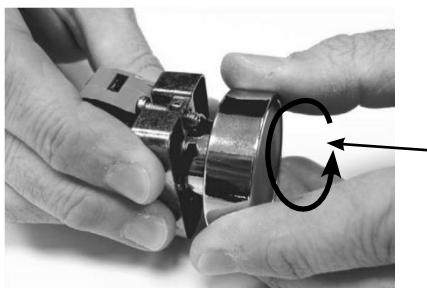
Secure mounting method eliminates

Any combination of contact blocks is allowed, up to a total of six (two blocks wide and three blocks deep)

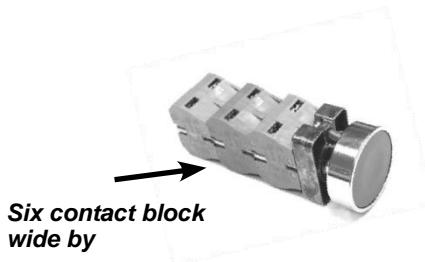
twisting in mounting hole



Easy installation



To remove operator, press toward support base and twist

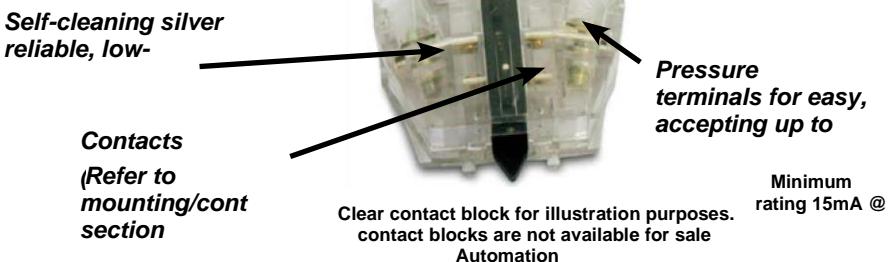


Six contact block wide by



To install switch, place support base against rear of panel (not shown here), insert the operator and twist clockwise until it clicks into place. Carefully tighten the securing screws. Do not over-tighten.

counterclockwise.

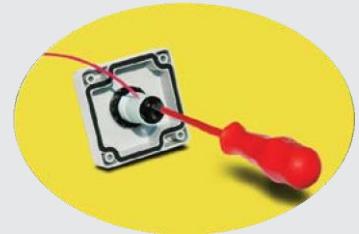


**Contacts
(Refer to mounting/cont section)**

**Clear contact block for illustration purposes.
contact blocks are not available for sale
Automation**

Minimum rating 15mA @

All indicators offer side entry with back terminals for easy



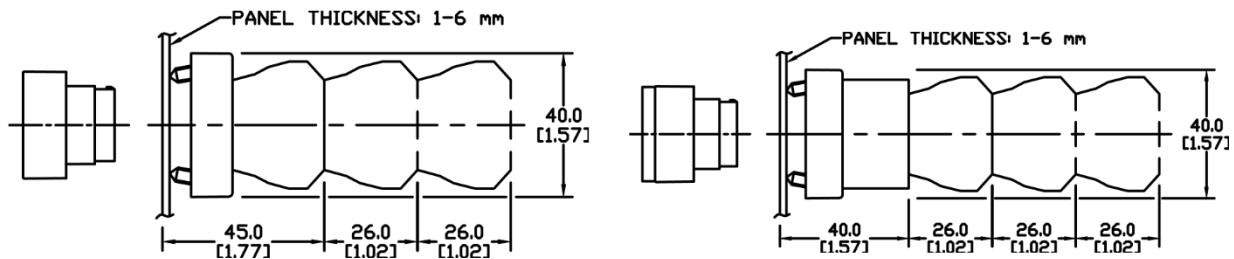
GCX Series 22mm Plastic Pilot Devices Specifications

Assembly information

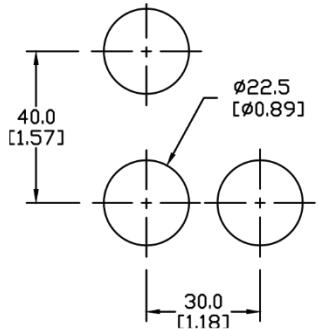
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

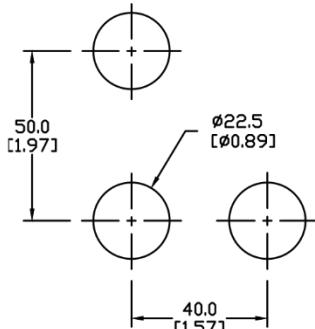
mm
[inches]



Mounting



This layout is suitable if all switches are 230V or less and the same polarity.

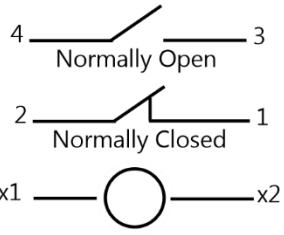


This layout is suitable if all switches are 400V or less and different polarity.

NOTE: Contact blocks can be arranged up to three deep by two wide.



Typical Wiring



Specifications

These specifications apply to all the GCX and ECX 22mm plastic pushbuttons and switches.

Physical Specifications

Standards Reference CEI EN 60947-5-1, CSA C22-2 n.14

Approvals UL File E189258, IMQ (where specified)

Enclosure Material Fiberglass reinforced thermoplastic

Contacts Material Silver

IP40 for [GCX3151-24](#), [GCX3151-120](#), [GCX3153-24](#) and
[GCX3153-120](#). IP65 for all others.(See Appendix of this

Protection Degree catalog for explanation of IP ratings according to IEC 144 CEI 70-1.)

Electric Shock Protection

IEC 536, Class II

Storage: -40 -to 80°C (-40 to 176° F)

Temperature Ratings

Operating: -25° to +70°C (-13° to 158° F)

Working Positions

All working positions are allowed

Pushbuttons, selector switches, joy stick switches:

1,000,000 operations **Mechanical Life**

Emergency mushrooms and push-push pushbuttons:

300,000 operations

(according to IEC 947-5-1)

Positive Opening Operation

All functions incorporating an NC contact are positive

opening operation

Electrical Specifications

Rated Thermal A300, Q300 (Refer to E22 Series mounting/contact **Current (contact block)** rating section for details)

Ui 660V according to CEI EN 60947-5-1,

Rated Insulation Voltage

300V according to CSA C22-2 n.14 and UL 508

Dielectric Strength 3kV (1 second) **Insulation Resistance** 2MΩ min. (500VDC) **Initial Contact Resistance** ≤ 25mΩ

Short-Circuit Protection*Cartridge fuses gl 10 A-500V 10, 3x3811-100 KA

Terminal Markings According to CENELEC EN 50013

Single screw with non-loosening plate clamp, 14AWG

Connections

max., Tighten to 0.8Nm max

Contacts Operation Self-cleaning types EN01 (N.C.) EN 10 (N.O.) slow-

action, positive opening

Operation Frequency 3600 operations per hour max.

AC15 (Control of AC electromagnetic loads)

24 volts AC at 10 amps

130 volts AC at 6.5 amps

Utilization Category

DC13 (Control of DC electromagnetic loads)

24 volts DC at 1.5 amps

110 volts DC at 0.5 amps ***Note: Recommended, not supplied**

tPIL-3

**IronHorse® Permanent-Magnet DC
Motors**

(SCR Rated) Model Overview

IronHorse motors are manufactured by leading motor suppliers with over 20 and 45 years experience delivering high-quality motors to the demanding U.S. market. Our suppliers test the motors during production and after final assembly. This is how we can stand behind our IronHorse motors with a two-year warranty (motors 1/3 hp and above only; motors 1/4 hp and less



[**MTPM-P10-1JK43**](#)

warranty).

IronHorse DC motors are designed for use on unfiltered SCR (Thyristor) type and PWM (pulse width modulated) type DC adjustable speed drives, and on across-the-line DC controls.

- Simple two-lead connection
- Class F insulation

The IronHorse line of DC motors features:

have a one-year

- Replacement brush sets

Features for Small-Frame Motors 1/4 hp and Under

[**MTPM-P25-1JK44**](#)



- Available models accommodate 12VDC, 24VDC, 90VDC (110VAC DC drive), and design 180VDC (230VAC DC drive)
- Dynamically balanced armature
- Rated for SCR drives
- TENV enclosure
- Reversible
- 18-inch leads, or junction boxes with 8-inch leads
- Externally replaceable brushes

[**MTPM-P33-1L18**](#)

- IP40 environmental rating
- Class F insulation
- High energy ceramic magnets
- Available in TENV or TEFC housings, depending on model
- NEMA 56C flange mount
- Can be mounted in any orientation
- Not intended for DC power generation
- UL recognized



- (E365956),
• Double shielded ball bearings
CSA certified (259724), RoHS

Features for Motors 1/3 hp and Above



[**MTPM-P75-1L18**](#)

- Input power of 115 or 230 volts rectified AC can be used with an appropriate SCR drive
- Linear speed/torque characteristics over entire speed range
- High starting torque for heavy load applications
- Capable of dynamic braking for faster stops
- Rolled steel shell frame / cast aluminum end bell
- Removable base (0.33–2 hp)
- STABLE motor slide bases for adjustable mounting of NEMA motors from 56–449T
- Space-saving design
- Large replaceable brushes for longer brush life
- Easy access to DC motor brushes (DC motors ship with one set of brushes installed and one set of spare brushes in the box)
- Large easy-to-wire junction box with rubber gasket and six-inch leads
- Heavy duty oversized ball bearings
- High tensile strength steel shaft
- Large easy to read nameplate
- Electrically reversible
- Not intended for DC power generation



- Service Factor: 1.0
- Two year warranty
- cCSA_{US} certified (247070), CE, RoHS

Applications

- Conveyors
- Turntables
- Where adjustable speed and constant torque are required
- When dynamic braking and reversing capabilities are needed

[MTPM-1P5-1M18](#)

MTPM Small-Frame Permanent Magnet DC Motors – 1/31 hp – 1/4 hp



[MTPM-3](#)
with



[MTPM-4](#)
with junction box

Selection and Specifications

Motor Specifications – MTPM Series Small-Frame Permanent Magnet DC Motors														
Part Number	Price	Voltage (VD C)	H P	Speed (rp m)	F/L Torque (oz·in)	F/L Current (A)	Shaft Dia (in)	Pilot Shaft (in)	Overhung Load (lb)	Axial Thrust Load (lb)	Wiring Type	Weight (lb)	Drawing Links	
<u>MT PM-P10-1JK43</u>	\$137.00	12/24	1/201/10	1746 4252	28	4.83	0.3 12 5	1.00	85	70	flyin g lead s	2.75	PDF	
<u>MT PM-P13-1JK42</u>	\$148.00	12/24	1/17 1/8	1825 4224	32	5.39	0.3 12 5					3.25	PDF	
<u>MT PM-P17-1JK43</u>	\$197.00	12/24	1/13 1/6	1841 4290	42	7.54	0.50					5.3	PDF	
<u>MT PM-P25-1JK40</u>	\$205.00	12/24	1/6 1/4	1732 3996	96 80	14.3 12.2	0.50	2.02	130	150	junc tion box	7.8	PDF	
<u>MT PM-P25-1JK44</u>	\$205.00	12/24	1/5 1/4	1854 4375	113 70	18.1 11.9	0.50					9	PDF	
<u>MT PM-P03-</u>	\$143.00	90	1/3 1	1797	18	0.39	0.3 12 5	1.00	85	70	flyin g lead s	2.75	PDF	

1L1 8												
MT PM- P04 - 1L1 7	\$151. 00	1 / 2 6	1749	22	0.46	0.3 12 5				3.25	PDF	
MT PM- P05 - 1L1 9	\$197. 00	1 / 1 9	1917	28	0.68	0.50				5.3	PDF	
MT PM- P13 - 1L1 9	\$195. 00	1/8	1917	73	1.4	0.50				7.8	PDF	
MT PM- P14 - 1L1 9	\$212. 00	1/7	1740	86	1.61	0.50				9	PDF	
MT PM- P07 - 1M 24	\$176. 00	1 / 1 5	2440	28	0.42	0.50	2.0 2	130	150	junc tion box	5.3	PDF
MT PM- P13 - 1M 19	\$212. 00	1/8	1865	73	0.73	0.50				7.8	PDF	
MT PM- P14 - 1M 18	\$212. 00	1/7	1828	84	0.83	0.50				9	PDF	



Replacement Parts

MTPM-BRUSH-x

MTGA-KIT-1

Replacement Parts for MTPM Series Small-Frame Permanent Magnet DC Motors *

Part Number	Price	Description	For Motors MTPM-
MTPM- BRUSH-4	\$39.00	DC motor brushes, replacement, for 1/4 hp 24VDC MTPM series permanent magnet DC motors. Package includes one set of 2 brushes and 2 brush caps.	P25-1JK40, P25-1JK44, P171JK43
MTPM- BRUSH-5	\$30.00	DC motor brushes, replacement, for 24VDC MTPM series permanent magnet DC motors 1/6 hp and smaller. Package includes one set of 2 brushes and 2 brush caps.	P10-1JK43, P13-1JK42,
MTPM- BRUSH-6	\$33.00	DC motor brushes, replacement, for 1/7 or 1/8 hp 90VDC or 180VDC MTPM series permanent magnet DC motors. Package includes one set of 2 brushes and 2 brush caps.	P13-1L19, P14-1L19, P13-1M19, P14-1M18
MTPM- BRUSH-7	\$27.00	DC motor brushes, replacement, for 90VDC or 180VDC MTPM series permanent magnet DC motors 1/10 hp and smaller. Package includes one set of 2 brushes and 2 brush caps.	P03-1L18, P04-1L17, P05-1L19, P07-1M24

<u>MTGA-KIT-1</u>	\$51.00	DC motor spare parts kit, for certain MTPM series permanent magnet DC motors as listed. Includes: two metal brush cap covers, one terminal box, one 1/8 (0.125 inch) shaft key and one 3/16 (0.187 inch) shaft key.	P05-1L19, P13-1L19, P14-1L19, P17-1JK43, P25-1JK40, P25-1JK44, Pxx-1Mxx
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* These replacement parts also fit many AutomationDirect DC gearmotors. Refer to the Gearmotors section for gearmotor application information.

56C Frame TEFC/TENV Motors – DC – 0.33 to 2 hp



Motor Specifications – DC 56C Frame Motors – 1800 RPM

<i>Part Number</i>	<i>Price</i>	<i>H P</i>	<i>B a s e R P M</i>	<i>Armature Voltage</i>	<i>Housin g</i>	<i>N E M A Fr a m e</i>	<i>S e rvi ce Fa cto r</i>	<i>F. L. A m p s</i>	<i>W ei gh t (lb)</i>	<i>Dra wing Lin ks</i>
<u>M TP M- P3 3- 1L 18</u>	\$2 34. 00	1 / 3			T E	N V		3. 5	17 .7 0	<u>PD F</u>
<u>M TP M- P5 0- 1L 18</u>	\$3 01. 00	1 / 2						5. 2	20 .7 4	<u>PD F</u>
<u>M TP M- P7 5- 1L 18</u>	\$3 41. 00	3 / 4		90 VD C	T E	F C		7. 8	25 .3 0	<u>PD F</u>
<u>M TP M- Q0 1- 1L 18</u>	\$3 78. 00	1			T E	N V		10 .4	28 .3 6	<u>PD F</u>
<u>M TP M- 1P 5- 1L 18</u>	\$4 10. 00	1 - 1 / 2						15 .4	34 .9 7	<u>PD F</u>
<u>M TP M- P3 3- 1 M 18</u>	\$2 31. 00	1 / 3			T E	N V		1. 75	17 .6 0	<u>PD F</u>
<u>M TP M- P5 0- 1 M 18</u>	\$3 00. 00	1 / 2		18 0	56 C fla nge			2. 6	20 .7 4	<u>PD F</u>
<u>M TP M- 80 4 M 18</u>	\$3 41. 00	3 / 4	8 0 0	V D C	T E	F C	m ou nt	1. 0	25 .5 8	<u>PD F</u>

<u>P7</u> <u>5-</u> <u>1-</u> <u>M-</u> <u>18</u>																
<u>M</u> <u>TP</u> <u>M-</u> <u>00</u> <u>1-</u> <u>1</u> <u>M</u> <u>18</u>	\$3 78. 00	1												5. 2	28 .3 2	PD F
<u>M</u> <u>TP</u> <u>M-</u> <u>TP</u> <u>5-</u> <u>1</u> <u>M</u> <u>18</u>	\$4 10. 00	1 - 1 / 2												7. 7	35 .7 0	PD F
<u>M</u> <u>TP</u> <u>M-</u> <u>00</u> <u>2-</u> <u>1</u> <u>M</u> <u>18</u>	\$6 52. 00	2												9. 8	61 .9 5	PD F

Note: Please review the AutomationDirect warranty and service on this product.
Terms & Conditions fo

Performance Data – DC 56C Frame Motors – 1800 RPM

Part Number	H	A r m a t u r e	T o r q u e (l b. ft)	F o r m F a	A m b e n *	I n s u l a t	Ball Bearings		M o u n	W i r e / H o	S h	C o n s e t e a d n R	O v e r a n l i	B a s e / s e	P a i n t	R o t o g (I .)	E f f i c i
							D E B e a r i n g	O D E B e a r i n g									
<u>MT</u> <u>PM</u> - <u>P3</u> <u>3-</u> <u>1L</u> <u>18</u>	1 / 3		0 .9 7													0.01 956	7 9
<u>MT</u> <u>PM</u> - <u>P5</u> <u>0-</u> <u>1L</u> <u>18</u>	1 / 2	9 0 V D C	1 .4 6	1 . 3 5	4 0 ° C (1 0	F 6 2 0 3	6 2 0 3	Top Mou nted	Junc ti on Box	Key ed	90180 0 R P M	0 - 2 0 0 0 R P M	Rig id Re m ov ab le	G r a y	0 .3 0 ;		8 0
<u>MT</u> <u>PM</u> - <u>P7</u> <u>5-</u>	3 / 4		2 .1 9												0 .7 0 ;		

<u>1L</u> <u>18</u>								
<u>MT</u> <u>PM</u> <u>-</u> <u>00</u> <u>1-</u> <u>1L</u> <u>18</u>	1		2 .9 2					
<u>MT</u> <u>PM</u> <u>-</u> <u>1P</u> <u>5-</u> <u>1L</u> <u>18</u>	1 - 1 /2		4 .3 8					
<u>MT</u> <u>PM</u> <u>-</u> <u>P3</u> <u>3-</u> <u>1M</u> <u>18</u>	1 / 3		0 .9 7					
<u>MT</u> <u>PM</u> <u>-</u> <u>P5</u> <u>0-</u> <u>1M</u> <u>18</u>	1 / 2		1 .4 6					
<u>MT</u> <u>PM</u> <u>-</u> <u>P7</u> <u>5-</u> <u>1M</u> <u>18</u>	3 / 4	1 8 0	2 .1 9					
<u>MT</u> <u>PM</u> <u>-</u> <u>00</u> <u>1-</u> <u>1M</u> <u>18</u>	1	V D C	2 .9 2					
<u>MT</u> <u>PM</u> <u>-</u> <u>1P</u> <u>5-</u> <u>1M</u> <u>18</u>	1 - 1 /2		4 .3 8					
<u>MT</u> <u>PM</u> <u>-</u> <u>00</u> <u>2-</u> <u>1M</u> <u>18</u>	2		5 .8 4					
				0 . 0	8 1	7 9	8 0	8 5

* See additional information in Form Factor Table.

Form Factor

The voltage used to power a permanent magnet (PM) DC motor is not pure DC; it is derived by rectifying a supplied AC voltage. The resulting DC voltage has a ripple that is related to the frequency of the AC input.

Form factor is the ratio of I_{rms} to I_{dc} , and it indicates how close the driving voltage is to pure DC. The

form factor for a DC battery is 1.0. The higher the form factor is above 1.0, the more it deviates from pure DC. The Form Factor Table shows examples of commonly used voltages.

Form factor should not exceed 1.40 for continuous operation. Half wave rectification is not recommended, as it drastically increases form factor.

Operating Ironhorse PMDC motors with DC voltages with form factors higher than 1.40 can result in premature brush failure and excessive motor heating.

Form Factor Table	
<i>Form Factor</i>	<i>DC Voltage Source</i>
1.0	Battery (pure DC)
1.05 *	Pulse width modulation (PWM)
1.40 **	Full wave rectification (1-phase)
1.9 ***	Half wave rectification (1-phase) **

* All DC-input IronHorse GSD series DC drives are

1.05.

IronHorse AC-input GSD5 DC drive is 1.05.

** 1-phase full wave rectification is the most common

form of DC drive in 0.33–2 hp range. All IronHorse

GSD series DC drives are 1.40 or better. *** Not

Recommended.

56C Frame Motors – DC – 0.33 to 2 hp – Accessories



DC motor brushes

Brushes commutate the incoming current in a DC motor. All IronHorse PMDC motors are shipped with a set of brushes in the motor. An extra set of brushes is included in the box. The brushes below can be ordered for spare.

IronHorse DC brushes should be changed at a maximum interval of 2500 hours motor runtime. When changing brushes, always change them as a set (never change only one brush).

DC Motor Accessories							
Part Number	Price	Description	Applicable Motor Type	Rated Voltage	Motor HP	Brush Materials	Dimension L x W x H
<u>MTPM-BRUSH-1</u>	\$15.50	Brushes with springs, one set of 2		90 VDC 180 VDC	0.33–1.5 hp		0.75 in x 0.27 in x 0.70 in 19 mm x 6.9 mm x 18 mm
<u>MTPM-BRUSH-2</u>	\$20.00	Brushes with springs, one set of 2	IronHorse MTPM	180 VDC	2hp	Resin class Graphite	0.71 in x 0.49 in x 0.70 in 18 mm x 12 mm x 18 mm
<u>MTPM-BRUSH-3</u>	\$18.00	Brushes with springs, one set of 2		90 VDC	1.5 hp		0.73 in x 0.35 in x 0.63 in 19 mm x 8.9 mm x 16 mm

All IronHorse 56C-frame DC motors ship with one set of brushes installed and one extra set in the box.

AP SIGNAL LOWERS YOUR BARRIER TO ENTRY FOR IIOT. SNAP SIGNAL LOWERS YOUR

BANNER

► T30R SERIES RADAR SENSOR **T30R-1515-LKDQ**



T30R Long Range Radar Sensor

Range 25 m; Input 10-30 V dc

Output: 1 NPN/PNP with IO-Link Communication; 1
NPN/PNP

5-pin M12 Integral

QD Part Number:

814006

CE

Operating Frequency	122 GHz
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ACCESSORIES TO COMPLETE YOUR SYSTEM

Add all or individual items to your cart. More options available below.

	DXMR90-4K DXMR90 IOLink Master/Controller Power: 12-30Vdc Female M12 (D-Code Ethernet) IP67, IP68 Ethernet IP, Modbus TCP, and Profinet Includes: STP-M12D-406

SPECIFICATIONS

Power	DC
Sensing Beam	Radar
PFM Output	Yes
PC Configurable	Yes
Sensing Mode (General)	Proximity
Sensing Mode (Detailed)	Time of Flight
Housing Style	Barrel
Device Type	Sensor
Primary Housing Material	PBT
Input Output	Cookies Discrete
Connection	xperience throughout our site, including access to My Integral QD and My Wish List.
Radar Beam Pattern (H x V°)	To learn more, visit our privacy policy. 15 x 15

QuickDisconnectType	M12
MaxSensingDistance(mm)	25000
MinimumSensingDistance(mm)	150
PowerSupply	10-30Vdc
Adjustments	Software;PushButton;RemoteTeach
NumberofPins	5
Discrete(Switched)Outputs	2 NPN/PNP Configurable
IPRating	IP67
MaxOperatingTemperature(°C)	65
MinOperatingTemperature(°C)	-40
MinimumResponseTime(ms)	6
BarrelThread	M30
Feature:RemoteTeach	Yes
Feature:ClearObjectDetection	Yes
Feature:Timing(Hold/Delay)	Yes
Feature:QuickDisconnect	Yes
IOLink	Yes
Cert:US	Yes

COMPATIBLE PRODUCTS

BRACKETS

	SAFT30R-PVC-G2 Accessory: For R-GAGET30R Series M30x1.5 to 2in NPT PVC With Retainer
---	---

	<p>SMB1815SF</p> <p>Cookies</p> <p>cepting cookies, we give you the best experience throughout our site, including access to My Account, My Library, Br a ckets:Swivel with setscrews for mounting</p> <p>Black reinforced thermoplastic polyester and My Wish List.</p> <p>Used for mounting of T18 or T30 by its cable To learn more, visit our h uprivacy policy. y.</p> <p>Hardware included</p>
	<p>SMB30A</p> <p>Bracket: Right-Angle Mounting</p> <p>Material: 12 Gauge Stainless Steel</p> <p>Curved mountingslot for versatility/ orientation</p> <p>Clearance for M6 (1/4 in) hardware</p>
	<p>SMB30C</p> <p>Bracket: Stainless Steel Mounting</p> <p>Material: Black VALOX</p> <p>30mm split clamp</p> <p>Hardware included</p>
	<p>SMB30FA</p> <p>S MB30FA Bracket: Swivel with Tilt and Pan Movement 30mm Mounting Hole 3/8-16x2in Bolt Thread Mount</p>
	<p>SMB30FAM10</p> <p>S MB30FAM10 Bracket: Swivel with Tilt and Pan Movement 30mm Mounting Hole M10-1.5x50 Bolt Thread</p>
	<p>SMB30FK</p> <p>S MB30FK Bracket: V-Clamp Flat with Fasteners for Mounting Sensor with 30mm Thread to Pipe or Extrusions 32.6mm (1.28in)</p>
	<p>SMB30MM</p> <p>Bracket: 30mm</p> <p>Material: 12 Gauge Stainless Steel</p> <p>Curved mountingslot for versatility/ orientation</p> <p>Clearance for M6 (1/4 in) hardware</p>

	<p>SMB30RAVK</p> <p>Bracket: V-Clamp Mount 30mm hole to 28mm tube Right-angle</p>
	<p>SMB30S</p> <p>Bracket: Plastic Material: Black Polyester 30mm Swivel Hardware included</p>
	<p>SMB30SC</p> <p>Accepting cookies, we give you the best experience throughout our site, including access to My Account, My Library, and My Wish List.</p> <p>Bracket: Compact 30mm Swivel To learn more, visit our privacy policy. Black reinforced thermoplastic polyester Wide Range of Articulation Hardware included</p>
	<p>SMB30SM</p> <p>Bracket: Swivel Material: Black VALOX Swivel ball is locked when bolts are tightened Hardware included</p>
	<p>SMBAMS30P</p> <p>Bracket: 30mm flat bracket Material: 12 Gauge Cold-Rolled Steel Curved mounting slot for versatility/orientation</p>
	<p>SMBAMS30RA</p> <p>Bracket: 30mm Right-Angle Material: 12 Gauge cold rolled steel Curved mounting slot for versatility/orientation</p>
	<p>SMBT30RTM</p> <p>Bracket: Tank Level, Horizontal Mounting Material: 12 Gauge Stainless Steel Two mounting slots for versatility/orientation Clearance for M6 (1/4 in) hardware</p>

PRO CONVERTER CABLE

	<p>PRO-KIT</p> <p>D K-Pro Series Accessory Kit includes Converter Cable, Splitter and Power Supply</p>
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DOUBLE-ENDED CORDSETS

	<p>MQDEC3-506SS</p> <p>Cordset A-Code M12 to A-Code M12 Double Ended 5-pin Straight Male; 5-pin Straight Female Connectors with Shield 1.83 m (6ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC3-515SS</p> <p>Cookies By accepting cookies, we give you the best experience throughout our site, including access to My Account, My Library, Cordset A-Code M12 to A-Code M12 Double Ended 5-pin Straight Male; 5-pin Straight Female Connectors with Shield and My Wish List. 4.58 m (15.02 ft) in Length To learn more, visit our privacy policy. Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC3-530SS</p> <p>Cordset A-Code M12 to A-Code M12 Double Ended 5-pin Straight Male; 5-pin Straight Female Connectors with Shield 9.2 m (30.18 ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>

SINGLE-ENDED CORDSETS

	<p>MQDEC2-506</p> <p>Cordset A-Code M12 Single Ended 5-pin Straight Female Connector with Shield 2 m (6.56 ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC2-506RA</p> <p>Cordset A-Code M12 Single Ended 5-pin Right-Angle Female Connector with Shield 2 m (6.56 ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>

	<p>MQDEC2-515</p> <p>Cordset A-Code M12 Single Ended 5-pin Straight Female Connector with Shield 5m (16.4ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC2-515RA</p> <p>Cordset A-Code M12 Single Ended 5-pin Right-Angle Female Connector with Shield 5m (16.4ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC2-530</p> <p>Cordset A-Code M12 Single Ended 5-pin Straight Female Connector with Shield 9m (29.52ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC2-530RA</p> <p>Cordset A-Code M12 Single Ended 5-pin Right-Angle Female Connector with Shield 9m (29.52ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p> <p>Cookies</p>
By accepting cookies, we give you the best experience throughout our site, including access to My Account, My Library, and My Wish List.	<p>By accepting cookies, we give you the best experience throughout our site, including access to My Account, My Library, and My Wish List.</p> <p>Cordset A-Code M12 Single Ended To learn more, visit our privacy policy. 5-pin Straight Female Connector with Shield 15m (49.2ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>
	<p>MQDEC2-550RA</p> <p>Cordset A-Code M12 Single Ended 5-pin Right-Angle Female Connector with Shield 15m (49.2ft) in Length Black PVC Jacket, Nickel-Plated Brass Nut</p>

SPLITTERS



CSB-M1251M1251B

M12 QD Splitter Cable
5-pin Straight male M12 0.30 m (1ft) Trunk
5-pin Straight Female M12 0.30 m (1ft) Branch 1
5-pin Straight Female M12 0.30 m (1ft) Branch 2
Nickel-Plated Brass Coupling Nuts Black Jacket

BANNER

Banner Engineering Corp. | 9714 Tenth Avenue North | Minneapolis, MN 55441 | United States of America

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WORLD-BEAM® QS30 Series Sensor (DC Voltage)

Datasheet



To view or download the latest technical information about this product, including specifications, dimensions, accessories, and wiring, see www.bannerengineering.com. Search for Instruction Manual p/n [119165](#).



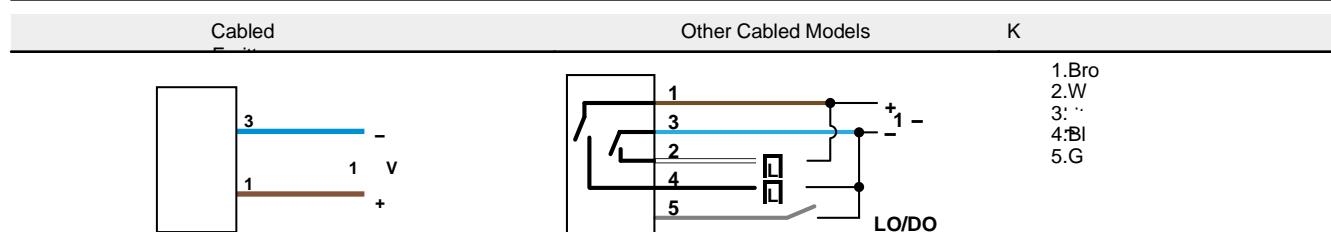
WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Models

Model ¹	Sensing Mode	Beam	Range ²	Output
QS30E (emitter)	Opposed	875 nm Infrared	60 m (200 ft)	N/A
QS30R (receiver)		Effective Beam: 18 mm (0.7 in)		
QS30LP	Polarized Retroreflective		8 m (26 ft)	
QS30LV	Retroreflective	630 nm Visible Red	12 m (40 ft)	
QS30D	Diffuse	940 nm Infrared	1 m (3.3 ft)	
QS30FF200	Fixed Field	680 nm Visible Red	200 mm (8 in)	Bipolar NPN/PNP
QS30FF400			400 mm (16 in)	
QS30FF600			600 mm (24 in)	

Wiring Diagrams



Cabled wiring diagrams are shown. Quick disconnect (QD) wiring diagrams are functionally identical.



1 Only standard 2 m (6.5 ft) cabled models are listed.

- To order the 9 m (30 ft) integral cable model, add suffix "W/30" to the model number (for example, QS30E W/30).
- To order the 5-pin integral M12/Euro-style quick disconnect (QD), add suffix "Q" (for example, QS30EQ). ² Polarized

Retroreflective and Retroreflective ranges are specified using a model BRT-84 retroreflector.

Original Document
119167 Rev. C

20 February 2018

119167

Cutoff Point Tolerance
Fixed-Field only: $\pm 5\%$ of nominal cutoff distance
Construction and Mounting
ABS housing, rated IEC IP67; NEMA 6; Acrylic lens cover
3 mm mounting hardware included
Connections
2 m (6.5 ft) unterminated 5-wire PVC cable; 9 m (30 ft) unterminated 5-wire PVC

cable ; or Integral 5-pin M12/Euro-style male quick disconnect (QD)
Application Tip for the QS30LV Model
For best sensing reliability, targets should be a minimum of 0.5m from the sensor

Specifications

Supply Voltage

10 V dc to 30 V dc (10% max. ripple) at less than 40 mA, exclusive of load Protected against reverse polarity and transient voltages

Output Response

Opposed Mode: 5 milliseconds ON and OFF

All others: 2 milliseconds

NOTE: 100 millisecond delay on power-up; outputs do not conduct during this time

Repeatability

Opposed Mode: not applicable All

others: 500 microseconds

Output Configuration

Bipolar: One current sourcing and one current sinking

Rating: 100 mA maximum each output at 25 °C Off-state

leakage current:

NPN: less than 200 µA

PNP: less than 10 µA

ON-state saturation voltage:

NPN: less than 1.6 V at 100 mA PNP:

less than 2.0 V at 100 mA

Protected against false pulse on power-up and continuous overload or short circuit of outputs

Indicators 2 LEDs on

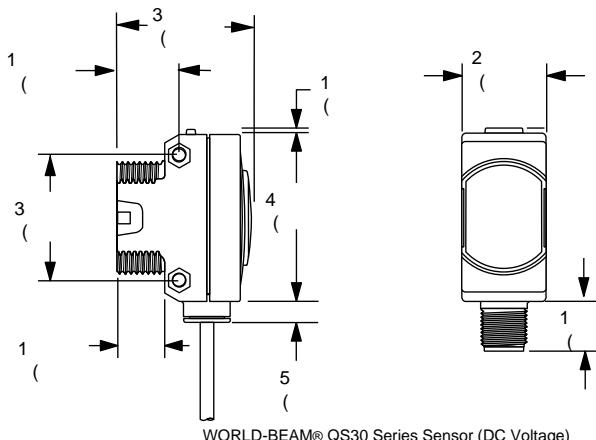
sensor top:

	Green	Yellow
On	Power on	Light sensed
Flashing	Output overloaded (except receivers)	Marginal excess gain (1–1.5x excess gain)

Large oval LED on sensor back (except emitters): Yellow on indicates the output is conducting

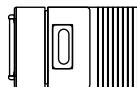
Dimensions

Cabled Models

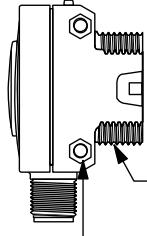


WORLD-BEAM® QS30 Series Sensor (DC Voltage)

QD Models



Yellow and Green LEDs



Yellow LED Output Indicator

M30 x 1.5 Thread max. torque 6 Nm (53 in lbs)
with included 30 mm

2 x Ø3.3 mm (0.125") mounting nut
max. torque
0.7 Nm (6 in lbs)

All measurements are listed in millimeters [inches], unless noted otherwise.

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more sensors, more solutions

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TL30 Basic Tower Light

Datasheet

30 mm Multi-Color General-Purpose or Audible Indicators

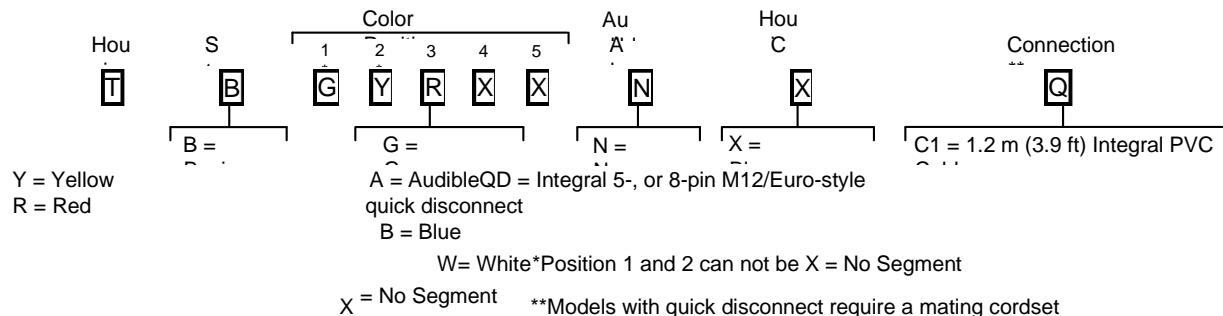
- Rugged, affordable, and easy-to-install multi-segment indicators
 - Compact 30 mm diameter
 - Illuminated segments provide easy-to-see operator guidance and indication of equipment status
 - Uniform indicator segments appear gray when off to eliminate false indication from ambient light
 - Models with 2, 3, 4, and 5 color segments plus audible
 - 12 V dc to 30 V dc operation
 - No assembly required, mounting nut and gasket supplied



Standard

Audible

Models



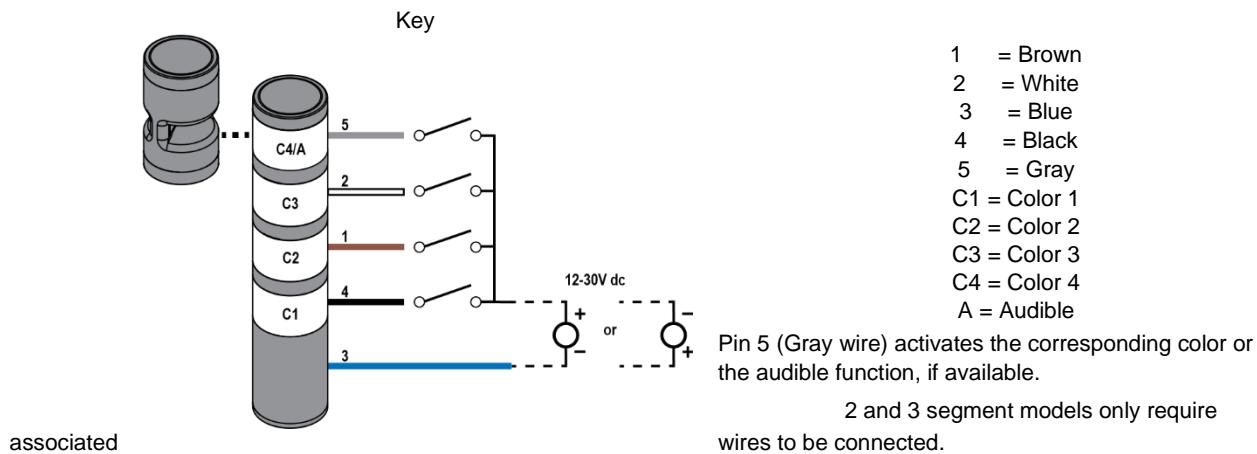
Wiring Diagrams



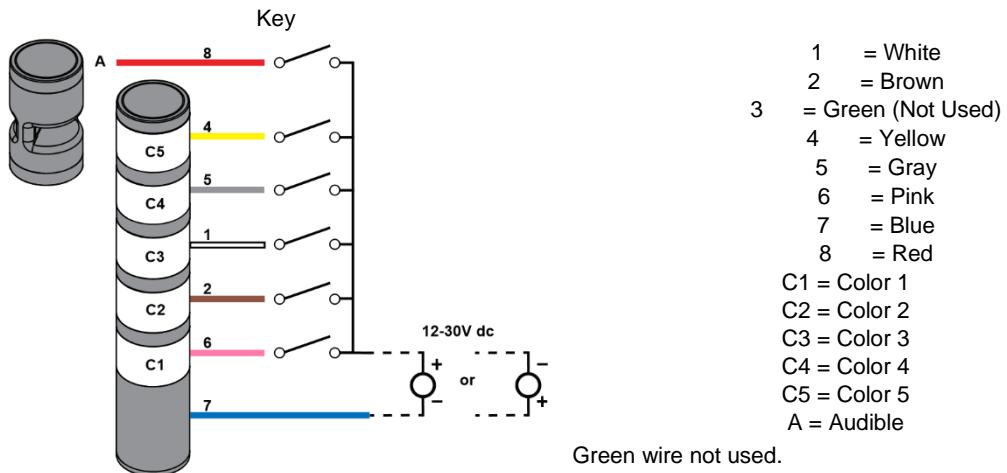
Note: All models are bimodal and can be wired as PNP or NPN devices.



5-Pin/Wire Models



8-Pin / 7-Wire Models



Specifications

Supply Voltage and Current

12 V dc to 30 V dc
Maximum current per LED segment: 40 mA
Omni-Directional Sealed Audible Alarm: 20 mA maximum current

Supply Protection Circuitry

Protected against transient voltages

Indicators

LEDs are independently selected; 2 to 5 colors depending on model

Indicator Response Time

Indicator On/Off: 1 millisecond maximum

Indicator Characteristics

Input Leakage Current Immunity
400 μ A¹

Audible Alarm

Omni-Directional Sealed Audible Alarm: 2.8 kHz \pm 500 Hz oscillation frequency, maximum intensity 90 dB at 1 m (3.3 ft) (typical)

Operating Conditions

-40 °C to +50 °C (-40 °F to +122 °F)
90% maximum relative humidity (non-condensing)
Storage Temperature: -40 °C to +70 °C (-40 °F to +158 °F)

Environmental Rating

All Models:
IEC IP65
UL Type 4X when mounted in a suitable enclosure Non-Audible: UL Type 13 when mounted in a suitable enclosure

Color	Dominant Wavelength (nm) or Color Temperature (CCT)	Color Coordinates ²		Lumen Output (Typical at 25 °C)
	x	y		
Green	524 nm	0.160	0.708	7.5
Red	620 nm	0.690	0.308	2.5
Yellow	592 nm	0.582	0.413	6.5
Blue	468 nm	0.136	0.062	2.0
White	5500K	0.332	0.360	7.5

¹ Any current above this value may activate the TL30.

² Refer to CIE 1931 chromaticity diagram or color chart, to show equivalent color with indicated color coordinates.

TL30 Basic Tower Light



Construction

Base, Segments and Audible: UV stabilized polycarbonate

2 P/N 206089 Rev. C Grommet: TPV

Mounting Nut: PBT

Sealing Gasket: PVC/NBR/CR

Mounting

M22 x 1.5 threaded base, maximum torque 2.25 N·m (20 in-lbf)

Mounting nut and sealing gasket included

Connections

Integral 5-pin, or 8-pin M12/Euro-style quick disconnect, or 1.2 m (3.9 ft) integral PVC cable, depending on model

Models with a quick disconnect require a mating cordset

Vibration and Mechanical Shock

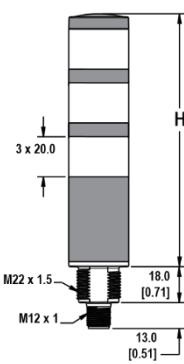
Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 1.0 mm amplitude, 5 minutes sweep, 30 minutes dwell)

Meets IEC 60068-2-27 requirements (Shock: 30G 11 ms duration, half sine wave)

IK07 (EN 60068-2-75 with SMBAMS22RA bracket) Certifications



Dimensions



Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

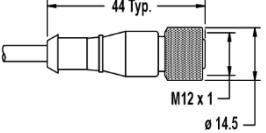
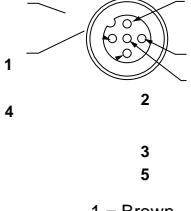
Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

# of colors	T	Power Height (H)
	Non-Audible	Omni-Directional Sealed Audible
2	99.7 mm (3.9 in)	145.6 mm (5.7 in)
3	126.7 mm (5.0 in)	172.6 mm (6.8 in)
4	153.7 mm (6.0 in)	199.6 mm (7.9 in)
5	180.7 mm (7.1 in)	226.6 mm (8.9 in)

All measurements are listed in millimeters [inches], unless noted otherwise.

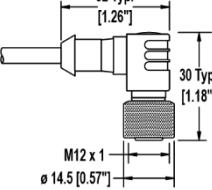
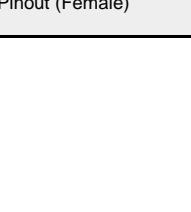
Accessories

Cordsets

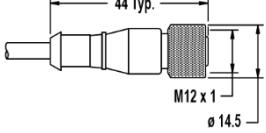
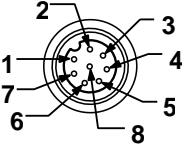
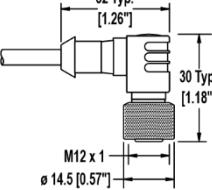
5-Pin Threaded M12/Euro-Style Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC1-501.5	0.50 m (1.5 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC1-506	1.83 m (6 ft)			
MQDC1-515	4.57 m (15 ft)			
MQDC1-530	9.14 m (30 ft)			

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3

5-Pin Threaded M12/Euro-Style Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC1-506RA	1.83 m (6 ft)	Right-Angle		
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

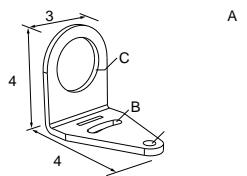
8-Pin Threaded M12/Euro-Style Cordsets with Open-Shield

Model	Length	Style	Dimensions	Pinout (Female)
MQDC2S-806	1.83 m (6 ft)	Straight		 1 = White 2 = Brown 3 = Green 4 = Yellow 5 = Gray 6 = Pink 7 = Blue 8 = Red
MQDC2S-815	4.57 m (15 ft)			
MQDC2S-830	9.14 m (30 ft)			
MQDC2S-850	15.2 m (50 ft)			
MQDC2S-806RA	1.83 m (6 ft)	Right-Angle		
MQDC2S-815RA	4.57 m (15 ft)			
MQDC2S-830RA	9.14 m (30 ft)			
MQDC2S-850RA	15.2 m (50 ft)			

Brackets

SMB22A

- Right-angle bracket with curved slot for versatile orientation
- 12-ga. stainless steel
- Mounting hole for 22 mm sensor

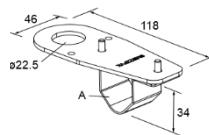


Hole center spacing: A to B = 26.0

Hole size: A = ø 4.6, B = 4.6 x 16.9, C = 22.2

SMB22FVK

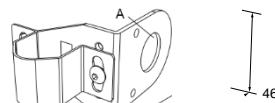
- V-clamp, flat bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm diameter tubing or 1 in. square extrusions
- 22 mm hole for mounting sensor



Hole size: A = ø 22.5

SMB22RAVK

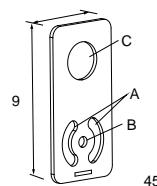
- V-clamp, right-angle bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm diameter tubing or 1 in. square extrusions
- 22 mm hole for mounting sensor



Hole size: A = ø 22.5

SMBAMS22P

- Flat SMBAMS series bracket with 22 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel



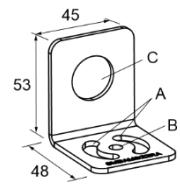
Hole center spacing: A = 26.0, A to B = 13.0

Hole size: A = 26.8 x 7.0, B = ø 6.5, C = ø 22.5

4 P/N 206089 Rev. C TL30 Basic Tower Light

SMBAMS22RA

- Right-angle SMBAMS series bracket with 22 mm hole for mounting sensors
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel

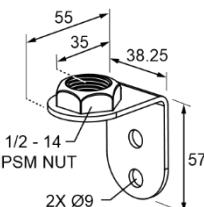


Hole center spacing: A = 26.0, A to B = 13.0

Hole size: A = 26.8 x 7.0, B = ø 6.5, C = ø 22.5

LMBE12RA35

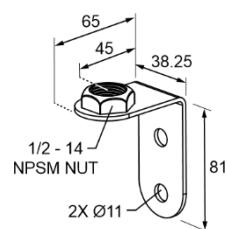
- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 35 mm



Hole center spacing: 20.0

LMBE12RA45

- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 45 mm



Hole center spacing: 35.0

LMB Sealed Right-Angle Bracket

Model	Description	Construction	
LMBE12RA	Pipe-Mount Models: Bracket kit with base, 1/2-14 pipe adapter, set screw, fasteners, O-rings, and gaskets. For use with stand-off pipe (listed and sold separately).	Black polycarbonate	

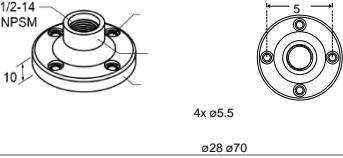
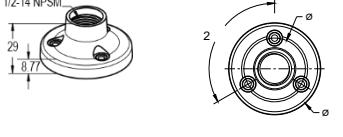
Elevated Mount System

Model	Features	Components

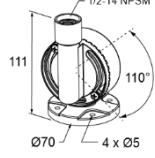
SA-M22E12 - Black Polycarbonate			<ul style="list-style-type: none"> • Streamlined black polycarbonate stand-off pipe adapter/cover • Connects between 22 mm light base and ½ in. NPSM/DN15 pipe 
Polished 304 Stainless Steel	Black Anodized Aluminum	Clear Anodized Aluminum	<ul style="list-style-type: none"> .. • Elevated-use stand-off pipe (½ in. NPSM/DN15) Polished 304 stainless steel, black anodized aluminum, or clear anodized aluminum surface • ½ in. NPT thread at both ends • Compatible with most industrial environments
SOP-E12-150SS 150 mm (6 in) long	SOP-E12-150A 150 mm (6 in) long	SOP-E12-150AC 150 mm (6 in) long	
SOP-E12-300SS 300 mm (12 in) long	SOP-E12-300A 300 mm (12 in) long	SOP-E12-300AC 300 mm (12 in) long	
SOP-E12-900SS 900 mm (36 in) long	SOP-E12-900A 900 mm (36 in) long	SOP-E12-900AC 900 mm (36 in) long	
SA-E12M30 - Black Acetal			<ul style="list-style-type: none"> • Streamlined black acetal mounting base adapter/ cover • Connects between ½ in. NPSM/DN15 pipe and 30 mm (1-3/16 in) drilled hole • Mounting hardware included 

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Pipe Mounting Flange

Pipe Mounting Flange			
Model	Features	Construction	
SA-F12	<ul style="list-style-type: none"> Elevated-use stand-off pipes (½ in, NPSM/DN15) M5 mounting hardware and nitrile gasket included 	Die-cast zinc base with black paint	
SA-F12-3	<ul style="list-style-type: none"> Elevated-use stand-off pipes (½ in, NPSM/DN15) M4 mounting hardware and nitrile blend gasket included 	Black Polycarbonate	

Foldable Mounting Bracket

Foldable Mounting Brackets			
Model	Features	Construction	
SA-FFB12	<ul style="list-style-type: none"> For use with 1/2 inch stand-off pipes Stainless steel hardware 	Black polycarbonate	

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