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Project 1: Conveyor Sorter System

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Full Description of System:

What is the purpose of the system?

The main purpose of this system is to move a product from the feeder to lines A or C, depending on its size. Using multiple buttons and selector switches, the operator can fill the feeder, take the product out of the feeder, decide if it should go into line A or C, and choose if the product should be packed in a set of 5,7,9 or 11 (depending on whichever line they were sent down). The first step is to fill the feeder, it can be fed with up to 20 products. Then the operator should press a green button to take the product out of the feeder, and onto the conveyor belt with the diverter. They then choose whether the product belongs in either lines A or C depending on its size and chooses if they should be packed in a specific set. The operation will be complete once all 4 sets have been full, which the machine will indicate using a red pilot light. A reset button must be pushed to reset all the counters back to zero and to start the whole operation over again.

Working environment of the system?

The system would be used indoors at a packaging center for packing bottles. This system will categorize the size of each bottle and package it into specific sets that the operator controls. Once all the sets are filled with bottles, a reset button must be pushed to clear all the current packages and start again.

System Graphic:

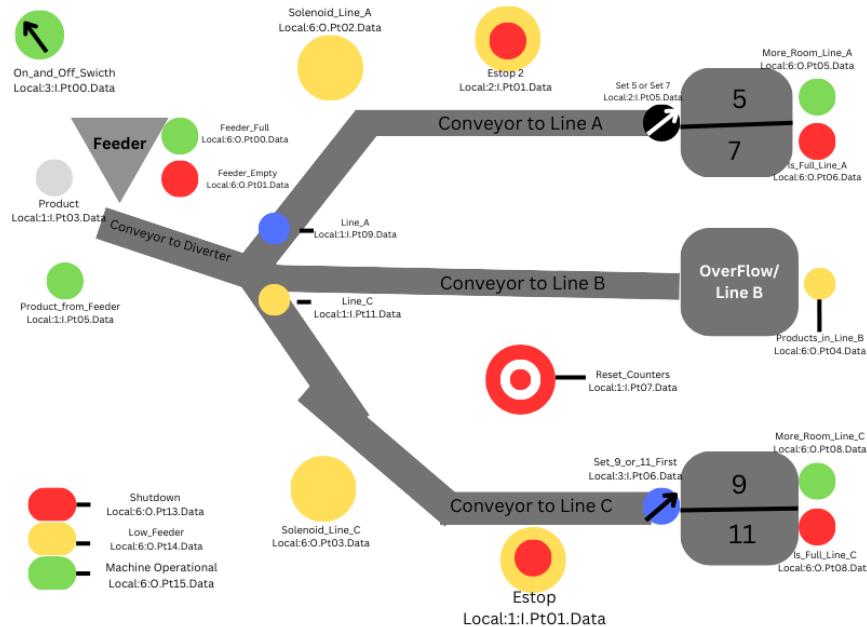


Figure 1: Feeder System Schematic of Conveyor System with Components and Alias Tags

Safety Description:

This system prioritizes the safety of the operator as quite a few conditions are set because of it. To start, there are two Estops on the system, which when pressed will shutdown the system until the user pushes it back out. The reason there are two Estops are because we are working with a long conveyor system which separates into 3 separate lines. Since this system is very large, there needs to be multiple estops at different points in case the operator needs to stop the machine. The ladder logic also uses seal in contacts for the pushbuttons which start the conveyor motor so that the motor will not start up again in case there is a main power outage which is then restored. Finally, the operator will not be allowed to put products in the feeder as long as the motor for the conveyors are running.

Logic Flow Chart:

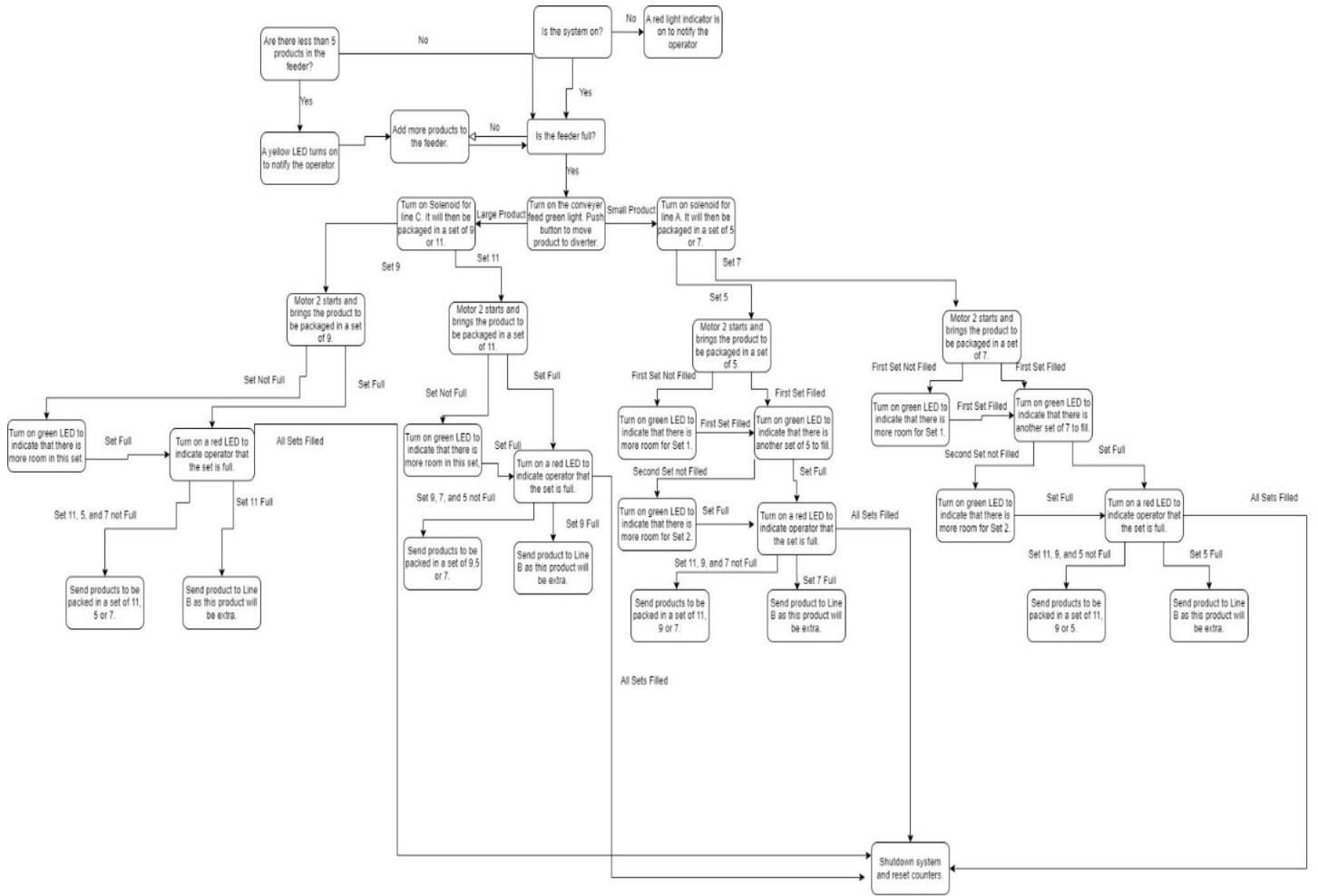


Figure 2: Flow Chart of Conveyor System

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 add products (small or large) in increments of 1.	Product	Local:1:I.Pt03.Data	Input	1	PushButton 1	AutomationDirect	CGK1105	NO	White 22 mm round button
2	Takes product out of the feeder onto the conveyor belt.	Product_from_Feeder	Local:1:I.Pt05.Data	Input	1	PushButton 2	AutomationDirect	CGK1102	NO	Green 40 mm round button
3	Will reset all counters used to track products.	Reset_Counters	Local:1:I.Pt07.Data	Input	1	PushButton 3	AutomationDirect	GCX1106	NO	Red 30 mm round button with "0" text
4	Will move the product to Line A indicating it is small.	Line_A	Local:1:I.Pt09.Data	Input	1	PushButton4	AutomationDirect	GCX1104	NO	Blue 30 mm round button
5	Will move the product to Line C indicating it is large.	Line_C	Local:1:I.Pt11.Data	Input	1	PushButton 5	AutomationDirect	GCX1103	NO	Yellow 30 mm round button
6	Can select the product to be filled in a set of 5.	Set 5	Local:2:I.Pt05.Data	Input	2	Selector Switch 2	AutomationDirect	CGX1300	NO or NC	2 positions maintained switch
7	Can select the product to be filled in a set of 7.	Set 7	Local:2:I.Pt05.Data	Input	2	Selector Switch 2	AutomationDirect	CGX1300	NO or NC	2 positions maintained switch
8	Can select the product to be filled in a set of 9.	Set_9_first	Local:3:I.Pt06.Data	Input	3	Selector Switch 5	AutomationDirect	CGK3254-24	NO or NC	blue, 2 position maintained switch
9	Can select the product to be filled in a set of 11.	Set_11_first	Local:3:I.Pt06.Data	Input	3	Selector Switch 5	AutomationDirect	CGK3254-24	NO or NC	blue, 2 position maintained switch
10	Will turn on and off the automated system.	On_and_Off_switch	Local:3:I.Pt00.Data	Input	3	Selector Switch 4	AutomationDirect	AR22PL-01013GZA	NO or NC	Green, 2 position maintained power switch
11	Will shutdown the system at any point when pressed. Location 1.	Estop	Local:1:I.Pt01.Data	Input	1	Estop	Banner Engineering	SSA-EB1PL-02EQ5A	NC	30 mm mounted red button, yellow base
12	Will shutdown the system at any point when pressed. Location 2.	Estop2	Local:2:I.Pt01.Data	Input	2	Estop	Banner Engineering	SSA-EB1PL-02EQ5A	NC	31 mm mounted red button, yellow base
13	Move product from feeder, to the diverter.	Mover1	Local:4:O.Pt14.Data	Output	4	DC Motor 1	AutomationDirect	MTPM-P33-1L18		90 VDC, 1800 RPM
14	Move product from diverter to either lines A, B, or C.	Sorter_Motor	Local:4:O.Pt15.Data	Output	4	DC Motor 2	AutomationDirect	MTPM-P33-1L18		90 VDC, 1800 RPM
15	The red conveyor feed light will turn on indicating that the feeder is empty.	Feeder_Empty	Local:6:O.Pt01.Data	Output	6	Conveyor Feed Red	AutomationDirect	ECK2051-127L		30 mm red indicator light
16	The green conveyor feed light will turn on indicating that the feeder is full.	Feeder_Full	Local:6:O.Pt00.Data	Output	6	Conveyor Feed Green Light	AutomationDirect	ECK2052-24L		30 mm green indicator light
17	The conveyor solenoid 1 light will turn on indicating that the product is going to line A.	Solenoid_Line_A	Local:6:O.Pt02.Data	Output	6	Conveyor Solenoid 1	AutomationDirect	ECK2053-127L		30 mm yellow indicator light
18	The conveyor solenoid 2 light will turn on indicating that the product is going to line C.	Solenoid_Line_C	Local:6:O.Pt03.Data	Output	6	Conveyor Solenoid 2	AutomationDirect	ECK2053-127L		30 mm yellow indicator light
19	The conveyor line B yellow light will turn on to indicate that extra products have gone to line B.	Products_in_Line_B	Local:6:O.Pt04.Data	Output	6	Conveyor Line B Yellow	AutomationDirect	ECK2053-127L		30 mm yellow indicator light
20	The conveyor line A green light will turn on to indicate that more products can go into line A.	More_Room_Line_A	Local:6:O.Pt05.Data	Output	6	Conveyor Line A Green	AutomationDirect	ECK2052-24L		30 mm green indicator light
21	The conveyor line C green light will turn on to indicate that more products can go into line C.	More_Room_Line_C	Local:6:O.Pt07.Data	Output	6	Conveyor Line C Green	AutomationDirect	ECK2052-24L		30 mm green indicator light
22	The conveyor line A red light will turn on when either set 5 or set 7 is complete, or when line A is completely done.	is_Full_Line_A	Local:6:O.Pt06.Data	Output	6	Conveyor Line A Red	AutomationDirect	ECK2051-127L		30 mm red indicator light
23	The conveyor line C red light will turn on when either set 9 or set 11 is complete, or when line C is completely done.	is_Full_Line_C	Local:6:O.Pt08.Data	Output	6	Conveyor Line C Red	AutomationDirect	ECK2051-127L		30 mm red indicator light
24	The red tower indicates that the system is off.	Shutdown	Local:6:O.Pt13.Data	Output	6	Tower light Red	Banner Engineering	TL30BGYRXAXC1		Tower light
25	The yellow indicates if the feeder has less than 5 products left.	Low_Feeder	Local:6:O.Pt14.Data	Output	6	Tower light Yellow	Banner Engineering	TL30BGYRXAXC1		Tower light
26	The green tower light indicates that the machine is on and operational.	Machine_Operational	Local:6:O.Pt15.Data	Output	6	Tower light Green	Banner Engineering	TL30BGYRXAXC1		Tower light

Figure 3: Development Spreadsheet of Conveyor 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, White
Manufacturer: Automation Direct
Device PN: CGX1105
Quantity: 1



- Push Button, Green
Manufacturer: Automation Direct
Device PN: CGX1102
Quantity: 1



- Push Button, Red
Manufacturer: Automation Direct
Device PN: CGX1106
Quantity: 1



- Push Button, Blue
Manufacturer: Automation Direct
Device PN: CGX1104
Quantity: 1



- Push Button, Yellow
Manufacturer: Automation Direct
Device PN: CGX1103
Quantity: 1



- Estop
Manufacturer: Banner Engineering
Device PN: SSA-EB1PL-02ECQ5A
Quantity: 2



- 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, Blue
Manufacturer: Automation Direct
Device PN: CGX3254-24
Quantity: 1



- Maintained Selector Switch, 2 Position Knob, 1NO 1NC, Green
Manufacturer: Automation Direct
Device PN: AR22PL-010L3GZA
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: 3



- Yellow Indicator Light
Manufacturer: Automation Direct
Device PN: ECX2053-127L
Quantity: 3



- Green Indicator Light
Manufacturer: Automation Direct
Device PN: ECX2052-24L
Quantity: 3



- LED Tower Light

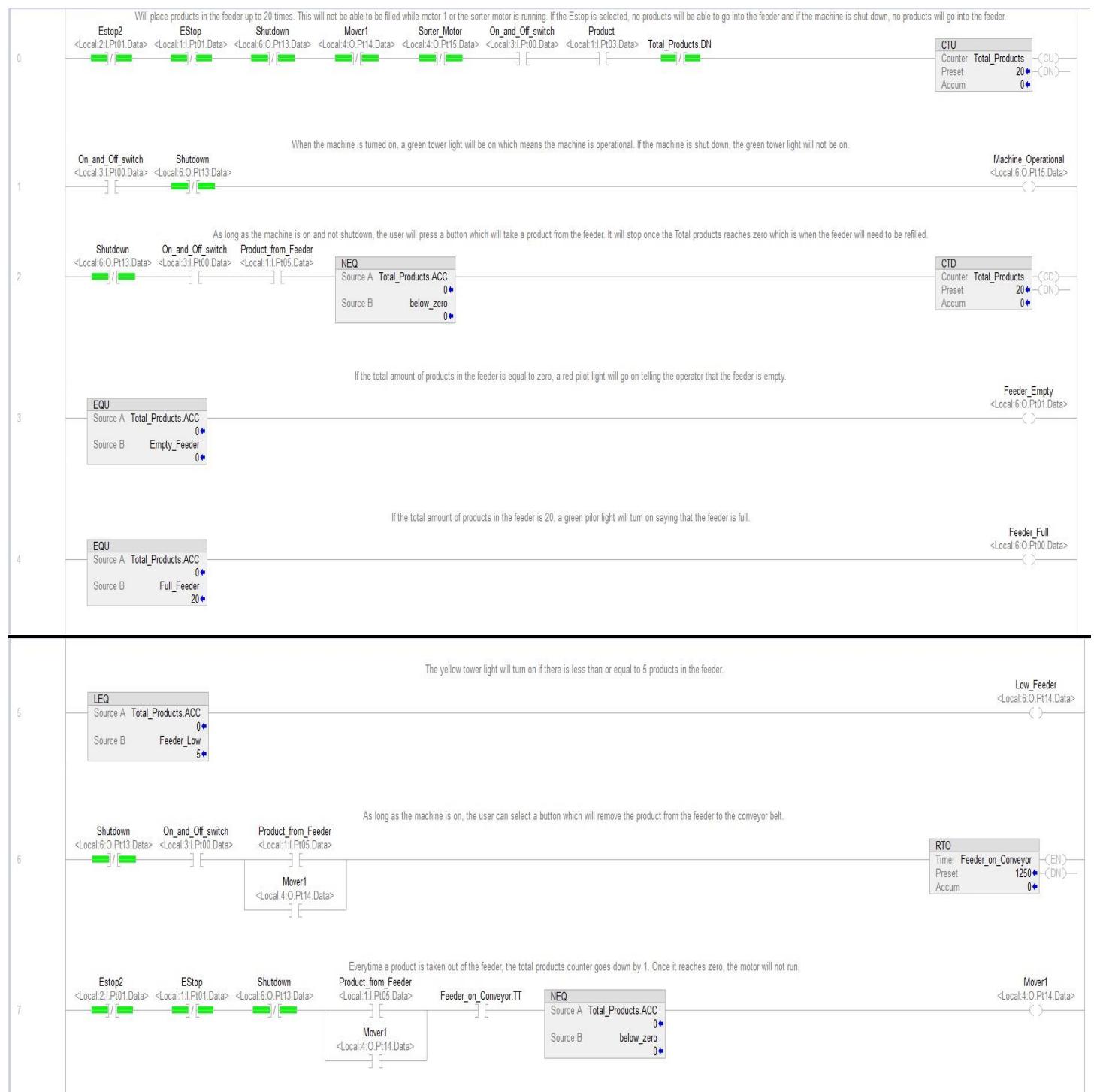
Manufacturer: Banner Engineering

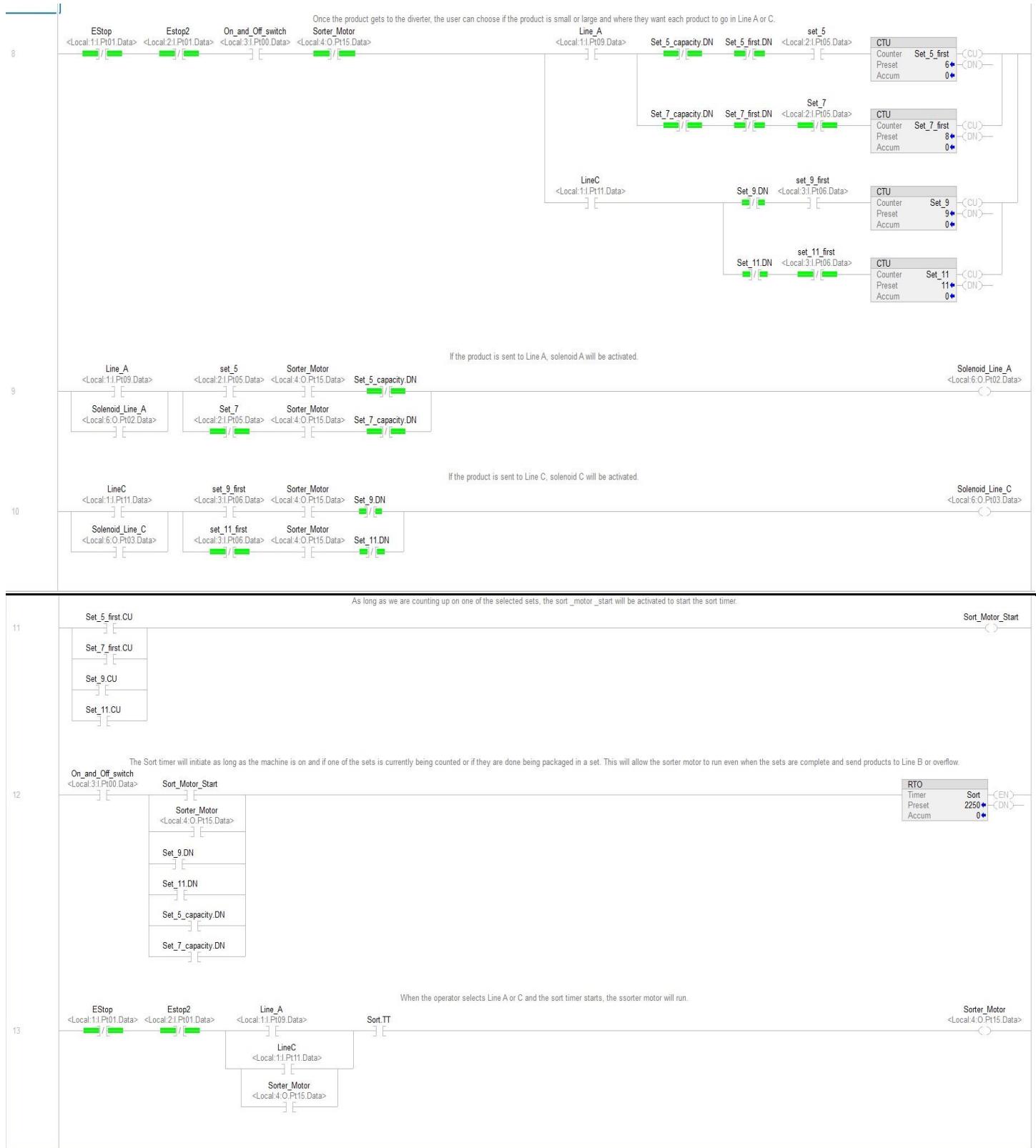
Device PN: TL30BGYRXXAXC1

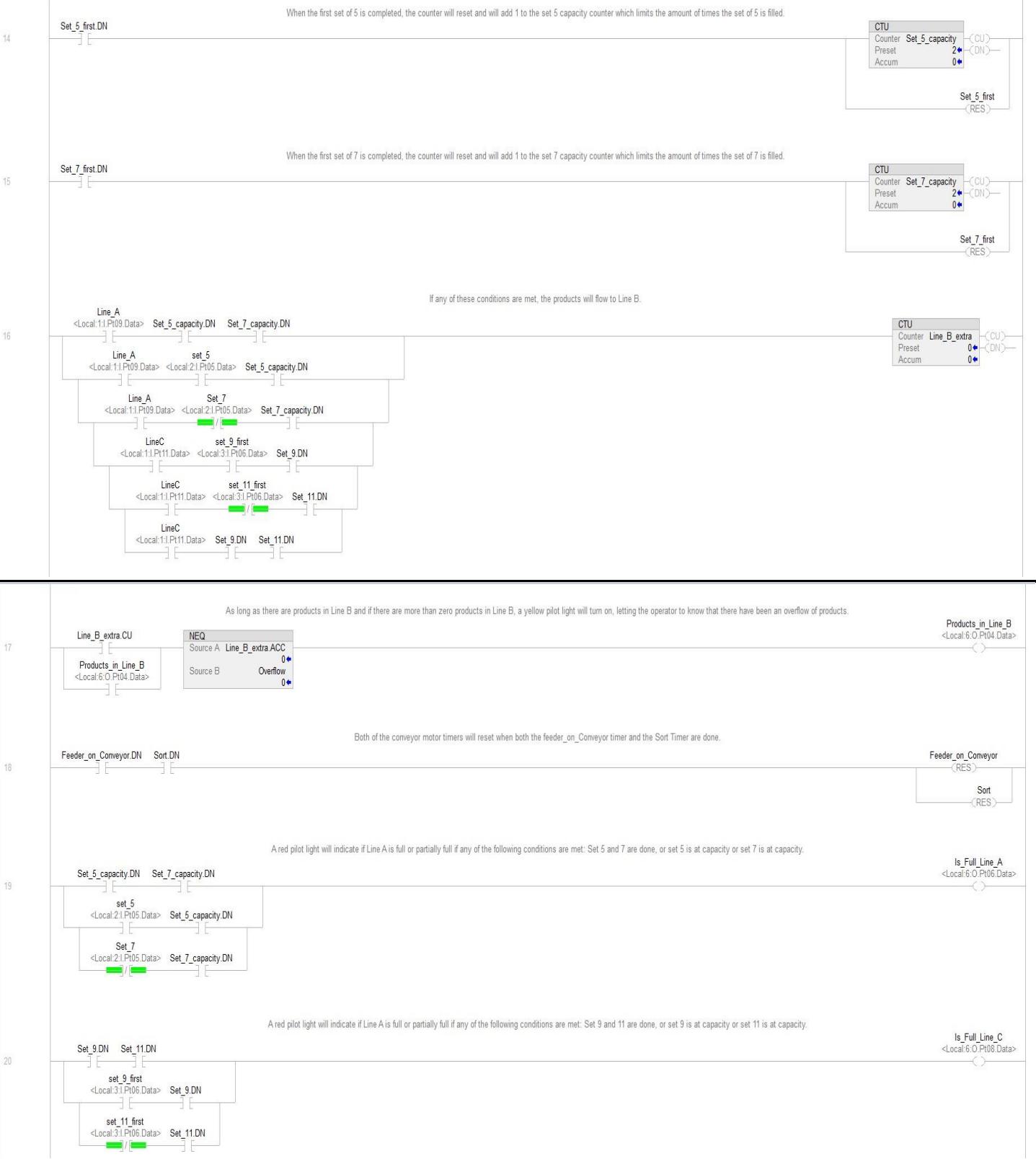
Quantity: 1

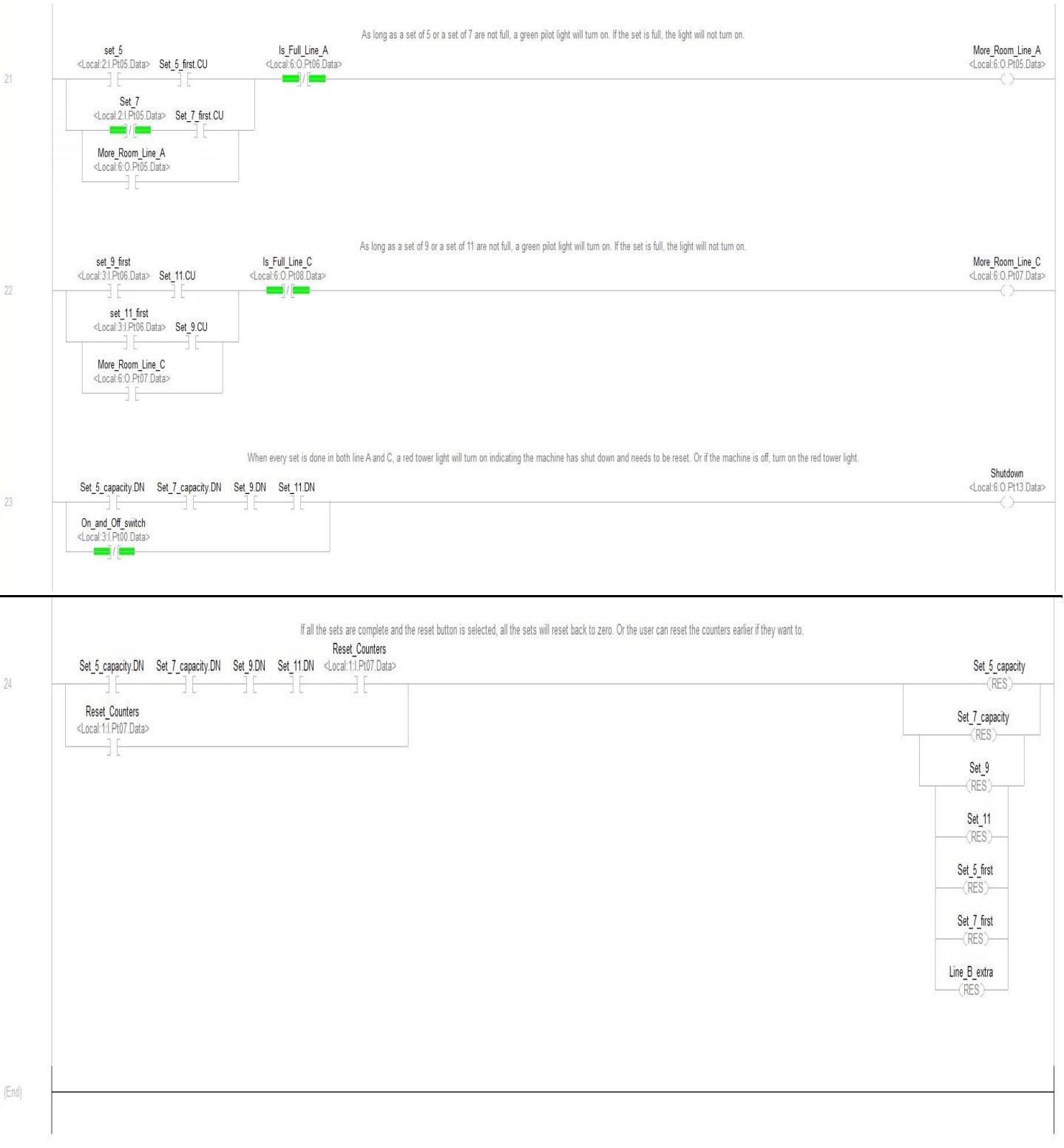


Logic of System:









Startup Configuration:

Startup assumptions of the system devices is stated:

As the system begins to startup a few assumptions are made. Assumption 1: There are no products in the feeder. Assumption 2: All the counters are set to zero with no previous products being packaged. Assumption 3: It is assumed that the operator will refill the feeder to the maximum amount before continuing in the system.

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 system has no way to sense if there is a person in the area and will keep moving even if someone is there, unless an emergency switch is pushed. There are also one two emergency shutdown buttons and for a large conveyor system with 3 separate lines, there should be more spread out just in case. The conveyor system is currently not in an enclosed area and is dangerous for the operator to be around.

Power loss:

In the event of a power loss, there are two seal 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, a reset button must be pushed. 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 two 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.

Situations where input or output devices are faulty:

In the case where the user attempts to bring out more products but the feeder is empty, the motor will not start. If the operator accidentally selects the wrong conveyor line, full system must be stopped to remove

product. In the event where the conveyor motors are not working, the operator will be prompted to call the maintenance team to solve the issue.

Safety hardware:

To ensure the safety of the operator, there are two emergency buttons. Both buttons are placed on different areas of the machine so the operator can shut it off wherever he is closest to. As soon as one of these buttons are selected, the whole system will shutdown and need to be reset before being active again. There is also a red tower light to indicate to operators that the system has shutdown.

Does the system failsafe?

In the case of an emergency, the system will shutdown 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 allow 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, 5069OB8, 5069-

OB16F, 5069-OB16K, 5069-OW4I, 5069-OW16, 5069-

5069F8, 5069-IY4, 5069-IY4K, 5069-OF4, 5069-OF4K, 5069-OF

5069B8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK

5069AENTR, 5069-AENTRK, 5069-

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5069-SERIAL Serial Module	110
5069-FPD Field Potential Distributor	118
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The Compact 5000™ I/O architecture provides a wide range of input and output modules to span many applications, from high-speed digital to process control. The architecture uses Producer/Consumer technology that allows input information and output status to be shared among multiple Logix 5000™ controllers.

Compact 5000 I/O modules are used as local I/O modules in CompactLogix™ 5380 and Compact GuardLogix® 5380 controller systems. The modules are also used as remote I/O modules with CompactLogix 5380, Compact

GuardLogix 5380 controllers, and some other Logix 5000 controllers. You use the Studio 5000 Logix Designer® application to configure the modules.

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

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.

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

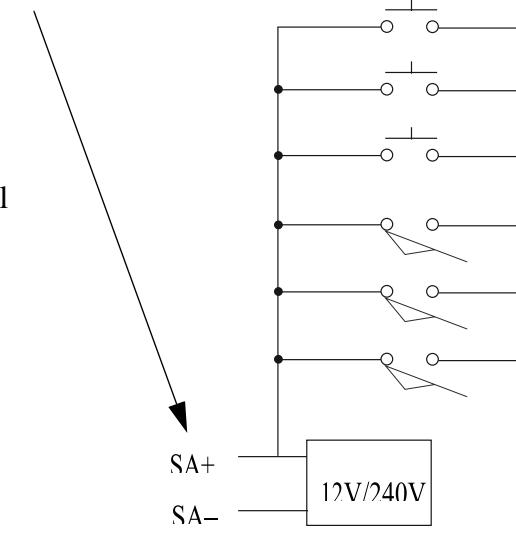
Connections to an external power supply that provides SA power via the SA power RTB on one of the following:

- 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.

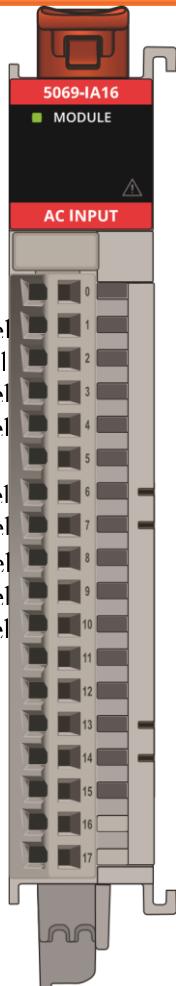
You can't install modules that draw AC SA power next to a Compact GuardLogix 5380 controller. Compact GuardLogix 5380 controllers do not support AC power on their SA power RTBs.

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

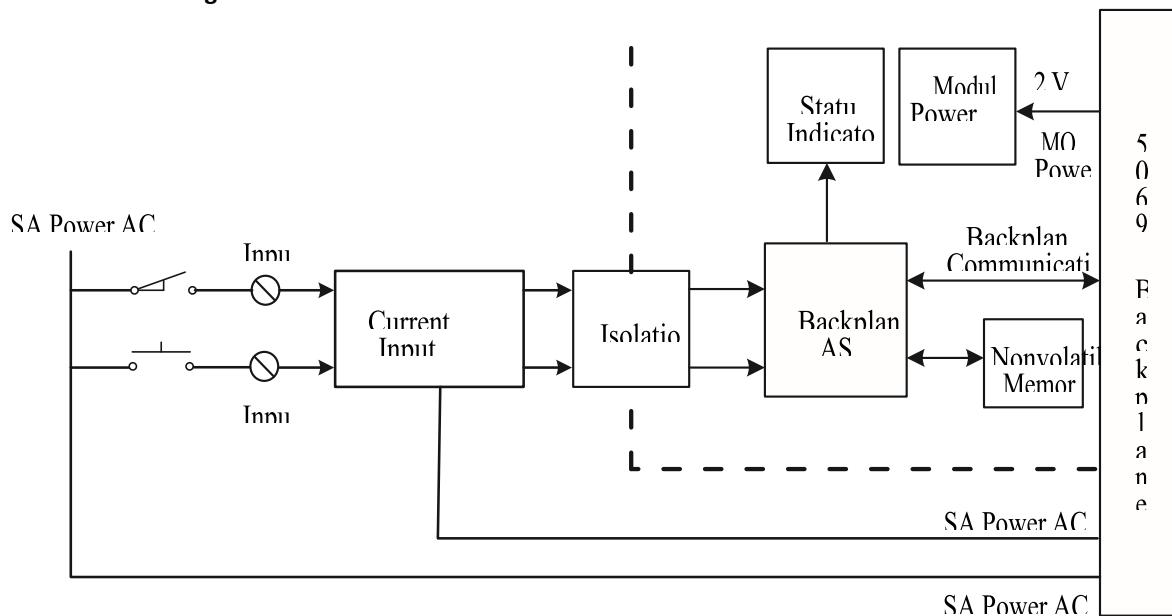
The following figure shows a functional block diagram for the 5069-IA16 module.



Input Channel 0
Input Channel 1
Input Channel 2
Input Channel 3
Input Channel 4
Input Channel 5
Input Channel 6
Input Channel 7
Input Channel 8
Input Channel 9
Input Channel 10
Input Channel 11
Input Channel 12
Input Channel 13
Input Channel 14
Input Channel 15
Input Channel 16
Input Channel 17



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	2mA @ 79V AC 3mA @ 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</p> <p>2 - power ports</p> <p>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.

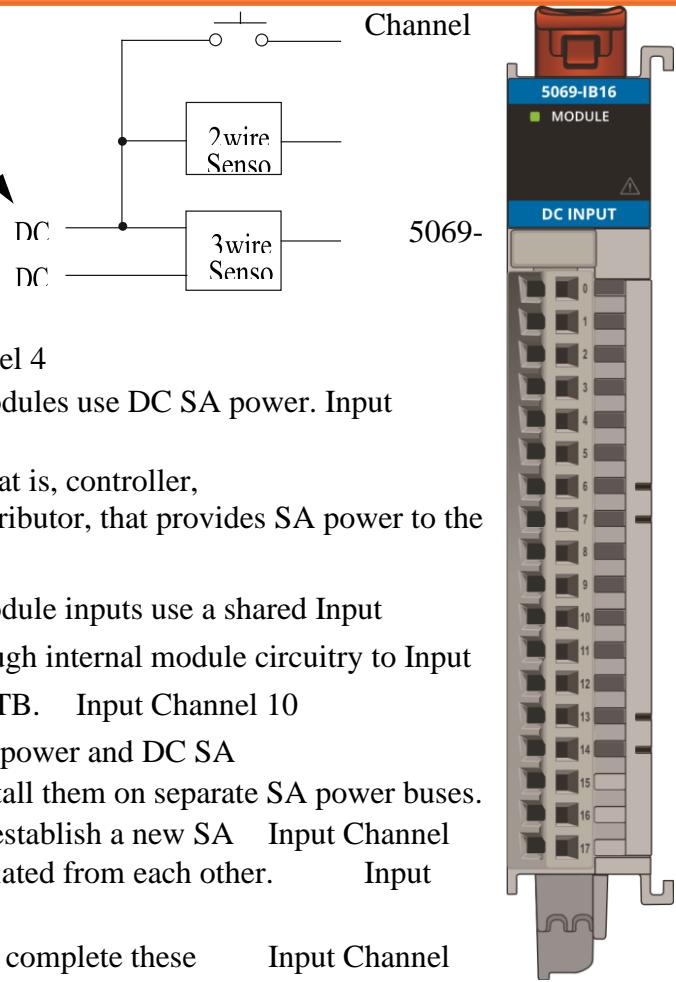
No Connect

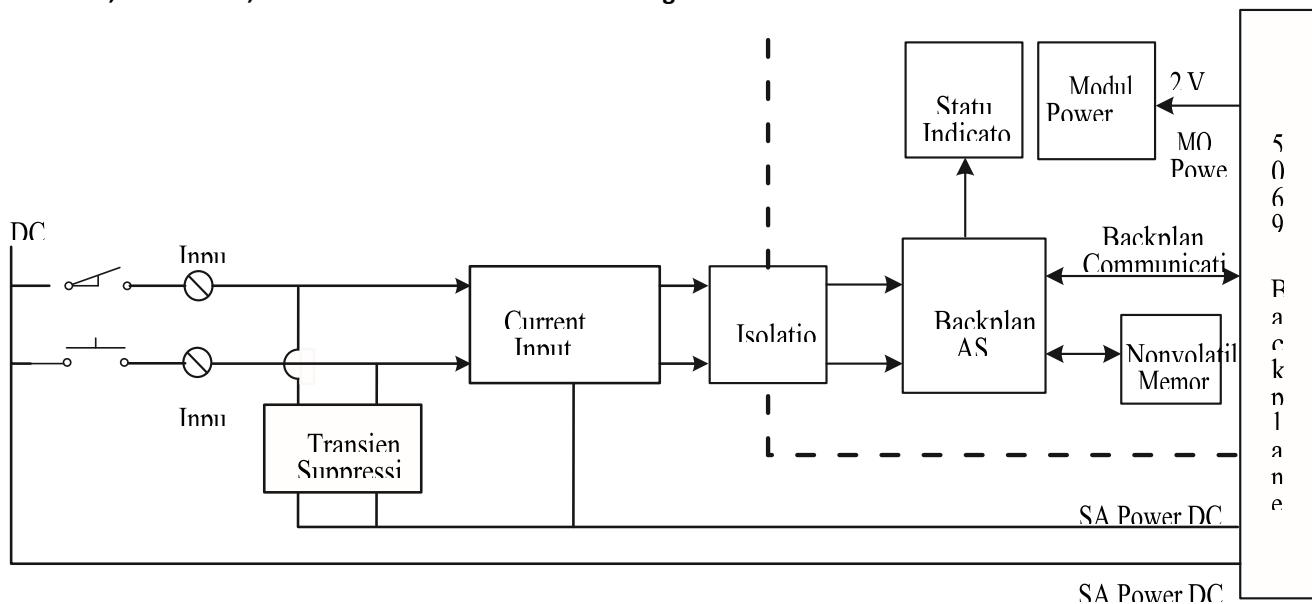
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.

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 Diagram

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

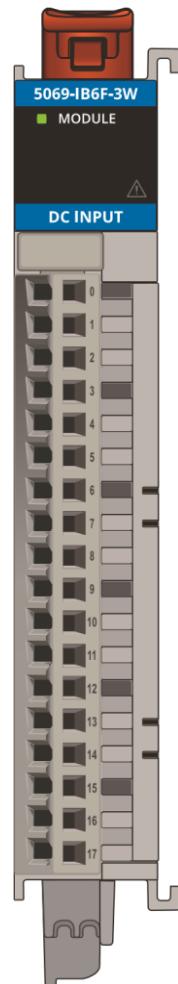
Connections to an external power supply that provides SA power are made via the SA power RTB on one of the following:

- 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.
 1. Install the modules that use one type of SA power, for example DC, to the

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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)

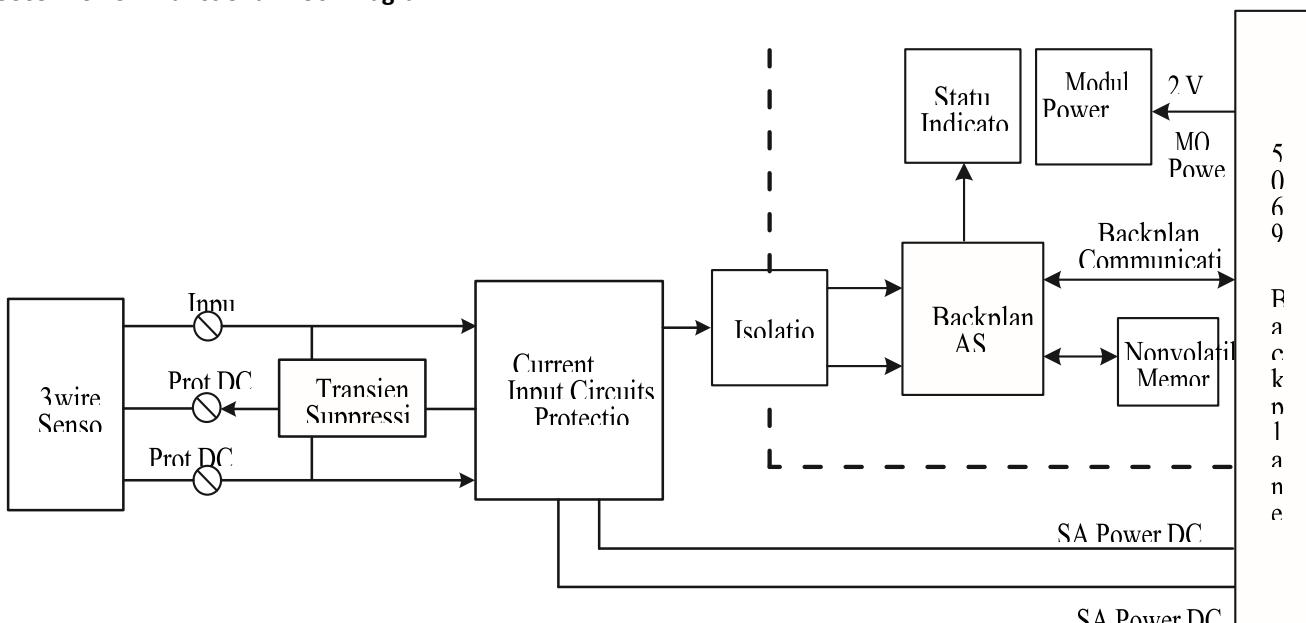
Input Channel 3

SA+ (24V DC)

SA- (24V DC Return)

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)	<p>≤ 10 µs, ±1 µs @ 25 °C (77 °F)</p> <p>≤ 10 µs, ±1 µs @ 25 °C (77 °F)</p>
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.

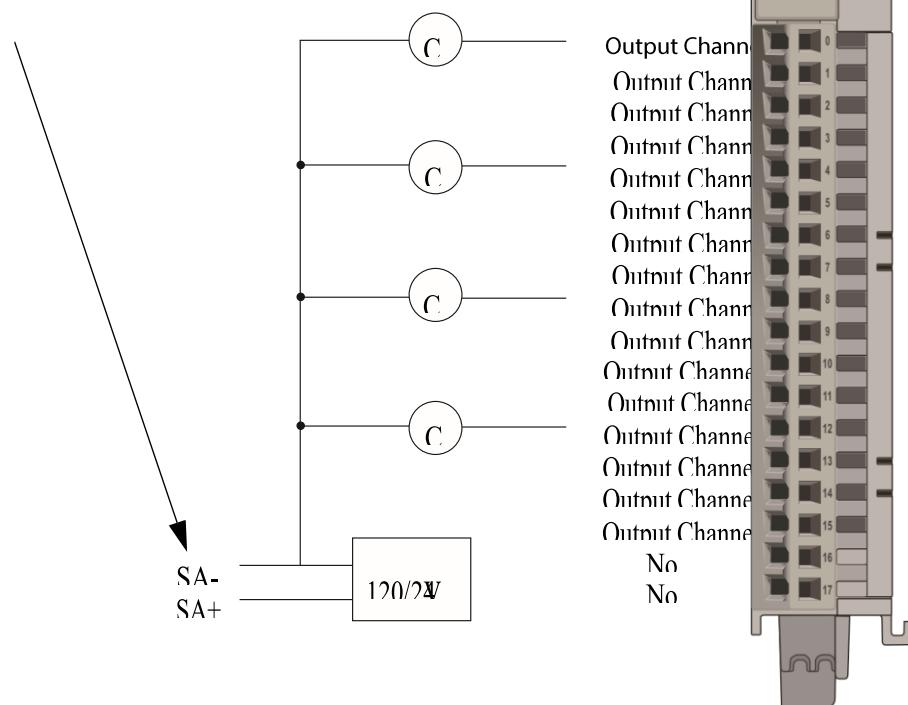
SA Power

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



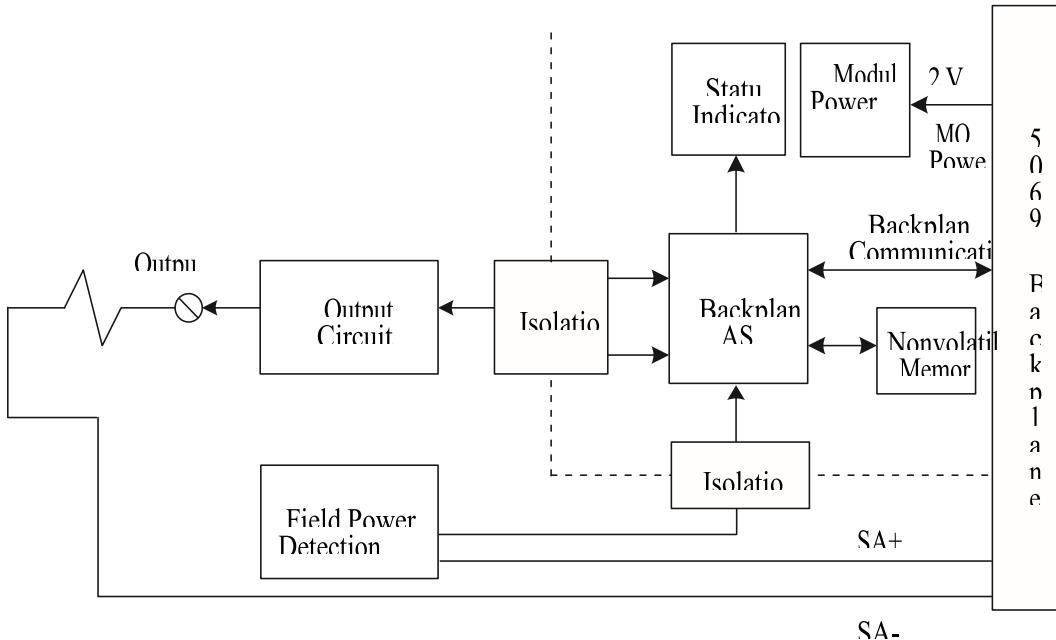
it and install the 5069-OA16 module next to it. You cannot install modules that draw AC SA power next to a

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	One of these RTB types. <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.

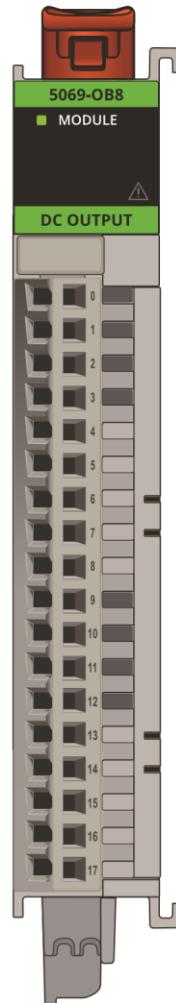
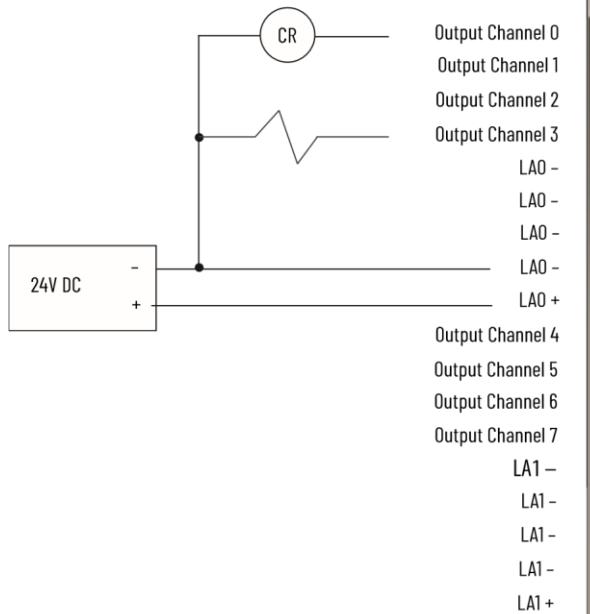
5069-OB8 Wiring Diagram

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 +/-.



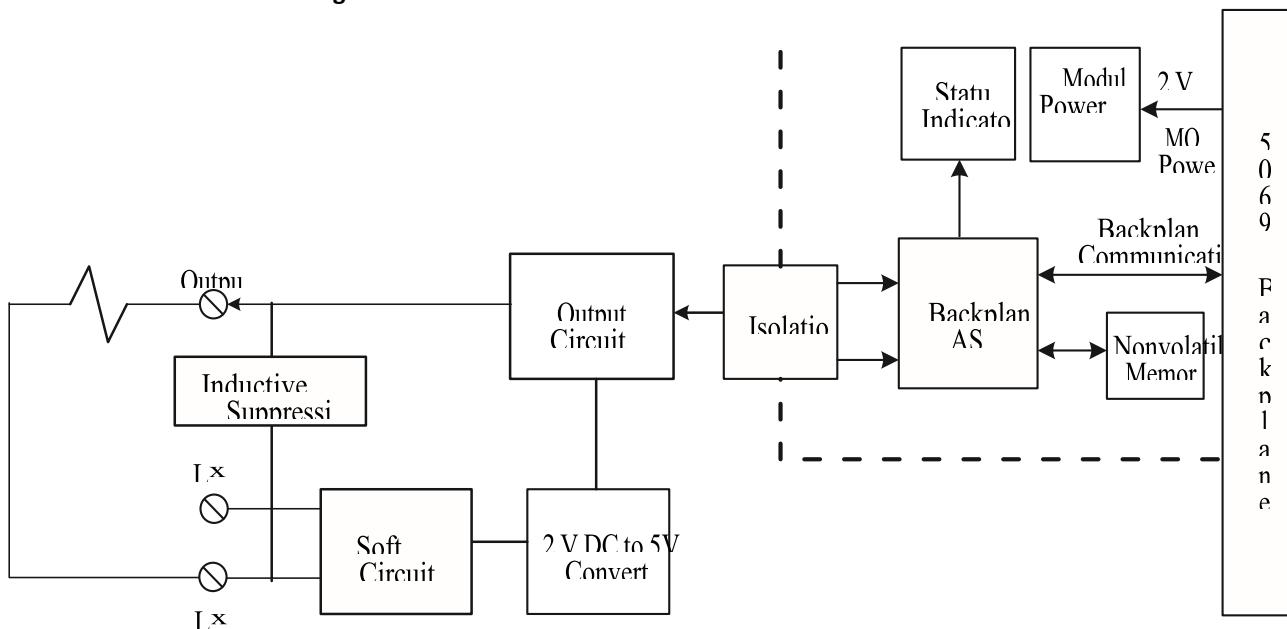
The 5069-OB8 module **does not draw current from the SA power bus**.

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
Oversupply 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

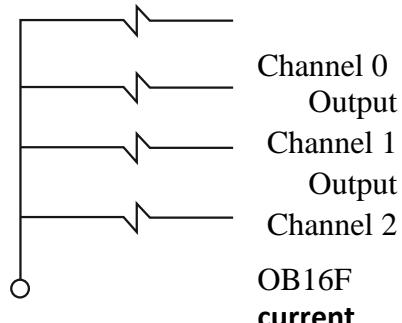
Channel Connections

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

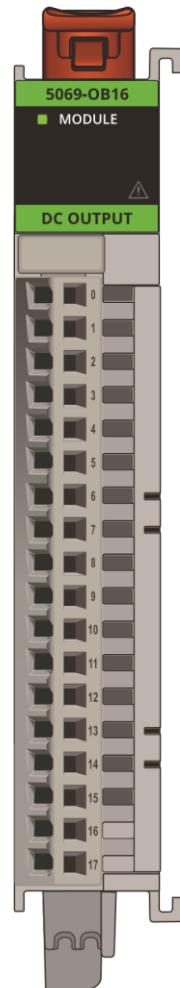
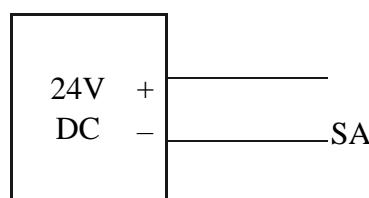


The 5069-OB16, 5069-OB16K, and 5069-modules **do** Output Channel 3 **not draw from the SA power bus**. Output Channel 4

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 LA (-) Output Channel 9 establish a new SA power bus in a system. power



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 example DC, to the right of the adapter or controller,

that is, the first SA power bus.

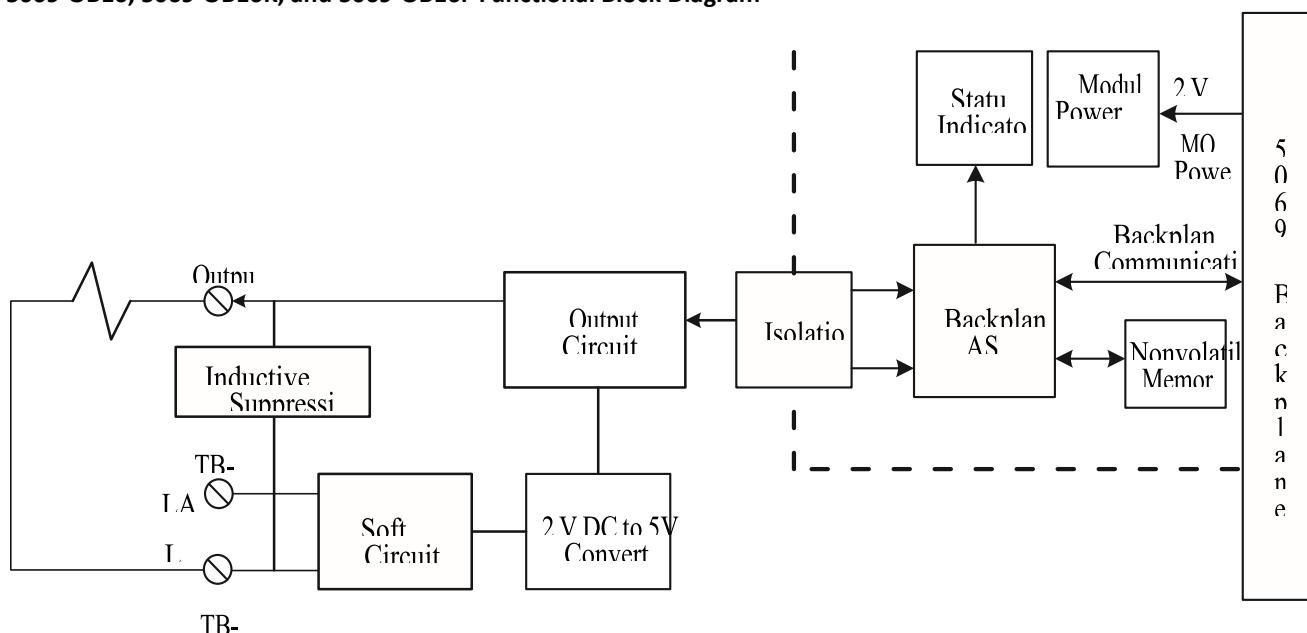
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.LA+

3. Install the modules that use the other type of SA power, 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

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 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-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.

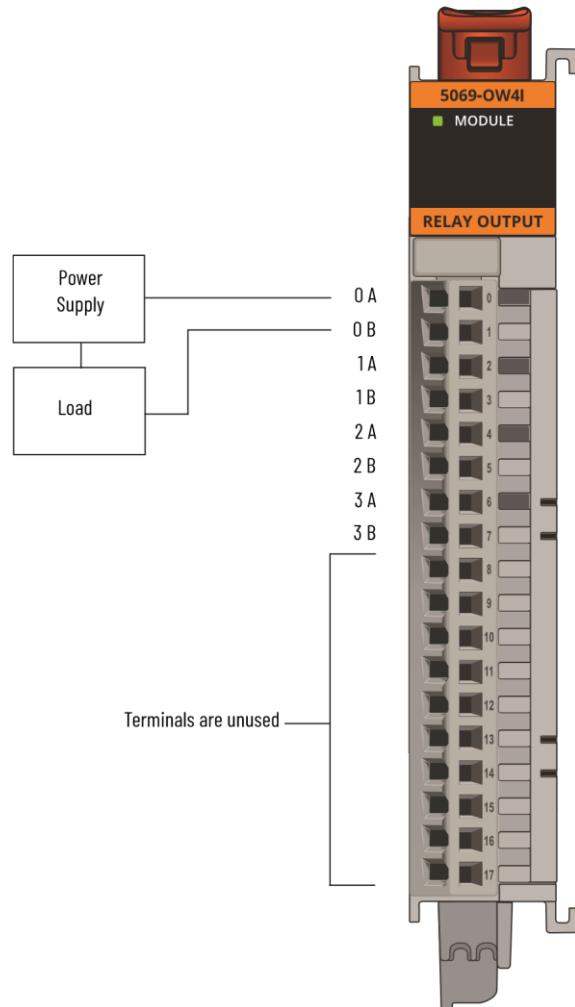
SA Power

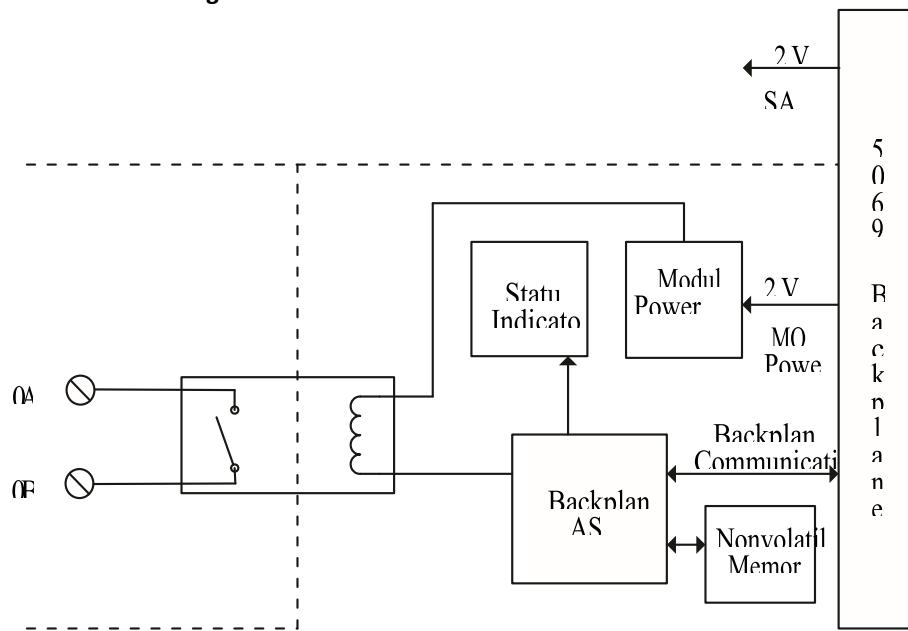
The 5069-OW4I module **does not draw current from the SA power bus**.

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 Break		Voltamperes Make Break		NEMA ICS 2-125
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

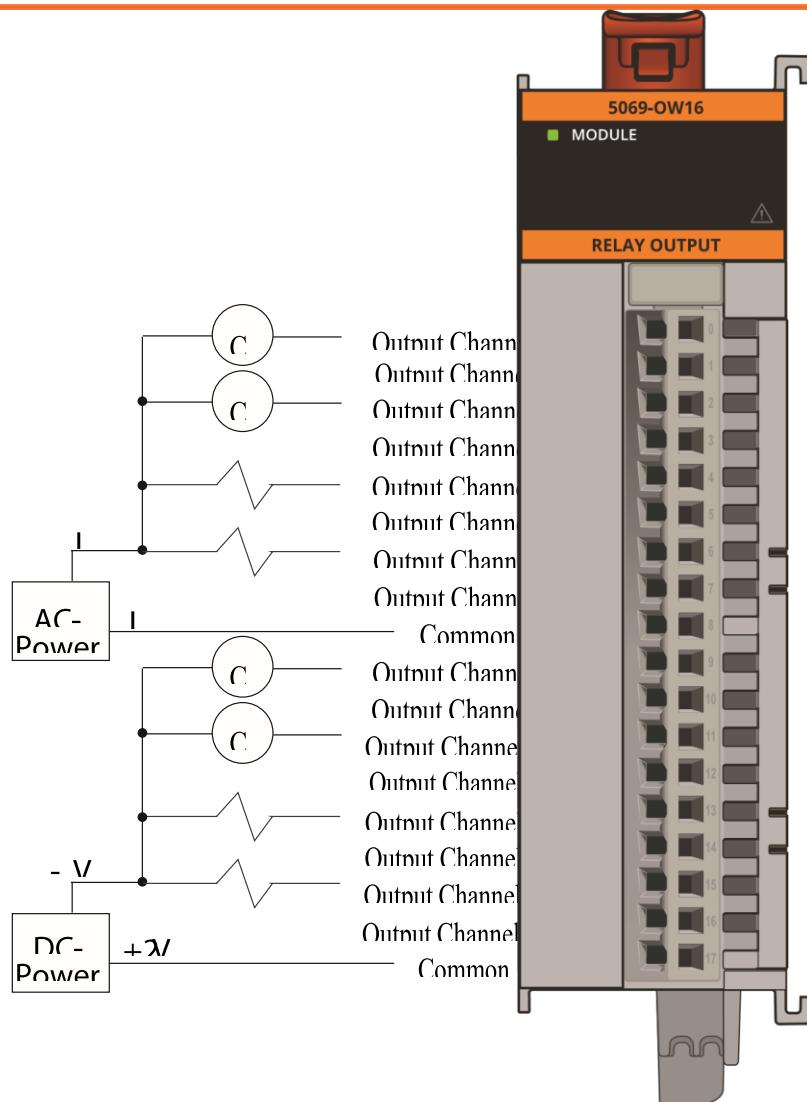
Connections to an external power supply that provides SA power are made via the SA power RTB on one of the following:

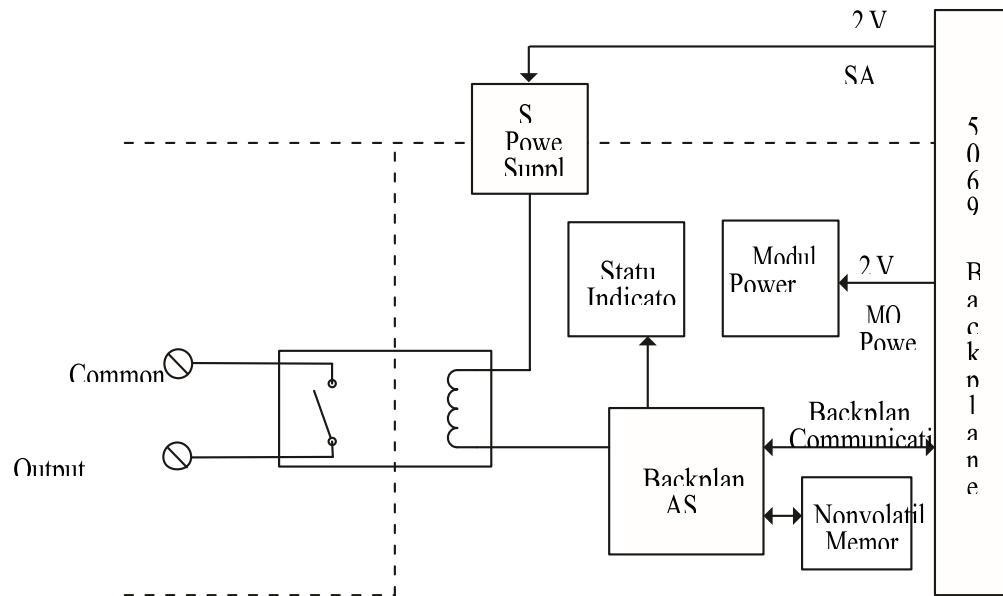
- CompactLogix 5380 controller
- Compact GuardLogix 5380 controller
- CompactLogix 5480 controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- 5069-FPD field potential distributor

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.
- 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-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 Make	Break	Voltamperes Make	Break	NEMA ICS 2-125
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**.

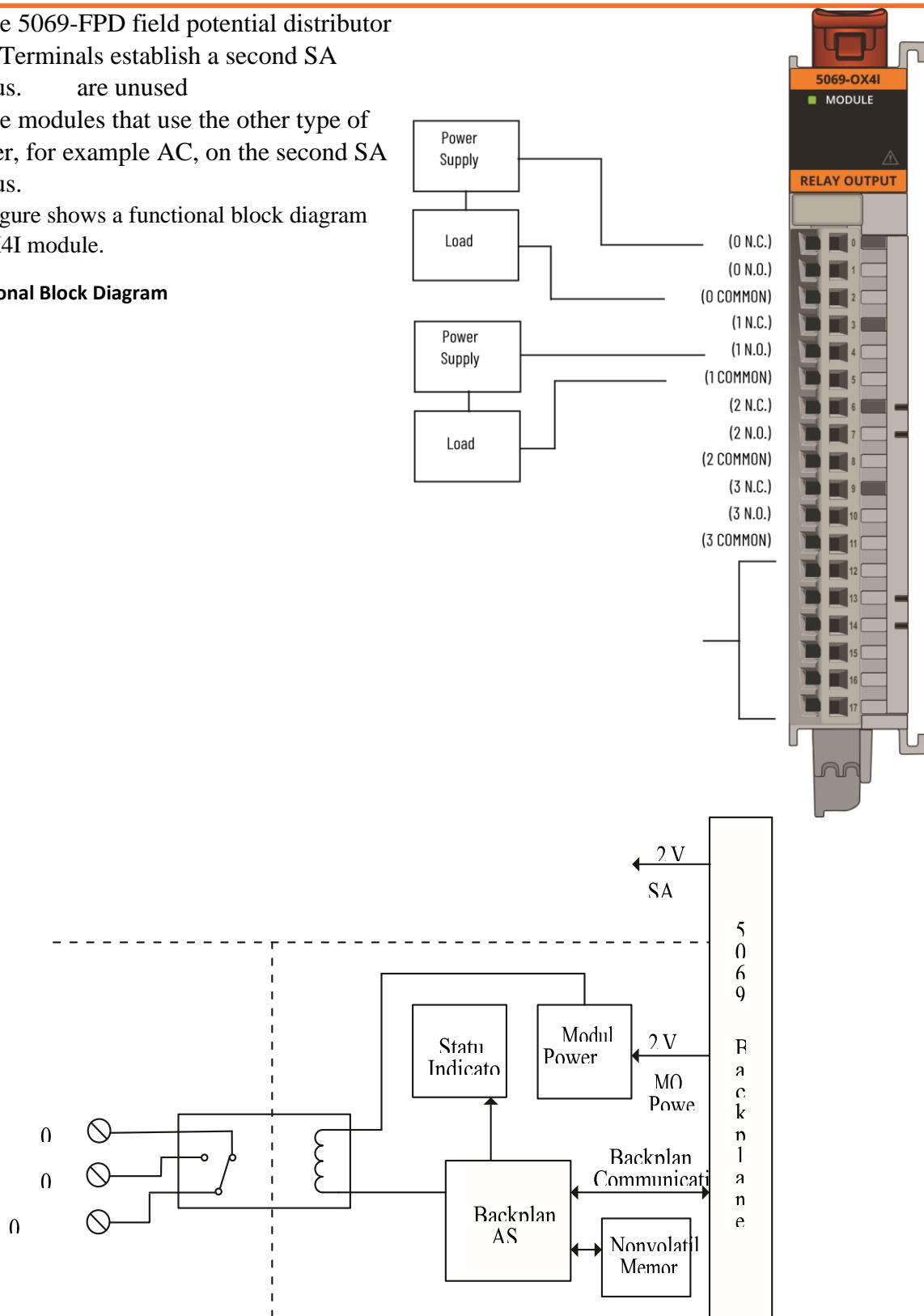
Still, the module is a DC-type module, and you must install it on a DC SA power bus.

- 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 Make		Voltamperes Make		NEMA ICS 2-125
		Break		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

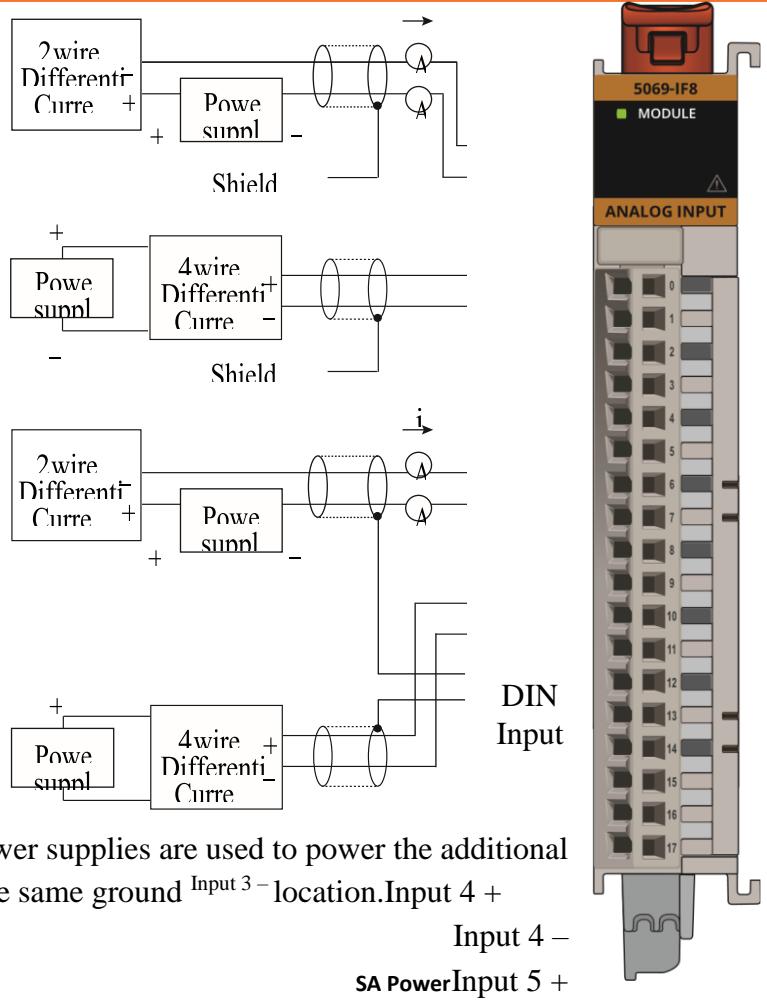
The diagram shows devices that are connected to channels 0, 2, 5, and 7. You aren't restricted to using only this channel. You can connect devices to any channel or combination of channels as needed.

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



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
- Input 6 –
- CompactLogix 5480 controller
- Input 7 +
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter

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 to the system and to power external devices that are connected to Input 0 – channels as needed.

the system and to power external devices that are connected to 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 +

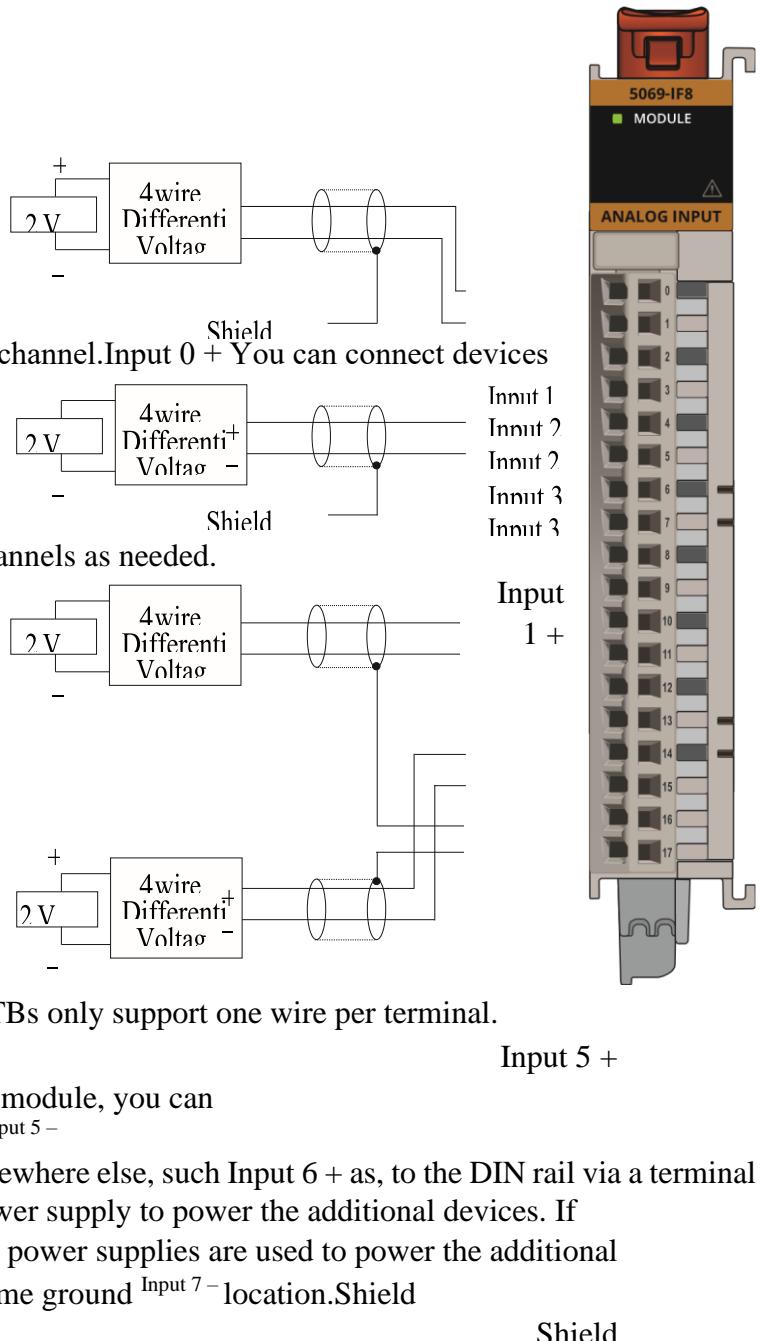
If you connect more than two devices to the module, you can ground two devices at the shield terminals.

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

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:

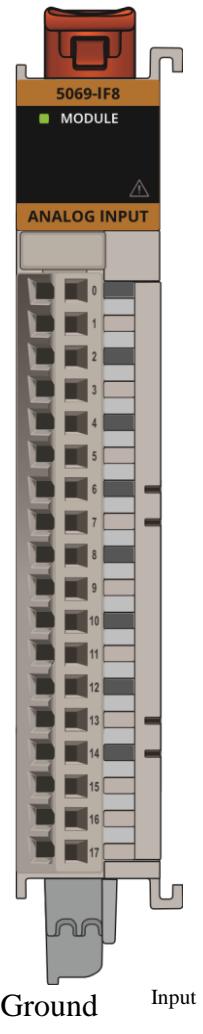
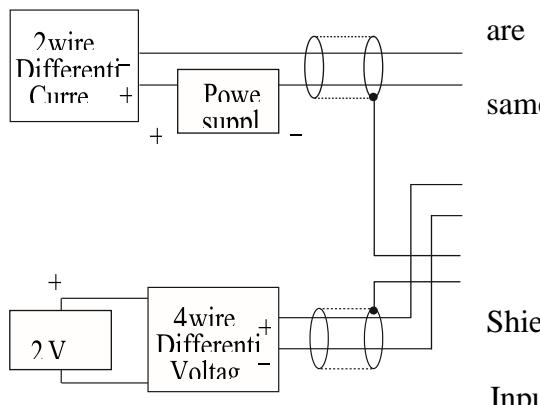
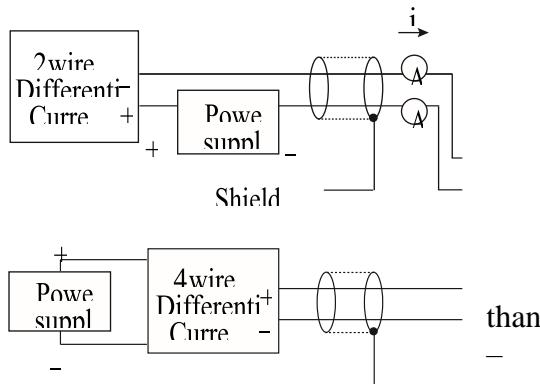
- Place additional loop devices, for example, strip chart recorders, at either **A** location in the current loop.
- Use separate external power supplies to provide SA power to the system and to power external devices that are connected to the module.
- This module has only two shield terminals.

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 +



are
same

Input
4 +

SA PowerInput 4 –

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

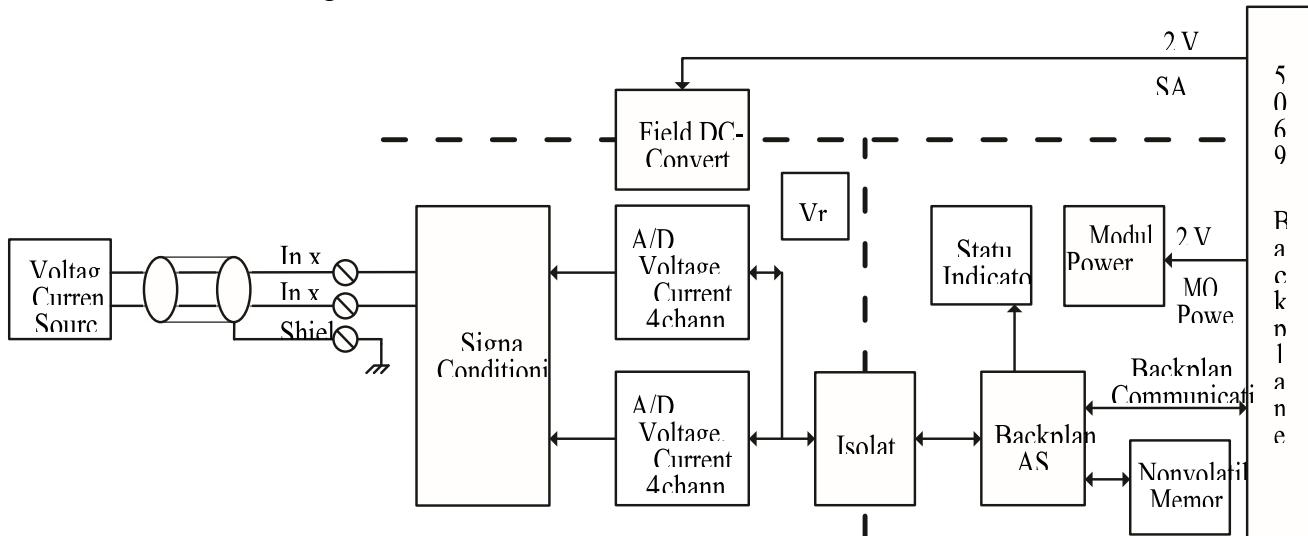
Input 7 +

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 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.

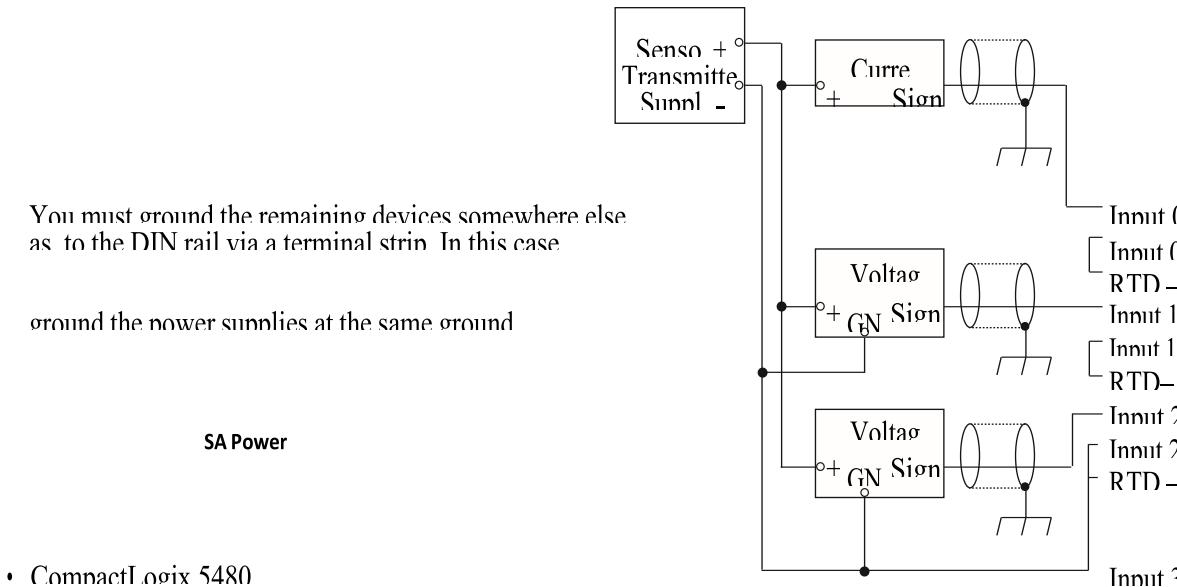
(4) You must use the 5069-RTB14CJC RTB.

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.



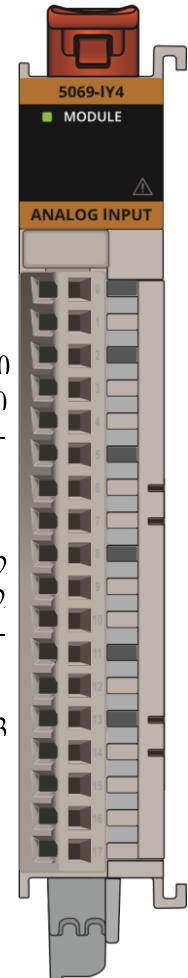
• CompactLogix 5480

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.

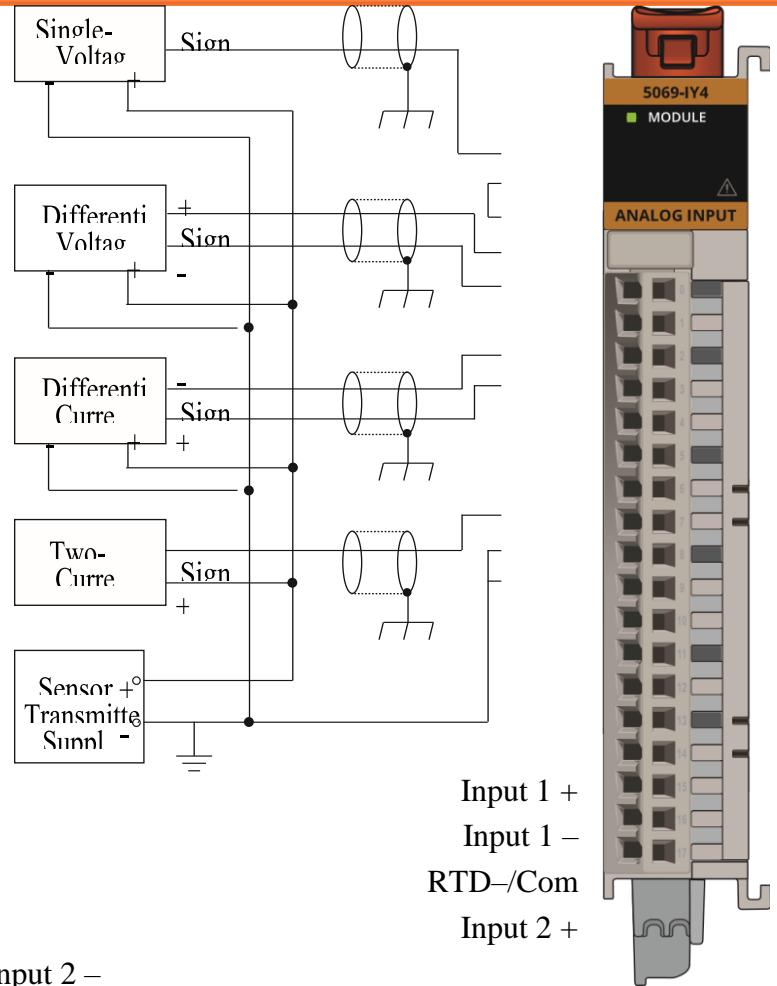
IMPORTANT: Remember the following:

- 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 PowerInput 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
- 5069-AENTR or 5069-AEN2TR EtherNet/IP Adapter
- 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.

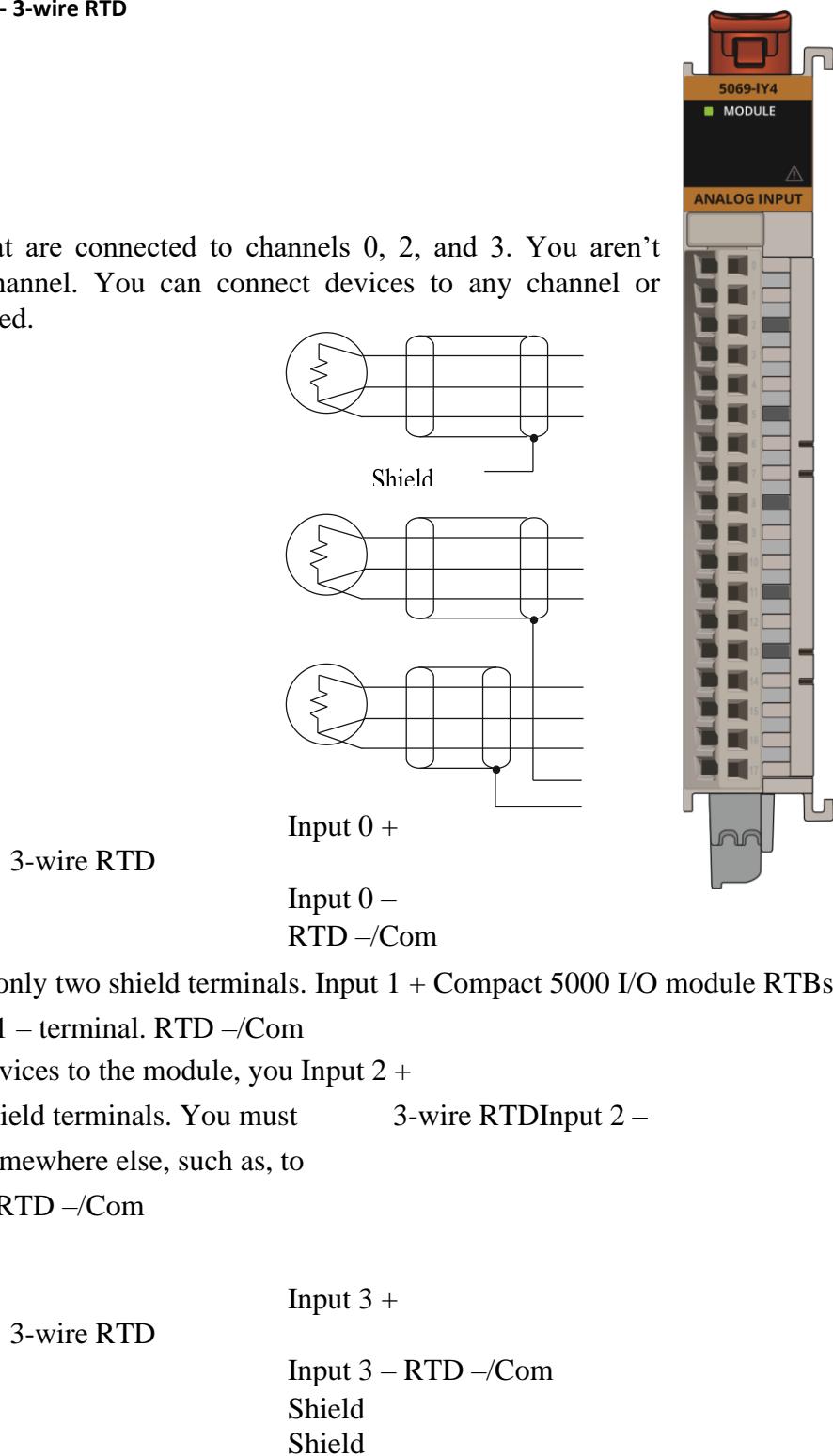
2. Install the 5069-FPD field potential distributor to establish a second SA power bus.
3. Install the modules that use the other type of SA power, for example AC, on the second SA power bus.

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.

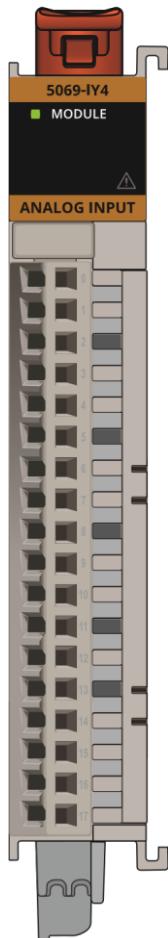
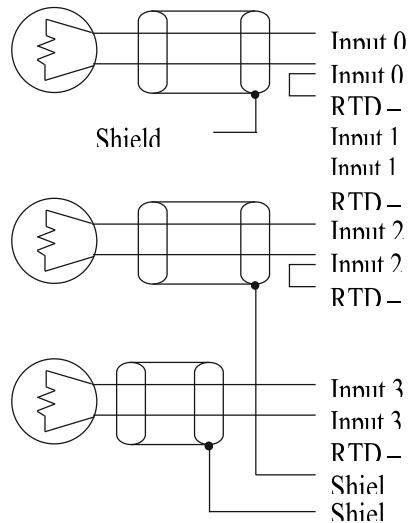
5069-IY4 and 5069-IY4K Wiring Diagram - 2-wire RTD

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.

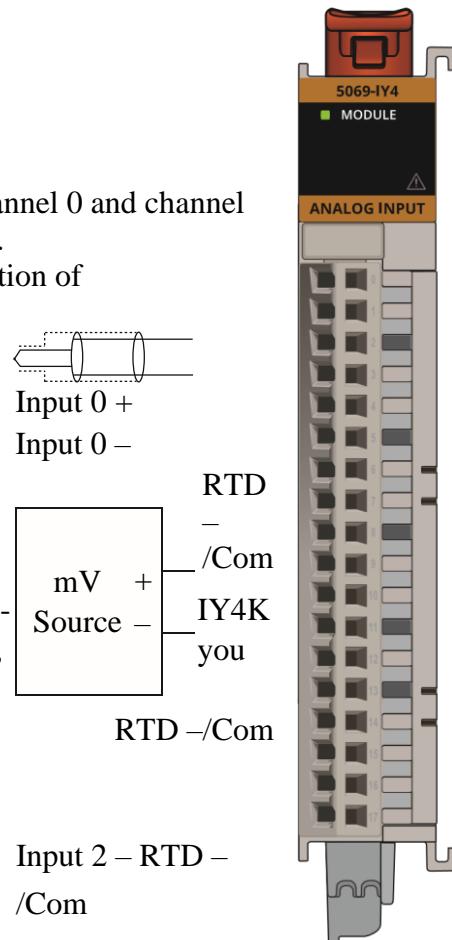
You can connect devices to any channel or combination of Thermocouple

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.

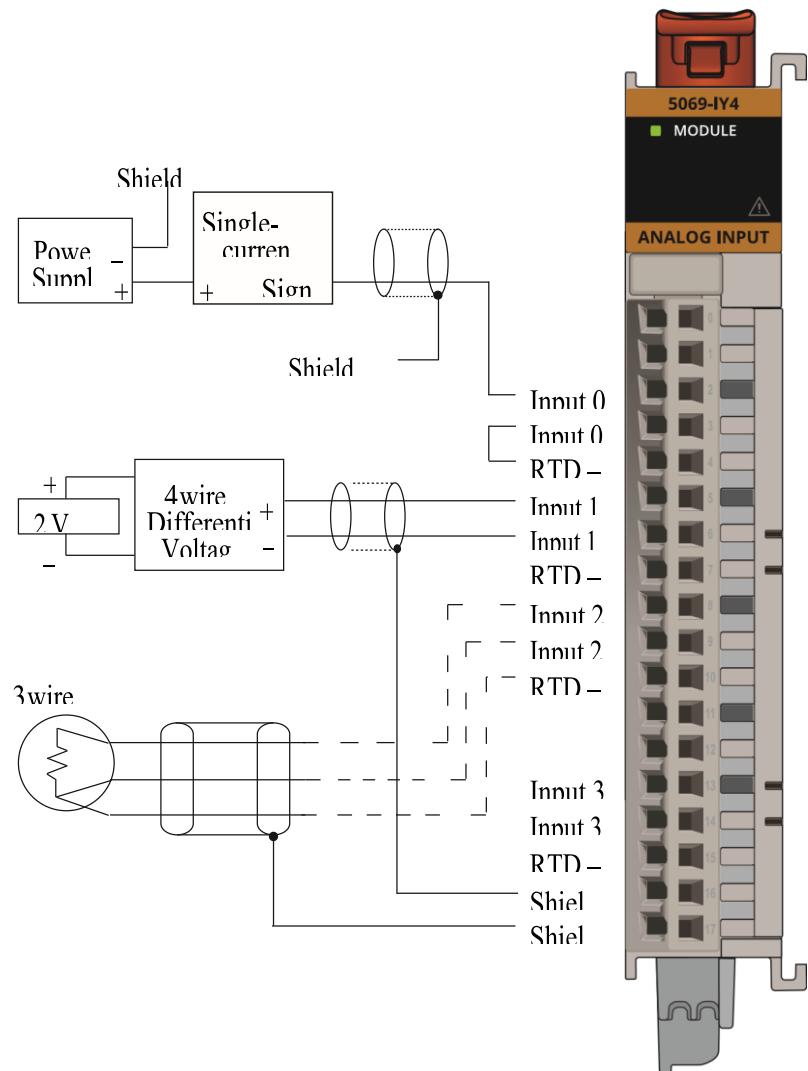
You can connect devices to any channel or combination of channels as needed.

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.

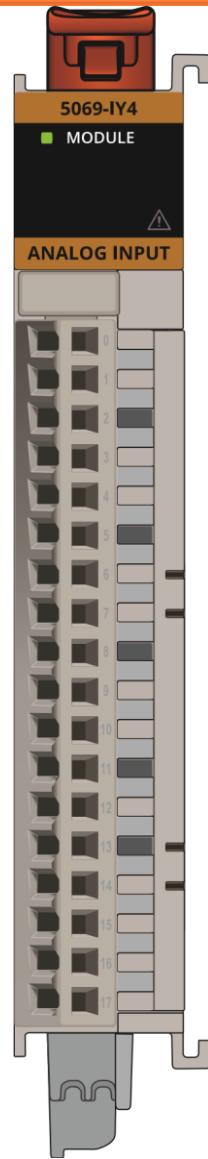
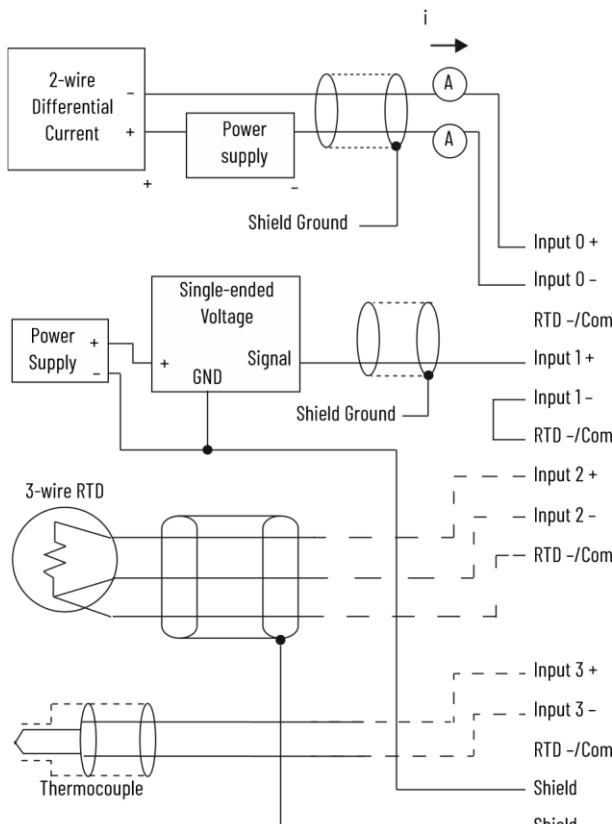
You can connect devices to any channel or combination of

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.

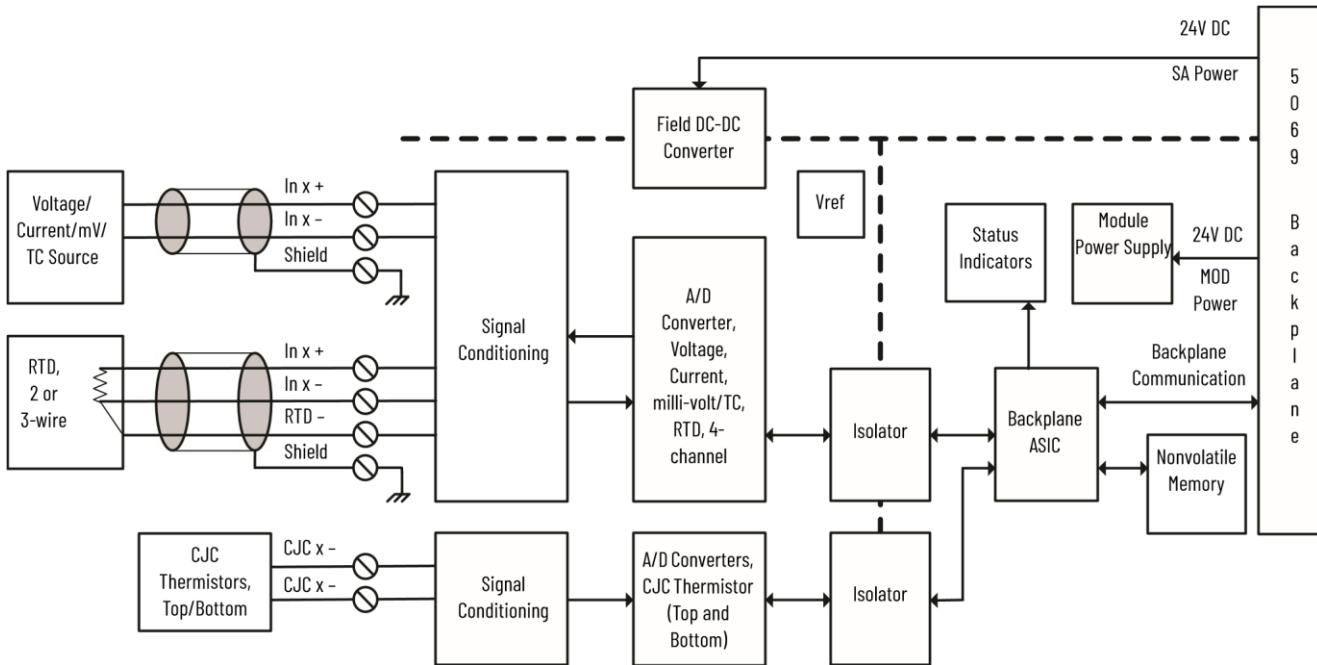
1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or

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-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

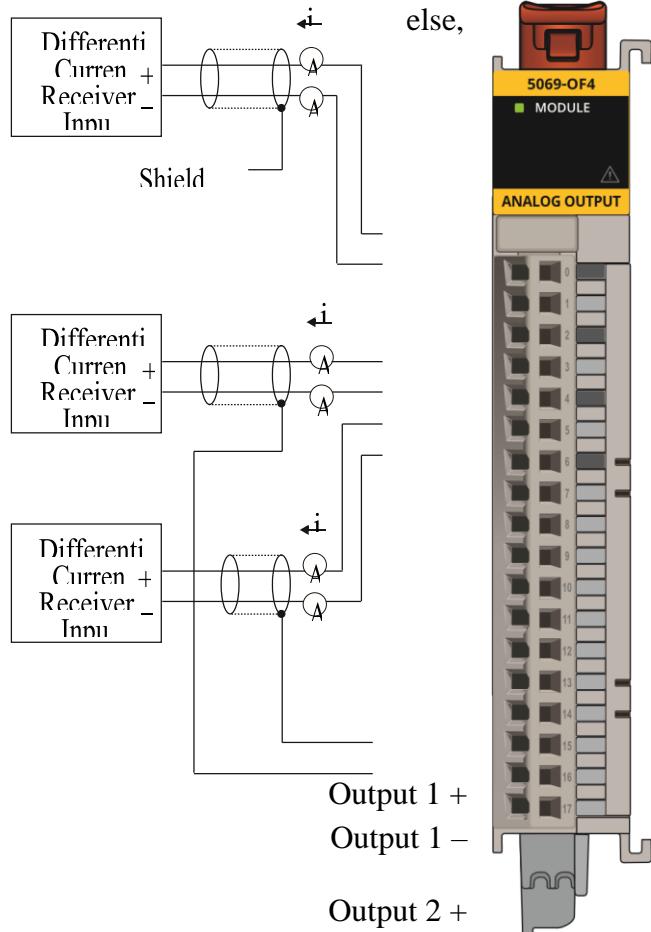
Channel Connections

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^{Output 0 –}



Connections to an external power supply that provides SA power are made via the SA power RTB on one of the following:^{Output 2 –}

- CompactLogix 5380 controller Output 3 +
 - Compact GuardLogix 5380 controller 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.

- 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.

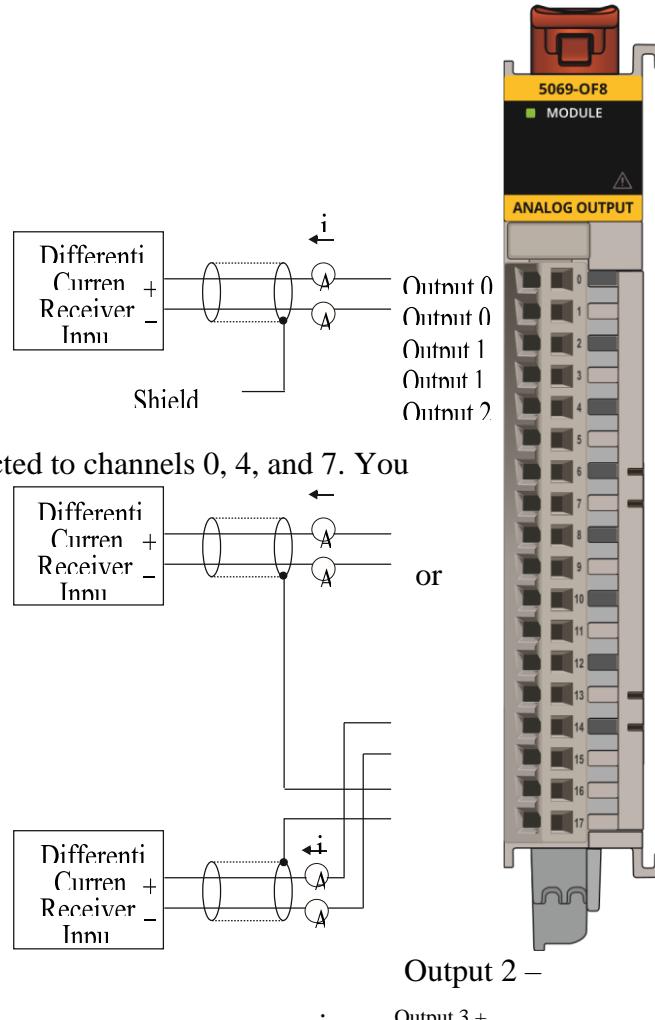
5069-OF8 Wiring Diagram - Current Mode

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.
- 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 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

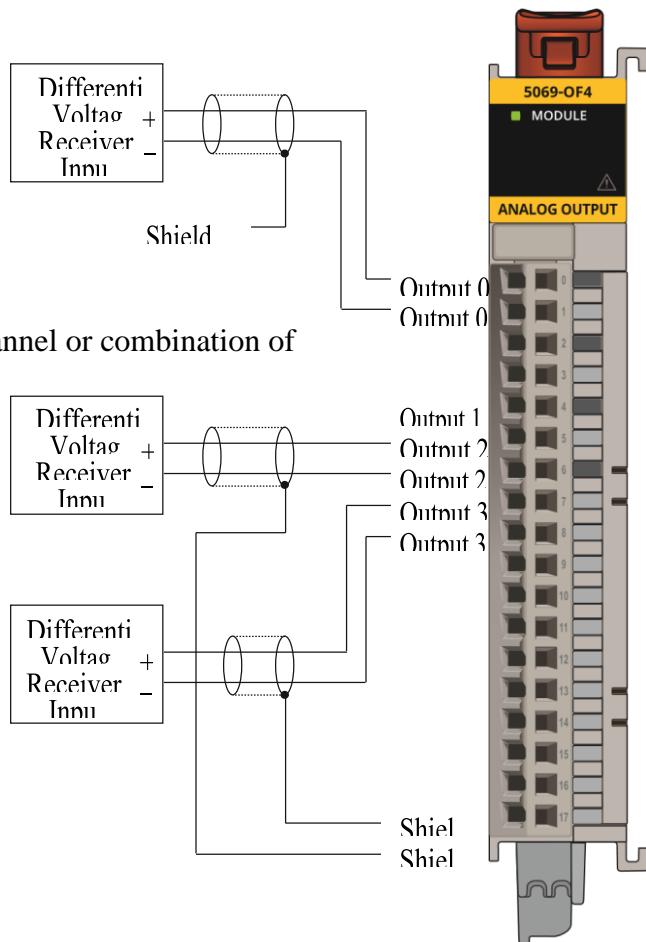
Channel Connections

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

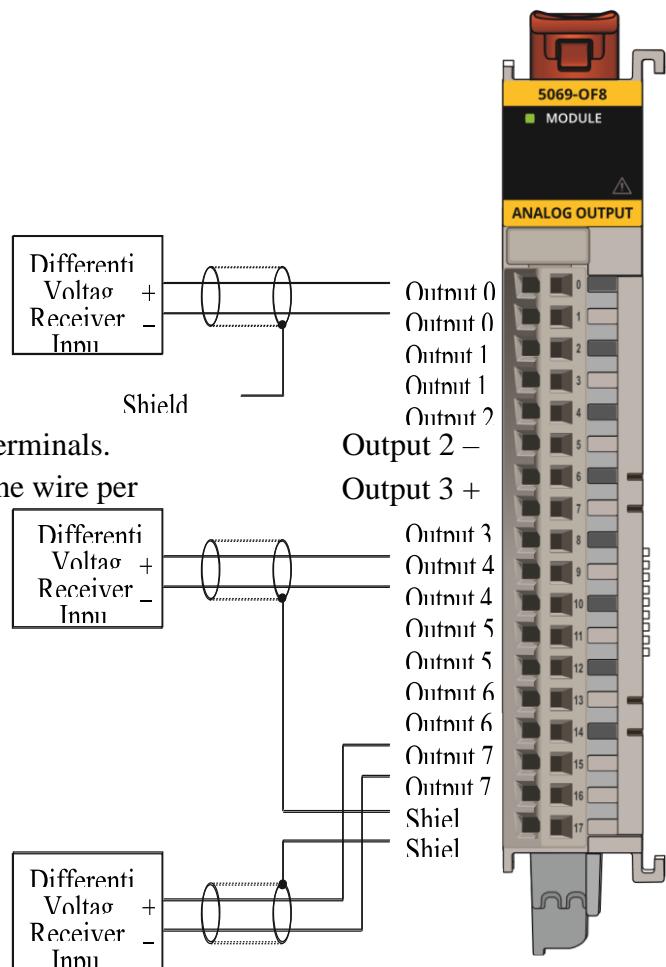
The diagram shows a device that is connected to channels 0, 2, and 3. You aren't restricted to using only these channels. You can connect

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.

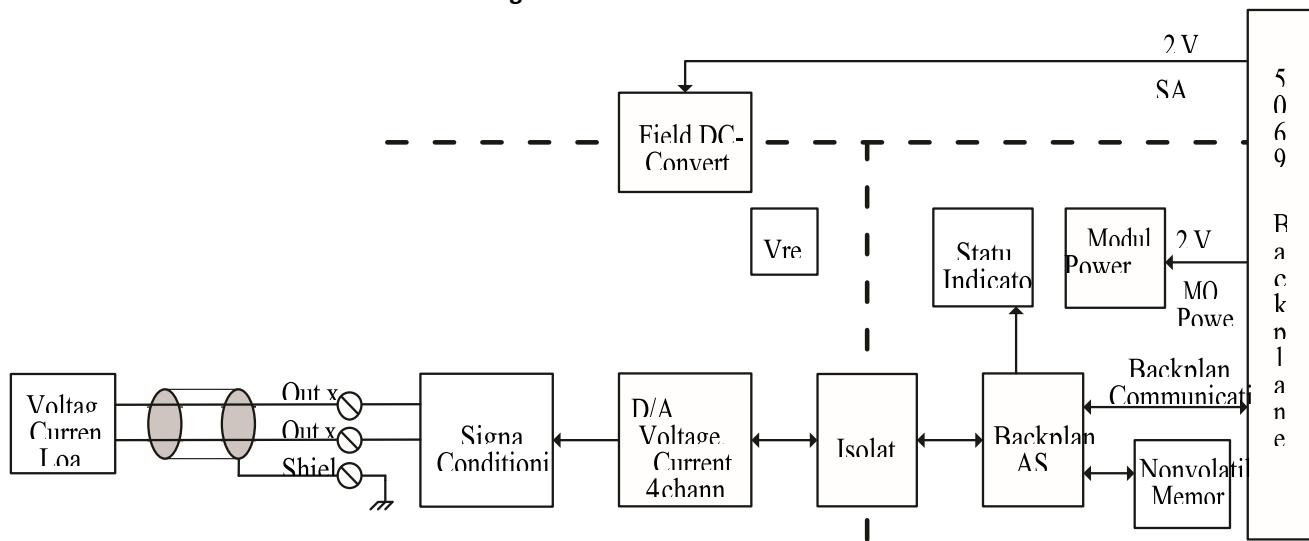
terminal.

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.



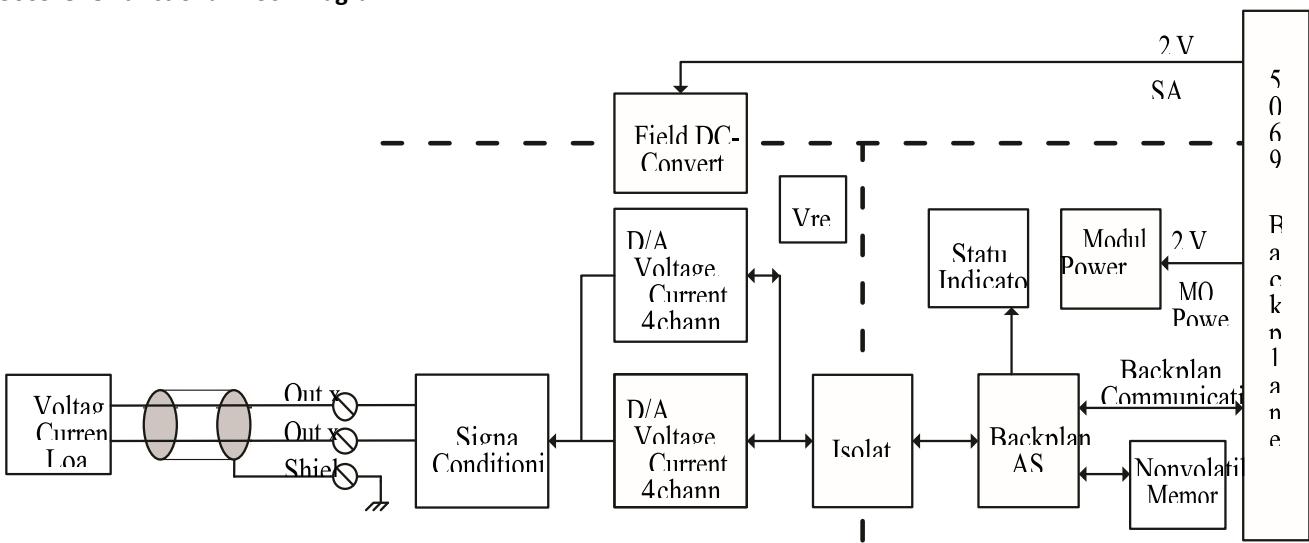
The following figure shows a functional block diagram for the 5069-OF4 and 5069-OF4K modules.

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.

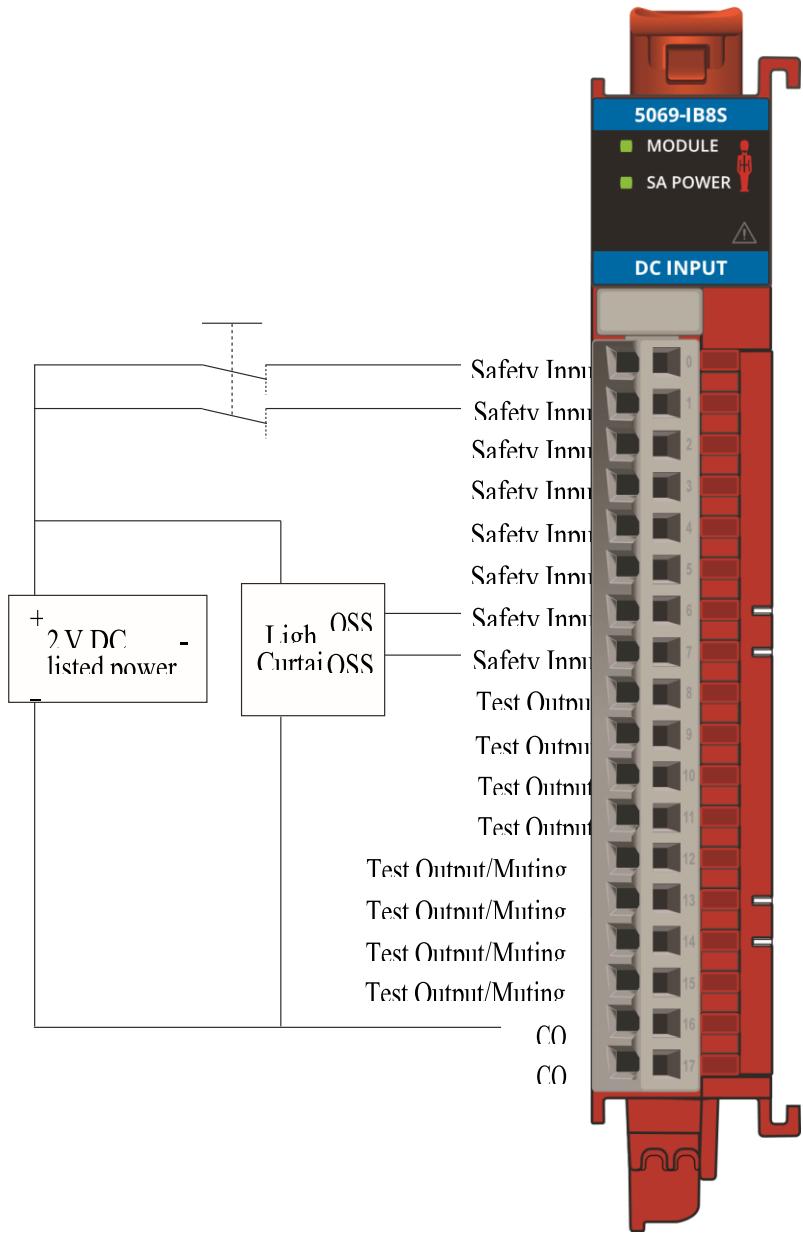
SA Power

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.
 - 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 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.

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 SA power to adjacent

SA Power

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

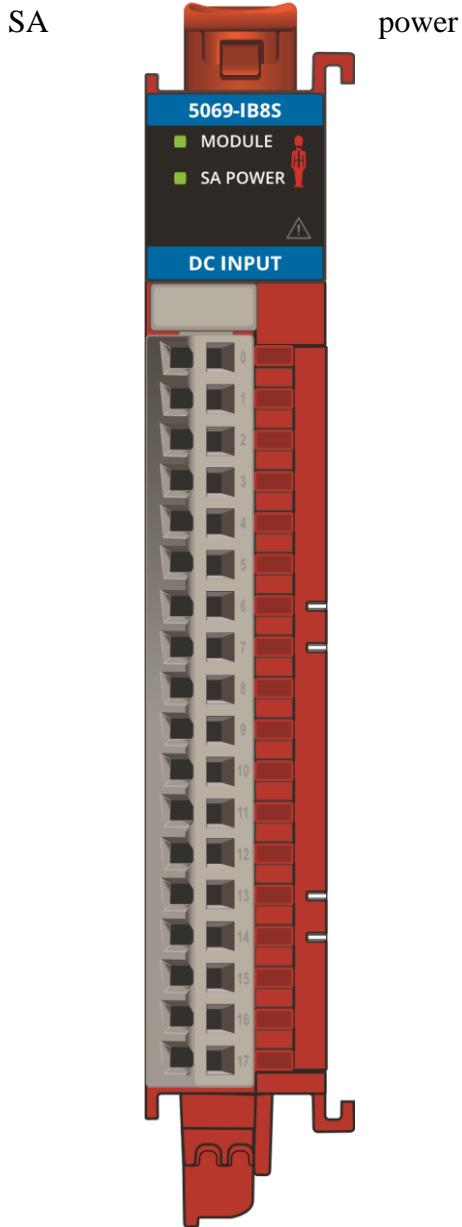
- Compact GuardLogix 5380 controller

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

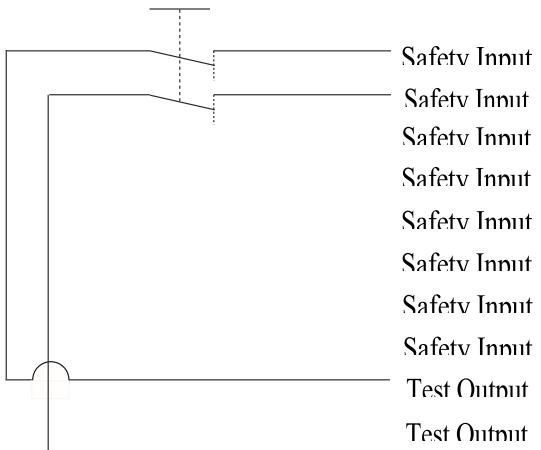
IMPORTANT:

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

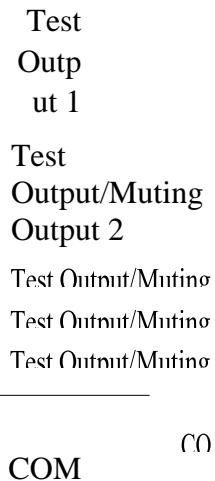


electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.



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.



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.

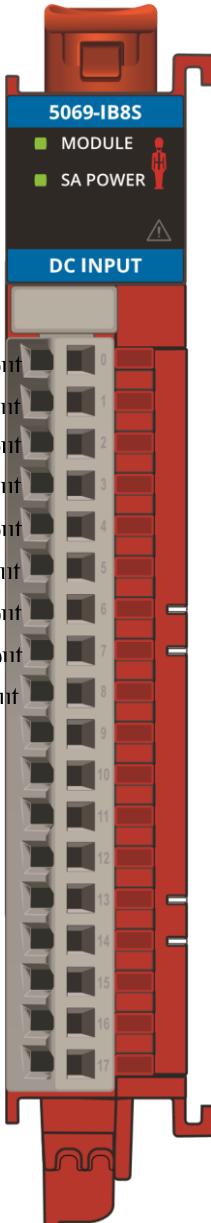
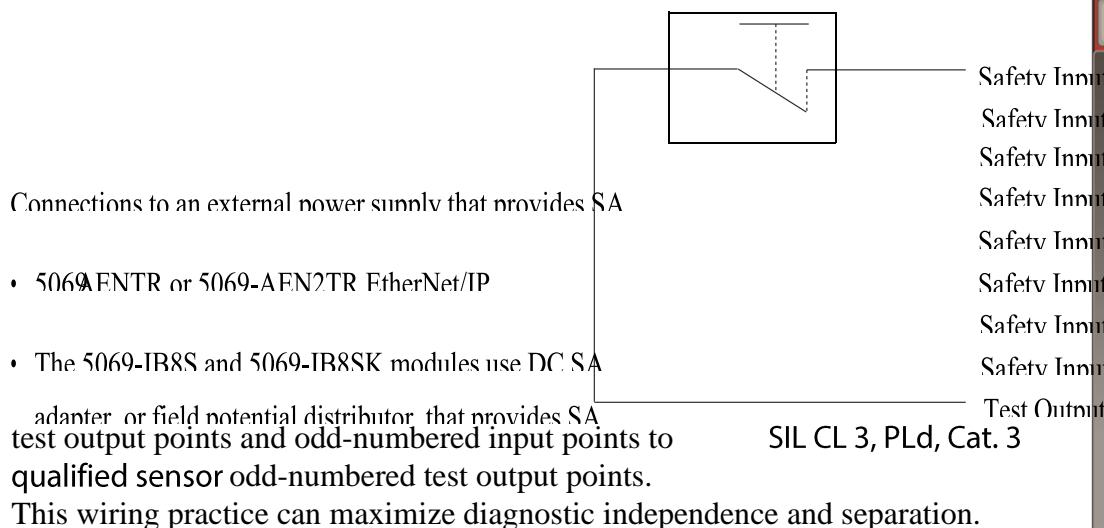
- Use a SIL CL 3, PLd, Cat. 3 qualified sensor.
- One of the following configuration combinations:
 - Input Point Mode = Safety Pulse Test
 - Test Output Mode = Pulse Test
 - Input Point Mode = Safety
 - Test Output Mode = Power Supply

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



SA Power

the SA power RTB on one of the following:

- Compact GuardLogix 5380 controller
- 5069-FPD field potential distributor **IMPORTANT:** Remember the following:
must connect DC power to the component, that is, controller, the modules.

- 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	<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 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-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.

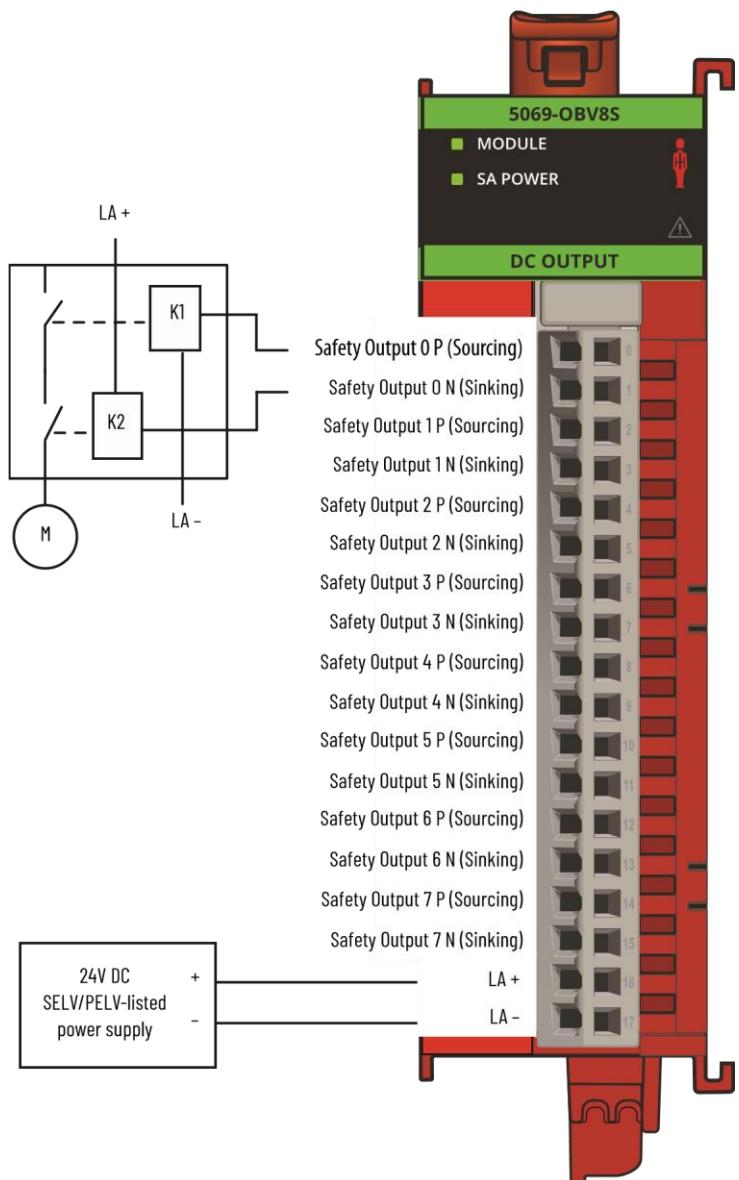
LA Power

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. 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.

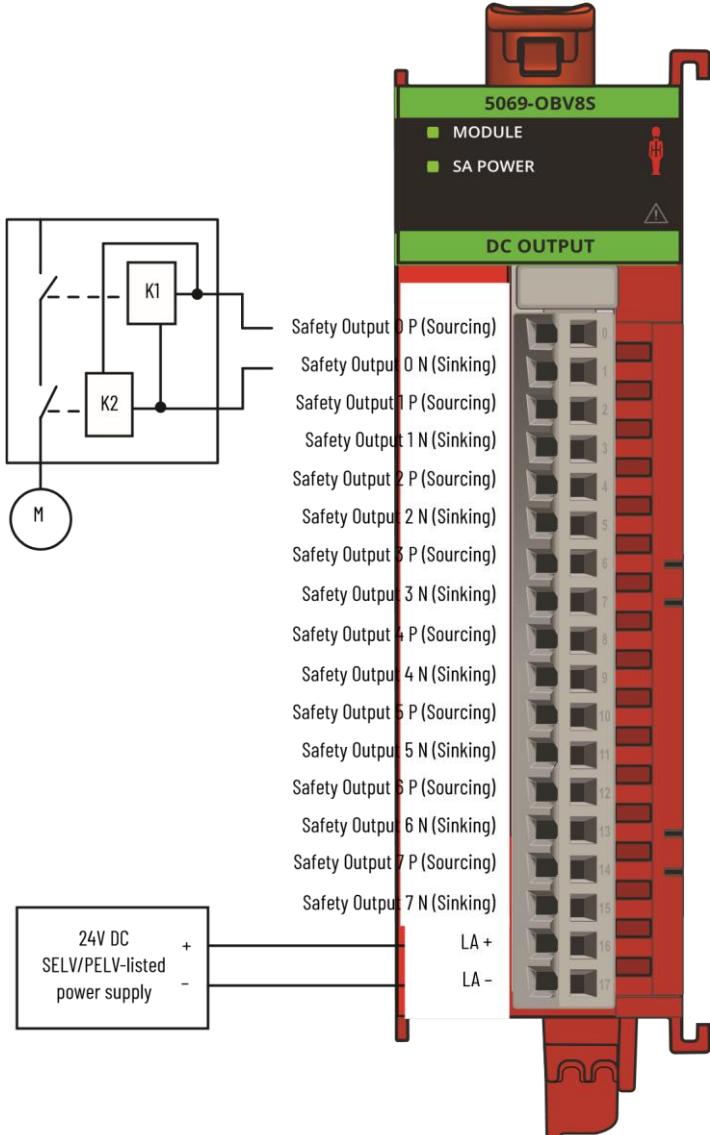
Connection Pairs

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.

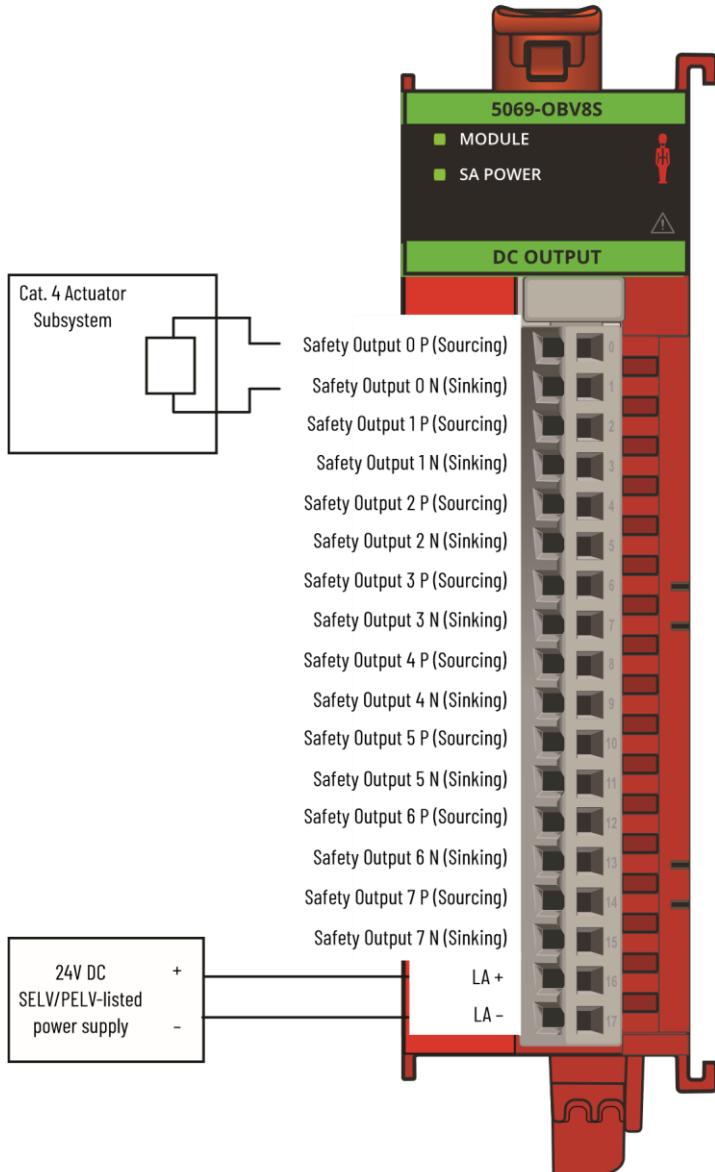
For Category 4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of the following actions:

- 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-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.
 - 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

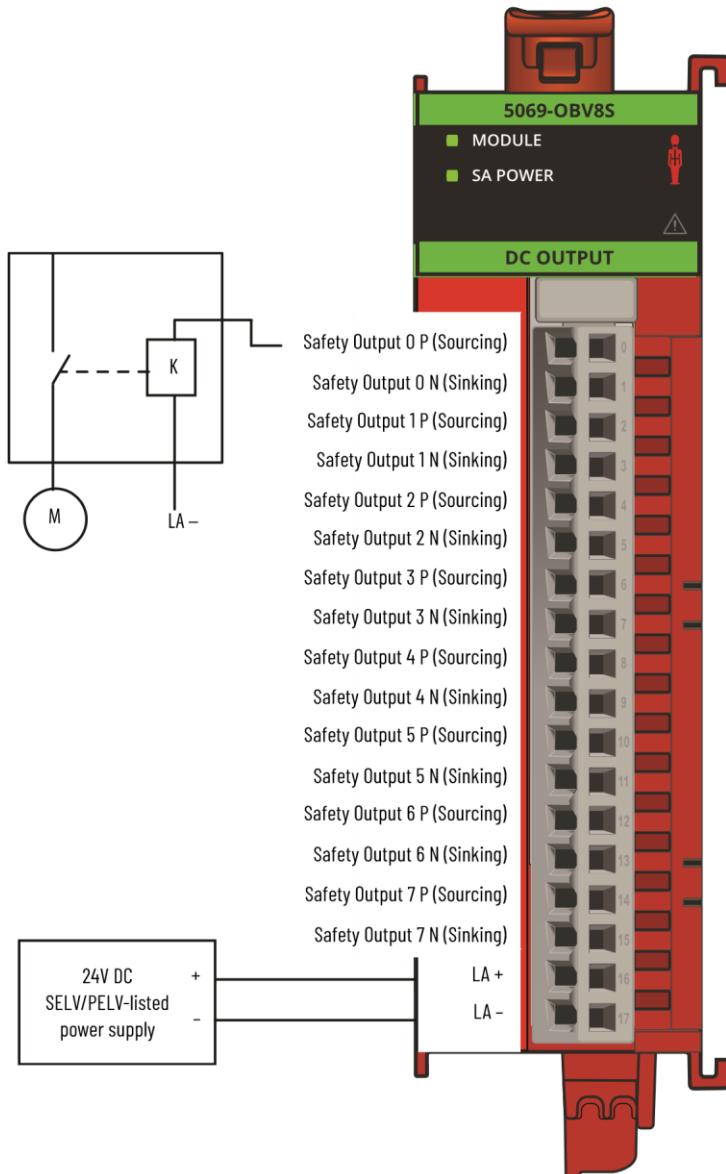
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power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

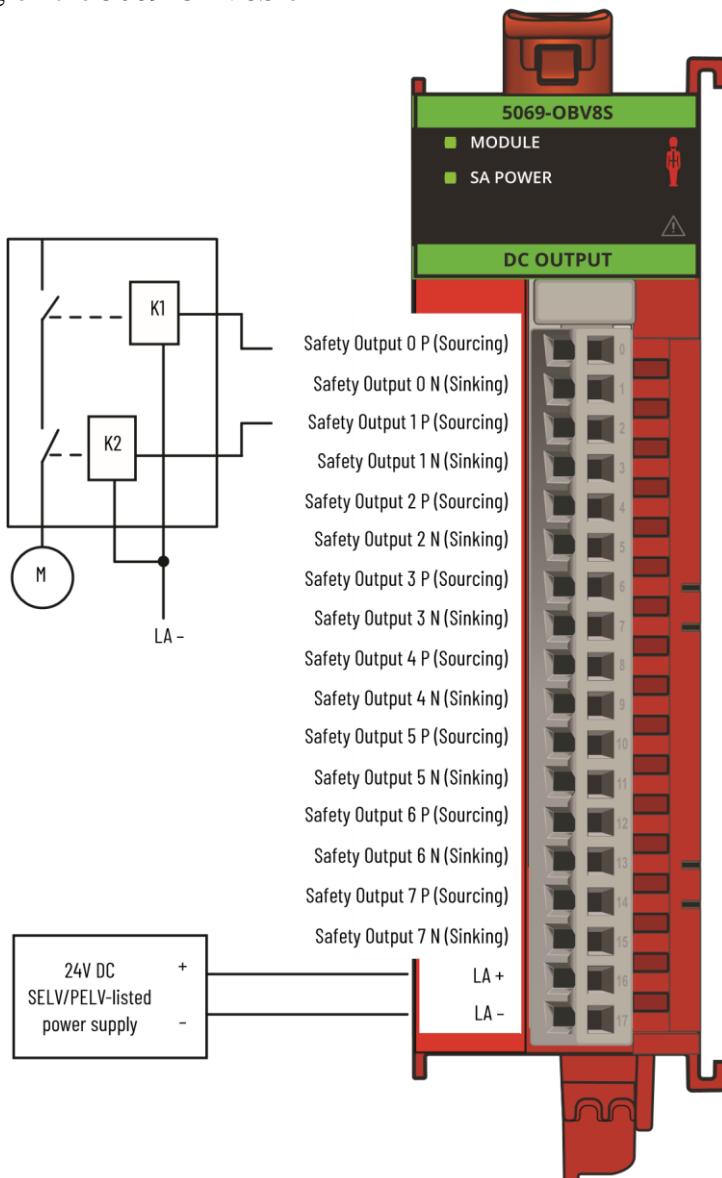
LA Power

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

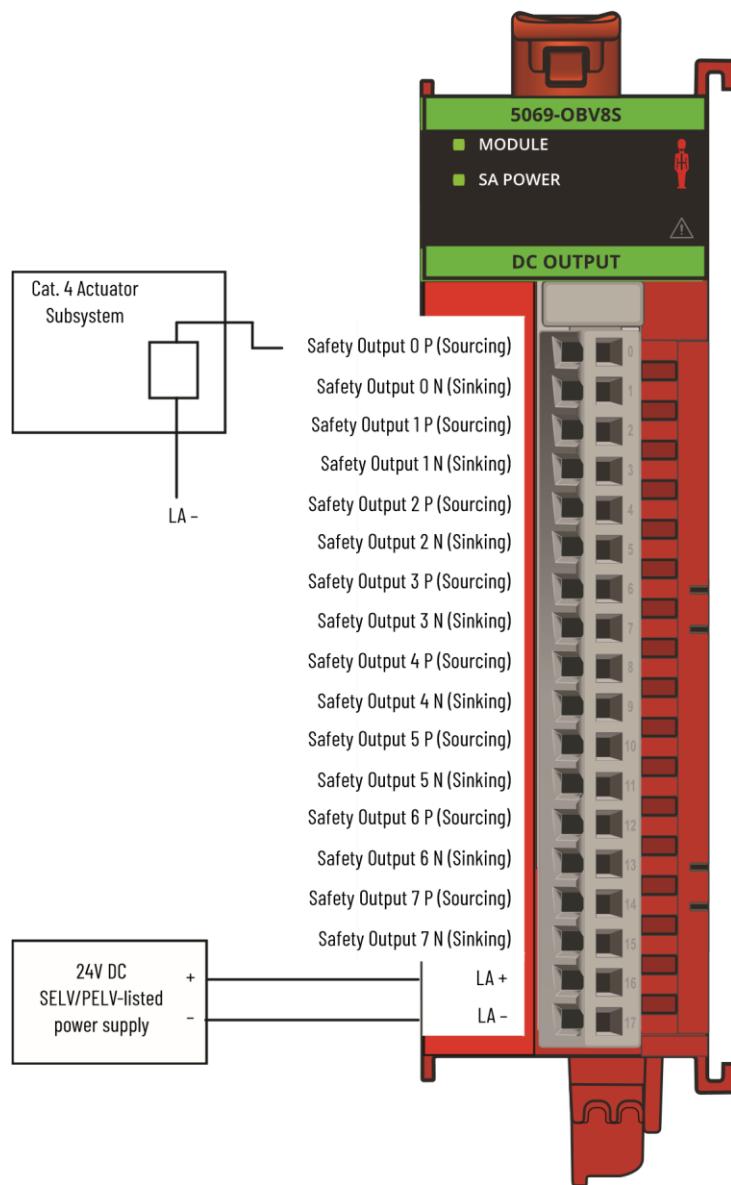
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power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

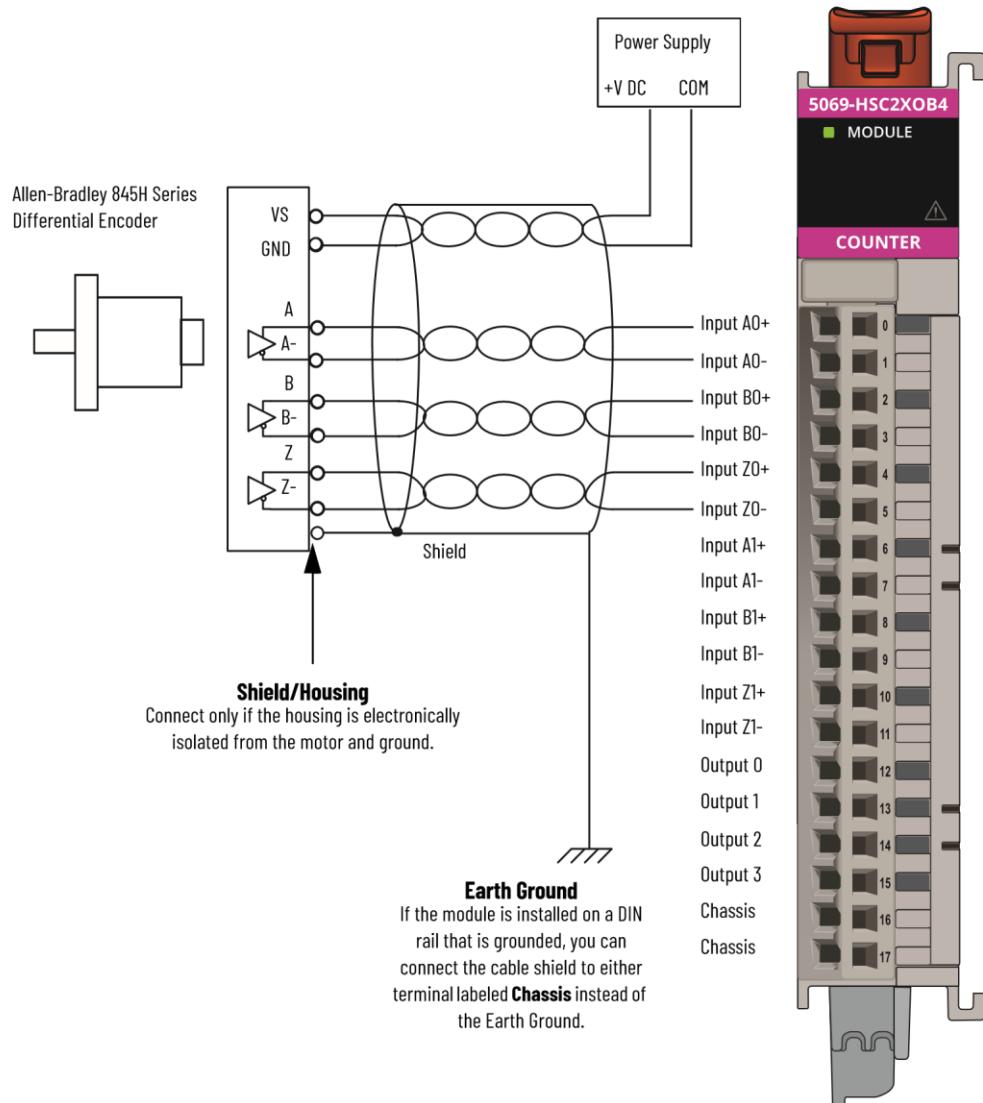
The following figure shows a wiring diagram for the 5069-HSC2xOB4 module connected to a differential encoder.

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.

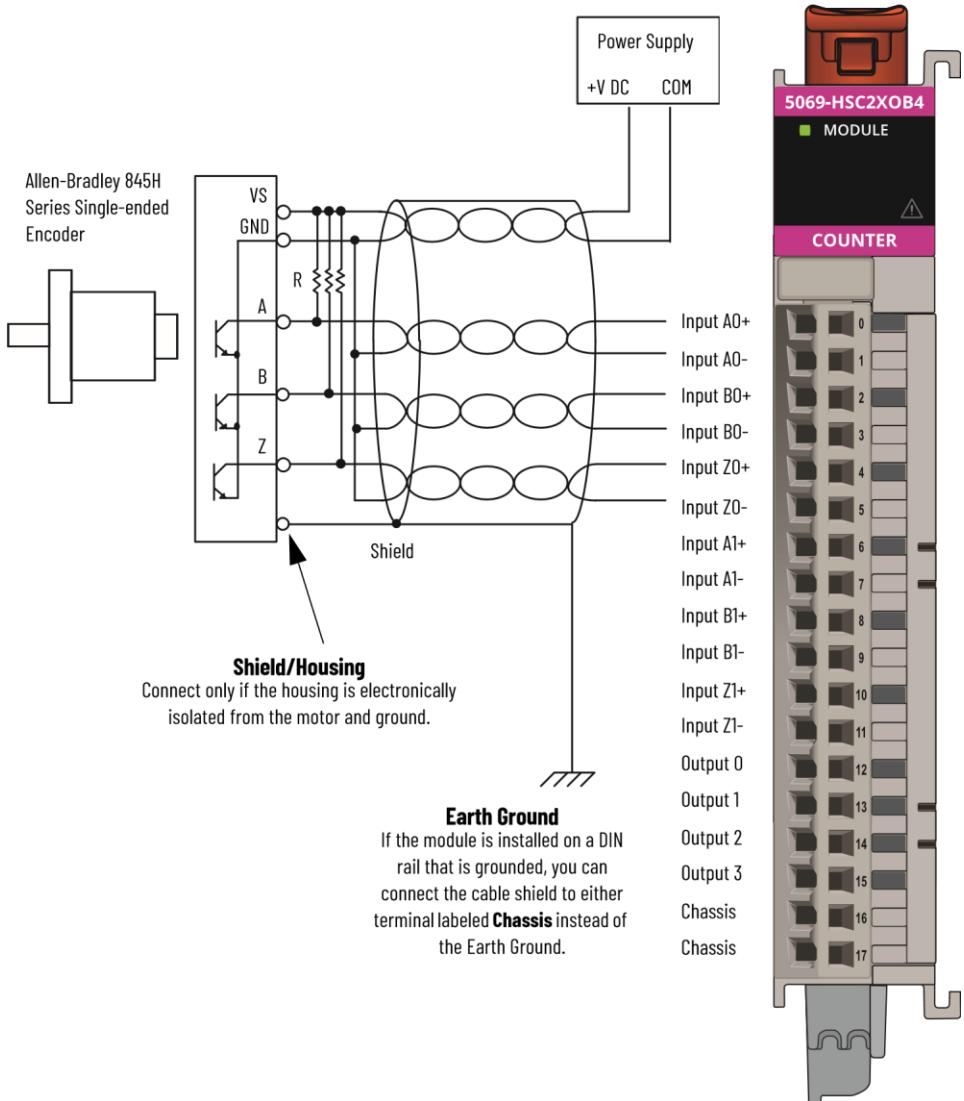
IMPORTANT: External resistors, as indicated in the R location, are required if they aren't internal to the encoder. The pull-up resistor (R) value depends on the power supply value. The following table shows the maximum resistor values for typical supply voltages. To calculate the maximum resistor value,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

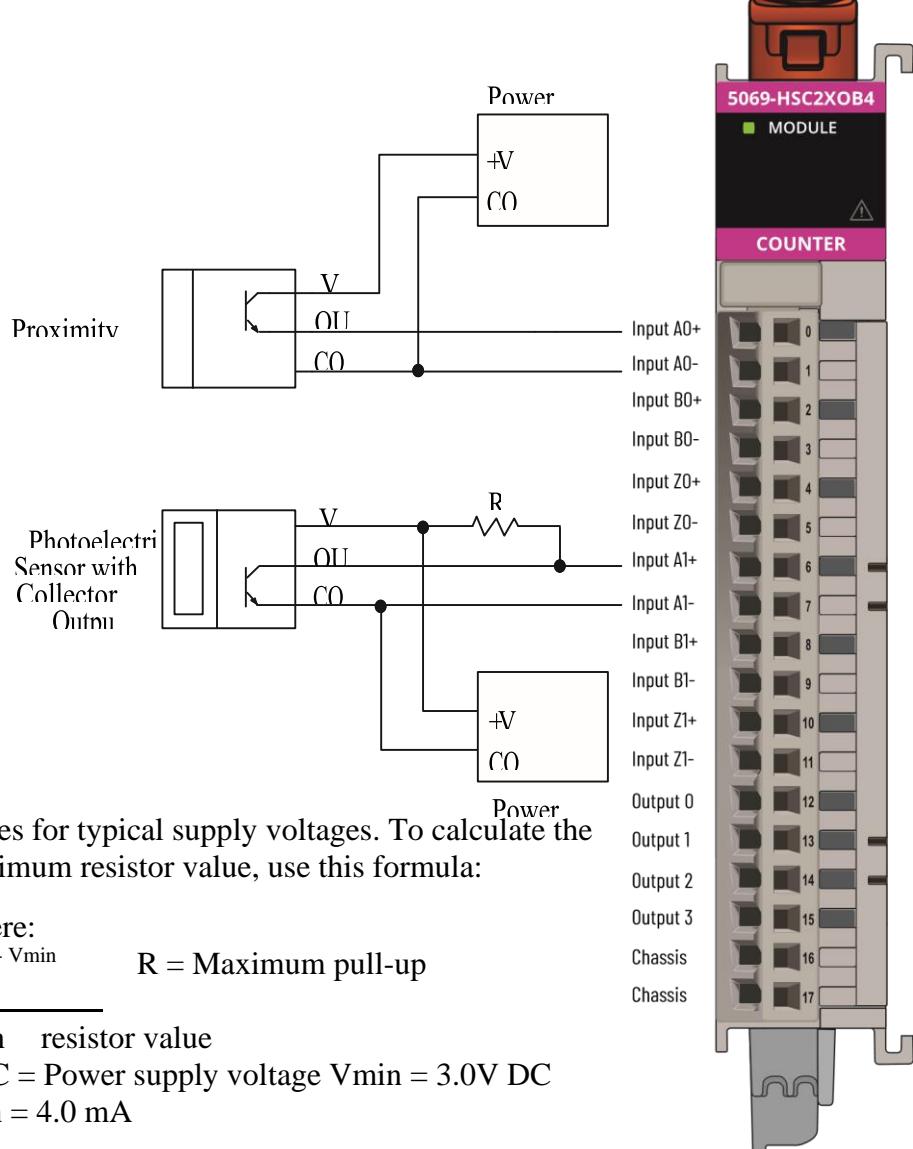
Channel Connections

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 shows the maximum resistor

Power Supply DC	Pull-up Resistor Value (R), Max ⁽¹⁾
5	Ω
12	Ω
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:

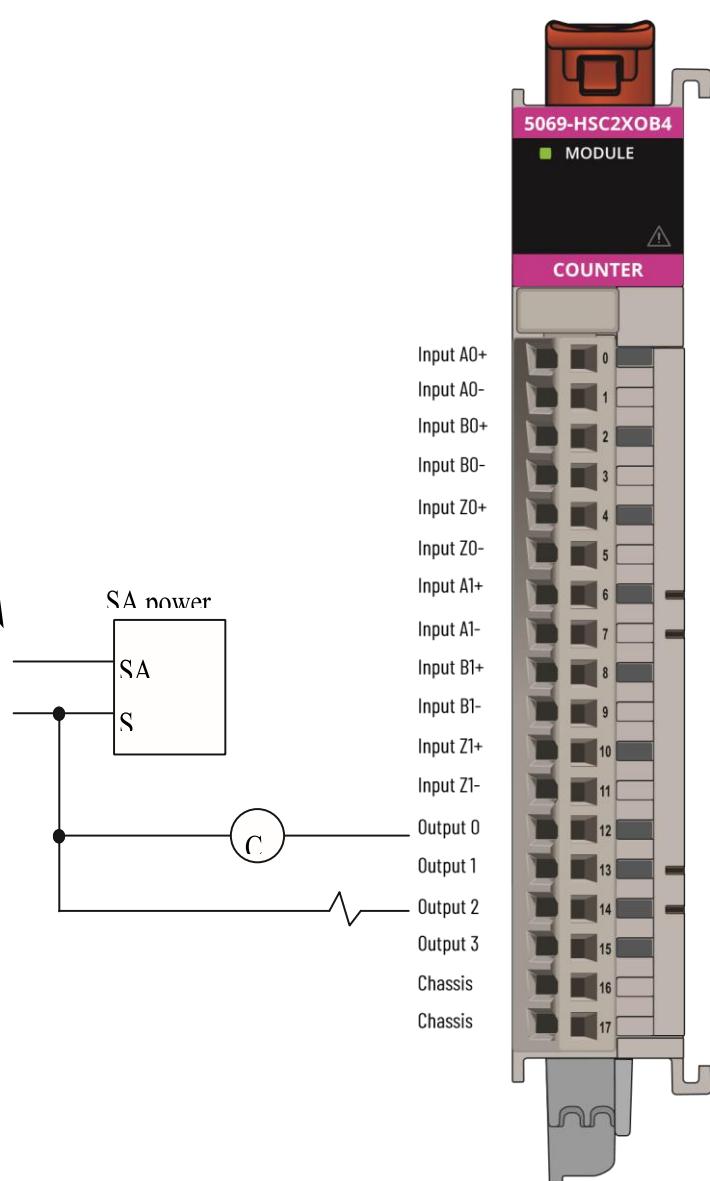
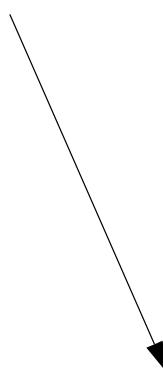
- CompactLogix 5380 controller

- 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.



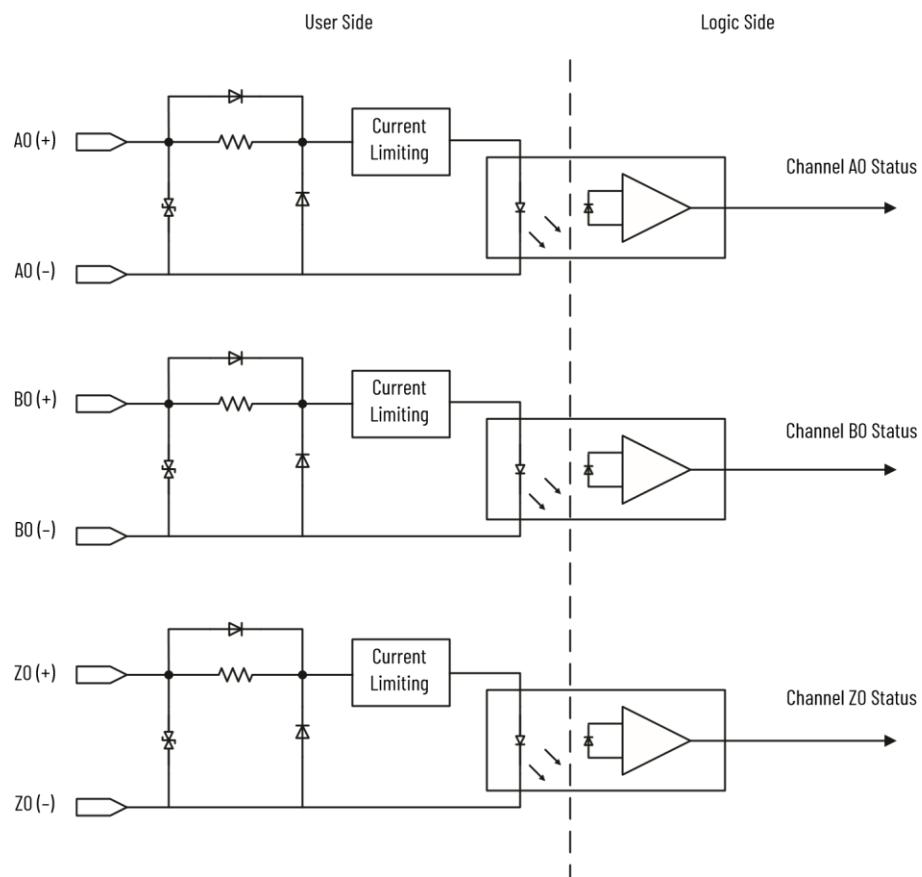
Recommended Surge Suppression

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.

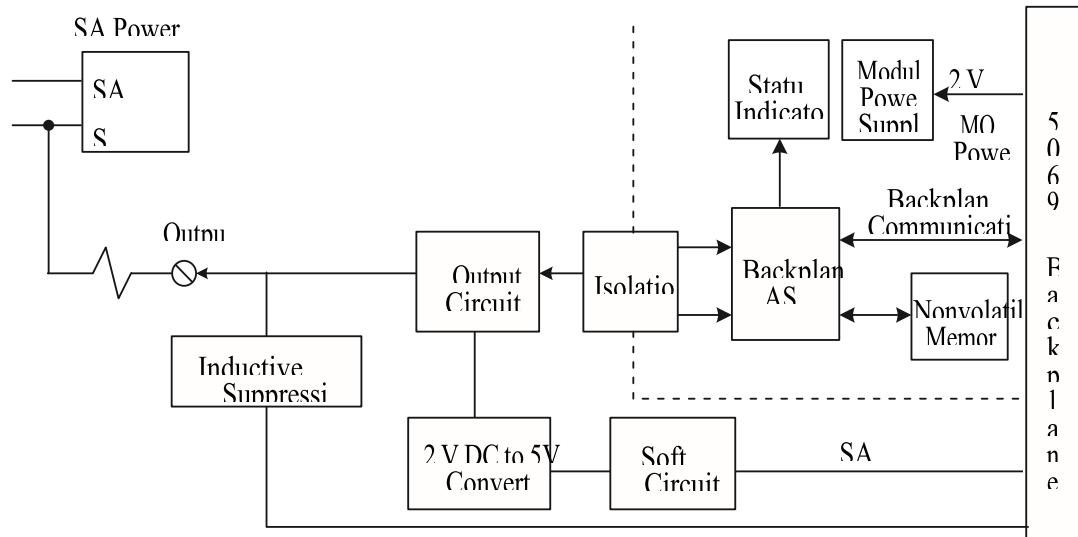
5069-HSC2xOB4 Functional Block Diagram



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	<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 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.

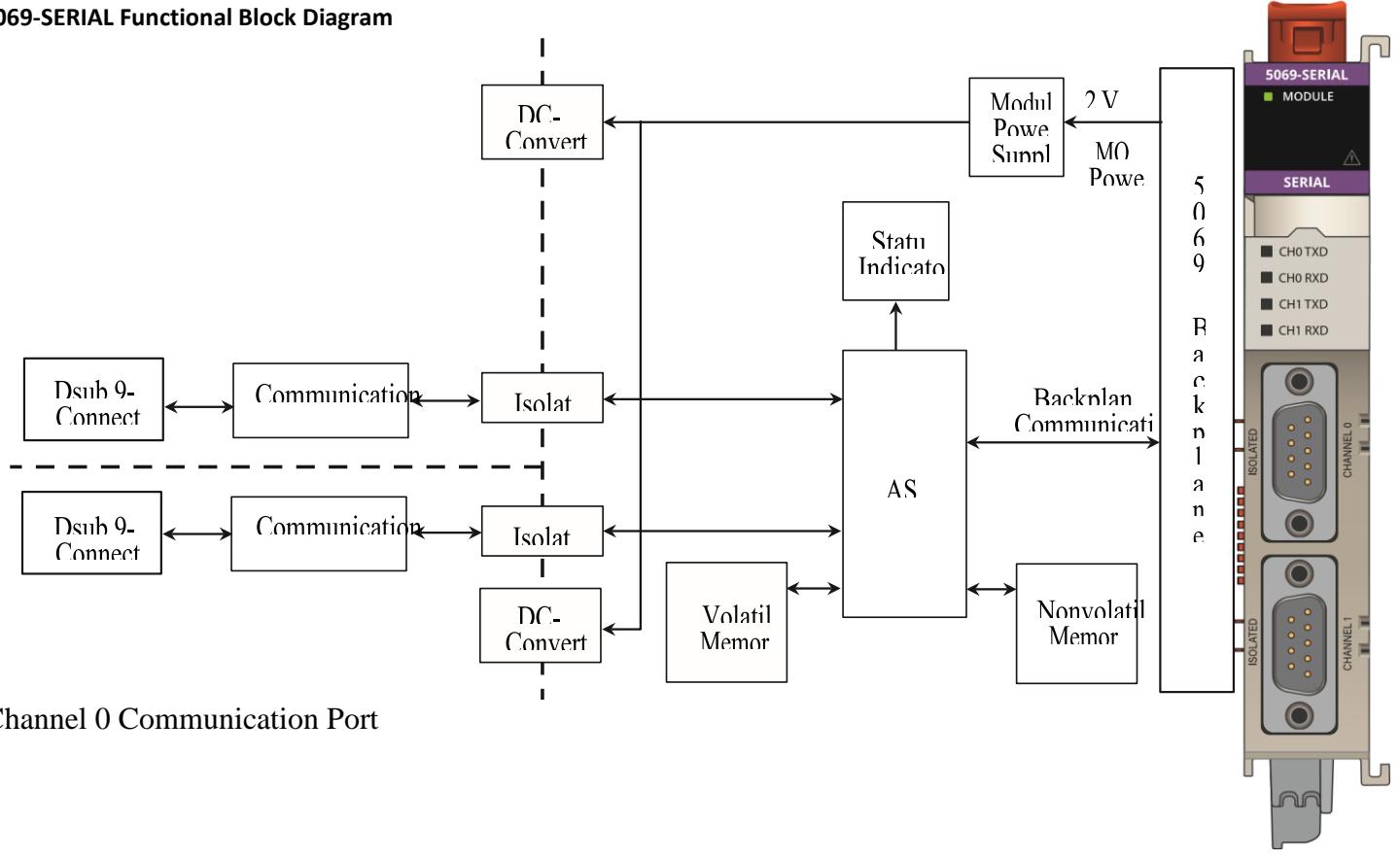
SA Power

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.

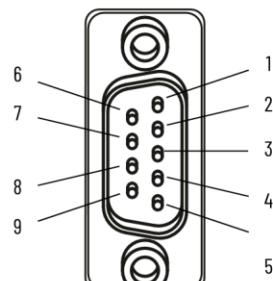
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA power bus in a system. SA power buses are isolated from each other. To keep the modules on separate SA power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



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	-	-	-	-

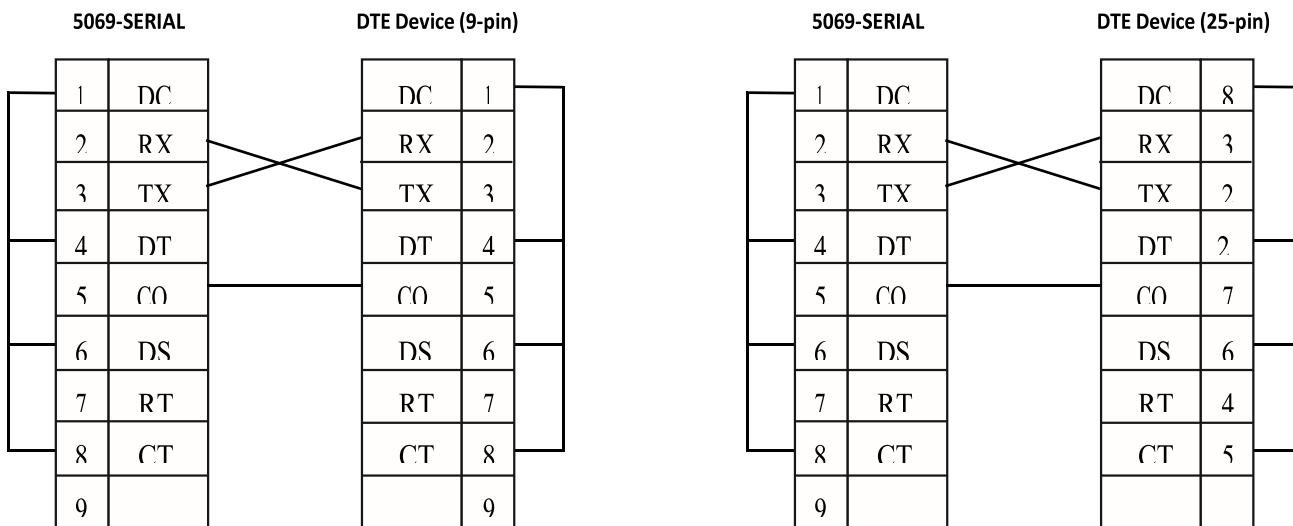
(1) From 5069-SERIAL

(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



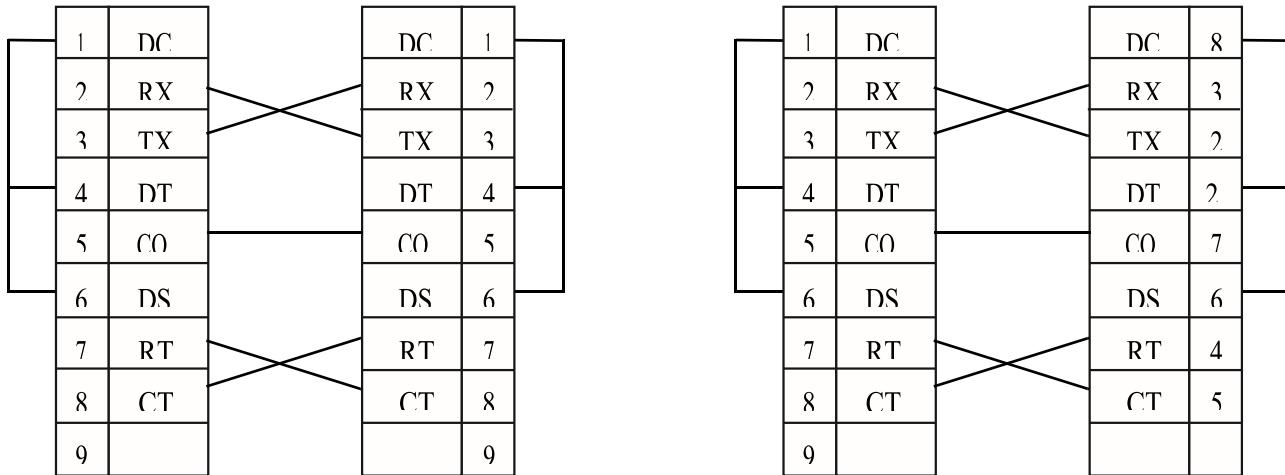
5069-SERIAL to DTE Device (9-pin or 25-pin) with "Half-duplex"

5069-SERIAL

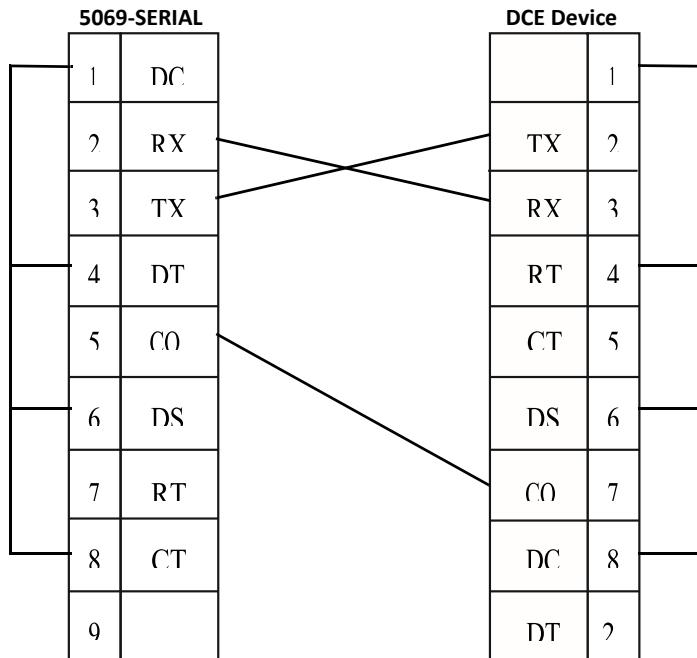
DTE Device (9-pin)

5069-SERIAL

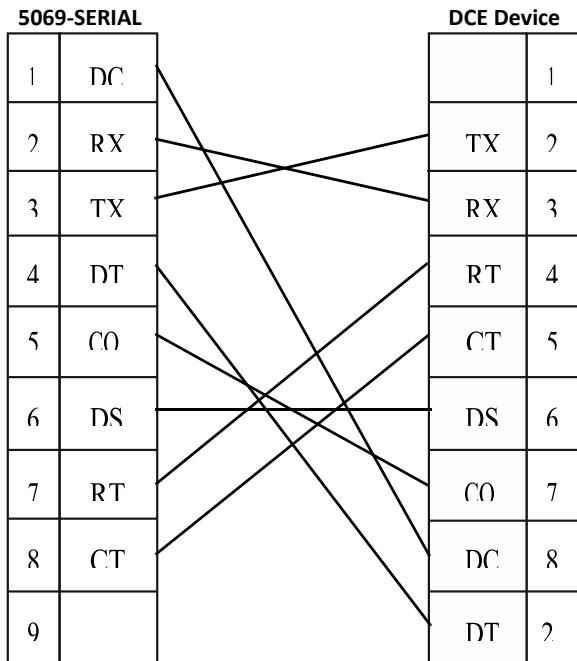
DTE Device (25-pin)



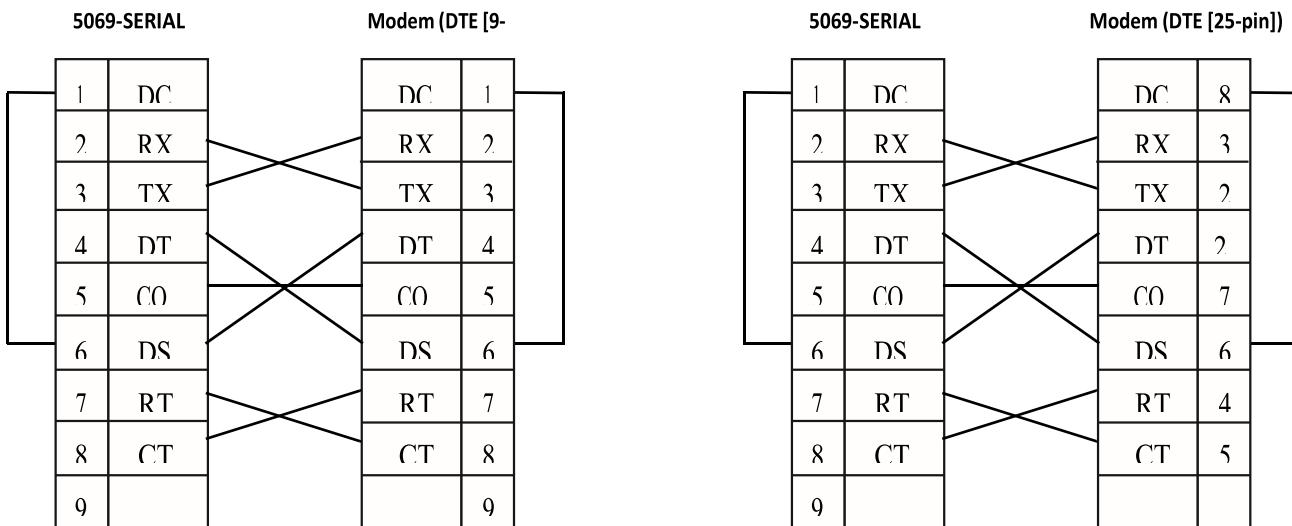
5069-SERIAL to DCE Device with "Full-duplex"



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



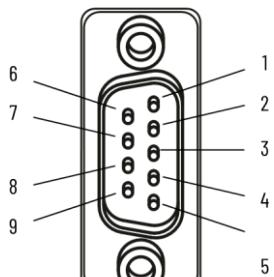
5069-SERIAL to DTE Device (9-pin or 25-pin) with “Full or Half-duplex” or Null Modem



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	-	-	-

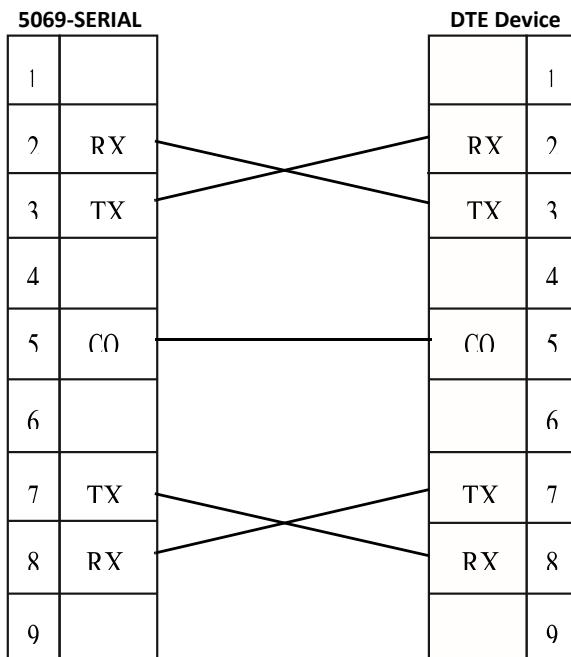
(1) From 5069-SERIAL

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

The following graphic shows RS-422 wiring.

5069-SERIAL RS-422 Wiring

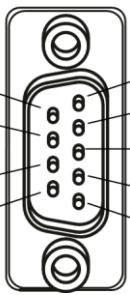
IMPORTANT Place the termination resistor between RxD+ and RxD- to implement this wiring.



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	-	-	-

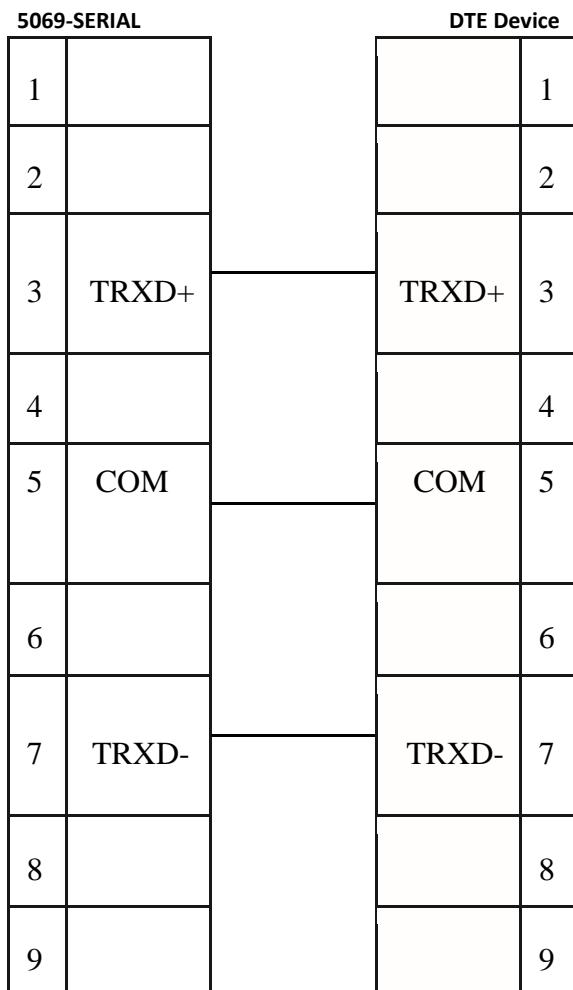
(1) From 5069-SERIAL

(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
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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

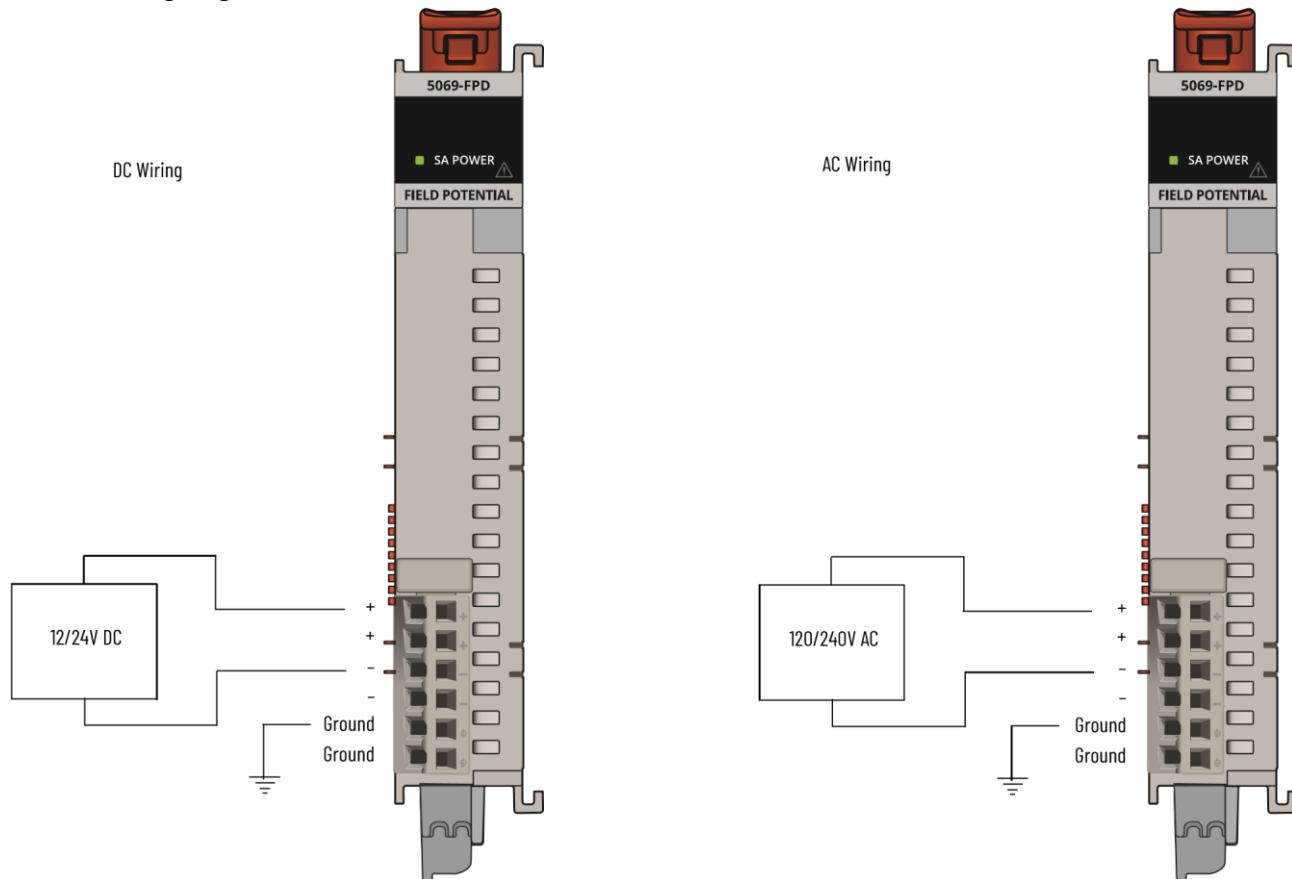
Certifications ⁽¹⁾	5069-SERIAL
IECEx	IECEx System, compliant with: <ul style="list-style-type: none"> • IEC 60079-0; General Requirements • IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4X Gc • IECEx UL 15.0055X
KC	Korean Registration of Broadcasting and Communications 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

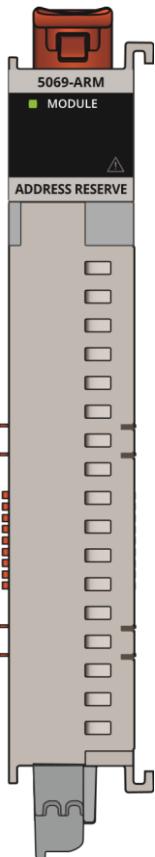
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation Russian Customs Union TR CU 004/2011 LV Technical Regulation

(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

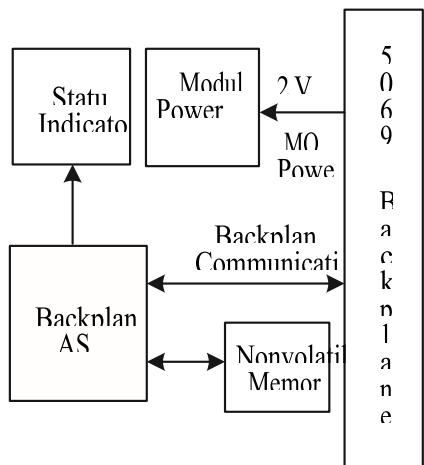
The following figure shows the 5069-ARM module.

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

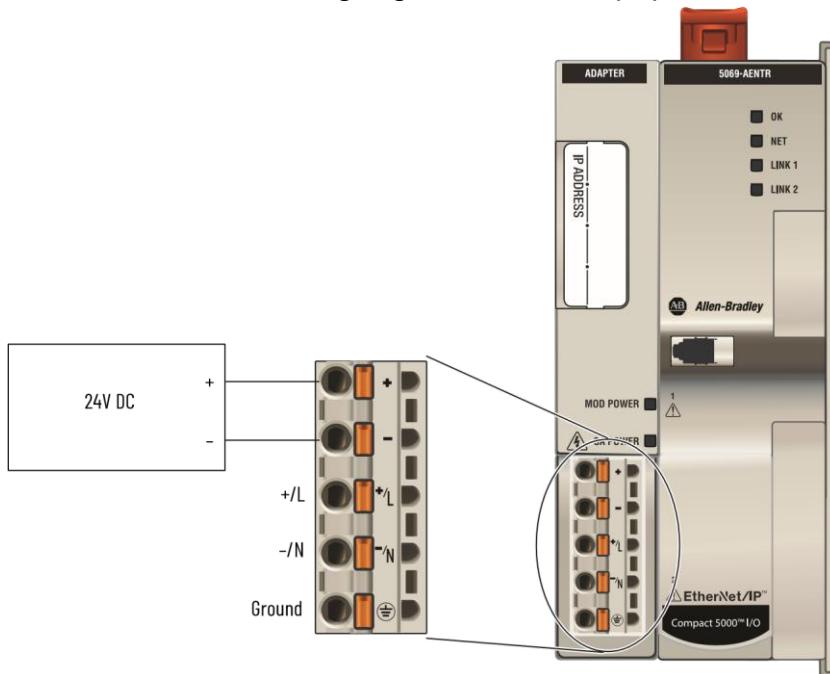
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions
Ex	European Union 2014/34/EU ATEX Directive, compliant with: • EN 60079-0; General Requirements • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • II 3 G Ex nA IIC T4 Gc • DEMKO 15 ATEX 1455X When 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

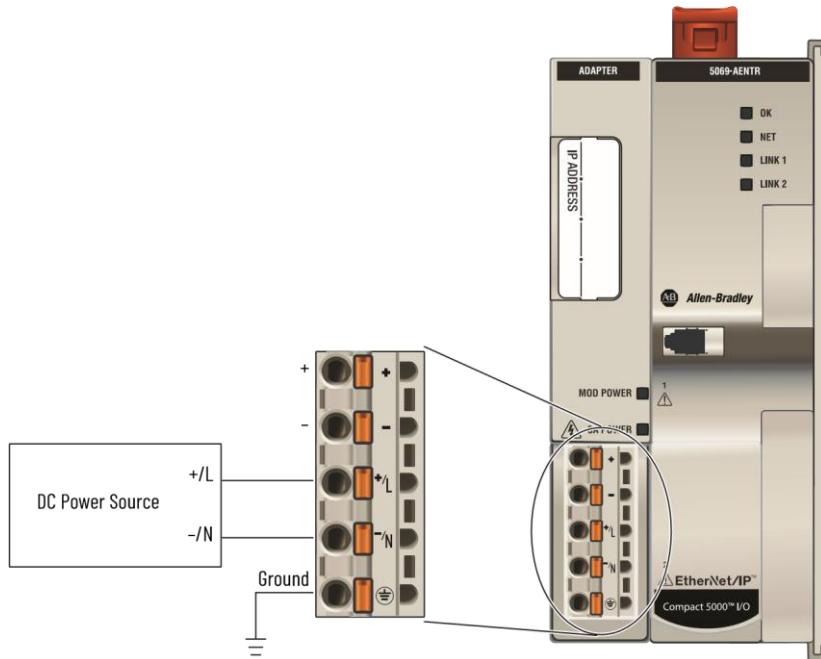
The following figure shows a wiring diagram for how to connect Mod power to the 5069-AENTR and 5069-AENTRK EtherNet/IP™ adapters.

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



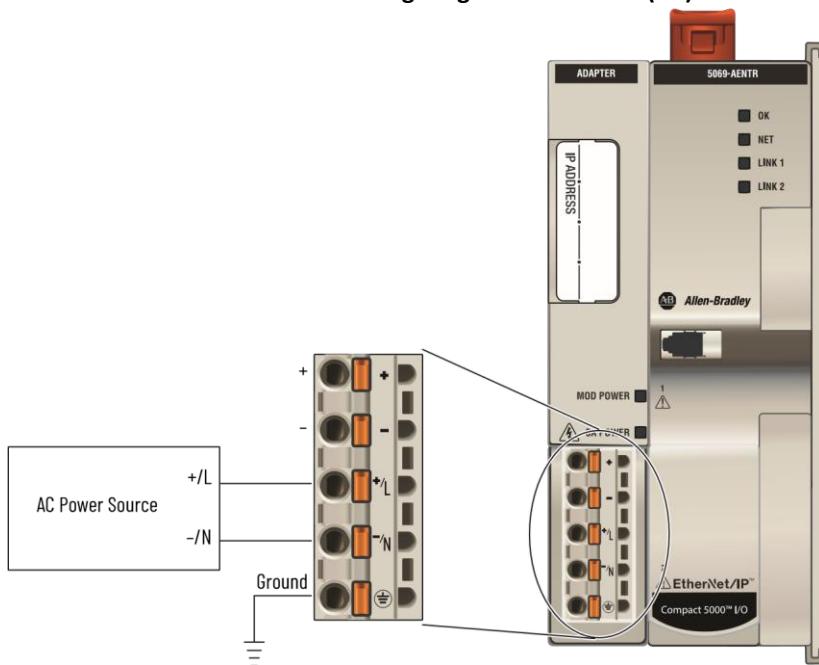
The following figure shows a wiring diagram for how to connect SA power (DC) to the 5069-AENTR and 5069-AENTRK EtherNet/IP adapters.

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
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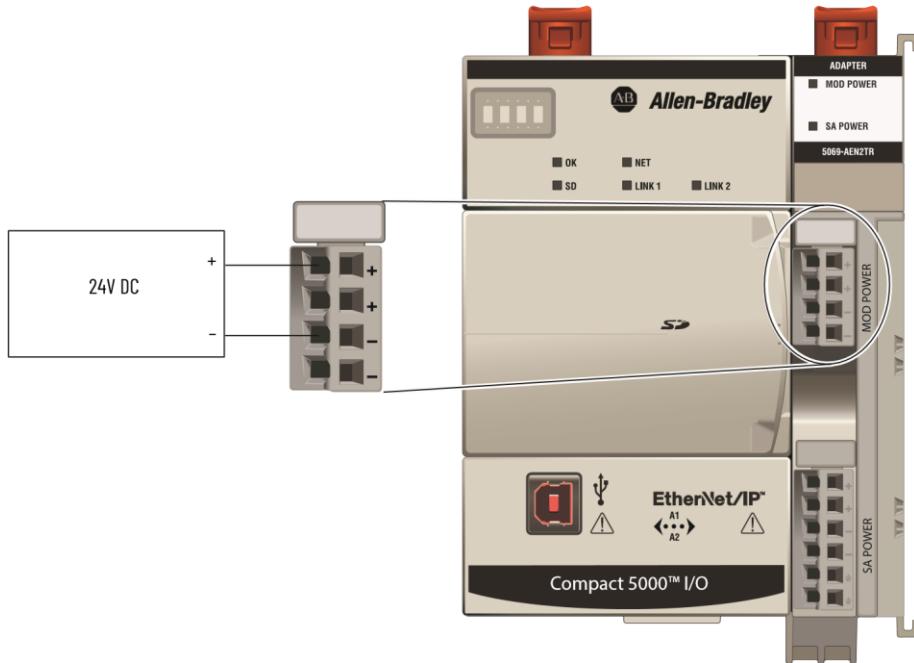
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2014/30/EU EMC Directive, compliant with: <ul style="list-style-type: 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

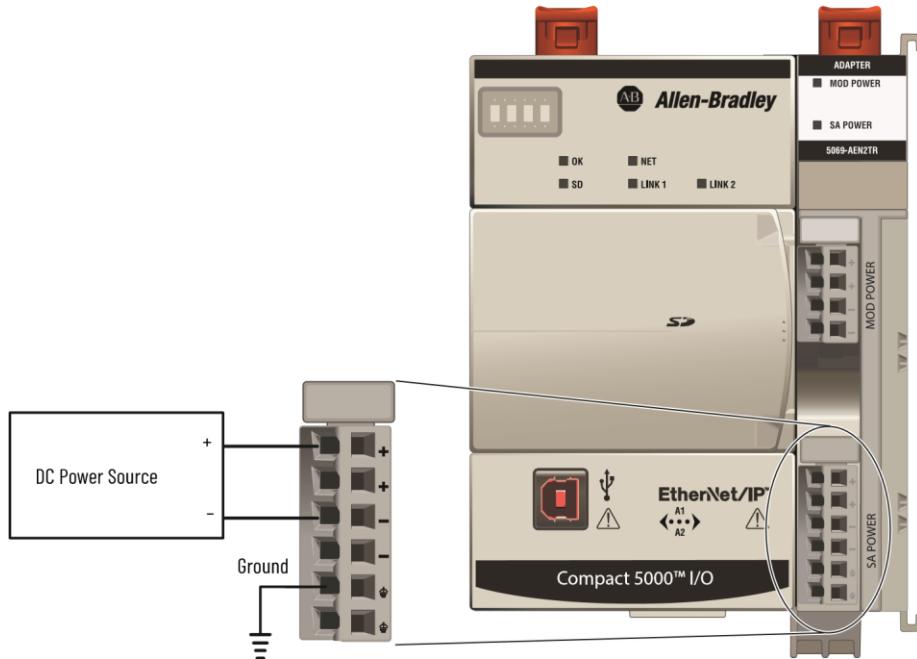
The following figure shows a wiring diagram for how to connect Mod power to the 5069-AEN2TR EtherNet/IP adapter.

5069-AEN2TR Wiring Diagram - MOD Power (DC)



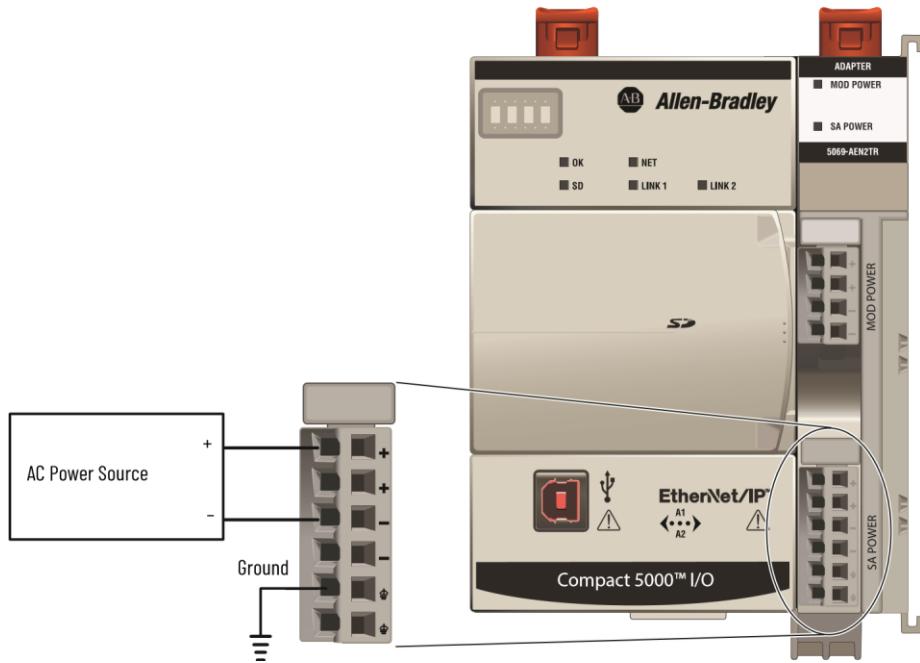
The following figure shows a wiring diagram for how to connect SA power (DC) to the 5069-AEN2TR EtherNet/IP adapter.

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.

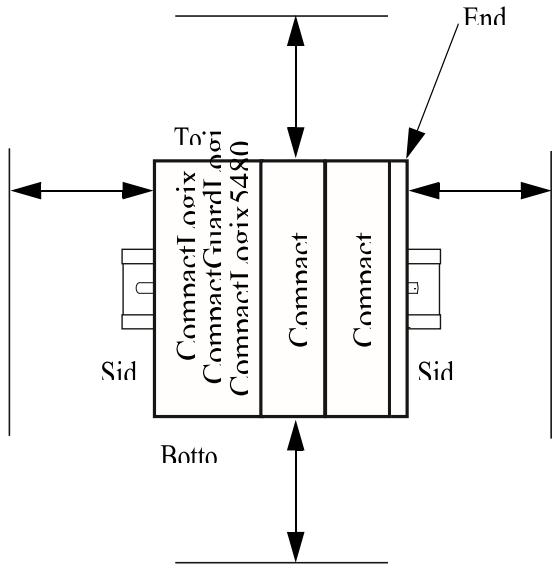
Controller Minimum Spacing Requirements

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.

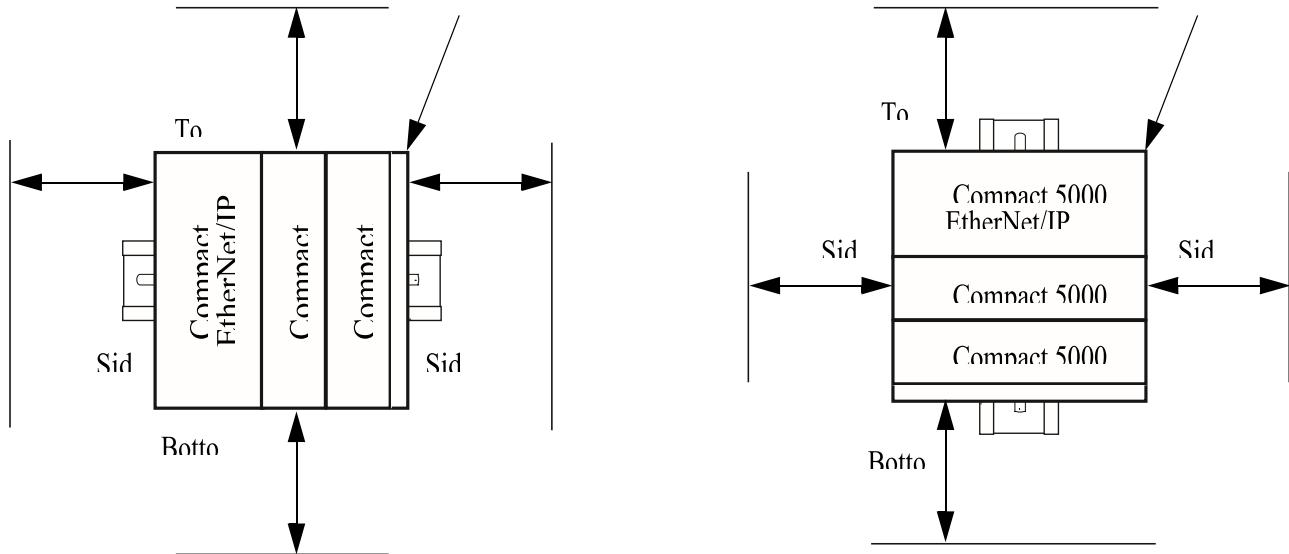
Horizontal Mounting

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.

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Publication 5069-TD001M-EN-P - April 2022

Supersedes Publication 5069-TD001L-EN-P - October 2020

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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.

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

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
	5	\$9.50	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

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 Cutler-Hammer monoblock LED 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	120V@5mA 0.6 watts	
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.

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

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.

switches are keyed alike.

ECX1067-2

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 mounting screw: 0.5 N·m max Note: Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect
ECX1040-5	5	\$17.00	PDF	Green, normally-open (N.O.)	
ECX1040-2	2	\$7.25	PDF		
ECX1042-2	2	\$7.25	PDF	Brown, normally-open (N.O.), push-push	Use on lighted Push-push button only



ECX1030-2

Note: See electrical specifications on GCX Series 22mm Plastic Pilot Devices

EMERGENCY STOP

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	
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	Part numbers starting with GCX124, GCX125 GCX324, GCX325



GR1172PR-5

Three-position short lever operator



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, GVX328
<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

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

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	Part numbers starting with GCX119, GCX120 GCX319, GCX320
<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	



GR1168PR-

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	Part numbers starting with GCX121, GCX321
<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	



PL1308PR-

Legend plates

Plastic legend plates for use with 22mm pilot devices. White engraved text on colored background. O-ring included.



ECX1670-B07



ECX1670-R03

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
		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
IN	Black	ECX1670-B28	\$3.75	PDF
		ECX1670-B29	\$3.75	PDF
JOG	Black	ECX1670-B05	\$3.00	PDF
		ECX1670-B30	\$3.75	PDF
JOG FOR	Black	ECX1670-B30	\$3.75	PDF
		ECX1670-B31	\$3.75	PDF
JOG REV	Black	ECX1670-B31	\$3.75	PDF
		ECX1670-B15	\$3.00	PDF
LOW	Black	ECX1670-B32	\$3.75	PDF
LOWER	Black	ECX1670-B33	\$3.75	PDF

Note:

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	Black	ECX1670-B17	\$3.00	PDF
OUT	Black	ECX1670-B35	\$3.75	PDF
POWER ON	Black	ECX1670-B21	\$3.00	PDF
PULL ON PUSH OFF	Black	ECX1670-B50	\$3.75	PDF
RAISE	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
		ECX1670-B09	\$3.00	PDF
RUN	Black	ECX1670-B45	\$3.75	PDF
SAFE RUN	Black	ECX1670-B10	\$3.00	PDF
START	Black	ECX1670-B11	\$3.00	PDF
		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
UP-DOWN	Black	ECX1670-B18	\$3.00	PDF

Legend plate text is 3mm in height



[ECX1690-B16](#)

[ECX1690-I](#)

Jumbo Plastic Legend Plates				
Legend	Color of Field	Part Number	Price	Drawing Link
Blank Plate	Black	ECX1690-B	\$3.75	PDF
Blank Plate	Red	ECX1690-R	\$3.75	PDF
EMERG. STOP	Red	ECX1690-R03	\$3.75	PDF
HAND-OFF-AUTO	Black	ECX1690-B20	\$3.75	PDF
JOG	Black	ECX1690-B05	\$3.75	PDF
OFF-ON	Black	ECX1690-B16	\$3.75	PDF
OPEN-CLOSE	Black	ECX1690-B17	\$3.75	PDF
POWER ON	Black	ECX1690-B21	\$3.75	PDF
START	Black	ECX1690-B10	\$3.75	PDF
STOP	Red	ECX1690-R11	\$3.75	PDF

Note: Legend plate text is 3mm in height

GCX Series 22mm Plastic Pilot Devices

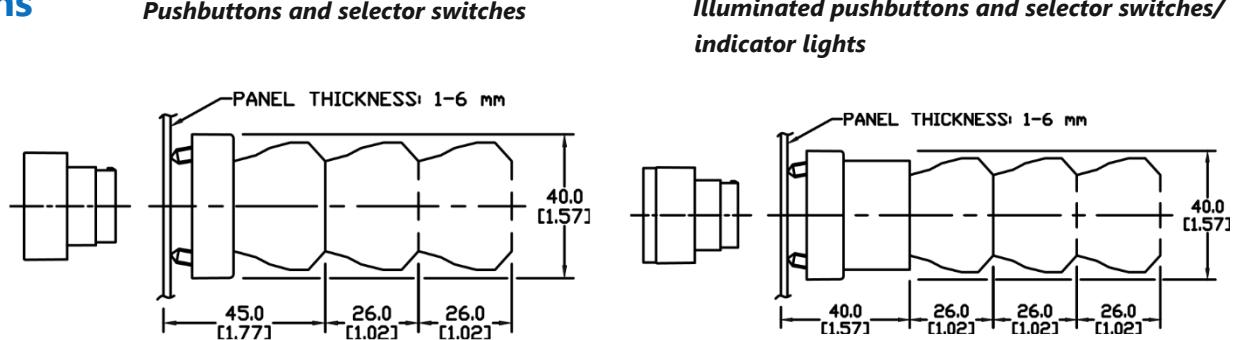
Specifications

Assembly information

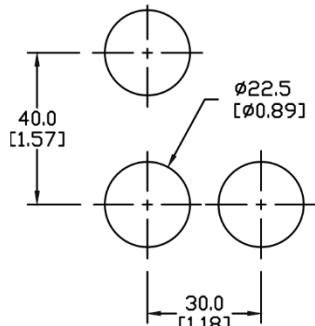
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

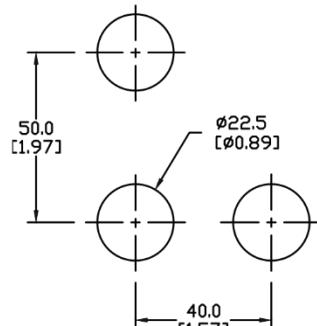
mm
[inches]



Mounting



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

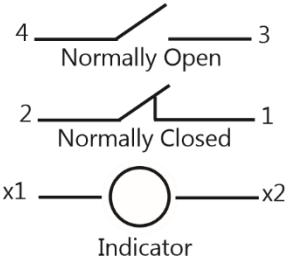


This layout is suitable if all switches are 400V or less and different polarity.

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

GCX Series 22mm Plastic Key Switches and Selector Switches

Key-operated selector switches

Note: Keyed switches come with two keys. All plastic 22mm keyed switches are keyed the same.



GCX340

Key-operated Selector Switches			
Part Number	Price	Drawing Link	Description
GCX3420	\$15.50	PDF	22mm plastic selector switch, key-operated, two-position maintained, key can be removed in all positions. One N.O. contact block. Replacement keys available
GCX3430	\$15.50	PDF	22mm plastic selector switch, key-operated, two-position spring-return from right. One N.O. contact block. Replacement keys available
GCX3470-22	\$22.50	PDF	22mm plastic selector switch, key-operated, three-position maintained, key can be removed in all positions. Two N.O. and two N.C. contact blocks. Replacement keys available

Replacement keys are available. Order part no. [ECX1067-2](#) (pkg. of 2). Keys for plastic 22mm keyed switches are not compatible with Cutler-Hammer key switches.



Note: When using switches having two-deep contact blocks (such as, Model [GCX3470-22](#)) with the 22mm plastic enclosures, be sure to use enclosures that are 74mm deep.

51 mm-deep enclosures are too shallow and the switch body will not fit.

Two-position selector switches



version

GCX3350
Lever version

Knob

Two-position Selector Switches			
Part Number	Price	Drawing Link	Description
GCX3300	\$8.25	PDF	22mm plastic selector switch, two-position maintained, black knob. One N.O. contact block
GCX3310	\$9.00	PDF	22mm plastic selector switch, two-position spring-return from right, black knob. One N.O. contact block
GCX3350	\$9.00	PDF	22mm plastic selector switch, two-position maintained, black lever. One N.O. contact block
GCX3360	\$9.50	PDF	22mm plastic selector switch, two-position spring-return from right, black lever. One N.O. contact block

Contact Closure Sequence - 2-Position Switch

GCX3300

Contact Blocks	Contact Arrangement (viewed from front)		Switch Position (viewed from front)		
	Left	Right	Left (Note 1)	(Note 2)	Right (Note 2)
1 x N.C.	N.C.		X		
		N.C.	X		
1 x N.O.	N.O.			X	
		N.O.			X
2 x N.C.	N.C.	N.C.	XX		
2 x N.O.	N.O.	N.O.			XX

Note 1: Left switch position deactivates all contacts. Note 2: Right switch position activates all contacts.

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

tPIL-11

GCX Series 22mm Plastic Illuminated Selector Switches

Illuminated two-position selector switches

20 models available:

- Available in five colors
- 24V and 120V models
- Available in spring-return and maintained styles
- Replacement knobs are available

GCX3245-24



Illuminated Spring Return Two-position Selector Switches						
Part Number	Lamp Color	Price	Drawing Link	Description	Replacement Incandescent Bulb [5 per pack]	Replacement LED Lamp [2 per pack]
<i>Incandescent</i>						
<u>GCX3241-24</u>	Red	\$12.50	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1911-2, 26mA</u>
<u>GCX3241-120</u>	Red	\$13.00	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1921-2, 5mA</u>
<u>GCX3242-24</u>	Green	\$12.50	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1912-2, 26mA</u>
<u>GCX3242-120</u>	Green	\$13.00	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1922-2, 5mA</u>
<u>GCX3243-24</u>	Yellow	\$12.50	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1913-2, 26mA</u>
<u>GCX3243-120</u>	Yellow	\$13.00	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1923-2, 5mA</u>
<u>GCX3244-24</u>	Blue	\$12.50	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1914-2, 26mA</u>
<u>GCX3244-120</u>	Blue	\$13.00	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1924-2, 5mA</u>
<u>GCX3245-24</u>	Clear	\$12.50	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1915-2, 26mA</u>
<u>GCX3245-120</u>	Clear	\$13.00	<u>PDF</u>	22mm plastic incandescent illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1925-2, 5mA</u>
<i>LED</i>						
<u>GCX3241-24L</u>	Red	\$17.50	<u>PDF</u>	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1911-2, 26mA</u>
<u>GCX3241-120L</u>	Red	\$17.50	<u>PDF</u>	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1921-2, 5mA</u>
<u>GCX3242-24L</u>	Green	\$20.50	<u>PDF</u>	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1912-2, 26mA</u>

<u>GCX3242-120L</u>	Green	\$20.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1922-2, 5mA</u>
<u>GCX3243-24L</u>	Yellow	\$17.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1913-2, 26mA</u>
<u>GCX3243-120L</u>	Yellow	\$17.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1923-2, 5mA</u>
<u>GCX3244-24L</u>	Blue	\$20.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1914-2, 26mA</u>
<u>GCX3244-120L</u>	Blue	\$20.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1924-2, 5mA</u>
<u>GCX3245-24L</u>	Clear	\$21.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1915-2, 26mA</u>
<u>GCX3245-120L</u>	Clear	\$22.50	PDF	22mm plastic LED illuminated 2-position selector switch. Spring-return from right. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1925-2, 5mA</u>

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

tPIL-13

GCX Series 22mm Plastic Illuminated Selector Switches

Illuminated two-position selector switches

20 models available:

- Available in five colors
- 24V and 120V models
- Available in spring-return and maintained styles [GCX3251-24](#)
- Replacement knobs are available



Illuminated Maintained Two-position Selector Switches

Part Number	Lamp Color	Price	Drawing Link	Description	Replacement Incandescent Bulb [5 per pack]	Replacement LED Lamp [2 per pack]
Incandescent						
<u>GCX3251-24</u>	Red	\$12.50	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1911-2, 26mA</u>
<u>GCX3251-120</u>	Red	\$13.00	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1921-2, 5mA</u>
<u>GCX3252-24</u>	Green	\$12.50	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u>	<u>ECX1912-2, 26mA</u>
<u>GCX3252-120</u>	Green	\$13.00	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u>	<u>ECX1922-2, 5mA</u>
<u>GCX3253-24</u>	Yellow	\$12.50	PDF	22mm plastic incandescent illuminated 2-position selector switch.	<u>ECX1902-5, 80mA</u>	<u>ECX1913-2, 26mA</u>

			Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.		
<u>GCX3253-120</u>	Yellow	\$13.00	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1923-2, 5mA</u>
<u>GCX3254-24</u>	Blue	\$12.50	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1914-2, 26mA</u>
<u>GCX3254-120</u>	Blue	\$13.00	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1924-2, 5mA</u>
<u>GCX3255-24</u>	Clear	\$12.50	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1915-2, 26mA</u>
<u>GCX3255-120</u>	Clear	\$13.00	PDF	22mm plastic incandescent illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1925-2, 5mA</u>
LED					
<u>GCX3251-24L</u>	Red	\$17.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1911-2, 26mA</u>
<u>GCX3251-120L</u>	Red	\$18.00	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1921-2, 5mA</u>
<u>GCX3252-24L</u>	Green	\$20.00	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1912-2, 26mA</u>
<u>GCX3252-120L</u>	Green	\$20.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1922-2, 5mA</u>
<u>GCX3253-24L</u>	Yellow	\$17.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1913-2, 26mA</u>
<u>GCX3253-120L</u>	Yellow	\$18.00	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1923-2, 5mA</u>
<u>GCX3254-24L</u>	Blue	\$20.00	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1914-2, 26mA</u>
<u>GCX3254-120L</u>	Blue	\$20.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1924-2, 5mA</u>
<u>GCX3255-24L</u>	Clear	\$21.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 24VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1902-5, 80mA</u> <u>ECX1915-2, 26mA</u>
<u>GCX3255-120L</u>	Clear	\$22.50	PDF	22mm plastic LED illuminated 2-position selector switch. Maintained. 120VDC/VAC. One N.O. contact block. Illuminated colored knob.	<u>ECX1904-5, 20mA</u> <u>ECX1925-2, 5mA</u>

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.

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

Replacement Incandescent Bulbs					
Part Number	Quantity	Price	Rating	Description	
<u>ECX1900-5</u>	5	\$9.50	6V@ 200mA 1.2 watts	6V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	
<u>ECX1902-5</u>	5	\$9.50	24V@ 80mA watts	24V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	
<u>ECX1904-5</u>	5	\$20.00	130V@20mA 2.6 watts	120V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4	

Replacement LED Lamps

Part Number	Color	Quantity	Price	Rating	Description	
<u>ECX1911-2</u>	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 Cutler-Hammer monoblock LED indicators.	
<u>ECX1912-2</u>	Green		\$22.00			
<u>ECX1913-2</u>	Yellow		\$17.50			
<u>ECX1914-2</u>	Blue		\$23.50			
<u>ECX1915-2</u>	White		\$28.00			
<u>ECX1921-2</u>	Red		\$17.50	120V@5mA 0.6 watts		
<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

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.

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.

Note: Part number 109225 is recommended when punching holes for 22mm pilot devices.

109225

Protective Covers for Pushbuttons					
Part Number	Color	Quantity	Price	Description	
<u>ECX1700-5</u>	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.	
<u>ECX1701-5</u>	Red		\$7.50		
<u>ECX1702-5</u>	Green		\$7.50		
<u>ECX1703-5</u>	Yellow		\$7.50		
<u>ECX1704-5</u>	Blue		\$7.50		
<u>ECX1705-5</u>	Clear		\$7.50		
<u>ECX1706-5</u>	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.	

Replacement Keys

Part Number	Quantity	Price	Description

Replacement keys

<u>ECX1067-2</u>	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.
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Note: All key-actuated 22mm plastic selector switches are keyed alike.

ECX1067-2**Replacement 22mm support base**

Replacement 22mm Support Base				
Part Number	Quantity	Price	Drawing Link	Description
<u>ECX3029-2</u>	1	\$1.75	<u>PDF</u>	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
<u>ECX1030-2</u>	2	\$7.25	<u>PDF</u>	Red, normally-closed (N.C.)	Replacement contact block for 22mm pushbuttons and selector switches. Tightening Torque, terminal screw: 0.8 N·m max mounting screw: 0.5 N·m max Note: Will not work with Cutler-Hammer 22mm switches sold by AutomationDirect
<u>ECX1030-5</u>	5	\$17.00	<u>PDF</u>	Green, normally-open (N.O.)	
<u>ECX1040-2</u>	2	\$7.25	<u>PDF</u>	Brown, normally-open (N.O.), push-push	Use on lighted Push-push button only
<u>ECX1040-5</u>	5	\$17.00	<u>PDF</u>		
<u>ECX1042-2</u>	2	\$7.25	<u>PDF</u>		

**ECX1030-2**

Note: See electrical specifications on GCX Series 22mm Plastic Pilot Devices

EMERGENCY STOP legend

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

plate

**ECX1651**

Short Lever Replacement Operator					Two-position short lever 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](#)

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, GVX328
<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	

Three-position short lever operator



[GR1288PR-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

Mushroom switch 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	



[GR1168PR](#)

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	



[PL1308PR-](#)

Part numbers starting with GCX121, GCX321

PL1308PW-5	White	\$7.00	22mm illuminated extended pushbutton, replacement operator, 5/pk	
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Legend plates

Plastic legend plates for use with 22mm pilot devices. White engraved text on colored background. O-ring included.



ECX1670-B07



ECX1670-R03

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
FEEDER ON	Black	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
IN	Black	ECX1670-B28	\$3.75	PDF
INCH	Black	ECX1670-B29	\$3.75	PDF
JOG	Black	ECX1670-B05	\$3.00	PDF
JOG FOR	Black	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

Note:

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	Black	ECX1670-B17	\$3.00	PDF
OUT	Black	ECX1670-B35	\$3.75	PDF
POWER ON	Black	ECX1670-B21	\$3.00	PDF
PULL ON PUSH OFF	Black	ECX1670-B50	\$3.75	PDF
RAISE	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
UP-DOWN	Black	ECX1670-B18	\$3.00	PDF

Legend plate text is 3mm in height



[ECX1690-B16](#)

[ECX1690-I](#)

Jumbo Plastic Legend Plates

Legend	Color of Field	Part Number	Price	Drawing Link
Blank Plate	Black	ECX1690-B	\$3.75	PDF
Blank Plate	Red	ECX1690-R	\$3.75	PDF
EMERG. STOP	Red	ECX1690-R03	\$3.75	PDF
HAND-OFF-AUTO	Black	ECX1690-B20	\$3.75	PDF
	Black	ECX1690-B05	\$3.75	PDF
OFF-ON	Black	ECX1690-B16	\$3.75	PDF
OPEN-CLOSE	Black	ECX1690-B17	\$3.75	PDF
POWER ON	Black	ECX1690-B21	\$3.75	PDF
START	Black	ECX1690-B10	\$3.75	PDF
STOP	Red	ECX1690-R11	\$3.75	PDF

Note: Legend plate text is 3mm in height

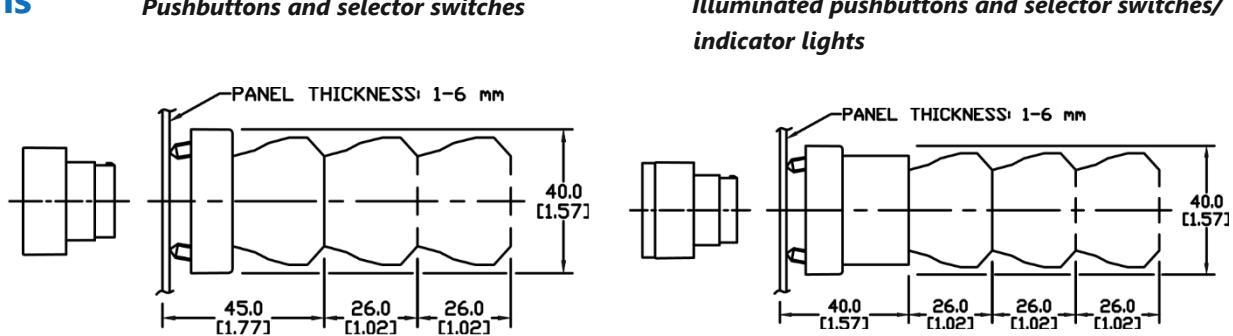
GCX Series 22mm Plastic Pilot Devices Specifications

Assembly information

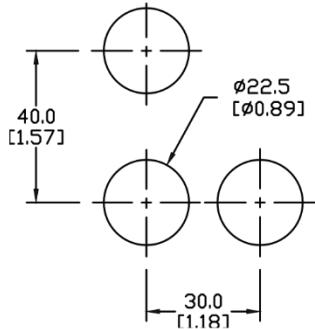
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

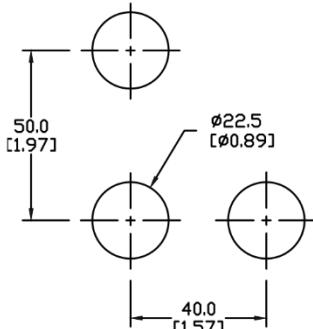
mm
[inches]



Mounting



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

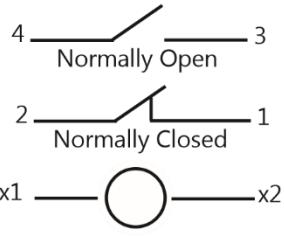


This layout is suitable if all switches are 400V or less and different polarity.

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

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

Contacts Operation

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

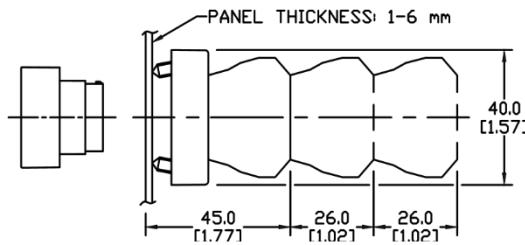
110 volts DC at 0.5 amps *Note: Recommended, not supplied

GCX Series 22mm Metal Pilot Devices Specifications

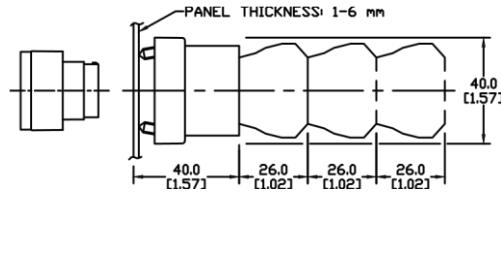
Assembly information

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.

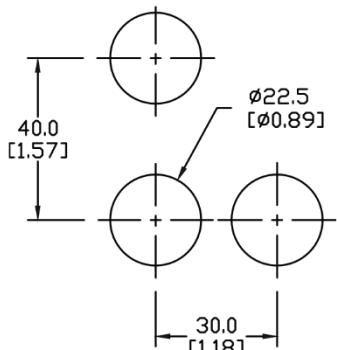
Pushbuttons and selector switches



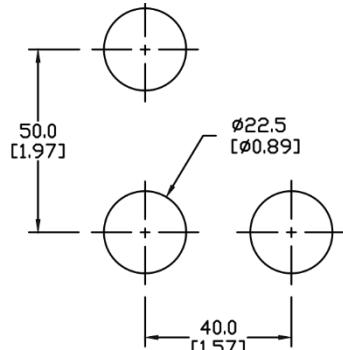
Illuminated pushbuttons and selector switches/pilot lights



Mounting



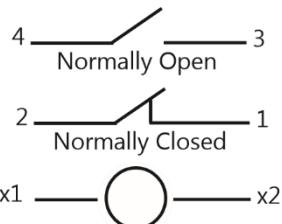
This layout is suitable if all switches are 230V or less and the same polarity.



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, CSA C22-2 n.14	Rated Thermal Current (contact block)	A300, Q300 (Refer to E22 Series mounting/ contact rating section for details)
Approvals	CSA, IMQ (where specified), UL File E189258	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, chromium plated	Dielectric Strength	3kV (1 second)
Contacts Material	Silver	Insulation Resistance	2MΩ min. (500VDC)
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.)	Initial Contact Resistance	≤ 25mΩ
Temperature Ratings	Storage: -40 to 80°C (-40 to 176°F) Operating: -25 to +70°C (-13 to 158°F)	Short-Circuit Protection*	Cartridge fuses gl 10A - 500V 10,3x38I1 100kA
Working Positions	All working positions are allowed	Terminal Markings	According to CENELEC EN 50013
Mechanical Life	Pushbuttons, selector switches: Joy stick switches: 1,000,000 operations Mushroom pushbuttons: 300,000 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.
		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

*Note: Recommended, not supplied

GCX Series 22mm Metal Pushbuttons

Momentary flush pushbuttons with protective metal ring (30mm dia. actuator)

GCX1102



Momentary Pushbuttons Flush with Protective Metal Ring				
Part Number	Color	Price	Drawing Link	Description
<u>GCX1100</u>	Black	\$7.50	PDF	One N.O. contact block, 30mm dia. actuator, mounts in 22mm hole
<u>GCX1101</u>	Red	\$7.50	PDF	One N.C. contact block, 30mm dia. actuator, mounts in 22mm hole
<u>GCX1102</u>	Green	\$7.50	PDF	One N.O. contact block, 30mm dia. actuator, mounts in 22mm hole
<u>GCX1103</u>	Yellow	\$7.50	PDF	
<u>GCX1104</u>	Blue	\$7.50	PDF	
<u>GCX1105</u>	White	\$7.50	PDF	

Momentary Flush ON/OFF pushbuttons with protective metal ring (30mm dia. actuator)

GCX1106

GCX1107



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

GCX1113

Double-headed momentary pushbuttons



GCX1152 (with on/off symbols)

GCX1151-24

Double-headed Momentary Pushbuttons

Part Number	Price	Drawing Link	Description
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Description

Momentary Pushbuttons Flush ON/OFF

Part Number	Color	Price	Drawing Link	Description
<u>GCX1106</u>	Red with "Off" symbol (O) on actuator	\$8.25	PDF	One N.C. contact block, 30mm dia. actuator, mounts in 22mm hole
<u>GCX1107</u>	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

Part Number	Color	Price	Drawing Link	Description
<u>GCX1120</u>	Black	\$8.75	PDF	One N.O. contact block, 40mm dia. actuator, mounts in 22mm hole
<u>GCX1121</u>	Red	\$8.75	PDF	One N.C. contact block, 40mm dia. actuator, mounts in 22mm hole
<u>GCX1122</u>	Green	\$8.75	PDF	
<u>GCX1123</u>	Yellow	\$8.75	PDF	
<u>GCX1124</u>	Blue	\$8.75	PDF	
<u>GCX1125</u>	White	\$8.75	PDF	One N.O. contact block, 40mm dia. actuator, mounts in 22mm hole

Momentary Extended Pushbuttons

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

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.



GCX110G

Momentary extended pushbutton operator (without contact block) (30mm dia. actuator)

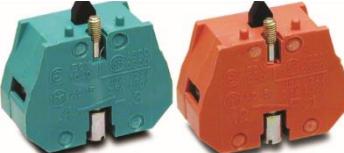
Momentary Extended Pushbutton Operators (without contact block)

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



GCX111G

Contact blocks are available for these products.



ECX1042-2 ECX1030-2

Replacement Incandescent Bulbs				
Part Number	Quantity	Price	Rating	Description
<u>ECX1900-5</u>	5	\$9.50	6V@ 200mA , 1.2 watts	6V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
<u>ECX1902-5</u>	5	\$9.50	24V@ 80mA 2 watts	24V replacement bulb for 22mm switches and indicators. Miniature bayonet base T31/4
<u>ECX1904-5</u>	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
<u>ECX1911-2</u>	Red		\$17.50		
<u>ECX1912-2</u>	Green		\$22.00		
<u>ECX1913-2</u>	Yellow		\$17.50	24V@26mA 0.6 watts	LED replacement lamp for miniature bayonet bases
<u>ECX1914-2</u>	Blue		\$23.50		Works with 22mm switches and indicators, but illumination will not be as even when used with the ECX 22mm indicators
<u>ECX1915-2</u>	White		\$28.00		Note: Will not replace sealed Cutler-Hammer monoblock LED indicators.
<u>ECX1921-2</u>	Red	2	\$17.50		
<u>ECX1922-2</u>	Green		\$22.00		
<u>ECX1923-2</u>	Yellow		\$17.50	120V@5mA 0.6 watts	
<u>ECX1924-2</u>	Blue		\$23.50		
<u>ECX1925-2</u>	White		\$28.00		



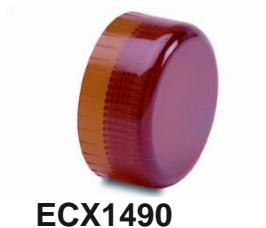
ECX1912

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.

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	



Hole plug



ECX1490

Pilot Light replacement lens

PL1170PR-5

Protective covers for pushbuttons

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



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.
ECX1040-2	2	\$7.25	PDF	Green, normally-open (N.O.)	
ECX1040-5	5	\$17.00	PDF		
ECX1042-2	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.



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 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

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



GR1168PR-5

Part Number	Lamp Color	Price	Description	Use with
<u>GR1168PR-5</u>	Red	\$9.00	22mm illuminated flush pushbutton replacement operator, 5/pk	Part numbers starting with GCX119, GCX120 GCX319, GCX320
<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	

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	Part numbers starting with GCX121, GCX321
<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	



[PL1308PR](#)

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	Black	Black	Silver	<u>ECX1670A-B46</u>	\$3.75	<u>PDF</u>
Blank Plate	Black	-	Silver	<u>ECX1670A-B</u>	\$3.75	<u>PDF</u>
Blank Plate	Red	-	Silver	<u>ECX1670A-R</u>	\$3.75	<u>PDF</u>
CLAMP	Black	Black	Silver	<u>ECX1670A-B24</u>	\$3.75	<u>PDF</u>
CLOSE	Black	Black	Silver	<u>ECX1670A-B01</u>	\$3.75	<u>PDF</u>
DOWN	Black	Black	Silver	<u>ECX1670A-B02</u>	\$3.75	<u>PDF</u>
EMERG. STOP	Red	Red	Silver	<u>ECX1670A-R03</u>	\$3.75	<u>PDF</u>
EXTEND	Black	Black	Silver	<u>ECX1670A-B51</u>	\$3.75	<u>PDF</u>
FEEDER OFF	Black	Black	Silver	<u>ECX1670A-B26</u>	\$3.75	<u>PDF</u>
FEEDER ON	Black	Black	Silver	<u>ECX1670A-B25</u>	\$3.75	<u>PDF</u>
FOR OFF REV	Black	Black	Silver	<u>ECX1670A-B19</u>	\$3.75	<u>PDF</u>
FOR REV	Black	Black	Silver	<u>ECX1670A-B13</u>	\$3.75	<u>PDF</u>

FORWARD	Black	Black	Silver	<u>ECX1670A-B04</u>	\$3.75	PDF
GRIP	Black	Black	Silver	<u>ECX1670A-B53</u>	\$3.75	PDF
HAND-AUTO	Black	Black	Silver	<u>ECX1670A-B14</u>	\$3.75	PDF
HAND OFF AUTO	Black	Black	Silver	<u>ECX1670A-B20</u>	\$3.75	PDF
HIGH	Black	Black	Silver	<u>ECX1670A-B27</u>	\$3.75	PDF
HIGH LOW	Black	Black	Silver	<u>ECX1670A-B43</u>	\$3.75	PDF
IN	Black	Black	Silver	<u>ECX1670A-B28</u>	\$3.75	PDF
INCH	Black	Black	Silver	<u>ECX1670A-B29</u>	\$3.75	PDF
JOG	Black	Black	Silver	<u>ECX1670A-B05</u>	\$3.75	PDF
JOG FOR	Black	Black	Silver	<u>ECX1670A-B30</u>	\$3.75	PDF
JOG REV	Black	Black	Silver	<u>ECX1670A-B31</u>	\$3.75	PDF
JOG RUN	Black	Black	Silver	<u>ECX1670A-B15</u>	\$3.75	PDF
LOW	Black	Black	Silver	<u>ECX1670A-B32</u>	\$3.75	PDF
LOWER	Black	Black	Silver	<u>ECX1670A-B33</u>	\$3.75	PDF
MAN AUTO	Black	Black	Silver	<u>ECX1670A-B44</u>	\$3.75	PDF

Note: Legend plate text is 3mm in height

Continued on next page



[ECX1670A-B48](#)



[ECX1670A-R11](#)

Aluminum Legend Plates (continued)

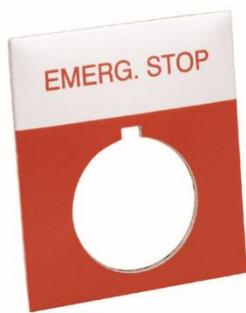
Legend	Color of Field	Text Color	Background Color	Part Number	Price	Drawing Link
MAN OFF AUTO	Black	Black	Silver	<u>ECX1670A-B47</u>	\$3.75	PDF
MOTOR RUN	Black	Black	Silver	<u>ECX1670A-B22</u>	\$3.75	PDF
MOTOR STOP	Black	Black	Silver	<u>ECX1670A-B23</u>	\$3.75	PDF
OFF	Black	Black	Silver	<u>ECX1670A-B34</u>	\$3.75	PDF
OFF ON	Black	Black	Silver	<u>ECX1670A-B16</u>	\$3.75	PDF
ON	Black	Black	Silver	<u>ECX1670A-B06</u>	\$3.75	PDF
OPEN	Black	Black	Silver	<u>ECX1670A-B07</u>	\$3.75	PDF
OPEN OFF CLOSE	Black	Black	Silver	<u>ECX1670A-B48</u>	\$3.75	PDF
OPEN CLOSE	Black	Black	Silver	<u>ECX1670A-B17</u>	\$3.75	PDF

OUT	Black	Black	Silver	<u>ECX1670A-B35</u>	\$3.75	<u>PDF</u>
POWER ON	Black	Black	Silver	<u>ECX1670A-B21</u>	\$3.75	<u>PDF</u>
PULL ON PUSH OFF	Black	Black	Silver	<u>ECX1670A-B50</u>	\$3.75	<u>PDF</u>
RAISE	Black	Black	Silver	<u>ECX1670A-B36</u>	\$3.75	<u>PDF</u>
READY	Black	Black	Silver	<u>ECX1670A-B37</u>	\$3.75	<u>PDF</u>
RELEASE	Black	Black	Silver	<u>ECX1670A-B54</u>	\$3.75	<u>PDF</u>
RESET	Black	Black	Silver	<u>ECX1670A-B38</u>	\$3.75	<u>PDF</u>
RETRACT	Black	Black	Silver	<u>ECX1670A-B52</u>	\$3.75	<u>PDF</u>
REVERSE	Black	Black	Silver	<u>ECX1670A-B08</u>	\$3.75	<u>PDF</u>
RUN	Black	Black	Silver	<u>ECX1670A-B09</u>	\$3.75	<u>PDF</u>
SAFE RUN	Black	Black	Silver	<u>ECX1670A-B45</u>	\$3.75	<u>PDF</u>
START	Black	Black	Silver	<u>ECX1670A-B10</u>	\$3.75	<u>PDF</u>
STOP	Black	Black	Silver	<u>ECX1670A-B11</u>	\$3.75	<u>PDF</u>
STOP	Red	Red	Silver	<u>ECX1670A-R11</u>	\$3.75	<u>PDF</u>
TEST	Black	Black	Silver	<u>ECX1670A-B39</u>	\$3.75	<u>PDF</u>
TRANSFER	Black	Black	Silver	<u>ECX1670A-B40</u>	\$3.75	<u>PDF</u>
TRIP	Black	Black	Silver	<u>ECX1670A-B41</u>	\$3.75	<u>PDF</u>
UNCLAMP	Black	Black	Silver	<u>ECX1670A-B42</u>	\$3.75	<u>PDF</u>
UP	Black	Black	Silver	<u>ECX1670A-B12</u>	\$3.75	<u>PDF</u>
UP OFF DOWN	Black	Black	Silver	<u>ECX1670A-B49</u>	\$3.75	<u>PDF</u>
UP DOWN	Black	Black	Silver	<u>ECX1670A-B18</u>	\$3.75	<u>PDF</u>

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	<u>PDF</u>
Blank Plate	Red	-	Silver	<u>ECX1680A-R</u>	\$4.25	<u>PDF</u>
EMERG. STOP	Red	Red	Silver	<u>ECX1680A-R03</u>	\$4.25	<u>PDF</u>
HAND OFF AUTO	Black	Black	Silver	<u>ECX1680A-B20</u>	\$4.25	<u>PDF</u>
JOG	Black	Black	Silver	<u>ECX1680A-B05</u>	\$4.25	<u>PDF</u>
OFF ON	Black	Black	Silver	<u>ECX1680A-B16</u>	\$4.25	<u>PDF</u>
OPEN CLOSE	Black	Black	Silver	<u>ECX1680A-B17</u>	\$4.25	<u>PDF</u>
POWER ON	Black	Black	Silver	<u>ECX1680A-B21</u>	\$4.25	<u>PDF</u>
START	Black	Black	Silver	<u>ECX1680A-B10</u>	\$4.25	<u>PDF</u>
STOP	Red	Red	Silver	<u>ECX1680A-R11</u>	\$4.25	<u>PDF</u>

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>				
<u>E22PB1A</u>	800EPF2 800E3LX10	ZA2BA2 ZA2BZ101	P9XPNNNG10N0	3SB1000-0AB01 3SB02-CBH 3SB1400-0B
<u>E22PB3A</u>	800EPF3 800E3LX10	ZA2BA3 ZA2BZ101	P9XPNVG10N0	3SB1000-0AE01 3SB02-CBH 3SB1400-0B
<u>E22EB2B</u>	800EPE4 800E3LX01	ZA2BL4 ZA2BZ102	P9XPNRS20N0	3SB1000-0LC01 3SB02-CBH 3SB1400-0B
<u>E22ASB204</u>	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>				
<u>E22TB2X4B</u>	800EPLE4 800E3DL3 800E3X01	ZA2BW14 ZA2BW06224	P9XPLRSDN12NADI	3SB1001-OLC01 3SB02-CBH 3SB1400-0C 3SB1400-2H
<u>E22TB3X4A</u>	800EPLE3 800E3DL3 800E3X10	ZA2B213 AZ2B206124	P9XPLVSDN12NADI	3SB1001-OLE01 3SB02-CBH 3SB1400-0B 3SB1440-2H
<u>E22TB9X4A</u>	800EPLE5 800E3DL3 800E3X10	ZA2BW15 ZA2BW06124	P9XPLASDN12NADI	3SB1001-OLD01 3SB02-CBH 3SB1400-0B 3SB1400-2H
<u>E22TB2X10B</u>	800EPLE4 800E2RL5 800E3X01	ZA2BW14 ZA2BW062120	P9XPLRSB P9PRNVJ P9PDNVD	3SB1001-OLC01 3SB02-CBH 3SB1400-0C
<u>E22TB3X10A</u>	800EPLE3 800E2RL5 800E3X10	ZA2BW13 ZA2BW061120	P9XPLVSD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DE 3SB1400-OB
<u>E22TB9X10A</u>	800DPLE5 800E2RL5 800E3X10	ZA2BW15 ZA2B2061120	P9XPLASD P9PRNVJ P9PDNVD	3SB02-UPR1P 3SB1910-0DD 3SB1400-0B

tPIL-99

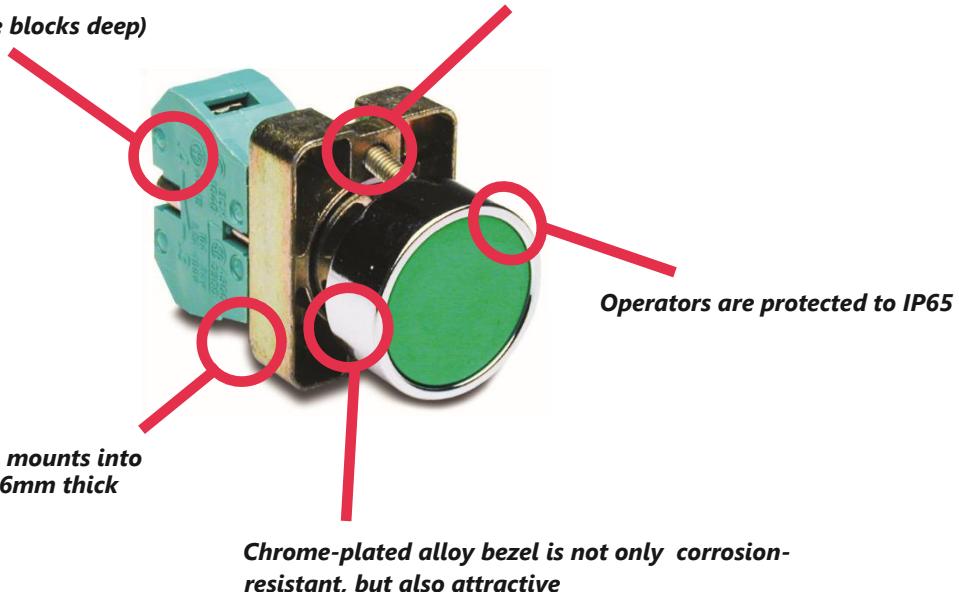
GCX Series 22mm Metal Pilot Devices

Features

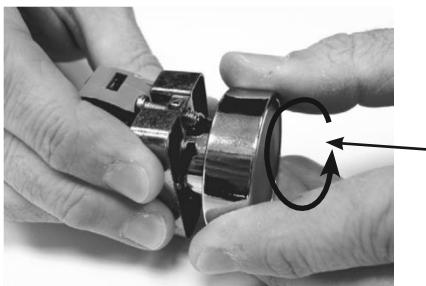
Any combination of contact blocks is

Secure mounting method eliminates twisting in mounting hole

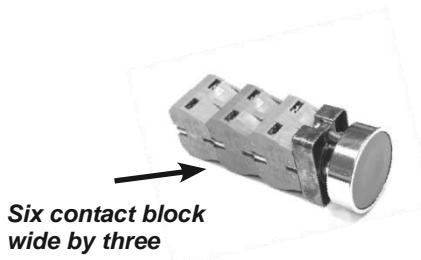
**allowed, up to a total of six
(two blocks wide and three blocks deep)**



Easy installation

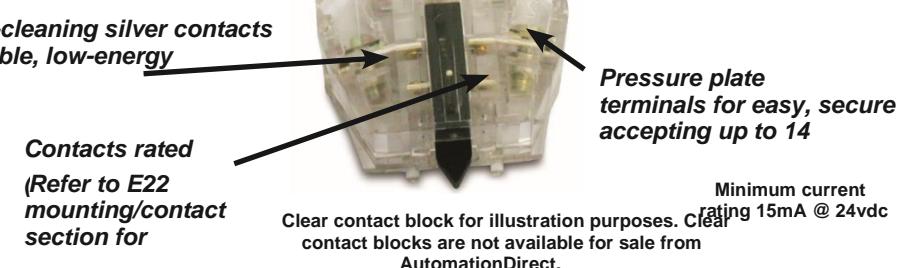


To remove operator, press toward support base and twist



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.



All indicators offer side wire entry with back screw terminals for easy wiring



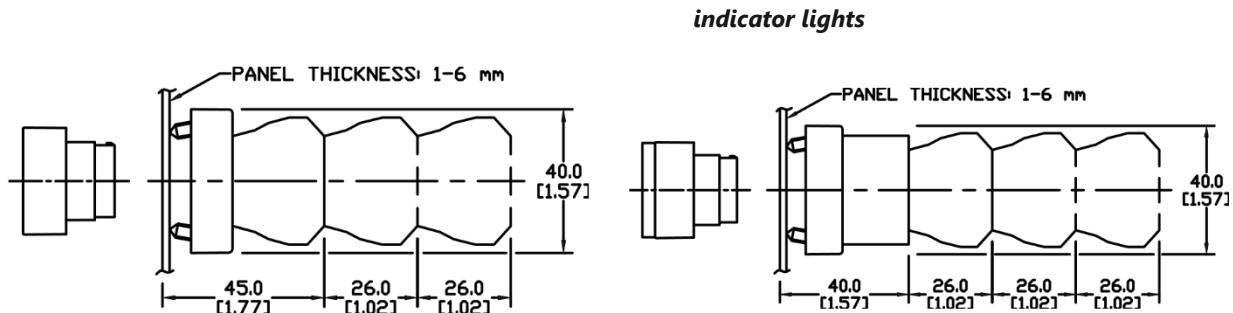
GCX Series 22mm Plastic Pilot Devices Specifications

Assembly information

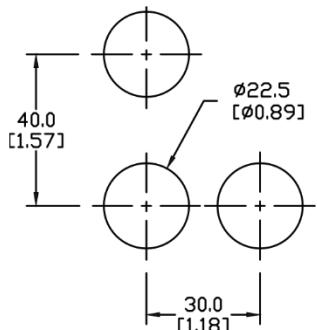
These pushbuttons and indicator lights are supplied with the appropriate contact blocks, unless otherwise indicated. Use these drawings as a guide to make sure there is adequate clearance behind the panel.

Dimensions

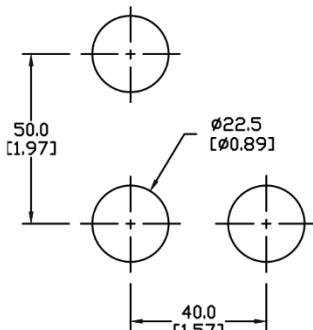
mm
[inches]



Mounting



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

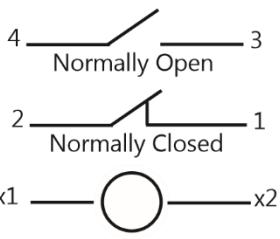


This layout is suitable if all switches are 400V or less and different polarity.

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 GENELEC EN 50013

Single screw with non-loosening plate clamp, 14AWG

Connections

max. Tighten to 0.8Nm max

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

Contacts Operation

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

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 have a



MTPM-P10-1JK43

warranty).

The IronHorse line of DC motors features: one-year
• Replacement brush sets

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

Features for Small-Frame Motors 1/4 hp and Under

MTPM-P25-1JK44



- Available models accommodate 12VDC, 24VDC, 90VDC (110VAC DC drive), and 240VDC, 180VDC (230VAC DC drive)
- Dynamically balanced armature
- Rated for SCR drives
- TENV enclosure
- 18-inch leads, or junction boxes with 8-inch leads
- Externally replaceable brushes
- Reversible

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



- 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

MTPM-P75-1L18

- 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-P10-
with flying



MTPM-P25-
with junction box

Selection and Specifications

Motor Specifications – MTPM Series Small-Frame Permanent Magnet DC Motors														
Part Number	Price	Voltage (VDC)	HP	Speed (rpm)	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>MTPM-P10-1JK43</u>	\$87.00	12/24	1/20 1/10	1746 4252	28	4.83	0.3125	1.00	85	70	flying leads	2.75	PDF	
<u>MTPM-P13-1JK42</u>	\$97.00	12/24	1/17 1/8	1825 4224	32	5.39	0.3125					3.25	PDF	
<u>MTPM-P17-1JK43</u>	\$129.00	12/24	1/13 1/6	1841 4290	42	7.54	0.50	2.02	130	150	junction box	5.3	PDF	
<u>MTPM-P25-1JK40</u>	\$157.00	12/24	1/6 1/4	1732 3996	96 80	14.3 12.2	0.50					7.8	PDF	
<u>MTPM-P25-1JK44</u>	\$157.00	12/24	1/5 1/4	1854 4375	113 70	18.1 11.9	0.50	1.00	85	70	flying leads	9	PDF	
<u>MTPM-P03-1L18</u>	\$94.00		1/31	1797	18	0.39	0.3125					2.75	PDF	
<u>MTPM-P04-1L17</u>	\$99.00		1/26	1749	22	0.46	0.3125	2.02	130	150	junction box	3.25	PDF	
<u>MTPM-P05-1L19</u>	\$129.00		1/19	1917	28	0.68	0.50					5.3	PDF	
<u>MTPM-P13-1L19</u>	\$150.00		1/8	1917	73	1.4	0.50	1.00	85	70	flying leads	7.8	PDF	
<u>MTPM-P14-1L19</u>	\$163.00		1/7	1740	86	1.61	0.50					9	PDF	
<u>MTPM-P07-1M24</u>	\$135.00	180	1/15	2440	28	0.42	0.50	2.02	130	150	junction box	5.3	PDF	
<u>MTPM-P13-1M19</u>	\$163.00		1/8	1865	73	0.73	0.50					7.8	PDF	
<u>MTPM-P14-1M18</u>	\$163.00		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-
<u>MTPM-BRUSH-4</u>	\$34.50	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
<u>MTPM-BRUSH-5</u>	\$26.00	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,
<u>MTPM-BRUSH-6</u>	\$29.00	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
<u>MTPM-BRUSH-7</u>	\$23.50	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>	\$45.00	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

* 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													
Part Number	Price	HP	Base RPM	Armature Voltage	Housing	NEMA Frame	Service Factor	F.L. Amps	Weight (lb)	Drawing Links			
<u>MTPM-P33-1L18</u>	\$234.00	1/3	90 VDC	TENV	56C flange mount	TEFC	1.0	3.5	17.70	PDF			
<u>MTPM-P50-1L18</u>	\$301.00	1/2						5.2	20.74	PDF			
<u>MTPM-P75-1L18</u>	\$341.00	3/4						7.8	25.30	PDF			
<u>MTPM-001-1L18</u>	\$378.00	1						10.4	28.36	PDF			
<u>MTPM-1P5-1L18</u>	\$410.00	1-1/2						15.4	34.97	PDF			
<u>MTPM-P33-1M18</u>	\$231.00	1/3		TENV				1.75	17.60	PDF			
<u>MTPM-P50-1M18</u>	\$300.00	1/2						2.6	20.74	PDF			
<u>MTPM-P75-1M18</u>	\$341.00	3/4						3.9	25.58	PDF			
<u>MTPM-001-1M18</u>	\$378.00	1						5.2	28.32	PDF			
<u>MTPM-1P5-1M18</u>	\$410.00	1-1/2						7.7	35.70	PDF			
<u>MTPM-002-1M18</u>	\$652.00	2						9.8	61.95	PDF			

Note: Please review the AutomationDirect Terms & warranty and service on this product.
Conditions fo

Performance Data – DC 56C Frame Motors – 1800 RPM

Part Number	H. Voltage Range	Armature Current (Amp.)	Torque (lb·ft) Full Load	Form Factor*	Ambient Temp.	Insulation Class	Ball Bearings		Mounting	Wire/Housing	Shaft	ConstSp aneetd ToRa rqng uee	Overall Sp ee ng d	Base/ Type	Paint Color	Rotor Inertia kg·m²	Efficiency (%)
							DE Bearing	ODE Bearing									
<u>MTPM-P33-1L18</u>	1/3		0.97	90 VDC	40°C (104°F)	F	6203	6203	Top Mounted	Junction Box	Keyed	901800 RPM	0-2000 RPM	Rigid Removable	Gray	0.01956	79
<u>MTPM-P50-1L18</u>	1/2		1.46													0.0365	
<u>MTPM-P75-1L18</u>	3/4		2.19													0.0795	80
<u>MTPM-001-1L18</u>	1		2.92													0.03225	
<u>MTPM-1P5-1L18</u>	1-1/2		4.38													0.01945	81

<u>MTPM-P33-</u>	1/3		0.97											0.01956	7
<u>1M18</u>															9
<u>MTPM-P50-</u>	1/2		1.46											0.01365	
<u>1M18</u>															
<u>MTPM-P75-</u>	3/4	18	2.19											0.01795	8
<u>1M18</u>		0													0
<u>MTPM-001-</u>	1	V	2.92											0.01225	
<u>1M18</u>		D													
<u>MTPM-1P5-</u>	1-	4.38												0.01945	8
<u>1M18</u>	1/2														1
<u>MTPM-002-</u>	2		5.84											0.01675	8
<u>1M18</u>															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	
Form Factor	DC Voltage Source
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).

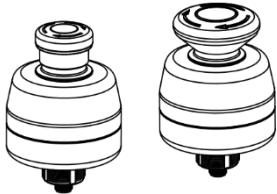
DC Motor Accessories							
Part Number	Price	Description	Applicable Motor Type	Rated Voltage	Motor HP	Brush Materials	Dimension L x W x H
<u>MTPM-BRUSH-1</u>	\$15.50	Brushes with springs, one set of 2	IronHorse MTPM	90 VDC 180 VDC	0.33–1.5 hp	Resin class Graphite	0.75 in x 0.27 in x 0.70 in 19 mm x 6.9 mm x 18 mm
<u>MTPM-BRUSH-2</u>	\$20.00	Brushes with springs, one set of 2		180 VDC	2hp		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.

SSA-EB Series Emergency Stop Push Button

Datasheet

Illuminated Safety BUS Gateway Compatible 30 mm Mount Electro-mechanical Push Buttons



- Designed to interface with Safety BUS nodes/gateways
- Rugged design; easy installation with no assembly or individual wiring required
- Push-to-stop, twist-to-release, or pull-to-release operation per EN 60947-5-5
 - Models with the washdown cover are push-to-stop and pull-to-release operation per EN 60947-5-5
- Latching design complies with ISO 13850; direct (positive) opening operation per EN 60947-5-1
- Compliant with ANSI B11.19, NFPA 79, and IEC/EN 60204-1 Emergency Stop requirements
- "Safe Break Action" ensures normally closed (NC) contacts will open if the contact block is separated from the actuator
- 5-pin M12 quick disconnect
- Models with yellow and red indication of actuation (armed or depressed/latched button)
- "Emergency Stop" legend included
- U.S. Patent No. Des. 700,149
- FDA-grade silicone cover withstands high pressure, high temperature washdown, and increases the product rating to IEC IP69; the cover is ECOLAB® certified to withstand aggressive cleaning procedures with chemicals used in the food processing industry

Models SSA-EB... series are "mushroom-style" electro-mechanical emergency stop push buttons. When the button is armed, the switch's safety contacts (normally closed/NC) are closed and its monitoring contacts (normally open/NO), if present, are open. When the button is pushed, the switch's safety contacts open, and the monitoring contacts close. The contacts remain in this condition until the push button is manually rearmed by twisting clockwise the red push button actuator.

The SSA-EB1P..-02ECQ5.. series has a 30 mm mounting base similar to Banner's OTB, VTB, and STB Optical Touch Buttons for ease of mounting without requiring an additional enclosure. The illuminated models provide indication of an armed button and a pushed/actuated button (indication is dependent on model). The red indication allows for easy identification of a pushed/actuated button.

Models

Model	EZ-LIGHT® Illumination Logic and Description	Connection
SSA-EB1PL-02ECQ5A	OFF (armed), RED (solid, PUSH)	Integral 5-pin M12 male quick disconnect Safety BUS node compatible ¹ CH1 = pins 1 & 2 CH2 = pins 4 & 5
SSA-EB1PLXR-02ECQ5A	OFF (armed), RED (flash, PUSH)	
SSA-EB1PLYR-02ECQ5A	YELLOW (armed) & RED (flash, PUSH)	
SSA-EB1PL2-02ECQ5A	Illuminated button, OFF (armed), RED (solid, PUSH ON)	
SSA-EB1PL-02ECQ5B	OFF (armed), RED (solid, PUSH)	Integral 5-pin M12 male quick disconnect Safety
SSA-EB1PLXR-02ECQ5B	OFF (armed), RED (flash, PUSH)	
SSA-EB1PLYR-02ECQ5B	YELLOW (armed) & RED (flash, PUSH)	
SSA-EB1PL2-02ECQ5B	Illuminated button, OFF (armed), RED (solid, PUSH ON)	

¹Compatible with AllenBradley ArmorBlock® 1732DS Safe DeviceNet and 1732ES Safe EtherNet/IP remote I/O

BUS node compatible 23

		CH1 = pins 1 & 4 CH2 = pins 2 & 5
--	--	--------------------------------------

Additional models available. For non-illuminated models, see <http://www.bannerengineering.com> and search for 162755.

Important... Read this before proceeding!

The user is responsible for satisfying all local, state, and national laws, rules, codes, and regulations relating to the use of this product and its application. Banner Engineering Corp. has made every effort to provide complete application, installation, operation, and maintenance instructions. Please contact a Banner Applications Engineer with any questions regarding this product.

The user is responsible for making sure that all machine operators, maintenance personnel, electricians, and supervisors are thoroughly familiar with and understand all instructions regarding the installation, maintenance, and use of this product, and with the machinery it controls. The user and any personnel involved with the installation and use of this product must be thoroughly familiar

164714

with all applicable standards, some of which are listed within the specifications. Banner Engineering Corp. makes no claim regarding a specific recommendation of any organization, the accuracy or effectiveness of any information provided, or the appropriateness of the provided information for a specific application.



WARNING:

- **Not a safeguarding device**
- Failure to follow these instructions could result in serious injury or death.
- This device is not considered a safeguarding device because it requires an overt action by an individual to stop machine motion or hazards. A safeguarding device limits or eliminates an individual's exposure to a hazard without action by the individual or others. This device cannot be substituted for required safeguarding. Refer to the applicable standards to determine those requirements.

U.S. Application Standards

ANSI B11.0 Safety of Machinery; General Requirements and Risk Assessment

ANSI B11.19 Performance Criteria for
Safeguarding NFPA 79 Electrical Standard
for Industrial Machinery

International/European Standards

EN ISO 12100 Safety of Machinery – General Principles for Design — Risk Assessment and Risk Reduction

ISO 13850 (EN 418) Emergency Stop Devices, Functional Aspects – Principles for Design

IEC 62061 Functional Safety of Safety-Related Electrical, Electronic and Programmable Control Systems

EN ISO 13849-1 Safety-Related Parts of Control Systems

IEC/EN 60204-1 Electrical Equipment of Machines Part 1: General Requirements

EN 60947-1 Low Voltage Switchgear – General Rules

EN 60947-5-1 Low Voltage Switchgear – Electromechanical Control Circuit Devices

EN 60947-5-5 Low Voltage Switchgear – Electrical Emergency Stop Device with Mechanical Latching Function

EU Declaration of Conformity (DoC)

Banner Engineering Corp. herewith declares that these products are in conformity with the provisions of the listed directives and all essential health and safety requirements have been met. For the complete DoC, please go to www.bannerengineering.com.

Product	Directive
SSA-EB1PL.. Emergency Stop Push Button	Machinery Directive 2006/42/EC, Low Voltage Directive 2014/35/EU

Representative in EU: Peter Mertens, Managing Director, Banner Engineering BV. Address: Park Lane, Culliganlaan 2F, bus 3, 1831 Diegem, Belgium.

Emergency Stop Considerations

NFPA 79, ANSI B11.19, IEC/EN 60204-1, and ISO 13850 specify emergency stop requirements, including the following:

- Emergency-stop push buttons shall be located at each operator control station and at other operating stations where emergency shutdown is required.
- Stop and emergency-stop push buttons shall be continuously operable and readily accessible from all control and operating stations where located. Do not mute or bypass E-stop buttons.
- Actuators of emergency-stop devices shall be colored red. The background immediately around the device actuator shall be colored yellow (where possible). The actuator of a push-button-operated device shall be of the palm or mushroom-head type.
- The emergency-stop actuator shall be a self-latching type.



WARNING:

- **Do not mute or bypass any emergency stop device**
- Muting or bypassing the safety outputs renders the emergency stop function ineffective.
- ANSI B11.19, NFPA 79 and IEC/EN 60204-1 require that the emergency stop function remains active at all times.



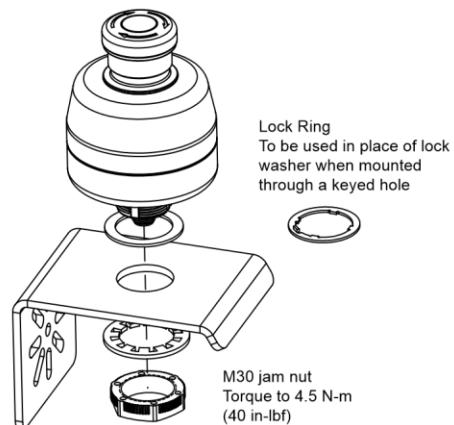
WARNING:

- Connect two or more devices to the same safety module (controller) in series
- Connecting devices in parallel defeats the switch contact monitoring ability of the module and creates an unsafe condition that could result in serious injury or death.
- Failure to test each device individually in this manner could result in undetected faults and create an unsafe condition that could result in serious injury or death.
- Connect the contacts of the corresponding pole of each switch in series. Never connect the contacts of multiple switches in parallel. Individually actuate (engage) each device, then release (or re-arm) and reset the safety module. This allows the module to check each switch and its wiring to detect faults. Perform this check during the prescribed checkouts.

Installation and Maintenance

Figure 1. Mounting the ..ECQ (30 mm) models

Install the device so that operation is not impeded, but should be protected against inadvertent operation (for example, accidental actuation by being bumped or leaned against). Do not operate the switch using a tool. Do not expose the switch to excessive shocks and vibrations, otherwise the switch may be deformed or damaged, causing malfunction or operation failure. Hardware includes jam nut, lock washer, lock ring, and seal washer. The lock ring may be used to prevent switch rotation if a 5 mm hole keyway is provided in the 30 mm mounting hole. The threaded base contains external M30 threads for the supplied jam nut, as well as internal 1/2-14 NPSM threads for an alternate mounting option.



Electrical installation must be made by qualified personnel⁴ and must comply with NEC (National Electrical Code), NFPA 79 or IEC/EN 60204-1, and all applicable local standards. It is not possible to give exact wiring instructions for a device that interfaces to a multitude of machine control configurations. The following is general in nature; it is recommended to perform a risk assessment to ensure appropriate application, interfacing/hookup, and risk reduction (see ISO 12100 or ANSI B11.0).

Table 1: SSA-EB1PLxx-02ECQ5A⁵ and SSA-EB1PLxx-02ECQ5B⁶

Pin	Color	-02ED1Q5A		-02ED1Q5B		Pinout
		Function	Contacts	Function	Contacts	
1 ⁶	Brown	CH1a	N.C.	CH1b	N.C.	
2	White	CH1b	N.C.	CH2a	N.C.	1

⁴ A Qualified Person possesses a recognized degree or certificate or has extensive knowledge, training, and experience to solve problems relating to the emergency stop installation.

⁵ Compatible with AllenBradley ArmorBlock® 1732DS Safe DeviceNet remote I/O.

⁶ Compatible with Siemens ET 200pro PROFIsafe gateway.

⁷ Pin 1 on all models requires power from the node/gateway for the EZ-LIGHT™ illumination logic (see LED Voltage/Current specifications). User must verify interconnection compatibility.

3	Blue	0V dc		0V dc		
4	Black	CH2a	N.C.	CH1a	N.C.	
5	Gray	CH2b	N.C.	CH2b	N.C.	



WARNING:

- **Risk of electric shock**
- Use extreme caution to avoid electrical shock. Serious injury or death could result.
- Always disconnect power from the safety system (for example, device, module, interfacing, etc.), guarded machine, and/or the machine being controlled before making any connections or replacing any component. Lockout/tagout procedures might be required. Refer to OSHA 29CFR1910.147, ANSI Z244-1, or the applicable standard for controlling hazardous energy.
- Make no more connections to the device or system than are described in this manual. Electrical installation and wiring must be made by a Qualified Person⁸ and must comply with the applicable electrical standards and wiring codes, such as the NEC (National Electrical Code), NFPA 79, or IEC 60204-1, and all applicable local standards and codes.

Checkout

At machine set up, a *Designated Person*⁹ should test each safety point for proper machine shutdown response. A *Designated Person* should check the safety point for proper operation, physical damage, button looseness, and excessive environmental contamination. This should take place on a periodic schedule determined by the user, based on the severity of the operating environment and the frequency of switch actuations.

Adjust, repair, or replace components as needed. If inspection reveals contamination on the switch, thoroughly clean the switch and eliminate the cause of the contamination. Replace the switch and/or appropriate components when any parts or assemblies are damaged, broken, deformed, or badly worn; or if the electrical/mechanical specifications (for the environment and operating conditions) have been exceeded.

Always test the control system for proper functioning under machine control conditions after performing maintenance, replacing the safety point, or replacing any component of the device.

Installing the Silicone Cover

To properly install the FDA-grade silicone cover and achieve an IEC IP69 rating, follow these instructions.

1. Turn the cover inside-out, except for the top portion the button fits into.
2. Place the cover on top of the emergency stop unit.
3. Roll the cover onto the e-stop unit.
4. Continue rolling the cover down, around the base of the e-stop unit, until the entire unit iscovered.



⁸ A person who, by possession of a recognized degree or certificate of professional training, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve problems relating to the subject matter and work.

⁹ A *Designated Person* is identified in writing by the employer as being appropriately trained to perform a specified checkout procedure. A Qualified Person possesses a recognized degree or certificate or has extensive knowledge, training, and experience to solve problems relating to the emergency stop installation.

- Mount the e-stop and cover assembly to a bracket wide enough to cover the base of the assembly. The cover should be clamped firmly between the e-stop button and the bracket.



Note: This cover is suitable for applications with pull-to-release resetting methods.

Note: The FDA-grade silicone cover withstands high pressure, high temperature washdown, and increases the product rating to IEC IP69. The cover is ECOLAB® certified to withstand aggressive cleaning procedures with chemicals used in the food processing industry.

Required Overcurrent Protection

Specifications

Housing / Button

Polycarbonate / Polyamide

Threaded base has M30 by 1.5 external threads; Maximum Tightening Torque: 4.5 N·m (40 in-lbf)

Operating Conditions

-25 °C to +55 °C (-13 °F to +131 °F)

45% to 85% relative humidity (no condensation)

Environmental Rating

For Indoor Use Only

IEC IP65 (IEC 60529), UL Type 4X and UL Type 13

IEC IP67, IEC IP69 (IEC 60529), and UL Type 4X and UL Type 13 (with SSA-EB1P-ECWC cover installed)

Insulation Resistance

100 MΩ minimum (500 V DC megger)

Impulse Withstand Voltage

2.5 kV

Pollution Degree

3

Output Configuration

See [Installation and Maintenance](#) on p. 3

Overvoltage Category

II

Contact Material/Bounce ¹⁰

Gold plated silver / 20 ms

Electrical Life

100,000 operations minimum, 250,000 operations minimum at 24 V AC/DC,
100 mA

Mechanical Life

250,000 operations

Shock Resistance

Operating extremes: 150 m/s² (15G)



Vibration Resistance

Operating extremes: 10 Hz to 500 Hz, amplitude 0.35 mm acceleration 50 m/s²

Illuminated Base

LED Color: Yellow - 590 nm, Red - 618 nm

LED Flash Rate: 1.6 Hz at 50% duty cycle

LED Voltage/Current: 12 V DC to 30 V DC; 120 mA at 12 V DC, 65 mA at 24 V DC, 60 mA at 30 V DC

Illuminated Button

LED Color: Red

LED Voltage/Current: 24 V AC/DC ± 10%; 15 mA

Electrical Rating

Minimum load: 1 mA at 5 V AC/DC

SSA-EB1PLxx-..Q5: 3 A at 250 V maximum

UL Applications: 1.5 A at 250 V AC, 1 A at 30 V DC (pilot duty)

CE Applications: AC-15: 1.5 A at 250 V AC, DC-13: 1 A at 30 V DC

Rated Insulation Voltage (Ui)

250 V

Rated Current (Ith)

3A

B10d

100,000 (based on ISO13849-1(2006))

Design and Application Standards

Compliant with EN 60497-1 / -5-1, ISO 13850, ANSI B11.19 , NFPA 79, IEC/EN 60204-1

Date code format (U.S. Standard Format)

YYWWX: 2-digit year, 2-digit week, "X" internal code

Certifications



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

¹⁰ When the button is reset, the normally closed contacts will chatter. When pressing the button, the normally open contacts will chatter. When designing a control circuit, take the contact chatter time into consideration. Do not expose the switch to external shocks, otherwise the contacts will bounce.

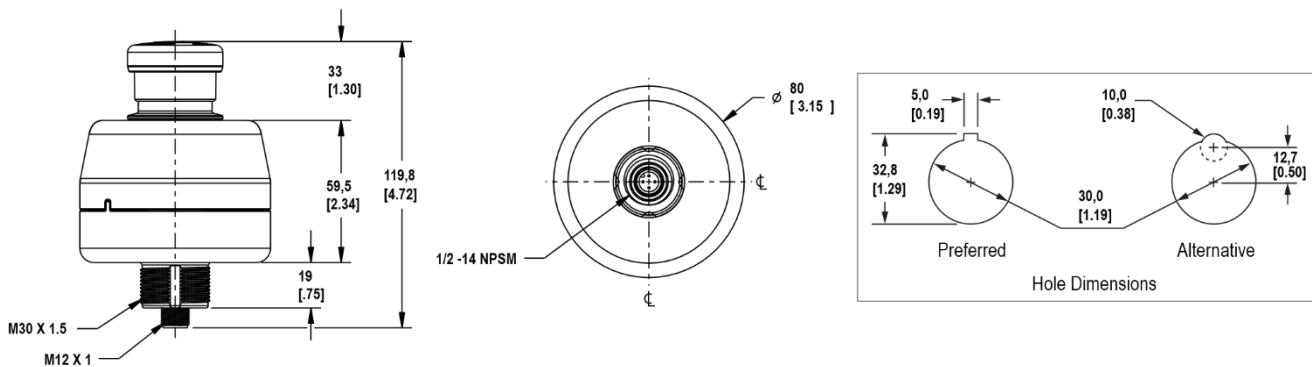
28		0.8
30		0.5

Rated Operating Current and Voltage (Ue)

		30 V	125 V	250 V
AC 50/60 Hz	Resistive Load (AC-12)	-	-	3 A
	Inductive Load (AC-15)	-	3 A	1.5 A
DC	Resistive Load (DC-12)	2 A	0.4 A	0.2 A
	Inductive Load (DC-13)	1 A	0.22 A	0.1 A

The operating current is classified according to EN 60947-5-1 making and breaking capacities and are measured at resistive/inductive load types specified in EN 60947-5-1. See "Electrical Rating" above for specific model and UL/CE maximum ratings.

Dimensions

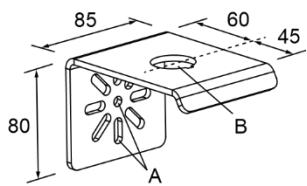


Accessories

Mounting Brackets

SSA-MBK-EEC1

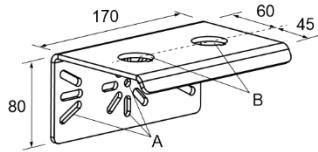
- Single 30 mm hole
- 8 gauge steel, black finish (powder coat)
- Front surface for customer applied labels



Hole size: A = \varnothing 7 , B = \varnothing 30

SSA-MBK-EEC2

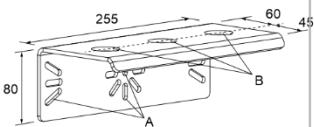
- Two 30 mm holes
- 8 gauge steel, black finish (powder coat)
- Front surface for customer applied labels



Hole size: A = \varnothing 7 , B = \varnothing 30

SSA-MBK-EEC3

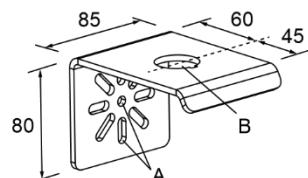
- Three 30 mm holes
- 8 gauge steel, black finish (powder coat)
- Front surface for customer applied labels



Hole size: A = \varnothing 7 , B = \varnothing 30

SSA-MBK-EEC1-SS

- Single 30 mm hole
- 8 gauge 316 stainless steel
- Front surface for customer applied labels



Hole size: A = \varnothing 7 , B = \varnothing 30

The SSA-MBK-EECx brackets offer:

- Horizontal and vertical (post) mounting
- Interchangeable positions of mounted devices (e.g. OTB/STB/VTB, E-Stop, K50s)

Cordsets

5-Pin Threaded M12 Cordsets—Double Ended

Model	Length	Style	Dimensions	Pinout (Male)	Pinout (Female)
DEE2R-51D	0.3 m (1 ft)	Female Straight/ Male Straight		1 2 3 4 5	
DEE2R-53D	0.91 m (3 ft)				
DEE2R-58D	2.44 m (8 ft)				
DEE2R-515D	4.57 m (15 ft)				
DEE2R-525D	7.62 m (25 ft)				
DEE2R-550D	15.2 m (50 ft)				
DEE2R-575D	22.9 m (75 ft)				
DEE2R-5100D	30.5 m (100 ft)				

1 = Brown
2 = White
3 = Blue

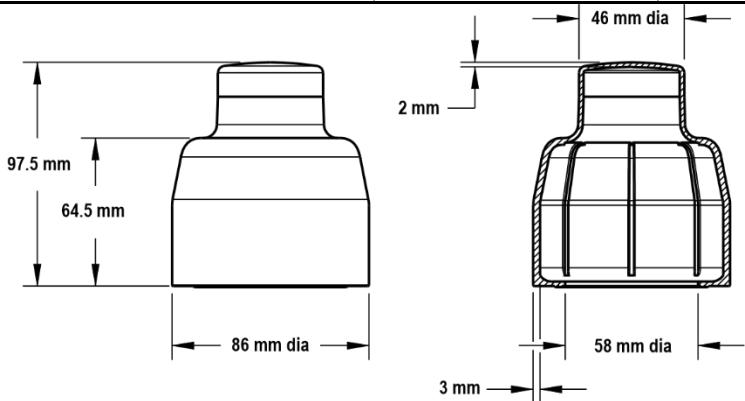
4 = Black
5 = Green/Yellow

See Banner Engineering catalog or go to www.bannerengineering.com for additional models and complete information.

Washdown Silicone Cover SSA-EB1P-ECWC

To order a model with the washdown cover installed, add "-WC" to the model number. For example, **SSA-EB1PL-02ECQ5A-WC**.

Washdown Cover Model	For Push Button Models	Description
SSA-EB1P-ECWC	Standard 40 mm	FDA-grade silicone cover



Pre-Installed Shroud

To order a unit with a shroud (model **ESC-1-YW**) pre-installed, the model number has an **S1** inserted after the LED color characters (for example **SSA-EB1PLYR-02ECQ5A** becomes **SSA-EB1PLYRS1-02ECQ5A**). Contact Banner Engineering for availability.

Figure 2. SSA-EB1PLxx-02ECQ5 E-Stop

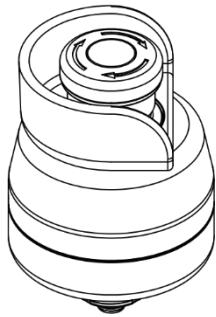
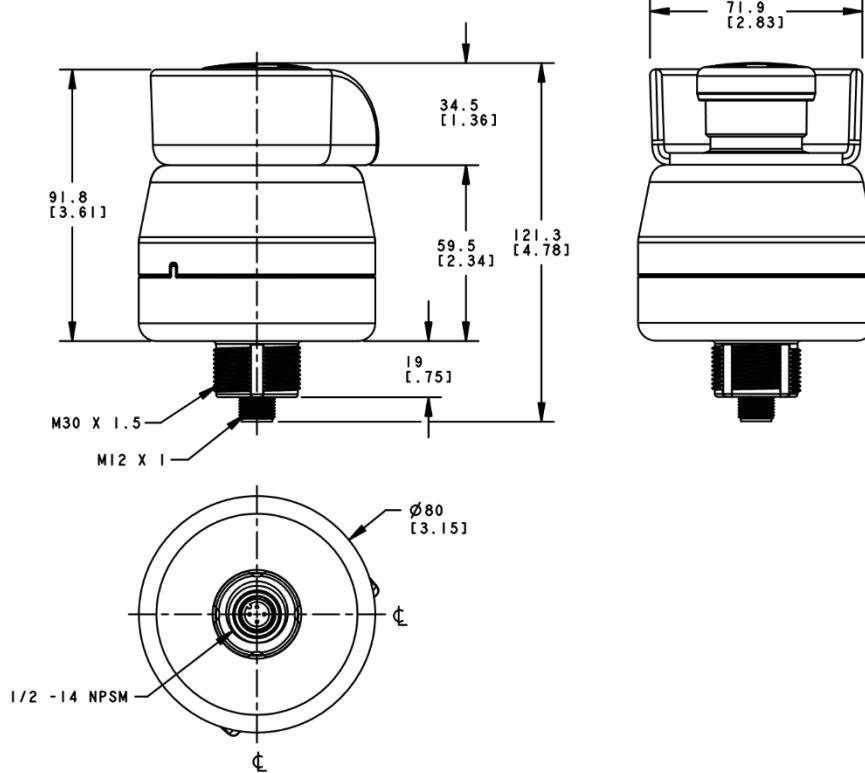


Figure 3. Dimensions for the SSA-EB1PLxx-02ECQ5 E-stop button with shroud with a Shroud



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For patent information, see www.bannerengineering.com/patents.

TL30 Basic Tower Light

Datasheet

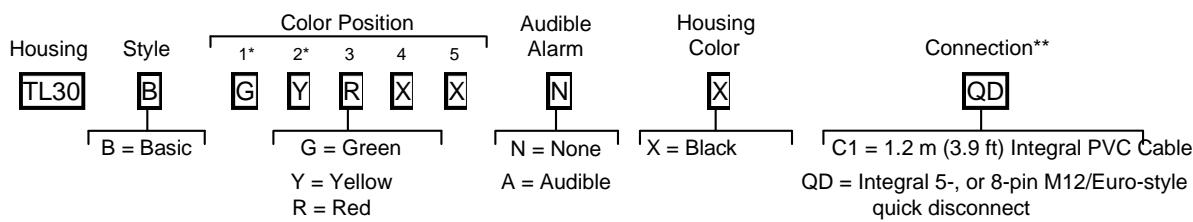
30 mm Multi-Color General-Purpose or Audible Indicators

- 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



W= White*Position 1 and 2 can not be X = No Segment

X = No Segment **Models with quick disconnect require a mating cordset

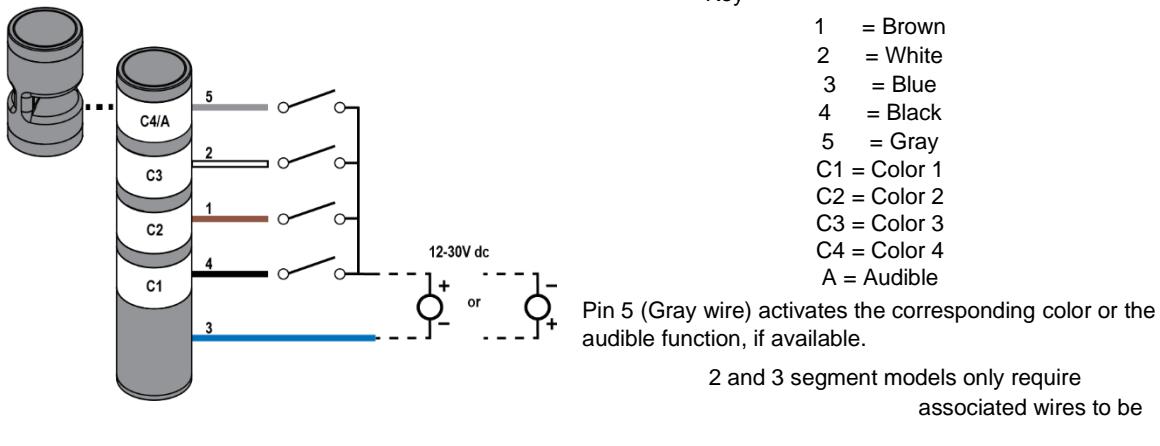
Wiring Diagrams



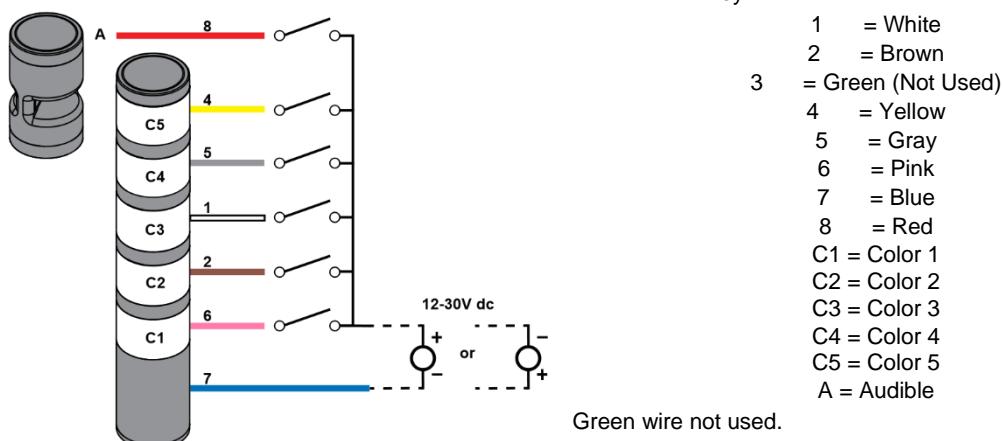
Note: All models are bimodal and can be wired as PNP or NPN devices.



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

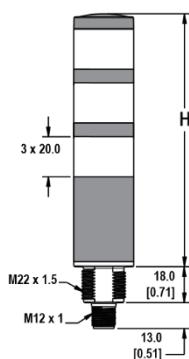
Meets IEC 60068-2-6 requirements (Vibration: 10 Hz to 55 Hz, 1.0 mm amplitude, 5 minutes sweep, 30 minutes dwell)

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

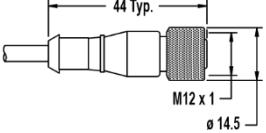
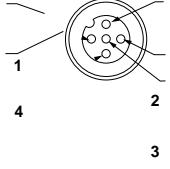
# of colors	Tower Height (H)	
	Non-Audible	Omni-Directional Sealed Audible
2	99.7 mm (3.9 in)	145.6 mm (5.7 in)
3	126.7 mm (5.0 in)	172.6 mm (6.8 in)
4	153.7 mm (6.0 in)	199.6 mm (7.9 in)
5	180.7 mm (7.1 in)	226.6 mm (8.9 in)

All measurements are listed in millimeters [inches], unless noted otherwise.

Accessories

Cordsets

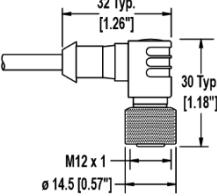
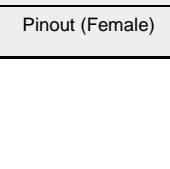
5-Pin Threaded M12/Euro-Style Cordsets—Single lead
End

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)			

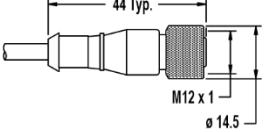
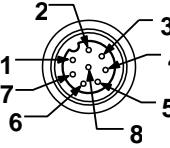
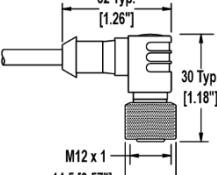
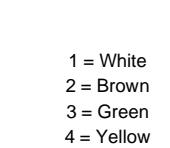
P/N 206089 Rev. C

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		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC1-515RA	4.57 m (15 ft)			
MQDC1-530RA	9.14 m (30 ft)			

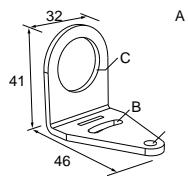
8-Pin Threaded M12/Euro-Style Cordsets with Open-Shield

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		 1 = White 2 = Brown 3 = Green 4 = Yellow 5 = Gray 6 = Pink 7 = Blue 8 = Red
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

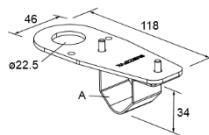


Hole center spacing: A to B = 26.0

Hole size: A = \varnothing 4.6, B = 4.6 x 16.9, C = 22.2

SMB22FVK

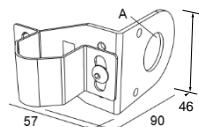
- V-clamp, flat bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm diameter tubing or 1 in. square extrusions
- 22 mm hole for mounting sensor



Hole size: A = \varnothing 22.5

SMB22RAVK

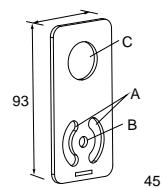
- V-clamp, right-angle bracket and fasteners for mounting to pipe or extensions
- Clamp accommodates 28 mm diameter tubing or 1 in. square extrusions
- 22 mm hole for mounting sensor



Hole size: A = \varnothing 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



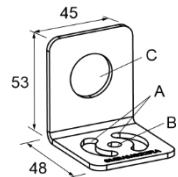
Hole center spacing: A = 26.0, A to B = 13.0

Hole size: A = 26.8 x 7.0, B = \varnothing 6.5, C = \varnothing 22.5

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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

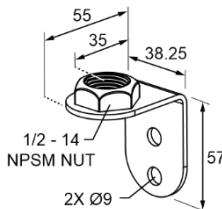


Hole center spacing: A = 26.0, A to B = 13.0

Hole size: A = 26.8 x 7.0, B = \varnothing 6.5, C = \varnothing 22.5

LMBE12RA35

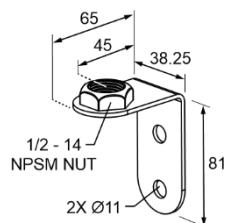
- Direct mounting of stand-off pipe, with common bracket type
- Zinc-plated steel
- 1/2-14 NPSM nut
- Mounting distance from the wall to the center of the 1/2-14 NPSM nut is 35 mm



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

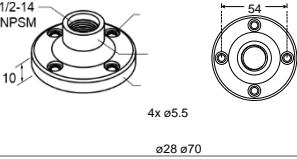
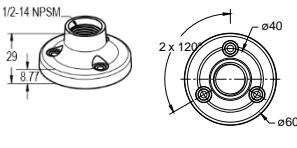
Model	Features	Components
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SA-M22E12 - Black Polycarbonate			<ul style="list-style-type: none"> • Streamlined black polycarbonate stand-off pipe adapter/cover • Connects between 22 mm light base and ½ in. NPSM/DN15 pipe 	
Polished 304 Stainless Steel	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 	

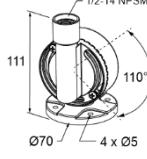
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The College of Engineering Technology
Manufacturing and Mechanical Engineering Technology
Professor Michael Slifka

Pipe Mounting Flange

Pipe Mounting Flange			
Model	Features	Construction	
SA-F12	<ul style="list-style-type: none"> Elevated-use stand-off pipes (1/2 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 (1/2 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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