



Compact 5000 I/O Digital Modules

Catalog Numbers 5069-IA16, 5069-IB8S, 5069-IB8SK, 5069-IB16, 5069-IB16F, 5069-IB16K, 5069-IB6F-3W, 5069-OA16, 5069-OB8, 5069-OBV8S, 5069-OBV8SK, 5069-OB16, 5069-OB16F, 5069-OB16K, 5069-OW4I, 5069-OW16, 5069-OX4I



Allen-Bradley

by ROCKWELL AUTOMATION

User Manual

Original Instructions

Important User Information

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

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

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

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

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

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

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This manual describes how to use Compact 5000™ I/O digital modules in Logix 5000™ control systems.

Make sure that you are familiar with the following:

- Use of a controller in a Logix 5000 control system.
- Use of an EtherNet/IP™ network, if the digital I/O modules are used remotely.
- Use of safety systems.
- Use Studio 5000 Logix Designer® environment.

IMPORTANT In this manual, we use **standard module** to indicate a standard digital I/O module. We use **safety module** to indicate a safety digital I/O module. Further, we use **Compact 5000 I/O digital module** to indicate when a concept or task applies to both the standard and safety digital I/O modules.

Summary of Changes

This manual was revised to add information listed in the following table.

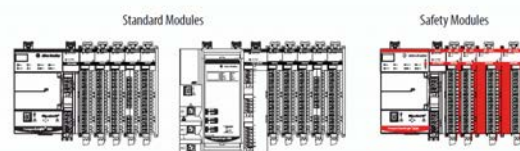
Topic	Pages
The 5069-OB16, 5069-OB16F, 5069-OB16K Series B modules support Field Power Loss Detection.	102...103
Update to description for the No Load Detection with Safety Output Modules	106
Update to the wiring diagram for when at 5069-IB8S or 5069-IB8SK module input is connected to a Test Output. A different input actuator type is shown.	125
A description of the feature Discrepancy that is available on the 5069-IB8S or 5069-IB8SK module is added. The new feature is only available if the modules use firmware revision 2.011.	133...136
There are test source limits when you configure a 5069-IB8S or 5069-IB8SK module.	191
The status indicators table for standard DC output modules indicates that a flashing red I/O status indicator can mean that a Field Power Loss condition exists on the following modules: <ul style="list-style-type: none"> • 5069-OB16/B • 5069-OB16F/B • 5069-OB16K/B modules. 	204
Updated explanation of the naming conventions that are used with module tags.	218
New content describes Connection Details with the Compact 5000 I/O Safety Input Modules.	256
The 5069-IB8S and 5069-IB8SK modules wiring diagrams are updated.	258...260

Graphics Indicate Feature Support

Throughout this manual, graphics appear with section titles to indicate the digital I/O modules that support the feature that is described in that section.

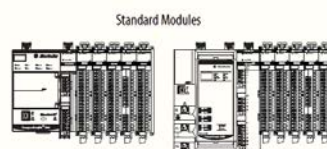
If both standard and safety modules support a feature, you see icons for both types.

Module Data Quality Reporting



If only one type of module, standard or safety, supports a feature, you see only one type of icon.

Timestamping



Terminology

The following table defines terms that are used in this manual.

Table 1 - Terminology Used throughout the Manual

Abbreviation	Full Term	Definition
1oo2	One out of Two	Identifies the programmable electronic controller architecture.
CIP™	Common Industrial Protocol	An industrial communication protocol that is used by Logix 5000-based automation systems on EtherNet/IP, ControlNet®, and DeviceNet® communication networks.
CIP Safety™	Common Industrial Protocol - Safety Certified	SIL-rated version of CIP.
—	Connection	Logical communication channel for communication between nodes. Connections are maintained and controlled between masters and slaves.
CL	Claim Limit	The max safety integrity level (SIL) that can be achieved.
DC	Diagnostic Coverage	The ratio of the detected failure rate to the total failure rate.
EN	European Norm.	The official European Standard.
GSV	Get System Value	A ladder logic instruction that retrieves specified controller status information and places it in a destination tag.
—	Multicast	The transmission of information from one sender to multiple receivers.
MTTF	Mean Time to Failure	The length of time that a device or other product is expected to remain reliable in operation.
NAT	Network Address Translation	The translation of an Internet Protocol (IP) address to another IP address on another network.
ODVA	Open DeviceNet Vendor Association	A nonprofit association of vendors that are established for the promotion of CIP networks.
PFD	Probability of a dangerous failure on demand	The average probability of a system to fail to perform its design function on demand.
PFH	Average frequency of a dangerous failure per hour	The probability of a system to have a dangerous failure occur per hour.
PL	Performance Level	ISO 13849-1 safety rating.
—	Proof test	Periodic test that detects failures in a safety-related system so that, if necessary, the system can be restored to an as-new condition or as close as practical to this condition.
SC	Systematic Capability	A confidence that the systematic safety integrity meets the requirements of the specified safety integrity level (SIL). (from IEC 61508-4)
SFF	Safe Failure Fraction	The sum of safe failures plus the sum of dangerous detected failures divided by the sum of all failures.
SIL	Safety Integrity Level	A relative level of risk-reduction that is provided by a safety function, or to specify a target level of risk reduction.
SIL CL	SL Claim Limit	The max safety integrity level (SIL) that can be achieved.

Table 1 - Terminology Used throughout the Manual

Abbreviation	Full Term	Definition
SNN	Safety Network Number	Safety network number, which uniquely identifies a network across all networks in the safety system. You are responsible for assigning a unique number for each safety network or safety subnet within a system.
SRT	Safety Reaction Time	A consideration of delays or latencies within the safety system.
—	Standard	Devices or portions of devices that do not participate in the safety function.
—	Unicast	The transmission of information from one sender to one receiver.

Additional Resources

The following resources contain information about related products from Rockwell Automation.

Table 2 - Additional Resources to Use with Compact 5000 I/O Digital Modules

Resource	Description
Compact 5000 I/O Digital 16-point Sinking Input Modules Installation Instructions, publication 5069-IN004	Describes how to install and wire the 5069-IB16, 5069-IB16F, and 5069-IB16K input modules.
Compact 5000 I/O Digital 3-wire Sinking Input Module Installation Instructions, publication 5069-IN006	Describes how to install and wire the 5069-IB6F-3W input module.
Compact 5000 I/O Digital 16-point Sourcing Output Modules Installation Instructions, publication 5069-IN007	Describes how to install and wire the 5069-OB16, 5069-OB16F, and 5069-OB16K output modules.
Compact 5000 I/O Digital 4-point Isolated Relay Output Module Installation Instructions, publication 5069-IN008	Describes how to install and wire the 5069-OW4I output module.
Compact 5000 I/O Digital 4-point Isolated Normally-open/Normally-closed Relay Output Module Installation Instructions, publication 5069-IN009	Describes how to install and wire the 5069-OX4I output module.
Compact 5000 I/O Analog 8-channel Current/Voltage Input Module Installation Instructions, publication 5069-IN010	Describes how to install and wire the 5069-IF8 analog input module.
Compact 5000 I/O Analog 4-channel Current/Voltage/RTD/Thermocouple Input Module Installation Instructions, publication 5069-IN011	Describes how to install and wire the 5069-IY4 and 5069-IY4K analog input modules.
Compact 5000 I/O Analog Current/Voltage Output Modules Installation Instructions, publication 5069-IN012	Describes how to install and wire the 5069-OF4, 5069-OF4K, and 5069-OF8 analog output modules.
Compact 5000 I/O Digital 16-point 120/240V AC Input Module Installation Instructions, publication 5069-IN015	Describes how to install and wire the 5069-IA16 input module.
Compact 5000 I/O Digital 16-point 120/240V AC Output Module Installation Instructions, publication 5069-IN016	Describes how to install and wire the 5069-OA16 output module.
Compact 5000 I/O Digital 8-point 24V DC Output Module Installation Instructions, publication 5069-IN017	Describes how to install and wire the 5069-OB8 output module.
Compact 5000 I/O Digital 16-point Relay Output Module Installation Instructions, publication 5069-IN018	Describes how to install and wire the 5069-OW16 output module.
Compact 5000 I/O Safety Sinking Input Module Installation Instructions, publication 5069-IN020	Describes how to install and wire the 5069-IB8S and 5069-IB8SK safety input module.
Compact 5000 I/O Safety Output Module Installation Instructions, publication 5069-IN021	Describes how to install and wire the 5069-OBV8S and 5069-OBV8SK safety output modules.
Compact 5000 I/O Field Potential Distributor Installation Instructions, publication 5069-IN001	Describes how to install and wire the 5069-FPD field potential distributor.
Compact 5000 I/O Address Reserve Module Installation Instructions, publication 5069-IN002	Describes how to install the 5069-ARM address reserve module.
Compact 5000 I/O EtherNet/IP Adapter Installation Instructions, publication 5069-IN003	Describes how to install and wire the Compact 5000 I/O EtherNet/IP adapters.

Table 2 - Additional Resources to Use with Compact 5000 I/O Digital Modules

Resource	Description
Compact 5000 I/O Modules and EtherNet/IP Adapter Technical Data, publication 5069-TD001	Provides specifications, wiring diagrams, and module block diagrams for Compact 5000 I/O modules and EtherNet/IP adapters
Compact 5000 I/O Analog Modules User Manual, publication 5069-UM005	Describes how to configure, operate, and troubleshoot Compact 5000 I/O analog modules.
Compact 5000 I/O High-speed Counter Module User Manual, publication 5069-UM006	Describes how to configure, operate, and troubleshoot the Compact 5000 I/O high-speed counter module.
Compact 5000 EtherNet/IP Adapters User Manual, publication 5069-UM007	Describes how to configure, operate, and troubleshoot the Compact 5000 I/O EtherNet/IP adapters.
CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, publication 5069-UM001	Describes how to configure, operate, and troubleshoot CompactLogix™ 5380 and Compact GuardLogix® 5380 controllers.
CompactLogix 5480 Controllers User Manual, publication 5069-UM002	Describes how to configure, operate, and troubleshoot CompactLogix 5480 controllers.
ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication 1756-UM543	Describes how to configure, operate, and troubleshoot ControlLogix® 5580 and GuardLogix 5580 controllers.
GuardLogix and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication 1756-RM012	Describes requirements for achieving and maintaining Safety Integrity Level (SIL) 2 and Performance Level (PL) d requirements with the GuardLogix 5580 controller system, using the Studio 5000 Logix Designer application.
SISTEMA Performance Level Calculator, available for download at: https://www.rockwellautomation.com/en_NA/capabilities/industrial-safety-solutions/overview.page?pagetitle=Safety-Automation-Builder&docid=ef863d3d3422316df38f212973b23076	The SISTEMA tool automates calculation of the attained Performance Level from the safety-related parts of a machine's control system to (EN) ISO 13849-1.
Integrated Architecture and CIP Sync Configuration Application Technique, publication IA-AT003	Provides information about CIP Sync™ technology and how to synchronize clocks within the Rockwell Automation® Integrated Architecture® system.
Electronic Keying in Logix5000 Control Systems Application Technique, publication LOGIX-AT001	Describes how to use electronic keying in Logix 5000 control system applications.
Logix5000 Controllers Tasks, Programs, and Routines Programming Manual, publication 1756-PM005	Provides more information on event tasks and event task configuration.
Position-based Output Control with the MAOC Instruction, publication 1756-AT017	Describes how to configure time-scheduled output control with the MAOC instruction.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, http://www.rockwellautomation.com/rockwellautomation/certification/overview.page	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

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Logix 5000™ controllers use Compact 5000™ I/O digital modules to control devices in a control system.

Compact 5000 I/O digital modules use removable terminal blocks (RTBs) to connect field-side wiring. You use the Studio 5000 Logix Designer® application to configure the modules.

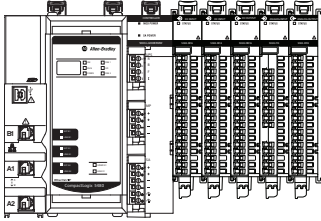
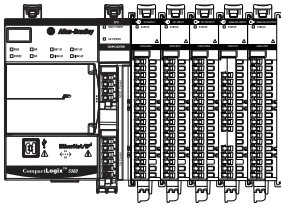
IMPORTANT Controller and programming software compatibility requirements apply when you use Compact 5000 I/O digital modules. For more information on controller and software compatibility, see [Controller and Software Compatibility on page 14](#).

Compact 5000 I/O digital modules use the Producer/Consumer network communication model. This communication is an intelligent data exchange between modules and other system devices in which each module produces data without first being polled.

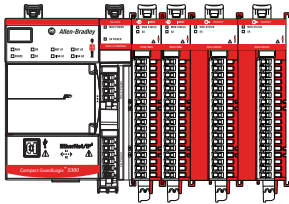
Controller and Software Compatibility

Controller and programming software compatibility requirements apply when you use Compact 5000 I/O digital modules.

Standard Modules



Safety Modules



Controller Compatibility

Compatibility between Logix 5000 controllers and Compact 5000 I/O digital modules varies based on module type and location. That is, whether the module is a standard or safety I/O module and whether the module is local or remote.

For example, CompactLogix™ 5380 and CompactLogix 5480 controllers are compatible with local or remote Compact 5000 I/O standard modules. Compact GuardLogix® 5380 controllers are compatible with local or remote Compact 5000 I/O digital modules.

Software Compatibility

Compact 5000 I/O digital modules are supported in different minimum versions of the Logix Designer application.

For example, Compact 5000 I/O standard modules support the Logix Designer application, version 28 or later. Compact 5000 I/O safety modules support the Logix Designer application, version 32 or later.

For more information on compatibility requirements, see [Table 3 on page 15](#)

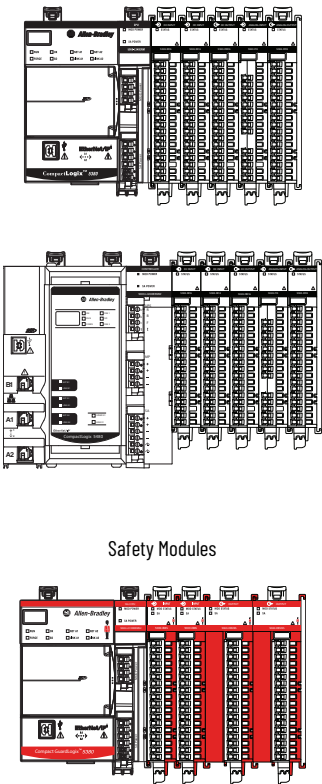
[Table 3](#) describes the module compatibility requirements when you use Compact 5000 I/O digital modules with Logix 5000 controllers.

Table 3 - Compact 5000 I/O Digital Modules Controller and Software Compatibility Requirements

Modules	Location	Controllers		Logix Designer Application
		System	Cat. Nos.	
Standard Modules 5069-IA16, 5069-IB16, 5069-IB16F, 5069- IB16K, 5069-IB6F-3W, 5069-OA16, 5069-OB8, 5069-OB16, 5069- OB16F, 5069-OB16K, 5069-OW4I, 5069- OW16, 5069-0X4I	Local I/O modules	CompactLogix 5380	5069-L320ER, 5069-L320ERMK, 5069-L330ERMK, 5069-L340ERM, 5069-L350ERMK	Version 28.00.00 or later
			5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L310ERS2, 5069-L320ERM, 5069-L320ERMK, 5069-L330ER, 5069-L330ERM, 5069-L330ERMK, 5069-L340ER	Version 29.00.00 or later
			5069-L350ERM, 5069-L350ERMK, 5069-L380ERM, 5069-L3100ERM	Version 30.00.00 or later
		CompactLogix 5480	5069-L46ERMW	Version 32.00.00 or later
			5069-L430ERMW, 5069-L450ERMW, 5069-L4100ERMW, 5069-L4200ERMW	Version 32.01.00 or later
		Compact GuardLogix 5380	5069-L306ERS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERS2, 5069-L320ERS2, 5069-L320ERS2K, 5069-L320ERS2, 5069-L320ERS2K, 5069-L330ERS2, 5069-5069-L330ERS2K, L330ERS2, 5069-L330ERS2K, 5069-L340ERS2, 5069-L340ERS2, 5069-L350ERS2, 5069-L350ERS2K, 5069-L350ERS2, 5069-L350ERS2K, 5069-L380ERS2, 5069-L380ERS2, 5069-L3100ERS2, 5069-L3100ERS2	Version 31.00.00 or later
	Remote I/O modules	CompactLogix 5380	5069-L320ER, 5069-L340ERM	Version 28.00.00 or later
			5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L310ERS2, 5069-L320ERM, 5069-L330ER, 5069-L330ERM, 5069-L340ER	Version 29.00.00 or later
			5069-L350ERM, 5069-L380ERM, 5069-L3100ERM	Version 30.00.00 or later
		CompactLogix 5480	5069-L46ERMW	Version 32.00.00 or later
			5069-L430ERMW, 5069-L450ERMW, 5069-L4100ERMW, 5069-L4200ERMW	Version 32.01.00 or later
		Compact GuardLogix 5380	5069-L306ERS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERS2, 5069-L320ERS2, 5069-L320ERS2K, 5069-L320ERS2, 5069-L320ERS2K, 5069-L330ERS2, 5069-5069-L330ERS2K, L330ERS2, 5069-L330ERS2K, 5069-L340ERS2, 5069-L340ERS2, 5069-L350ERS2, 5069-L350ERS2K, 5069-L350ERS2, 5069-L350ERS2K, 5069-L380ERS2, 5069-L380ERS2, 5069-L3100ERS2, 5069-L3100ERS2	Version 31.00.00 or later
		ControlLogix® 5580	1756-L83E, 1756-L85E	Version 28.00.00 or later
			1756-L81E, 1756-L82E, 1756-L84E	Version 29.00.00 or later
		GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	Version 31.00.00 or later
Safety Modules 5069-IB8S, 5069-IB8SK, 5069-OBV8S, 5069-OBV8SK	Local	Compact GuardLogix 5380	5069-L306ERS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERS2, 5069-L320ERS2, 5069-L320ERS2K, 5069-L320ERS2, 5069-L320ERS2K, 5069-L330ERS2, 5069-5069-L330ERS2K, L330ERS2, 5069-L330ERS2K, 5069-L340ERS2, 5069-L340ERS2, 5069-L350ERS2, 5069-L350ERS2K, 5069-L350ERS2, 5069-L350ERS2K, 5069-L380ERS2, 5069-L380ERS2, 5069-L3100ERS2, 5069-L3100ERS2	Version 32.00.00 or later
	Remote	Compact GuardLogix 5380	5069-L306ERS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERS2, 5069-L320ERS2, 5069-L320ERS2K, 5069-L320ERS2, 5069-L320ERS2K, 5069-L330ERS2, 5069-5069-L330ERS2K, L330ERS2, 5069-L330ERS2K, 5069-L340ERS2, 5069-L340ERS2, 5069-L350ERS2, 5069-L350ERS2K, 5069-L350ERS2, 5069-L350ERS2K, 5069-L380ERS2, 5069-L380ERS2, 5069-L3100ERS2, 5069-L3100ERS2	
			1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	
		GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	

Types of Modules

Standard Modules



Safety Modules

Table 4 describes the Compact 5000 I/O digital modules.

Table 4 - Compact 5000 I/O Digital Modules

Module Type	Cat. No.	Description
Standard	5069-IA16	79...264V AC 16-point, input module
	5069-IB16	10...32V DC 16-point, sinking input module
	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
	5069-OA16	85...264V AC 16-point, output module
	5069-OB8	10...32V DC 8-point, sourcing high-current output module
	5069-OB16	10...32V DC 16-point, sourcing output module
	5069-OB16K	10...32V DC 16-point, conformal coated sourcing output module
	5069-OB16F	10...32V DC 16-point, sourcing fast output module
	5069-OW4I	5...264V AC /125V DC 4-point, isolated normally open relay output module
	5069-OW16	5...264V AC/125V DC 16-point, normally open relay output module
Safety ⁽¹⁾	5069-IB8S	18...32V DC 8-point, safety sinking input module
	5069-IB8SK	18...32V DC 8-point, conformal coated safety sinking input module
	5069-OBV8S	18...32V DC 8-point, safety output module that can be used as follows: <ul style="list-style-type: none">• Bipolar output module• Sourcing output module
	5069-OBV8SK	18...32V DC 8-point, conformal coated safety output module that can be used as follows: <ul style="list-style-type: none">• Bipolar output module• Sourcing output module

(1) You can use the safety modules in applications that are rated up to, and including, SIL CL 3, PLe, Cat. 4 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1.

Module Overview

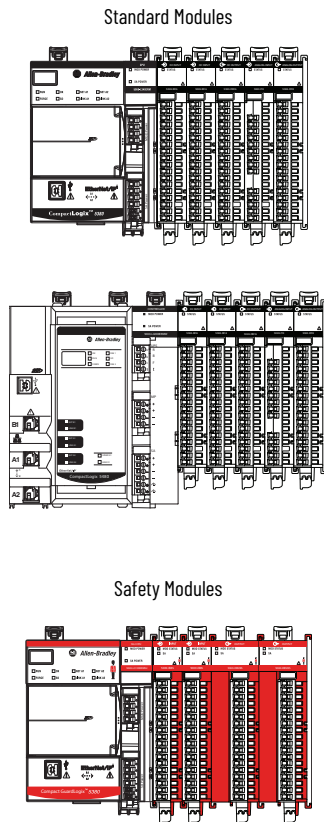


Figure 1 shows the parts of a Compact 5000 I/O digital module.

IMPORTANT Compact 5000 I/O safety modules look the same from the front with the exception that the safety modules have a red housing.

Figure 1 - Example Compact 5000 I/O Digital Modules

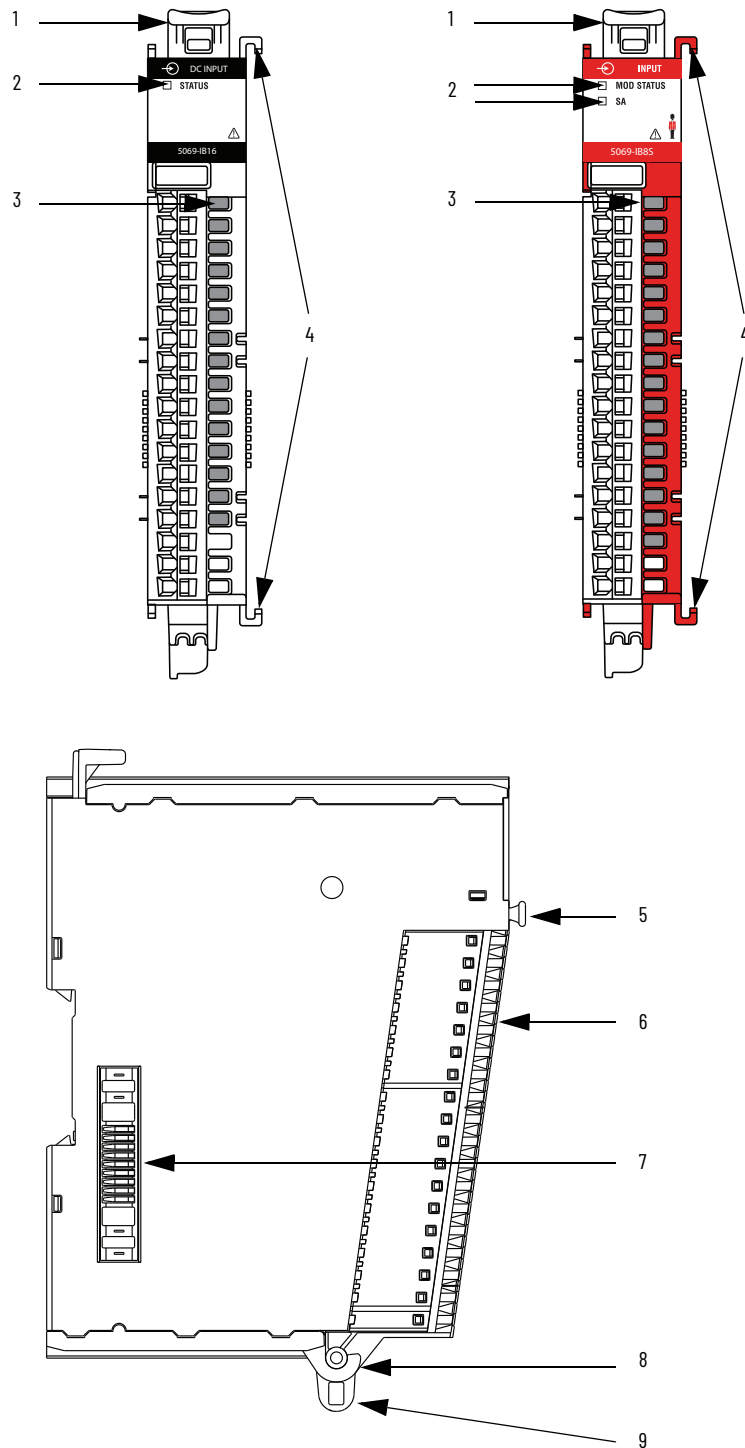


Table 5 - Compact 5000 I/O Digital Module Parts

Item	Item	Description
1	DIN rail latch	Locks the module on the DIN rail.
2	Module and power status indicators	Standard modules: <ul style="list-style-type: none"> • STATUS - Displays the status of communication and module health. Safety modules: <ul style="list-style-type: none"> • MOD Status - Displays the status of communication and module health. • SA - Displays whether SA power is applied to the module.
3	I/O status indicators	Displays the status of the input/output point.
4	Interlocking pieces	Securely installs Compact 5000 I/O digital modules in the system.
5	RTB handle	Anchors the RTB on the module.
6	RTB	Provides a wiring interface for the module.
7	MOD power bus and SA power bus connectors	Pass system-side and field-side power across the internal circuitry of the module in a Compact 5000 I/O system. The connectors are isolated from each other.
8	RTB lower tab	Hooks RTB onto the module to begin installation.
9	Lower hook	Used with cable tie after you wire the module.

Local I/O Modules or Remote I/O Modules

You can use Compact 5000 I/O digital modules as local or remote I/O modules, with some restrictions that are based on the module and controller type. Compatibility requirements apply and are described in [Controller and Software Compatibility on page 14](#).

Local I/O Modules

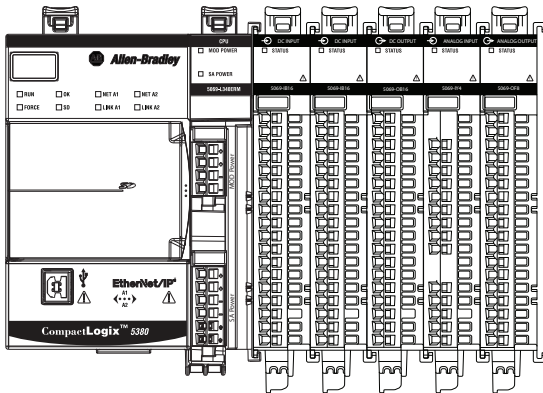
When Compact 5000 I/O digital modules reside in the same system as the controller, the modules are local I/O modules.

Local I/O modules are installed to the right of the controller and exchange data with the controller over the system backplane.

Figure 2 - Local Compact 5000 I/O Digital Modules

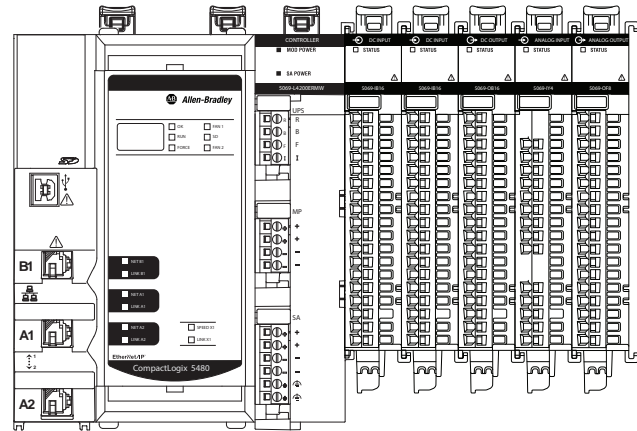
CompactLogix 5380 Controller

Local Compact 5000
I/O Standard Modules



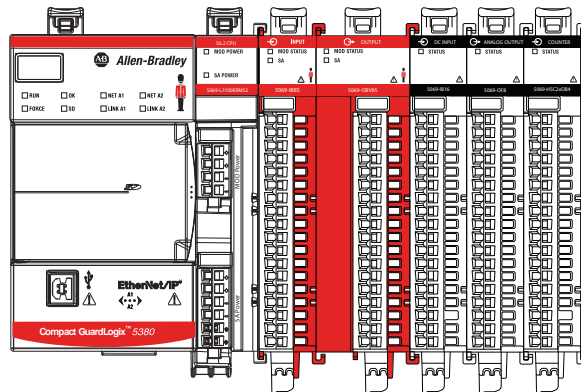
CompactLogix 5480 Controller

Local Compact 5000 I/O
Standard Modules



Compact GuardLogix 5380 Controller

Local Compact 5000 I/O
Digital Modules



Remote I/O Modules

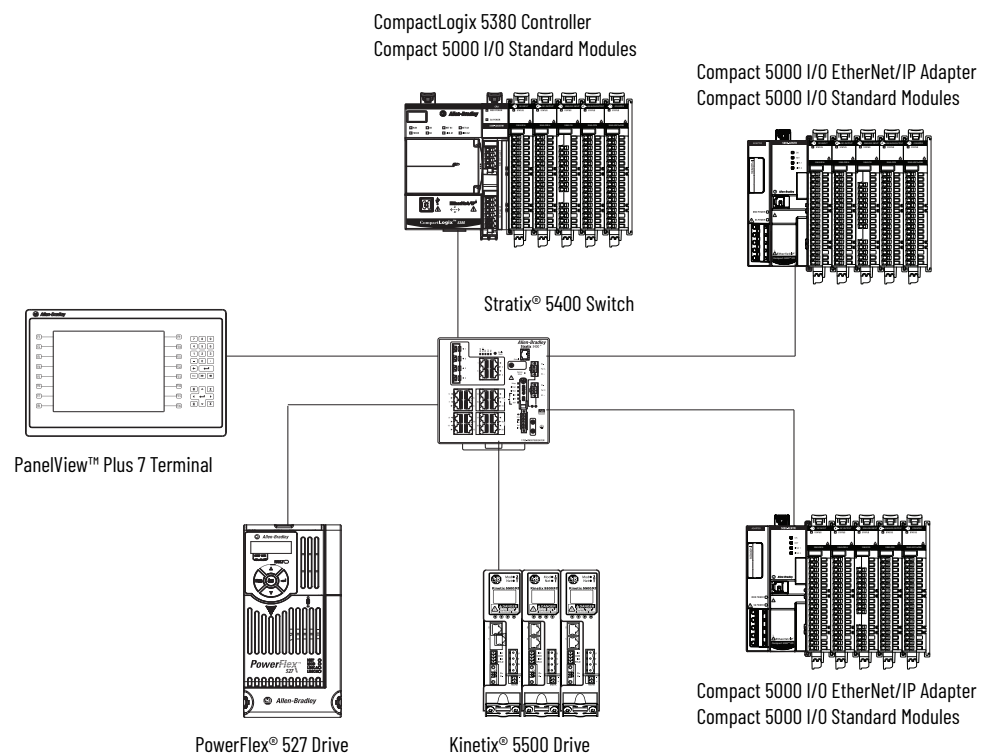
When Compact 5000 I/O digital modules reside in a separate location from Logix 5000 controllers, they are remote I/O modules. Remote Compact 5000 I/O digital modules are accessible over an EtherNet/IP™ network via a Compact 5000 I/O EtherNet/IP adapter.

The modules are installed to the right of the adapter and exchange data across the remote system backplane. The data is then exchanged with the controller over the EtherNet/IP network.

IMPORTANT Remember, some restrictions apply when you use the I/O modules remotely. For example, you can use Compact 5000 I/O safety modules as remote I/O modules only in Compact GuardLogix 5380 or GuardLogix 5380 control systems.

[Figure 3](#) shows remote Compact 5000 I/O standard modules in an example CompactLogix 5380 control system.

Figure 3 - Remote Compact 5000 I/O Standard Modules in a CompactLogix 5380 Control Applications



[Figure 4](#) shows remote Compact 5000 I/O safety modules in a Compact GuardLogix 5380 control application.

Figure 4 - Remote Compact 5000 I/O Safety Modules in a Compact GuardLogix 5380 Control Application

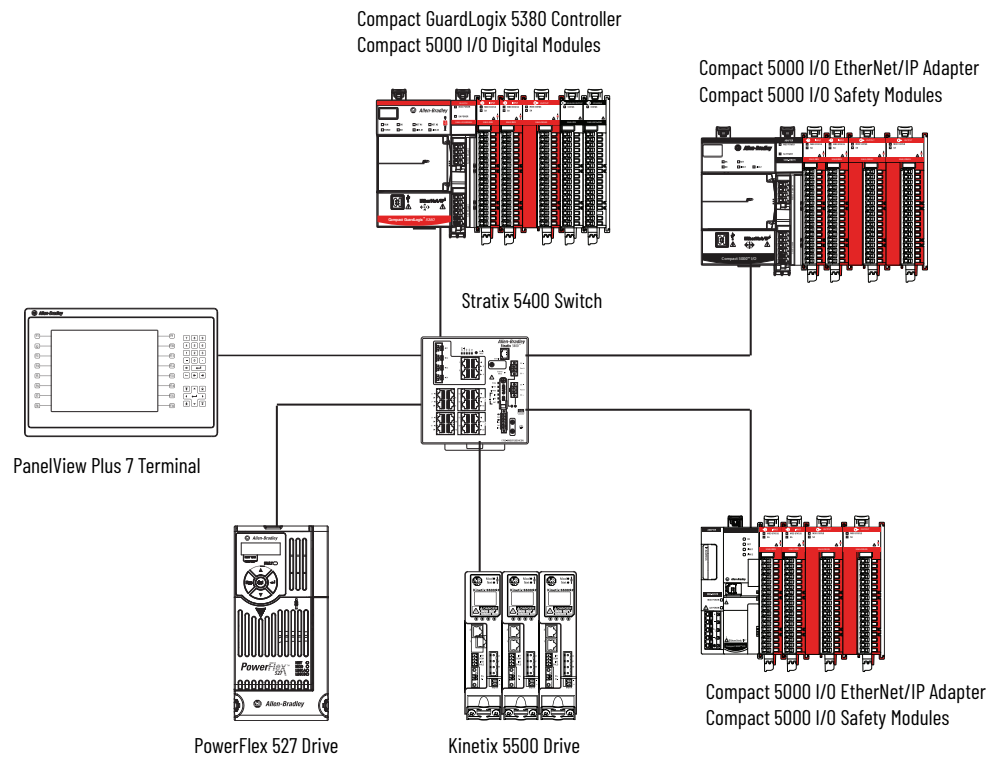
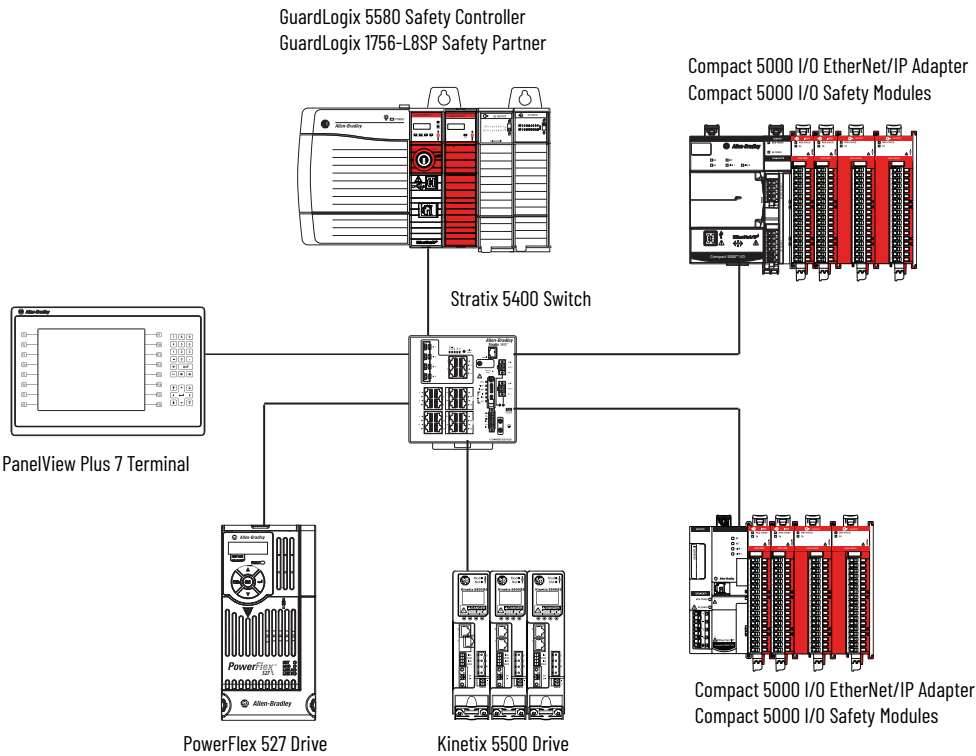


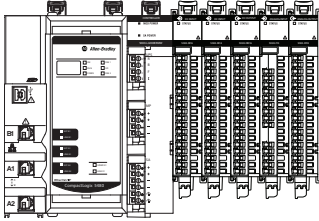
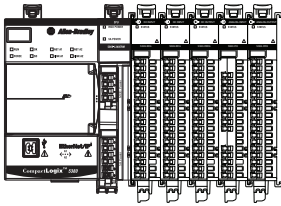
Figure 5 shows remote Compact 5000 I/O safety modules in a GuardLogix 5580 control application.

Figure 5 - Remote Compact 5000 I/O Safety Modules in a GuardLogix 5580 Control Application

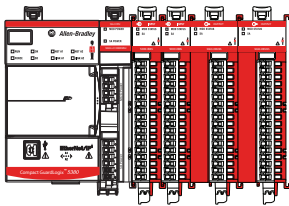


Secure Access to the System

Standard Modules



Safety Modules



To secure access to a Logix 5000 controller, Compact 5000 EtherNet/IP adapter, or I/O module by authorized users only, consider the following options:

- Password protect the source and execution of the control program.
- Deploy EtherNet/IP devices in accordance with recommended architectures and concepts. See the Converged Plantwide Ethernet (CPwE) Design and Implementation Guide, publication [ENET-TD001](#).
- Implement physical barriers, such as locked cabinets.

To secure access to the system, consider the following options:

- Follow industry best practices to harden your PCs and servers, including anti-virus/anti-malware and application whitelisting solutions.

The recommendations are published at the Rockwell Automation® technical support center in Knowledgebase article Rockwell Automation *Customer Hardening Guidelines*, #546987.

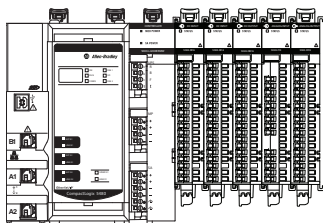
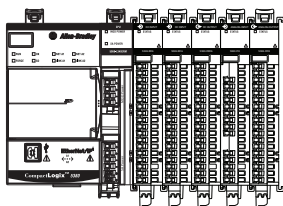
The technical support center is available at: <https://rockwellautomation.custhelp.com/>

- Develop and deploy backup and disaster recovery policies and procedures. Test backups on a regular schedule.
- Minimize network exposure for all control system devices and systems, and make sure that they are not accessible from the Internet.
- Locate control system networks and devices behind firewalls and isolate them from the business network.
- Subscribe to Knowledgebase article *Industrial Security Advisory Index*, #54102 at the Rockwell Automation technical support center so you have access to information about security matters that affect Rockwell Automation products.

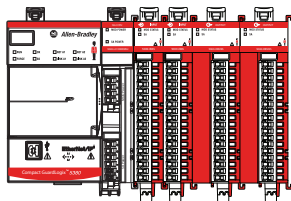
The technical support center is available at: <https://rockwellautomation.custhelp.com/>

Ownership

Standard Modules



Safety Modules



Every I/O module in a Logix 5000 control system must be owned by a controller, also known as the owner-controller. When a Compact 5000 I/O digital module is used in a Logix 5000 control system, the owner-controller performs the following:

- Stores configuration data for every module that it owns.
- Can reside in a location that differs from the Compact 5000 I/O digital modules.
- Sends the I/O module configuration data to define module behavior and begin operation in the control system.

Each Compact 5000 I/O digital module must continuously maintain communication with its owner-controller during normal operation.

IMPORTANT The following modules are restricted to one owner-controller:

- Compact 5000 I/O standard output modules
 - Compact 5000 I/O safety modules
-

Multiple Owners of Compact 5000 I/O Standard Input Modules

Multiple Logix 5000 controllers can connect to Compact 5000 I/O standard input modules as owner-controllers.

In this case, the following conditions must exist:

- The controllers maintain the same configuration.
- The configuration in each controller uses a Data connection to the input module.
- The first controller to make a connection to the input module is the only controller that can change the connection. Therefore, it is 'owns' the module configuration.

IMPORTANT If the controller that owns the module configuration changes the configuration, the other controllers are not notified of the changes. For more information, see [Configuration Changes in a Standard Input Module with Multiple Owners on page 25](#).

- The controllers that do maintain, but do not 'own', the module configuration are similar to Listen-only controllers.

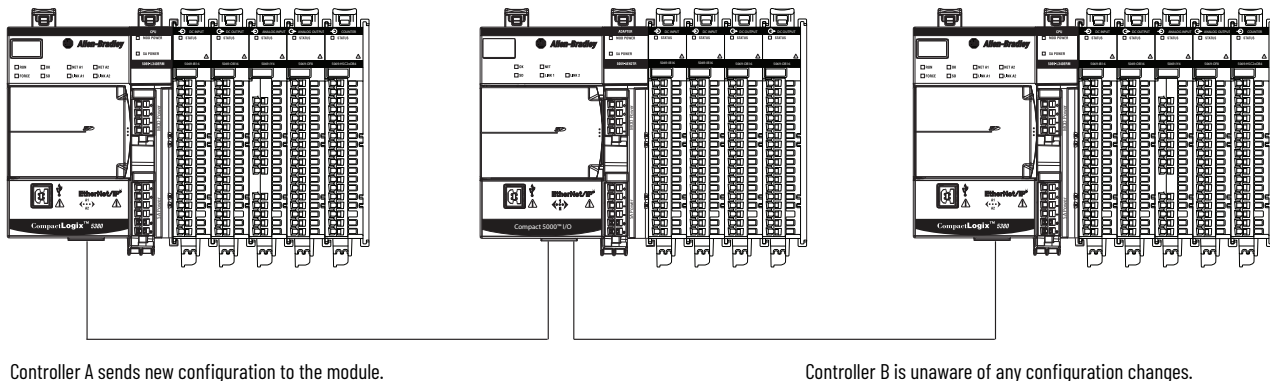
The difference between the controllers is that the controllers that maintain, but do not own, the module configuration can use a Multicast or Unicast connection over the EtherNet/IP network.

For more information on Listen-only controllers, see [Listen Only on page 47](#).

Configuration Changes in a Standard Input Module with Multiple Owners

You must be careful when changing the configuration data of an input module in a multiple-owner scenario. If the configuration data is changed in owner A and sent to the module, the changed configuration data is accepted as the new configuration for the module. Owner B continues to listen unaware that any changes have been made in the behavior of the input module, as illustrated.

Figure 6 – Module Configuration Changes with Multiple Owners



IMPORTANT A message in Logix Designer application alerts you to the possibility of a multiple owner-controller situation and lets you inhibit the connection before changing the module configuration. When changing the configuration for a module with multiple owners, we recommend that you inhibit the connection.

To help prevent other owner-controllers from receiving potentially erroneous data, use the following steps when changing the configuration of a module in a multiple owner scenario while online.

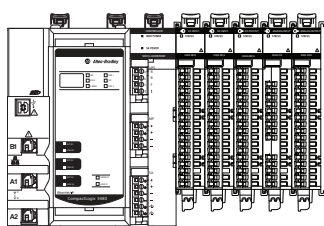
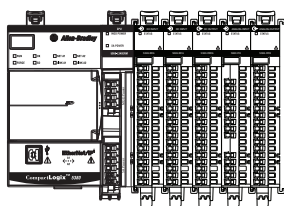
1. For each owner-controller, inhibit the connection to the module either in the software on the Connection tab or the message dialog box warning you of the multiple owner condition.
2. Make the appropriate configuration data changes in the software.

For more information on how to use the Logix Designer application to change the configuration, see the following:

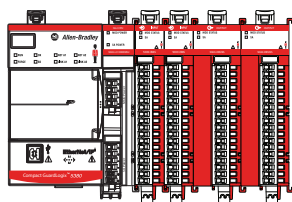
- Standard modules - Chapter 6, [Configure a Standard Module on page 141](#)
 - Safety modules - Chapter 7, [Configure and Replace Safety Modules on page 181](#)
3. Repeat [step 1](#) and [step 2](#) for all owner-controllers, to make the exact same changes in each.
 4. Clear the Inhibit checkbox in each owner-controller configuration.

Construct a System

Standard Modules



Safety Modules



Before you use your Compact 5000 I/O digital modules, you must complete tasks that are based on whether the modules are local or remote I/O modules.

Local I/O Modules

Complete the following steps.

1. Install a CompactLogix 5380, CompactLogix 5480, or Compact GuardLogix 5380 controller.

IMPORTANT You must use a Compact GuardLogix 5380 controller if the local Compact 5000 I/O digital modules includes safety modules.

For more information on controller compatibility, see [Controller and Software Compatibility on page 14](#).

2. Install the modules to the right of the controller.
3. Install the end cap on the last module in the local system.

IMPORTANT The end cap in a CompactLogix 5380, CompactLogix 5480, or Compact GuardLogix 5380 control system covers the exposed interconnection on the last module on the DIN rail.

If you do not install an end cap on the last module on the DIN rail, equipment damage or injury can occur.

Remote I/O Modules

Complete the following:

1. Install a controller that is compatible with the remote Compact 5000 I/O digital modules to be used in the application via an EtherNet/IP network.

IMPORTANT Remember, you must use a Compact GuardLogix 5380 controller or GuardLogix 5580 controller if the set of remote Compact 5000 I/O digital modules include safety modules.

For more information on controller compatibility, see [Controller and Software Compatibility on page 14](#).

2. Install an EtherNet/IP network.
3. Connect the controller to the network.
4. Install a Compact 5000 I/O EtherNet/IP adapter.
5. Connect the adapter to the network.
6. Install the Compact 5000 I/O digital modules to the right of the adapter.
7. Install the end cap on the last module in the local system.

IMPORTANT The end cap in a CompactLogix 5380, CompactLogix 5480, or Compact GuardLogix 5380 control system covers the exposed interconnection on the last module on the DIN rail.

If you do not install an end cap on the last module on the DIN rail, equipment damage or injury can occur.

For information on how to install compatible controllers, adapters, and Compact 5000 I/O modules, see the publications that are listed in [Table 2 on page 11](#).

Use a 5069-ARM Address Reserve Module to Reserve a Node Address

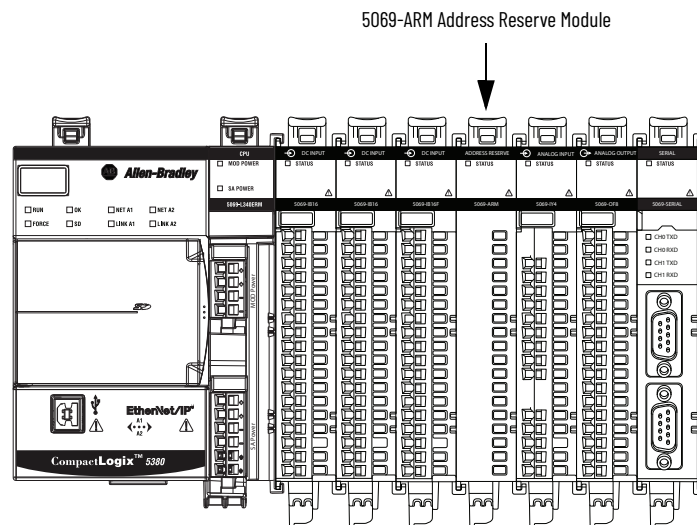
Every Compact 5000 I/O digital module has a unique node address in a system. As modules are installed, the node addresses increment. The Logix Designer application project includes modules in the I/O Configuration that correspond to the physical modules.

If a module is not available during initial system installation and operation, you can use a 5069-ARM address reserve module to reserve the slot in the system. That is, you install the 5069-ARM address reserve module to reserve the node address. The address reserve module remains installed until the I/O module is available.

When you install the address reserve module, you also make sure that the subsequently-installed modules are at the correct node address.

You use the corresponding entry in the Logix Designer application project to reserve the node address. That is, when you add modules to the I/O Configuration tree in the project, you add an address reserve module at the node address that matches the physical module location.

Figure 7 - CompactLogix 5380 Control System with a 5069-ARM Address Reserve Module



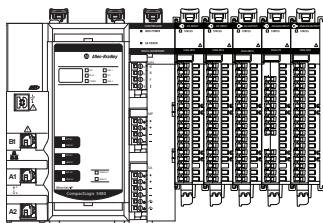
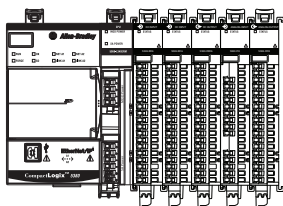
When the I/O becomes available, you complete the following tasks.

1. Remove the 5069-ARM module from the system.
2. Install the I/O module in the slot that previously contained the 5069-ARM module.
3. Replace the 5069-ARM module entry in the I/O Configuration section of the Logix Designer application project with the new I/O module.

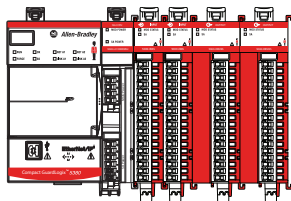
For more information on how to use a 5069-ARM module in a Logix Designer application project, see [Reserve an I/O Module Slot on page 150](#).

Power the Modules

Standard Modules



Safety Modules



Compact 5000 I/O digital modules receive the following power types from first component in the system, that is, the controller or adapter:

- System-side Power - Powers the system and lets modules transfer data and execute logic.

System-side power is provided through the Module (MOD) Power connector and is passed to each module as it is added to the system.

System-side power is also known as **MOD power**.

- Field-side Power - Powers field-side devices that are connected to some Compact 5000 I/O digital modules.

Field-side power is provided through the Sensor/Actuator (SA) Power connector and is passed to each module as it is added to the system.

Field-side power is also known as **SA power**.

Power begins at the leftmost device in the system and passes across the I/O module internal circuitry via power buses. The MOD power bus and SA power buses are isolated from each other. The leftmost device is either a controller or an EtherNet/IP adapter.

IMPORTANT Remember the following:

- A system has only one MOD power bus.
- A system can have multiple SA power buses. The first SA power bus typically starts at the controller or adapter, and 5069-FPD field potential distributors let you establish new SA power buses in the same system. For more information, see [Use a 5069-FPD Field Potential Distributor to Establish New SA Power Buses on page 29](#).
- Compact GuardLogix 5380 controllers only:
 - You must use an SELV/PELV-listed power supply to provide MOD power and SA power to the controller.
 - Additional requirements exist when you power a functional safety application that includes Compact 5000 I/O safety modules.

For more information on these requirements, see [Power Requirements When You Use Compact 5000 I/O Safety Modules on page 31](#).

IMPORTANT Remember the following:

- **DC-type modules** and **AC-type modules** must be on **separate SA power buses**.

The following Compact 5000 I/O digital modules are **DC-type** modules:

- 5069-IB8S
- 5069-IB8SK
- 5069-IB16
- 5069-IB16F
- 5069-IB16K
- 5069-IB6F-3W
- 5069-OB8
- 5069-OBV8S
- 5069-OBV8SK
- 5069-OB16
- 5069-OB16F
- 5069-OB16K
- 5069-OW4I
- 5069-OW16
- 5069-OX4I

The following Compact 5000 I/O digital modules are **AC-type** modules:

- 5069-IA16
- 5069-OA16

For more information on how to establish new SA power buses, see [page 29](#).

For more information on how to power local Compact 5000 I/O digital modules, see the following:

- CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, publication [5069-UM001](#)
- CompactLogix 5480 Controller User Manual, publication [5069-UM002](#)

For more information on how to power remote Compact 5000 I/O digital modules, see the Compact 5000 EtherNet/IP Adapters User Manual, publication [5069-UM007](#).

Use a 5069-FPD Field Potential Distributor to Establish New SA Power Buses

A 5069-FPD field potential distributor lets you change the field-side power distribution source for Compact 5000 I/O modules to the right of the field power distributor. The field potential distributor passes MOD power bus signals through to the next module in the system.

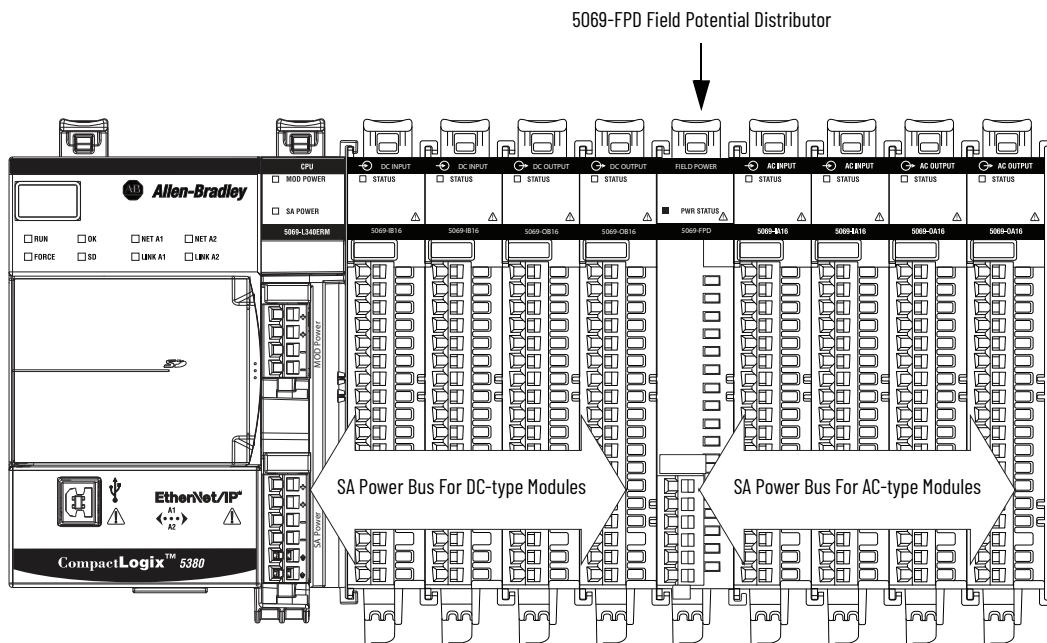
You can use a 5069-FPD field potential distributor to establish a new SA power bus in a system. The field potential distributor blocks the current that passes across the SA power bus to the left of the field potential distributor. It then establishes a new SA power bus for modules to the right.

The new SA power bus extends to the last module in the system or until another field potential distributor establishes another SA power bus.

The SA power bus that a field potential distributor establishes functions in the same way as the SA power bus that a controller or adapter establishes.

[Figure 8](#) shows a CompactLogix 5380 system that includes a field potential distributor that isolates DC-type modules from AC-type modules.

Figure 8 - CompactLogix 5380 Controller System with 5069-FPD Field Potential Distributor



IMPORTANT You must install DC-type modules and AC-type modules on separate SA power buses.

You use 5069-FPD field potential distributors to establish SA power buses that are separate from the SA power bus that the controller or adapter establishes.

To install modules on separate SA power buses, complete the following steps.

1. Install the controller or adapter.
The controller or adapter establishes the first SA power bus.
2. Install one type of modules to the right of the controller or adapter, for example, DC-type modules.
3. Install a 5069-FPD field potential distributor.
The field potential distributor establishes a new SA power bus that is isolated from the first one.
4. Install the other type of modules to the right of the field potential distributor, for example, AC-type modules.
Additional requirements apply when you use a 5069-FPD field potential distributor in a local or remote system with Compact 5000 I/O safety modules.

For more information on the additional requirements, see [Power Requirements When You Use Compact 5000 I/O Safety Modules on page 31](#)

Power Requirements When You Use Compact 5000 I/O Safety Modules

This section describes the requirements that apply when you connect MOD power and SA power to a system that includes both types of Compact 5000 I/O digital modules.

There is some variation in the requirements based on whether the safety modules are used as local or remote I/O modules. That is, if the modules are installed in a Compact GuardLogix 5380 system or a Compact 5000 I/O system accessible over an EtherNet/IP network.

Power a Compact GuardLogix 5380 System That Includes Compact 5000 I/O Safety Modules

[Table 6](#) describes requirements that apply when you connect MOD power and SA power to a Compact GuardLogix 5380 system with a mix of standard and safety modules.

Table 6 - Connect Power to a Compact GuardLogix 5380 System with Compact 5000 I/O Standard and Safety Modules

Power Type	Requirements	Example System
MOD Power	<ul style="list-style-type: none"> You must use an SELV/PELV-listed 24V DC power supply to provide MOD power to the controller. The total continuous current draw across the MOD power bus must not be more than 5 A max at 18...24V DC. We recommend that you calculate the total MOD power bus current draw as you install modules. 	

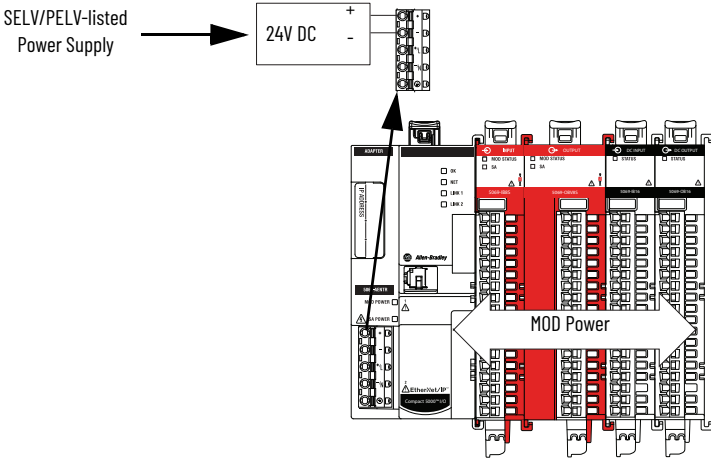
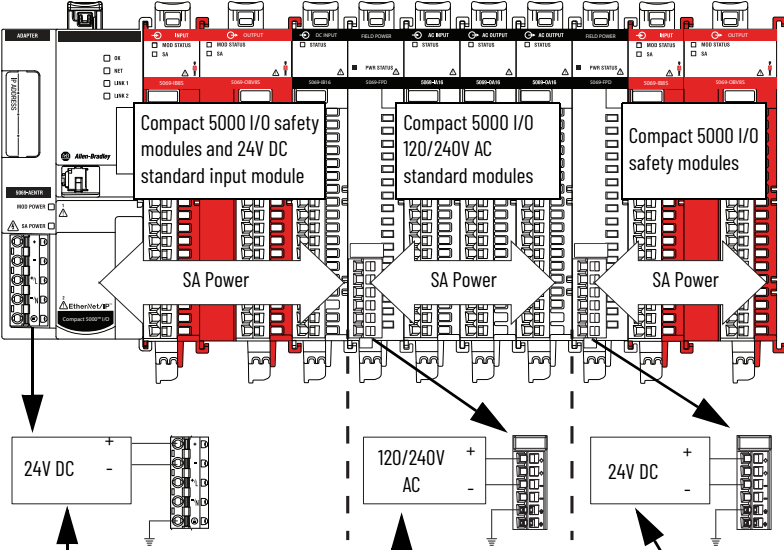
Table 6 - Connect Power to a Compact GuardLogix 5380 System with Compact 5000 I/O Standard and Safety Modules

Power Type	Requirements	Example System
SA Power	<ul style="list-style-type: none">You must use an SELV/PELV-listed power supply to provide SA power to the controller.You must use a 24V DC power supply to provide SA power to the controller.The total continuous current draw across an SA power bus must not be more than 10 A max at 18...24V DC.You can install only Compact 5000 I/O safety modules and non-relay DC-type standard modules next to the safety controller. <p>IMPORTANT: This requirement is related to the controller, not the I/O modules.</p> <p>However, you can install safety modules and non-relay DC-type modules to the right of a 5069-FPD field potential distributor.</p> <ul style="list-style-type: none">If you install safety modules to the right of a field potential distributor, you must use an SELV/PELV-listed power supply to provide SA power.You must isolate the following groups of modules on separate SA power buses:<ul style="list-style-type: none">Safety and non-relay DC-type standard modulesRelay DC-type modulesAC-type modulesIf you install AC-type modules, you must install them to the right a field potential distributor. The 120/240V AC power supply that provides SA power is not required to be SELV/PELV-listed.If you install relay DC-type standard modules, you must install them to the right of a field potential distributor. The 24V DC power supply that provides SA power is not required to be SELV/PELV-listed.	<p>SA Power</p> <p>24V DC</p> <p>120/240V AC</p> <p>24V DC</p> <p>SELV/PELV-listed Power Supply</p> <p>Non SELV/PELV-listed Power Supply</p> <p>SELV/PELV-listed Power Supply</p> <p>The modules on this SA power bus are 120/240V AC modules. This power supply can also be a non SELV/PELV-listed 24V DC power supply, if necessary, based on system configuration. 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.</p>

Power a Remote Compact 5000 I/O System That Includes Compact 5000 I/O Safety Modules

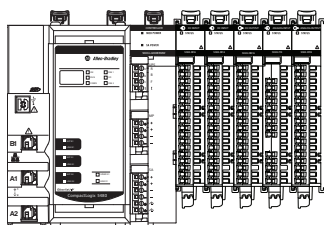
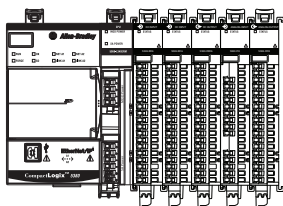
[Table 7](#) describes requirements that apply when you connect MOD power and SA power to a Compact 5000 I/O system with standard and safety modules.

Table 7 - Connect Power to a Compact 5000 I/O System with Standard and Safety Modules

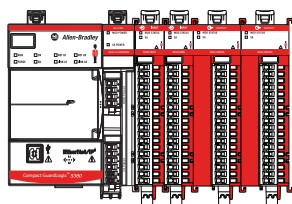
Power Type	Requirements	Example System
MOD Power	<ul style="list-style-type: none"> You must use an SELV/PELV-listed power supply to provide MOD power to the controller. The total continuous current draw across the MOD power bus must not be more than 10 A max at 18...24V DC. <p>We recommend that you calculate the total MOD power bus current draw as you install modules.</p>	 <p>SELV/PELV-listed Power Supply → 24V DC</p> <p>MOD Power</p>
SA Power	<ul style="list-style-type: none"> You must use an SELV/PELV-listed power supply to provide SA power to the adapter. You must use a 24V DC power supply to provide SA power to the adapter. The total continuous current draw across an SA power bus must not be more than 10 A max at 18...24V DC. If you install safety modules to the right of a field potential distributor, you must use an SELV/PELV-listed power supply to provide SA power. You must isolate the following groups of modules on separate SA power buses: <ul style="list-style-type: none"> Safety and non-relay DC-type standard modules Relay DC-type modules AC-type modules If you install AC-type modules, you must install them to the right of a field potential distributor. The 120/240V AC power supply that provides SA power is not required to be SELV/PELV-listed. If you install relay DC-type standard modules, you must install them to the right of a field potential distributor. The 24V DC power supply that provides SA power is not required to be SELV/PELV-listed. 	 <p>Compact 5000 I/O safety modules and 24V DC standard input module</p> <p>Compact 5000 I/O 120/240V AC standard modules</p> <p>Compact 5000 I/O safety modules</p> <p>SA Power</p> <p>SA Power</p> <p>SA Power</p> <p>24V DC</p> <p>120/240V AC</p> <p>24V DC</p> <p>SELV/PELV-listed Power Supply</p> <p>Non SELV/PELV-listed Power Supply</p> <p>SELV/PELV-listed Power Supply</p> <p>The modules on this SA power bus are 120/240V AC modules. Therefore, this must be a 120/240V AC power supply. However, it can be a non SELV/PELV-listed power supply because there are no safety modules on the 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.</p>

Configure the Modules

Standard Modules



Safety Modules



You must create a Logix Designer application project for the controller that owns the Compact 5000 I/O digital modules. The project includes module configuration data for the module.

The Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules either across the backplane or over an EtherNet/IP network.

The I/O modules can operate immediately after receiving the configuration data.

IMPORTANT This section shows some Logix Designer application screens; it is not a complete description of how to configure a module.

- For more information on how to use the Logix Designer application to configure Compact 5000 I/O standard modules, see Chapter 6, [Configure a Standard Module on page 141](#).
 - For more information on how to use the Logix Designer application to configure Compact 5000 I/O safety modules, see Chapter 7, [Configure and Replace Safety Modules on page 181](#).
-

Connections with Compact 5000 I/O Digital Modules

During module configuration, you must define the module. Among the Module Definition parameters with Compact 5000 I/O digital modules, you must choose a connection type for the module. A connection is a real-time data transfer link between the owner-controller and the module that occupies the slot that the configuration references.

When you download module configuration to a controller, the controller attempts to establish a connection to each module in the configuration.

Because part of module configuration includes a slot number in the local or remote system, the owner-controller checks for the presence of a module there. If a module is detected, the owner-controller sends the configuration.

One of the following occurs:

- If the configuration is appropriate to the module detected, a connection is made and operation begins.
- If the configuration is not appropriate to the module detected, the data is rejected and the Logix Designer application indicates that an error occurred.

The configuration can be inappropriate for many reasons. For example, a mismatch in electronic keying that helps prevent normal operation.

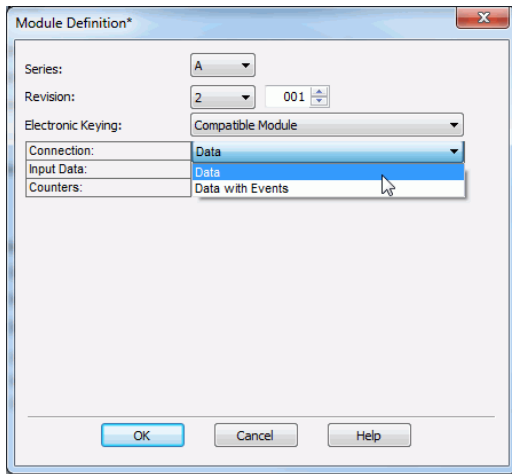
The owner-controller monitors its connection with a module. Any break in the connection, for example, the loss of power to the system, causes a fault. The Logix Designer application monitors the fault status tags to indicate when a fault occurs on a module.

Connection Types That Are Available with Compact 5000 I/O Standard Modules

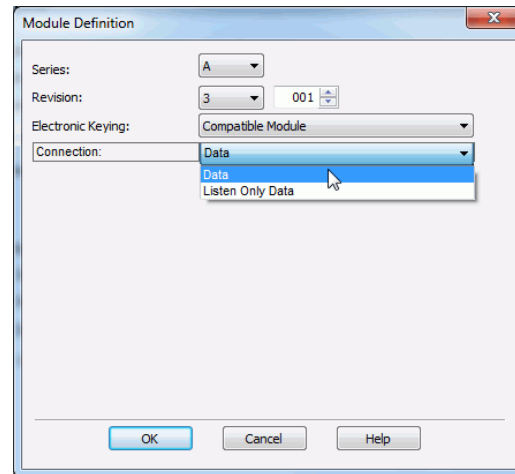
The Connection choice determines what data is exchanged between the owner-controller and the module.

The following are example Module Definition dialog boxes, and available Connection choices, for Compact 5000 I/O standard modules.

5069-IB16F Module



5069-OA16 Module



[Table 8](#) describes the connection types that you can use with Compact 5000 I/O standard modules.

Table 8 - Connections - Compact 5000 I/O Standard Modules

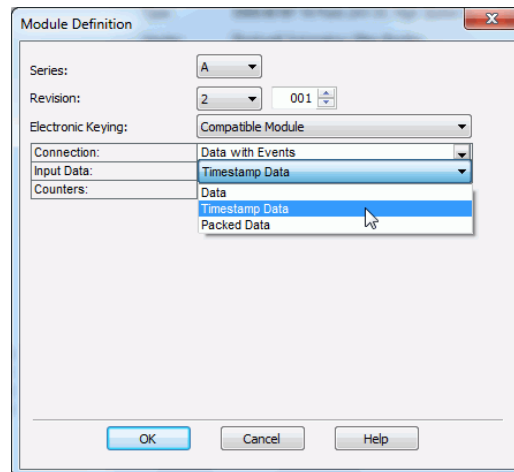
Connection Type	Description	
	Compact 5000 I/O Standard Input Modules	Compact 5000 I/O Standard Output Modules
Data	The module returns the following to the owner-controller: <ul style="list-style-type: none"> General input data General fault data Counter data - Not available with all modules 	The module returns the following to the owner-controller: <ul style="list-style-type: none"> General fault data Output data
Data with Events ⁽¹⁾	The module returns the following to the owner-controller: <ul style="list-style-type: none"> General input data General fault data Input data time stamp Event input data time stamp Event fault data Event input data Event output data Counter data - Not available with all modules. With the modules that can provide counter data, they only provide it based on the Input Data selection. 	—
Listen Only Data	When a Listen Only Data connection is used, the controller that makes the connection does not own the module configuration. The 'listening controller' merely listens to the data exchanged between the module and the owner-controller, that is, general input data and general fault data. For more information on Listen Only Data connections, see Listen Only on page 47 .	

(1) Data with events is available on only the 5069-IB16F and 5069-IB6F-3W standard input modules.

Data Types Available with Compact 5000 I/O Standard Modules

The Module Definition includes a Data parameter that matches the module type. Standard input modules use Input Data, and standard output modules use Output Data.

The module type and Connection choice determine the available Input Data or Output Data choices. For example, you can configure a 5069-IB16F input module to use the Connection choice Data with Events. The resulting Input Data choices are Data with Events include Data, Packed Data, or Timestamped Data, as shown.



The 5069-IB16 input module does not support the Connection choice Data with Events, however. As a result, the Input Data choice Timestamped Data is not available.

For more information on how to use the Module Definition parameters with Compact 5000 I/O digital modules, see the following:

- Module Definition on [page 154](#)
- Logix Designer application online help

Connections with Compact 5000 I/O Safety Modules

During module configuration, you must define the module. Among the Module Definition parameters with Compact 5000 I/O safety modules, you must choose how module is configured.

The choice depends on whether the project is downloaded to the controller that owns the module configuration, that is, the owner-controller, or to a controller that is listening to input modules in a project.

A real-time data transfer link is established between the controller and the module that occupies the slot that the configuration references.

When you download module configuration to a controller, the controller attempts to establish a connection to each module in the configuration.

Because part of module configuration includes a slot number in the local Compact GuardLogix 5380 controller system or remote Compact 5000 I/O system, the owner-controller checks for the presence of a module there. If a module is detected, the owner-controller sends the configuration. One of the following occurs:

- If the configuration is appropriate to the module detected, a connection is made and operation begins.
- If the configuration is not appropriate to the module detected, the data is rejected and the Logix Designer application indicates that an error occurred.

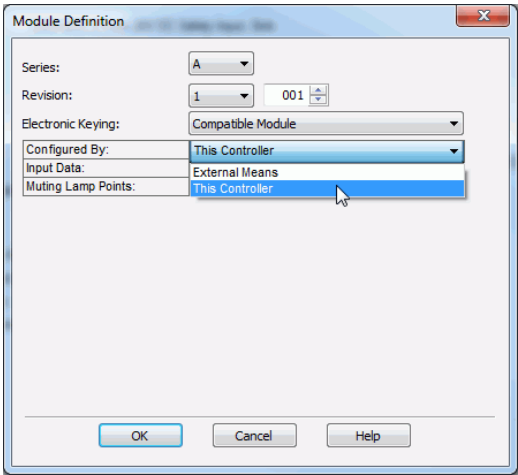
The configuration can be inappropriate for many reasons. For example, a mismatch in electronic keying that helps prevent normal operation.

The owner-controller monitors its connection with a module. Any break in the connection, for example, the loss of power to a remote Compact 5000 I/O system, causes a fault. The Logix Designer application monitors the fault status tags to indicate when a fault occurs on a module.

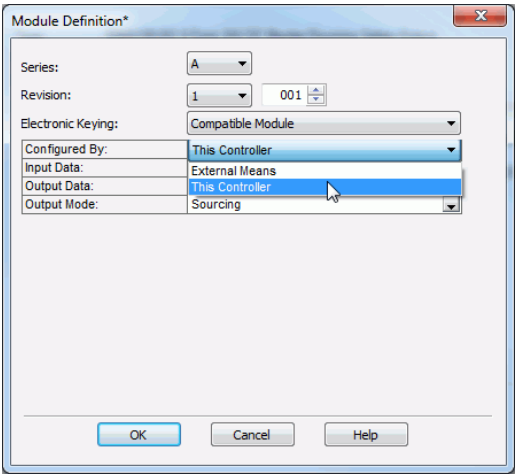
Configured by Options That Are Available with Compact 5000 I/O Safety Modules

The Configured By choice determines what data is exchanged between the owner-controller and the module. The following are example Module Definition dialog boxes, and available Connection choices, for Compact 5000 I/O safety modules.

5069-IB8S Module



5069-OBV8S Module



[Table 9](#) describes the connection types that you can use with Compact 5000 I/O safety modules.

Table 9 - Configured by Choices - Compact 5000 I/O Safety Modules

Configured by Choice	Description	
	Compact 5000 I/O Safety Input Module	Compact 5000 I/O Safety Output Module
This Controller	<p>This choice directs the controller to configure the module.</p> <p>The module returns the following to the owner-controller:</p> <ul style="list-style-type: none">• General fault data• Safety input data• Muting lamp points	<p>The module returns the following to the owner-controller:</p> <ul style="list-style-type: none">• General fault data• Safety input data• Safety output data <p>IMPORTANT: When you choose This Controller, you must define the output mode that the module uses, that is, sourcing or bipolar output mode.</p>
External Means	<p>This choice directs the controller to establish only a safety input connection. When the External Means is chosen, another controller owns the module.</p> <p>A controller that uses this option does not write configuration for the module or control the Test Outputs. It merely listens to the data exchanged with the owner-controller. That is, it receives Safety input data.</p> <p>For more information on the External Means option, see External Means on page 51. In this case, all other connections to the module, for example, the connection to the owner-controller must also use the Multicast option.</p>	

Data Types Available with Compact 5000 I/O Safety Modules

On the Module Definition dialog box for Compact 5000 I/O safety modules, you must configure data type parameters.

[Table 10](#) describes the available data type choices based on module type.

Table 10 - Compact 5000 I/O Safety Modules - Data Types

Catalog Number	Supported Data Types	Data Type Choices
5069-IB8S, 5069-IB8SK ⁽¹⁾	Input Data	Safety Data Safety Packed Data
	Output Data	There is not an Output Data field on the Module Definition dialog box in the Logix Designer application for the 5069-IB8S module. However, if you enable Muting on points 02 and/or 03, output data is available in module output tags. For more information on module tags, see Appendix B, Module Tag Definitions on page 217 .
5069-OBV8S, 5069-OBV8SK ⁽¹⁾	Input Data	Safety Data Safety Packed Data
	Output Data	Safety Data Safety Packed Data None IMPORTANT: This field is automatically set based on how you configure the Configured By and Input Data parameters on the Module Definition dialog box. For example, if you configure a 5069-OBV8S module to use the Configured By parameter of This Controller and the Input Data parameter of Safety Data, the Output Data field is automatically set to Safety Data and no other choices are available.

(1) The conformal coated module catalog numbers are not available in the Logix Designer application. If your application uses a conformal coated module, you choose the non-conformal coated catalog number when you add the module to the project.

Muting Lamp Points Available with Compact 5000 I/O Safety Input Module

The Module Definition for the 5069-IB8S and 5069-IB8SK safety input modules includes the Muting Lamp Points parameter. This parameter defines what output points on the module, if any, are connected to muting lamps.

There is a corresponding test output point configuration when an output is configured as a muting lamp output. The output drives a muting lamp. For more information, see [Muting Lamp Operation on page 131](#).

IMPORTANT If the Configured By parameter is External Means, the Muting Lamp Points parameter is disabled. It is automatically set to None.

Output Mode Available with Compact 5000 I/O Safety Input Module

The Module Definition for the 5069-OBV8S or 5069-OBV8SK safety output module includes the Output Mode parameter. This parameter defines whether the module is operating in Sourcing or Bipolar mode.

IMPORTANT If the Configured By parameter is External Means, the Output Mode parameter is disabled. It is automatically set to None.

For more information on the Module Definition parameters that are available with Compact 5000 I/O digital modules, see the Logix Designer application.

Requested Packet Interval

The Requested Packet Interval (RPI) is a configurable parameter that defines a rate at which the owner-controller and the module exchange data.

You set the RPI value during initial module configuration and can adjust it as necessary after module operation has begun. The following are valid RPI values:

- Compact 5000 I/O standard modules - 0.2...750 ms
- Compact 5000 I/O safety modules - 2...500 ms

IMPORTANT You can change the RPI while the project is online. If you change the RPI while the project is online, however, the connection to the module is closed and reopened in one of the following ways:

- You inhibit the connection to the module, change the RPI value, and uninhibit the connection.
- You change the RPI value. In this case, the connection is closed and reopened immediately after you apply the change to the module configuration.

Connection Reaction Time Limit with Compact 5000 I/O Safety Modules

With Compact 5000 I/O safety modules, the Connection Reaction Time Limit configuration affects the module RPI.

The Connection Reaction Time Limit defines the predicted period of safety packets on the associated connection. If the Max Network Delay exceeds the Connection Reaction Time Limit, a connection fault occurs.

By default, the Connection Reaction Time Limit is four times the RPI.

Use the default values for Timeout Multiplier (2) and Network Delay Multiplier (200). The Network Delay Multiplier value is in terms of percentage. Thus, 200 means 200%.

IMPORTANT To determine what is appropriate, analyze each safety channel. The default Timeout Multiplier of 2 and Network Delay Multiplier of 200 creates a worst-case input connection reaction time limit of 4 times the RPI, and an output connection reaction time limit of 3 times the RPI.

Changes to these parameters must be approved only after a thorough review by a safety administrator.

For more information on how to specify RPI rates, see the following:

- Compact 5000 I/O standard modules - [page 155](#)
- Compact 5000 I/O safety modules - [page 188](#)
- Logix5000 Controllers Design Considerations Reference Manual, publication [1756-RM094](#)

Connection Over an EtherNet/IP Network

When you configure a remote Compact 5000 I/O digital module, you must configure the Connection over EtherNet/IP parameter in the configuration for the remote adapter that connects the I/O modules to the network. The configuration choice dictates how input data is transmitted over the network.

The Compact 5000 I/O digital modules use one of the following methods to transmit data:

- Multicast - Data is sent to all network devices.

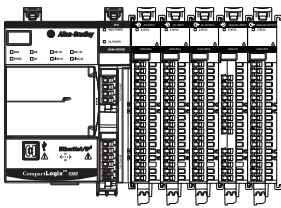
If you are using the I/O modules in a redundancy system, you must use Multicast.

- Unicast - Data is sent to one or more controllers depending on module configuration.

Unicast is the default setting.

Input Module Operation

Standard Modules



Logix 5000 controllers do not poll the Compact 5000 I/O standard or safety input modules for input data.

The data exchange process between the input modules and the controller differs based on whether the module is a local I/O module or remote I/O module.

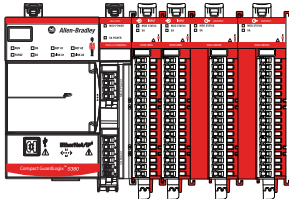
Local Compact 5000 I/O Digital Input Modules

Local Compact 5000 I/O digital input modules broadcast their input data, that is, channel and status data, to the system backplane at the time that is defined in the RPI.

At the RPI, the following events occur.

1. The local input module scans its channels for input data.
2. The module sends the data to the system backplane.
3. The controller receives the data immediately.

Safety Modules



Trigger Events for Standard Input Modules

IMPORTANT Compact 5000 I/O safety input modules cannot trigger events.

Some Compact 5000 I/O standard input modules can trigger an event. For example, the modules can trigger the Event task. The event task lets you execute a section of logic immediately when an event, or receipt of new data, occurs.

The following can trigger events:

- An input state change.
- A counting input done bit change.
- A pattern of input state changes on multiple module inputs.

For more information on how to use a Compact 5000 I/O standard input module to trigger an event, see [Events on page 88](#).

Remote Compact 5000 I/O Digital Input Modules

Remote Compact 5000 I/O digital input modules broadcast their input data to the Compact 5000 I/O system backplane at the time that is defined in the RPI. The input data consists of channel and status data.

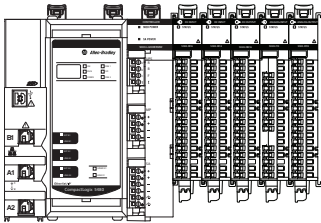
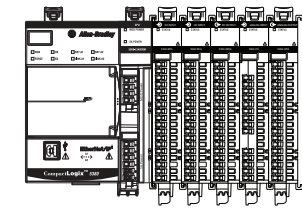
At the RPI, the following events occur.

1. The remote input module scans its channels for input data.
2. The module sends the data to the remote system backplane.
3. The Compact 5000 I/O EtherNet/IP adapter sends the data over the EtherNet/IP network.
4. One of the following:
 - If the controller is directly connected to the EtherNet/IP network, it receives the input data immediately.
 - If the controller is connected to the EtherNet/IP network through another communication module, the module sends the data to its backplane and the controller receives it.

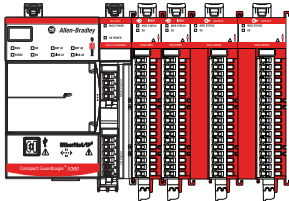
IMPORTANT This can **only** be the case if a **ControlLogix 5580** or **GuardLogix 5580** controller owns the I/O module. CompactLogix 5380, CompactLogix 5480, and Compact GuardLogix 5380 controllers do not support the use of an EtherNet/IP communication module in the local system.

Output Module Operation

Standard Modules



Safety Modules



Logix 5000 controllers send data to Compact 5000 I/O digital output modules at the RPI or after an Immediate Output (IOT) instruction is executed.

The RPI defines when the controller sends data to an output module and when the module echoes data. The IOT instruction sends new data to an output module whenever new data is produced.

IMPORTANT CompactLogix 5380 and CompactLogix 5480 controllers can also send data to Compact 5000 I/O standard output modules, that is, standard modules, when an IOT instruction is executed.

Compact GuardLogix 5380 controllers cannot send data when an IOT instruction is executed. You **cannot use IOT instructions** in safety programs.

References to IOT instructions in this section apply only to CompactLogix 5380 controllers.

At the RPI, not only does the controller send data to the output module, but also the output module sends data to the controller. For example, the output module sends an indication of the channel data quality.

IMPORTANT The RPI for a Compact 5000 I/O safety output module is the Safety Task period. Safety output data is sent at the completion of the Safety Task scan.

The data exchange process between Compact 5000 I/O digital output modules and a controller differs based on whether the module is a local I/O module or remote I/O module.

Local Compact 5000 I/O Digital Output Modules

Local Compact 5000 I/O digital output modules receive output data from a controller and send data to the controller. The data exchange occurs over the system backplane.

Controller to Local Output Module Data Transmission

The controller broadcasts data to its local backplane at one of the following:

- RPI
- An IOT instruction is executed.

IMPORTANT An IOT instruction sends data to the output module immediately, and resets the RPI timer.

Compact GuardLogix 5380 controllers cannot send data when an IOT instruction is executed. You **cannot use IOT instructions** in safety programs.

Based on the RPI rate and the length of the controller program scan, the output module can receive and echo data multiple times during one program scan.

When the RPI is less than the program scan length, the output channels can change values multiple times during a program scan. The owner-controller does not depend on the program scan to complete to send data.

The following events occur when the controller sends data to a local Compact 5000 I/O output module.

1. The controller sends data to system backplane at the RPI or when an IOT instruction is executed.
2. The local output module receives the data from the system backplane and behaves as dictated by its configuration.

Local Output Module to Controller Data Transmission

When a local Compact 5000 I/O digital output module receives new data and the requested data value is present on the RTB, the output module sends, or 'echoes', a data value back to the controller and to the rest of the control system. The data value corresponds to the signal present at its terminals. This feature is called [Data Echo](#).

In addition to the Data Echo, the output module sends other data to the controller at the RPI. For example, the module alerts the controller if a short circuit condition exists on the module.

The following events occur when a local Compact 5000 I/O digital output module sends data to the controller at the RPI.

1. The module sends the data to the system backplane.
2. The controller receives the data immediately.

Remote Compact 5000 I/O Digital Output Modules

Remote Compact 5000 I/O digital output modules receive output data from a controller and send data to the controller. The data exchange occurs over an EtherNet/IP network.

Controller to Remote Output Module Data Transmission

The controller broadcasts data to its local backplane at one of the following:

- RPI
- An IOT instruction is executed.

IMPORTANT An IOT instruction sends data to all output modules in the system immediately, and resets the RPI timer.

Based on the RPI rate and the length of the controller program scan, the output module can receive and echo data multiple times during one program scan.

When the RPI is less than the program scan length, the output channels can change values multiple times during a program scan. The owner-controller does not depend on the program scan to complete to send data.

The following events occur when the controller sends data to a Compact 5000 I/O digital output module.

1. One of the following ways:
 - If the controller is directly connected to the EtherNet/IP network, it broadcasts data to the network.

In this case, skip to [step 3](#).
 - If the controller is connected to the EtherNet/IP network via a communication module, the controller transmits the data to the backplane.

In this case, proceed to [step 2](#).
2. The EtherNet/IP communication module transmits the data to the EtherNet/IP network.
3. The Compact 5000 I/O EtherNet/IP adapter in the remote Compact 5000 I/O system receives the data from the network and transmits it to the system backplane.
4. The remote output module receives the data from the backplane and behaves as dictated by its configuration.

Remote Output Module to Controller Data Transmission

When a Compact 5000 I/O digital output module receives new data and the requested data value is present on the RTB, the output module sends, or 'echoes', a data value back to the controller and to the rest of the control system. The data value corresponds to the signal present at its terminals. This feature is called [Data Echo](#).

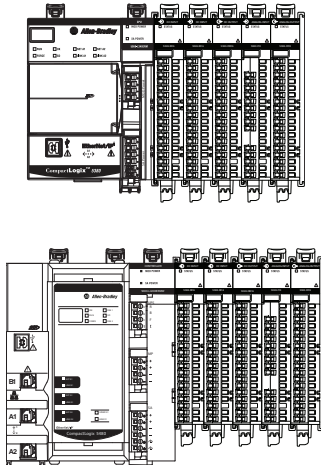
In addition to the Data Echo, the output module sends other data to the controller at the RPI. For example, the module alerts the controller if a short circuit condition exists on the module.

The following events occur when a remote Compact 5000 I/O digital output module sends data to the controller at the RPI.

1. The module sends the data to the system backplane.
2. The Compact 5000 I/O EtherNet/IP adapter in the 5069 Compact I/O system sends the data over the EtherNet/IP network.
3. One of the following:
 - If the controller is directly connected to the EtherNet/IP network, it receives the input data from the network without need for a communication module.
 - If the controller is connected to the EtherNet/IP network through another communication module, the module transmits the data to its backplane and the controller receives it.

Listen Only

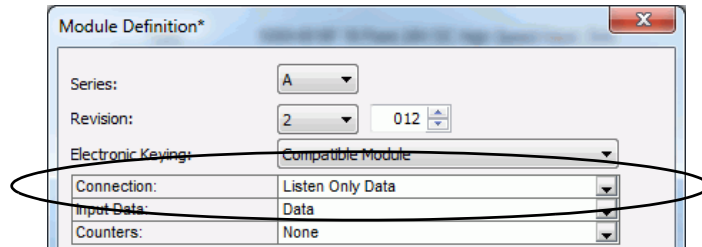
Standard Modules



The owner-controller, as described in [Ownership on page 24](#), exchanges data with I/O modules. The owner-controller owns the module configuration in its Logix Designer application project.

Other controllers that do not own the module or exchange data with it can listen to input data or 'echoed' output data. The listening controller does not own the module configuration or exchange other data with the module.

During the I/O configuration process, you choose a Listen Only connection type. The Connection pull-down menu is available on the Module Definition dialog box.



For more information on how to access the Module Definition dialog box for Compact 5000 I/O standard modules, see [General Category on page 153](#).

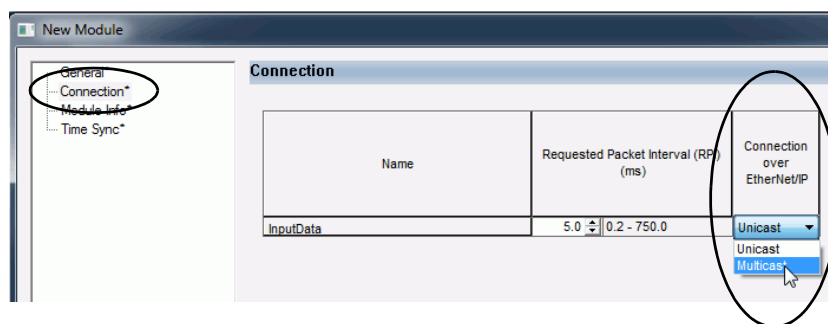
-
- IMPORTANT** Listen Only connections include the following restrictions:
- The connection type is only available with Compact 5000 I/O standard modules.
 - The I/O modules must reside in a remote system. Controllers cannot make Listen Only connections to local I/O modules.
-

Connection Over EtherNet/IP

You must set the Connection Over EtherNet/IP parameter when you configure a remote Compact 5000 I/O module. The available choices are Unicast and Multicast.

To establish a Listen Only connection from a listening controller, the **Connection over EtherNet/IP must be Multicast** in both Logix Designer application projects, that is, the owner-controller project and the listening controller project.

The Connection over EtherNet/IP pull-down menu is available on the Connection category.

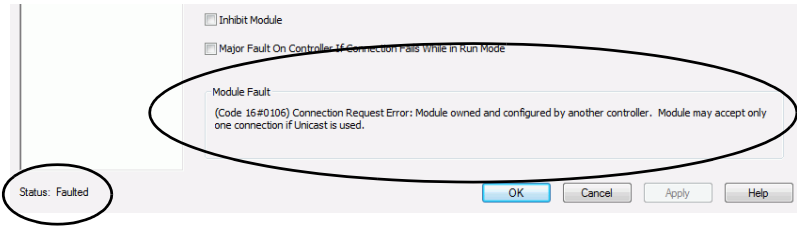


For more information on the Connection category for Compact 5000 I/O standard modules, see [page 155](#).

Connection Request Errors

Module faults and connection request errors occur if the Connection Over EtherNet/IP connection is not Multicast in both Logix Designer application projects.

Information about the fault is available on the Connection category of the Module Properties dialog box.



[Table 11](#) describes the possible configuration combinations, and the result of each, when you attempt to establish a Listen Only connection.

Table 11 - Connection Over EtherNet/IP Scenarios

Connection over EtherNet/IP Choice		Resulting Error Code
Owner-controller project	Listening controller project	
Multicast	Multicast	None - Connection established successfully
Multicast	Unicast	16#0106 Connection Request Error: Module owned and configured by another controller. Module may accept only one connection if Unicast is used.
Unicast	Unicast or Multicast	16#0108: Connection Request Error: Connection type (Multicast/Unicast) not supported.
Inhibited or powered-down	Multicast	16#0119 Connection Request Error: Module not owned.



In some instances, the Logix Designer application lets you configure a module with choices that result in connection request errors. However, the application does not alert you to the error that occurs as a result of the choices until the project goes online.

For example, if an owner-controller project uses Multicast and the listening controller project uses Unicast, the result is a module fault and error code 16#106. However, the Logix Designer project in the listening controller only alerts you to the error when the project goes online.

We recommend that you confirm the Connection Over EtherNet/IP choice in the listening controller's project is correct before you go online.

Additional Considerations With Listen Only Connections

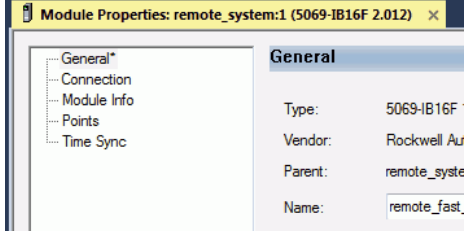
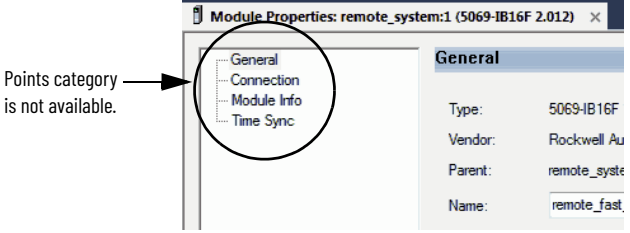
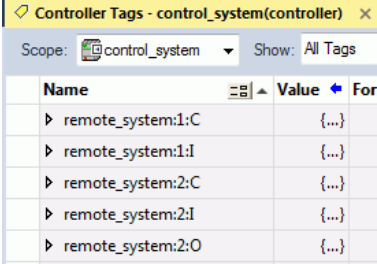
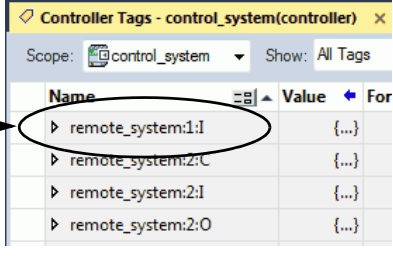
Remember the following when you use Listen Only connections:

- Listening controllers receive data from the module as long as the connection between the owner-controller and the module is maintained.

If the connection between an owner-controller and the module is broken, the module stops sending data and connections to all listening controllers are also broken.

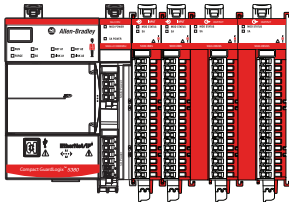
- When a controller uses a Listen Only Data connection, configurable categories on the Module Properties dialog box are not available. And only Input tags are created in the Module tags.

For example, shows the categories and module tags that appear when a 5069-IB16F module is configured in the owner-controller project with a Data connection compared to when the same module is configured in the listening controller project with a Listen Only connection.

	Owner-controller Project	Listening Controller Project
Categories on Module Properties dialog box		
Module Tags Created		

External Means

Safety Modules

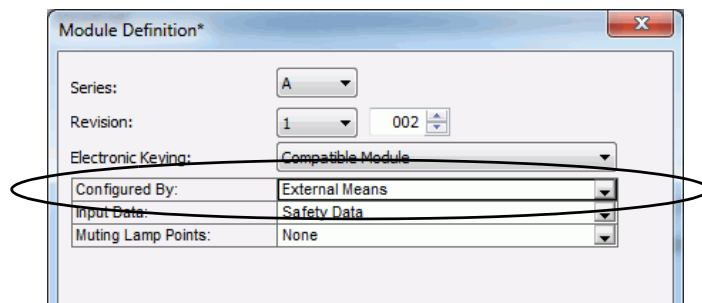


External Means is similar to Listen Only. However, because External Means is only available with Compact 5000 I/O safety modules the **owner-controller and listening controllers must be safety controllers**. In this section, owner-controller and listening controller refer to Compact GuardLogix 5380 controllers.

The owner-controller, as described in [Ownership on page 24](#), exchanges data with I/O modules. The owner-controller owns the module configuration in its Logix Designer application project.

Other controllers that do not own the module or exchange data with it can listen to **safety input data** or 'echoed' output data. The listening controller does not control the Test Outputs on 5069-IB8S or 5069-IB8SK modules or safety outputs on 5069-OBV8S or 5069-OBV8SK modules.

During the I/O configuration process, you choose External Means for the Configured By parameter. The Configured By pull-down menu is available on the Module Definition dialog box.



For more information on how to access the Module Definition dialog box for Compact 5000 I/O safety modules, see [General Category on page 185](#).

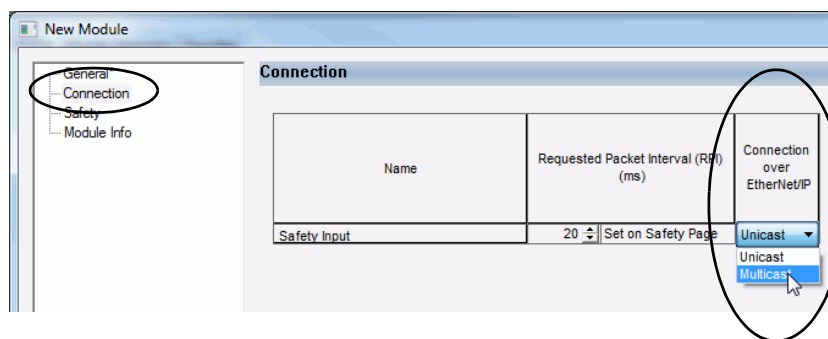
-
- IMPORTANT** Use of External Means includes the following restrictions:
- The choice is only available with Compact 5000 I/O safety modules.
 - The safety I/O modules must reside in a remote system. Controllers cannot use External Means with local I/O modules.
-

Connection Over EtherNet/IP

You must set the Connection Over EtherNet/IP parameter when you configure a remote Compact 5000 I/O module. The available choices are Unicast and Multicast.

To establish a Listen Only connection from a listening controller, the **Connection over EtherNet/IP must be Multicast** in both Logix Designer application projects, that is, the owner-controller project and the listening controller project.

The Connection over EtherNet/IP pull-down menu is available on the Connection category.



For more information on the Connection category for Compact 5000 I/O safety modules, see [page 188](#).

Connection Request Errors

Module faults and connection request errors occur if the Connection Over EtherNet/IP connection is not Multicast in both Logix Designer application projects.

Information about the fault is available on the Connection category of the Module Properties dialog box.

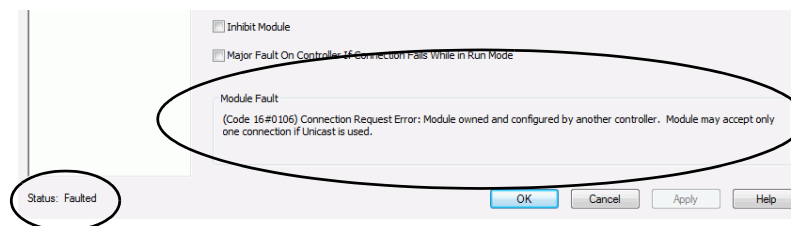


Table 12 describes the possible configuration combinations, and the result of each, when you attempt to establish a connection using External Means.

Table 12 - Connection Over EtherNet/IP Scenarios

Connection over EtherNet/IP Choice		Resulting Error Code
Owner-controller project	Listening controller project	
Multicast	Multicast	None - Connection established successfully
Multicast	Unicast	16#0106 Connection Request Error: Module owned and configured by another controller. Module may accept only one connection if Unicast is used.
Unicast	Unicast or Multicast	16#0108: Connection Request Error: Connection type (Multicast/Unicast) not supported.
Inhibited or powered-down	Multicast	16#0119 Connection Request Error: Module not owned.



In rare instances, the Logix Designer application lets you configure a module with choices that result in connection request errors. However, the application does not alert you to the error that occurs as a result of the choices until the project goes online.

For example, if an owner-controller project uses Multicast and the listening controller project uses Unicast, the result is a module fault and error code 16#106. However, the Logix Designer application project in the listening controller only alerts you to the error when the project goes online.

We recommend that you confirm the Connection Over EtherNet/IP choice in the listening controller's project is correct before you go online.

Additional Considerations With Connections When You Use External Means

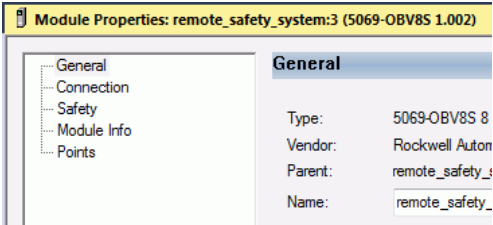
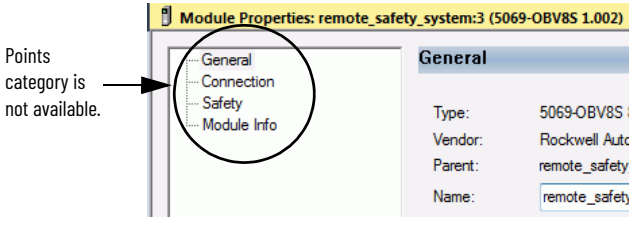
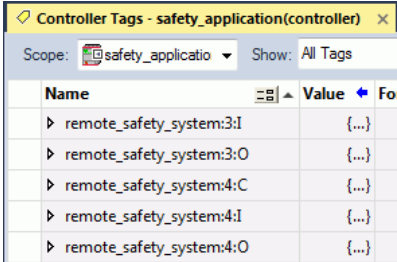
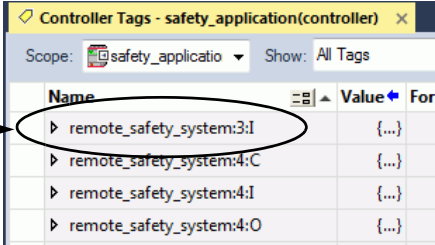
Remember the following about connections that are established by using External Means:

- Listening controllers receive data from the module as long as the connection between the owner-controller and the module is maintained.

If the connection between an owner-controller and the module is broken, the module stops sending data and connections to all listening controllers are also broken.

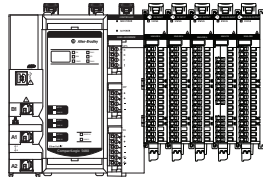
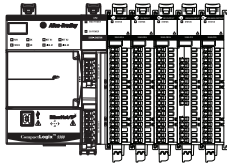
- When a controller uses External Means, configurable categories on the Module Properties dialog box are not available. And only Input tags are created in the Module tags.

For example, shows the categories and module tags that appear when a 5069-OBV8S module is configured in the owner-controller project with a This Controller compared to when the same module is configured in the listening controller project with an External Means.

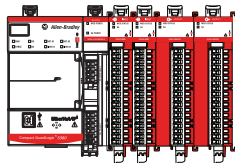
	Owner-controller Project	Listening Controller Project
Categories on Module Properties dialog box		
Module Tags Created		

Protected Operations

Standard Modules



Safety Modules



To maintain the secure operation of your Compact 5000 I/O digital modules, operations that can disrupt module operation are restricted based on the module operating mode.

[Table 13](#) describes the restrictions.

Table 13 - Protected Operations on Compact 5000 I/O Digital Modules

Current Module Operation	Activity						
	Firmware Update Request	Module Reset Request	Connection Request	Configuration Change	Connection or Data Format Change	Electronic Keying Change	RPI Change
Connection not running	Accepted						
Connection running	Rejected	Accepted ⁽¹⁾	Accepted ⁽²⁾	Accepted ⁽²⁾	Not allowed ⁽³⁾	Accepted ⁽⁴⁾	Accepted ⁽⁴⁾
Firmware update is in process	Rejected						

(1) Only requests for Listen Only connections are accepted.

(2) Configuration change is accepted in the following scenarios:

- Changes are made in the Module Properties dialog box and you click Apply.
- Changes are made in the Configuration tags and you send a Reconfigure Module MSG to the module.

(3) The difference between Rejected and Not allowed is that rejected activities can be attempted in the Logix Designer application but do not take effect. The activities that are not allowed, that is, attempts to change the Connection or Data Format used, do not occur in the Logix Designer application.

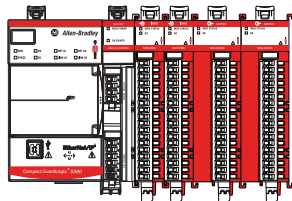
For example, if you attempt to reset a module that is connected to the owner-controller, the Logix Designer application executes the request and alerts you that it was rejected. If you attempt to change the data format on a module that is connected to an owner-controller, the Logix Designer application does not execute the attempted change. The application only alerts you that the change is not allowed. In the case, if the change is attempted online, the Module Definition dialog box field that changes the data format is disabled.

(4) The change occurs after the connection is closed and reopened. You can close and reopen the connection in the following ways:

- Change the project while it is offline and download the updated project before going online again.
- Change the project while it is online and click Apply or OK in the Module Properties dialog box. In this case, before the change is made, a dialog box alerts you of the ramifications before the change is made.

Considerations Specific to Safety Modules

Safety Modules



Compact 5000 I/O safety modules have additional items of which you must be aware. Type approval, certification, and suitability for use in safety applications vary by catalog number.

IMPORTANT Functional safety certification and performance of Compact 5000 I/O safety modules requires that the modules operate in conditions at or below the ambient operating temperature specification.

The probability of a dangerous failure on demand (PFD) and average frequency of a dangerous failure per hour (PFH) calculations for these modules are based on the module operating conditions adhering to the ambient operating temperature specification.

For more information on the maximum ambient operating temperature specification for Compact 5000 I/O safety modules, see the Compact 5000 I/O Modules and EtherNet/IP Adapter Technical Data, publication [5069-TD001](#).

The following apply to the modules:

- Type-approved and certified for use in safety applications up to and including SIL 3 per IEC 61508
- Suitable for use in safety applications up to and including SIL CL 3 per IEC 62061
- Suitable for use in safety applications up to and including Performance Level e (PLe), category 4 per ISO 13849-1

IMPORTANT Requirements are based on the standards current at the time of certification.

For more information on safety application suitability levels with the Compact 5000 I/O safety modules, see the following:

- 5069-IB8S and 5069-IB8SK - [Safety Input Module Features on page 123](#)
 - 5069-OBV8S and 5069-OBV8SK - [Safety Output Module Features on page 136](#)
-

Overall System Safety Function

The type approval, certification, and suitability levels for Compact 5000 I/O safety modules describe a system with an overall system safety function of SIL 3.

However, just because the modules are rated for use in a system with a safety function of SIL 3, you are not required to use Compact 5000 I/O safety modules in those applications. You can use the modules in safety applications with an overall system safety function that is less than SIL 3.

For example, Compact GuardLogix 5380 controllers are suitable for use in safety applications that are rated up to, and including, SIL CL 2, PLd, Cat. 3 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1.

In this case, the overall system safety function is SIL 2. You can use Compact 5000 I/O safety modules in this application even though the modules are rated for use in systems with higher overall system safety function.

GuardLogix 5580 controllers, when used with a safety partner are suitable for use in SIL 3 safety applications. You can use Compact 5000 I/O safety modules as remote I/O modules in such an application.

For more information on the suitability level of Logix 5000 safety controllers, see the GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication [1756-RMO12](#).

Single-channel or Dual-channel Mode

You can use Compact 5000 I/O safety modules in single-channel mode or dual-channel configuration. The configuration affects the safety application suitability level for a module.

In single-channel mode, the signal status on one channel is evaluated. Based on that status, safety input data and safety input status can be off or on.

In dual-channel mode, the consistency between the signal status on two channels is evaluated. Based on the status on both channels, safety input data and safety input status can be off or on.

You use safety instructions in the safety controller ladder logic with two single channels, that is, one even and one odd.

We recommend that, if you use dual channel safety instructions, for example, the Dual Channel Input Stop (DCS) instruction, in the Safety Task, you configure the channels for single-channel mode.

Use with Safety Controllers

You can only use the Compact GuardLogix 5380 or GuardLogix 5580 controllers with the Compact 5000 I/O safety modules. Restrictions apply regarding how the controllers can use the I/O modules. The restrictions are described in [Controller and Software Compatibility on page 14](#).

For more information on which controllers you can use with Compact 5000 I/O safety modules, see [Table 3 on page 15](#).

You must use the Logix Designer application, version 32 or later, to configure the Compact 5000 I/O safety modules.

Determine Conformity



ATTENTION: Use only appropriate components or devices that comply with the relevant safety standards and meet the required safety integrity level or Performance Level and safety category.

- Conformity to the requirements of the relevant safety standards must be determined for the entire system by conducting a risk assessment.
- Use devices properly according to the installation environment, performance rating, and functions of the machine.
- Use devices within their specified ratings.
- We recommend that you consult a certification body regarding assessment of conformity to the required safety integrity level or Performance Level.

You are responsible for confirming compliance with the applicable standards for the entire system. You must read, understand, and fulfill the functional safety requirements of the standard applicable to your safety application.

Obtain Firmware

Verify that the firmware revision of the Compact 5000 I/O safety modules that you use is correct before commissioning the system.

Firmware information for safety I/O devices is available at the Rockwell Automation Product Compatibility and Download Center (PCDC). The PCDC is available at:

<https://compatibility.rockwellautomation.com/Pages/home.aspx>

Only download firmware and access product release notes from the Rockwell Automation PCDC.

Do not download firmware from non-Rockwell Automation sites.

Safety Function During Firmware Update

The Compact 5000 I/O safety modules are not safety capable when a firmware update is in process. You must use other methods to maintain the safety function during the update process.

Safety Precautions



ATTENTION: Personnel responsible for the application of safety-related programmable electronic systems (PES) shall be aware of the safety requirements in the application of the system and shall be trained in the use of the system.

Observe the following precautions for the proper use Compact 5000 I/O safety modules.



ATTENTION: As serious injury can occur due to loss of required safety function, follow the following safety precautions.

- Never use test outputs as safety outputs. Test outputs are not safety outputs.
- Do not use standard I/O data or explicit message data as safety data.
- Do not use light-emitting diode (LED) status indicators on the I/O modules for safety operations.
- Do not connect loads beyond the rated value to the safety outputs.
- Apply properly specified voltages to the module. Applying inappropriate voltages can cause the module to fail to perform its specified function, which could lead to loss of safety functions or damage to the module.
- Wire the Compact 5000 I/O safety modules as shown in the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication [5069-TD001](#).
- Set unique network node addresses before connecting devices to the network.
- Perform testing to confirm that device wiring, configuration, and operation is correct before you start system operation.
- Do not disassemble, repair, or modify the module. This can result in loss of safety functions.

For more information about safety precautions, see [Secure Access to the System on page 23](#).

Installing and Replacing Modules



ATTENTION:

- Clear previous configuration data before you connect devices to the network or connecting input or output power to the device.
- Configure the replacement device properly and confirm that it operates correctly.
- After installation of the module, a safety administrator must confirm the installation and conduct trial operation and maintenance.

Securing Access to the System

For information on how to secure access to the system, see [page 23](#).

Safety Application Requirements

Safety application requirements include evaluating the following:

- Probability of failure rates (PFD and PFH)
- System reaction time settings
- Functional verification tests that fulfill appropriate safety-level criteria

Creating, recording, and verifying that the safety signature is also a required part of the safety application development process. The safety controller creates the safety signatures. The safety signature consists of an identification number, date, and time that uniquely identifies the safety portion of a project. This number includes all safety logic, data, and safety I/O configuration.

For safety system requirements, including information on the SNN, verifying the safety signature, functional verification test intervals, system reaction time, and PFD/PFH calculations, see the GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication [1756-RM012](#).

You must read, understand, and fulfill the requirements that are described in this publication before you operate a safety system that uses Compact 5000 I/O safety modules.

Safe State



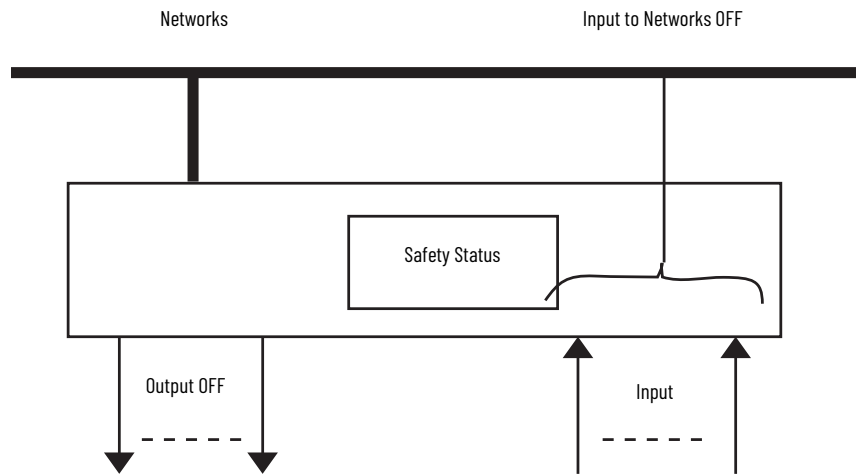
ATTENTION:

- The safe state of the outputs is defined as the off state.
- The safe state of the module and its data is defined as the off state.
- Use the Compact 5000 I/O safety modules only in applications where the off state is the safe state.

The following are the safe states of the safety modules:

- Safety outputs: OFF
- Safety input data to network: OFF

Figure 9 - Safety Status



The modules are designed for use in applications where the safe state is the off state.

IMPORTANT

If you inhibit a safety module from transitioning to a safe state when a fault occurs because an I/O connection is lost, you accept responsibility for any consequences that result from your decision to inhibit.

We recommend that you use other means to maintain the safe state if you inhibit the safety module from transitioning to a safe state.

Configuration Signature and Ownership

Every Compact 5000 I/O safety module in a system has a configuration signature and configuration ownership.

Configuration Signature

Each safety device has a unique configuration signature that defines the module configuration. The configuration signature includes the following:

- ID number
- Date
- Time

The configuration signature is used to verify a module's configuration.

Configuration Ownership

The connection between the owner-controller and the Compact 5000 I/O safety module is based on the following:

- Compact 5000 I/O safety module node number
- Compact 5000 I/O safety module safety network number
- Controller node or slot number

IMPORTANT	If the owner-controller is a Compact GuardLogix 5380 controller, the controller has a node number. If the owner-controller is a GuardLogix 5580 controller, the controller has a slot number.
------------------	--

- Controller safety network number
- Path from the controller to the Compact 5000 I/O safety module
- Configuration signature

If any differences are detected, the connection between the owner-controller and the Compact 5000 I/O safety module is lost, the yellow yield icon appears in the controller project tree.

Different Configuration Owner

When a controller owns the I/O module configuration, other controllers can listen to the input module. In this case, the module configuration signature in the Logix Designer application project for any listening controller must match the one in the owner-controller project.



If the safety module is configured for inputs only, you can copy and paste the configuration signature from one project to the other.
If the safety module has safety outputs, for example, the 5069-OBV8S module, the configuration signature parameter is disabled.

Reset Compact 5000 I/O Safety Modules to Out-of-Box State

If a Compact 5000 I/O safety module was used previously, you must clear the configuration ownership before you can install it on a safety network. That is, you must return the module configuration to its out-of-box state.

When a Compact 5000 I/O safety module is in the out-of-box state, its configuration is not owned by a controller.

The Safety category on the Module Properties dialog box displays the module Configuration Ownership. The Logix Designer application project must be online to check.

If the module configuration is owned, the Safety category displays whether the controller for the opened project owns the module configuration or another controller owns it.

For information on how to reset the module in the Logix Designer application, see [Reset to Out-of-Box Configuration on page 196](#).

You cannot reset the module to its out-of-box configuration if any of the following conditions exist:

- There are pending edits to the module properties.
- When a safety signature exists in the controller project.

Notes:

Features Common to Compact 5000 I/O Digital Modules

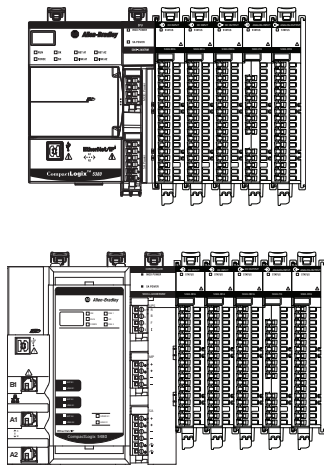
Topic	Page
Input Module Compatibility	66
Output Module Compatibility	67
Software Configurable	68
Module Data Quality Reporting	69
Fault and Status Reporting	70
Module Inhibiting	71
Electronic Keying	72
Module Firmware	73
Producer/Consumer Communication	73
Use CIP Sync Time with Fast I/O Modules	74
Timestamping	74

This chapter describes features that are common to Compact 5000™ I/O digital modules unless otherwise noted.

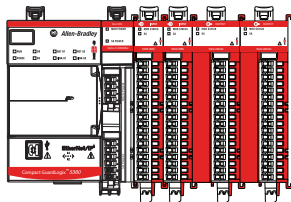
Some features are supported on all I/O modules and other features are specific to module types. The differences are indicated in feature descriptions.

Input Module Compatibility

Standard Modules



Safety Modules



Compact 5000 I/O digital input modules interface to sensing devices and detect whether they are On or Off.

The input modules convert DC On/Off signals from user devices to appropriate logic level for use in the controller. Typical input devices include the following:

- Proximity switches
- Limit switches
- Selector switches
- Float switches
- Push-button switches

When you design systems with Compact 5000 I/O digital input modules, consider the following factors:

- Voltage necessary for your application
- Current leakage
- Whether you need a solid-state device
- Whether your application uses sinking or sourcing wiring

Output Module Compatibility

Compact 5000 I/O digital output modules can be used to drive output devices. Typical devices compatible with the following output modules include:

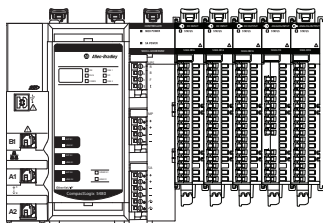
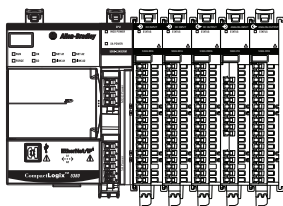
- Motor starters
- Solenoids
- Indicators

When you design systems with Compact 5000 I/O digital output modules, follow the following guidelines:

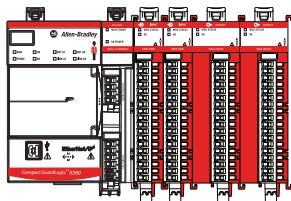
- Make sure that the output modules can supply the necessary surge and continuous current for proper operation.
- Make sure that the surge and continuous current are not exceeded. Damage to the module could result.

When you size output loads, refer to the documentation supplied with the output device for the surge and continuous current necessary to operate the device.

Standard Modules

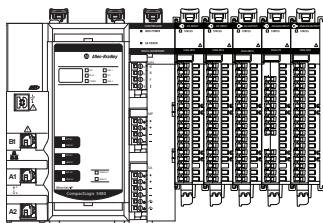
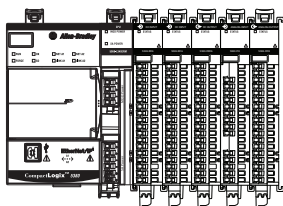


Safety Modules

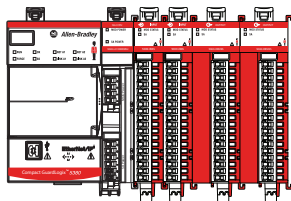


Software Configurable

Standard Modules



Safety Modules



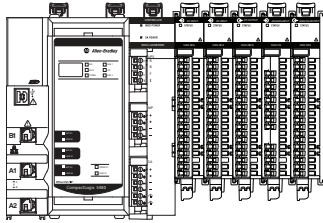
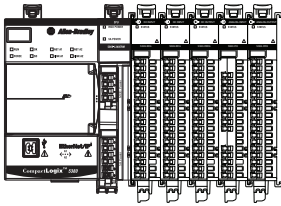
You use the Logix Designer application to configure the module, monitor system operation, and troubleshoot issues. You can also use the Logix Designer application to retrieve this information from any module in the system:

- Serial number
- Firmware revision information
- Product code
- Vendor
- Error and fault information
- Diagnostic information

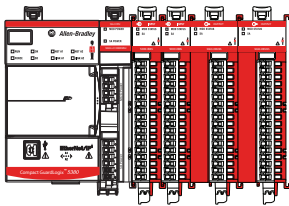
By minimizing the need for tasks, such as setting hardware switches and jumpers, the software makes module configuration easier and more reliable.

Module Data Quality Reporting

Standard Modules



Safety Modules



The Compact 5000 I/O digital modules indicate the quality of channel data that is returned to the owner-controller. Data quality represents accuracy. Levels of data quality are reported via module input tags.

The following input tags indicate the level of data quality.

IMPORTANT Once the condition that causes the Fault or Uncertain tag to change to 1 is removed, the tag automatically resets to 0. The Logix Designer application controls the tags. You cannot change the status of the tags. Remember that in some system configurations, the tag is not reset immediately after the condition is removed. The tag typically resets after a small delay.

- **I.Ptxx.Fault** - This tag indicates that the reported channel data is inaccurate and cannot be trusted for use in your application. Do not use the reported channel data for control.

If the tag is set to 1, you cannot trust the data reported. You must troubleshoot the module to correct the cause of the inaccuracy.

Example causes of inaccurate data include:

- Field Power Loss condition (output modules)
- No Load condition (standard output modules only)
- Short Circuit condition (output modules)

We recommend that you troubleshoot the module for the typical causes first.

- **I.Ptxx.Uncertain** - This tag indicates that the reported channel data can be inaccurate but the degree of inaccuracy is unknown. We recommend that you do not use the reported channel data for control.

If the module sets this tag to 1, you know that the data can be inaccurate. You must troubleshoot the module to discover what degree of inaccuracy exists.

Example causes of uncertain data include:

- Module is operating outside its designed operating range
- Data is under manual or override control

We strongly recommend that you monitor the tags in your program to make sure that the application is operating as expected with accurate channel input data.

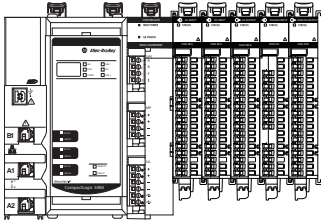
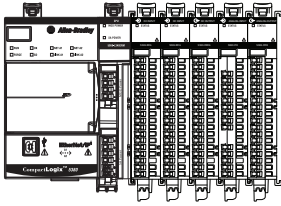
Fault and Status Reporting

The Compact 5000 I/O digital modules report fault and status data along with channel data. Fault and status data is reported in the following ways:

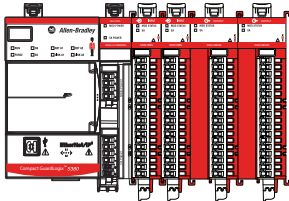
- Logix Designer application
- Module status indicators
- I/O status indicators

IMPORTANT Do not use the module status indicators or I/O status indicators on Compact 5000 I/O safety modules for safety operations.

Standard Modules



Safety Modules

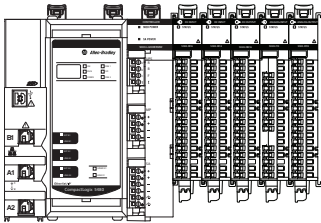
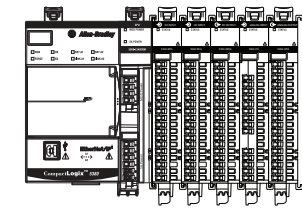


For more information on fault and status reporting, see:

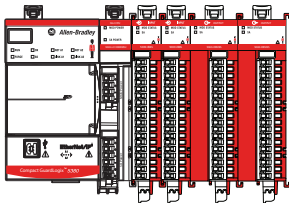
- Input modules - [Fault and Status Reporting on page 82](#)
- Output modules - [Fault and Status Reporting on page 113](#)
- Appendix A, [Troubleshoot Your Module on page 199](#)

Module Inhibiting

Standard Modules



Safety Modules



Module inhibiting lets you indefinitely suspend a connection, including Listen Only connections, between an owner-controller and an I/O module without removing the module from the configuration. This process lets you temporarily disable a module, such as to perform maintenance.

IMPORTANT You cannot inhibit a connection when the controller is safety-locked or a safety signature exists for the controller.

You can use module inhibiting in the following ways:

- You write a configuration for an I/O module but inhibit the module to help prevent it from communicating with the owner-controller. The owner does not establish a connection and the configuration is not sent to the module until the connection is uninhibited.
- In your application, a controller already owns a module, has downloaded the configuration to the module, and is exchanging data over the connection between the devices.

In this case, you can inhibit the module and the connection to the module does not exist.

IMPORTANT Whenever you inhibit an output module that is ProgMode enabled, it enters Program mode, and all outputs change to the state configured for Program mode.

For example, if an output module is configured so that the state of the outputs transition to zero during Program mode, whenever that module is inhibited, outputs transition to zero.

You can use module inhibiting in the following instances:

- You want to update an I/O module, for example, update the module firmware revision. Use this procedure.
 - a. Inhibit the module.
 - b. Perform the update.
 - c. Uninhibit the module.
- You use a program that includes a module that you do not physically possess yet. You do not want the controller to look for a module that does not yet exist. In this case, you can inhibit the module in your program until it physically resides in the proper slot.

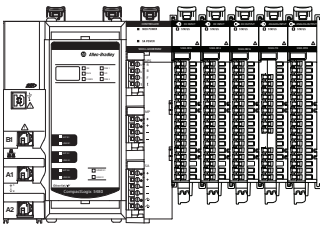
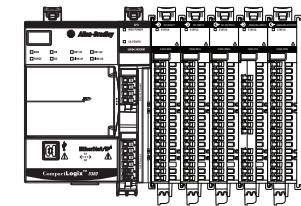
You can inhibit the connection to a Compact 5000 I/O digital module on the Connection category of the Module Properties dialog box.

To see where to inhibit a connection, see the following:

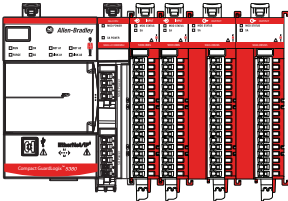
- Compact 5000 I/O standard modules - [page 155](#)
- Compact 5000 I/O safety modules - [page 188](#)

Electronic Keying

Standard Modules



Safety Modules



Electronic Keying reduces the possibility that you use the wrong device in a control system. It compares the device that is defined in your project to the installed device. If keying fails, a fault occurs. These attributes are compared.

Table 14 -

Attribute	Description
Vendor	The device manufacturer.
Device Type	The general type of the product, for example, digital I/O module.
Product Code	The specific type of the product. The Product Code maps to a catalog number.
Major Revision	A number that represents the functional capabilities of a device.
Minor Revision	A number that represents behavior changes in the device.

The following Electronic Keying options are available.

Table 15 -

Keying Option	Description
Compatible Module	Lets the installed device accept the key of the device that is defined in the project when the installed device can emulate the defined device. With Compatible Module, you can typically replace a device with another device that has the following characteristics: <ul style="list-style-type: none">• Same catalog number• Same or higher Major Revision• Minor Revision as follows:<ul style="list-style-type: none">– If the Major Revision is the same, the Minor Revision must be the same or higher.– If the Major Revision is higher, the Minor Revision can be any number.
Disable Keying	Indicates that the keying attributes are not considered when attempting to communicate with a device. With Disable Keying, communication can occur with a device other than the type specified in the project. ATTENTION: Be extremely cautious when using Disable Keying; if used incorrectly, this option can lead to personal injury or death, property damage, or economic loss. We strongly recommend that you do not use Disable Keying. If you use Disable Keying, you must take full responsibility for understanding whether the device being used can fulfill the functional requirements of the application. IMPORTANT: Do not use this option in Safety applications.
Exact Match	Indicates that all keying attributes must match to establish communication. If any attribute does not match precisely, communication with the device does not occur.

Carefully consider the implications of each keying option when selecting one.

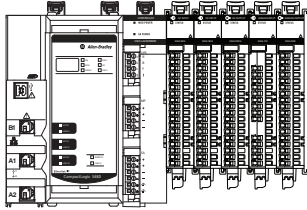
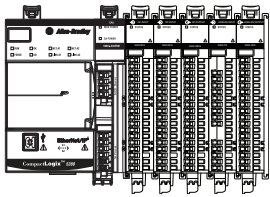
IMPORTANT	Changing Electronic Keying parameters online interrupts connections to the device and any devices that are connected through the device. Connections from other controllers can also be broken. If an I/O connection to a device is interrupted, the result can be a loss of data.
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More Information

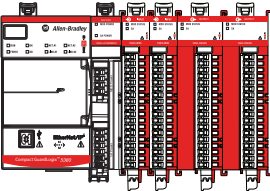
For more detailed information on Electronic Keying, see Electronic Keying in Logix5000 Control Systems Application Technique, publication [LOGIX-AT001](#).

Module Firmware

Standard Modules



Safety Modules



The Compact 5000 I/O digital modules are manufactured with module firmware installed. If updated module firmware revisions are available in the future, you can update the firmware.

Updated firmware revisions are made available for various reasons, for example, to correct an anomaly that existed in previous module firmware revisions.

IMPORTANT Verify that the module firmware revisions for the Compact 5000 I/O safety modules that you use are correct before commissioning your system.

You access updated firmware files at the Rockwell Automation® Product Compatibility and Download Center (PCDC). The PCDC is available at:

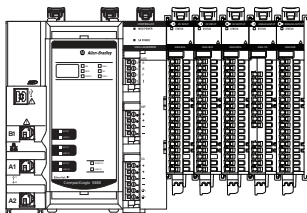
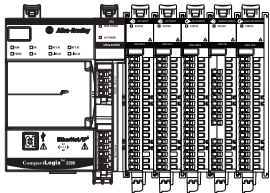
<https://compatibility.rockwellautomation.com/Pages/home.aspx>

Only download firmware and access product release notes from the Rockwell Automation® PCDC.

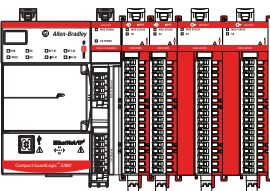
Do not download firmware from non-Rockwell Automation sites.

Producer/Consumer Communication

Standard Modules



Safety Modules



Compact 5000 I/O digital modules use the Producer/Consumer communication model to produce data without a controller polling them first. The modules produce the data and controllers consume it. That is, the owner-controller and controllers with a Listen Only connection to the module can consume it.

When an input module produces data, the controllers can consume the data simultaneously. Simultaneous data consumption minimizes the need for one controller to send the data to other controllers.

Use CIP Sync Time with Fast I/O Modules

The following Compact 5000 I/O standard modules use CIP Sync™ for time stamps and scheduling:

- 5069-IB16F
- 5069-IB6F-3W
- 5069-OB16F

CIP Sync is a CIP™ implementation of the IEEE 1588 PTP (Precision Time Protocol). CIP Sync provides accurate real-time (Real-World Time) or Universal Coordinated Time (UTC) synchronization of controllers and devices that are connected over CIP networks. This technology supports highly distributed applications that require timestamping, sequence of events recording, distributed motion control, and increased control coordination.

The 5069-IB16F, 5069-IB6F-3W, and 5069-OB16F modules are CIP Sync slave-only devices. There must be another module on the network that functions as a master clock. For more information on how to use CIP Sync technology, see the Integrated Architecture® System and CIP Sync Configuration Application Technique, publication [IA-AT003](#).

You can use fast Compact 5000 I/O digital modules to capture time stamps and schedule outputs while providing the following advances:

- Fast I/O modules have much higher precision than other modules.
- Inputs are timestamped by point, so multiple inputs can be configured for COS without losing time stamp data.
- CIP Sync is system-wide, so time stamp and schedule values are consistent across all modules in the system.

For example, if you use time stamps on a 5069-IB16F module to schedule outputs on a 5069-OB16F module, the controller, input module, and output module are not required to reside in the same local system. The I/O modules can reside in a remote I/O system.

- Output modules use all 64 bits of the time stamp to schedule, so there are no limits on schedule ranges.

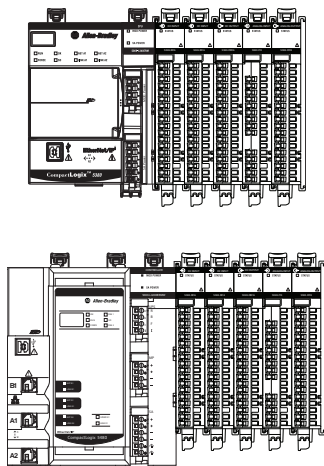
Timestamping

The control system uses a 64-bit system clock. The modules support CIP Sync timestamping by using the 1588 protocol that is passed throughout the system. The 1588 protocol is defined in the IEEE 1588-2002 standard, publication Standard for a Precision Clock Synchronization Protocol for Networked Measurement and Control Systems.

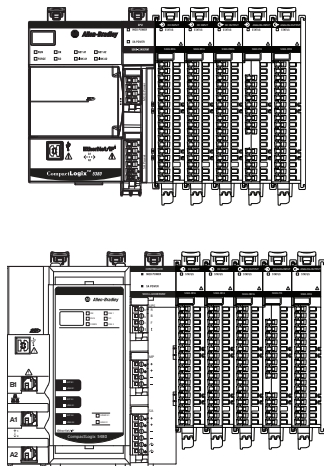
IMPORTANT Compact 5000 I/O safety modules do not support timestamping.

Each input channel scan or new output application is stamped with a CIP Sync time stamp. One time stamp is returned to the controller for the module with the input data transfer.

Standard Modules



Standard Modules



You can use this feature for the following:

- To identify the sequence of events in fault conditions or during normal operation.

You can use the system clock between multiple modules in the same chassis or throughout a system in which a common Time Master is used.



- To measure the change between samples and detect when a new sample is available for processing via the logic. The change between sample likely correlates closely with the RPI if no samples are missed in the logic.

You can also use the 1588 Protocol to synchronize sampling for modules across the entire system. By using the Synchronized Sampling feature, you can configure multiple modules to coordinate their input samples precisely with each other by using the same RPI.

Synchronized Sampling lets you configure a test stand, for example, and take many measurements simultaneously across many modules, if needed, while still precisely coordinating the sampling. With these modules, the synchronized sampling coordinates within approximately $\pm 10 \mu\text{s}$.

[Table 16](#) describes how you can use time stamps.

Table 16 - Timestamp Options

Topic	Description
Timestamping for a sequence of events	<p>You can use CIP Sync to establish a sequence of events occurring at a particular input module point by timestamping the input data. To determine a sequence of events, you must complete the following:</p> <ul style="list-style-type: none"> • Set the format of the input module to Timestamped Input Data. • Enable COS for the input where a sequence occurs, and disable COS for all other points on the module.
	 <p>If you configure multiple inputs for COS, your module generates a unique time stamp each time any of those inputs change state if the changes do not occur within 500 μs of each other. If multiple inputs that are configured for COS change state within 500 μs of each other, one time stamp is generated for all state changes. As a result, it appears as if they changed simultaneously.</p>
Timestamping with scheduled outputs	<p>You can use timestamping with the scheduled outputs feature, so that after input data changes state and a time stamp occurs, an output point actuates at a specific time. You can schedule outputs into the future. Outputs that are sent in one packet can differ by approximately 2 seconds. Sending in multiple messages allows greater spacing between schedules. When you use timestamping of inputs and scheduled outputs, you must complete the following:</p> <ul style="list-style-type: none"> • Choose a connection format for each input and output module that enables timestamping. • Disable COS for all input points on the input module except the point being timestamped.
	 <p>For scheduled outputs to work most effectively, remember the following:</p> <ul style="list-style-type: none"> • The schedule fires when it is configured to. You must make sure that there is enough time for the schedule to plan ahead. If you are using an MAOC instruction, you cannot control the schedule. • A system-level Grandmaster synchronizes the times of the I/O modules.

Notes:

Input Module Features

Topic	Page
Multiple Input Module Types	78
Data Transfer at RPI or Change of State	78
Software Configurable Input Filters and Delays	79
Module Health Diagnostic	82
Fault and Status Reporting	82
Simple Count Mode	85
Sequence of Events Per Point Timestamping	86
Chatter Detection	87
Events	88
Pulse Latching	92
Field Power Loss Detection	94
Short Circuit Protection	95
Thermal Shutoff	97

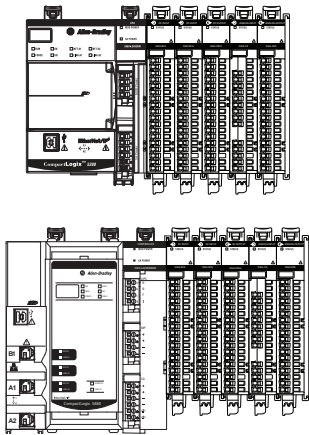
This chapter describes features that are supported on Compact 5000™ I/O digital input modules.

Multiple Input Module Types

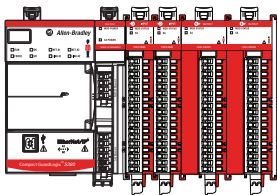
The Compact 5000 I/O digital module family offers the following input module types:

- AC standard input module - 5069-IA16
- DC standard input module - 5069-IB16
- DC standard input conformal coated module - 5069-IB16K
- DC standard fast input modules - 5069-IB16F, 5069-IB6F-3W
- DC safety input modules - 5069-IB8S and 5069-IB8SK

Standard Modules



Safety Modules



Data Transfer at RPI or Change of State

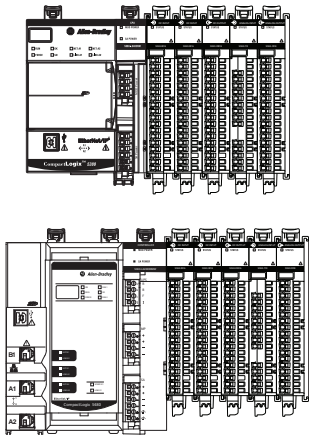
Compact 5000 I/O digital input modules always send data at the RPI, but they send data at a change of state only if the COS feature is enabled.

The following table describes the two ways a module sends data to the owner-controller.

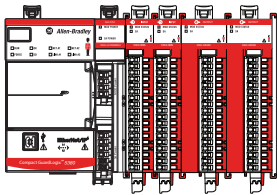
Method	Description
RPI	A user-defined rate at which the module updates the information that is sent to its owner-controller.
COS	Configurable feature that, when enabled, instructs the module to update its owner-controller with new data whenever a specified input point transitions from On to Off and Off to On. The data is sent at the RPI rate when there is no change of state. By default, this setting is always enabled for input modules.

You set the RPI on the Connection page of the Module Properties dialog box in the Logix Designer application.

Standard Modules

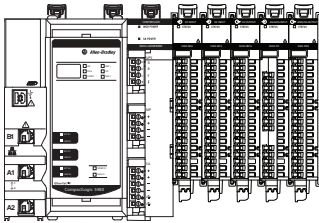
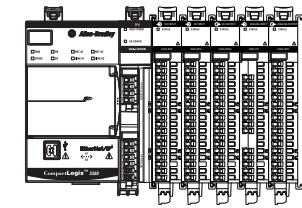


Safety Modules

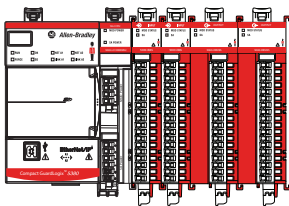


Software Configurable Input Filters and Delays

Standard Modules



Safety Modules



You can increase the time that it takes for an input point to transition from On to Off and Off to On for Compact 5000 I/O digital input modules. The increase in time is a delay of the signal from the module to the controller.

The increase in the time to transition from one state to another improves noise immunity within a signal.

Compact 5000 I/O Standard Input Modules

For Compact 5000 I/O standard input modules, the configurable parameter is **Input Filter Time**. This table describes how to use this feature with most of the standard input modules.

Module	Valid Filter Value Range	Default Value
5069-IB16, 5069-IB16K	0 μ ...50 ms	1 ms
5069-IB6F-3W		0 μ s
5069-IB16F		

The input signal that is connected to the **5069-IA16** input module dictates the **valid input filter values** that you can use.

Input Signal Value	Filter Time: Off to On - Valid Values	Filter Time: On to Off - Valid Values
120V AC	• 1 ms	• 10 ms • 20 ms
240V AC	• 1 ms • 2 ms • 5 ms	• 5 ms • 10 ms • 20 ms

IMPORTANT

Logix Designer application lets you choose filter time 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.

Make sure that you select a valid input filter value when you configure the module. If you select an invalid input filter value, the module can read signal levels incorrectly.

To see where to set the input filter values, see the following:

- 5069-IA16 module - [page 157](#)
- 5069-IB16 and 5069-IB16K module - [page 159](#)
- 5069-IB16F module - [page 161](#)
- 5069-IB6F-3W module - [page 167](#)

Compact 5000 I/O Safety Input Modules

For Compact 5000 I/O safety input modules, the configurable parameter is **Input Delay Time**. This table describes how to use this feature with the safety input modules.

Modules	Valid Filter Value Range	Default Value
5069-IB8S, 5069-IB8SK	0 ms...50 ms	0 ms

To see where to set the Input Delay Time on the 5069-IB8S or 5069-IB8SK modules, see [page 191](#). For more information on how to use the Input Delay Time feature on a 5069-IB8S or 5069-IB8SK module, see [Safety Input Delay Time on page 128](#).

Input Filter with Compact 5000 I/O Fast Input Modules

-
- | | |
|------------------|--|
| IMPORTANT | <ul style="list-style-type: none"> • This description applies to 5069-IB16F and 5069-IB6F-3W modules, and to any 5069-IB16 module that uses firmware revision 2.011 and earlier. • The input filters work the same whether the transition is a simple state transition or when the state transition triggers an Event. |
|------------------|--|
-

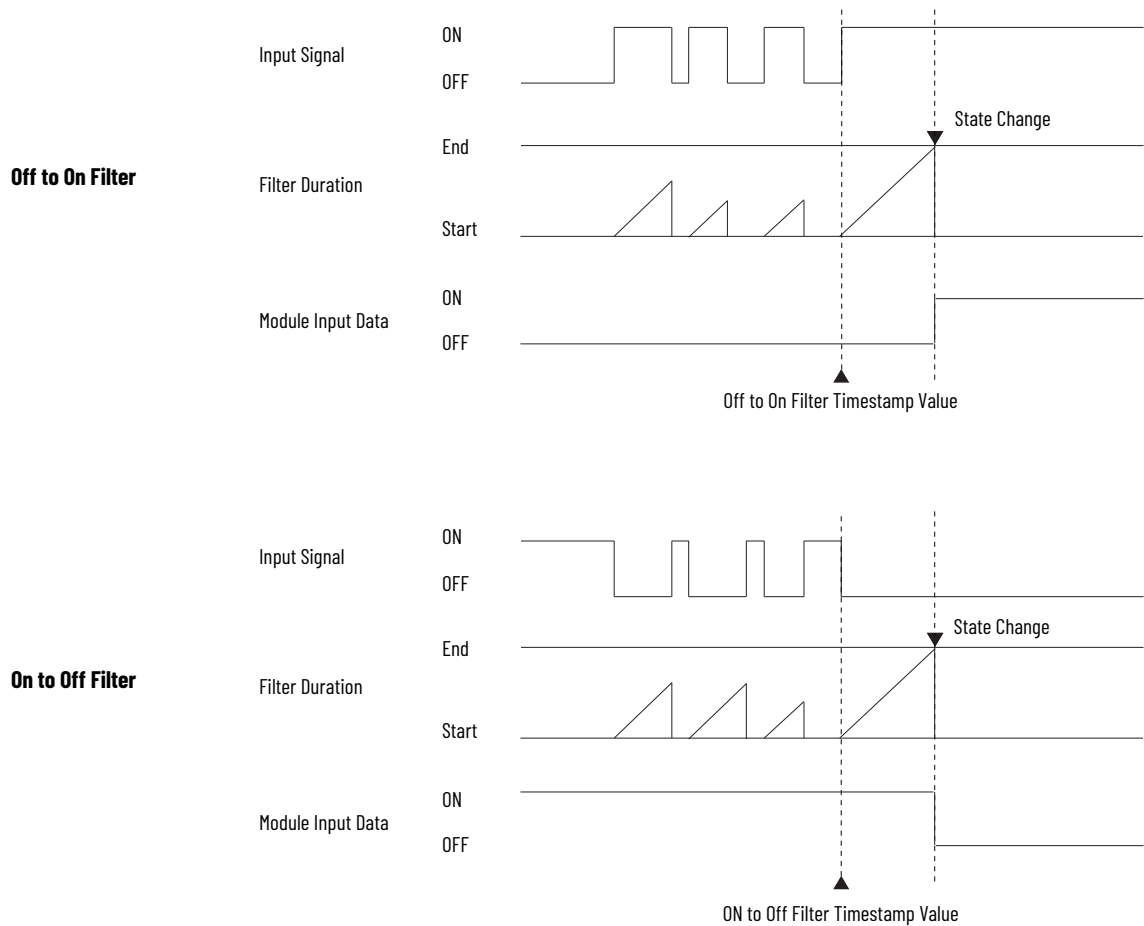
On the Compact 5000 I/O fast input modules, the input filter not only helps to improve noise immunity in a signal but also to help prevent rapid changes of the input data due to contact bounce.

The input filter time defines how long an input signal transition must remain in the new state before the transition is valid and the input changes state. Input and Event timestamps are only recorded with valid transitions.

A transition is only valid if the input signal remains in the new state for the entirety of the filter duration. If the input changes state again before the chosen input filter time elapses, the transition is not valid.

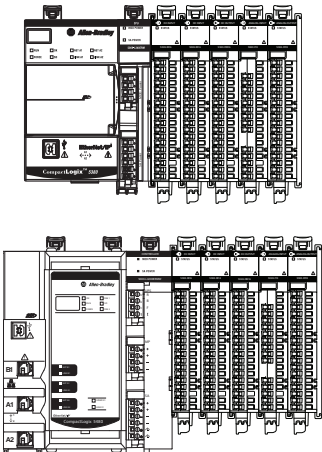
In [Figure 10](#), the first three signal transitions--both On to Off and Off to On--remain the same state until the filter time elapses and are not valid.

Figure 10 - Input Filter Usage on Compact 5000 I/O Fast Input Modules

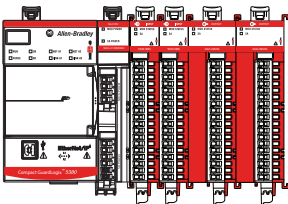


Module Health Diagnostic

Standard Modules



Safety Modules

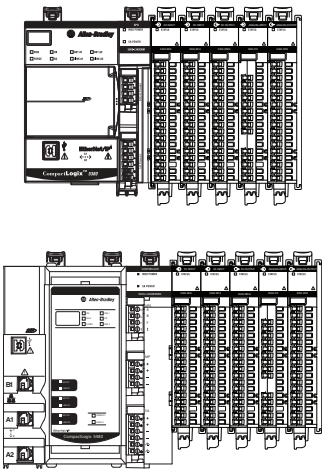


Every Compact 5000 I/O digital module has a status indicator on the front of the module that indicates module health.

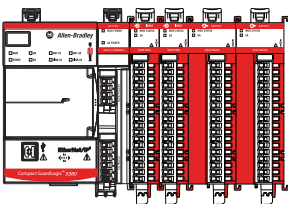
For more information on status indicators, see Appendix A, [Troubleshoot Your Module on page 199](#).

Fault and Status Reporting

Standard Modules



Safety Modules



The input modules multicast fault and status data with channel data to the owner and listening controllers. The data is returned via module tags that you can monitor in your Logix Designer application.

With some exceptions, the Compact 5000 I/O digital input modules provide the fault and data status in a point-centric format. The tag names that include Ptxx represent point-centric data in the table. The xx represents the point number.

Not all tags that are listed in [Table 17](#) apply to all Compact 5000 I/O digital input modules. For example, the 5069-IB16F module uses the Eventx.PtxxData tag. The 5069-IB16 or 5069-IB16K modules do not use it.

Compact 5000 I/O Standard Input Modules

[Table 17](#) lists tags that are used on Compact 5000 I/O standard input modules.

IMPORTANT For more information on the valid values for each tag, see Appendix B, [Module Tag Definitions on page 217](#).

Table 17 - Compact 5000 I/O Standard Input Module - Fault and Data Status

Data Type	Tag Name ⁽¹⁾	Triggering Event That Sets
Fault	ConnectionFaulted ⁽²⁾	The owner-controller loses its connection to the module.
	Counterxx.Fault	The counter data quality is bad.
	Ptxx.Fault	The point data quality is bad.
	Eventx.CounterxxFault	The corresponding counter had a fault that indicated when the event occurred.
	Eventx.Fault	The signal connection is lost.
	Eventx.Pttx.Fault	The event data quality is bad.
Status	RunMode	The module is in Run Mode.
	DiagnosticActive	Indicates if any diagnostics are active or if the prognostics threshold is reached.
	DiagnosticSequenceCount	The count increments each time that a diagnostic condition is detected or removed.
	Counterxx.Data	The point input status is 0 or 1.
	Counterxx.Uncertain	The counter data can be imperfect.
	Eventx.PttxData	The point input status is 0 or 1.
	Eventx.Uncertain	The event data can be imperfect.
	Pttx.Data	The point input status is 0 or 1.
	Pttx.Uncertain	The point data can be imperfect.
	Uncertain ⁽²⁾	The module is operating outside its designed operating range if data is under manual or override control.

(1) Not all tag names apply to all Compact 5000 I/O standard input modules. For example, only modules that support the Events feature use the Event tags but modules.

(2) This tag provides module-wide data and affects all channels simultaneously.

Compact 5000 I/O Safety Input Module

[Table 18](#) lists tags that are used on Compact 5000 I/O safety input module.

IMPORTANT For more information on the valid values for each tag, see Appendix B, [Module Tag Definitions on page 217](#).

Table 18 - Compact 5000 I/O Safety Input Module - Fault and Data Status

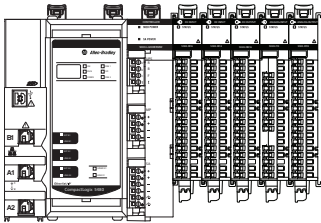
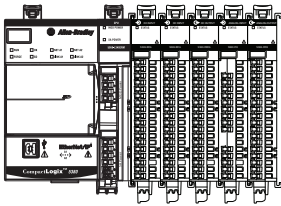
Data Type	Tag Name	Triggering Event That Sets
Fault	ConnectionFaulted ⁽¹⁾	The owner-controller loses its connection to the module.
	Ptxx.Fault	The point data quality is bad or the channel is set to Not Used.
	Ptxx.ShortCircuit	A short circuit condition exists on the point.
	Testxx.Fault	The point data quality is bad or the channel is set to Not Used.
	Testxx.ShortCircuit	A short circuit condition exists on the test point.
	Testxx.FieldPowerOff	A field power lost condition exists on the test point.
Status	RunMode	The module is in Run Mode.
	DiagnosticActive	Indicates if any diagnostics are active or if the prognostics threshold is reached.
	DiagnosticSequenceCount	The count increments each time that a diagnostic condition is detected or removed.
	Ptxx.Data	The data currently at the point.
	Ptxx.Uncertain	The point data can be imperfect because an Over temperature or Critical Temperature condition exists.
	Ptxx.Status	The point state transitions from normal to faulted or faulted to normal.
	Testxx.Readback	A 24V DC power is present at the test output.
	Testxx.Uncertain	The test point data can be imperfect.
	Testxx.Status	The test point state transitions from normal to faulted or faulted to normal.

(1) This tag provides module-wide data and affects all channels simultaneously.

For more information on fault reporting, see Appendix A, [Troubleshoot Your Module on page 199](#).

Simple Count Mode

Standard Modules



Simple count mode is used to count input pulses.

-
- IMPORTANT** The following Compact 5000 I/O standard input modules support Simple Count mode:
- 5069-IB16
 - 5069-IB16F
 - 5069-IB16K
 - 5069-IB6F-3W
-

When using the simple counter function, the module counts input pulses up to the following frequencies:

- The simple counter maximum frequency for the 5069-IB16 and 5069-IB16K modules is 500 Hz (inv. period 2 ms).

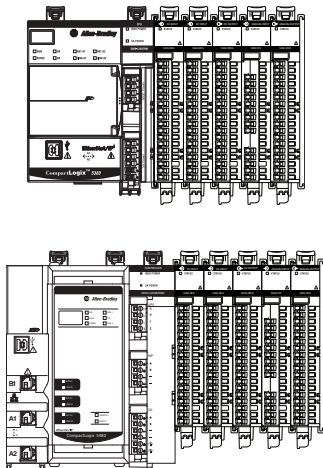
The maximum number of counters on the 5069-IB16 and 5069-IB16K modules is 8. You can configure channels 0...7 to be counters.

- The simple counter maximum frequency for the 5069-IB16F and 5069-IB6F-3W modules is: 30 kHz (inv. period 33.3 μ s).
 - The maximum number of counters on the 5069-IB16F module is 8. You can configure channels 0...7 to be counters.
 - The maximum number of counters on the 5069-IB6F-3W module is 4. You can configure channels 0...3 to be counters.

The modules compare total count to previously programmed values and then can activate an associated output. The modules provide for count up functionality and counter overflow.

Sequence of Events Per Point Timestamping

Standard Modules



Timestamping registers a time reference to a change in input data. CIP Sync™ is used for timestamping.

IMPORTANT

The following Compact 5000 I/O standard input modules support Per Point Timestamping:

- 5069-IB16F
- 5069-IB6F-3W

The 5069-IB16F and 5069-IB6F-3W DC input modules offer submillisecond timestamping on a per point basis. Time stamp values have $\pm 10 \mu s$ accuracy and $\pm 1 ns$ resolution.

You can use CIP Sync to establish a sequence of events occurring at an input module point by timestamping the input data. To determine a sequence of events, you must perform the following:

- On the Module Definition dialog box in the Logix Designer application project, set the Input Data parameter to Timestamp Data.
- Enable COS for the input point where a sequence occurs, and disable COS for all other points on the module.

You can enable COS in the following ways.

Location in Logix Designer Application	Action
Module Properties dialog box > Points category > Ptxx subcategory	Check the input transition type where you need to latch short duration pulses. For example, if you need to latch short duration pulses for Off to On transitions, check Off -> On Input Transition.
Module tags	One or both of the following: <ul style="list-style-type: none">• Change the C.Ptxx.CaptureOffOnEn tag to 1.• Change the C.Ptxx.CaptureOnOffEn tag to 1.

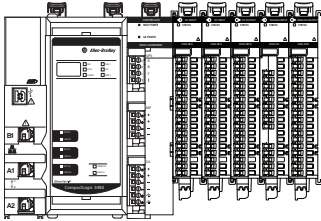
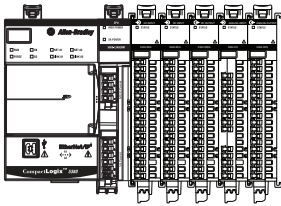
For more information on Timestamping, see [page 74](#).

To see where to set the Timestamping options, see the following:

- 5069-IB16F module - [page 162](#)
- 5069-IB6F-3W module - [page 168](#)

Chatter Detection

Standard Modules



Chatter Detection is a feature that is directly related to Timestamping. You use the feature to detect when a device that is connected to an input module causes chatter.

Chatter occurs when the device causes the inputs to transition falsely many times in a relatively short period. As a result, the module timestamps invalid input transitions.

You can configure the following:

- Chatter count - Determines the number of acceptable input transitions that can occur in a given time period before considering the input to be chatter.

Valid chatter count values range from 2...127.

- Chatter Time - Determines the amount of time within which the number of input transitions are counted.

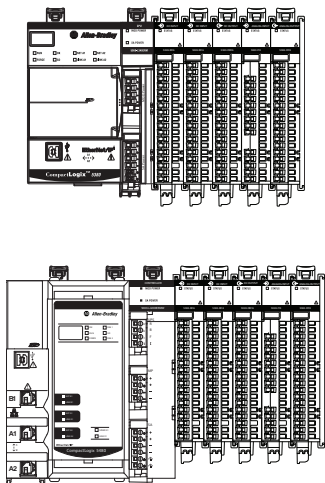
Valid chatter time values range from 1...10000 ms.

To see where to set the Chatter Detection options, see the following:

- 5069-IB16F module - [page 162](#)
- 5069-IB6F-3W module - [page 168](#)

Events

Standard Modules



You can use the Events feature to trigger events.

IMPORTANT

The following Compact 5000 I/O standard input modules support the Events feature:

- 5069-IB16F
- 5069-IB6F-3W

The modules support up to four event configurations.

The following can trigger events:

- An input state change.
- A counting input done bit change.
- A pattern of input state changes on multiple module inputs.

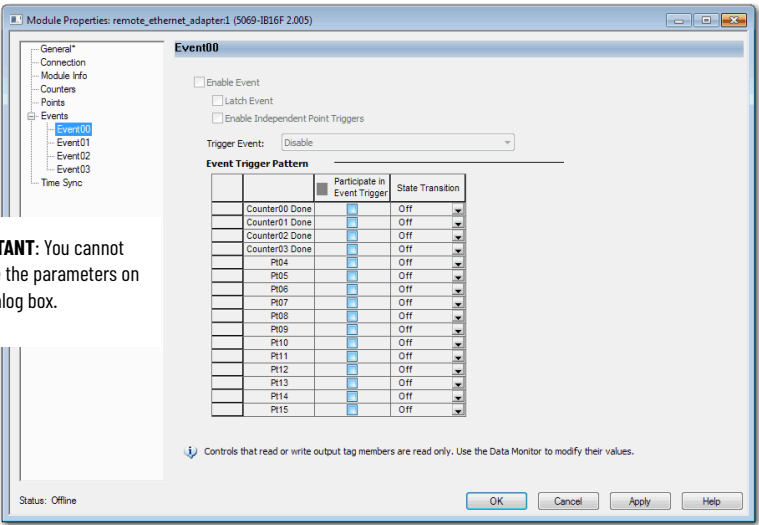
You must use the Data with Events connection type in the Module Definition to use the Events feature.

Event Definition

You define an event. When you define an event, remember the following:

- The event definition parameters are shown on Eventsxxx category in the Module Properties dialog box. The parameters are read-only in the dialog box as shown in this example.

IMPORTANT: You cannot change the parameters on this dialog box.



- The event definition parameters are configured in the Event Output s as shown in this example.

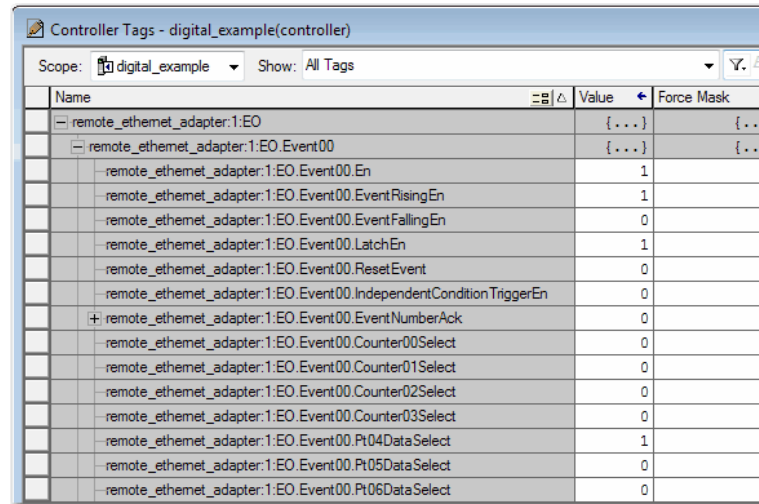


Table 19 describes the tasks that are included in defining an event.

Table 19 - Event Definition

Task	Event Output Tag to Change	Valid Values
Enable the event.	EO.Eventxx.En	<ul style="list-style-type: none"> • 0 = Event is disabled. • 1 = Event is enabled.
Choose if an input state change or a pattern of input state changes triggers the event.	EO.Eventxx.IndependentConditionTriggerEn	<ul style="list-style-type: none"> • 0 = Pattern of input state changes triggers the event. • 1 = Single input state change triggers the event.
Select at least one point on the module to participate in the event.	<p>The tag name changes based on the input function. The following names are available:</p> <ul style="list-style-type: none"> • EO.Eventxx.PtxxDataSelect - This tag appears for any point on the module if no counters are used. • EO.Eventxx.CounterxxSelect - These tags begin at point00 and continue based on the number of counters that the module uses. 	<ul style="list-style-type: none"> • 0 = Point does not participate in the event trigger. • 1 = Point participates in the event trigger.
For all points that participate in the event, choose what constitutes an event state.	<p>The tag name changes based on the input function. The following names are available:</p> <ul style="list-style-type: none"> • EO.Eventxx.PtxxDataValue - This tag appears for any point on the module if no counters are used. • EO.Eventxx.CounterxxValue - The tags begin at point00 and continue based on the number of counters that the module uses. 	<ul style="list-style-type: none"> • 0 = On to Off state transition • 1 = Off to On state transition
Choose which edge of the event triggers the event. That is, if the rising edge, falling edge, or either edge of the event.	<p>Both of the following:</p> <ul style="list-style-type: none"> • EO.Eventxx.EventRisingEn • EO.Eventxx.EventFallingEn 	<p>The combination of the tag settings determines which edge triggers the event:</p> <ul style="list-style-type: none"> • Rising edge triggers the event set by this combination: <ul style="list-style-type: none"> - EO.Eventxx.EventRisingEn = 1 - EO.Eventxx.EventFallingEn = 0 • Falling edge triggers the event set by this combination: <ul style="list-style-type: none"> - EO.Eventxx.EventRisingEn = 0 - EO.Eventxx.EventFallingEn = 1 • Falling edge triggers the event set by this combination: <ul style="list-style-type: none"> - EO.Eventxx.EventRisingEn = 1 - EO.Eventxx.EventFallingEn = 1
Latch the event. This task is optional.	EO.Eventxx.LatchEn	<ul style="list-style-type: none"> • 0 = Event is not latched. • 1 = Event is latched.

Independent Point Trigger

An input state change triggering an event is known as an independent point trigger.

To use this type of trigger, you must enable the Independent Point Trigger option in the event definition. You set the EO.Eventxx.IndependentConditionTriggerEn tag to 1.

Pattern Match Trigger

When a pattern of input state changes triggers an event, multiple points participate in the event trigger. To use this type of trigger, you must disable the Independent Point Trigger option in the event definition. You set the EO.Eventxx.IndependentConditionTriggerEn tag to 0.

Every point that participates in an event trigger is configured separately. Depending on the event definition, the collective status of all points triggers the event. The table describes event triggers.

Trigger	Definition
Enter pattern match state	If the event is defined to trigger on the rising edge, the event is triggered when a state change on any participating point results in all point configuration conditions being met. In the event definition dialog box, Trigger Event = On input transition to match pattern.
Leave pattern match state	If the event is defined to trigger on the falling edge, the event is triggered when a state change on any participating point results in all point configuration conditions no longer being met. In the event definition dialog box, Trigger Event = On input transition to not match pattern.
Enter or leave pattern match state	If the event is defined to trigger on the rising or falling edge, the event is triggered when a state change on any participating point results in all point configuration conditions being met or no longer being met. In the event definition dialog box, Trigger Event = On input transition to not match pattern.

Additional Event Considerations

When you use the Events feature, also consider the following:

- An Event task only actuates if an event occurs.

IMPORTANT	Make sure that you link the Event task to the Event Input tag, not the Input tag. Keep in mind that when the Event task executes, the input tag data can have the same data that was sent at the last RPI.
------------------	---

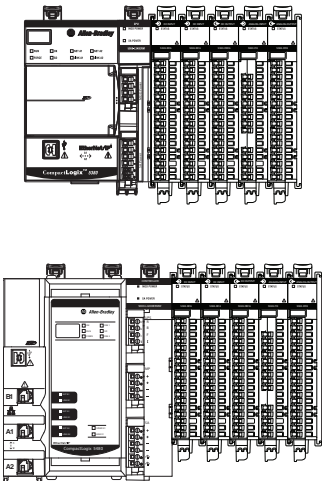
- An event is recognized only when it maintains the same state for at least the duration of the input filter time specified.
- Configure the event at a rate that stops task overlap conditions. If you enable COS for multiple points, a task overlap of the event can occur.
- Configure the event at a rate that is likely to succeed. A 2 ms signal width is the minimum pulse width that can be used at which the event succeeds.
- After the event executes, it does not execute again until the event occurs again.
- For more information on event tasks, see the Logix5000™ Controllers Tasks, Programs, and Routines Programming Manual, publication [1756-PM005](#).

To see how to configure the Events feature, see the following:

- 5069-IB16F module - [page 163](#)
- 5069-IB6F-3W module - [page 169](#)

Pulse Latching

Standard Modules



You can use Pulse Latching to detect or latch short duration pulses. The module can detect incoming pulses with a duration as short as 10 μ s if the frequency is under 4 kHz (period of 250 μ s).

IMPORTANT

The following Compact 5000 I/O standard input modules support Pulse Latching:

- 5069-IB16F
- 5069-IB6F-3W

Pulse Latching is supported via the Timestamping feature and Timestamp Latching.

To use Pulse Latching, you must complete the following:

- On the Module Definition dialog box in the Logix Designer application project, set the Input Data parameter to Timestamp Data.
- Enable COS for the input point where a latch of short duration pulses is needed. You can enable COS in the following ways.

Location in Logix Designer Application	Action
Module Properties dialog box > Points category > Ptxx subcategory	Check the input transition type where you need to latch short duration pulses. For example, if you need short duration pulses latched for Off to On transitions, check Off -> On Input Transition.
Module tags	One or both of the following: <ul style="list-style-type: none">• Change the C.Ptxx.CaptureOffOnEn tag to 1.• Change the C.Ptxx.CaptureOnOffEn tag to 1.

COS is disabled by default on all points.

When the module detects a short duration pulse at an input point, the changes that are described in this table occur.

Input Transition Type Where Pulse Is Captured	Change in Logix Designer Project
Off to On	<ul style="list-style-type: none">• The I.Ptxx.TimestampOffOnNumber tag increments.• The timestamp is recorded in I.Ptxx.TimestampOffOn tag.
On to Off	<ul style="list-style-type: none">• The I.Ptxx.TimestampOnOffNumber tag increments.• The timestamp is recorded in I.Ptxx.TimestampOnOff tag.

When subsequent short duration pulses are detected at the same input point, the Latching configuration dictates what changes, if any, occur in the Logix Designer project.

Latching Configuration	Input Transition Type Where Pulse Is Captured	Change in Logix Designer Project
Disabled (default) The following conditions disable Timestamp Latching: <ul style="list-style-type: none"> • Enable Timestamp Latching field on the Module Properties dialog box is clear • C.Ptxx.TimestampLatchEn tag = 0. 	Off to On	The I.Ptxx.TimestampOffOnNumber tag increments. The new timestamp is recorded in the I.Ptxx.TimestampOffOn tag, overwriting the previous timestamp.
	On to Off	The I.Ptxx.TimestampOnOffNumber tag increments. The new timestamp is recorded in the I.Ptxx.TimestampOnOff tag, overwriting the previous timestamp.
Enabled The following conditions enable Timestamp Latching: <ul style="list-style-type: none"> • Enable Timestamp Latching field on the Module Properties dialog box is checked. • C.Ptxx.TimestampLatchEn tag = 1. 	Off to On	The I.Ptxx.TimestampOffOnNumber and I.Ptxx.TimestampOffOn tags remain latched until the last captured pulse is acknowledged. In other words, the tag values remain the same until the last captured pulse is acknowledged.
	On to Off	The I.Ptxx.TimestampOnOffNumber and I.Ptxx.TimestampOnOff tags remain latched until the last captured pulse is acknowledged. In other words, the tag values remain the same until the last captured pulse is acknowledged.

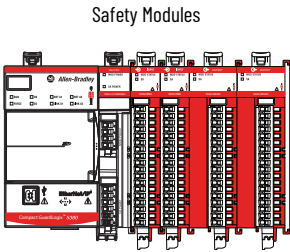
To acknowledge the last captured pulse, set the output tag of the last input pulse as follows:

- Off to On transition - Set the O.Ptxx.TimestampOffOnNumberAck tag = I.Ptxx.TimestampOffOnNumber tag.
- On to Off transition - Set the O.Ptxx.TimestampOnOffNumberAck tag = I.Ptxx.TimestampOnOffNumber tag.

Once a pulse latch is acknowledged for an input point, the next pulse at that point increments the corresponding I.Ptxx.TimestampOffOnNumber and records the timestamp in I.Ptxx.TimestampOffOn.

You can change tag values in program logic while normal module operation continues or through the Logix Designer application tag editor. For more information about module tags, see Appendix B, [Module Tag Definitions on page 217](#).

Field Power Loss Detection



The Field Power Loss Detection feature monitors for the loss of field-side power on an SA power bus.

IMPORTANT The 5069-IB8S and 5069-IB8SK are the only Compact 5000 I/O input modules that support Field Power Loss Detection.

When power is lost from an SA power bus, the Compact 5000 I/O safety input modules detect the loss of field power and fault. Fault data is then sent to the controller. All points on the module fault when field power is lost.

[Table 20](#) describes what happens when a field power loss **condition is detected**.

Table 20 - Field Power Loss Detection - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State	SA Status Indicator
<ul style="list-style-type: none">FaultsTurns off	<ul style="list-style-type: none">I.Testxx.FieldPowerOff tag = 1I.Testxx.Fault tag = 1	FieldPowerOff diagnostic = 1	Solid red	Off

To correct the issue, you must reapply field power to the test output.

[Table 21](#) describes what happens when a **field power is restored** and the error latch time, if set, has expired.

Table 21 - Field Power Loss Detection - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State	SA Status Indicator
Restarts in its commanded state.	<ul style="list-style-type: none">I.Testxx.FieldPowerOff tag = 0I.Testxx.Fault tag = 0	FieldPowerOff diagnostic = 0	Off	Steady green

IMPORTANT The module can require up to 1 second to complete the recovery in addition to the Input Error Latch Time.

Field Power Loss Detection has a corresponding tag that can be examined in the user program if a fault occurs. For information on modules, see Appendix B, [Module Tag Definitions on page 217](#).

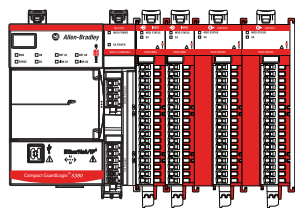
You can also monitor a point for the presence of a field power loss via the diagnostics that are available in the Module Properties dialog box in Logix Designer application.

IMPORTANT Keep in mind the following:

- Field Power Loss detection is specific to the SA Power bus.
- You can use 5069-FPD field potential distributors to establish new SA power buses that are separate from the one that the controller or EtherNet/IP™ adapter establishes.
- If separate external power supplies are used for each SA power bus, the loss of field power from one SA power bus does not affect modules that draw power from other SA power buses.

Short Circuit Protection

Safety Modules



Short Circuit Protection helps prevent damage to a test output on a 5069-IB8S or 5069-IB8SK module that can result when more current is present at the output than it can handle.

IMPORTANT The 5069-IB8S and 5069-IB8SK are the only Compact 5000 I/O input modules that support Short Circuit Protection.

The diagnostic is supported on all module outputs, that is, the Test Output points and the Test Output/Muting Output points.

[Table 22](#) describes what happens when a short circuit **condition is detected**.

Table 22 - Short Circuit Protection - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none">FaultsTurns off	I.Testxx.ShortCircuit tag = 1 I.Testxx.Fault tag = 1	Short Circuit diagnostic = 1	Flashing red

To correct the issue, remove the short.

[Table 23](#) describes what happens when the short circuit **condition is corrected**.

Table 23 - Short Circuit Protection - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Restarts in its commanded state.	I.Testxx.ShortCircuit tag = 0 I.Testxx.Fault tag = 0	Short Circuit diagnostic = 0	Turns off if there is no longer a load that is connected to the output.

For more information on the maximum current that you can apply to an output, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication [5069-TD001](#).

Muting Lamp Fault and Short Circuit Diagnostics Triggered

The conditions that are described in this section can trigger the Muting Lamp Fault and Short Circuit diagnostic on a 5069-IB8S or 5069-IB8SK module test output point.

[Table 24](#) describes conditions within which the muting lamp fault and short circuit diagnostics are triggered.

Table 24 - Short Circuit Protection - Compact 5000 I/O Safety Input Module

Conditions	Test Output Behavior	Tag ⁽¹⁾ and Diagnostic ⁽¹⁾ Value	I/O Status Indicator State
<ul style="list-style-type: none"> Muting Lamp Points in Module Definition - Point 02, Point 03, or Point 02 and 03 Test Output Point Mode - Muting Lamp Test Output Data tag = 1 Test output point is shorted to 24V DC 	<ul style="list-style-type: none"> Faults Turns off 	<ul style="list-style-type: none"> I.Testxx.ShortCircuit tag = 1 I.Testxx.Fault tag = 1 Muting Lamp Fault diagnostic = 1 Short Circuit diagnostic = 1 	Flashing red
<ul style="list-style-type: none"> Muting Lamp Points in Module Definition - Point 02, Point 03, or Point 02 and 03 Test Output Point Mode - Muting Lamp Test Output Data tag = 1 Test output point is shorted to another test output point 	<ul style="list-style-type: none"> Faults⁽²⁾ Turns off 	<ul style="list-style-type: none"> I.Testxx.ShortCircuit tag = 1 I.Testxx.Fault tag = 1 Muting Lamp Fault diagnostic = 1 Short Circuit diagnostic = 1 	Flashing red
<ul style="list-style-type: none"> Muting Lamp Points in Module Definition - Point 02, Point 03, or Point 02 and 03 Test Output Point Mode - Muting Lamp Test Output Data tag = 1 Test output point is shorted to ground 	<ul style="list-style-type: none"> Faults Turns off 	<ul style="list-style-type: none"> I.Testxx.ShortCircuit tag = 1 I.Testxx.Fault tag = 1 Short Circuit diagnostic = 1 Short Circuit to Ground diagnostic = 1 	Flashing red

(1) The diagnostics on the fault test output point are triggered in succession. That is, the Muting Lamp Fault diagnostic changes to 1 and then the Short Circuit diagnostic is triggered.

(2) This behavior occurs only on the test output point that is faulted.

When the conditions that trigger the diagnostics as described in [Table 24](#) are corrected, the results are the same as described in [Table 23 on page 95](#).

Test Output Recovery After Overload or Short Circuit to Ground Condition

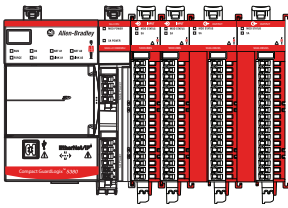
[Table 25](#) describes test output recovery after overload or short circuit to ground conditions occur.

Table 25 - Test Output Recovery - Compact 5000 I/O Safety Input Modules

Cause of Fault	Module Operating Conditions	Correction	Recovery Time
Overload Condition	<ul style="list-style-type: none"> Test Output Point Mode - Pulse Test, Power Supply, or Muting Lamp. Test Output Data tag = 1. Overload current ≥ 0.7 A. 	Remove the load from the test output point.	After the condition is corrected, and the test output is returned to the safe state, it recovers in whichever of the following times are higher: <ul style="list-style-type: none"> 10 seconds Input Error Latch Time - This time is set on the Input Points category of the Module Properties dialog box. To see where to set the Input Error Latch Time, go to page 191 .
Short Circuit to Ground Condition	<ul style="list-style-type: none"> Test Output Point Mode - Pulse Test, Power Supply, or Muting Lamp. Test Output Data tag = 1. Test output is connected directly to ground. 	One of the following: <ul style="list-style-type: none"> If the Point Mode for the test output is Pulse Test or Power Supply when the Short Circuit condition is detected, the condition can be corrected but you cannot set the test output to a safe state. If the Point Mode for the test output is Muting Lamp and the output is on when the Short Circuit condition is detected, the ShortToHigh is detected as a muting fault. 	After the condition is corrected, and the test output is returned to the safe state, it recovers in whichever of the following times are higher: <ul style="list-style-type: none"> 10 seconds Input Error Latch Time - This time is set on the Input Points category of the Module Properties dialog box. To see where to set the Input Error Latch Time, go to page 191 .

Thermal Shutoff

Safety Modules



Thermal Shutoff helps prevent damage to a test output on the 5069-IB8S or 5069-IB8SK module that can result when an output gets hotter than it can handle.

IMPORTANT The 5069-IB8S and 5069-IB8SK are the only Compact 5000 I/O input modules that support Thermal Shutoff.

This feature is **directly related to Short Circuit Protection** feature. The increased temperature at the output results from an excessive load at the output. That is, a load with high current is applied to the output. The high current heats the output beyond an acceptable temperature and the output turns off.

[Table 26](#) describes what happens when a thermal shutoff **condition is detected**.

Table 26 - Thermal Shutoff - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none"> Faults Turns off 	I.Testxx.ShortCircuit tag = 1	Short Circuit diagnostic = 1	Steady red

[Table 27](#) describes what happens when the **thermal shutoff condition** is corrected.

Table 27 - Thermal Shutoff - Compact 5000 I/O Safety Input Module

Test Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Goes in its commanded state. IMPORTANT: The commanded state must be the Off state.	I.Testxx.ShortCircuit tag = 0	One of the following: <ul style="list-style-type: none"> If the output point is shorted to 24V DC, the Overload diagnostic = 0. If the output point is shorted to ground, the Short Circuit diagnostic = 0. 	Turns off if there is no longer a load that is connected to the output.

For more information on how to use the modules, see Appendix B, [Module Tag Definitions on page 217](#).

Notes:

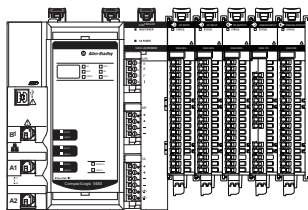
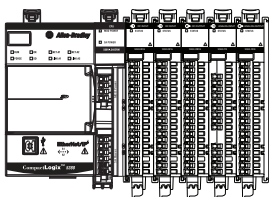
Output Module Features

Topic	Page
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No Load Detection	104
Short Circuit Protection	107
Thermal Shutoff	111
Fault and Status Reporting	113
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Isolated and Non-isolated Varieties of Output Modules	122

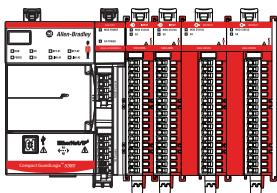
This chapter describes features that are supported on Compact 5000™ I/O digital output modules.

Multiple Output Module Types

Standard Modules



Safety Modules

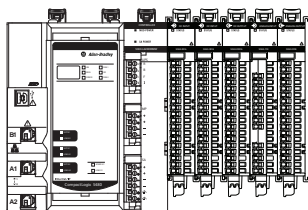
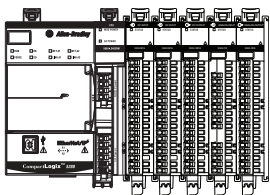


The Compact 5000 I/O digital module family offers the following output module types:

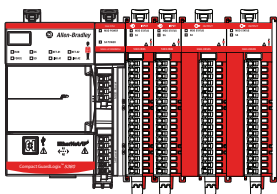
- AC standard output module - 5069-OA16
- DC standard output modules - 5069-OB8, 5069-OB16
- DC standard output conformal coated module - 5069-OB16K
- DC standard fast output module - 5069--OB16F
- Standard relay output modules - 5069-OW4I, 5069-OW16, 5069-OX4I
- Safety output modules - 5069-OBV8S and 5069-OBV8SK

Module Health Diagnostics

Standard Modules



Safety Modules



Each output module has a status indicator on the front of the module that indicates module health. For more information on module health diagnostics, see Appendix A, [Troubleshoot Your Module on page 199](#).

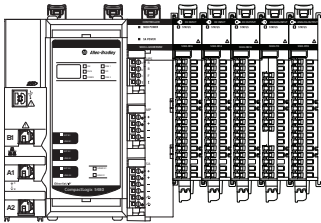
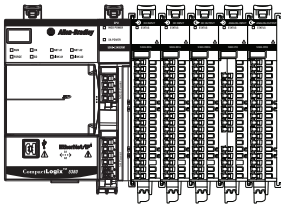
Data Echo

Data Echo automatically multicasts point data values that match the digital value that was sent to the screw terminals of the module then.

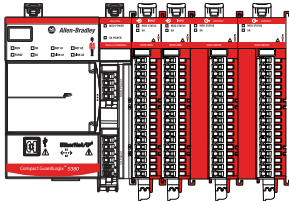
A Compact 5000 I/O digital output module returns a value that was sent to it by the owner-controller. The echoed value is either On or Off.

Fault and status data are also sent. This data is sent at the RPI.

Standard Modules



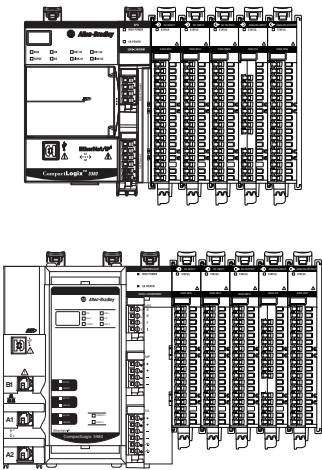
Safety Modules



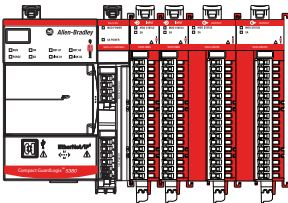
Field Power Loss Detection

The Field Power Loss Detection feature monitors for the loss of field power, either from the SA power bus or, for some modules, from the LA power terminals.

Standard Modules



Safety Modules



IMPORTANT

The following output module support Field Power Loss detection and receive field power from the **SA power bus**:

- 5069-0A16
- 5069-0W16

The following output modules that support Field Power Loss detection and receive field power from **LA power terminals**:

- 5069-0B8
- 5069-0B16/B
- 5069-0B16F/B
- 5069-0B16K/B
- 5069-0BV8S
- 5069-0BV8SK

These modules do not draw current from the SA power bus.

When field power is lost, Compact 5000 I/O digital output modules detect the loss of field power and fault. Fault data is then sent to the controller.

All points on the module fault when field power is lost.

[Table 28](#) describes what happens when a field power loss **condition is detected**.

Table 28 - Field Power Loss Detection Condition Detected - Compact 5000 I/O Digital Output Modules

Cat. Nos.	Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State	SA Status Indicator State
5069-0A16, 5069-0B8, 5069-0B16/B, 5069-0B16F/B, 5069-0B16K/B, 5069-0W16	• Faults • Turns off	I.Ptxx.Fault tag = 1	FieldPowerOff diagnostic = 1	Flashing Red	N/A
5069-0BV8S, 5069-0BV8SK		• I.Ptxx.FieldPowerOff tag = 1 • I.Ptxx.Fault tag = 1		Solid Red	Off

To correct the issue, you must reapply field power to the output module.

[Table 29](#) describes what happens when a field power loss **condition is resolved**, the error latch time, if set, has expired, and the module is recovered.

Table 29 - Field Power Loss Detection Condition is Resolved - Compact 5000 I/O Digital Output Modules

Cat. Nos.	Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State	SA Status Indicator State
5069-0A16, 5069-0B8, 5069-0B16/B, 5069-0B16F/B, 5069-0B16K/B, 5069-0W16	Restarts in its commanded state. ⁽¹⁾	I.Ptxx.Fault tag = 0	FieldPowerOff diagnostic = 0	Off	N/A
5069-0BV8S, 5069-0BV8SK		<ul style="list-style-type: none"> I.Ptxx.FieldPowerOff tag = 0 I.Ptxx.Fault tag = 0 			Steady green

(1) If the commanded state is On, the output turns on 100 ms after the Field Power Loss condition is resolved.

IMPORTANT The module can require up to 1 second to complete the recovery in addition to the Output Error Latch Time.

Field Power Loss Detection has a corresponding tag that can be examined in the user program if a fault occurs. For information on module s, see Appendix B, [Module Tag Definitions on page 217](#).

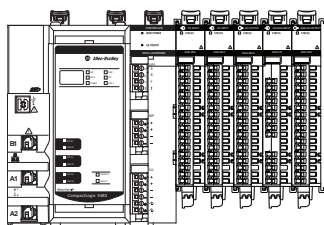
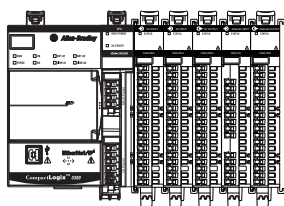
You can also monitor a point for the presence of a field power loss via the diagnostics that are available in the Module Properties dialog box in Logix Designer application.

IMPORTANT Keep in mind the following:

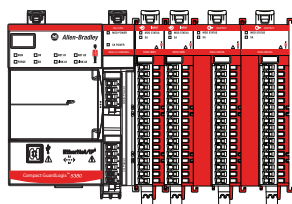
- With the 5069-0BV8S and 5069-0BV8SK modules, Field Power Loss detection not only detects the loss of field power at the LA terminals. Field Power Loss also detects the presence of an undervoltage or overvoltage condition on the SA power bus where the module resides. That is, if the SA power bus uses a level of power that is outside the supported voltage range for the module, the conditions described in [Table 28 on page 102](#) occur. Undervoltage or overvoltage conditions on the SA power bus can be detected whether field power is connected to the LA terminals or not.
- You can use 5069-FPD field potential distributors to establish new SA power buses that are separate from the one that the controller or EtherNet/IP™ adapter establishes.
- If separate external power supplies are used for each SA power bus, the loss of field power from one SA power bus does not affect modules that draw power from other SA power buses.

No Load Detection

Standard Modules



Safety Modules



No Load Detection detects when a wire is disconnected from an output or a load is missing from an output.

IMPORTANT The following Compact 5000 I/O digital output modules support No Load Detection:

- 5069-OB8
 - 5069-OB16
 - 5069-OB16F
 - 5069-OB16K
 - 5069-OBV8S
 - 5069-OBV8SK
-

No Load Detection with Standard Output Modules

On Compact 5000 I/O standard output modules, No Load detection only works when the **output is in the Off state**. A standard output module cannot detect a No Load condition if the output is in the On state.

A No Load condition can **exist** when the output is on. However, because standard output modules cannot detect a No Load condition when the output is on, the module appears to be working normally on the status indicators and in the Logix Designer application project.

No Load Detection is **disabled by default** on Compact 5000 I/O **standard output modules**. You must enable the feature in your Logix Designer application project in one of the following ways:

- Click Enable No Load Diagnostics for output on the Points category of the Module Properties dialog box, in the Logix Designer application project.
- Change the C.Outputxx.NoLoadEn to 1, where xx represents the output number.

A load that is connected to an output on a standard output module must draw a **minimum of 0.5 mA** or it is considered missing.

IMPORTANT An output must remain in the off state a minimum of 250 ms for No Load condition to be detected.

[Table 30](#) describes what happens when a No Load **condition is detected**.

Table 30 - No Load Detection - Compact 5000 I/O Standard Output Modules

Tag Value	Diagnostic Value	I/O Status Indicator State
I.Pttx.NoLoad tag = 1	No Load diagnostic = 1	Flashing red

To correct the No Load condition, reconnect any disconnected wires or the load to the output.

[Table 31](#) describes what happens when a No Load **condition is corrected**.

Table 31 - No Load Detection - Compact 5000 I/O Standard Output Modules

Tag Value	Diagnostic Value	I/O Status Indicator State
I.Pttx.NoLoad tag = 0	No Load diagnostic = 0	Off

You can monitor a module tag in your program that corresponds to the No Load Detection to check for a fault. For more information on the tag, see Appendix B, [Module Tag Definitions on page 217](#).

You can also monitor a point for the presence of a No Load condition via the diagnostics that are available in the Module Properties dialog box in Logix Designer application.

For more information on where to configure No Load Detection, see the following:

- 5069-OB8 - [page 173](#)
- 5069-OB16 and 5069-OB16K module - [page 174](#)
- 5069-OB16F module - [page 175](#)

No Load Detection with Safety Output Modules

On Compact 5000 I/O safety output modules, No Load detection only works when the **output is in the Off state**.

A No Load condition can **exist** when the output is on. However, because safety output modules cannot detect a No Load condition when the output is on, the module appears to be working normally on the status indicators and in the Logix Designer application project.

[Table 32](#) describes how you can use the feature.

Table 32 - No Load Detection Conditions - Compact 5000 I/O Safety Output Modules

Operating Conditions	Default Setting	Change Setting
<ul style="list-style-type: none"> Module revision 1.011 Default configuration profile in Logix Designer application 	Enabled	Not available You cannot disable the feature.
<ul style="list-style-type: none"> Module revision 2.011 Add-On profile, version 2.01, in Logix Designer application 		To disable the feature, clear the Enable No Load Diagnostic check box for the output on the Points category of the Module Properties dialog box.

A load that is connected to an output on a safety output module must draw a minimum of 10 mA, for example, 2.4 k Ω at 24V DC, or it is considered missing. This requirement applies if the output is in the Off and On state.

IMPORTANT An output must remain in the off state a minimum of 250 ms for No Load condition to be detected.

[Table 33](#) describes what happens when a No Load **condition is detected**.

Table 33 - No Load Detection - Compact 5000 I/O Safety Output Modules

Tag Value	I/O Status Indicator State
I.Ptxx.NoLoad tag = 1	One of the following: <ul style="list-style-type: none"> Flashing red - If the output is off and a No Load condition is detected. Flashing red/yellow - If the output is off and a No Load condition is detected, but the condition is not corrected and the output turns on. In this case, the status indicator is flashing red until the safety output is turned on.

IMPORTANT When the safety output is in the On state, and there was a load detected in the Off state, the I/O status indicator is steady yellow.

If the load is then lost from the safety output, for example, because a wire gets disconnected when the safety output is still in the On state, the No Load condition is not detected.

The I/O status indicator for the safety output remains steady yellow.

[Table 34](#) describes what happens when a No Load **condition is corrected**.

Table 34 - No Load Detection - Compact 5000 I/O Safety Output Modules

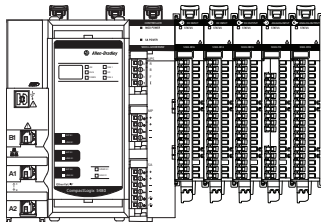
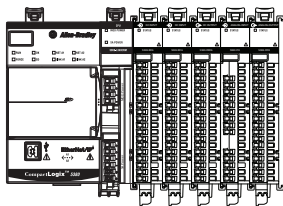
Tag Value	I/O Status Indicator State
I.Ptxx.NoLoad tag = 0	Off

You can monitor a module tag in your program that corresponds to the No Load Detection to check for a fault. For more information on the tag, see Appendix B, [Module Tag Definitions on page 217](#).

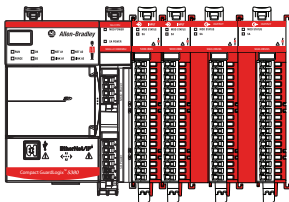
You can also monitor a point for the presence of a No Load condition via the diagnostics that are available in the Module Properties dialog box in Logix Designer application.

Short Circuit Protection

Standard Modules



Safety Modules



Short Circuit Protection helps prevent damage to the output that can result when more current is present at the output than it can handle.

IMPORTANT The following Compact 5000 I/O digital output modules support Short Circuit Detection:

- 5069-OB8
- 5069-OB16
- 5069-OB16F
- 5069-OB16K
- 5069-OBV8S
- 5069-OBV8SK

Short Circuit Protection with Standard Output Modules

[Table 35](#) describes what happens when a short circuit **condition is detected** on a Compact 5000 I/O standard output module.

Table 35 - Short Circuit Protection - Compact 5000 I/O Standard Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none"> • Faults • Turns off 	I.Ptxx.ShortCircuit tag = 1	Short Circuit diagnostic = 1	Flashing red

To correct the issue, you must remove the short circuit condition.

[Table 36](#) describes what happens when the short circuit **condition is corrected** on a Compact 5000 I/O standard output module.

Table 36 - Short Circuit Protection - Compact 5000 I/O Standard Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Restarts in its commanded state	I.Ptxx.ShortCircuit tag = 0	Short Circuit diagnostic = 0	Steady yellow

For more information on the maximum current that you can apply to an output, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication [5069-TD001](#).

Short Circuit Protection with Safety Output Modules

[Table 37](#) describes what happens when a short circuit **condition is detected** on a Compact 5000 I/O safety output module.

Table 37 - Short Circuit Protection - Compact 5000 I/O Safety Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none"> Faults Turns off 	One of the following: <ul style="list-style-type: none"> If the output point is shorted to 24V DC, the I.Ptxx.ShortCircuit tag = 1. If the output point is shorted to ground, no tags are changed. 	One of the following: <ul style="list-style-type: none"> If the output point was shorted to 24V DC when the short circuit condition was detected, the Short Circuit diagnostic = 1. If the output point is shorted to ground when the short circuit condition was detected, the Short Circuit to Ground diagnostic = 1. 	One of the following: <ul style="list-style-type: none"> Flashes red if the output point is shorted to 24V DC. Off if the output point is shorted to ground.

[Table 38](#) describes what happens when the short circuit condition is removed from a Compact 5000 I/O safety output module and the data is set to safe state, that is, the off state.

Table 38 - Short Circuit Protection - Compact 5000 I/O Safety Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Restarts in its commanded state	One of the following: <ul style="list-style-type: none"> If the output point is shorted to 24V DC, the I.Ptxx.ShortCircuit tag = 0. If the output point is shorted to ground, no tags are changed. 	One of the following: <ul style="list-style-type: none"> If the output point was shorted to 24V DC when the short circuit condition was detected, the Short Circuit diagnostic = 0. IMPORTANT: You must cycle power to the module to reset the diagnostic. If the output point is shorted to ground when the short circuit condition was detected, the Short Circuit to Ground diagnostic = 0. 	Turns off if there is no longer a load that is connected to the output.

For more information on the maximum current that you can apply to an output, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication [5069-TD001](#).

Other Conditions That Can Trigger the Short Circuit Diagnostic on the 5069-OBV8S or 5069-OBV8SK Module

[Table 39](#) describes conditions that can trigger the Short Circuit diagnostic.

Table 39 - Conditions That Trigger Short Circuit Diagnostic

Conditions	Output Behavior	Possible Tag and Diagnostic Combinations	I/O Status Indicator State
<ul style="list-style-type: none"> Output Mode - Sourcing Point Operation Type - Single Point Mode - Safety Pulse Test O.Ptxx.Data tag = 1 Output point is shorted to 24V DC. 	<ul style="list-style-type: none"> Faults Turns off 	Combination 1 <ul style="list-style-type: none"> I.Ptxx.ShortCircuit tag = 1 Short Circuit diagnostic = 1 I.Ptxx.Fault tag = 1 Combination 2 <ul style="list-style-type: none"> I.Ptxx.Fault tag = 1 Internal Fault diagnostic = 1 Combination 3 <ul style="list-style-type: none"> I.Ptxx.Fault tag = 1 Internal Fault diagnostic = 1 Overload Fault diagnostic = 1 IMPORTANT: The tag and diagnostic combinations that are described occur on the faulted output point and all of its associated group points.	
The following conditions exist on a pair of module outputs: <ul style="list-style-type: none"> Output Mode - Sourcing Point Operation Type - Dual Point Mode - Safety Pulse Test O.Ptxx.Data tag = 1 (Either output point in the pair) Output point is shorted to 24V DC (Either output point in the pair). 	<ul style="list-style-type: none"> Faults Turns off 	Combination 1 <ul style="list-style-type: none"> I.Ptxx.ShortCircuit tag = 1 I.Ptxx.Fault tag = 1 Short Circuit diagnostic = 1 Internal Fault diagnostic = 1 Combination 2 <ul style="list-style-type: none"> I.Ptxx.Fault tag = 1 Internal Fault diagnostic = 1 IMPORTANT: The tag and diagnostic combinations that are described occur on the faulted output point and all of its associated group points.	The I/O status indicator for the faulted output point turns off.
The following conditions exist on a pair of module outputs: <ul style="list-style-type: none"> Output Mode - Sourcing Point Operation Type - Dual O.Ptxx.Data tag = 1 (Both output points in the pair) Output points are shorted to each other. 	<ul style="list-style-type: none"> Faults Turns off 	Combination 1 <ul style="list-style-type: none"> I.Ptxx.ShortCircuit tag = 1 (Both output points in the pair) Short Circuit diagnostic = 1 (Both output points in the pair) I.Ptxx.Fault tag = 1 Combination 2 <ul style="list-style-type: none"> I.Ptxx.Fault tag = 1 (Faulted output point and all of its associated group points) Internal Fault diagnostic = 1 (Faulted output point and all of its associated group points) 	

When the conditions that trigger the diagnostics as described in [Table 39](#) are corrected, the results are the same as described in [Table 38 on page 108](#).

Output Recovery After Overload or Short Circuit to Ground Condition

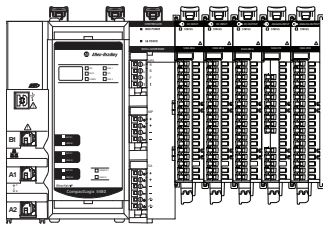
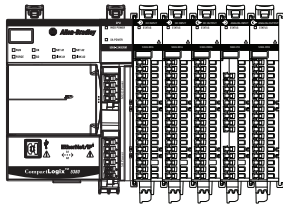
[Table 40](#) describes test output recovery after overload or short circuit to ground conditions occur.

Table 40 - Output Recovery - Compact 5000 I/O Safety Output Modules

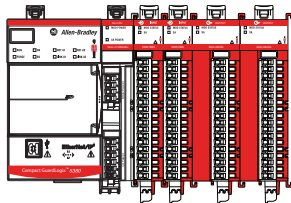
Cause of Fault	Module Operating Conditions	Correction	Recovery Time
Overload Condition	<ul style="list-style-type: none"> Output Point Mode - Safety or Safety Pulse Test. Output Data tag = 1. Overload current ≥ 1.5 A 	<p>Remove the load from the output point.</p> <p>When safety output module resides in a remote Compact 5000 I/O system, the connection to the Compact 5000 EtherNet/IP adapter can break.</p> <p>When the cable break occurs and then recovers, the load recovers if the command state of the output point is still high even if the command state in the program did not go to the safe state.</p>	<p>After the condition is corrected, and the output is returned to the safe state, it recovers in whichever of the following times is higher:</p> <ul style="list-style-type: none"> 10 seconds Output Error Latch Time - This time is set on the Points category of the Module Properties dialog box.
Short Circuit to Ground Condition	<ul style="list-style-type: none"> Output Point Mode - Safety or Safety Pulse Test. Output Data tag = 1. Output is connected directly to ground. 	<p>Remove the output connection to ground and set the output to a safe state.</p>	<p>To see where to set the Output Error Latch Time, go to page 192.</p>

Thermal Shutoff

Standard Modules



Safety Modules



Thermal Shutoff helps prevent damage to the output that can result when an output gets hotter than it can handle.

IMPORTANT The following Compact 5000 I/O digital output modules support the Thermal Shutoff feature:

- 5069-OB8
- 5069-OB16
- 5069-OB16F
- 5069-OB16K
- 5069-OBV8S
- 5069-OBV8SK

This feature is **directly related to Short Circuit Protection** feature. The increased temperature at the output results from an excessive load at the output. That is, a load with high current is applied to the output. The high current heats the output beyond an acceptable temperature and the output turns off.

Thermal Shutoff with Standard Output Modules

[Table 41](#) describes what happens when a thermal shutoff **condition is detected** on Compact 5000 I/O standard output modules.

Table 41 - Thermal Shutoff - Compact 5000 I/O Standard Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none"> • Faults • Turns off 	I.Ptxx.ShortCircuit tag = 1	—	Flashing red

[Table 42](#) describes what happens when the **thermal shutoff condition is corrected** on Compact 5000 I/O standard output modules.

Table 42 - Thermal Shutoff - Compact 5000 I/O Standard Output Modules

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Restarts in its commanded state.	I.Ptxx.ShortCircuit tag = 0	—	Turns off if there is no longer a load that is connected to the output.

For more information on how to use the modules, see Appendix B, [Module Tag Definitions on page 217](#).

Thermal Shutoff with a Safety Output Module

[Table 43](#) describes what happens when a thermal shutoff **condition is detected** on a Compact 5000 I/O safety output module.

Table 43 - Thermal Shutoff - Compact 5000 I/O Safety Output Module

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none"> Faults Turns off 	One of the following: <ul style="list-style-type: none"> If the output point is shorted to 24V DC when the thermal shutoff condition occurred, the I.Ptxx.ShortCircuit tag = 1. If the output point is shorted to ground when the thermal shutoff condition occurred, there is no change to the tags. 	One of the following: <ul style="list-style-type: none"> If the output point is shorted to 24V DC when the thermal shutoff condition occurred, there is no change in the diagnostics. If the output point is shorted to ground when the thermal shutoff condition occurred, the ShortCircuitGround diagnostic = 1. 	Steady red

[Table 44](#) describes what happens when the thermal shutoff **condition is corrected** on a Compact 5000 I/O safety output module.

Table 44 - Thermal Shutoff - Compact 5000 I/O Safety Output Module

Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
Remains in the off state	I.Ptxx.ShortCircuit tag = 0	One of the following: <ul style="list-style-type: none"> If the output point was shorted to 24V DC when the thermal shutoff condition occurred, the Overload diagnostic = 0. IMPORTANT: You must cycle power to the module to reset the diagnostic. If the output point was shorted to ground when the thermal shutoff condition occurred, the ShortCircuitGround diagnostic = 0. 	Turns off if there is no longer a load that is connected to the output.

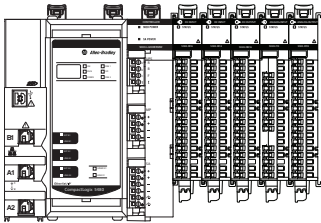
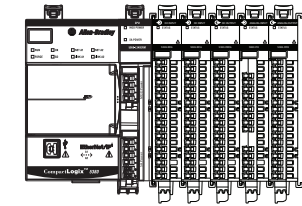
For more information on how to use the modules, see Appendix B, [Module Tag Definitions on page 217](#).

Fault and Status Reporting

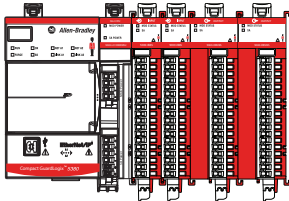
The output modules multicast fault and status data with channel data to the owner and listening controllers. The data is returned via module s that you can monitor in your Logix Designer application.

Not all tags that are listed in [Table 45](#) apply to all Compact 5000 I/O digital output modules. For example, the 5069-OB8 module uses the Ptxx.NoLoad tag. The 5069-OW4I module does not.

Standard Modules



Safety Modules



IMPORTANT For the 5069-OB16, 5069-OB16F, and 5069-OB16K output modules only, an output must remain in the on state for a minimum of 250 ms for an overload or short circuit to be detected. However, if a short circuit condition exists long term, it is detected as long as the output is switching at a rate no faster than 1 ms.

Compact 5000 I/O Standard Output Modules

[Table 45](#) lists tags that are used on Compact 5000 I/O standard output modules.

IMPORTANT For more information on the valid values for each tag in [Table 45](#), see Appendix B, [Module Tag Definitions on page 217](#).

Table 45 - Compact 5000 I/O Standard Output Modules - Fault and Data Status

Data Type	Tag Name	Triggering Event That Sets
Fault	ConnectionFaulted ⁽¹⁾	The owner-controller loses its connection to the module.
	Pttx.Fault	The point data quality is bad.
	Pttx.NoLoad	A no load condition exists on the point.
	Pttx.ShortCircuit	A short circuit condition exists on the point.
	Pttx.FieldPowerOff	A field power lost condition exists on the point.
Status	RunMode	The module is in Run Mode.
	DiagnosticActive	Indicates if any diagnostics are active or if the prognostics threshold is reached.
	DiagnosticSequenceCount	The count increments each time that a diagnostic condition is detected or removed.
	Pttx.Data	The point input status is 0 or 1.
	Pttx.Uncertain	The point data can be imperfect.
	Uncertain ⁽¹⁾	The module is operating outside its designed operating range if data is under manual or override control.

(1) This tag provides module-wide data an affects all channels simultaneously.

Compact 5000 I/O Safety Output Modules

[Table 46](#) lists tags that are used on Compact 5000 I/O safety output modules.

IMPORTANT For more information on the valid values for each tag in [Table 46](#), see Appendix B, [Module Tag Definitions on page 217](#).

Table 46 - Compact 5000 I/O Safety Output Modules - Fault and Data Status

Data Type	Tag Name	Triggering Event That Sets
Fault	ConnectionFaulted ⁽¹⁾	The owner-controller loses its connection to the module.
	Ptxx.Fault	The point data quality is bad or the channel is set to Not Used.
	Ptxx.ShortCircuit	A short circuit condition exists on the point.
	Ptxx.FieldPowerOff	A field power lost condition exists on the point.
Status	RunMode	The module is in Run Mode.
	DiagnosticActive	Indicates if any diagnostics are active or if the prognostics threshold is reached.
	DiagnosticSequenceCount	The count increments each time that a diagnostic condition is detected or removed.
	Ptxx.Readback	A 24V DC power source is connected to the output circuit.
	Ptxx.Data	The data currently at the point.
	Ptxx.Uncertain	The point data can be imperfect.

(1) This tag provides module-wide data an affects all channels simultaneously.

For more information on fault reporting, see Appendix A, [Troubleshoot Your Module on page 199](#).

Output State Change Time

[Table 47](#) lists the time that it takes for Compact 5000 I/O standard output module outputs to change state after a command.

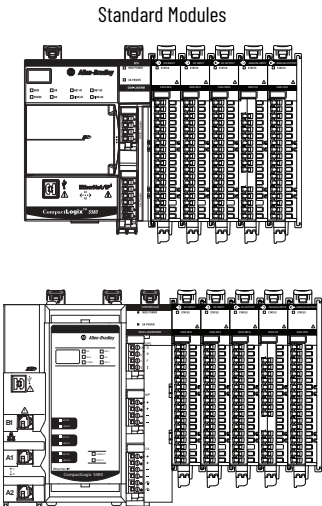


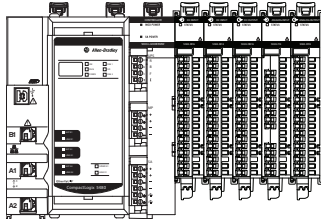
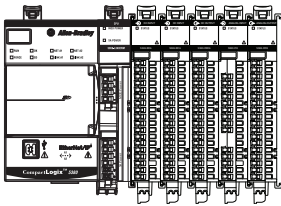
Table 47 - Time for a Module Output to Change State

Module	Time ⁽¹⁾
5069-0A16	1/2 cycle, typical For example, if the input uses a 50 Hz AC wave, 1 cycle = 1/50 or 20 ms. Because the typical time for the module output to change state is 1/2 cycle, in this example the time is 10 ms.
5069-0B8	100 µs
5069-0B16, 5069-0B16K	100 µs
5069-0B16F	10 µs
5069-0W4I	10 ms
5069-0W16	10 ms
5069-0X4I	15 ms

(1) The times that are listed in [Table 47](#) are from the time the module receives the message.

Configurable Channel-level Output State in Program Mode or Fault Mode

Standard Modules



You can configure individual output channels to specific states when the module is in Program mode or Fault mode. The following output states are available:

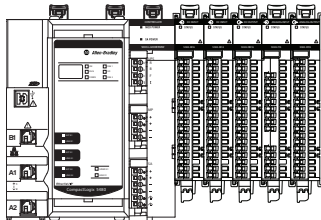
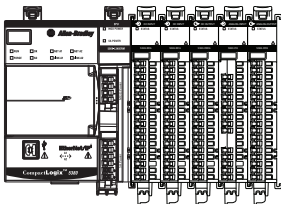
- Off
- On
- Hold last state

To see how to configure the output states in Program mode or Fault mode, see the following:

- 5069-OA16 module - [page 172](#)
- 5069-OB8 module - [page 173](#)
- 5069-OB16 and 5069-OB16K modules - [page 174](#)
- 5069-OB16F module - [page 175](#)
- 5069-OW4I module - [page 176](#)
- 5069-OW16 module - [page 177](#)
- 5069-OX4I module - [page 178](#)

Connection Fault Handling

Standard Modules



You can configure Compact 5000 I/O standard module behavior when a connection fault occurs, that is, the connection between the owner-controller and the output module breaks.

You must define the following:

- Immediate output behavior when the connection breaks.
- Length of time that the output behaves as defined.
- Output behavior if the connection remains broken when the length of time that is defined previously expires.

Output Behavior Immediately After a Connection Fault

When the connection between an owner-controller and output module breaks, the output can behave in the following ways, depending on how the Fault Mode parameter is configured:

- Turn off - Default
- Transition to a specific, user-defined value.
- Hold its last state.

If you configure the output to hold its last state, the output remains at that state value until the following occurs:

- The connection to the owner-controller is re-established.
- The output returns to normal operation, as defined in the module configuration.

The output state remains as commanded if Fault State Duration is set to Forever.

If the Fault State Duration is set to a value other than Forever, the output state changes to a user-configurable Final Fault State after the specified time period elapses. For more information, see [Final Fault State Value on page 116](#).

Fault State Duration After Connection Fault

If you configure the output to transition to a specific value after the connection breaks, you must define how long the output remains at the specified value before it transitions to a Final Fault State.

You can configure the output to remain at the specific value for the following times:

- Forever
- 1 second
- 2 seconds
- 5 seconds
- 10 seconds

After the Fault State Duration time expires, the output transitions to user-defined Final Fault State Value.

Final Fault State Value

The Final Fault State value defines the value to which the output goes after the Fault State Duration time expires.

You set the value in the C.Ptxx.FaultFinalState tag. For more information on module s, see Appendix B, [Module Tag Definitions on page 217](#).

Output State Once Connection Is Re-established

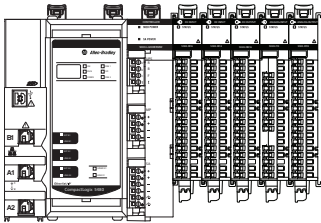
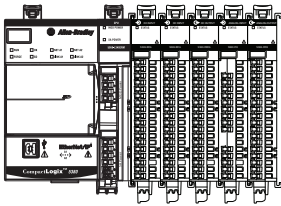
Once the connection between the owner-controller and output module is re-established, the output resumes normal operation.

To see where to configure the Connection Fault Handling parameters, see the following:

- 5069-OA16 module - [page 172](#)
- 5069-OB8 module - [page 173](#)
- 5069-OB16 and 5069-OB16K modules - [page 174](#)
- 5069-OB16F module - [page 175](#)
- 5069-OW4I module - [page 176](#)
- 5069-OW16 module - [page 177](#)
- 5069-OX4I module - [page 178](#)

Forcing

Standard Modules



Use a force to override data that your logic either uses or produces.

- Test and debug your logic.
- Temporarily maintain normal system operations when an input device has failed.

Use forces only as a temporary measure. They are not intended to be a permanent part of your application.

Make sure that you understand this before you use forces.



ATTENTION: Forcing can cause unexpected machine motion that could injure personnel. Before you use a force, determine how the force affects your machine or process and keep personnel away from the machine area.

- Enabling I/O or SFC forces causes your machine or process to go to another state or phase.
 - Removing forces can still leave forces in the enabled state.
- If forces are enabled and you install a force, the new force immediately takes effect.

Enable Forces

For a force to take effect, you enable forces. You can only enable and disable forces at the controller level.

- You can enable I/O forces and SFC forces separately or simultaneously.
- You cannot enable or disable forces for a specific module, tag collection, or tag element.

Disable or Remove a Force

To stop the effect of a force and let your project execute as programmed, disable or remove the force.

- You can disable or remove I/O and SFC forces simultaneously or separately.
- When you remove a force on an alias tag, you also remove the force on the base tag.



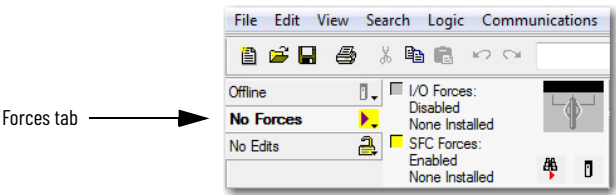
ATTENTION: Changes to forces can cause unexpected machine motion that could injure personnel. Before you disable or remove forces, determine how the change affects your machine or process and keep personnel away from the machine area.

Check Force Status

Before you use a force, determine the status of forces for the controller.

The Online toolbar shows the status of forces. It shows the status of I/O forces and SFC forces separately.

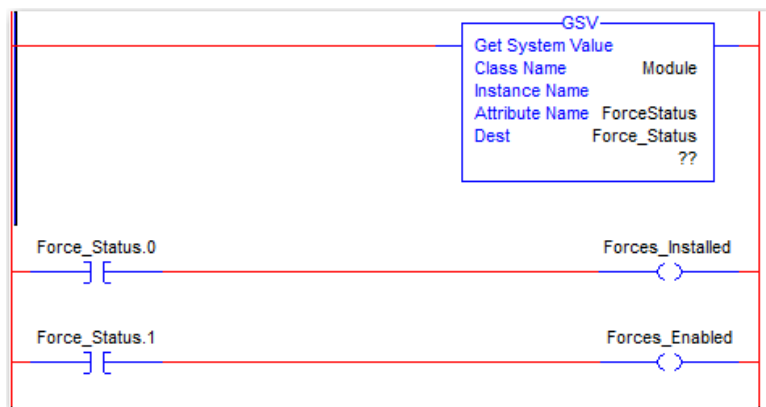
To Determine the Status of This	Use Any of The following
I/O forces	<ul style="list-style-type: none">• Online toolbar• GSV instruction
SFC forces	Online toolbar



Forces Tab Status	Means
Enabled	<ul style="list-style-type: none">• If the project contains any forces of this type, they are overriding your logic.• If you add a force of this type, the new force immediately takes effect
Disabled	Forces of this type are inactive. If the project contains any forces of this type, they are not overriding your logic.
Installed	At least one force of this type exists in the project.
None Installed	No forces of this type exist in the project.

GSV Instruction

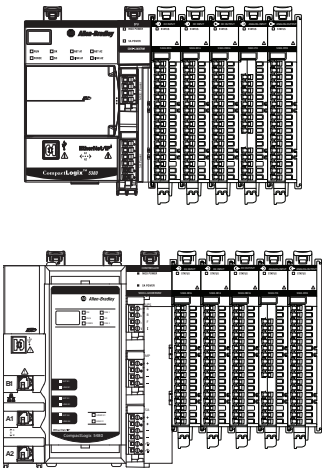
This example shows how to use a GSV instruction to get the status of forces. For the purposes of this example, Force_Status is a DINT tag.



To Determine This	Examine This bit	For This Value
Forces are installed.	0	1
No forces are installed.	0	0
Forces are enabled.	1	1
Forces are disabled.	1	0

Time-scheduled Output Control

Standard Modules



You can schedule times for module outputs to turn On or Off. The time schedules use units in nanoseconds.

IMPORTANT This feature is available only on the 5069-OB16F module.

The timing of scheduled outputs for the 5069-OB16F module is as follows:

- $\pm 10 \mu\text{s}$ accuracy
- 1 ns resolution

The module must be time synced or schedules are not applied.

Time-scheduled output control is used with the Motion Arm Output Cam (MAOC) instruction. The MAOC instruction enables position-based output control in the following ways:

- Uses the position of any motion axis in a Logix 5000™ control system as the position reference
- Updates the outputs based on the motion axis position at the motion group coarse update rate, typically 1...32 ms.

The instruction can update standard output modules at the coarse update rate. However, some high-speed applications require a higher degree of accuracy.

The 5069-OB16F scheduled output module improves the accuracy of the MAOC instruction by supporting the ability to schedule output On and Off times. All scheduling configuration for the On and Off times of an output is completed through the MAOC instruction. The instruction then updates values in the outputs of the module that define the scheduled output behavior.

Table 48 - 5069-OB16F Output Module Schedule Parameters

Feature	5069-OB16F
Number of schedules	32
Output points available for scheduling	16 (points 0...15)
Remote operation	—
Minimum schedule interval ⁽¹⁾	100 μs For schedules output the MAOC instruction, you can use 50 μs .

(1) The MAOC limits the minimum schedule interval (minimum pulse width) to 1/16 of the coarse update period.

Use an MAOC Instruction with a 5069-OB16F Output Module

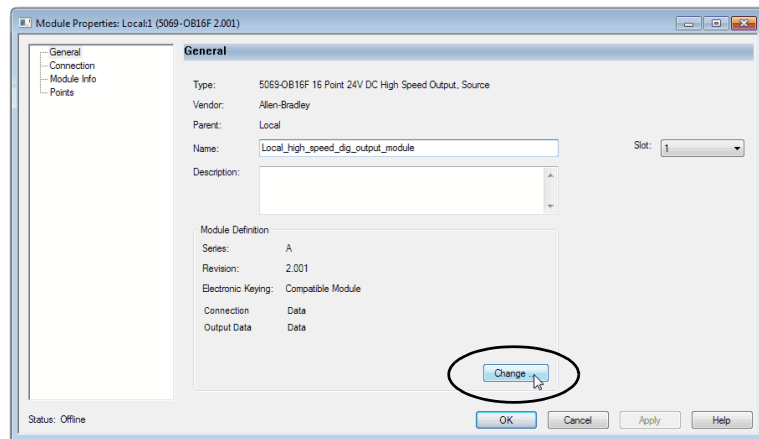
To use an MAOC instruction with schedule outputs on a 5069-OB16F output module, complete the following steps. The module can be a local I/O module or remote I/O module.

IMPORTANT Before you complete the steps, make sure that Time Synchronization is enabled in the controller and, if applicable, the EtherNet/IP adapter, to use scheduled outputs.

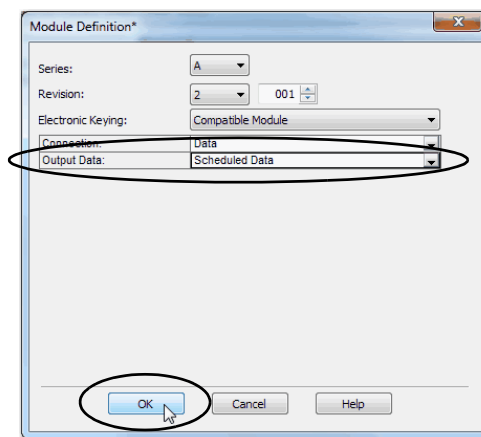
1. If necessary, add a 5069-OB16F output module to your Logix Designer application project.

For more information on how to add a 5069-OB16F output module to a Logix Designer application and configure the module, see Chapter 6, [Configure a Standard Module on page 141](#).

2. From the Module Properties dialog box, click Change to access the Module Definition parameters.

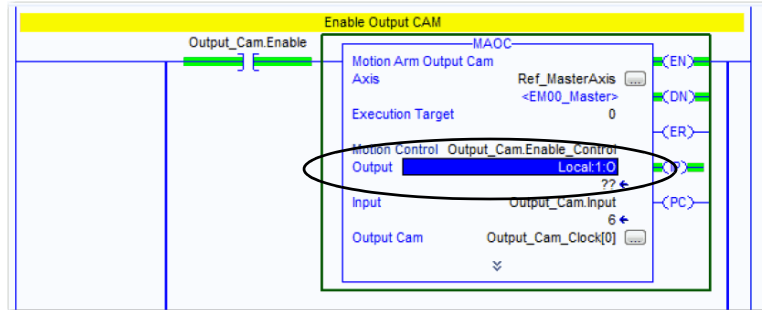


3. On the Module Definition dialog box, choose Scheduled Data for the Output Data and click OK.



4. To close the Module Properties dialog box, click OK.
5. Add an MAOC instruction to your logic.
6. In the MAOC instruction, use the module output tag in the Output operand, for example **Local:1:O** for a local output module.

The tag value displays as ??. This value is correct.



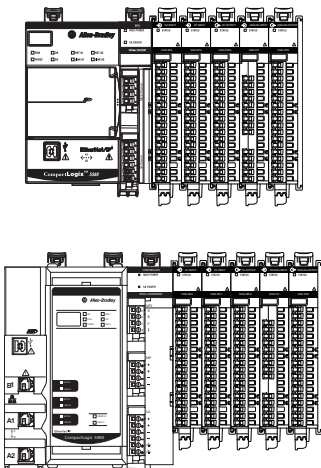
For more information on how to use an MAOC instruction in general, see the following:

- Logix5000 Controllers Motion Instructions Reference Manual, publication [MOTION-RM002](#)
- Position-based Output Control with the MAOC Instruction Application Technique, publication [1756-AT017](#)

Isolated and Non-isolated Varieties of Output Modules

The 5069-OW4I and 5069-OX4I standard output modules provide point-to-point wiring isolation.

Standard Modules



IMPORTANT Although some Compact 5000 I/O digital output modules do not provide wiring isolation, all Compact 5000 I/O digital output modules maintain internal electrical isolation between the system-side and field-side power buses.

Safety Module Features

Topic	Page
Safety Input Module Features	123
Safety Output Module Features	136
Fault and Status Reporting	140

This chapter describes features that are specific to Compact 5000™ I/O safety modules.

Safety Input Module Features

This section describes features that are available on the Compact 5000 I/O safety input module, that is, the 5069-IB8S and 5069-IB8SK modules.

The 5069-IB8S and 5069-IB8SK modules are 8-point safety sinking input modules that use eight safety inputs and four test outputs. The 5069-IB8SK module offers conformal coating.

Safety Application Suitability Levels

[Table 49](#) describes the safety application suitability levels for a 5069-IB8S and 5069-IB8SK module.

Table 49 - Safety Application Suitability for 5069-IB8S and 5069-IB8SK Modules

Suitability Level	Conditions	Notes
Safety applications that are rated up to, and including, SIL CL3, PLd, Cat. 3 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1. ⁽¹⁾	<ul style="list-style-type: none"> The module uses single-channel mode. Point Mode is Safety Pulse Test. 	Consider the following: <ul style="list-style-type: none"> The channel mode type, that is, single or dual, affects Performance Level and Category. You can use the modules in SIL CL3 applications regardless of channel mode type. The determining factor to whether a Compact 5000 I/O safety module resides in a SIL CL3, PLd, Cat. 4 safety application is that the overall safety architecture be a dual-channel system. To achieve SIL CL3 single-channel, the sensor that is used must be SIL CL 3 single-channel as well. The requirement that Point Mode be Safety Pulse Test assumes that only the safety modules provide diagnostics to a specific Suitability Level. The larger safety system within which the safety modules reside can provide the diagnostics necessary to achieve the stated Suitability Level without the requirement that Point Mode be Safety Pulse Test.
Safety applications that are rated up to, and including, SIL CL3, PLd, Cat. 4 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1.	<ul style="list-style-type: none"> The module uses dual-channel mode.⁽²⁾ Point Mode is Safety Pulse Test. 	

(1) Single channel could not be verified to PLd, Cat. 4 without a single channel sensor that is PLd, Cat. 4 rated.

(2) You do not configure the module to use dual-channel mode via the Logix Designer application module properties dialog box. You use a safety instruction to use the module in dual-channel mode.

The following apply to the safety inputs:

- You can connect safety devices, such as Emergency Stop Push Button, gate switches, and safety light curtains.
- Evaluate an input signal, that is, input data, in single-channel mode or dual-channel mode.
- An external wiring short circuit check is possible when inputs are wired in combination with test outputs. The module must be wired in combination with test outputs when this function is used.
- Independently adjustable on and off delays are available per channel.

The following apply to the test standard outputs:

- Separate test outputs are provided for short circuit detection of a safety input (or inputs).
- Can supply 24V DC power to devices, such as safety sensors.
- As many as two specific test outputs can be used for broken-wire detection of a muting lamp.

Use Test Output with a Safety Input

A test output can be used in combination with a safety input for short circuit and cross-channel fault detection.

In this case, Point Mode must be Safety Pulse Test. Safety input pairs must be associated with different Test Output sources.



The test output can also be configured as a power supply to source 24V DC to an external device, for example, a light curtain.

Figure 11 - Compact 5000 I/O Safety Input Module - Input Connected to Test Output**Channel Connections**

The diagram shows devices that are connected to safety input channels 0 and 3 and test output channel 0 and 1. You are not 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 test output points and odd-numbered input points to odd-numbered test output points.

This wiring practice can maximize diagnostic independence and separation.

SA Power

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

- Compact GuardLogix® 5380 Controller
- 5069-AENTR or 5069-AEN2TR EtherNet/IP™ Adapter
- 5069-FPD Field Potential Distributor

IMPORTANT: Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA Power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA Power bus in a system. SA Power buses are isolated from each other. To keep the modules on separate SA Power buses, complete the following steps.
 1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA Power bus.
 2. Install the 5069-FPD field potential distributor to establish a second SA Power bus.
 3. Install the modules that use the other type of SA power, for example AC, on the second SA Power bus.

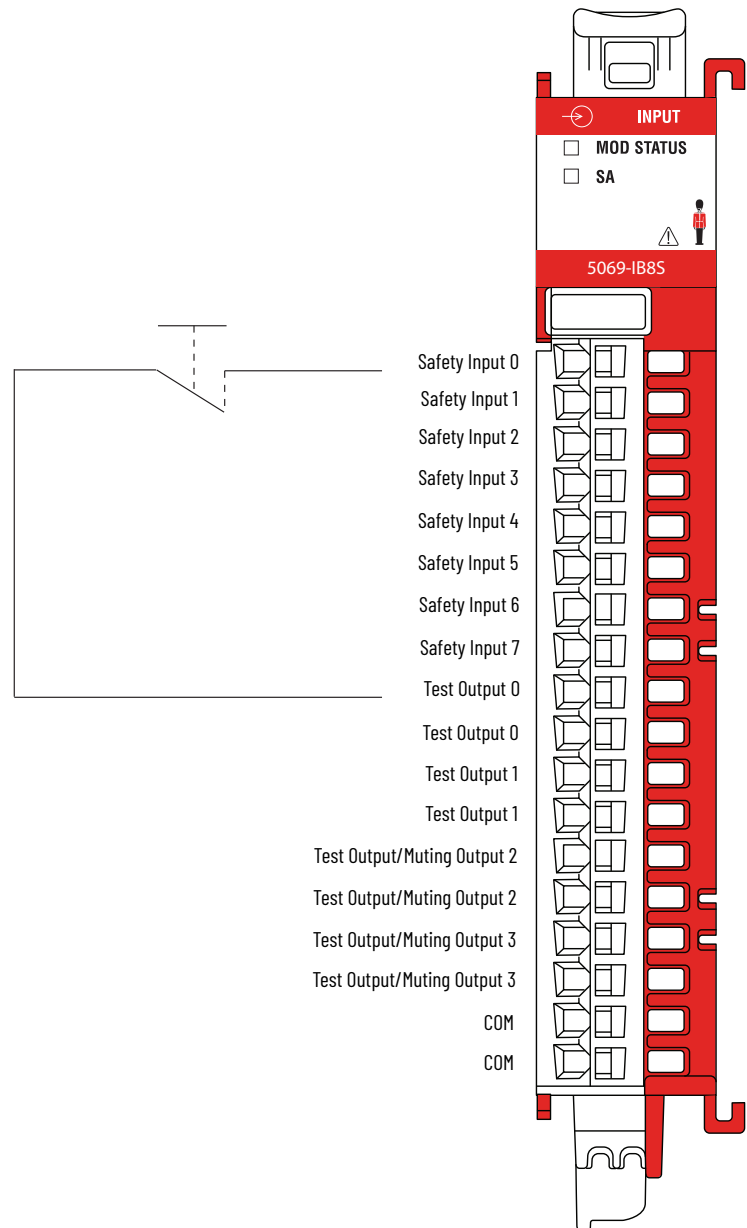
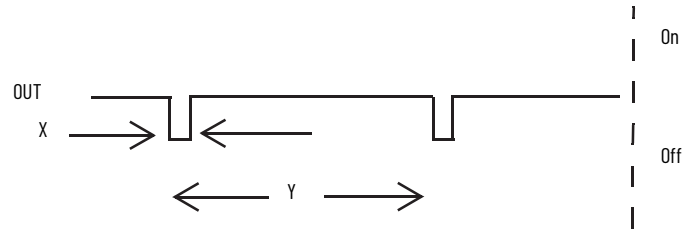
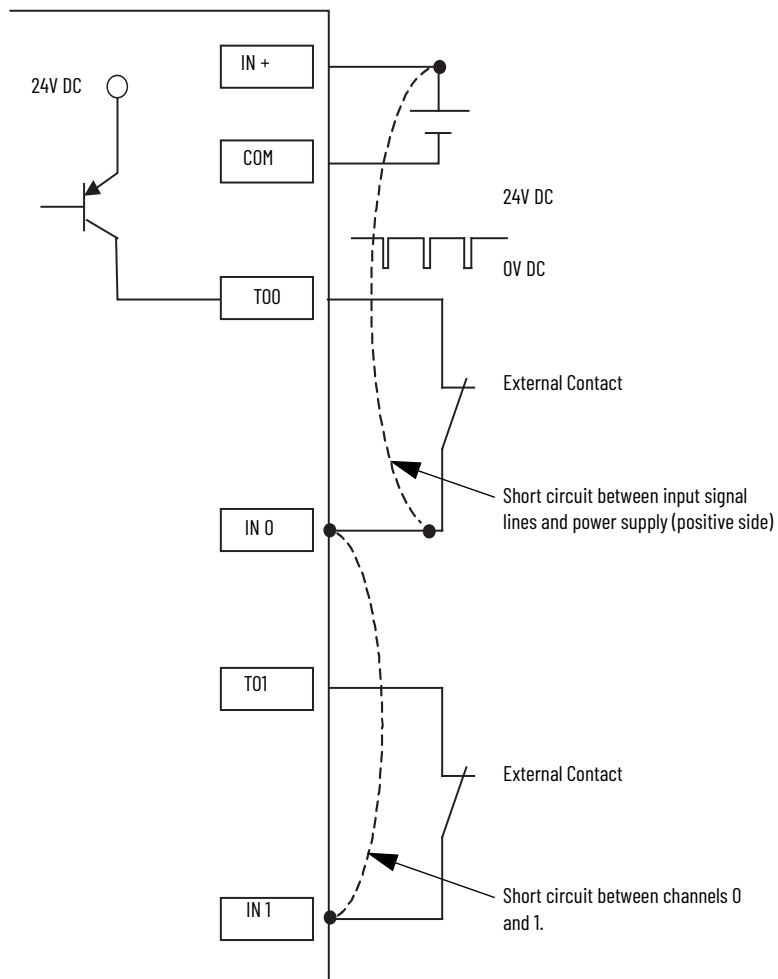


Figure 12 - 5069-IB8S or 5069-IB8SK Test Pulse in a Cycle

On the 5069-IB8S or 5069-IB8SK module, the test pulse width (X) is less than 700 μ s; the test pulse period (Y) is less than 100 ms.

When the external input contact is closed, a test pulse is output from the test output terminal to diagnose the field wiring and input circuitry. By using this function, short-circuits between inputs and 24V power, and between input signal lines can be detected.

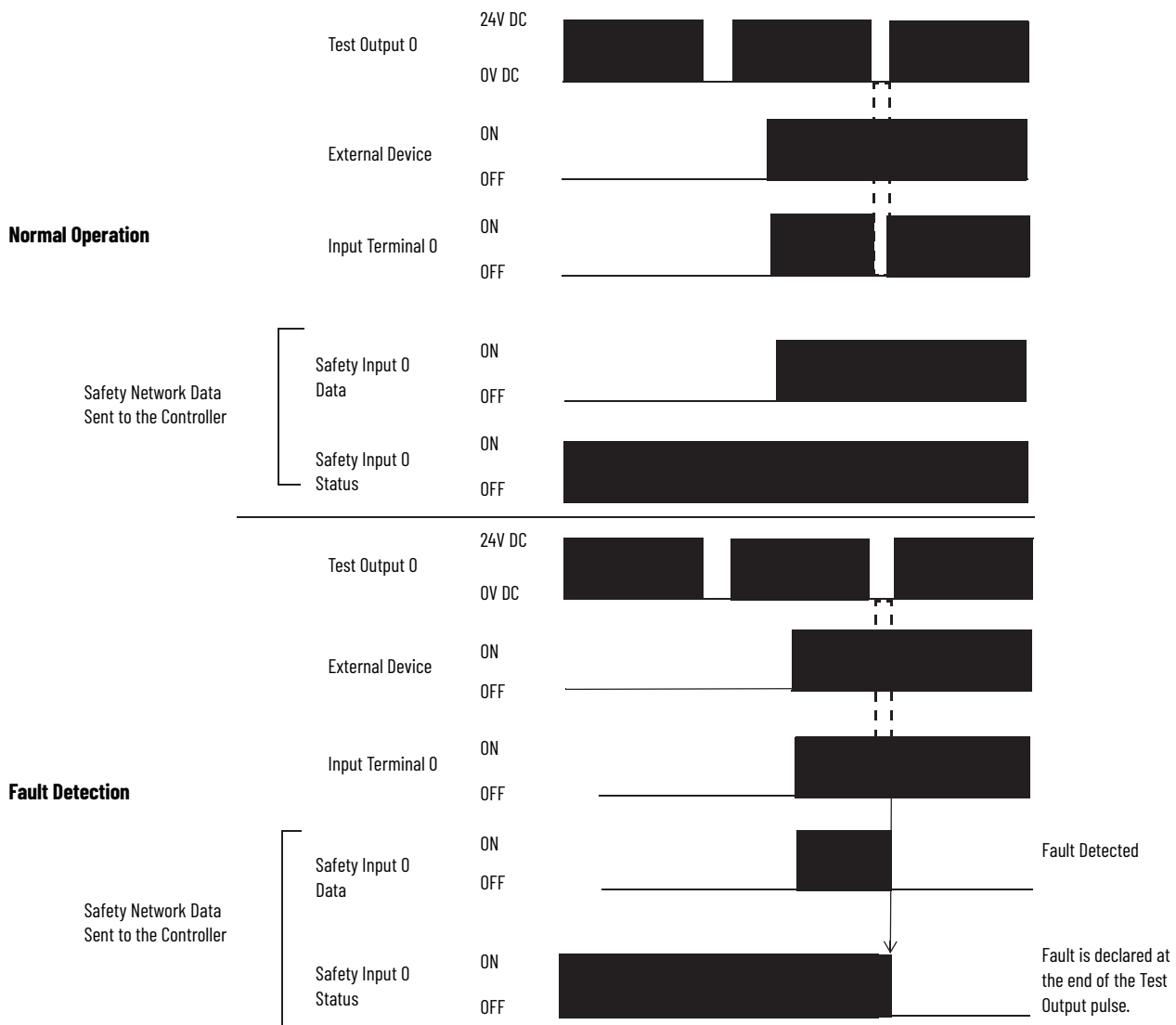
Figure 13 - Short Circuit Between Input Signal Lines

Single-channel Mode

If an error is detected on the input channel, Safety Input Data and Safety Input Status turn off.

For information on how to use single-channel mode with a 5069-IB8S or 5069-IB8SK module affects the safety application suitability level, see [Table 49 on page 123](#).

Figure 14 - Normal Operation and Fault Detection (Not to Scale)



Safety Input Fault Recovery

If an error is detected, the safety input data remains in the OFF state. To activate the safety input data again, complete the following steps.

1. Remove the cause of the error.
2. Place the safety input (or safety inputs) into the safe state.
3. Allow the Input Error Latch Time to elapse.

After the steps are completed, the I/O indicator (red) turns off. The input data is now active.

Safety Input Delay Time

You can increase the time that it takes for an input point to transition from On to Off and Off to On on the 5069-IB8S or 5069-IB8SK module. The increase in time is a delay of the signal from the module to the controller.

The delay time is in addition to the RPI, the parameter that defines a rate at which the owner-controller and the module exchange data (2...500 ms). For example, if you set the RPI at 10 ms and use an input delay time of 2 ms, the signal from the module to the controller is 12 ms.

An increase in the time it takes to transition from one state to another improves noise immunity within a signal.

Off to On Delay

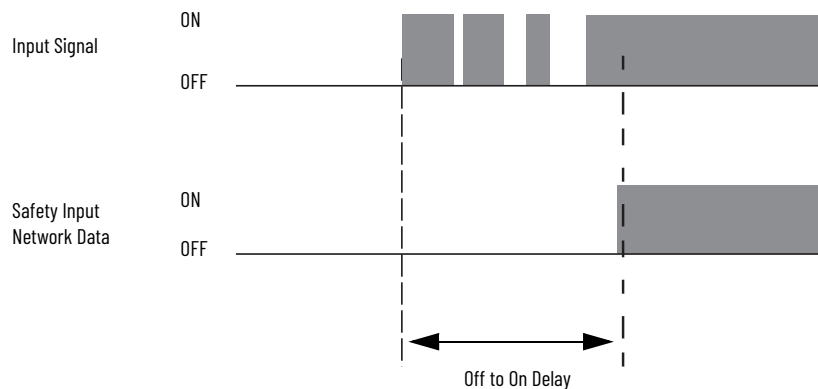
An input signal is treated as Logic 0 during the Off to On delay time after the rising edge of the input contact.

The input turns on only if the input contact remains on after the Off to On delay time has elapsed. This setting help prevent rapid changes of the input data due to contact bounce.

You can delay the Off to On transition by the following times:

- 0 ms (default)
- 1 ms
- 2 ms
- 5 ms
- 10 ms
- 20 ms
- 50 ms

Figure 15 - Off to On Delay



On to Off Delay

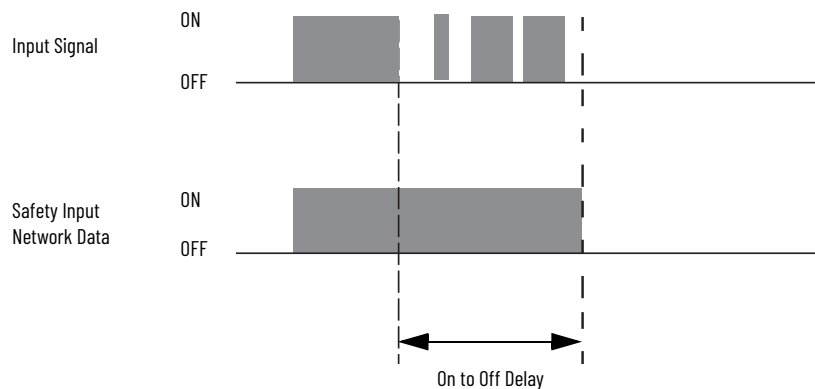
An input signal is treated as Logic 1 during the On to Off delay time after the falling edge of the input contact.

The input turns off only if the input contact remains off after the On to Off delay time has elapsed. This setting helps to prevent rapid changes of the input data due to contact bounce.

You can delay the On to Off transition by the following times:

- 0 ms (default)
- 1 ms
- 2 ms
- 5 ms
- 10 ms
- 20 ms
- 50 ms

Figure 16 - On to Off Delay



Muting Lamp Operation

Your controller program controls test outputs 2...3 to illuminate a muting lamp. Muting lamp status is monitored with a test that runs periodically during every test interval to detect a burned-out lamp. The test runs repeatedly when the test output is commanded On or commanded Off and a fault is detected.

Figure 17 shows how muting lamp operation, status, and fault detection are monitored.



The lamp test interval is 3 seconds. Two consecutive failed lamp tests are required to declare a burned-out lamp condition.

The lamp test does not always run immediately after the test output is energized. It starts at the next 3-second interval. To allow time for two consecutive test intervals, program a minimum Test Output On Time of 6 seconds.

Figure 17 - Muting Lamp Timing Diagram

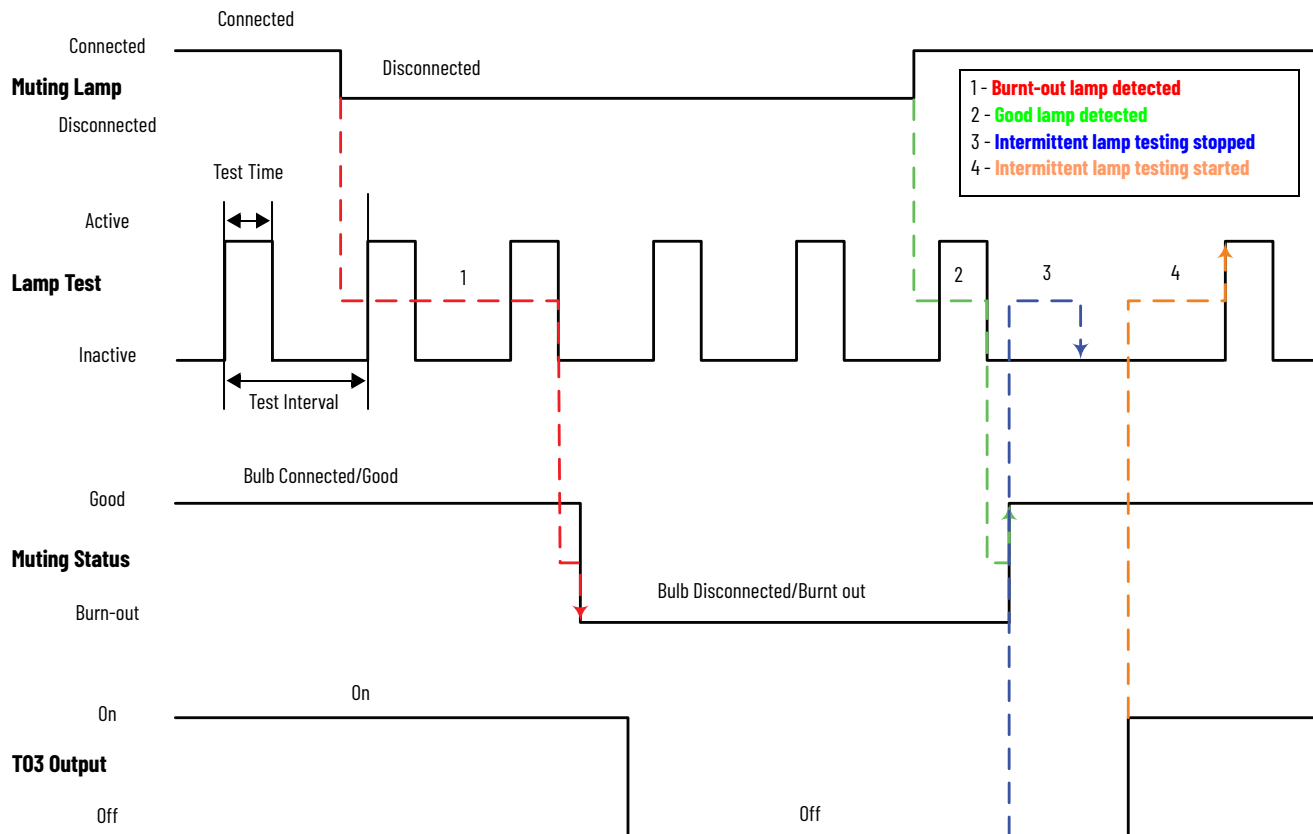


Table 50 shows the expected behavior of the muting status for test outputs TO2M and TO3M. Keep the following points in mind as well:

- When power is applied to the 5069-IB8S or 5069-IB8SK module, and T2 or T3 remains commanded off, the muting status defaults to on.

This bit operation is designed to help prevent erroneous muting instruction faults from the owner-controller. This bit status is not always the true indication of a burned-out lamp.

IMPORTANT Before checking the state of the corresponding muting status, be sure that the test output is commanded on. Once the test output is commanded on, a maximum time of 6 seconds is required for the module to detect a burned-out lamp.

- If a muting lamp circuit is open when power is applied to the module, the condition is detected when the test output is commanded on.
- When a lamp burns out and is replaced, the fault (muting status bit) returns to the normal condition, independent of the state of the test output.

Table 50 - Muting Status Bit Operation

Test Output Commanded State	Lamp Condition	Muting Status Bit	Description
ON	Bad (open circuit)	0	Repair lamp.
ON	Good	1	Normal condition. Lamp is operating properly.
OFF	Bad (open circuit)	0	If lamp remains OFF after T1/T3 output cycled, repair lamp.
OFF	Good	1	Normal condition.

Discrepancy

This section describes the following:

- [Single Channel SIL3 and Discrepancy Fault](#)
- [Transition Time Limit](#)
- [Fault Indication](#)

Single Channel SIL3 and Discrepancy Fault

The 5069-IB8S and 5069-IB8SK modules are certified to a single-channel SIL3 input design. The design creates internal dual-channel signals. The module takes the signal from one input channel terminal and creates two independent input paths inside its circuitry. The internal signals, one on each independent path, are then evaluated for consistency.

The Discrepancy feature on a 5069-IB8S and 5069-IB8SK modules lets the module compare the states of the two internal signals to see if they are different.

If the time of the discrepancy between the two internal signals exceeds the configured Transition Time Limit, that is, 2...500 ms, the safety input data and the individual-safety input status turn off for the input channel. The safety input is in the Safe state.

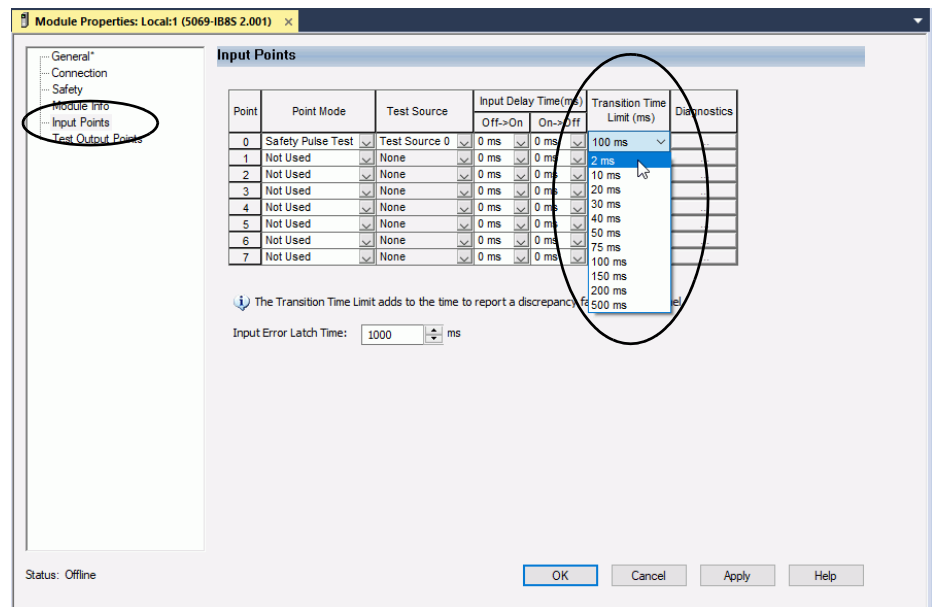
However, a discrepancy can exist for a period of time before the safety input data fault is generated.

- If the discrepancy is resolved before the time expires, there is no fault.
- If the discrepancy remains when the time expires, a fault occurs.

Transition Time Limit

The Transition Time Limit (TTL) is a new configuration in firmware revision 2.011 that defines the time duration that a 5069-IB8S or 5069-IB8SK module lets a discrepancy due to the input voltage rise or fall time variance exist and does not report a fault. Modules with firmware revision 1.011, that is the initial revision, have a fixed TTL of 2 ms.

After the transition, the 5069-IB8S or 5069-IB8SK module continues to check the two internal signals for the TTL value; the TTL value is user-configurable from 2...500 ms. You must install Add-On Profile, version 2.01 to see the pull-down menu when you configure the module.



When the transition occurs in one of the internal signals before the transition of the second internal signal, a discrepancy occurs. The threshold voltages for the signals are slightly different.

- If the second internal signal transitions to the same state before the Transition Time Limit elapses, the internal inputs are considered equivalent.

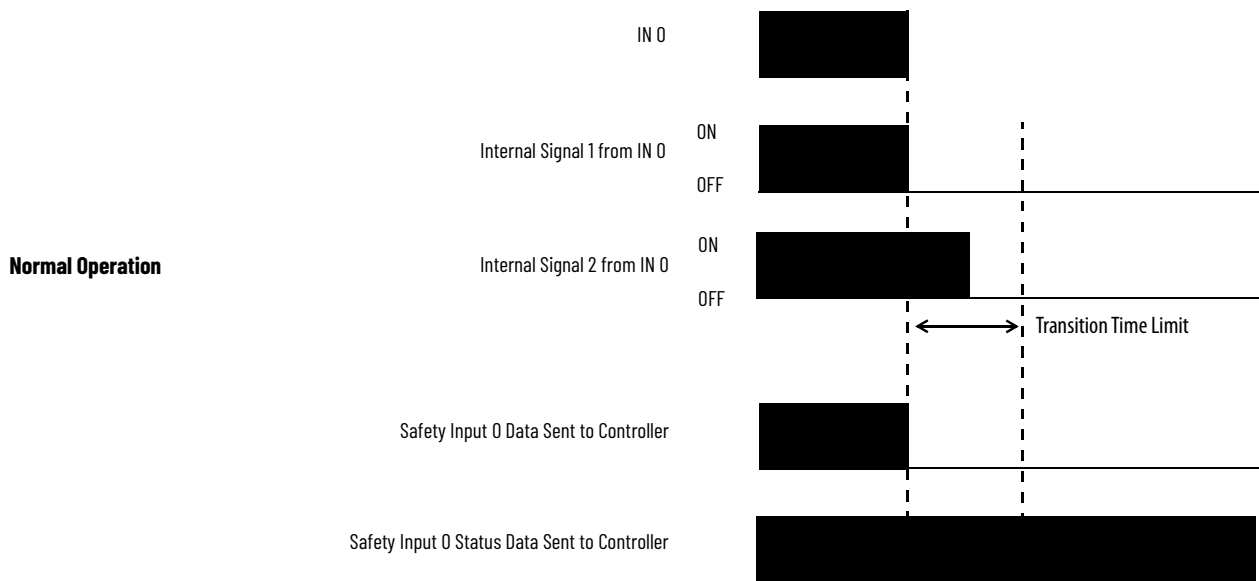
In this case, no error is detected.

- If the second internal signal transition does not occur before the Transition Time Limit elapses, the channel faults.

In the fault state, the input and status for the input channel is set low (OFF).

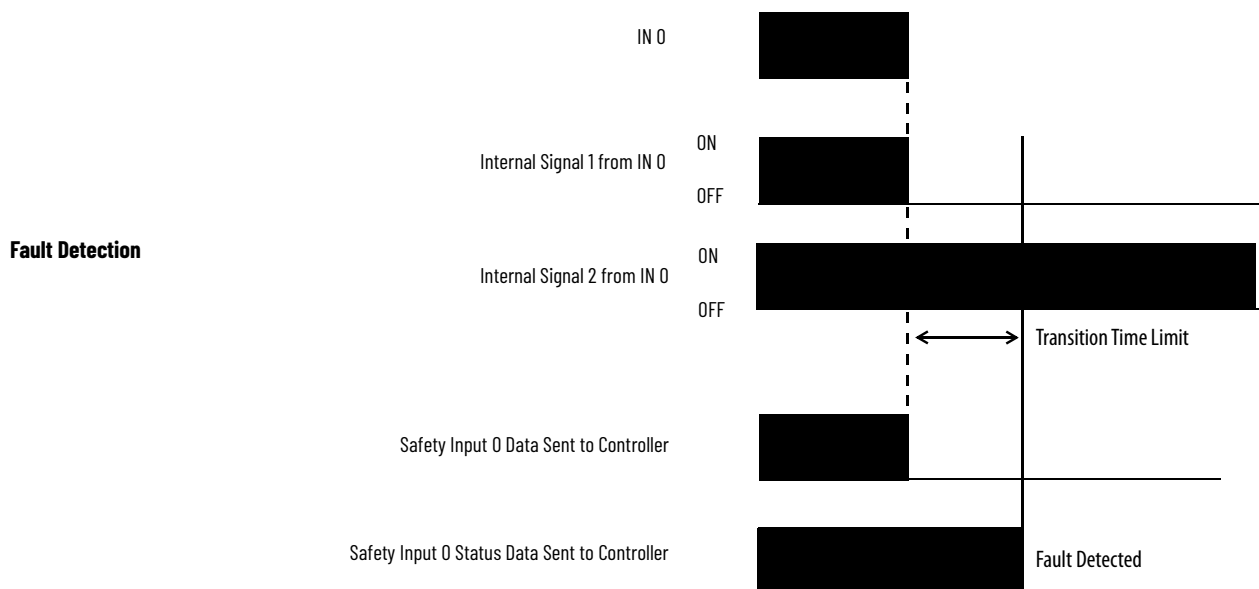
[Figure 18](#) shows conditions in which a discrepancy occurs. By the end of the TTL, the discrepancy is resolved. A fault does not occur. Safety input and status data continues to be sent to the controller.

Figure 18 - Normal Operation (Not to Scale)



[Figure 19](#) shows conditions in which a discrepancy occurs. By the end of the TTL, the discrepancy is not resolved. A fault occurs. Safety input data and status data are sent to the controller. The input is in the safe state, and the status is fault.

Figure 19 - Fault Detection (Not to Scale)



Fault Indication

When a discrepancy fault occurs, the 5069-IB8S or 5069-IB8SK module indicates that a fault exists. However, there is no actual discrepancy fault bit provided in the I/O tag structure, it only uses Fault = 1.

When the fault occurs, the input tags appear as follows:

- I.Pt xx .Data = 0
- I.Pt xx .Fault = 1

Where xx represents the point number.

To clear the fault and return the module to normal operations, reset the module. That is, cycle power to the module.

Safety Output Module Features

This section describes features that are available only on the Compact 5000 I/O safety output modules, that is, the 5069-OBV8S and 5069-OBV8SK modules.

The 5069-OBV8S and 5069-OBV8SK modules are safety output module that uses eight safety outputs. You use the outputs in one of the following ways:

- Sourcing/sinking outputs in Bipolar Output mode
- Sourcing outputs in Sourcing Output mode.

The only difference between the 5069-OBV8S and 5069-OBV8SK modules is that the 5069-OBV8SK module has conformal coating.

Safety Application Suitability Levels

[Table 51](#) describes the safety application suitability levels for 5069-OBV8S and 5069-OBV8SK modules.

Table 51 - Safety Application Suitability for 5069-OBV8S and 5069-OBV8SK Modules

Suitability Level	Conditions	Notes
Safety applications that are rated up to, and including, SIL CL3, PLd, Cat. 3 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1.	<ul style="list-style-type: none"> • Output Mode is Sourcing. • The module uses single-channel mode. • Point Mode is Safety Pulse Test. 	Consider the following: <ul style="list-style-type: none"> • The channel mode type, that is, single or dual, affects Category. You can use the modules in SIL CL3, PLd applications regardless of channel mode type. The determining factor to whether a Compact 5000 I/O safety module resides in a SIL CL3, PLd, Cat. 4 safety application is that the overall safety architecture be a dual-channel system.
Safety applications that are rated up to, and including, SIL CL3, PLd, Cat. 4 as defined in IEC 61508, IEC 61511, IEC 62061, and ISO 13849-1.	<ul style="list-style-type: none"> • Output Mode is Bipolar. Or <ul style="list-style-type: none"> • The module uses single-channel mode. • Output Mode is Sourcing. • Point Mode is Safety Pulse Test. • The channel is connected to an IEC 60947 certified actuator or contactor. Additionally, you must use shielded cable or cable trunk to mitigate short circuit faults on the channel. Or <ul style="list-style-type: none"> • The module uses dual-channel mode. • Output Mode is Sourcing. • Point Mode is Safety Pulse Test. 	<ul style="list-style-type: none"> • The requirement that Point Mode be Safety Pulse Test assumes that only the safety modules provide diagnostics to a specific Suitability Level. The larger safety system within which the safety I/O module resides can provide the diagnostics necessary to achieve the stated Suitability Level without the requirement that Point Mode be Safety Pulse Test.

- Solid-state outputs
- Single-channel mode uses one output signal, that is, data from an output channel, to provide control.

IMPORTANT Single-channel mode is only certified for functional safety applications with process safety times greater than or equal to 200 ms; or, applications with demand rates less than or equal to 3 demand per minute.

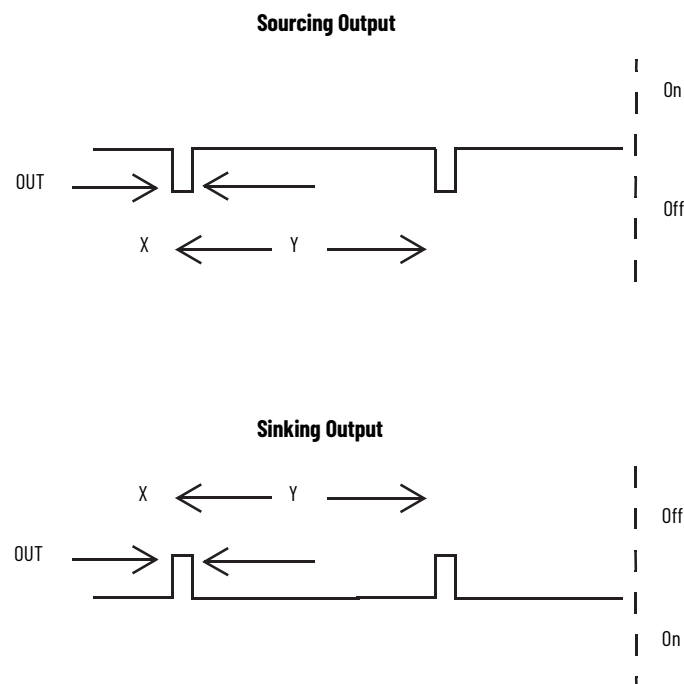
- Dual-channel mode uses two output signals, that is, data from two output channels to provide redundant control.
- Safety outputs can be pulse-tested to detect field wiring short-circuits to 24V DC.

Safety Output with Test Pulse

When the safety output is on, the safety output can be configured to pulse test the safety output channel. By using this function, you can continuously test the ability of the safety output to remove power from the output terminals of the module.

If an error is detected, the safety output data and individual safety output status turn off.

Figure 20 - 5069-OBV8S or 5069-OBV8SK Test Pulse in a Cycle



On the 5069-OBV8S or 5069-OBV8SK module, the pulse width (X) is less than 700 μ s, and the pulse period (Y) is less than 100 ms.



To help prevent the test pulse from causing the connected device to malfunction, pay careful attention to the input response time of the output device.

An open wire test and main switch pulse test can also generate a pulse on a safety output even in safety mode.

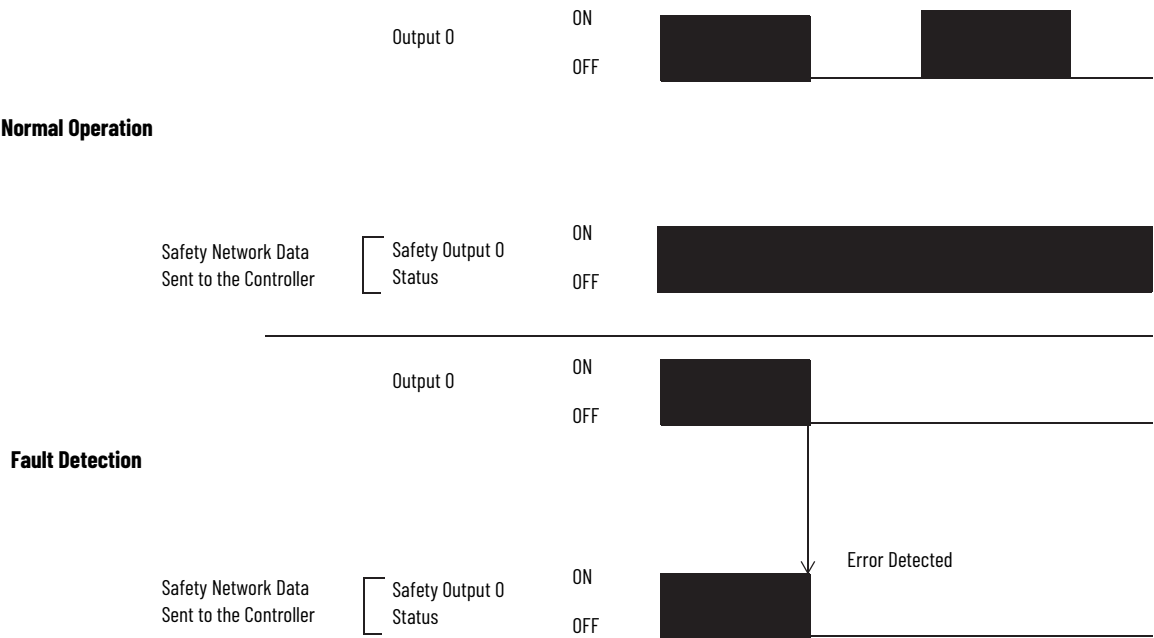
Two successive safety output pulses are required to determine if a short circuit fault exists. As a result, the effective pulse period is 200 ms, max.

Single-channel Mode

When the output channel is in the On state and without any faults, the safety outputs turned on. The status is normal. If a fault is detected on the output channel, the safety output data and individual safety output status turn off.

For information on how to use single-channel mode with a 5069-OBV8S or 5069-OBV8SK module affects the safety application suitability level, see [Table 51 on page 136](#).

Figure 21 - 5069-OBV8S or 5069-OBV8SK Single-channel Mode (Not to Scale)



Dual-channel Mode

IMPORTANT

Dual-channel mode is only available if the module is connected so that Output Mode is Sourcing.

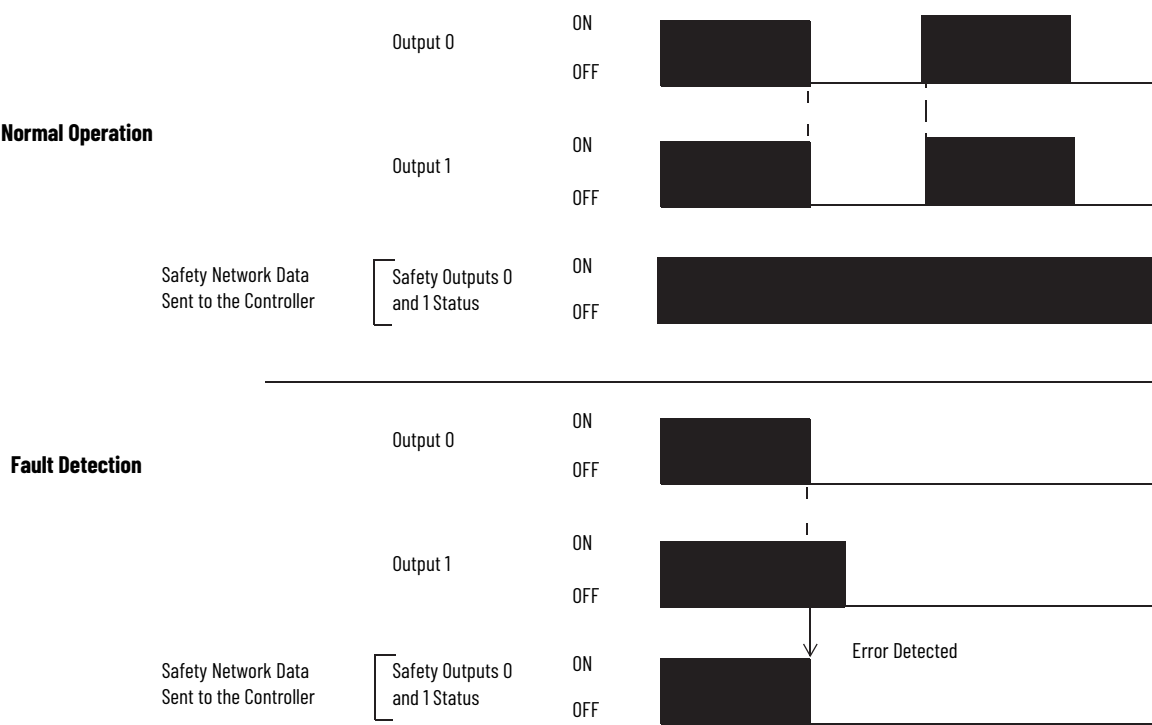
When dual-channel mode is used, output channels function as connection pairs. Connection pairs are as follows:

- Channels 0 and 1
- Channels 2 and 3
- Channels 4 and 5
- Channels 6 and 7

When both output channels in a connection pair are in the On state and without any faults, the safety outputs are turned on.

For information on how to use dual-channel mode with a 5069-OBV8S or 5069-OBV8SK module affects the safety application suitability level, see [Table 51 on page 136](#).

Figure 22 - 5069-OBV8S or 5069-OBV8SK Dual-channel Mode (Not to Scale)



Safety Output Fault Recovery

If a fault is detected, the safety outputs are switched off and remain in the off state. Follow this procedure to activate the safety output data again.

1. Remove the cause of the error.
2. Command the safety output (or safety outputs) into the safe state.

The safety output (or outputs) can be commanded low in any of the following ways:

- The controller sets the Ptxx.Data tag to 0.
 - The module is reset.
 - Power is cycled to the module.
 - The controller transitions to Program mode.
 - A controller or Safety task fault occurs.
 - A communications fault occurs on the module.
 - The connection to the module is inhibited.
3. Let the Output Error Latch Time elapse.

After the steps are completed, the I/O indicator (red) turns off. The output data can now be controlled.



If module outputs experience persistent high faults, consider cycling power to the module to clear the error.

IMPORTANT The module can require up to 1 second in addition to the Output Error Latch Time to complete the recovery.

Fault and Status Reporting

The Compact 5000 I/O safety modules multicast fault and status data with channel data to the owner and listening controllers. The data is returned via module tags that you can monitor in your Logix Designer application.

For more information on how to use module tags to monitor fault and status reporting, see the following:

- 5069-IB8S or 5069-IB8SK module - [Table 18 on page 84](#)
- 5069-OBV8S or 5069-OBV8SK module - [Table 46 on page 114](#)
- Appendix A, [Troubleshoot Your Module on page 199](#).

Configure a Standard Module

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This chapter describes how to configure your Compact 5000™ I/O standard modules in a Logix Designer application project. You can use the default module configuration or edit the module configuration.

This chapter does not explain the user-configurable module features that you can edit on different screens in your Logix Designer application project.

For detailed information about module features, see the following:

- Chapter 2, [Features Common to Compact 5000 I/O Digital Modules on page 65](#)
- Chapter 3, [Input Module Features on page 77](#)
- Chapter 4, [Output Module Features on page 99](#)
- Chapter 5, [Safety Module Features on page 123](#)

Before You Begin

You must complete the following tasks before you can configure the module:

1. Create a Logix Designer application project.
2. If you use the standard modules as remote modules, add a Compact 5000 I/O EtherNet/IP™ adapter to the project.

For more information on how to add a Compact 5000 I/O EtherNet/IP adapter to a Logix Designer application project, see the Compact 5000 EtherNet/IP Adapters User Manual, publication [5069-UM007](#).

Once the project is created and, if necessary, the adapter is added, you can create a module in the Logix Designer application project.

Create a New Module

There are two methods to add modules to your Logix Designer application project.

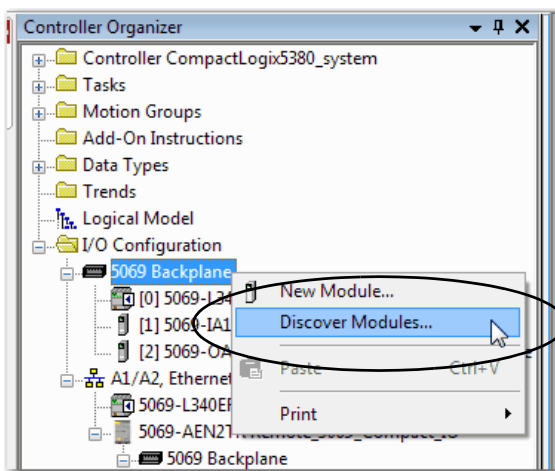
- Discover I/O modules
- New I/O modules

Discover Local I/O Modules

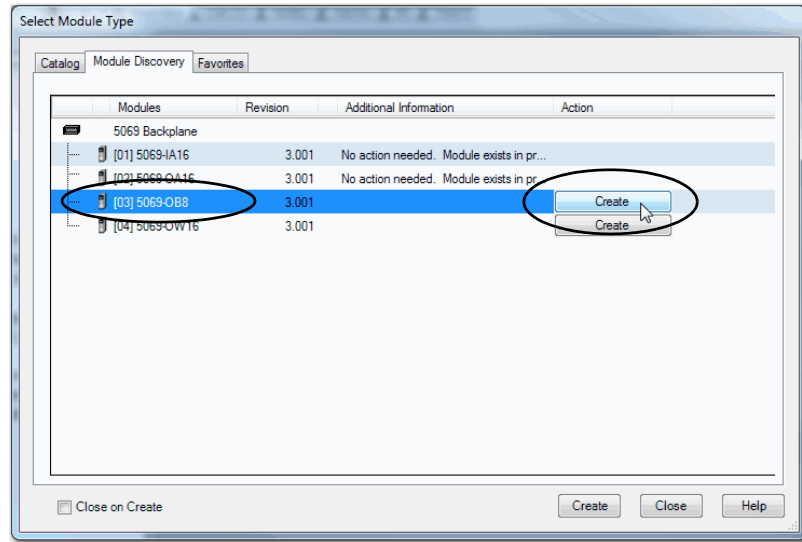
To use the Discover Modules method with local I/O modules, complete the following steps.

1. Go online with your Logix Designer application.
2. Right-click the 5069 Backplane and choose Discover Modules.

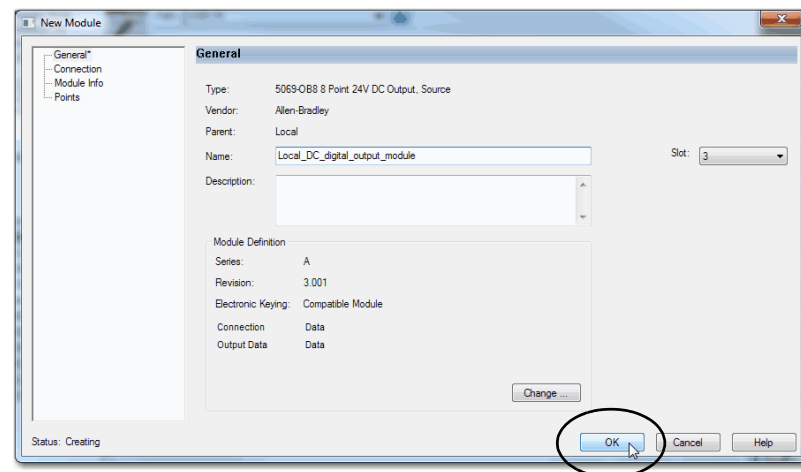
The Logix Designer application automatically detects available modules that are connected to the backplane.



- At the Select Module Type window, click Create to add the discovered module to your project.



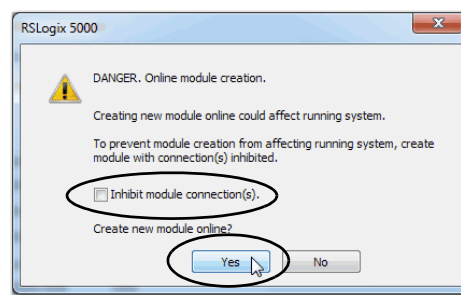
- At the New Module window, configure the module properties and click OK.



- At the warning dialog box, click Yes.



If you inhibit the module connection, you must remember to uninhibit the connection later.



- Close the Select Module Type dialog box.

To add additional local I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps 3...6.
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps 2...6.

New Local I/O Modules

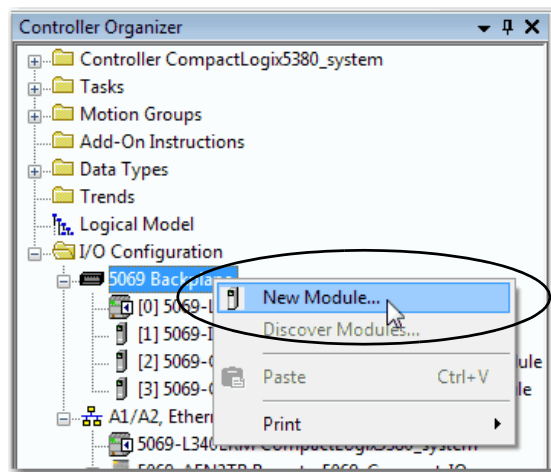
To use the New Module method with local I/O modules, complete the following steps.



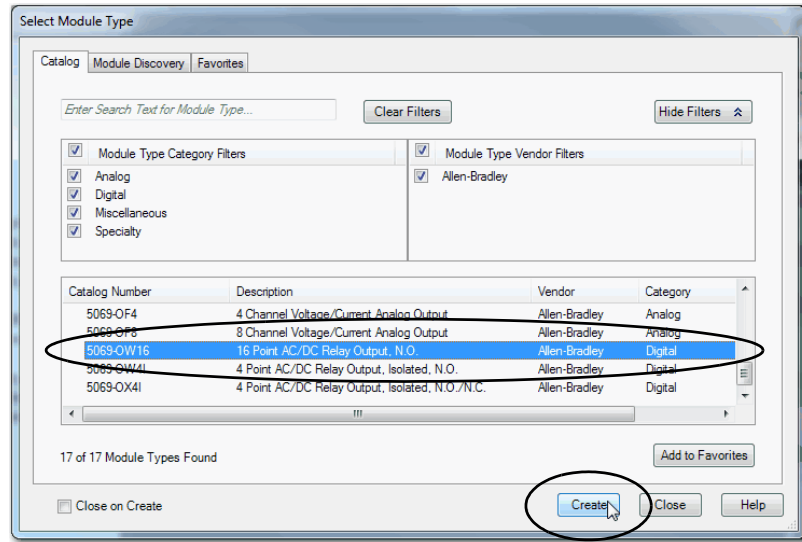
This example shows how to add a local I/O module when the Logix Designer application project is offline.

You can add new modules when the project is online, if desired. In this case, the steps are similar to the steps described in [Discover Local I/O Modules on page 142](#). One exception is that, in step 1, you choose New Module instead of Discover Modules.

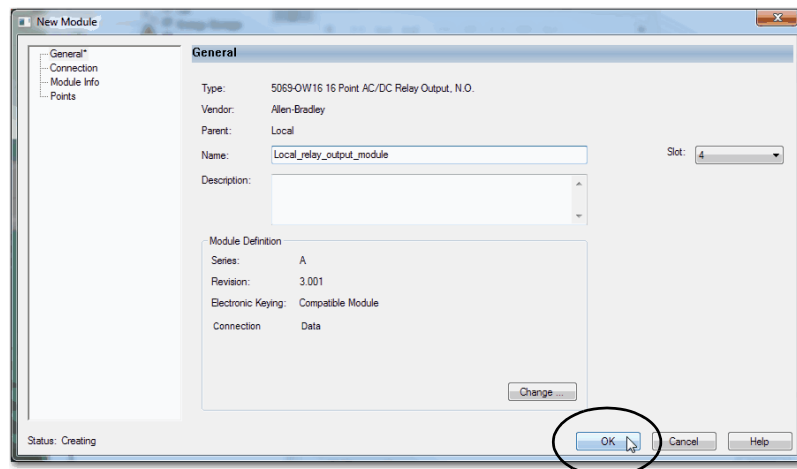
1. Right-click the 5069 Backplane and choose New Module.



- At the Select Module Type window, click Create to add the discovered module to your project.



- At the New Module window, configure the module properties and click OK.



To add additional local I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps 2...3.
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps 1...3.

Discover Remote I/O Modules

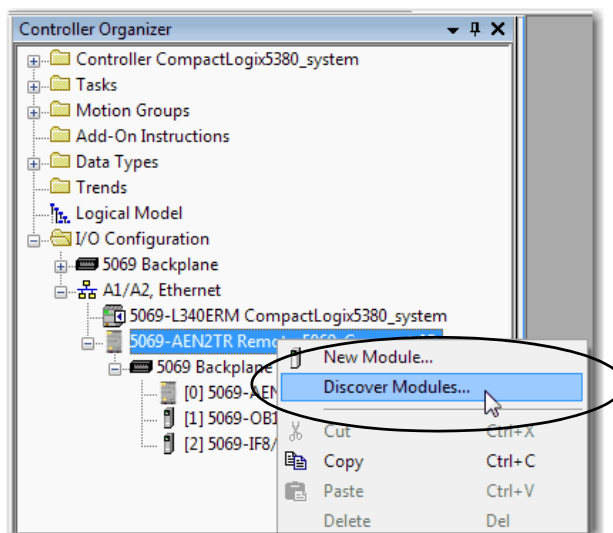
To use the Discover Modules method with remote I/O modules, complete the following steps.

1. Go online with your Logix Designer application.

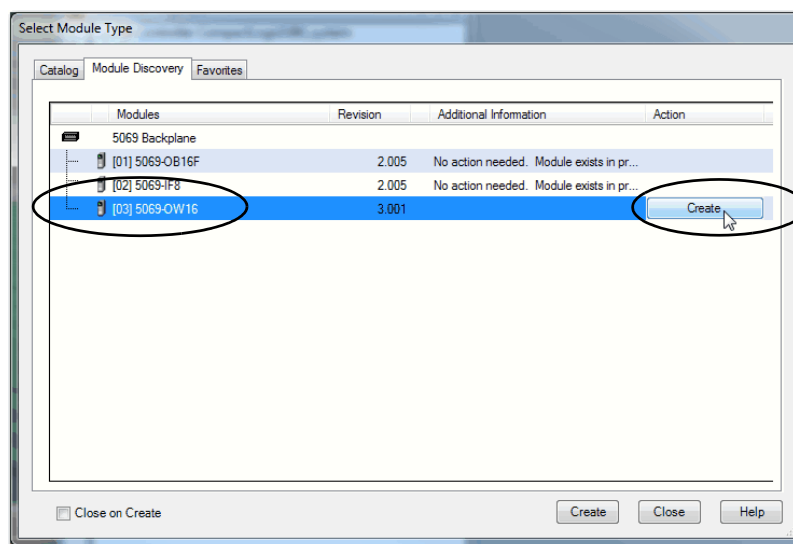
The project must include a Compact 5000 I/O EtherNet/IP adapter.

2. Right-click the Compact 5000 I/O EtherNet/IP adapter and choose Discover Modules.

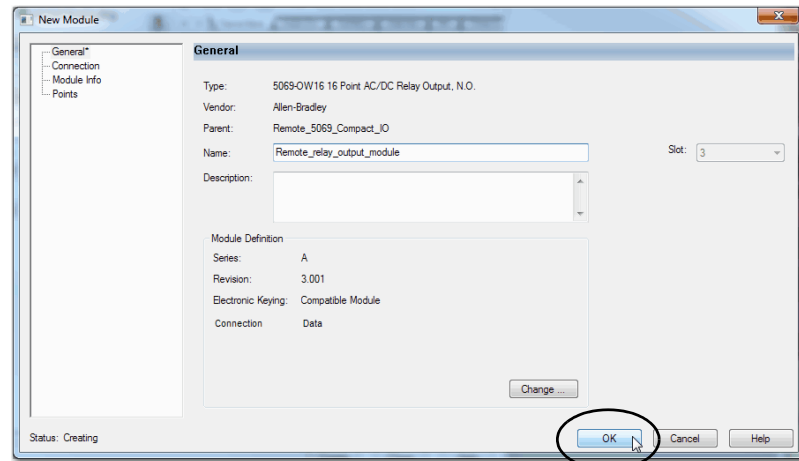
The Logix Designer application automatically detects available modules that are connected to the backplane.



3. At the Select Module Type window, click Create to add the discovered module to your project.



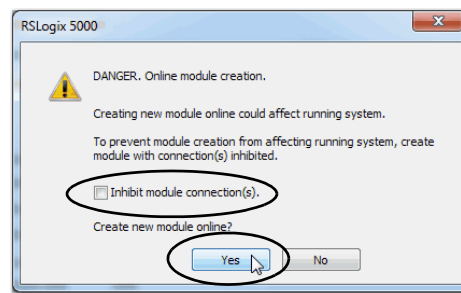
4. At the New Module window, configure the module properties and click OK.



5. At the warning dialog box, click Yes.



If you inhibit the module connection, you must remember to uninhibit the connection later.



6. Close the Select Module Type dialog box.

To add additional remote I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps [3...6](#).
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps [2...6](#).

New Remote I/O Module

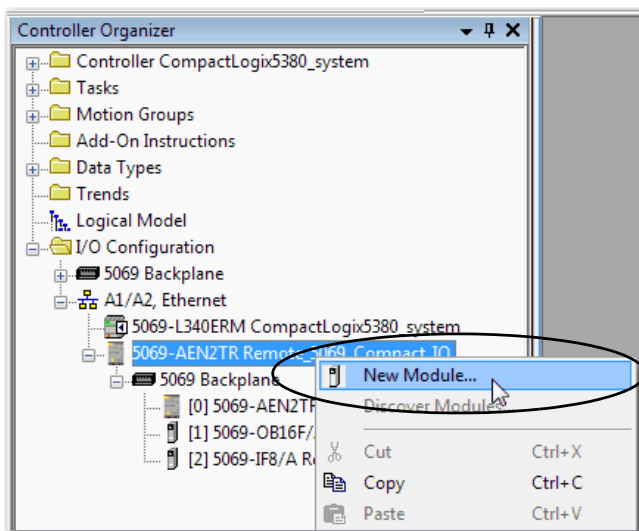
To use the New Module method with remote I/O modules, complete the following steps.



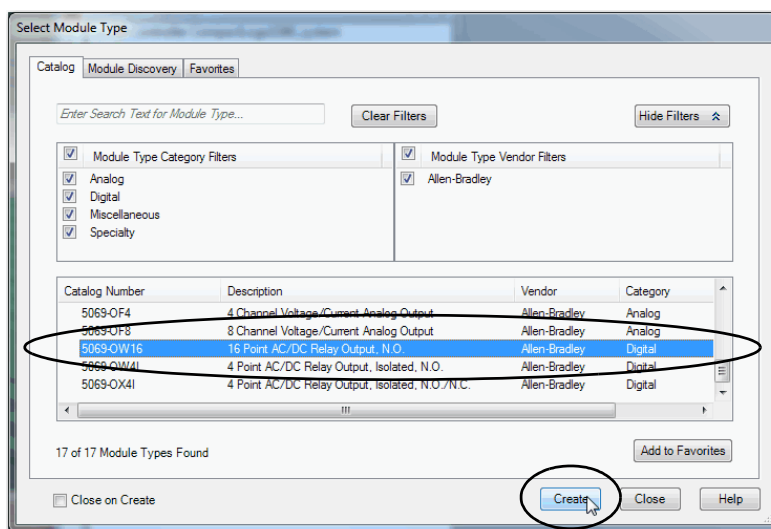
This example shows how to add a remote I/O module when the Logix Designer application project is offline.

You can add new modules when the project is online, if desired. In this case, the steps are similar to the steps described in [Discover Remote I/O Modules on page 146](#). One exception is that, in step 1, you choose New Module instead of Discover Modules.

1. Right-click the Compact 5000 I/O EtherNet/IP adapter and choose New Module.

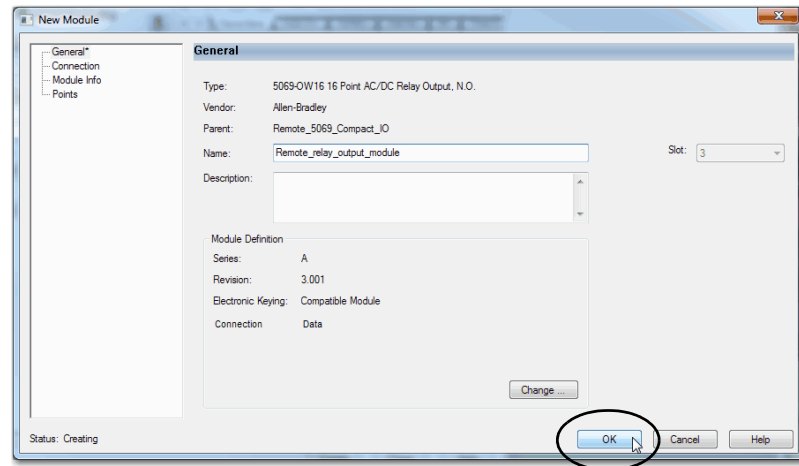


2. Select the module and click Create.



The New Module dialog box appears with a list of categories on the left side. The number and type of categories varies by module type.

3. You can click OK to use the default configuration as shown or edit the module configuration. The rest of this chapter describes how to edit module configuration categories.



To add additional remote I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps [2...3](#).
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps [1...3](#).

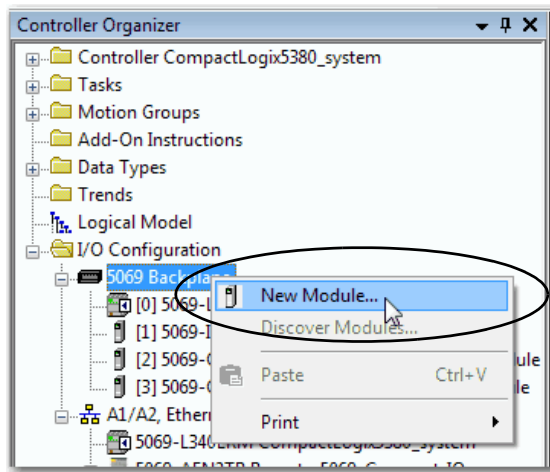
Reserve an I/O Module Slot

As described in [page 27](#), the 5069-ARM address reserve module reserves a module slot in the physical system and in the Logix Designer application project that is configured for the system.

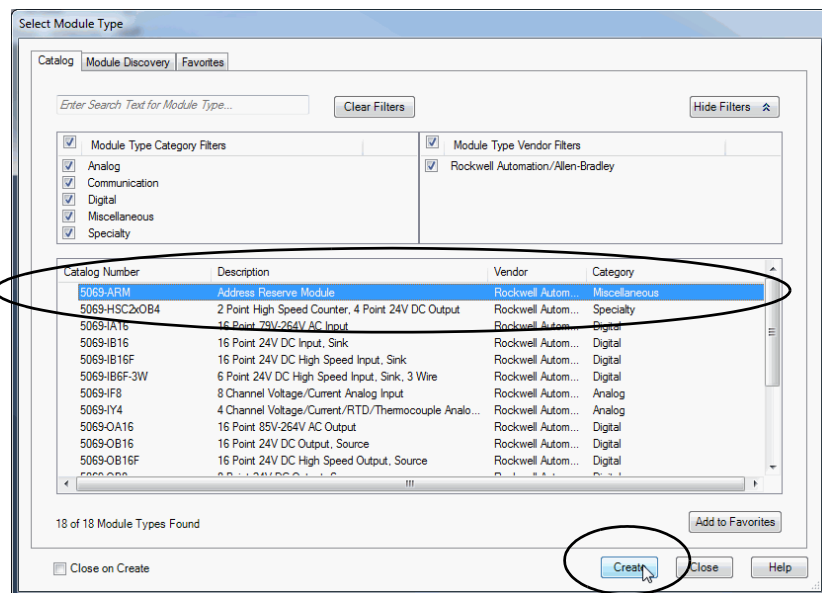
Add the 5069-ARM Module to the Project

You add a 5069-ARM module to the I/O Configuration section of a Logix Designer application project. You can use the New I/O or Discover I/O modules option to add the module. This example uses the New I/O module option.

1. Right-click the 5069 Backplane and choose New Module.

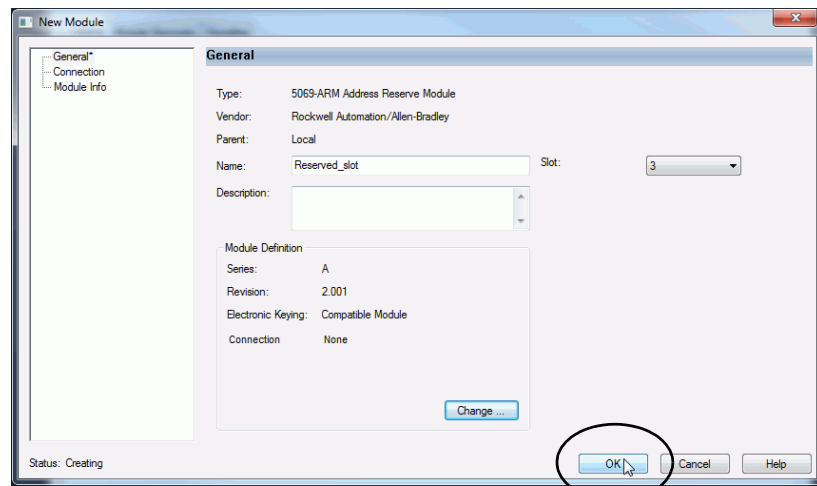


2. At the Select Module Type window, click Create to add the discovered module to your project.



- At the New Module window, configure the module properties and click OK.

Because the 5069-ARM module is only used to reserve an I/O slot, there are considerably fewer fields to configure than other Compact 5000 I/O digital modules.

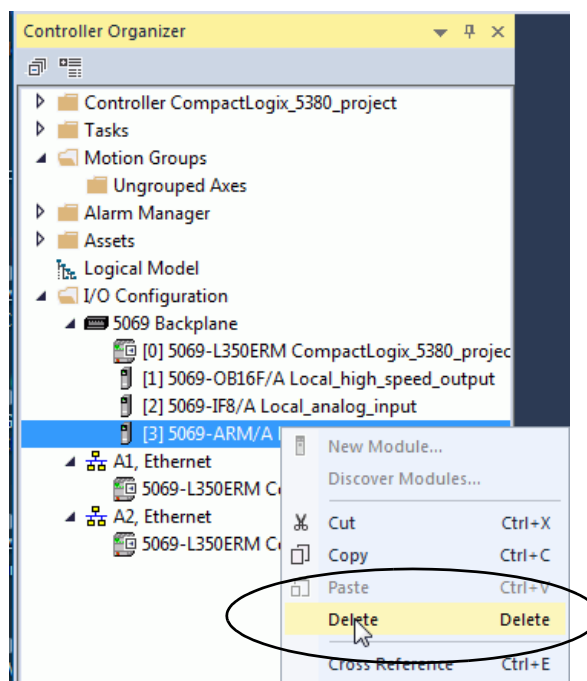


Delete the 5069-ARM Module from the Project

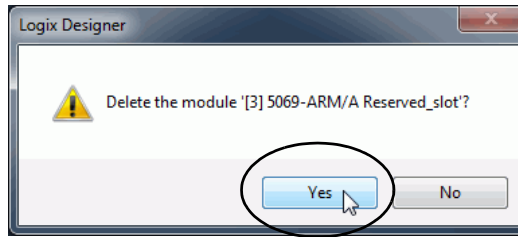
When you remove the 5069-ARM module from the system and install the Compact 5000 I/O digital module that is intended for that node address, you must also change the Logix Designer application project.

You must delete the 5069-ARM module from the project as follows.

- Right-click the module name and choose Delete.



2. To confirm the module deletion, click Yes on the dialog box that appears.



3. To add the Compact 5000 I/O digital module that uses the node address that the 5069-ARM module reserved, follow the steps that are described previously in this section.

Edit the Module Configuration Common Categories

You click the category names in the New Module dialog box to view and change the configuration parameters. Before you edit the module configuration, consider the following:

- This chapter shows how to edit configuration when you add the module to the Logix Designer application project.

If you access the module configuration after it is added to the project, the dialog box is named Module Properties. The same categories are displayed as the categories displayed on the New Module dialog box.

- Some new module configuration categories apply to all Compact 5000 I/O digital modules. Some categories are specific to the module type.

For example purposes, the figures in this section are from a 5069-IB16 module.

The following categories apply to all Compact 5000 I/O standard modules and are described in this section.

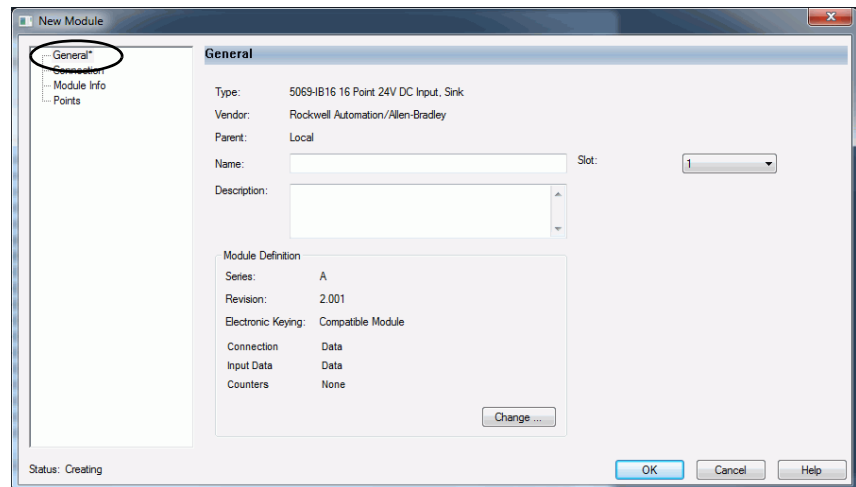
- [General Category](#)
- [Connection Category](#)
- [Module Info Category](#)

General Category

The General category appears first when you create a module. The parameters in this category are the same for all Compact 5000 I/O digital modules.

You use this category to complete the following optional tasks:

- Name the module.
- Assign a slot number. (required)
- Describe the module.
- Access the Module Definition.



Module Definition

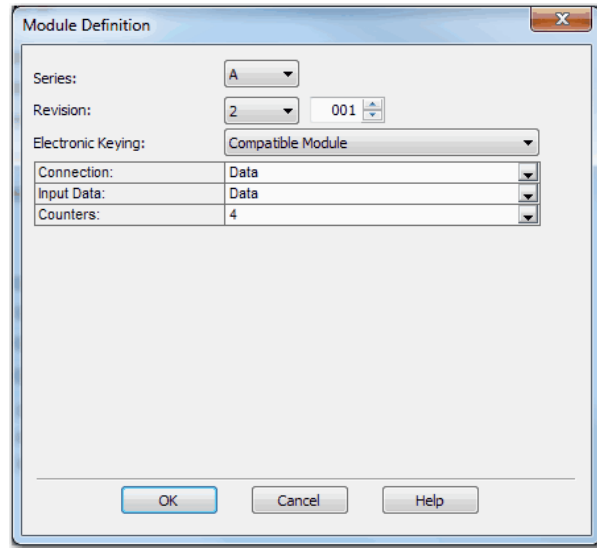
To change Module Definition parameters from the default values, click the Change ellipsis on the General tab of the Module Properties dialog box.

[Table 52](#) describes the parameters on the Module Definition dialog box.

IMPORTANT

The graphic is an example of a Module Definition dialog box. The available fields can vary between Compact 5000 I/O digital modules types.

For example, the 5069-IA16 input module does not support counters so the Counters parameter is not available on the Module Definition dialog box for that module.



[Table 52](#) describes the parameters that are available on the Module Definition dialog box.

Table 52 - Module Definition Parameters

Parameter	Definition	Available Choices ⁽¹⁾
Series	Module hardware series	Module-specific
Revision	Module firmware revision, including major and minor revision levels	Module-specific
Electronic Keying	Software method by which you reduce the possibility of using the wrong device in a control system. For more information, see the following: <ul style="list-style-type: none"> • Electronic Keying on page 72 • Electronic Keying in Logix5000 Control Systems Application Technique, publication LOGIX-AT001 	<ul style="list-style-type: none"> • Exact Match • Compatible Module • Disable Keying
Connection	Determines the following for the module type you configure: <ul style="list-style-type: none"> • Available configuration parameters • Data type transferred between the module and the controller • Which tags are generated when configuration is complete 	<ul style="list-style-type: none"> • Data • Data with Events • Listen Only Data⁽²⁾
Input Data - Input modules only	All available configurations, input data. This connection type creates all controller tags specific to the module type being used.	<ul style="list-style-type: none"> • Data • Timestamped Data • Packed Data
Counters - Input modules only	Determines the number of counters that are used for the module type.	<ul style="list-style-type: none"> • None • 2 • 4 • 8
Output Data - Output modules only	All available configurations, output data. This connection type creates all controller tags specific to the module type being used.	<ul style="list-style-type: none"> • Data • Scheduled Data • Packed Data

(1) The choices that are available vary by module type and catalog number.

(2) Controller and module establish communication without the controller sending any configuration or output data to the module. A full input data connection is established but depends on the connection between the owner-controller and the module.

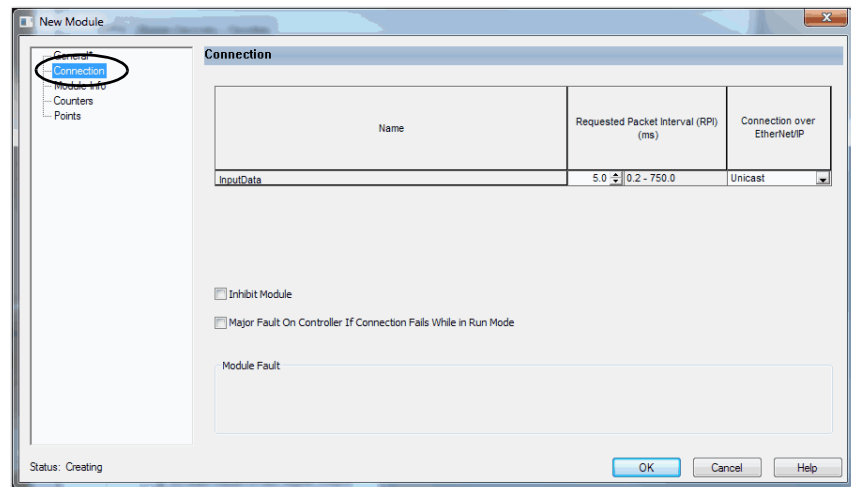
Connection Category

The Connection category lets you complete the following tasks:

- Set the RPI rate. For more information on the RPI, see [Requested Packet Interval on page 40](#).
- Set the Connection over the Ethernet/IP network type of connection.
- Inhibit the module. For more information on how to inhibit the module, see [page 71](#).
- Configure whether a connection failure while the controller is in Run mode causes a major or minor fault.



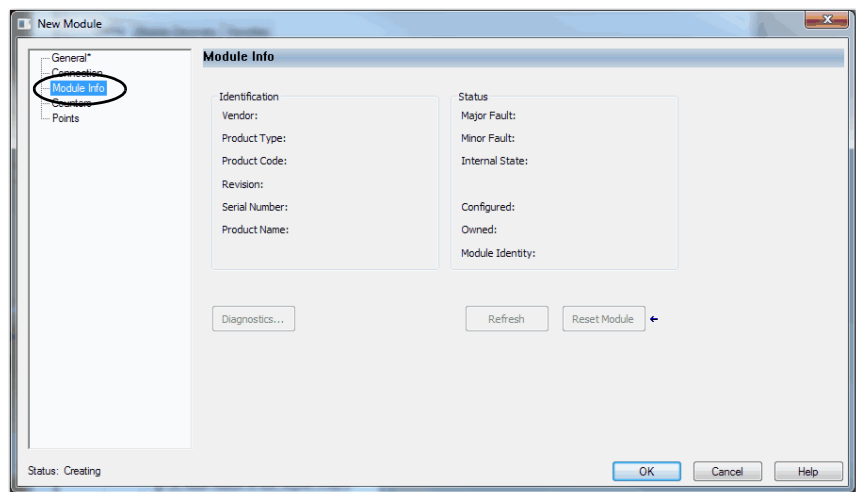
The Module Fault area of the Connection category is useful during module troubleshooting. For more information on the Module Fault area, see [page 213](#).



Module Info Category

The Module Info category displays module and status information about the module when the project is online. You can use this category to complete the following:

- Determine the identity of the module.
- Access module diagnostics.
- Refresh the data on the screen.
- Reset the module.



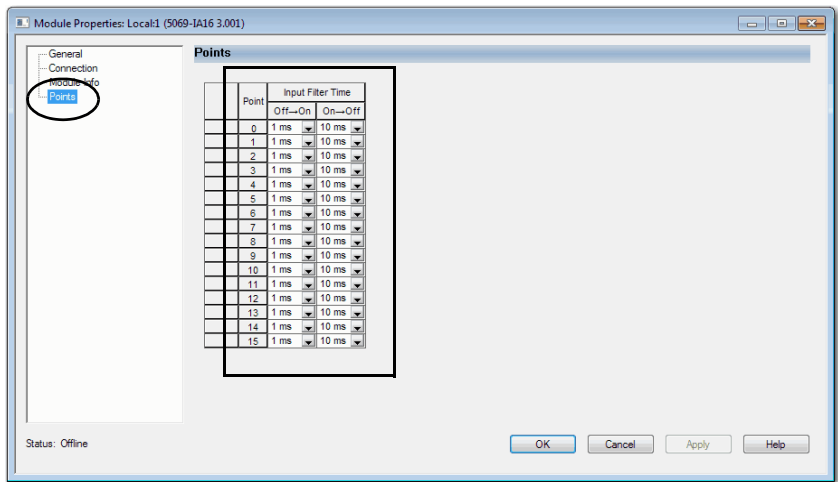
Edit 5069-IA16 Module Configuration Categories

In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-IA16 module:

IMPORTANT If you use the Listen Only connection type, the Points category does not appear.

Points Category

The Points category shows the available input filter time values for the module points.



For more information on input filters, see [page 79](#).

Edit 5069-IB16 Module Configuration Categories

To configure a 5069-IB16K module, you use the 5069-IB16 module profile in your Logix Designer application project.

In addition to the General, Connection, and Module Info categories, the following categories are available when you configure a 5069-IB16 module:

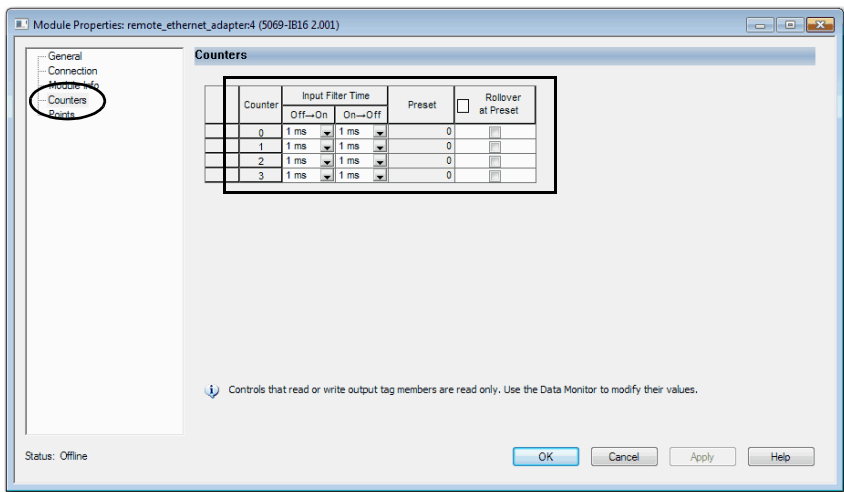
- [Counters Category](#)
- [Points Category](#)

IMPORTANT If you use the Listen Only connection type, the Points Category and Counters Category do not appear.

Counters Category

The Counters category is only available if you choose a value for Counters in the Module Definition dialog box.

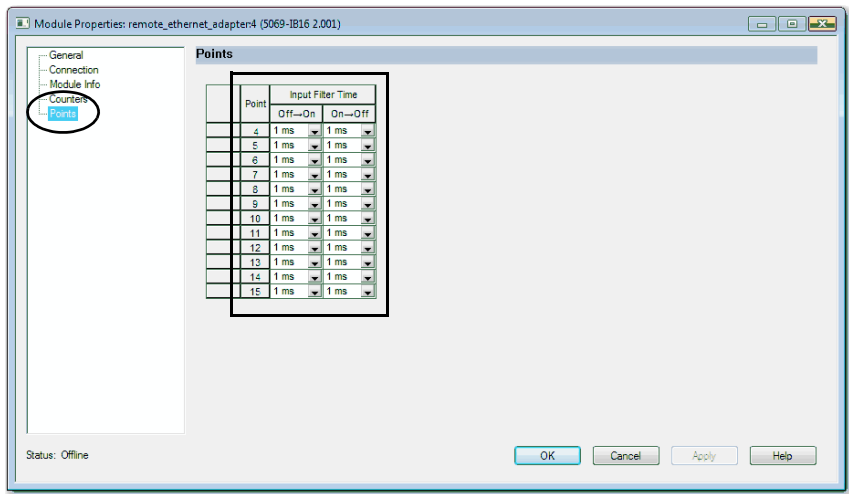
The Counters category shows the configuration options available for each counter. You can also configure the counter Preset value and enable Rollover at Preset.



IMPORTANT The total number of Counters subtracts from the available number of Points. For example, if you configure a 5069-IB16 module to use four counters, the first four terminals are not available to use as points.
The number of points available on the module in this case is 12. That is, points 4...15.
The maximum number of counters that can be configured is eight channels. That is, counters 0...7.

Points Category

The Points category shows the available input filter time values for the module points.



For more information on input filters, see [page 79](#).

Edit 5069-IB16F Module Configuration Categories

In addition to the General, Connection, and Module Info categories, the following categories are available when you configure a 5069-IB16F module:

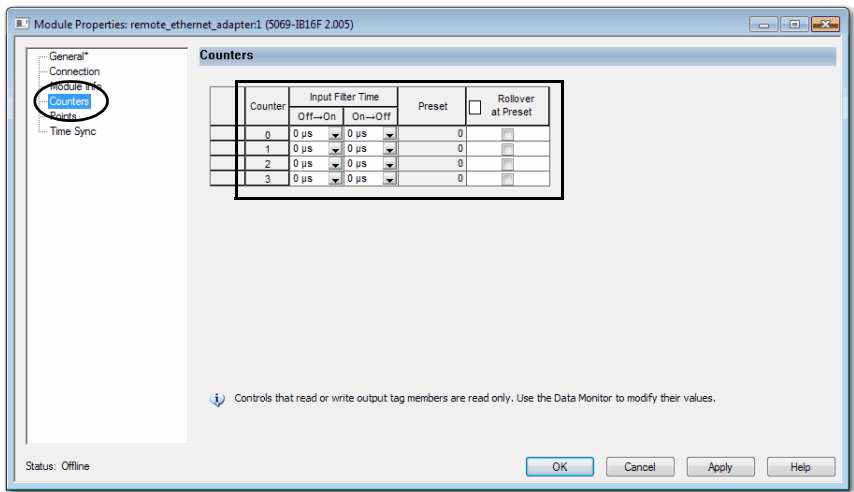
- [Counters Category](#)
- [Points Category](#)
- [Events Category](#)
- [Time Sync Category](#)

IMPORTANT If you use the Listen Only connection type, the Points Category, Counters Category, Events Category, and Time Sync Category do not appear.

Counters Category

The Counters category is available only if you choose a value for Counters in the Module Definition dialog box.

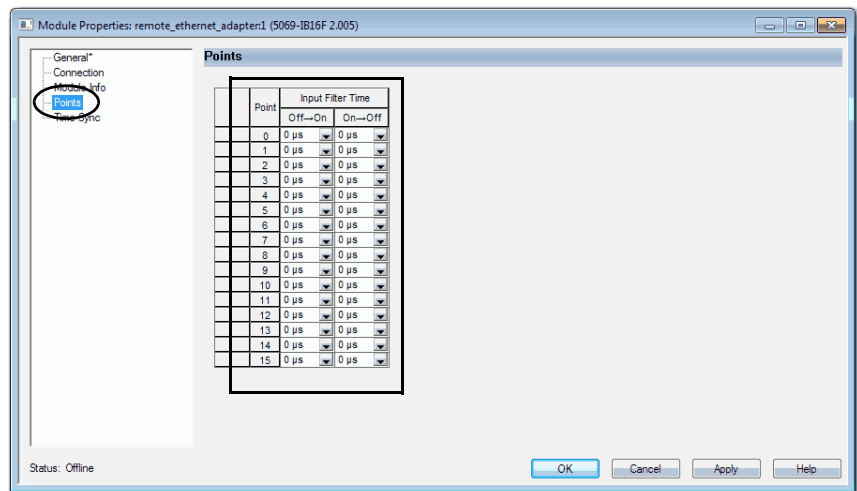
The Counters category shows the configuration options available for each counter. Based on your Input Filter Time selections, the Input Filter Time Off>On and On>Off times change. You can also configure the counter Preset value and enable Rollover at Preset.



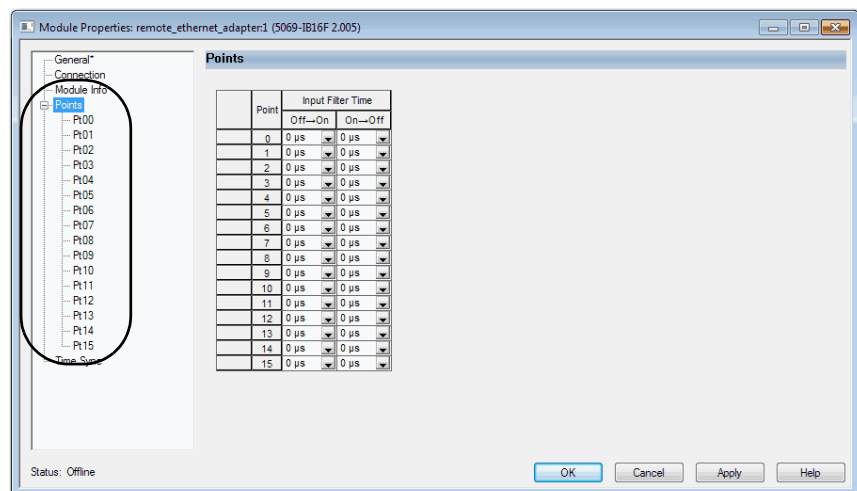
IMPORTANT The total number of Counters subtracts from the available number of Points. For example, if you configure a 5069-IB16F module to use four counters, the first four terminals are not available to use as points. The number of points available on the module in this case is 12. That is, points 4...15.

The maximum number of counters that can be configured is eight channels. That is, counters 0...7.

Points Category



If you choose Timestamped Data for Input Data in the Module Definition dialog box, the Points category expands.



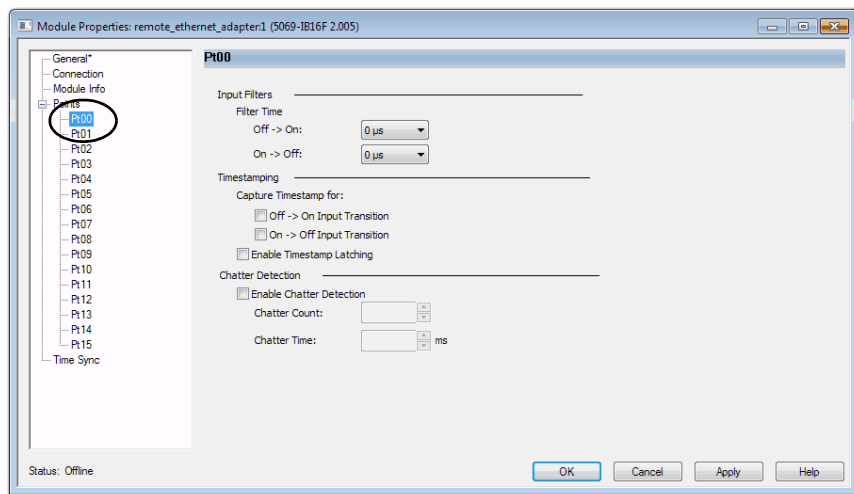
For more information on input filters, see [page 79](#).

PTxx Category

The PTxx category shows the configuration options available when you use Timestamping on a point.

IMPORTANT You must choose the Input Data option Timestamp Data on the Module Definition dialog box to see this category in the Module Properties dialog box.

Click each PTxx to configure it as necessary for your application.



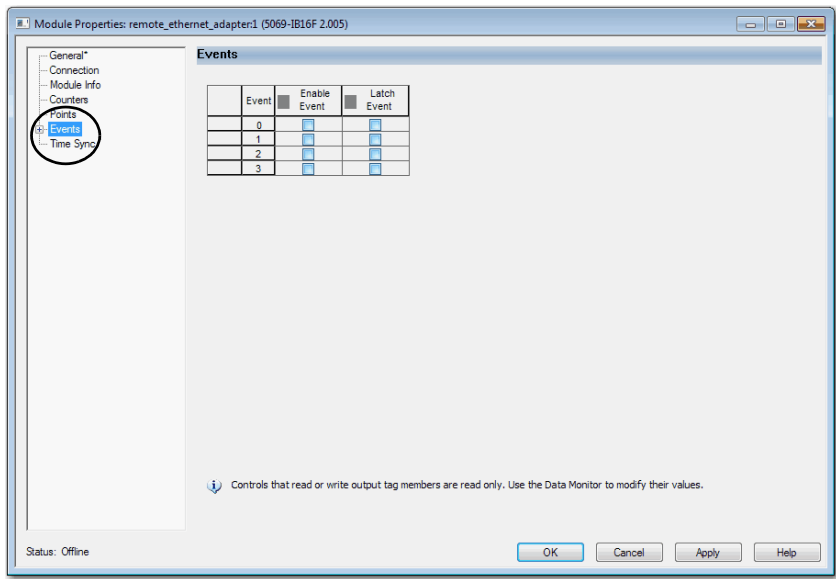
For more information on the fields on this screen, see the following:

- Input filters - [page 79](#)
- Timestamping - [page 86](#)

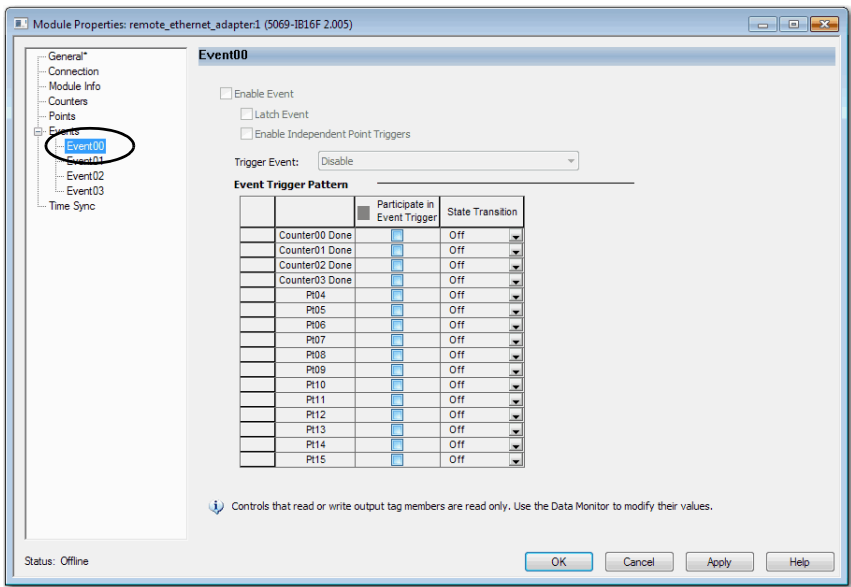
Events Category

The Events category is available only if you choose Data with Events for Connection in the Module Definition dialog box. Click the + sign next to the Events category to expand it.

IMPORTANT You cannot configure events on the Module Properties dialog box. The parameters that are displayed are read-only. You must use the Event Output tags to configure an event. For more information, see [Configure an Event in the Event Output Tags on page 164](#).



The Events subcategories show the configuration parameters for events.



Configure an Event in the Event Output Tags

To configure an event, you must change the Event Output tags for the affected module via the Tag Monitor in the Logix Designer application. When you change the tags, the change is reflected on the Module Properties dialog box.

The following graphics show how tag values are reflected on the Module Properties. The following conditions are shown:

- Event is enabled
- Point 4 is configured to trigger the event
- Event is latched
- Trigger Event is on input transition to match pattern

These changes in the Event Output tags configure the event. After the tags are changed, the related parameters on the Module Properties are updated automatically.

Name	Value	Force Mask
remote_ethernet_adapter:1:EO	{...}	{...}
remote_ethernet_adapter:1:EO.Event00	{...}	{...}
remote_ethernet_adapter:1:EO.Event00.En	1	
remote_ethernet_adapter:1:EO.Event00.EventRisingEn	1	
remote_ethernet_adapter:1:EO.Event00.LatchEn	1	
remote_ethernet_adapter:1:EO.Event00.ResetEvent	0	
remote_ethernet_adapter:1:EO.Event00.IndependentConditionTriggerEn	0	
remote_ethernet_adapter:1:EO.Event00.EventNumberAck	0	
remote_ethernet_adapter:1:EO.Event00.Counter00Select	0	
remote_ethernet_adapter:1:EO.Event00.Counter01Select	0	
remote_ethernet_adapter:1:EO.Event00.Counter02Select	0	
remote_ethernet_adapter:1:EO.Event00.Counter03Select	0	
remote_ethernet_adapter:1:EO.Event00.Pi04DataSelect	1	
remote_ethernet_adapter:1:EO.Event00.Pi05DataSelect	0	
remote_ethernet_adapter:1:EO.Event00.Pi06DataSelect	0	

	Participate in Event Trigger	State Transition
Counter00 Done	<input type="checkbox"/>	Off
Counter01 Done	<input type="checkbox"/>	Off
Counter02 Done	<input type="checkbox"/>	Off
Counter03 Done	<input type="checkbox"/>	Off
Pi04	<input checked="" type="checkbox"/>	Off
Pi05	<input type="checkbox"/>	Off
Pi06	<input type="checkbox"/>	Off
Pi07	<input type="checkbox"/>	Off

For more information on module tags, see the following:

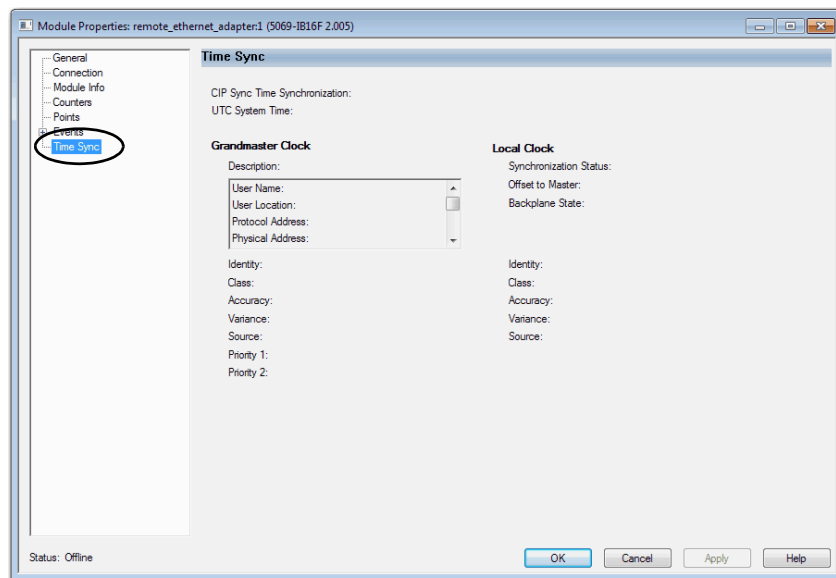
- [View the Module Tags on page 179](#)
- Appendix B, [Module Tag Definitions on page 217](#)

For more information on the Events feature, see [page 88](#).

Time Sync Category

The Time Sync category displays and status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync™ Time Synchronization
- UTC System Time
- Grandmaster Clock information
- Local Clock information



Edit 5069-IB6F-3W Module Configuration Categories

In addition to the General, Connection, and Module Info categories, the following categories are available when you configure a 5069-IB6F-3W module:

- [Points Category](#)
- [Counters Category](#)
- [Events Category](#)
- [Time Sync Category](#)

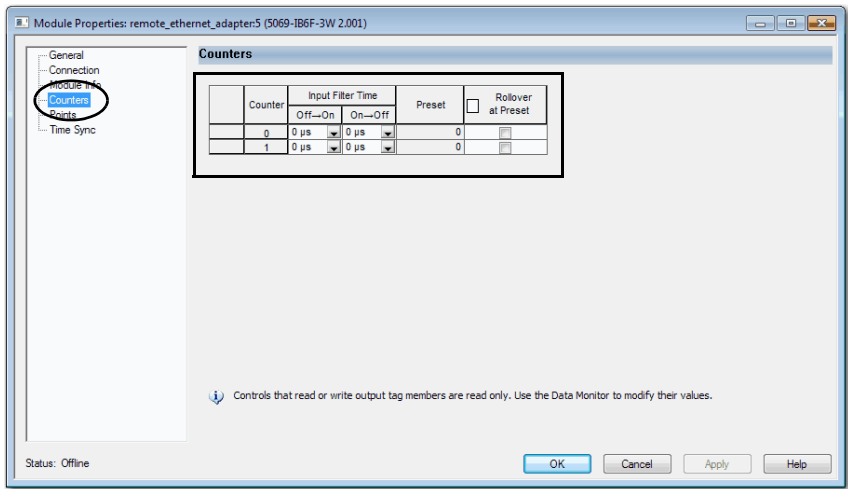
IMPORTANT If you use the Listen Only connection type, the Points Category, Counters Category, Events Category, and Time Sync Category do not appear.

Counters Category

The Counters category is available only if you choose a value for Counters in the Module Definition dialog box.

The Counters category for the 5069-IB6F-3W module functions the same as it does for the other Compact 5000 I/O standard input modules. The only difference is that the 5069-IB6F-3W module offers no more than four counters.

The Counters category shows the configuration options available for each counter. You can also configure the counter Preset value and enable Rollover at Preset.

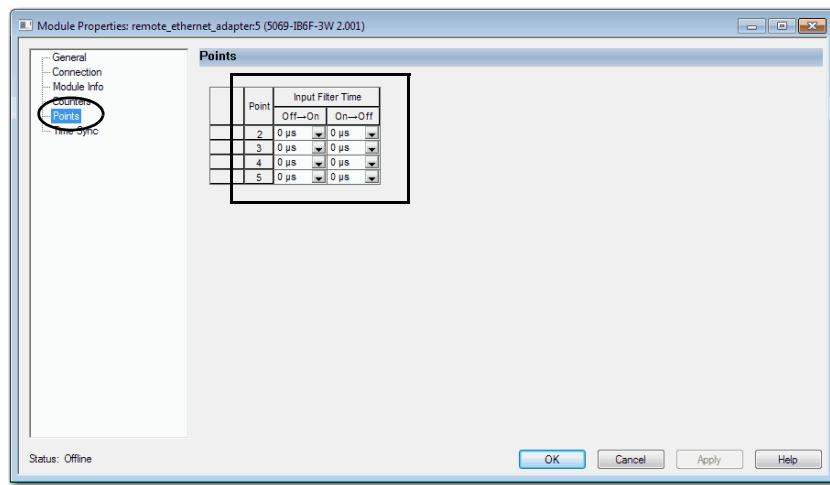


IMPORTANT The total number of Counters subtracts from the available number of Points. For example, if you configure a 5069-IB6F-3W module to use two counters, the number of points available on the module is four. That is, points 2...5.

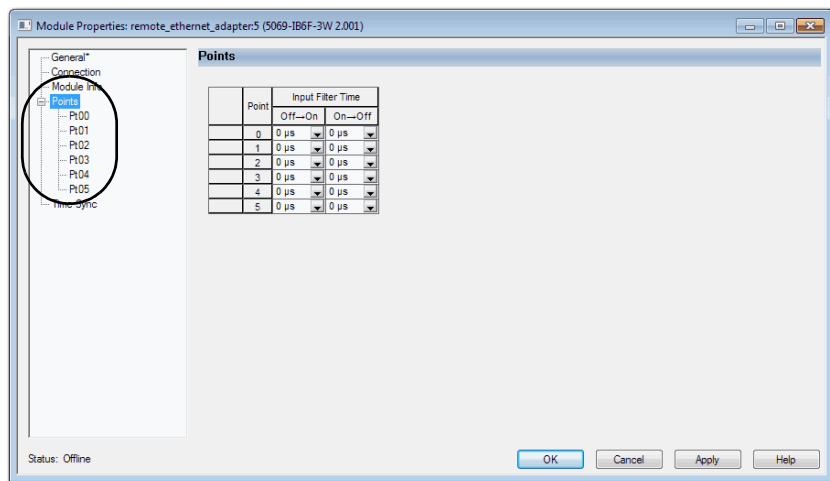
The maximum number of counters that can be configured is four channels. That is, counter 0...3.

Points Category

The Points category shows the available input filter time values for the module points.



If you choose Timestamped Data for Input Data in the Module Definition dialog box, the Points category expands.



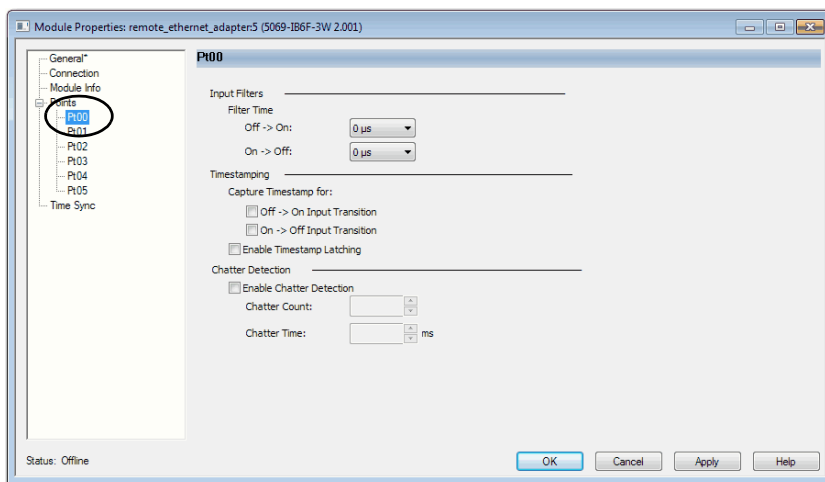
For more information on input filters, see [page 79](#).

PTxx Category

The PTxx category shows the configuration options available when you use Timestamping on a point.

IMPORTANT You must choose the Input Data option Timestamp Data on the Module Definition dialog box to see this category in the Module Properties dialog box.

Click each PTxx to configure it as necessary for your application.



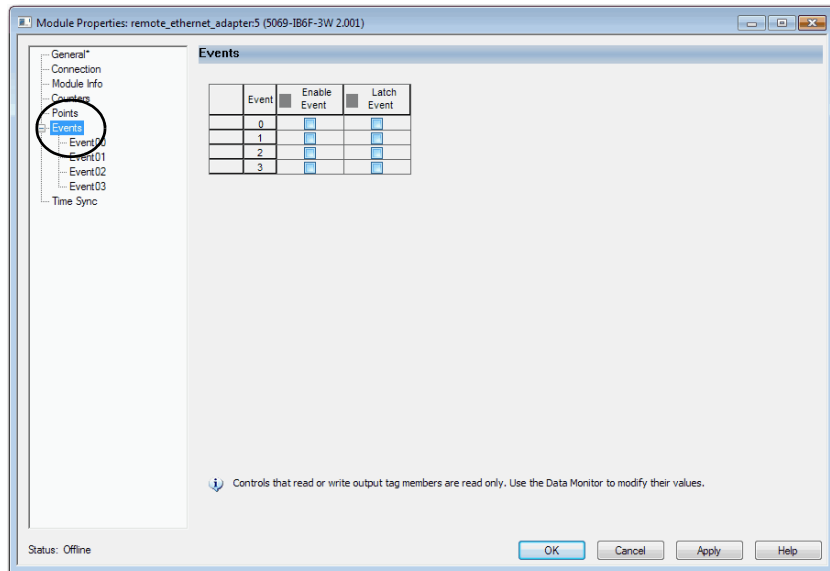
For more information on the fields on this screen, see the following:

- Input filters - [page 79](#).
- Timestamping - [page 86](#)
- Chatter Detection - [page 87](#)

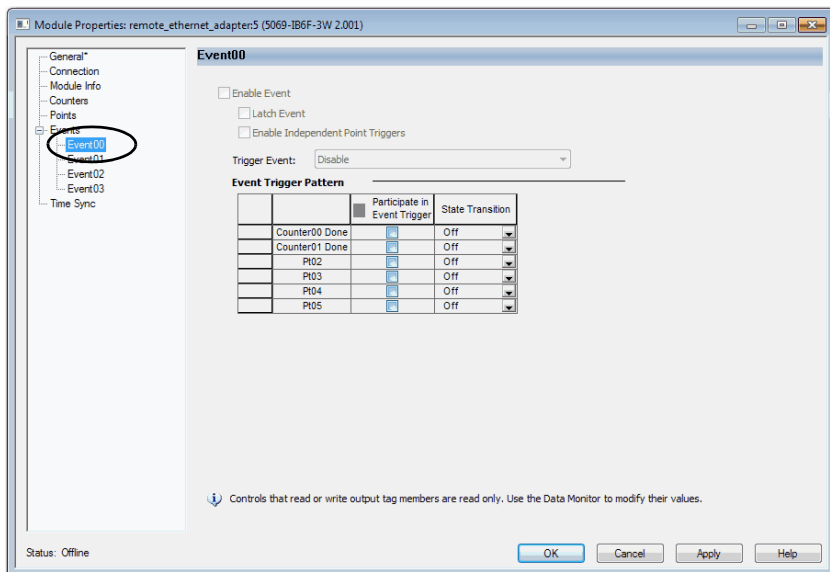
Events Category

The Events category is available only if you choose Data with Events for Connection in the Module Definition dialog box. Click the + sign next to the Events category to expand it.

IMPORTANT You cannot configure events on the Module Properties dialog box. The parameters that are displayed are read-only. You must use the Event Output tags to configure an event. For more information, see [Configure an Event in the Event Output Tags on page 170](#).



The Events subcategories show the configuration parameters for events.



Configure an Event in the Event Output Tags

To configure an event, you must change the Event Output tags for the affected module via the Tag Monitor in the Logix Designer application. When you change the tags, the change is reflected on the Module Properties dialog box.

The following graphics show how tag values are reflected on the Module Properties. The following conditions are shown:

- Event is enabled
- Point 4 is configured to trigger the event
- Event is latched
- Trigger Event is On input transition to match pattern

These changes in the Event Output tags configure the event. After the tags are changed, the related parameters on the Module Properties are updated automatically.

Name	Value	Force Mask	Style
+ remote_ethernet_adapter:5.C	{...}	{...}	
+ remote_ethernet_adapter:5.I	{...}	{...}	
+ remote_ethernet_adapter:5.O	{...}	{...}	
+ remote_ethernet_adapter:5.EI	{...}	{...}	
- remote_ethernet_adapter:5.EO	{...}	{...}	
- remote_ethernet_adapter:5.EO.Event00	{...}	{...}	
- remote_ethernet_adapter:5.EO.Event00.En	1		Dec
- remote_ethernet_adapter:5.EO.Event00.EventRisingEn	1		Dec
- remote_ethernet_adapter:5.EO.Event00.EventFallingEn	1		Dec
- remote_ethernet_adapter:5.EO.Event00.LatchEn	1		Dec
- remote_ethernet_adapter:5.EO.Event00.ResetEvent	0		Dec
- remote_ethernet_adapter:5.EO.Event00.IndependentConditionTriggerEn	0		Dec
+ remote_ethernet_adapter:5.EO.Event00.EventNumberAck	0		Dec
- remote_ethernet_adapter:5.EO.Event00.Counter00Select	0		Dec
- remote_ethernet_adapter:5.EO.Event00.Counter01Select	0		Dec
- remote_ethernet_adapter:5.EO.Event00.Pt02DataSelect	1		Dec

	Participate in Event Trigger	State Transition
Counter00 Done	<input type="checkbox"/>	Off
Counter01 Done	<input type="checkbox"/>	Off
Pt02	<input checked="" type="checkbox"/>	Off
Pt03	<input type="checkbox"/>	Off
Pt04	<input type="checkbox"/>	Off
Pt05	<input type="checkbox"/>	Off

For more information on module tags, see the following:

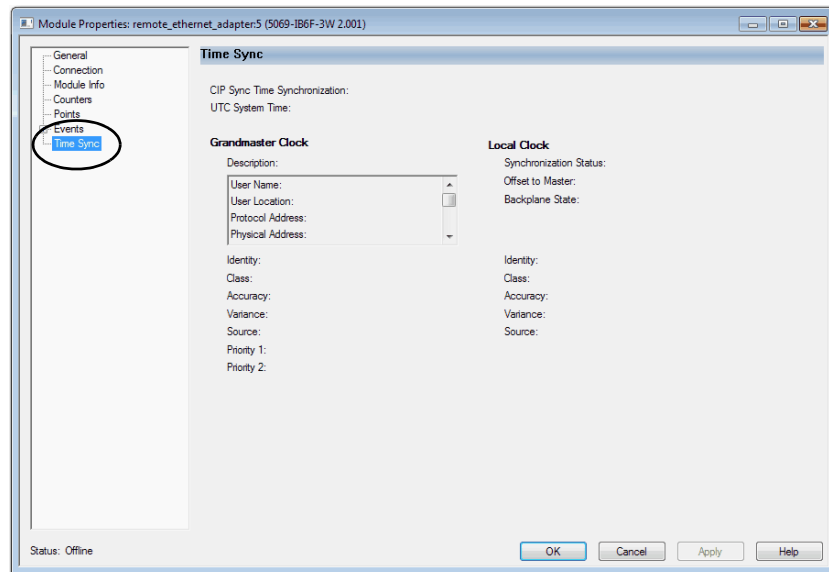
- [View the Module Tags on page 179](#)
- Appendix B, [Module Tag Definitions on page 217](#).

For more information on the Events feature, see [page 88](#).

Time Sync Category

The Time Sync category displays and status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync Time Synchronization
- UTC System Time
- Grandmaster Clock information
- Local Clock information



Edit 5069-OA16 Module Configuration Categories

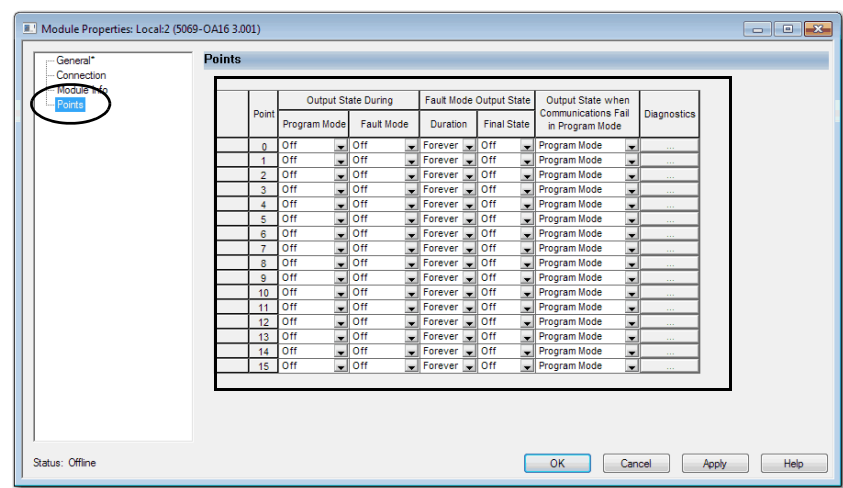
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OA16 module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode



Edit 5069-OB8 Module Configuration Categories

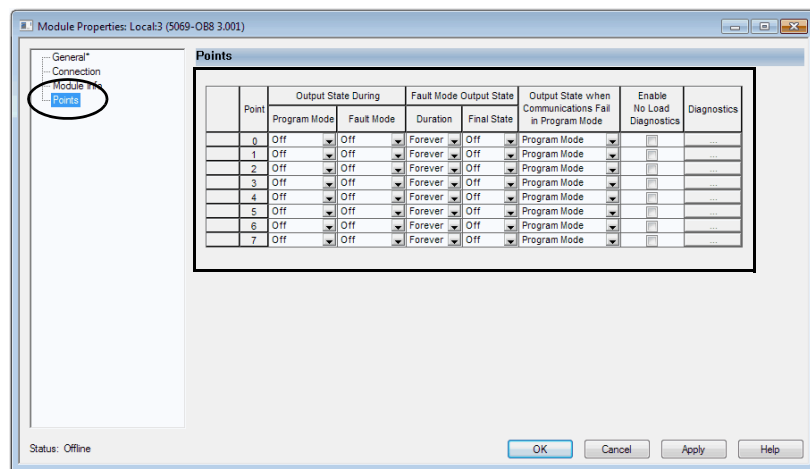
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OB8 module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode
- Enable No Load Diagnostics



Edit 5069-OB16 Module Configuration Categories

To configure a 5069-OB16K module, you use the 5069-OB16 module profile in your Logix Designer application project.

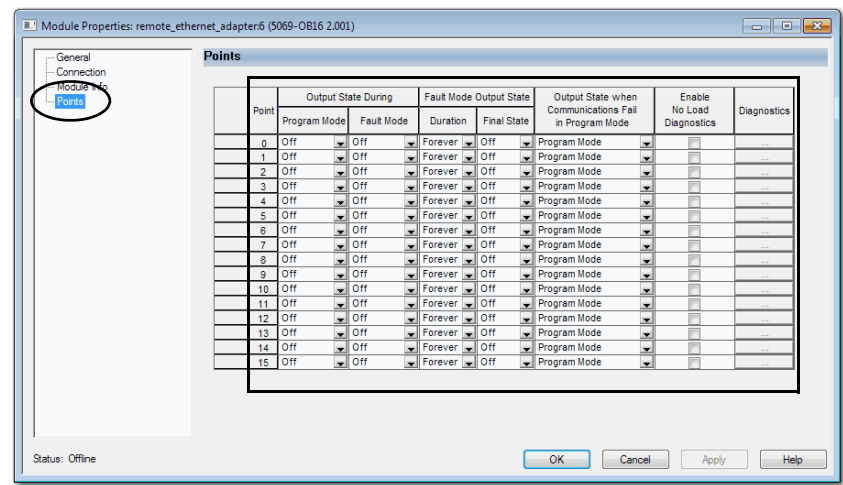
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OB16 module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode
- Enable No Load Diagnostics



Edit 5069-OB16F Module Configuration Categories

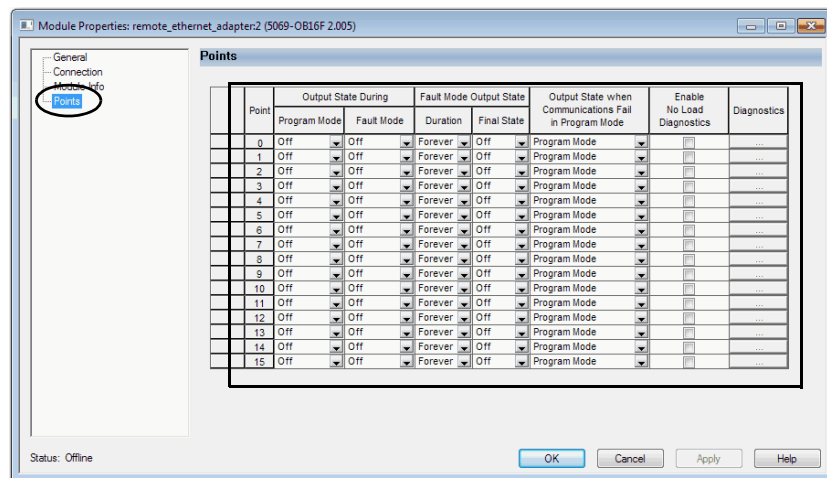
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OB16F module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode
- Enable No Load Diagnostics



Edit 5069-OW4I Module Configuration Categories

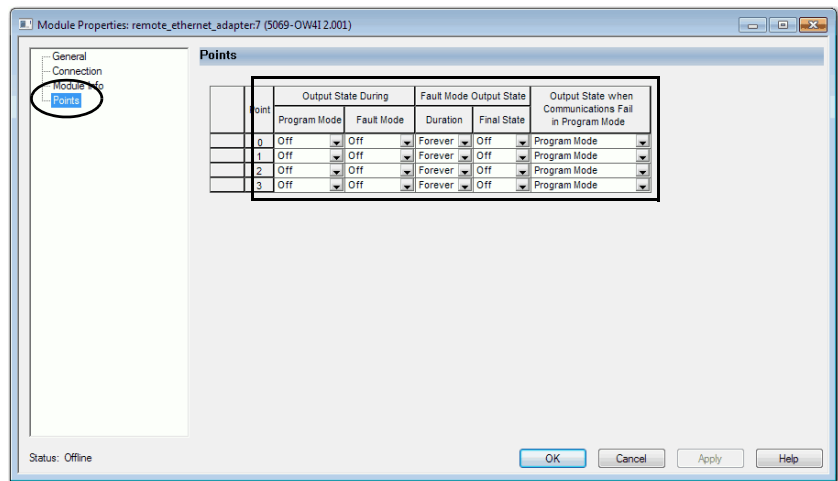
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OW4I module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode



Edit 5069-OW16 Module Configuration Categories

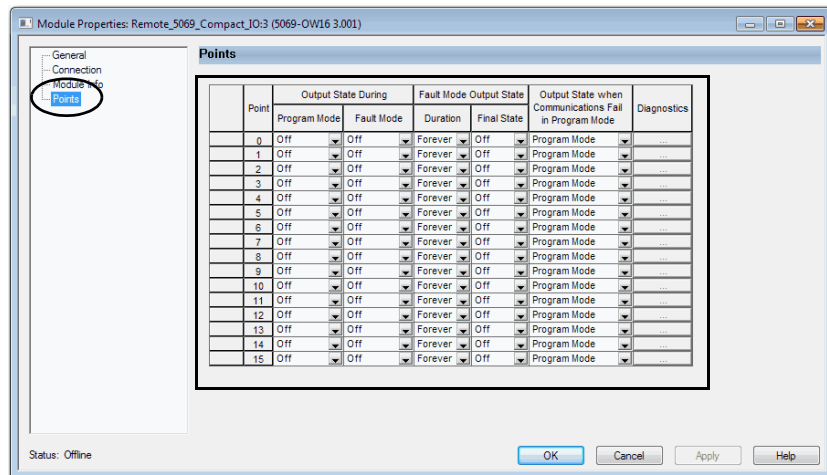
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OW16 module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Output State When Communications Fail in Program Mode



Edit 5069-OX4I Module Configuration Categories

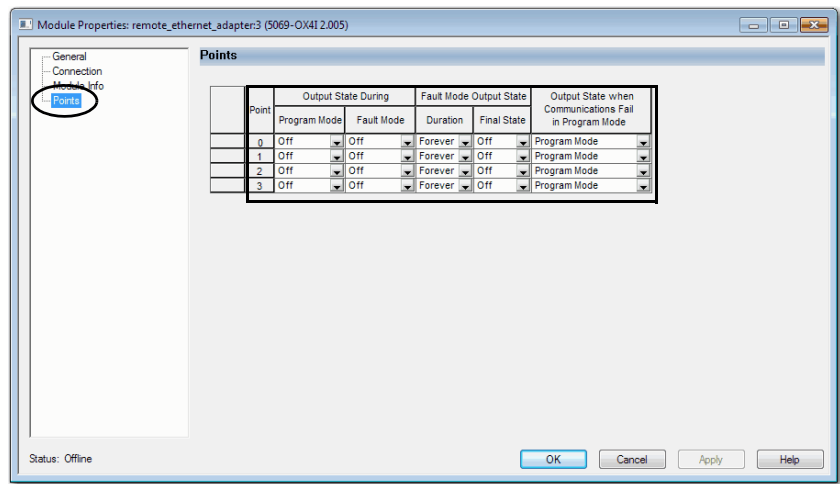
In addition to the General, Connection, and Module Info categories, the Points category is available when you configure a 5069-OX4I module.

IMPORTANT If you use the Listen Only connection type, the Points Category does not appear.

Points Category

The Points category shows the configuration options available for each point. You can configure the following parameters from the Points category:

- Output State During Program Mode
- Output State During Fault Mode
- Fault Mode Output State Duration
- Fault Mode Output State Final State
- Communication Failure Output State

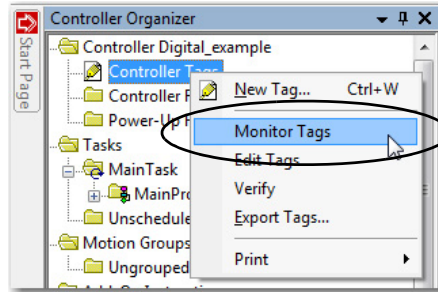


View the Module Tags

When you create a module, the Logix Designer application creates a set of tags that you can view in the Tag Editor. Each configured feature on your module has a distinct tag that is available for use in the controller program logic.

Complete the following steps to access the tags for a module.

1. In the Controller Organizer, right-click Controller Tags and choose Monitor Tags.



The Controller Tags dialog box appears with data.

2. To view the tags, click the + symbols as shown.

Scope: Digital_example Show: All Tags		Enter Name Filter			
Name	Value	Force Mask	Style	Data Type	
- remote_ethernet_adapter:1.C	{...}	{...}		AB:5000_DI16_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt00	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt01	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
- remote_ethernet_adapter:1.C.Pt01.InputOnFilter	13		Decimal	SINT	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.0	1		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.1	0		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.2	1		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.3	1		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.4	0		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.5	0		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.6	0		Decimal	BOOL	
- remote_ethernet_adapter:1.C.Pt01.InputOffFilter.7	0		Decimal	BOOL	
+ remote_ethernet_adapter:1.C.Pt01.InputOnFilter	13		Decimal	SINT	
+ remote_ethernet_adapter:1.C.Pt02	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt03	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt04	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt05	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt06	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt07	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt08	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt09	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt10	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt11	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt12	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt13	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt14	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	
+ remote_ethernet_adapter:1.C.Pt15	{...}	{...}		AB:5000_DI_Channel_IB16.C:0	

For more information on module tags, see Appendix B, [Module Tag Definitions on page 217](#).

Notes:

Configure and Replace Safety Modules

Topic	Page
Before You Begin	181
Create a New Module	182
Edit the Module Configuration Common Categories	185
Edit the 5069-IB8S and 5069-IB8SK Module Configuration Categories	191
Edit the 5069-OBV8S and 5069-OBV8SK Module Points Category	192
View the Module Tags	193
Replace a Safety Module	194

This chapter describes how to configure your Compact 5000™ I/O safety modules in a Logix Designer application project.

IMPORTANT You must use the Logix Designer application, version 32 or greater with the modules.

By default, all safety input and output channels on Compact 5000 I/O safety modules are disabled. You must configure each point that is used in a Safety application.

This chapter does not explain the user-configurable parameters, or corresponding module features, in your Logix Designer application project.

For detailed information about module features, see the following:

- Chapter 2, [Features Common to Compact 5000 I/O Digital Modules on page 65](#)
- Chapter 3, [Input Module Features on page 77](#)
- Chapter 4, [Output Module Features on page 99](#)
- Chapter 5, [Safety Module Features on page 123](#)

Before You Begin

You must complete the following tasks before you can configure the module:

1. Create a Logix Designer application project.
2. If you use the safety modules as remote I/O modules, add a Compact 5000 I/O EtherNet/IP™ adapter to the project.

For more information on how to add a Compact 5000 I/O EtherNet/IP adapter to a Logix Designer application project, see the Compact 5000 EtherNet/IP Adapters User Manual, publication [5069-UM007](#).

Once the project is created and, if necessary, the adapter is added, you can create a module in the Logix Designer application project.

Create a New Module

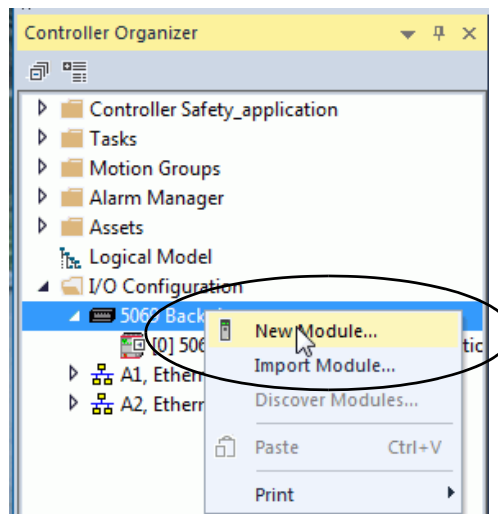
Unlike Compact 5000 I/O standard modules, you cannot add a Compact 5000 I/O safety module to a Logix Designer application project while the project is online. The project must be offline to add Compact 5000 I/O safety modules to it.

You can create a new local or remote Compact 5000 I/O safety module. Local I/O modules are installed in the same system as the Compact GuardLogix® 5380 controllers. Remote I/O modules are installed in a system that includes a Compact 5000 I/O EtherNet/IP adapter that connects to an EtherNet/IP network.

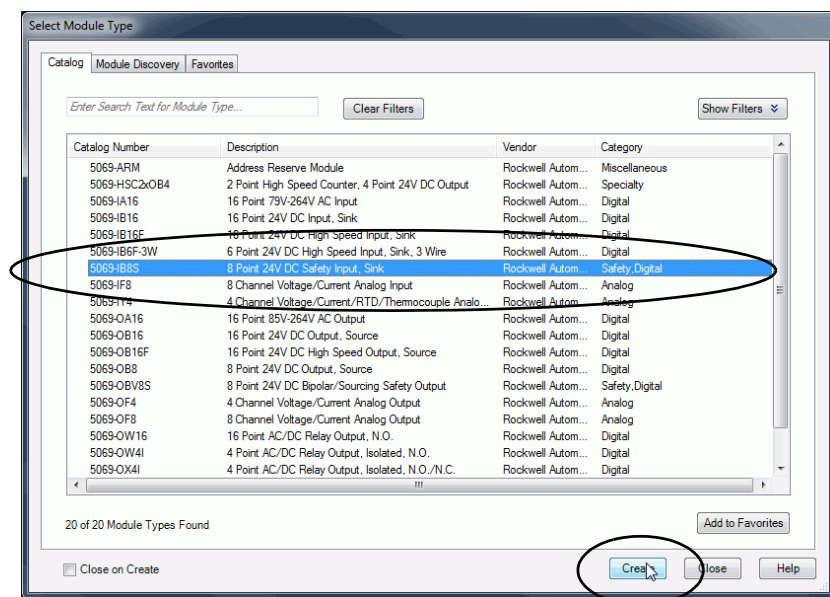
New Local Safety Module

To create a new local Compact 5000 I/O safety module, complete the following steps.

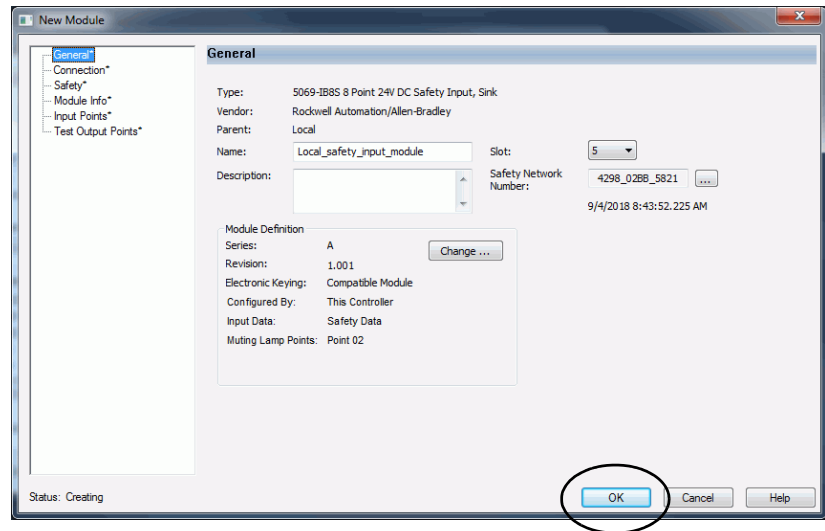
1. Right-click the 5069 Backplane and choose New Module.



2. At the Select Module Type window, click Create to add the discovered module to your project.



- At the New Module window, configure the module properties and click OK.



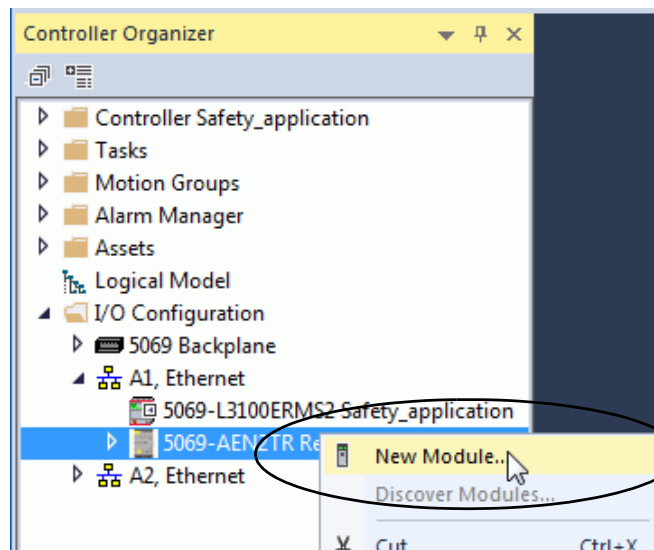
To add additional local I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps [2...3](#).
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps [1...3](#).

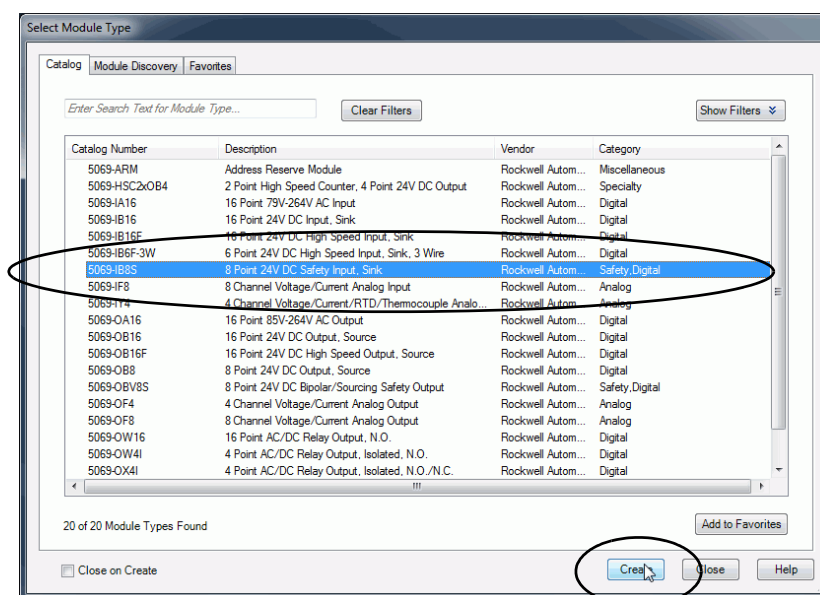
New Remote I/O Module

To create a new remote Compact 5000 I/O safety module, complete the following steps.

- Add a Compact 5000 I/O EtherNet/IP adapter to the project.
- Right-click the Compact 5000 I/O EtherNet/IP adapter and choose New Module.

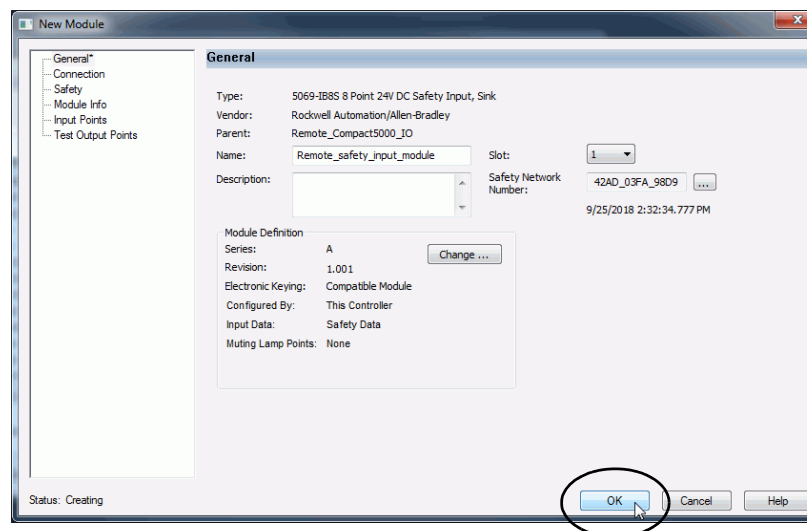


3. Select the module and click Create.



The New Module dialog box appears with a list of categories on the left side. The number and type of categories varies by module type.

4. You can click OK to use the default configuration as shown or edit the module configuration. The rest of this chapter describes how to edit module configuration categories.



To add additional remote I/O modules with this method, complete one of the following:

- If you cleared the Close on Create checkbox when you created the first I/O module, repeat steps 3...4.
- If you did not clear the Close on Create checkbox when you created the first I/O module, repeat steps 2...4.

Edit the Module Configuration Common Categories

You click the category names in the New Module dialog box to view and change the configuration parameters. Before you edit the module configuration, consider the following:

- This chapter shows how to edit configuration when you add the module to the Logix Designer application project.

If you access the module configuration after it is added to the project, the dialog box is named Module Properties. The same categories are displayed as the categories displayed on the New Module dialog box.

- Some new module configuration categories apply to all Compact 5000 I/O safety modules. Some categories are specific to the module type.

IMPORTANT By default, all safety input and output channels on Compact 5000 I/O safety modules are disabled.
You must configure each point that is used in a Safety application.

The following categories apply to all Compact 5000 I/O safety modules and are described in this section.

- [General Category](#)
- [Connection Category](#)
- [Safety Category](#)
- [Module Info Category](#)

General Category

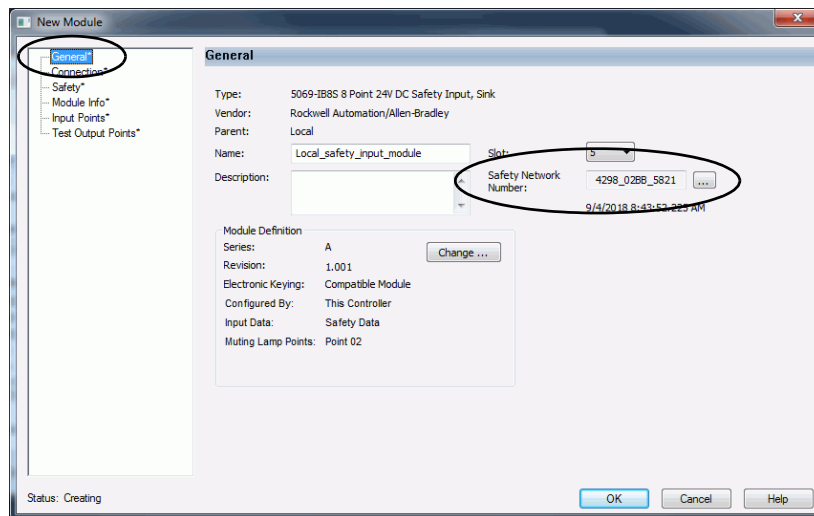
The General category appears first when you create a module. The parameters in this category are the same for all Compact 5000 I/O safety modules.

You use this category to complete the following tasks:

- Name the module.
- Assign a node number.
- Describe the module.
- Access the Module Definition.

Safety Network Number

The Logix Designer application automatically assigns an SNN to Compact 5000 I/O safety modules as they are added to the project.



The SNN is a time-based number that uniquely identifies subnets across all networks in the safety system. All Compact 5000 I/O safety modules in a same system use the same SNN by default.

- Local Compact 5000 I/O safety modules are automatically assigned the same SNN as the 5069 Backplane SSN in the controller configuration.
- Remote Compact 5000 I/O safety modules are automatically assigned the same SNN.

The Logix Designer application assigns an SNN to the first safety module that is added to a remote system. The application assigns the same SNN to additional safety modules that are added to this remote I/O system.

For more information on Safety Network Numbers, see the GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication [1756-RM012](#).

Module Definition

Module Definition parameters are available on the General tab of the Module Properties dialog box in the Logix Designer application project.

[Table 53](#) describes the parameters on the Module Definition dialog box.

5069-IB8S, 5069-IB8SK Modules

5069-OBV8S, 5069-OBV8SK Modules

[Table 53](#) describes the parameters that are available on the Module Definition dialog box.

Table 53 - Module Definition Parameters

Parameter	Definition	Available Choices
Series	Module hardware series	Module-specific
Revision	Module firmware revision, including major and minor revision levels	Module-specific
Electronic Keying	Software method by which you reduce the possibility of using the wrong device in a control system. For more information, see the following: <ul style="list-style-type: none"> Electronic Keying on page 72 Electronic Keying in Logix5000 Control Systems Application Technique, publication LOGIX-AT001 	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying <p>We strongly recommend that you use Exact Match or Compatible Module in Safety applications.</p>
Configured By	Determines the following for the module type you configure: <ul style="list-style-type: none"> Which controller tags are generated when configuration is complete Whether you can choose an Output Data type - Output module only Whether you can choose an Output Mode - Output module only Whether muting lamp points can be used - Input module only 	<ul style="list-style-type: none"> This Controller External Means⁽¹⁾
Input Data	Determines what type of input data is exchanged between the module and the controller. Creates all controller tags specific to the module type being used. IMPORTANT: The 5069-OBV8S and 5069-OBV8SK output modules exchange input data with the controller.	<ul style="list-style-type: none"> Safety data Safety packed data
Muting Lamp Points - 5069-IB8S or 5069-IB8SK module only	Determines which input channels, if any, are connected to muting lamps.	<ul style="list-style-type: none"> None Point 02 Point 03 Point 02 and 03
Output Data - 5069-OBV8S or 5069-OBV8SK module only	Determines what type of output data is exchanged between the module and the controller. The available choices are dictated by the Configured By parameter choice.	<ul style="list-style-type: none"> None - If Configured By is External Means. Safety data and Safety packed data - If Configured By is This Controller.
Output Mode - 5069-OBV8S or 5069-OBV8SK module only	Determines how the outputs are used. That is, one of the following: <ul style="list-style-type: none"> Sourcing outputs. In this case, you connect the external device to only the sourcing point on an output channel. As connection pairs. In this case, you connect the external device to both the sourcing and sinking points on an output channel. 	<ul style="list-style-type: none"> Sourcing Bipolar

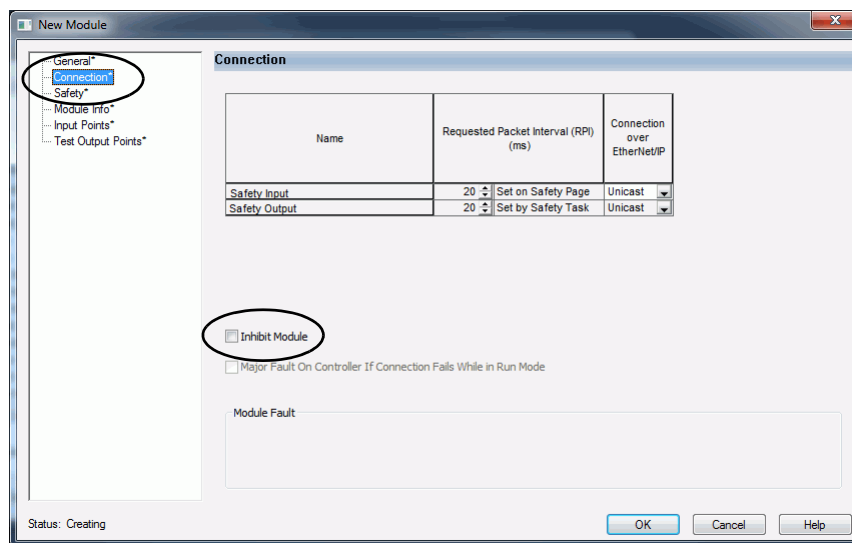
(1) Controller and module establish communication without the controller sending any configuration or output data to the module. A full input data connection is established but depends on the connection between the owner-controller and the module.

Connection Category

The Connection category lets you inhibit the module.

Before you inhibit the module, make sure that you are aware of the impact it has on your application. For more information on inhibiting the module, see [page 71](#).

IMPORTANT You cannot set the RPI for Compact 5000 I/O safety modules on the Connections category. For Compact 5000 I/O safety modules, you set the RPI on the Safety category.



Connection Over the EtherNet/IP Network

Remote Compact 5000 I/O safety modules support the Connection over EtherNet/IP parameter.

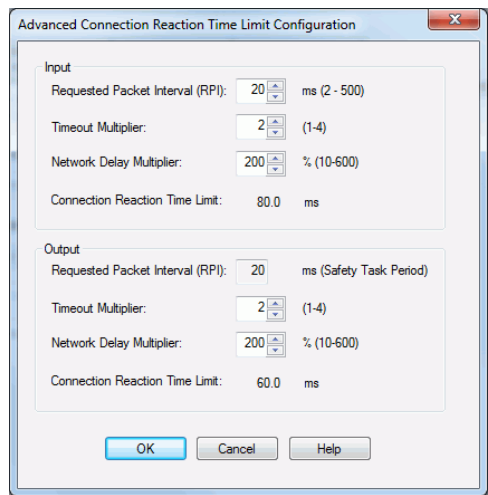
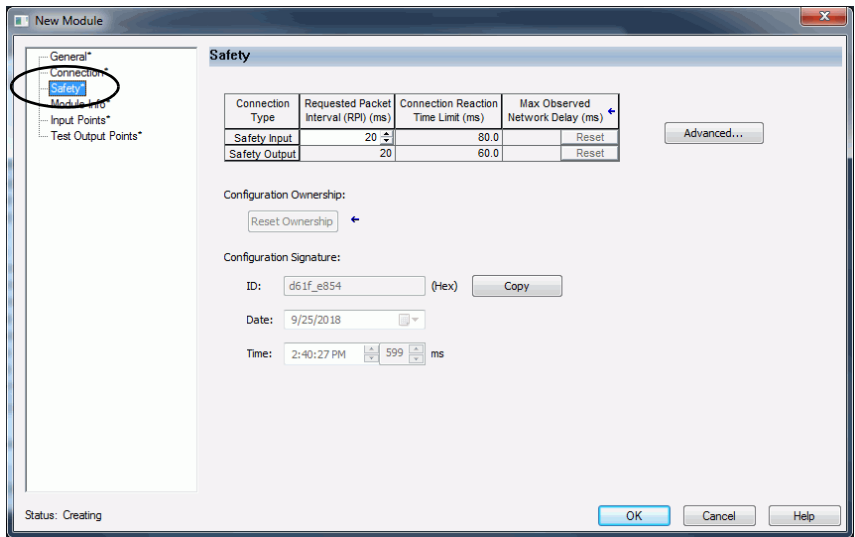
- With safety input data, you can choose Unicast or Multicast.
- With safety output data, you **must** use Unicast.

For more information, see [page 48](#).

Safety Category

The Safety category lets you set the RPI rate. You must click the Advanced button to change the Connection Reaction Time Limit configuration.

IMPORTANT Remember, the Safety Task period determines the 5069-OBV8S or 5069-OBV8SK module RPI.

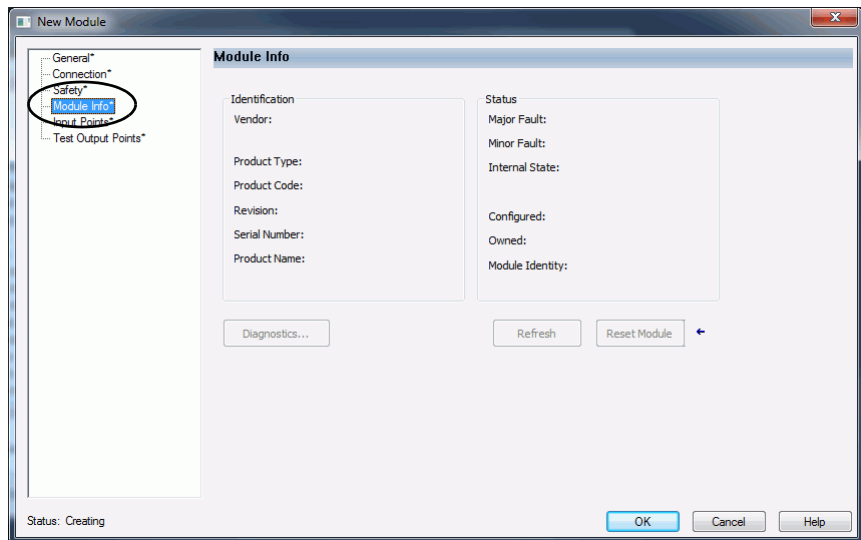


For more information on the RPI and the Connection Reaction Time Limit parameters, see [Requested Packet Interval on page 40](#).

Module Info Category

The Module Info category displays module and status information about the module when the project is online. You can use this category to complete the following:

- Determine the identity of the module.
- Access module diagnostics.
- Refresh the data on the screen.
- Reset the module.



Edit the 5069-IB8S and 5069-IB8SK Module Configuration Categories

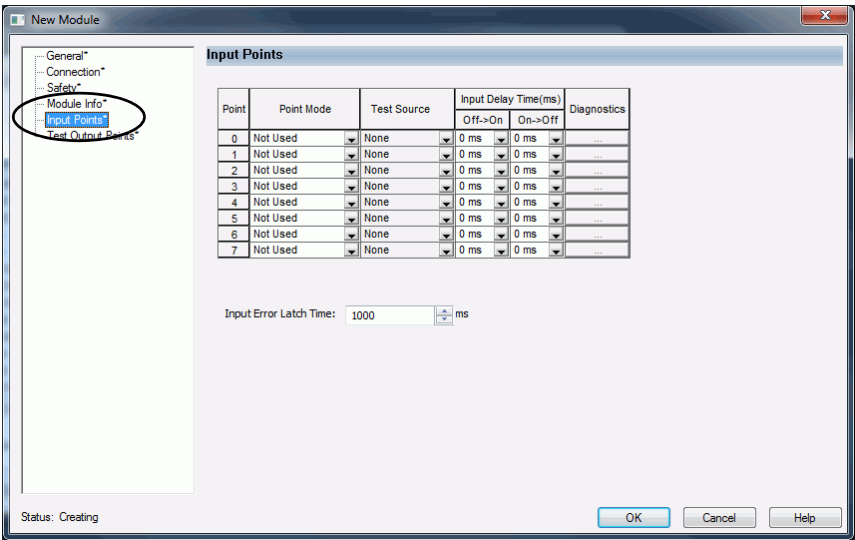
The following categories are available when you configure a 5069-IB8S or 5069-IB8SK module:

- [Input Points Category](#)
- [Test Output Points Category](#)

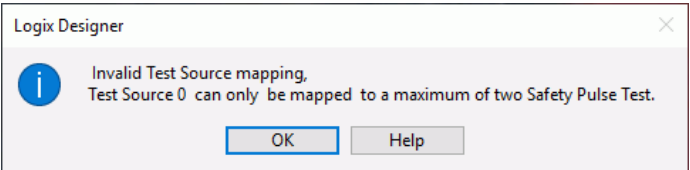
Input Points Category

The Input Points category is only available if you choose This Controller for the Configured By parameter on the Module Definition dialog box.

You must configure each point to use it in a Safety application. The inputs are disabled by default.



IMPORTANT The Logix Designer application project limits the number of Safety Pulse tests to which you can map a test source. For example, you can map Test Source 0 to a maximum of two Safety Pulse tests. If you try to exceed the maximum number, the software prevents the configuration and a message similar to the following appears.

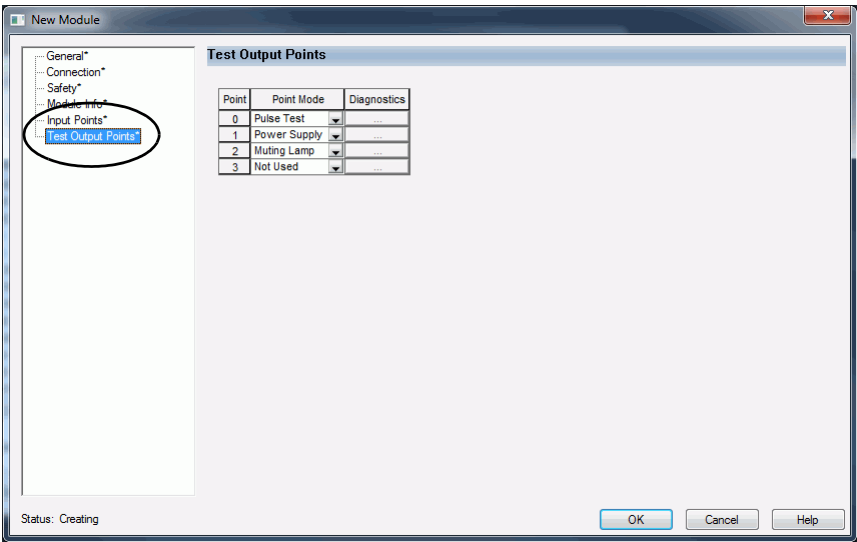


For more information on input delay times, see [page 79](#).

Test Output Points Category

The Test Output Points category is only available if you choose This Controller for the Configured By parameter on the Module Definition dialog box.

You must configure each point to use it in a Safety application. The outputs are disabled by default.

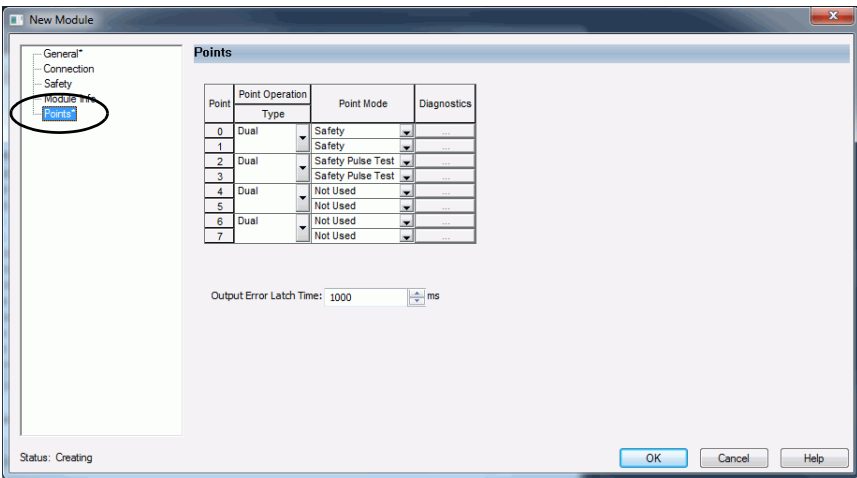


Edit the 5069-OBV8S and 5069-OBV8SK Module Points Category

The 5069-OBV8S and 5069-OBV8SK modules use the Points category.

The Points category is only available if you choose This Controller for the Configured By parameter on the Module Definition dialog box.

You must configure each point to use it in a Safety application. The outputs are disabled by default.

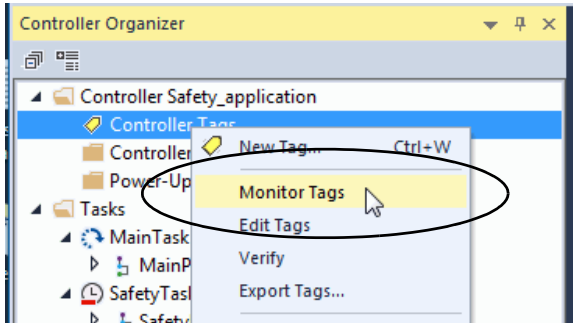


View the Module Tags

When you create a module, the Logix Designer application creates a set of tags that you can view in the Tag Editor. Each configured feature on your module has a distinct tag that is available for use in the controller program logic.

Complete the following steps to access the tags for a module.

1. In the Controller Organizer, right-click Controller Tags and choose Monitor Tags.



The Controller Tags dialog box appears with data.

2. To view the tags, click the triangle symbols.

A screenshot of the 'Controller Tags - Safety_application(controller)' dialog box. It displays a table of tags with columns: Name, Value, Force Mask, Style, Data Type, and Class. A black oval highlights the first column, 'Name', and the first few rows of data. The tags listed include 'Local1:1', 'Local1:1.RunMode', 'Local1:1.ConnectionFaulted', 'Local1:1.DiagnosticActive', 'Local1:1.DiagnosticSequenceCount', 'Local1:1.Pt00', 'Local1:1.Pt00.Data', 'Local1:1.Pt00.Fault', 'Local1:1.Pt00.Uncertain', 'Local1:1.Pt00.ShortCircuit', 'Local1:1.Pt00.Status', and 'Local1:1.Pt01'. Each row has a small triangle icon in the 'Name' column, which is the target of step 2 in the instructions.

Name	Value	Force Mask	Style	Data Type	Class
Local1:1	{...}	{...}		AB:5000_SDI:I:0	Safety
Local1:1.RunMode	0		Decimal	BOOL	Safety
Local1:1.ConnectionFaulted	0		Decimal	BOOL	Safety
Local1:1.DiagnosticActive	0		Decimal	BOOL	Safety
Local1:1.DiagnosticSequenceCount	0		Decimal	SINT	Safety
Local1:1.Pt00	{...}	{...}		CHANNEL_SDI:I:0	Safety
Local1:1.Pt00.Data	0		Decimal	BOOL	Safety
Local1:1.Pt00.Fault	0		Decimal	BOOL	Safety
Local1:1.Pt00.Uncertain	0		Decimal	BOOL	Safety
Local1:1.Pt00.ShortCircuit	0		Decimal	BOOL	Safety
Local1:1.Pt00.Status	0		Decimal	BOOL	Safety
Local1:1.Pt01	{...}	{...}		CHANNEL_SDI:I:0	Safety

For more information on module tags, see Appendix B, [Module Tag Definitions on page 217](#)

Replace a Safety Module

Replacing a safety module that sits on a CIP Safety™ network is more complicated than replacing standard devices because of the Safety Network Number (SNN).

Safety devices require this more complex identifier to make sure that module numbers that are duplicated on separate subnets across all networks in the application do not compromise communication between the correct safety devices.

The SNN is a unique identifier that is automatically assigned to each subnet in a safety application. The same SNN is assigned to all devices on the subnet.

For example, when a Compact 5000 I/O EtherNet/IP adapter is used in a safety application, the Logix Designer application project assigns it an SNN. All Compact 5000 I/O digital modules that are installed with that adapter, are automatically assigned the same SNN.

However, each Compact 5000 I/O safety modules require a unique identifier within the same subnet. A DeviceID is used to uniquely identify each safety module. The SNN and module slot number constitute the DeviceID of the safety module.

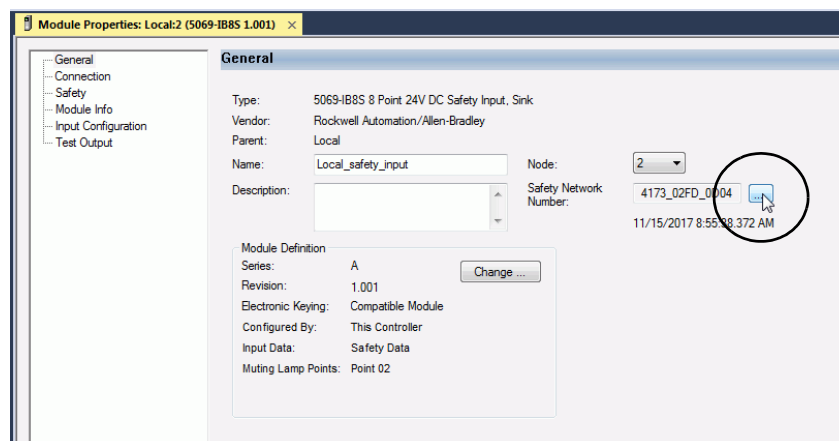
Set the SNN Manually

The SNN is used to provide integrity on the initial download to a Compact 5000 I/O safety module.

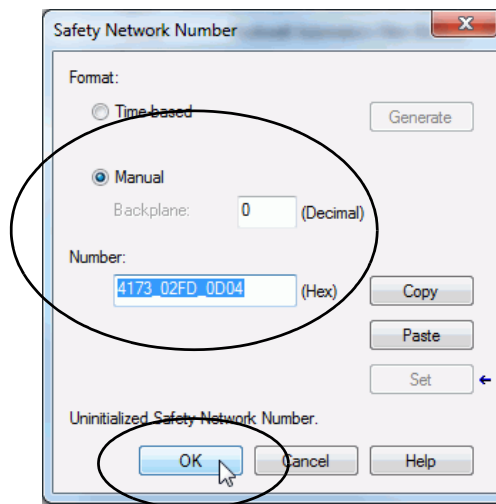
If a safety signature exists, the Compact 5000 I/O safety module must have DeviceID that matches the module in the safety controller project, before it can receive its configuration.

To maintain integrity, the module SNN must be set manually.

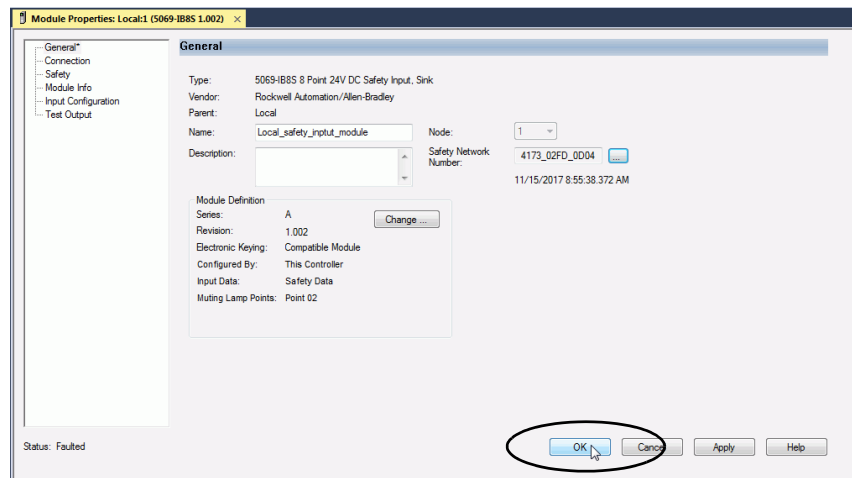
1. On the General category of the Module Properties dialog box, click the ellipsis next to the Safety Network Number.



2. On the Safety Network Number dialog box, click Manual.
3. Type the SNN in the Number field and click OK.



4. On the Module Properties dialog box, click OK.



Reset to Out-of-Box Configuration

When the Logix Designer application is online, the Safety tab of the Module Properties dialog box displays the current configuration ownership. When the opened project owns the configuration, Local is displayed.

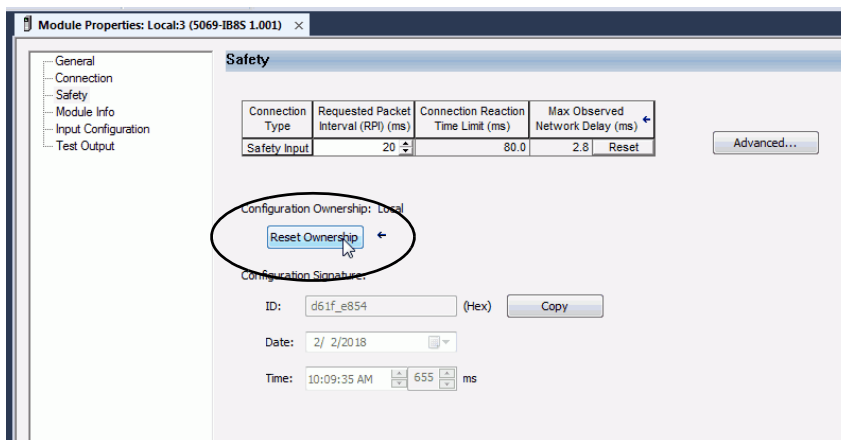
When a second device owns the configuration, Remote is displayed, along with the SNN, and node address or slot number of the configuration owner. Communication error is displayed if the module read fails.

If the connection is Local, you must inhibit the module connection before you reset ownership. To inhibit the module:

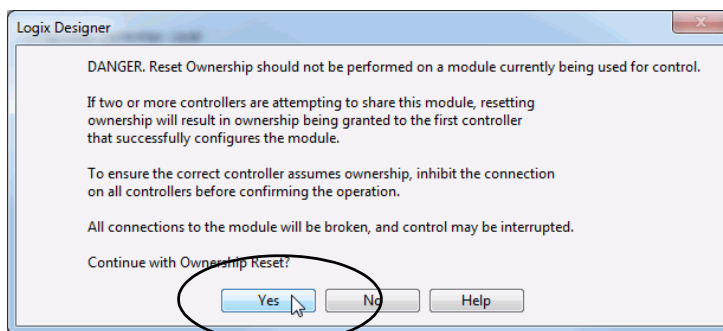
1. Right-click the module and choose Properties.
2. On the Connection tab, click Inhibit module.
3. Click Apply and then OK.

Complete the following steps to reset the module to its out-of-box configuration when online.

1. Right-click the module and choose Properties.
2. On the Safety tab, click Reset Ownership.



3. When a dialog box appears asking if you want to continue with the reset, read it and click Yes.



Replace a Module in a Logix 5000 System

Consider the following conditions before you replace a Compact 5000 I/O safety module in a Logix 5000™ system:

- If you rely on a portion of the CIP Safety system to maintain SIL 3 behavior during module replacement and functional testing, you must use the Configure Only When No Safety Signature Exists feature.
- If you rely on the entire routable CIP Safety control system to maintain SIL 3/PL (d or e) during the replacement and functional testing of a module, you can use the Configure Always feature.

Replacement with 'Configure Only When No Safety Signature Exists' Enabled

When a module is replaced, the configuration is downloaded from the safety controller if the DeviceID of the new module matches the original. The DeviceID is updated whenever the SNN is set.

If the project is configured with Configure Only When No Safety Signature Exists enabled, follow the appropriate instructions in to replace a Compact 5000 I/O safety module.

After you complete the steps in a scenario correctly, the DeviceID matches the original. This match enables the safety controller to download the proper module configuration, and re-establish the safety connection.

Table 54 - Replace a Compact 5000 I/O Safety Module

Controller Safety Signature Exists	Replacement Module Condition	Action Required
No	No SNN (Out-of-box)	None. The module is ready for use.
Yes or No	Same SNN as original safety task configuration	None. The module is ready for use.
Yes	No SNN (Out-of-box)	Complete the steps in Set the SNN Manually on page 194 .
Yes	Different SNN from original safety task configuration	
No		

Replacement with 'Configure Always' Enabled



ATTENTION: Enable the 'Configure Always' feature only if the entire CIP Safety Control System is not being relied on to maintain SIL 3 behavior during the replacement and functional testing of a module. Do not place modules that are in the out-of-box condition on a CIP Safety network when the Configure Always feature is enabled, except while following this replacement procedure.

When the 'Configure Always' feature is enabled, the controller automatically checks for and connects to a replacement module that meets all of the following requirements:

- The controller has configuration data for a compatible module at that network address.
- The module is in out-of-box condition or has an SNN that matches the configuration.

If the project is configured for 'Configure Always', follow the appropriate steps to replace a Compact 5000 I/O safety module.

1. Remove the old I/O module and install the new module.

If	Then
the module is in out-of-box condition	go to step 6 . No action is needed for the controller to take ownership of the module.
an SNN mismatch error occurs	go to the next step to reset the module to out-of-box condition.

2. Right-click your I/O module and choose Properties.
3. Click the Safety tab.
4. Click Reset Ownership.
5. Click OK.
6. Follow your company-prescribed procedures to functionally test the replaced I/O module and system and to authorize the system for use.

Troubleshoot Your Module

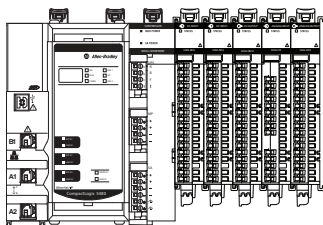
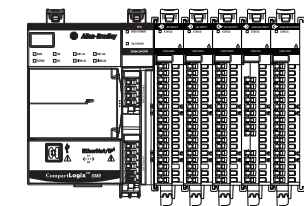
Topic	Page
Module Status Indicator	200
Compact 5000 I/O Standard Input Modules Status Indicators	201
Compact 5000 I/O Standard Output Modules Status Indicators	203
Compact 5000 I/O Safety Input Module Status Indicators	207
Compact 5000 I/O Safety Output Module Status Indicators	209
Use the Logix Designer Application for Troubleshooting	211
Internal Fault Triggered on the Safety Output Module	216

Compact 5000™ I/O modules use the following status indicators:

- Module (MOD) Status Indicator - This indicator operates the same for all Compact 5000 I/O digital modules.
- I/O Status Indicator - This indicator operates differently based on the module type.
- SA Status Indicator- This indicator is only available on the Compact 5000 I/O safety modules.

Module Status Indicator

Standard Modules



Safety Modules

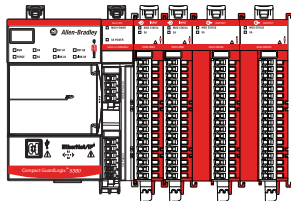


Table 55 describes the Module (MOD) Status indicator on Compact 5000 I/O digital modules.

Table 55 - Module Status Indicator - Compact 5000 I/O Digital Modules

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>None if your application does not use the module</p> <p>If your application uses the module and it is expected to be operating, complete the following:</p> <ul style="list-style-type: none"> Confirm that the system is powered. Confirm that the module is installed properly.
Steady green	The module has a connection to the owner-controller and is operating normally.	None
Flashing green	<p>One of the following:</p> <ul style="list-style-type: none"> The module does not have a connection to the controller. A connection can result from missing, incomplete, or incorrect module configuration. Compact 5000 I/O Safety Modules only - A connection can be established with the controller, but the Validator has not completed an initial Time Coordination exchange. 	Troubleshoot your Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> Cycle power to the module. If the status indicator remains in the steady red state, replace the module.
Flashing red	<p>One of the following conditions exists:</p> <ul style="list-style-type: none"> A module firmware update is in progress. A module firmware update attempt failed. The device has experienced a recoverable fault. A connection to the module has timed out. 	<p>Complete one of the following:</p> <ul style="list-style-type: none"> Let the firmware update progress complete. Reattempt a firmware update after one fails. Use the Logix Designer application to determine the cause of the module fault. The Connection and Module Info categories of the modules configuration indicate the fault type. To clear a recoverable fault, complete one of the following: <ul style="list-style-type: none"> Cycle module power. Click Reset Module in the Logix Designer application project via the Module Info category of the Module Properties dialog box. <p>If the fault does not clear after you cycle power and click Reset Module, contact Rockwell Automation® Technical Support.</p> <ul style="list-style-type: none"> Use the Logix Designer application to determine if a connection has timed out. The Connection category in the Module Properties for the module indicates the module state, including if a connection has timed out. If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.
Flashing red/green	Compact 5000 I/O Safety Modules only - The UNID needs to be commissioned in the module.	Commission the UNID in the module.

Compact 5000 I/O Standard Input Modules Status Indicators

Figure 23 shows the Compact 5000 I/O standard AC input module status indicators.

Figure 23 - Compact 5000 I/O Standard AC Input Module I/O Status Indicators

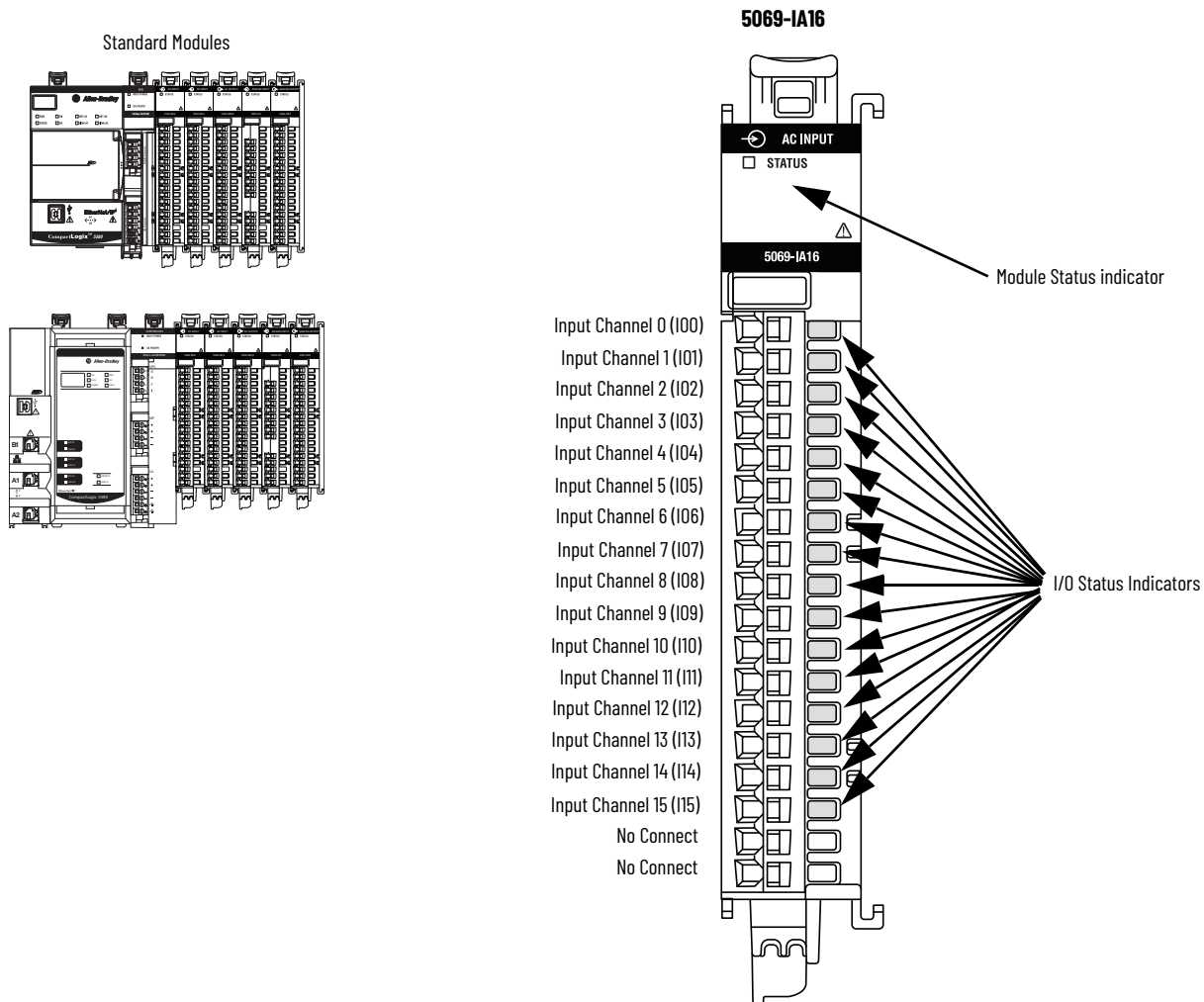


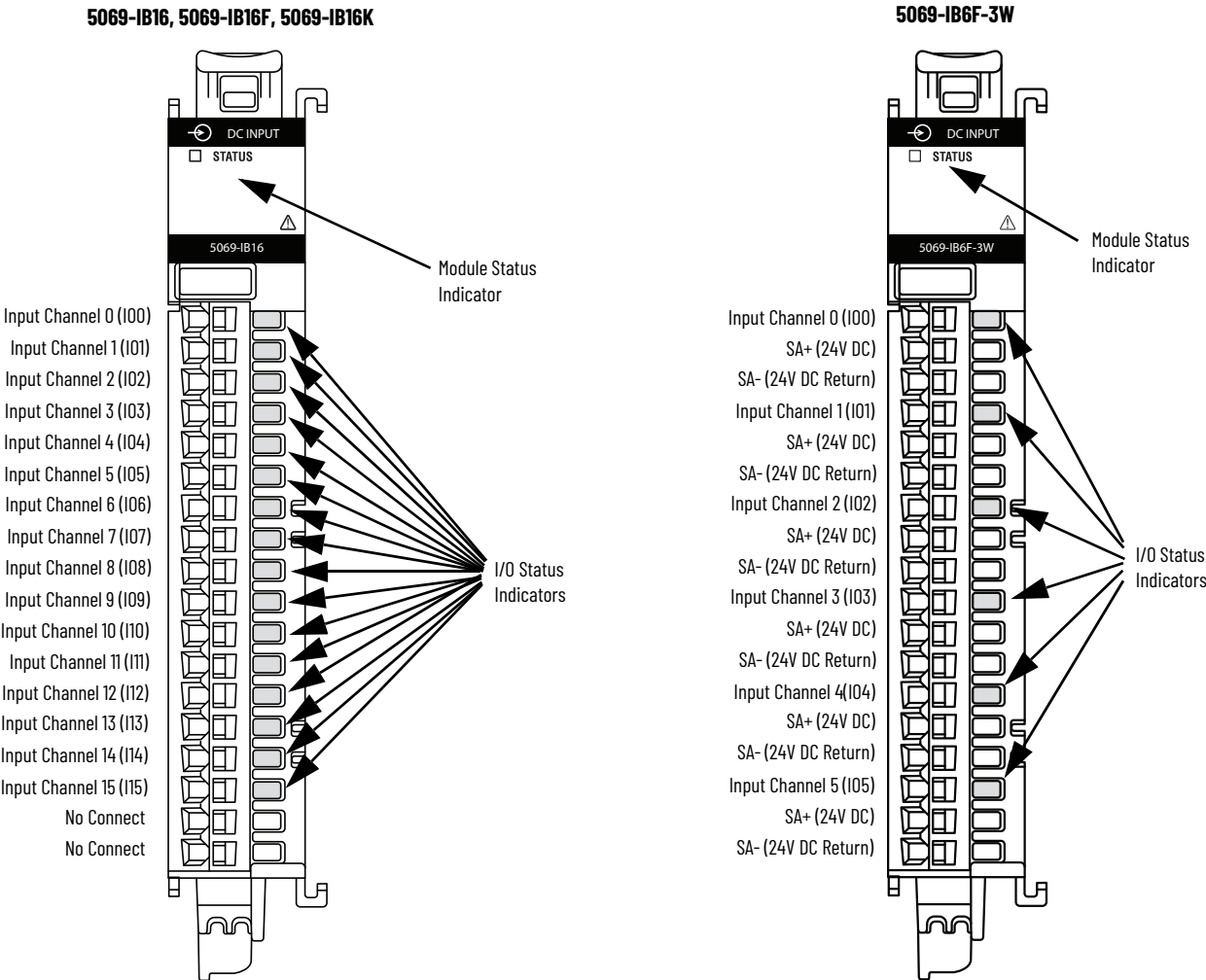
Table 56 describes the Compact 5000 I/O standard AC input module I/O status indicators.

Table 56 - I/O Status Indicators - Compact 5000 I/O Standard AC Input Module

Indicator State	Description	Recommended Action
Off	Input is Off or no module power applied	None
Steady yellow	The input is On.	None

[Figure 24](#) shows the Compact 5000 I/O standard DC input modules status indicators.

Figure 24 - Compact 5000 I/O Standard DC Input Module Status Indicators



IMPORTANT: The 5069-IB16F and 5069-IB16K module status indicators appear the same as the indicators are shown on the 5069-IB16 module.

[Table 57](#) describes the Compact 5000 I/O standard DC input modules I/O status indicators.

Table 57 - I/O Status Indicators - Compact 5000 I/O Standard DC Input Modules

Indicator State	Description	Recommended Action
Off	The input is Off, or no module power applied	None
Steady yellow	The input is On.	None

Compact 5000 I/O Standard Output Modules Status Indicators

Figure 25 shows the status indicators on the Compact 5000 I/O standard AC output module.

Figure 25 - Compact 5000 I/O Standard AC Output Modules Status Indicators

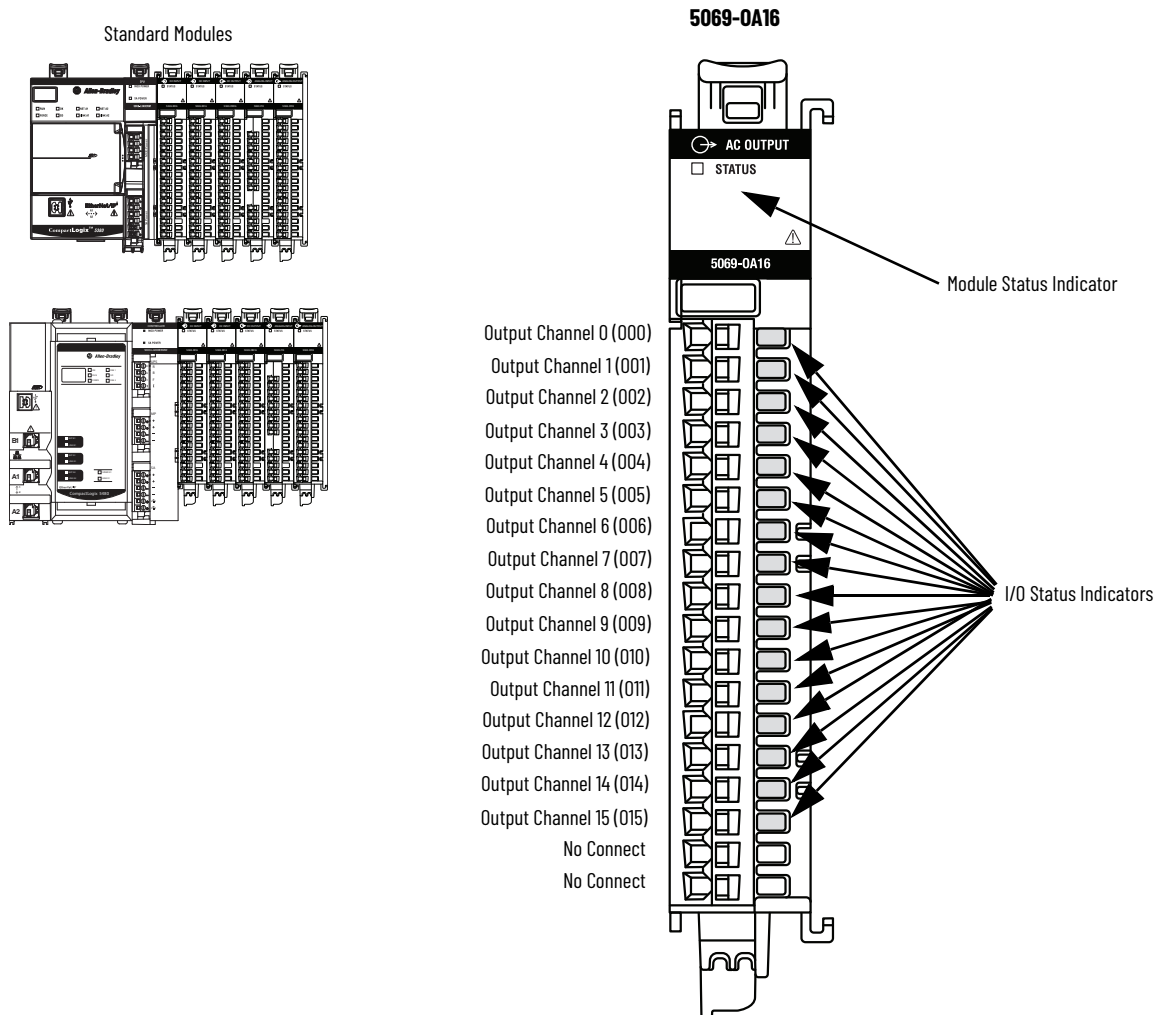


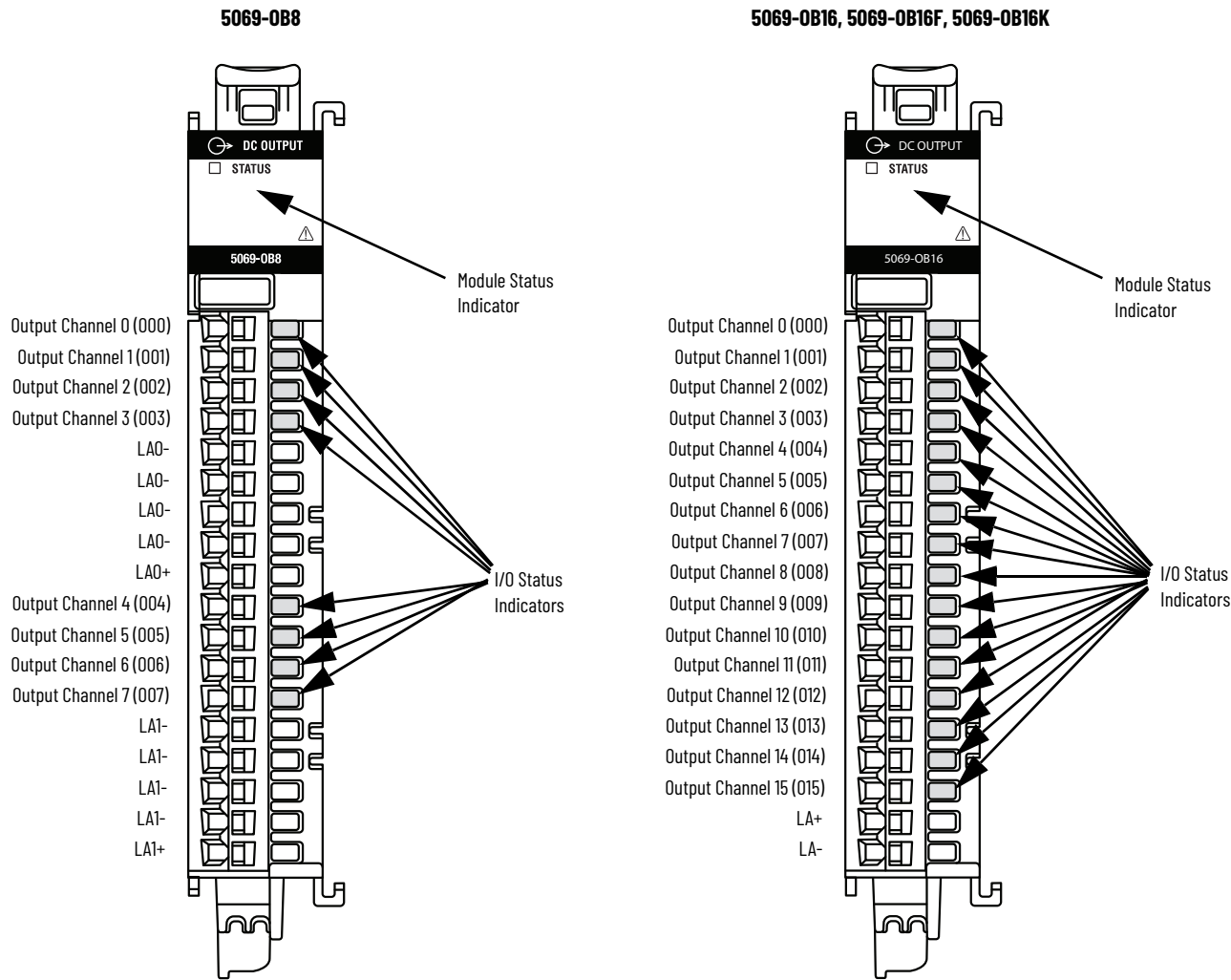
Table 58 describes the I/O status indicators on Compact 5000 I/O standard AC output modules.

Table 58 - I/O Status Indicators - Compact 5000 I/O Standard AC Output Module

Indicator State	Description	Recommended Action
Off	Output is Off, or no module power applied.	None
Steady yellow	The output is On.	None
Flashing red	A Field Power Loss detection condition exists.	Reconnect power to the input.

[Figure 26](#) show the status indicators on the Compact 5000 I/O standard DC output modules.

Figure 26 - Compact 5000 I/O Standard Output DC Modules Status Indicators

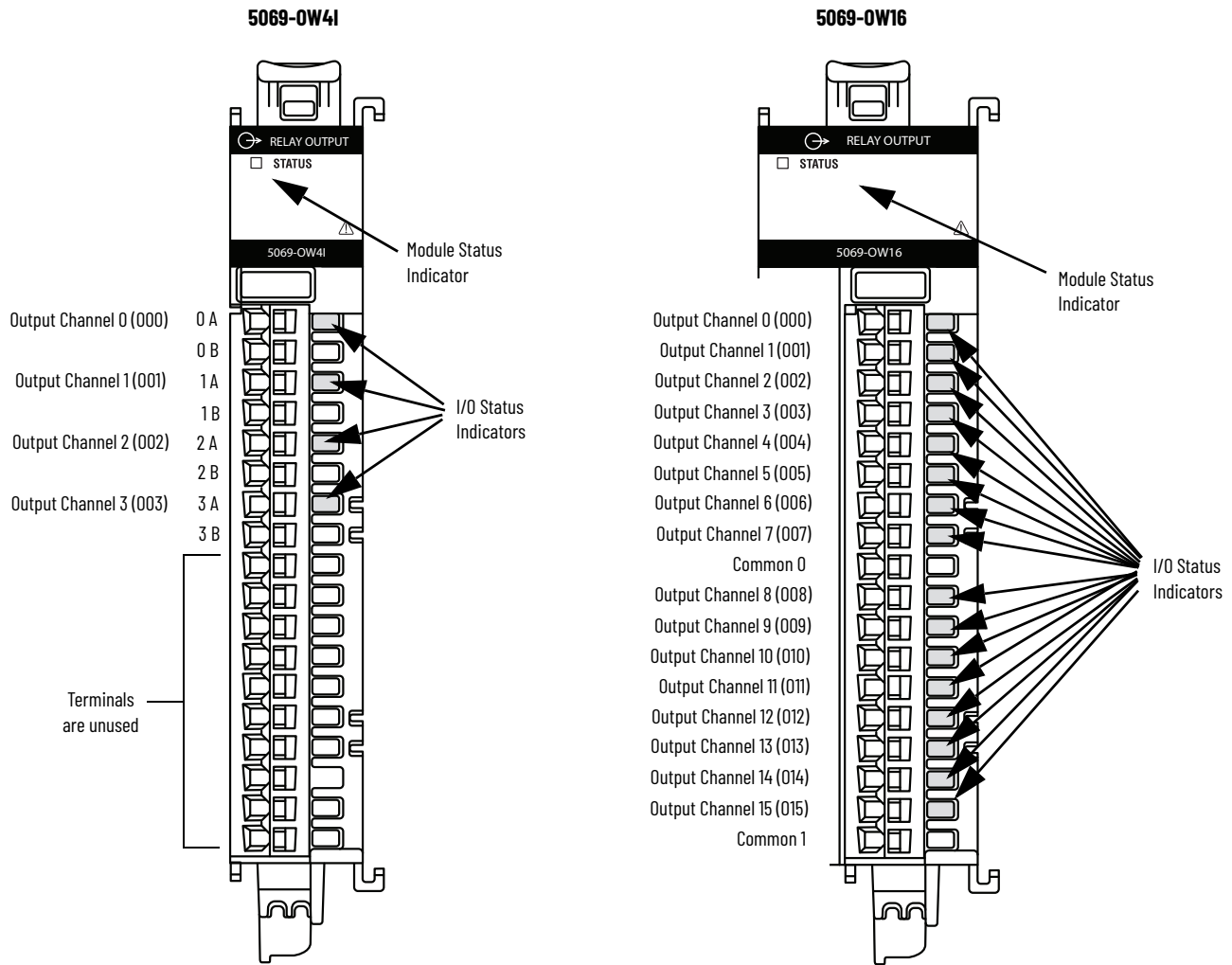


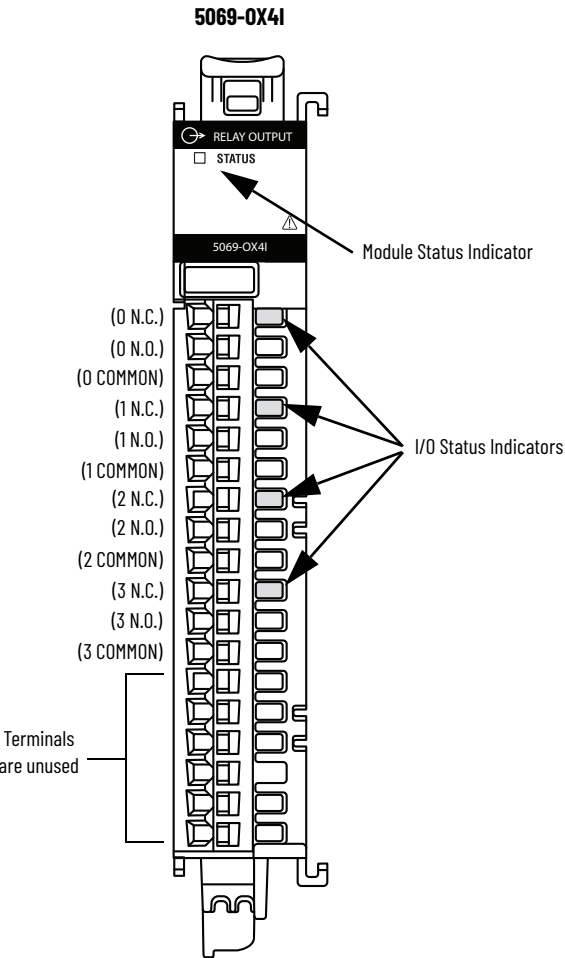
IMPORTANT: The 5069-0B16F and 5069-0B16K module status indicators appear the same as the indicators are shown on the 5069-0B16 module.

[Table 59](#) describes the I/O status indicators on Compact 5000 I/O standard DC output modules.

Table 59 - I/O Status Indicators - Compact 5000 I/O Standard DC Output Modules

Indicator State	Description	Recommended Action
Off	Output is Off, or no module power applied	None
Steady yellow	The output is On.	None
Flashing red	One of the following: <ul style="list-style-type: none">• A No Load or Short Circuit condition exists.• 5069-0B8, 5069-0B16/B, 5069-0B16F/B, 5069-0B16K/B - A Field Power Loss condition exists.	One of the following: <ul style="list-style-type: none">• Locate and correct the no load or short circuit condition.• Locate and correct the cause of field power loss condition.

Figure 27 - Compact 5000 I/O Standard Relay Output Module Status Indicators




[Table 60](#) describes the I/O status indicators on Compact 5000 I/O standard relay output modules.

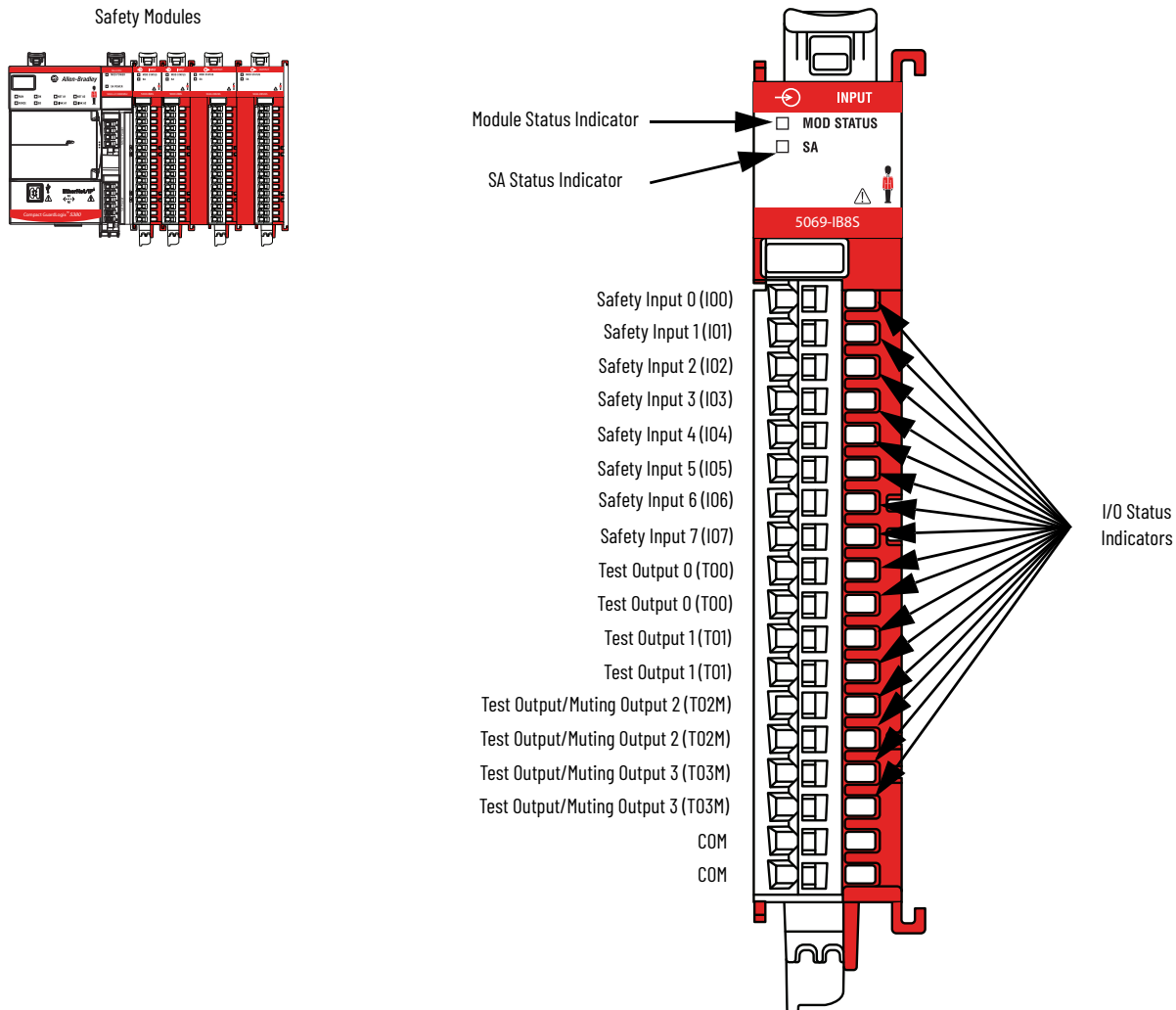
Table 60 - I/O Status Indicators - Compact 5000 I/O Standard Relay Output Modules

Indicator State	Description	Recommended Action
Off	Output is Off, or no module power applied	None
Steady yellow	The output is On.	None
Flashing red	5069-0W16 only - A Field Power Loss condition exists.	Locate and correct the cause of field power loss condition.

Compact 5000 I/O Safety Input Module Status Indicators

[Figure 28](#) shows the Compact 5000 I/O safety input module status indicators.

Figure 28 – Compact 5000 I/O Safety Input Module Status Indicators



IMPORTANT: The 5069-IB8SK module status indicators appear the same as the indicators are shown on the 5069-IB8S module.

SA Status Indicator

[Table 61](#) describes the Compact 5000 I/O safety input module SA status indicator.

Table 61 - SA Status Indicator - Compact 5000 I/O Safety Input Module

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> There is no SA power that is applied to the module. The status of SA power is unknown. The SA power is below valid range as defined by the module. That is, the power is too low. During a safety critical fault, SA power was turned off. 	Check the power source and address any issues.
Steady green	SA power is in a valid range as defined by the module.	None
Steady red	The SA power is outside the valid range as defined by the module. In this case, the power can be off, too low, or too high.	Diagnose and remedy the cause of the power being outside the valid range.

I/O Status Indicators

[Table 62](#) describes the Compact 5000 I/O safety input module I/O status indicators.

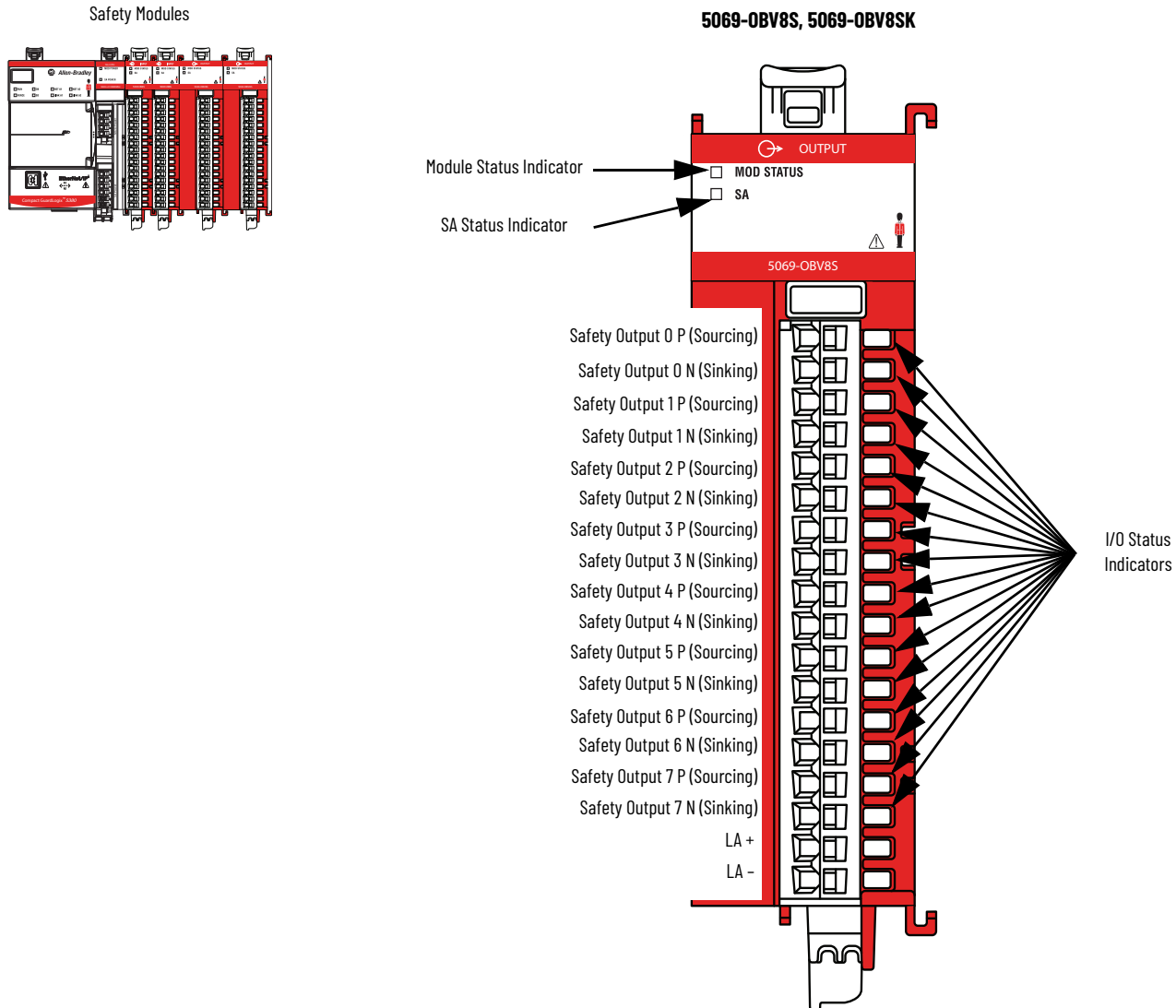
Table 62 - I/O Status Indicators - Compact 5000 I/O Safety Input Module

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The channel is Off. The channel is not configured. The channel is not enabled. There is no module power applied. 	The action is based on the cause of the indicator being in the Off state. For example, if the channel is expected to be Off, there is no action to take.
Steady yellow	The channel is On.	None
Flashing red	Short Circuit condition exists.	Locate and address the condition.
Steady red	One of the following: <ul style="list-style-type: none"> Field Power Loss condition exists. Overload condition exists on test output. Short Circuit to Ground condition exists on a test output. Other hardware fault not previously listed occurred on the module. 	One of the following: <ul style="list-style-type: none"> If a Field Power Loss, Overload, or Short Circuit to Ground condition exists, check the module wiring and correct any issues. If there is not a Field Power Loss, Overload, or Short Circuit to Ground condition present, cycle module power. If the status indicator remains in the steady red state after you cycle power, replace the module.

Compact 5000 I/O Safety Output Module Status Indicators

Figure 29 show the status indicators on the Compact 5000 I/O safety output module.

Figure 29 - Compact 5000 I/O Safety Output Module Status Indicators



IMPORTANT: The 5069-OBV8SK module status indicators appear the same as the indicators are shown on the 5069-OBV8S module.

SA Status Indicator

[Table 63](#) describes the Compact 5000 I/O safety output module SA status indicator.

Table 63 - SA Status Indicator - Compact 5000 I/O Safety Output Module

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> There is no power SA power that is applied to the module. The status of SA power is unknown. The SA power is below valid range as defined by the module. That is, the power is too low. During a safety critical fault, SA power was turned off. 	Check the power source and remedy any issues.
Steady green	SA power is in a valid range as defined by the module.	None
Steady red	The SA power is outside the valid range as defined by the module. In this case, the power can be off, too low, or too high.	Diagnose and remedy the cause of the power being outside the valid range.

I/O Status Indicators

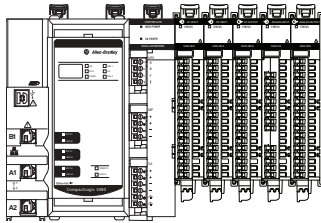
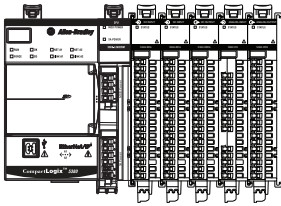
[Table 64](#) describes the I/O status indicators on Compact 5000 I/O safety output modules.

Table 64 - I/O Status Indicators - Compact 5000 I/O Safety Output Modules

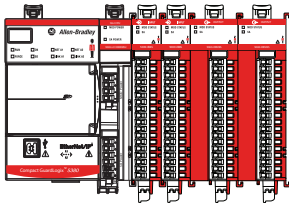
Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The channel is Off. The channel is not configured. The channel is not enabled. There is no module power applied. 	The action is based on the cause of the indicator being in the Off state. For example, if the channel is expected to be Off, there is no action to take.
Steady yellow	The output is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> If the output is off and a No Load condition is detected. A Short Circuit condition exists. 	Locate and address the condition.
Steady red	One of the following: <ul style="list-style-type: none"> Field Power Loss condition exists. Overload condition exists on output. Short Circuit to Ground condition exists on an output. Other hardware fault not previously listed occurred on the module. 	One of the following: <ul style="list-style-type: none"> If a Field Power Loss, Overload, or Short Circuit to Ground condition exists, check the module wiring and correct any issues. If there is not a Field Power Loss, Overload, or Short Circuit to Ground condition present, cycle module power. If the status indicator remains in the steady red state after you cycle power, replace the module.
Flashing red/yellow	The output is off and a No Load condition is detected, but the condition is not corrected and the output turns on. In this case, the status indicator is flashing red until the output is turned on.	Assess and correct the condition.

Use the Logix Designer Application for Troubleshooting

Standard Modules



Safety Modules



The Logix Designer application indicates the presence of fault conditions.

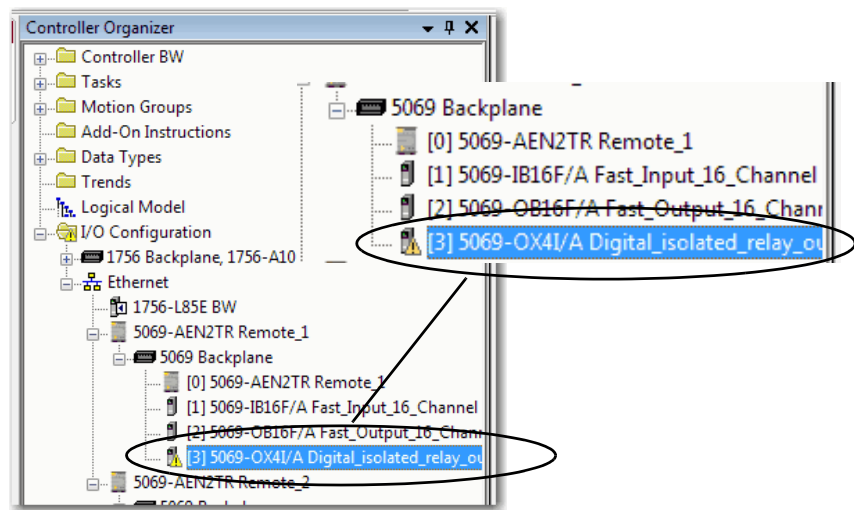
Fault conditions are reported in the following ways:

- [Warning Signal in the I/O Configuration Tree](#)
- [Status and Fault Information in Module Properties Categories](#)
- [Logix Designer Application Tag Editor](#)

Warning Signal in the I/O Configuration Tree

As shown in [Figure 30](#), a warning icon appears in the I/O Configuration tree when a fault occurs.

Figure 30 - Warning Icon in Controller Organizer



Status and Fault Information in Module Properties Categories

The Module Properties section in the Logix Designer application includes a series of categories. The numbers and types of categories varies by module type.

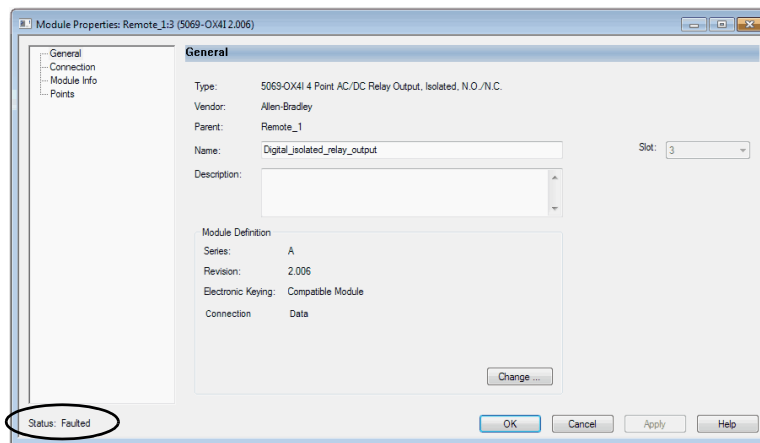
Each category includes options to configure the module or monitor the status of the module. The following are ways to monitor the state of a module for faults:

- [Module Status on General Category](#)
- [Module Fault Descriptions on Connection Category](#)
- [Module Fault Descriptions on Module Info Category](#)

Module Status on General Category

As shown in [Figure 31](#), the status of a module is indicated on the General category of the Modules Properties.

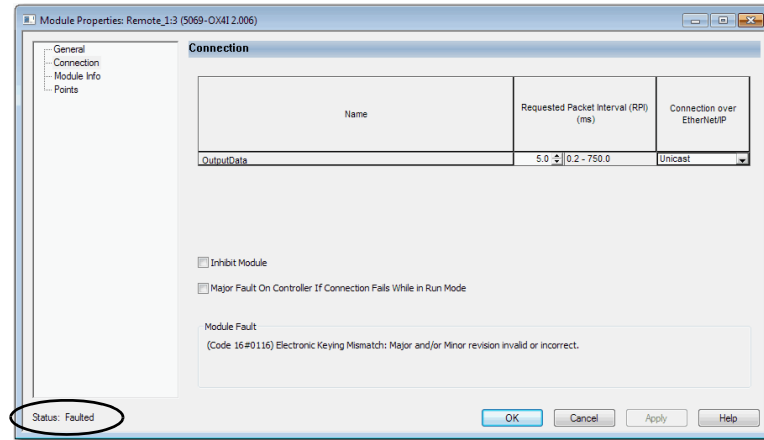
Figure 31 - Fault Message in Status Line



Module Fault Descriptions on Connection Category

As shown in [Figure 32](#), a module fault description that includes an error code that is associated with the specific fault type is listed on the Connection category.

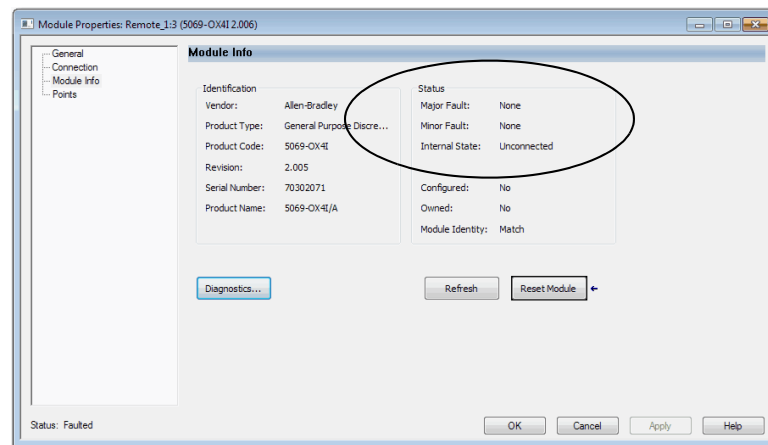
Figure 32 - Fault Description with Error Code



Module Fault Descriptions on Module Info Category

As shown in [Figure 33](#), major and minor fault information is listed on the Module Info tab in the Status section.

Figure 33 - Major and Minor Fault Information



Module and Point Diagnostics

You can use diagnostics in a Logix Designer application project to monitor module and/or point operating conditions and to troubleshoot issues that affect a module and/or point. You can only use diagnostics when the **project is online**.

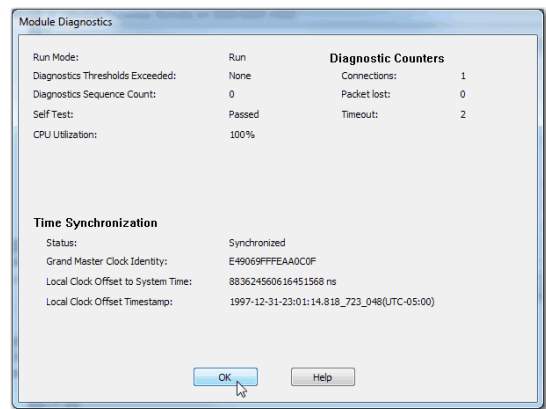
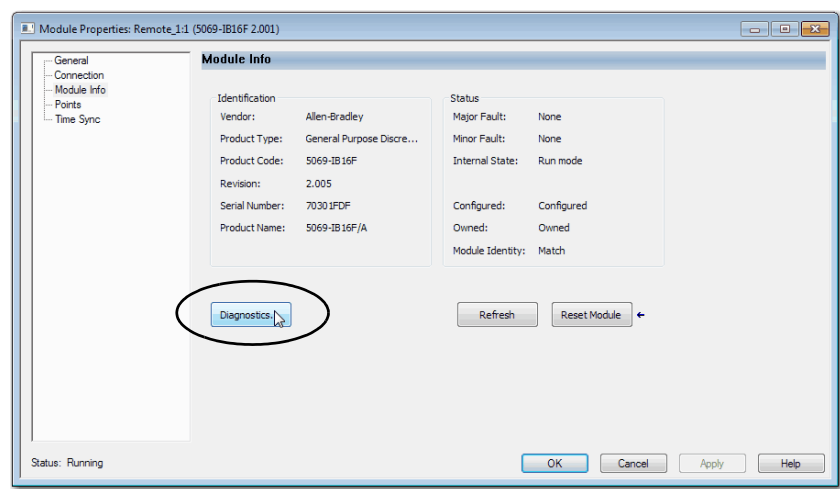
- [Module Diagnostics](#)
- [Point Diagnostics](#)

Module Diagnostics

Module diagnostics provide information on a module-wide basis. For example, the Module Diagnostics dialog box indicates the mode within which a module is operating, that is, Run, Remote Run, Remote Program, or Program.

Module Diagnostics are accessible from the Module Info category on the Module Properties dialog box, as shown in [Figure 34](#).

Figure 34 - Module Information Diagnostics



Point Diagnostics

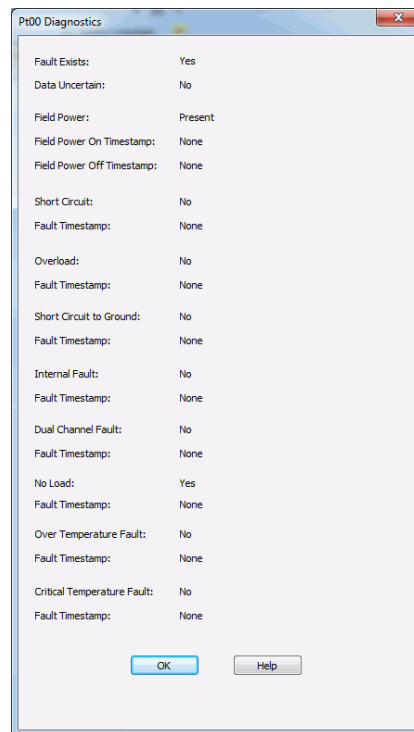
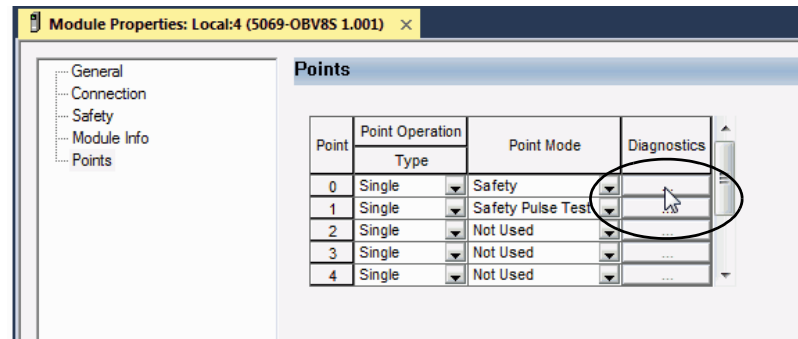
Point diagnostics provide information on an individual point basis. For example, you can check individual points on a 5069-IB8S or 5069-IB8SK safety input module for the presence of a Short Circuit condition.

Remember the following:

- Not all Compact 5000 I/O digital modules provide point diagnostics.
- The point diagnostics that are available vary by module type and functionality.
- There are some differences between modules, but most commonly, the Module Properties dialog box category from which you can access point diagnostics is Points.

[Figure 35](#) shows how to access output point diagnostics on the 5069-OBV8S module and the diagnostics dialog box.

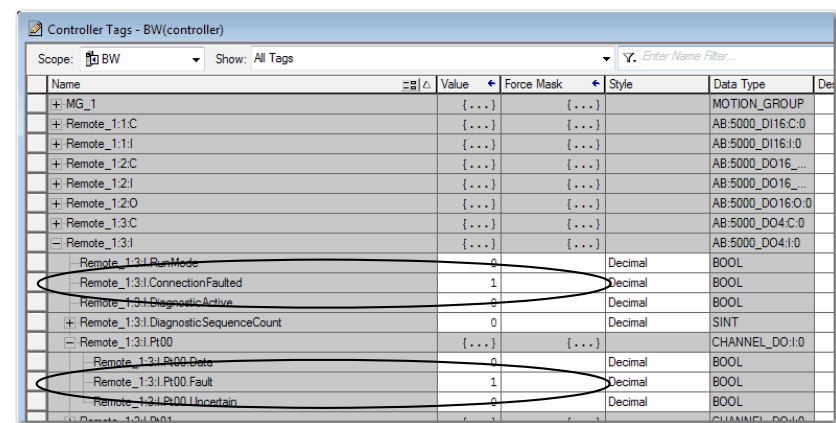
Figure 35 - Point Diagnostics



Logix Designer Application Tag Editor

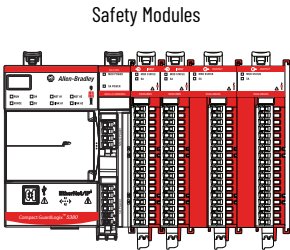
[Figure 36](#) show how fault conditions are indicated in the controller tags.

Figure 36 – Fault Indication in Controller Tags



Name	Value	Force Mask	Style	Data Type	Description
MG_1	{...}	{...}		MOTION_GROUP	
Remote_1:1:C	{...}	{...}		AB:5000_DI16:C:0	
Remote_1:1:I	{...}	{...}		AB:5000_DI16:I:0	
Remote_1:2:C	{...}	{...}		AB:5000_DO16:...	
Remote_1:2:I	{...}	{...}		AB:5000_DO16:...	
Remote_1:2:O	{...}	{...}		AB:5000_DO16:O:0	
Remote_1:3:C	{...}	{...}		AB:5000_DO4:C:0	
Remote_1:3:I	{...}	{...}		AB:5000_DO4:I:0	
Remote_1:3:I.RunMode	0		Decimal	BOOL	
Remote_1:3:I.ConnectionFaulted	1		Decimal	BOOL	
Remote_1:3:I.DiagnosticActive	0		Decimal	BOOL	
Remote_1:3:I.DiagnosticSequenceCount	0		Decimal	SINT	
Remote_1:3:I.Pt00	{...}	{...}		CHANNEL_DO:I:0	
Remote_1:3:I.Pt00.Data	0		Decimal	BOOL	
Remote_1:3:I.Pt00.Fault	1		Decimal	BOOL	
Remote_1:3:I.Pt00.Uncertain	0		Decimal	BOOL	
Remote_1:3:I.Pt01	{...}	{...}		CHANNEL_DO:I:0	

Internal Fault Triggered on the Safety Output Module



[Table 65](#) describes conditions that can trigger InternalFault.

Table 65 – Conditions That Trigger InternalFault

Conditions	Output Behavior	Tag Value	Diagnostic Value	I/O Status Indicator State
<ul style="list-style-type: none">Output Mode - BipolarPoint Operation Type - SinglePoint Mode - SafetyA load is connected between a sourcing output point and a sinking output point.O.Ptxx.Data tag = 0An overload resistor shorts the sourcing output point to 0V DC	Faults	I.Ptxx.Fault tag = 1	InternalFault = 1	The I/O status indicator for the faulted output point is steady red.
<ul style="list-style-type: none">Output Mode - BipolarPoint Operation Type - SinglePoint Mode - Safety or Safety Pulse TestA load is connected between a sourcing output point and a sinking output point.O.Ptxx.Data tag = 0Either output point shorts to 0V DC	Faults	I.Ptxx.Fault tag = 1	InternalFault = 1	
<ul style="list-style-type: none">Output Mode - SourcingPoint Operation Type - SinglePoint Mode - Safety or Safety Pulse TestO.Ptxx.Data tag = 1Output point shorts to 24V DC	Faults	I.Ptxx.Fault tag = 1 IMPORTANT: The tag value occurs on the faulted output point and all of its associated group points.	InternalFault = 1 IMPORTANT: The diagnostic value occurs on the faulted output point and all of its associated group points.	

When the conditions that trigger the diagnostics as described in [Table 65](#) are corrected, the output faults are cleared, the tags and diagnostics reset to 0, and the I/O status indicators turn off.

Module Tag Definitions

Topic	Page
Name Conventions	218
Access the Tags	219
5069-IA16 Module Tags	219
5069-IB16 Module Tags	221
5069-IB16F Module Tags	223
5069-IB6F-3W Module Tags	231
5069-OA16 Module Tags	239
5069-OB8 Module Tags	241
5069-OB16 Module Tags	243
5069-OB16F Module Tags	245
5069-OW4I, 5069-OW16, and 5069-OW4I Module Tags	248
5069-IB8S and 5069-IB8SK Module Tags	250
5069-OBV8S and 5069-OBV8SK Module Tags	252

Module tags are created when you add a module to the Logix Designer application project.

The set of tags that are associated with any module depends on the choices that you make in the Module Definition dialog box. For example, if you use a Listen Only Connection, the Logix Designer application creates only Input tags for that module.

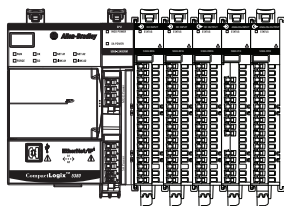
There are four sets of tags.

- Configuration
- Event Input - 5069-IB16F and 5069-IB6F-3W modules only
- Event Output - 5069-IB16F and 5069-IB6F-3W modules only
- Input
- Output

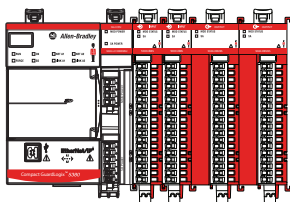
IMPORTANT	The tables that are in this section list all tags available with a module. Not all tags in the list are used when that module type is added to a project. Tag use varies by module configuration.
------------------	---

Name Conventions

Standard Modules



Safety Modules



The module tags use defined naming conventions. The conventions are as follows:

- One of the following:
 - Module is local - Local
 - Module is remote - Name of the remote adapter
- Slot number
- Tag type
- Channel/point number
- Parameter

Tag for Local Module

The following example module tag name is for fault data on channel 1 of a 5069-OA16 output module in the second slot of a local system. The fault data is an input tag.

Local:2:I.Pt01.Fault

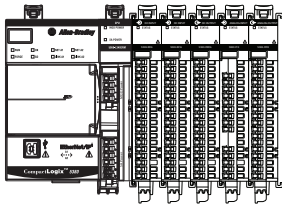
Tag for Remote Module

The following example module tag name is for the Off to On input filter on channel 0 of a 5069-IB16 input module in the first slot of a remote system. The EtherNet/IP adapter name is *remote_5069_adapter*, and the filter setting is a configuration tag.

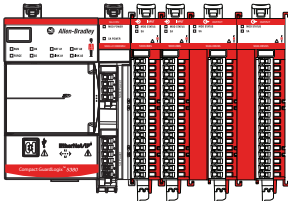
remote_5069_adapter:1:C.Pt00.InputOffOnFilter

Access the Tags

Standard Modules

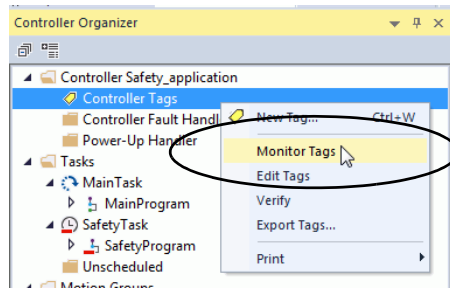


Safety Modules



You can view tags from the Tag Editor.

1. Open your Logix Designer application project.
2. Right-click Controller Tags and choose Monitor Tags.

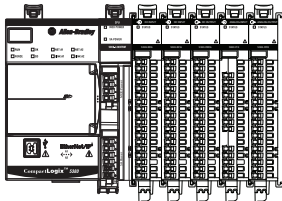


3. Open the tags as necessary to view specific tags.

Scope: Digital_example Show: All Tags					
Name	Value	Force Mask	Style	Data Type	
remote_ethernet_adapter:1.C	[...]	[...]		AB-5000_DI16_IB16.C:0	
remote_ethernet_adapter:1.C.P00	[...]	[...]		AB-5000_DI_Channel_IB16.C:0	
remote_ethernet_adapter:1.C.P01	[...]	[...]		AB-5000_DI_Channel_IB16.C:0	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter	13		Decimal	SINT	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.0	1		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.1	0		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.2	1		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.3	1		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.4	0		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.5	0		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.6	0		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter.7	0		Decimal	BOOL	
remote_ethernet_adapter:1.C.P01.InputOnOffFilter	13		Decimal	SINT	
remote_ethernet_adapter:1.C.P02	[...]	[...]		AB-5000_DI_Channel_IB16.C:0	

5069-IA16 Module Tags

Standard Modules



This section describes the tags that are associated with the 5069-IA16 module.

Configuration Tags

[Table 66](#) describes the 5069-IA16 module configuration tags.

Table 66 - 5069-IA16 Module Configuration Tags

Name	Data Type	Definition	Valid Values
Ptxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	The valid values are determined by the input signal. Input signal is 120V AC. <ul style="list-style-type: none"> • 13 = 1 ms Input signal is 240V AC. <ul style="list-style-type: none"> • 13 = 1 ms • 14 = 2 ms • 15 = 5 ms IMPORTANT: Logix Designer application lets you enter tag values for filter values that are invalid for some input signals. Make sure that you select a valid input filter value. If you select an invalid input filter value, the module can read signal levels incorrectly.
Ptxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	Input signal is 120V AC: <ul style="list-style-type: none"> • 16 = 10 ms • 17 = 20 ms Input signal is 240V AC: <ul style="list-style-type: none"> • 15 = 5 ms • 16 = 10 ms • 17 = 20 ms

Input Tags

[Table 67](#) describes the 5069-IA16 module input tags.

Table 67 - 5069-IA16 Module Input Tags

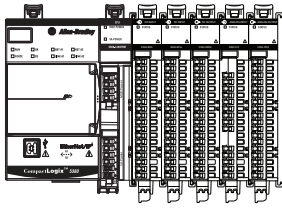
Name	Data Type	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	<ul style="list-style-type: none"> -128...+127 <p>The value of 0 is skipped except during module power-up.</p>
Pttx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.Faults	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Pttx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>

5069-IB16 Module Tags

This section describes the tags that are associated with the 5069-IB16 module.

You use the 5069-IB16 module profile in your Logix Designer application project with the 5069-IB16K module.

Standard Modules



Configuration Tags

[Table 68](#) describes the 5069-IB16 module configuration tags.

Table 68 - 5069-IB16 Module Configuration Tags

Name	Data Type	Definition	Valid Values
Counterxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> 9 = 0 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Counterxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> 9 = 0 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Counterxx.RolloverAtPreset	BOOL	Determines whether the simple counter rolls over to 0 when it reaches 0:Preset (1) or at 2147483647 (0).	<ul style="list-style-type: none"> 0 = Maximum value 1 = Preset value
Ptxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> 9 = 0 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Ptxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> 9 = 0 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms

Input Tags

[Table 69](#) describes the 5069-IB16 module input tags.

Table 69 - 5069-IB16 Module Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
Uncertain	BOOL	Indicates if the module is operating outside its designed operating range of if data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good 1 = Uncertain
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Counterxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Counterxx.Fault	BOOL	Indicates that counter data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Counterxx.Uncertain	BOOL	Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Counterxx.Done	BOOL	When set, indicates the corresponding counter Done bit (rising or falling depending on configuration) triggered the event.	<ul style="list-style-type: none"> 0 = Corresponding Done bit did not trigger the event 1 = Corresponding Done bit triggered the event
Counterxx.Rollover	BOOL	The counter counted up to Preset -1 and continued counting from 0. The 0:RolloverAck bit transitioning from 0 to 1 or the 0:Reset transitioning from 0 to 1 clears this bit.	<ul style="list-style-type: none"> 0 = Counter has not counted up to Preset - 1 and continued counting from 0 1 = Counter counted up to Preset - 1 and continued counting from 0
Counterxx.Count	DINT	The number of input transitions counted by a counter.	All values.
Ptxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.

Output Tags

[Table 70](#) describes the 5069-IB16 module output tags. The 5069-IB16 module output tags are only available if you have enabled counters in the Module Definition dialog box.

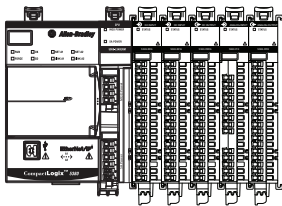
Table 70 - 5069-IB16 Module Output Tags

Name	Data Type	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1 I:Count and I:Rollover are set to zero.	<ul style="list-style-type: none"> 0 = I:Count and I:Rollover values are not set to 0 1 = I:Count and I:Rollover values are set to 0
Counterxx.RolloverAck	BOOL	Clears the Rollover bit in the input tag when it transitions from 0 to 1.	<ul style="list-style-type: none"> 0 = I:Rollover bit is not cleared 1 = I:Rollover bit is cleared
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, the counter counts to the Preset value and then rolls over to zero. If RolloverAtPreset is not set, the counter sets the Done bit and continues counting up to Max DINT. If C:RolloverAtPreset = 1, then if I:Count ≥ 0:Preset, I:Count=0, else I:Done bit always = 0. Set I:Rollover bit when I:Count transitions from 0:Preset - 1 to 0. If C:RolloverAtPreset = 0, then if I:Count ≥ 0:Preset, I:Done = 1, else I:Done = 0. Set I:Rollover bit when I:Count transitions from 2,147,483,647 to 0. 	0...2,147,483,647

5069-IB16F Module Tags

This section describes the tags that are associated with the 5069-IB16F module.

Standard Modules



Configuration Tags

[Table 71](#) describes the 5069-IB16F module configuration tags.

Table 71 - 5069-IB16F Module Configuration Tags

Name	Size	Definition	Valid Values
Counterxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	5 = 0 μs 6 = 5 μs 7 = 10 μs 8 = 20 μs 9 = 50 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Counterxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	5 = 0 μs 6 = 5 μs 7 = 10 μs 8 = 20 μs 9 = 50 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms

Table 71 - 5069-IB16F Module Configuration Tags

Name	Size	Definition	Valid Values
Counterxx.RolloverAtPreset	BOOL	Determines whether the simple counter rolls over to 0 when it reaches 0:Preset (1) or at 2147483647 (0).	<ul style="list-style-type: none"> 0 = Maximum value 1 = Preset value
Ptxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	5 = 0 μ s 6 = 5 μ s 7 = 10 μ s 8 = 20 μ s 9 = 50 μ s 10 = 100 μ s 11 = 200 μ s 12 = 500 μ s 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Ptxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	5 = 0 μ s 6 = 5 μ s 7 = 10 μ s 8 = 20 μ s 9 = 50 μ s 10 = 100 μ s 11 = 200 μ s 12 = 500 μ s 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Ptxx.ChatterTime	INT	A value from 1...10000 ms in whole ms increments.	1...10000
Ptxx.ChatterCount	SINT	The number of input changes that are considered Chatter.	<ul style="list-style-type: none"> 0 = Disabled 2...127 = Enabled
Ptxx.CaptureOffOnEn	BOOL	Enables capturing Off to On time stamps. If cleared, the point does not record Off to On time stamps.	<ul style="list-style-type: none"> 0 = Capture disabled (default) for OFF to ON input transitions 1 = Capture enabled for OFF to ON input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off time stamps. If cleared, the point does not record On to Off time stamps.	<ul style="list-style-type: none"> 0 = Capture disabled (default) for ON to OFF input transitions 1 = Capture enabled for ON to OFF input transitions
Ptxx.TimestampLatchEn	BOOL	<p>When this bit is set, timestamps are latched; this means that a Timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset.</p> <p>If the bit is not set, the new LO Timestamp overwrites the first LO Timestamp immediately, even if the controller has yet to extract that data.</p> <p>You can acknowledge the timestamp in the following ways:</p> <ul style="list-style-type: none"> Off to On transition timestamp: The Ptxx.TimestampOffOnNumber.x input tag value is written to the Ptxx.TimestampxxxxxNumberAck output tag value. If Timestamp Latching is enabled, the Ptxx.Timestampxxxxx input tag remains the same until the next input Off to On transition occurs. Otherwise, the input tag value is cleared. On to Off transition timestamp: The Ptxx.TimestampOnOffNumber.x input tag value is written to the Ptxx.TimestampxxxxxNumberAck output tag value. If Timestamp Latching is enabled, the Ptxx.Timestampxxxxx input tag remains the same until the next input On to Off transition. Otherwise, the input tag value is cleared. 	<ul style="list-style-type: none"> 0 = Timestamps are overwritten with each successive COS transition. 1 = Timestamps are latched until acknowledged.

Event Input Tags

[Table 72](#) describes the 5069-IB16F module event input tags. The event input tags are displayed only if Data with Events is selected in the Module Definition window.

Table 72 – 5069-IB16F Module Event Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
Diagnostic Active	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequence Count	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Eventx	BOOL	Indicates the number of the event.	0...3
Eventx.PtxxFault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Eventx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Eventx.EventDropped	BOOL	Indicates when an event has been discarded because events are occurring faster than they are being acknowledged.	<ul style="list-style-type: none"> 0 = An event status has not been dropped. 1 = An event status has been dropped.
Eventx.EventRising	BOOL	Indicates whether an event triggered when an input transition results in an event pattern being matched.	0 or 1
Eventx.EventFalling	BOOL	Indicates whether an event triggered when an input transition resulted in an event pattern no longer being matched.	0 or 1
Eventx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync™ is not available 1 = CIP Sync is available
Eventx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
Eventx.EventsPending	SINT	The number of events currently queued in the modules. A value greater than 0 indicates that the controller is not currently keeping up with the rate of events.	All positive values.
Eventx.EventNumber	DINT	Running count of events, which increments by one each new time event. The originator sets the Event Number Ack to the Event Number to acknowledge receipt of the event. When the EventNumber reaches its maximum value and rolls over it is to roll over to 1, not 0.	All values.
Eventx.EventTimestamp	LINT	The time the event occurred.	All positive values.
Eventx.CounterxxDone	BOOL	When set, indicates the corresponding counter Done bit (rising or falling depending on configuration) triggered the event.	<ul style="list-style-type: none"> 0 = Corresponding counter Done bit did not trigger the event 1 = Corresponding counter Done bit triggered the event

Table 72 - 5069-IB16F Module Event Input Tags

Name	Size	Definition	Valid Values
Eventx.PtxxData	BOOL	When set, indicates the corresponding data value (rising or falling depending on configuration) triggered the event.	<ul style="list-style-type: none"> 0 = Corresponding data value did not trigger the event 1 = Corresponding data value triggered the event
Eventx.CounterxxFault	BOOL	When set, indicates that the corresponding counter had a fault indicated when the event occurred.	<ul style="list-style-type: none"> 0 = Corresponding counter did not have a fault indicated when the event occurred 1 = Corresponding counter did have a fault indicated when the event occurred
Eventx.Fault	BOOL	Detects whether the signal is good data. The fault is set to 1 by the originator when the connection is lost.	<ul style="list-style-type: none"> 0 = Good 1 = Bad

Event Output Tags

[Table 73](#) describes the 5069-IB16F module event output tags. The event output tags are displayed only if Data with Events is selected in the Module Definition window.

Table 73 - 5069-IB16F Module Event Output Tags

Name	Size	Definition	Valid Values
Eventxx.En	BOOL	When set, the corresponding event trigger definition is active and events are triggered when conditions match the definition.	<ul style="list-style-type: none"> 0 = Event trigger definition is not active and events are not triggered when conditions match the definition 1 = Event trigger definition is active and events are triggered when conditions match the definition
Eventxx.EventRisingEn	BOOL	When set an event is to trigger each time a condition change results in conditions that match the event trigger definition.	0 or 1
Eventxx.EventFallingEn	BOOL	When set, an event is to trigger each time a condition change results in conditions that no longer match the event trigger definition.	0 or 1
Eventxx.LatchEn	BOOL	When set, events are latched until acknowledged. A new event is lost if the previous event has not been acknowledged. When not set, new events overwrite old events.	<ul style="list-style-type: none"> 0 = Not latched (default) 1 = Latched
Eventxx.ResetEvent	BOOL	When transitions from 0 to 1, resets all events and clears the event queue on the channel.	<ul style="list-style-type: none"> 0 = Events are not cleared. 1 = Events are cleared when a rising edge occurs.
Eventxx.IndependentConditionTriggerEn	BOOL	For events, determines whether each condition that is indicated in the trigger definition can initiate an event independently.	<ul style="list-style-type: none"> 0 = When all selected conditions achieve the configured values, an event is triggered. 1 = When any selected condition achieves the configured value, an event is triggered.
Eventxx.EventNumberAck	DINT	The controller writes back the EI:Event[<n>].EventNumber into this EO:Event[<n>].EventNumberAck to indicate receipt of the event. All events with I:EventNumbers that occurred before EventNumberAck is acknowledged.	All values
Eventxx.CounterxxSelect	BOOL	When set, indicates that the corresponding counter is to participate in the event trigger definition.	<ul style="list-style-type: none"> 0 = Corresponding counter does not participate in the event trigger definition 1 = Corresponding counter participates in the event trigger definition
Eventxx.PtxxDataSelect	BOOL	When set, indicates that the corresponding data value is to participate in the event trigger definition.	0 or 1
Eventxx.CounterxxValue	BOOL	If the counter function is selected in the event trigger definition, this member indicates that value that is to trigger the event.	0 or 1
Eventxx.PtxxDataValue	BOOL	Indicates the input value of the event point data.	<ul style="list-style-type: none"> 0 = Input inactive 1 = Input active

Input Tags

[Table 74](#) describes the 5069-IB16F module input tags.

Table 74 - 5069-IB16F Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
Diagnostic Active	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
DiagnosticSequence Count	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Counterxx.Data	BOOL	Current output data to be applied for normal (unscheduled) outputs.	<ul style="list-style-type: none"> 0 = Off 1 = On
Counterxx.Fault	BOOL	Indicates that counter data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Counterxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Counterxx.Done	BOOL	Indicates that the I:Count tag \geq 0:Preset.G430.	0 or 1

Table 74 - 5069-IB16F Module Input Tags

Name	Size	Definition	Valid Values
Counterxx.Rollover	BOOL	The counter counted up to RolloverValue - 1 (for HSC) or Preset -1 (for simple counters) and then continued counting from the 0:Rollunder (for HSC) or 0 (for simple counters). The 0:RolloverAck bit transitioning from 0 to 1 or the 0:Reset transitioning from 0 to 1 clears this bit.	0 or 1
Counterxx.Count	DINT	The number of input transitions counted by a counter.	All values
EventStatus[x].EventDropped	BOOL	Indicates when an event has been discarded because events are occurring faster than they are being acknowledged.	<ul style="list-style-type: none"> 0 = An event status has not been dropped. 1 = An event status has been dropped.
EventStatus[x].CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
EventStatus[x].CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
EventStatus[x].EventReset	BOOL	When EO.Event[<n>].ResetEvent transitions from 0 to 1, I.EventStatus[<n>].EventReset transitions to 1 to indicate that the reset was received and completed. It stays 1 until EO.Event[<n>].ResetEvent transition to zero.	<ul style="list-style-type: none"> 0 = Do not reset 1 = Reset
EventStatus[x].EventsPending	SINT	The number of events currently queued in the modules. A value greater than zero indicates that the controller is not currently keeping up with the rate of events.	All positive values.
EventStatus[x].EventNumber	DINT	Running count of events, which increments by one each new time event. The originator sets the Event Number Ack to the Event Number to acknowledge receipt of the event. When the EventNumber reaches its maximum value and rolls over it is to roll over to 1, not 0.	All values.
PtxxData	BOOL	When set, indicates the corresponding data value (rising or falling depending on configuration) triggered the event.	0 or 1
PtxxFault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
PtxxUncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>

Table 74 - 5069-IB16F Module Input Tags

Name	Size	Definition	Valid Values
Ptxx.Chatter	BOOL	Indicates if the input is chattering per the ChatterTime and ChatterCount settings.	<ul style="list-style-type: none"> 0 = Normal 1 = Input is chattering
Ptxx.TimestampOverflowOffOn	BOOL	Indicates an Off to On time stamp was lost in a discrete product. If TimestampLatchEn is set, a new time stamp was not recorded because one is already latched. If TimestampLatchEn is clear, a timestamp was overwritten.	0 or 1
Ptxx.TimestampOverflowOnOff	BOOL	Indicates an On to Off time stamp was lost in a discrete product. If TimestampLatchEn is set, a new time stamp was not recorded because one is already latched. If TimestampLatchEn is clear, a timestamp was overwritten.	0 or 1
Ptxx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
Ptxx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
Ptxx.TimestampOffOnNumber	INT	A timestamp number for the Off to On transition for the most-recently produced timestamp. IMPORTANT: If Timestamp Latching is enabled, when this tag value matches the Ptxx.TimestampOffOnNumberAck output tag value, the Pt.xx.TimestampOffOn input tag remains the same until the next input Off to On transition. Otherwise, the input tag value is cleared.	All values.
Ptxx.TimestampOnOffNumber	INT	A timestamp number for the On to Off transition for the most-recently produced timestamp. IMPORTANT: If Timestamp Latching is enabled, when this tag value matches the Ptxx.TimestampOnOffNumberAck output tag value, the Pt.xx.TimestampOnOff input tag remains the same until the next input On to Off transition. Otherwise, the input tag value is cleared.	All values.
Ptxx.TimestampOffOn	LINT	64-bit Timestamp corresponding to when a change of state Off to On was recorded at the input. IMPORTANT: This number is cleared when Pt.xx.TimestampOffOnNumber input tag value and the Ptxx.TimestampOffOnNumberAck output tag value match.	All values.
Ptxx.TimestampOnOff	LINT	64-bit Timestamp corresponding to when a change of state On to Off was recorded at the input. IMPORTANT: This number is cleared when Pt.xx.TimestampOnOffNumber input tag value and the Ptxx.TimestampOnOffNumberAck output tag value match.	All values.

Output Tags

[Table 75](#) describes the 5069-IB16F module output tags.

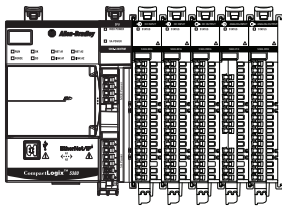
Table 75 - 5069-IB16F Module Output Tags

Name	Size	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, I:Count, and I:Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Do not reset 1 = Reset
Counterxx.RolloverAck	BOOL	Clears the Rollunder tag in the input tag when it transitions from 0 to 1.	0 or 1
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, the counter counts to the Preset value and then rolls over to zero. If RolloverAtPreset is not set, the counter sets the Done bit and continues counting up to Max DINT. If C:RolloverAtPreset = 1, then if I:Count ≥ 0:Preset, I:Count=0., else I:Done bit always = 0. Set I:Rollover bit when I:Count transitions from 0:Preset - 1 to 0. If C:RolloverAtPreset = 0, then if I:Count ≥ 0:Preset, I:Done = 1, else I:Done = 0. Set I:Rollover bit when I:Count transitions from 2,147,483,647 to 0. 	0...2,147,483,647
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input channel when it transitions from 0 to 1.	<ul style="list-style-type: none"> 0 = Timestamps are not erased. 1 = Timestamps are erased.
Ptxx.TimestampOffOnNumberAck	INT	<p>An Off to On timestamp identifier that is written by the controller to indicate that the identified timestamp has been seen and acted on.</p> <ul style="list-style-type: none"> When Latching is enabled and the Timestamp Number that is received from the controller transitions to the most recent timestamp that is produced, the module can produce a new timestamp. When Latching is disabled and the Timestamp Number that is received from the controller transitions to the most recent timestamp that is produced, the Ptxx.TimestampOffOn and the Ptxx.TimestampOverflowOffOn tags are cleared. 	All values.
Ptxx.TimestampOnOffNumberAck	INT	<p>An On to Off timestamp identifier that is written by the controller to indicate that the identified timestamp has been seen and acted on.</p> <ul style="list-style-type: none"> When Latching is enabled and the Timestamp Number that is received from the controller transitions to the most recent timestamp that is produced, the module can produce a new timestamp. When Latching is disabled and the Timestamp Number that is received from the controller transitions to the most recent timestamp that is produced, the Ptxx.TimestampOnOff and the Ptxx.TimestampOverflowOnOff tags are cleared. 	All values.

5069-IB6F-3W Module Tags

This section describes the tags that are associated with the 5069-IB6F-3W module.

Standard Modules



Configuration Tags

[Table 76](#) describes the 5069-IB6F-3W module configuration tags.

Table 76 - 5069-IB6F-3W Configuration Tags

Name	Size	Definition	Valid Values
Counterxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> • 5 = 0 μs • 6 = 5 μs • 7 = 10 μs • 8 = 20 μs • 9 = 50 μs • 10 = 100 μs • 11 = 200 μs • 12 = 500 μs • 13 = 1 ms • 14 = 2 ms • 15 = 5 ms • 16 = 10 ms • 17 = 20 ms • 18 = 50 ms
Counterxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> • 5 = 0 μs • 6 = 5 μs • 7 = 10 μs • 8 = 20 μs • 9 = 50 μs • 10 = 100 μs • 11 = 200 μs • 12 = 500 μs • 13 = 1 ms • 14 = 2 ms • 15 = 5 ms • 16 = 10 ms • 17 = 20 ms • 18 = 50 ms
Counterxx.RolloverAtPreset	BOOL	Determines whether the simple counter rolls over to 0 when it reaches 0:Preset (1) or at 2147483647 (0).	<ul style="list-style-type: none"> • 0 = Maximum value • 1 = Preset value
Ptxx.InputOffOnFilter	SINT	The amount of time that a signal must be in the on state before the input data indicates the on state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> • 5 = 0 μs • 6 = 5 μs • 7 = 10 μs • 8 = 20 μs • 9 = 50 μs • 10 = 100 μs • 11 = 200 μs • 12 = 500 μs • 13 = 1 ms • 14 = 2 ms • 15 = 5 ms • 16 = 10 ms • 17 = 20 ms • 18 = 50 ms

Table 76 - 5069-IB6F-3W Configuration Tags

Name	Size	Definition	Valid Values
Ptxx.InputOnOffFilter	SINT	The amount of time that a signal must be in the off state before the input data indicates the off state. The amount of time is indicated using an enumeration. Not all products support all enumeration values.	<ul style="list-style-type: none"> • 5 = 0 μs • 6 = 5 μs • 7 = 10 μs • 8 = 20 μs • 9 = 50 μs • 10 = 100 μs • 11 = 200 μs • 12 = 500 μs • 13 = 1 ms • 14 = 2 ms • 15 = 5 ms • 16 = 10 ms • 17 = 20 ms • 18 = 50 ms
Ptxx.ChatterTime	INT	A value from 1...10000 ms in whole ms increments.	1...10000
Ptxx.ChatterCount	SINT	The number of input changes that are considered Chatter.	<ul style="list-style-type: none"> • 0 = Disabled • 2...127 = Enabled
Ptxx.CaptureOffOnEn	BOOL	Enables capturing Off to On time stamps. If cleared, point does not record Off to On time stamps.	<ul style="list-style-type: none"> • 0 = Capture disabled (default) for OFF to ON input transitions • 1 = Capture enabled for OFF to ON input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off time stamps. If cleared, point does not record On to Off time stamps.	<ul style="list-style-type: none"> • 0 = Capture disabled (default) for ON to OFF input transitions • 1 = Capture enabled for ON to OFF input transitions
Ptxx.TimestampLatchEn	BOOL	<p>When this bit is set, timestamps are latched; this means that a Timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset. If the bit is not set, the new LO Timestamp overwrites the first LO Timestamp immediately, even if the controller has yet to extract that data.</p> <p>The timestamp can also be acknowledge if the Ptxx.TimestampxxxxxNumber input tag value is written to the Ptxx.TimestampxxxxxNumberAck output tag value. It is worth noting that writing the input tag value to the output tag value, clears the Ptxx.Timestampxxxxx input tag value.⁽¹⁾</p>	<ul style="list-style-type: none"> • 0 = Timestamps are overwritten with each successive COS transition. • 1 = Timestamps are latched until acknowledged.

(1) In this case, the xxxxx in the tag names represents OffOn or OnOff tags based on what transition occurred. That is, a change in state from Off to On or On to Off.

Event Input Tags

[Table 77](#) describes the 5069-IB6F-3W module event input tags. The event input tags are displayed only if you select Data with Events in the Module Definition window.

Table 77 – 5069-IB6F-3W Module Event Input Tags

Name	Size	Definition	Valid Values
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
Eventx	BOOL	Indicates the number of the event.	0...3
Eventx.Fault	BOOL	Detects whether the signal is good data. The fault is set to 1 by the originator when the connection is lost.	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted)
Eventx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Eventx.EventDropped	BOOL	Indicates when an event has been discarded because events are occurring faster than they are being acknowledged.	<ul style="list-style-type: none"> 0 = An event status has not been dropped. 1 = An event status has been dropped.
Eventx.EventRising	BOOL	Indicates whether an event triggered when an input transition results in an event pattern being matched.	0 or 1
Eventx.EventFalling	BOOL	Indicates whether an event triggered when an input transition resulted in an event pattern no longer being matched.	0 or 1
Eventx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
Eventx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
Eventx.EventsPending	SINT	The number of events currently queued in the modules. A value greater than 0 indicates that the controller is not currently keeping up with the rate of events.	All positive values.
Eventx.EventNumber	DINT	Running count of events, which increments by one each new time event. The originator sets the Event Number Ack to the Event Number to acknowledge receipt of the event. When the EventNumber reaches its maximum value and rolls over it is to roll over to 1, not 0.	All values.
Eventx.Timestamp	LINT	The time the event occurred.	All positive values.
Eventx.CounterxxDone	BOOL	When set, indicates the corresponding counter Done bit (rising or falling depending on configuration) triggered the event.	0 or 1

Table 77 – 5069-IB6F-3W Module Event Input Tags

Name	Size	Definition	Valid Values
Eventx.PtxxData	BOOL	When set, indicates the corresponding data value (rising or falling depending on configuration) triggered the event.	0 or 1
Eventx.CounterxxFault	BOOL	When set, indicates that the corresponding counter had a fault indicated when the event occurred.	0 or 1
Eventx.PtxxFault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>

Event Output Tags

[Table 78](#) describes the 5069-IB6F-3W module event output tags. The event output tags are displayed only if you select Data with Events in the Module Definition window.

Table 78 – 5069-IB6F-3W Module Event Output Tags

Name	Size	Definition	Valid Values
Eventxx.En	BOOL	When set, the corresponding event trigger definition is active and events are triggered when conditions match the definition.	0 or 1
Eventxx.EventRisingEn	BOOL	When set, an event is to trigger each time a condition change results in conditions that match the event trigger definition.	0 or 1
Eventxx.EventFallingEn	BOOL	When set, an event is to trigger each time a condition change results in conditions that no longer match the event trigger definition.	0 or 1
Eventxx.LatchEn	BOOL	When set, events are latched until acknowledged. A new event is lost if the previous event has not been acknowledged. When not set, new events overwrite old events.	<ul style="list-style-type: none"> 0 = Not latched (default) 1 = Latched
Eventxx.ResetEvent	BOOL	When the value transitions from 0 to 1, resets all events and clears the event queue on the channel.	<ul style="list-style-type: none"> 0 = Events are not cleared 1 = Events are cleared when a rising edge occurs
Eventxx.IndependentConditionTrigger En	BOOL	For events, determines whether each condition that is indicated in the trigger definition can initiate an event independently.	<ul style="list-style-type: none"> 0 = When all selected conditions achieve the configured values, an event is triggered. 1 = When any selected condition achieves the configured value, an event is triggered.
Eventxx.EventNumberAck	DINT	The controller writes back the EI:Event[<n>].EventNumber into this EO:Event[<n>].EventNumberAck to indicate receipt of the event. All events with I:EventNumbers that occurred before EventNumberAck is acknowledged.	All values.
Eventxx.CounterxxSelect	BOOL	When set, indicates that the corresponding counter is to participate in the event trigger definition.	0 or 1
Eventxx.PtxxDataSelect	BOOL	When set, indicates that the corresponding data value is to participate in the event trigger definition.	0 or 1
Eventxx.CounterxxValue	BOOL	If the counter function is selected in the event trigger definition, this member indicates that value that is to trigger the event.	0 or 1
Eventxx.PtxxDataValue	BOOL	Input value of the event point data.	<ul style="list-style-type: none"> 0 = Input inactive 1 = Input active

Input Tags

[Table 79](#) describes the 5069-IB6F-3W module input tags.

Table 79 - 5069-IB6F-3W Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-127...+128 The value of 0 is skipped except during module power-up.
Uncertain	BOOL	Indicates if the module is operating outside its designed operating range of if data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good 1 = Uncertain
Counterxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Counterxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Counterxx.Uncertain	BOOL	Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.

Table 79 - 5069-IB6F-3W Module Input Tags

Name	Size	Definition	Valid Values
Counterxx.Done	BOOL	Indicates that the I:Count tag \geq O:Preset.G430.	0 or 1
Counterxx.Rollover	BOOL	The counter counted up to RolloverValue - 1 (for HSC) or Preset -1 (for simple counters) and then continued counting from the O:Rollunder (for HSC) or 0 (for simple counters). The O:RolloverAck bit transitioning from 0 to 1 or the O:Reset transitioning from 0 to 1 clears the bit.	0 or 1
Counterxx.Count	DINT	The number of input transitions counted by a counter.	All values.
EventStatusx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
EventStatusx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
EventStatusx.EventDropped	BOOL	Indicates when an event has been discarded because events are occurring faster than they are being acknowledged.	<ul style="list-style-type: none"> 0 = An event status has not been dropped 1 = An event status has been dropped
EventStatusx.EventNumber	DINT	Running count of events, which increments by one each new time event. The originator sets the Event Number Ack to the Event Number to acknowledge receipt of the event. When the EventNumber reaches its maximum value and rolls over it is to roll over to 1, not 0.	All values.
EventStatusx.EventReset	BOOL	When EO.Event[<n>].ResetEvent transitions from 0 to 1, I.EventStatus[<n>].EventReset transitions to 1 to indicate that the reset was received and completed. It stays 1 until EO.Event[<n>].ResetEvent transition to zero.	<ul style="list-style-type: none"> 0 = Do not reset 1 = Reset
EventStatusx.EventsPending	SINT	The number of events currently queued in the modules. A value greater than zero indicates that the controller is not currently keeping up with the rate of events.	All positive values.
Ptxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>

Table 79 - 5069-IB6F-3W Module Input Tags

Name	Size	Definition	Valid Values
Pttx.Chatter	BOOL	1 = Shows that the input is chattering per the ChatterTime and ChatterCount settings. 0 = Normal	<ul style="list-style-type: none"> 0 = Normal 1 = Input is chattering
Pttx.TimestampOverflowOnOff	BOOL	Indicates an On to Off time stamp was lost in a discrete product. If TimestampLatchEn is set, a new time stamp was not recorded because one is already latched. If TimestampLatchEn is clear, a timestamp was overwritten.	0 or 1
Pttx.TimestampOverflowOffOn	BOOL	Indicates an Off to On time stamp was lost in a discrete product. If TimestampLatchEn is set, a new time stamp was not recorded because one is already latched. If TimestampLatchEn is clear a timestamp was overwritten.	0 or 1
Pttx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
Pttx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
Pttx.TimestampOffOnNumber	INT	A timestamp number for the Off to On transition for the most-recently produced timestamp. IMPORTANT: If Timestamp Latching is enabled, when this tag value matches the Pttx.TimestampOffOnNumberAck output tag value, the Pt.xxTimestampOffOn input tag remains the same until the next input Off to On transition. Otherwise, the input tag value is cleared.	All values.
Pttx.TimestampOnOffNumber	INT	A timestamp number for the On to Off transition for the most-recently produced timestamp. IMPORTANT: If Timestamp Latching is enabled, when this tag value matches the Pttx.TimestampOnOffNumberAck output tag value, the Pt.xxTimestampOnOff input tag remains the same until the next input On to Off transition. Otherwise, the input tag value is cleared.	All values.
Pttx.TimestampOffOn	LINT	64-bit Timestamp corresponding to when a change of state Off to On was recorded at the input. IMPORTANT: This number is cleared when Pt.xx.TimestampOffOnNumber input tag value and the Pttx.TimestampOffOnNumberAck output tag value match.	All values.
Pttx.TimestampOnOff	LINT	64-bit Timestamp corresponding to when a change of state On to Off was recorded at the input. IMPORTANT: This number is cleared when Pt.xx.TimestampOnOffNumber input tag value and the Pttx.TimestampOnOffNumberAck output tag value match.	All values.

Output Tags

[Table 80](#) describes the 5069-IB6F-3W module output tags.

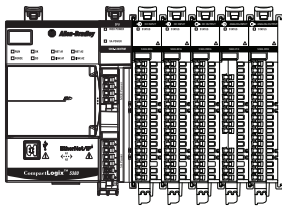
Table 80 - 5069-IB6F-3W Module Output Tags

Name	Size	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, I:Count, and I:Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Do not reset 1 = Reset
Counterxx.RolloverAck	BOOL	Clears the Rollunder bit in the input tag when it transitions from 0 to 1.	0 or 1
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, the counter counts to the Preset value and then rolls over to zero. If RolloverAtPreset is not set, the counter sets the Done bit and continues counting up to Max DINT. If C:RolloverAtPreset = 1, then if I:Count ≥ 0:Preset, I:Count=0. I:Done bit always = 0. Set I:Rollover bit when I:Count transitions from 0:Preset - 1 to 0. If C:RolloverAtPreset = 0, then if I:Count ≥ 0:Preset, I:Done = 1, else I:Done = 0. Set I:Rollover bit when I:Count transitions from 2,147,483,647 to 0. 	0...2,147,483,647
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input channel when it transitions from 0 to 1.	<ul style="list-style-type: none"> 0 = Timestamps are not erased 1 = Timestamps are erased
Ptxx.TimestampOffOnNumberAck	INT	<p>An Off to On timestamp identifier that is written by the controller to indicate that the identified timestamp has been seen and acted on. When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module can produce a new timestamp.</p> <p>IMPORTANT: When this tag value matches the Ptxx.TimestampOffOnNumber input tag value the Pt.xxTimestampOffOn input tag value is cleared.</p>	All values.
Ptxx.TimestampOnOffNumberAck	INT	<p>An On to Off timestamp identifier that is written by the controller to indicate that the identified timestamp has been seen and acted on. When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module can produce a new timestamp.</p> <p>IMPORTANT: When this tag value matches the Ptxx.TimestampOnOffNumber input tag value, the Pt.xxTimestampOnOff input tag value is cleared.</p>	All values.

5069-OA16 Module Tags

This section describes the tags that are associated with the 5069-OA16 module.

Standard Modules



Configuration Tags

[Table 81](#) describes the 5069-OA16 module configuration tags.

Table 81 - 5069-OA16 Module Configuration Tags

Name	Size	Definition	Valid Values
Pttx.FaultMode	BOOL	Selects the behavior the output channel takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Pttx.FaultValue	BOOL	Defines the value that the discrete output should assume if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.ProgMode	BOOL	Selects the behavior the output channel should take when transitioned into Program mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Pttx.ProgValue	BOOL	Defines the value that the output should take when the connection transitions to Program mode if the ProgMode bit is set to "User-Defined Value".	<ul style="list-style-type: none"> 0 = The output state is Off during Program mode. 1 = The output state is On during Program mode.
Pttx.FaultFinalState	BOOL	If FaultValueStateDuration is nonzero, determines the final Output state after the configured FaultValueStateDuration time out occurs.	<ul style="list-style-type: none"> 0 = The output state is Off after the FaultValueStateDuration time expires. 1 = The output state is On after the FaultValueStateDuration time expires.
Pttx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Fault Mode when the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode 1 = Go to Fault mode
Pttx.FaultValueStateDuration	SINT	This value determines the length of time the Fault Mode state is held before the FaultFinalState being applied.	<ul style="list-style-type: none"> 0 = Hold forever (default). 1, 2, 5, or 10 seconds

Input Tags

[Table 82](#) describes the 5069-OA16 module input tags.

Table 82 - 5069-OA16 Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Ptxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.

Output Tags

[Table 83](#) describes the 5069-OA16 module output tags.

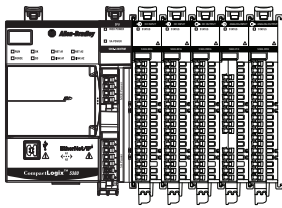
Table 83 - 5069-OA16 Module Output Tags

Name	Size	Definition	Valid Values
Ptxx.Data	BOOL	Indicates the current output value.	<ul style="list-style-type: none"> 0 = Off 1 = On

5069-OB8 Module Tags

This section describes the tags that are associated with the 5069-OB8 module.

Standard Modules



Configuration Tags

[Table 84](#) describes the 5069-OB8 module configuration tags.

Table 84 - 5069-OB8 Module Configuration Tags

Name	Size	Definition	Valid Values
Ptxx.FaultMode	BOOL	Selects the behavior the output channel takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.FaultValue	BOOL	Defines the value that the output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ProgMode	BOOL	Selects the behavior the output channel takes when transitioned into Program mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program mode if the ProgMode bit is set to "User-Defined Value".	<ul style="list-style-type: none"> 0 = The output state is Off during Program mode. 1 = The output state is On during Program mode.
Ptxx.FaultFinalState	BOOL	If FaultValueStateDuration is nonzero, determines the final Output state after the configured FaultValueStateDuration time-out occurs.	<ul style="list-style-type: none"> 0 = The output state is Off after the FaultValueStateDuration time expires. 1 = The output state is On after the FaultValueStateDuration time expires.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode 1 = Go to Fault mode
Ptxx.NoLoadEn	BOOL	Enables no load detection for output channels.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable
Ptxx.FaultValueStateDuration	SINT	This value determines the length of time the Fault Mode state is held before the FaultFinalState being applied.	<ul style="list-style-type: none"> 0 = Hold forever (default). 1, 2, 5, or 10 seconds

Input Tags

[Table 85](#) describes the 5069-OB8 module input tags.

Table 85 - 5069-OB8 Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	<ul style="list-style-type: none"> -128...+127 <p>The value of 0 is skipped except during module power-up.</p>
Ptxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Ptxx.NoLoad	BOOL	Indicates that the signal wire has been disconnected from one of its terminals or the RTB has been removed. Used with Output channels.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Ptxx.ShortCircuit	BOOL	Indicates an output short circuit or overcurrent.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit or overcurrent

Output Tags

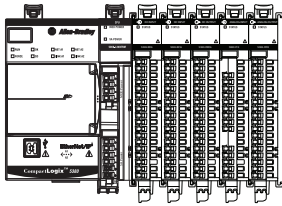
[Table 86](#) describes the 5069-OB8 module output tags.

Table 86 - 5069-OB8 Module Output Tags

Name	Size	Definition	Valid Values
Ptxx.Data	BOOL	Indicates the current output value.	<ul style="list-style-type: none"> 0 = Off 1 = On

5069-OB16 Module Tags

Standard Modules



This section describes the tags that are associated with the 5069-OB16 module. You use the 5069-IB16 module profile in your Logix Designer application project with the 5069-IB16K module.

Configuration Tags

[Table 87](#) describes the 5069-OB16 module configuration tags.

Table 87 - 5069-OB16 Module Configuration Tags

Name	Size	Definition	Valid Values
Ptxx.FaultMode	BOOL	Selects the behavior the output channel takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.FaultValue	BOOL	Defines the value that the output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ProgMode	BOOL	Selects the behavior that the output takes when transitioned into Program mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program mode if the ProgMode bit is set to "User-Defined Value".	<ul style="list-style-type: none"> 0 = The output state is Off during Program mode. 1 = The output state is On during Program mode.
Ptxx.FaultFinalState	BOOL	If FaultValueStateDuration is nonzero, determines the final Output state after the configured FaultValueStateDuration time-out occurs.	<ul style="list-style-type: none"> 0 = The output state is Off after the FaultValueStateDuration time expires. 1 = The output state is On after the FaultValueStateDuration time expires.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode 1 = Go to Fault mode
Ptxx.NoLoadEn	BOOL	Enables no load detection for output channels.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable
Ptxx.FaultValueStateDuration	SINT	This value determines the length of time the Fault Mode state is held before the FaultFinalState being applied.	<ul style="list-style-type: none"> 0 = Hold forever (default). 1, 2, 5, or 10 seconds

Input Tags

[Table 88](#) describes the 5069-OB16 module input tags.

Table 88 - 5069-OB16 Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
Uncertain	BOOL	Indicates if the module is operating outside its designed operating range of if data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good 1 = Uncertain
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Ptxx.Data	BOOL	Indicates the current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.NoLoad	BOOL	Indicates that the signal wire has been disconnected from one of its terminals or the RTB has been removed. Used with Output channels.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Ptxx.ShortCircuit	BOOL	Indicates an output short circuit or overcurrent.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit or overcurrent

Output Tags

[Table 89](#) describes the 5069-OB16 module output tags.

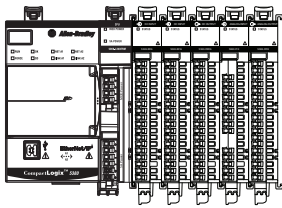
Table 89 - 5069-OB16 Module Output Tags

Name	Size	Definition	Valid Values
Ptxx.Data	BOOL	Indicates the current output value.	<ul style="list-style-type: none"> 0 = Off 1 = On

5069-OB16F Module Tags

This section describes the tags that are associated with the 5069-OB16F modules.

Standard Modules



Configuration Tags

[Table 90](#) describes the 5069-OB16F module configuration tags.

Table 90 – 5069-OB16F Configuration Tags

Name	Size	Definition	Valid Values
Ptxx.FaultMode	BOOL	Selects the behavior the output channel takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.FaultValue	BOOL	Defines the value that the output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ProgMode	BOOL	Selects the behavior that the output takes when transitioned into Program mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program mode if the ProgMode bit is set to "User-Defined Value".	<ul style="list-style-type: none"> 0 = The output state is Off during Program mode. 1 = The output state is On during Program mode.
Ptxx.FaultFinalState	BOOL	If FaultValueStateDuration is nonzero, determines the final Output state after the configured FaultValueStateDuration time-out occurs.	<ul style="list-style-type: none"> 0 = The output state is Off after the FaultValueStateDuration time expires. 1 = The output state is On after the FaultValueStateDuration time expires.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode 1 = Go to Fault mode
Ptxx.NoLoadEn	BOOL	Enables no load detection for output channels.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable
Ptxx.FaultValueStateDuration	SINT	This value determines the length of time the Fault Mode state is held before the FaultFinalState being applied.	<ul style="list-style-type: none"> 0 = Hold forever (default). 1, 2, 5, or 10 seconds

Input Tags

[Table 91](#) describes the 5069-OB16F module input tags.

Table 91 - 5069-OB16F Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
Uncertain	BOOL	Indicates if the module is operating outside its designed operating range of if data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good 1 = Uncertain
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master.	<ul style="list-style-type: none"> 0 = CIP Sync is not available 1 = CIP Sync is available
CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but is not now due to a timeout.	<ul style="list-style-type: none"> 0 = A valid time master has not timed out. 1 = A valid time master was detected on the backplane, but the time master has timed out. The module is using its local clock and can be drifting away from the last known time master.
Ptxx.Data	BOOL	Current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.NoLoad	BOOL	Indicates that the signal wire has been disconnected from one of its terminals or the RTB has been removed. Used with Output channels.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Ptxx.ShortCircuit	BOOL	Indicates an output short circuit or overcurrent.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit or overcurrent
Schedulex	SINT	Indicates which schedule to load from 32 available schedules.	<ul style="list-style-type: none"> 1...32 = Valid schedule 0, 129...255 = No schedule

Table 91 - 5069-OB16F Module Input Tags

Name	Size	Definition	Valid Values
Schedulex.State	SINT	Current state of the Tagschedule at index x.	<ul style="list-style-type: none"> 0 = Inactive 1 = Active – schedule is next to be applied to any of the outputs. 2 = Current – schedule is not the next to be applied one of the outputs. 3 = Expired – schedule has been applied. 4 = Discarded – scheduled but mask was off, or the requested schedule was late (received after its scheduled application time) and a more recent schedule has already been applied to that output point. 5 = Late – received schedule after the time it is to be applied.
Schedulex.ScheduleNumber	SINT	Echo of ScheduleNumber from the output image.	0...3
LateScheduleCount	INT	Count of schedules that arrive late. That is, the arrival time is after scheduled time. Counter rolls over every 65535 late updates. The output is still be driven to new state if this is the most recent schedule for that point. Useful in indicating that network delays/losses are causing scheduling issues.	All values.
LostScheduleCount	INT	Increments whenever the schedule sequence number in the output tag skips a value, which can indicate a lost schedule. Counter rolls over every 65535 lost updates.	All values.

Output Tags

[Table 92](#) describes the 5069-OB16F module output tags.

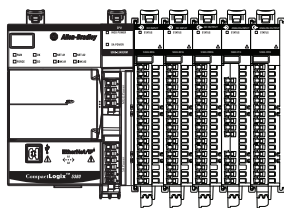
Table 92 - 5069-OB16F Module Output Tags

Name	Size	Definition	Valid Values
TimeBase	LINT	Indicates the TimeBase for all schedule times in a scheduled output consumed assembly or channel. The TimeBase + The Schedule[n].TimeOffset determines the time for the schedule. Base/Offset scheme that is used to fit enough schedules into the assembly.	Any positive value.
Ptxx.Data	BOOL	Current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ScheduleEn	BOOL	Specifies the use of normal output data or scheduled data.	<ul style="list-style-type: none"> 0 = Normal output data 1 = Scheduled data
Schedulex	SINT	Indicates which schedule to load from 32 available schedules.	<ul style="list-style-type: none"> 1...32 = Valid schedule 0, 129...255 = No schedule
Schedulex.ID	SINT	There are 32 schedules available (for Neo R1 products). Indicates which schedule to load.	<ul style="list-style-type: none"> 1...32 = Valid schedule 0 or 129...255 = No schedule
Schedulex.SequenceNumber	SINT	Indicates that the schedule information is valid and to process this schedule.	All values.
Schedulex.OutputPointSelect	SINT	Selects the output point that this schedule applies to. 0xFF means no output point selected.	0...15
Schedulex.Data	BOOL	Output data to be applied at time that is specified in schedule.	0 or 1
Schedulex.TimeOffset	DINT	Offset from schedule base time. Used for scheduled output consumed tags. Base/Offset scheme that is used to fit enough schedules in the assembly.	All values.

5069-OW4I, 5069-OW16, and 5069-OX4I Module Tags

This section describes the tags that are associated with the 5069-OW4I, 5069-OW16, and 5069-OX4I modules. The tags are the same for each module.

Standard Modules



Configuration Tags

[Table 93](#) describes the 5069-OW4I and 5069-OX4I module configuration tags.

Table 93 - Relay Output High Current Module Configuration Tags

Name	Size	Definition	Valid Values
Ptxx.FaultMode	BOOL	Selects the behavior the output channel takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.FaultValue	BOOL	Defines the value that the output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ProgMode	BOOL	Selects the behavior the output takes when transitioned into Program mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Hold last state 1 = Go to a user-defined value
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program mode if the ProgMode bit is set to "User-Defined Value".	<ul style="list-style-type: none"> 0 = The output state is Off during Program mode. 1 = The output state is On during Program mode.
Ptxx.FaultFinalState	BOOL	If FaultValueStateDuration is nonzero, determines the final Output state after the configured FaultValueStateDuration time-out occurs.	<ul style="list-style-type: none"> 0 = The output state is Off after the FaultValueStateDuration time expires. 1 = The output state is On after the FaultValueStateDuration time expires.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode 1 = Go to Fault mode
Ptxx.FaultValueStateDuration	SINT	This value determines the length of time the Fault Mode state is held before the FaultFinalState being applied.	<ul style="list-style-type: none"> 0 = Hold forever (default). 1, 2, 5, or 10 seconds

Input Tags

[Table 94](#) describes the 5069-OW4I, 5069-OW16, 5069-OX4I module input tags.

Table 94 - Relay Output High Current Module Input Tags

Name	Size	Definition	Valid Values
RunMode	BOOL	Channel's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run Mode
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128..127 The value of 0 is skipped except during module power-up.
Ptxx.Data	BOOL	Current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (Faulted) <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>

Output Tags

[Table 95](#) describes the 5069-OW4I, 5069-OW16, and 5069-OX4I module outputs tags.

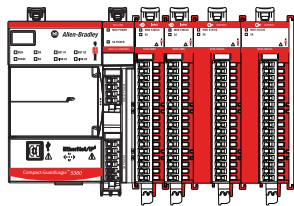
Table 95 - Relay Output High Current Module Output Tags

Name	Size	Definition	Valid Values
Ptxx.Data	BOOL	Current input value.	<ul style="list-style-type: none"> 0 = Off 1 = On

5069-IB8S and 5069-IB8SK Module Tags

This section describes the tags that are associated with the 5069-IB8S or 5069-IB8SK module.

Safety Modules



Input Tags

[Table 96](#) describes the 5069-IB8S or 5069-IB8SK module input tags.

Table 96 - 5069-IB8S or 5069-IB8SK Module Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	Module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, it changes the tag to 1.	<ul style="list-style-type: none"> 0 = Connection running 1 = Connection not running
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Ptxx.Data	BOOL	Indicates the current safety input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates one of the following: <ul style="list-style-type: none"> The channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69. The channel is set to Not Used. 	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted) or set to Not Used <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, you must complete the steps described in Safety Input Fault Recovery on page 128 to reset this tag to 0.</p> <p>If the tag is 1 because the channel is set to Not Used, no action is required.</p>
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data <p>This tag is set to 1 when the module has reached a critical operating temperature or is higher the acceptable operating temperature. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>
Ptxx.ShortCircuit	BOOL	Indicates a short circuit.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Ptxx.Status	BOOL	Indicates the status of the channel.	<ul style="list-style-type: none"> 0 = Bad, causing a fault 1 = Good

Table 96 - 5069-IB8S or 5069-IB8SK Module Input Tags

Name	Data Type	Definition	Valid Values
Testxx.Readback	BOOL	Indicates that a 24V DC power source is present at the test output.	<ul style="list-style-type: none"> 0 = 24V DC power is not present 1 = 24V DC power is present
Testxx.Fault	BOOL	Indicates one of the following: <ul style="list-style-type: none"> The channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69. The channel is set to Not Used. 	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted) or set to Not Used If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, you must complete the steps described in Safety Input Fault Recovery on page 128 to reset this tag to 0. ⁽¹⁾ If the tag is 1 because the channel is set to Not Used, no action is required.
Testxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data This tag is set to 1 when the module has reached a critical operating temperature or is higher the acceptable operating temperature. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Testxx.ShortCircuit	BOOL	Indicates an output short circuit	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Testxx.FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the channel.	<ul style="list-style-type: none"> 0 = No field power off condition 1 = Field power off condition
Testxx.Status	BOOL	Indicates the channel status.	<ul style="list-style-type: none"> 0 = Fault 1 = Good

(1) If the Point Mode for the test output is Pulse Test or Power Supply when the Short Circuit condition is detected, the condition can be corrected but you cannot set the test output to a safe state.

Output Tags

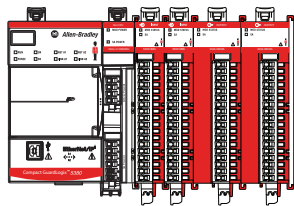
[Table 97](#) describes the 5069-IB8S or 5069-IB8SK module output tags.

Table 97 - 5069-IB8S or 5069-IB8SK Module Output Tags

Name	Size	Definition	Valid Values
Mutingxx.Data	BOOL	Indicates the current muting value	<ul style="list-style-type: none"> 0 = Off 1 = On

5069-OBV8S and 5069-OBV8SK Module Tags

Safety Modules



This section describes the tags that are associated with the 5069-OBV8S or 5069-OBV8SK module.

Input Tags

[Table 98](#) describes the 5069-OBV8S and 5069-OBV8SK module input tags.

Table 98 - 5069-OBV8S and 5069-OBV8SK Module Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	Module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection is running. The module sets this tag to 0 when connected. If the module is not connected, the controller overwrites the tag to 1.	<ul style="list-style-type: none"> 0 = Connection is working 1 = Connection is not working
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics active 1 = One or more diagnostics are active or the prognostics threshold is reached
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected. Set to zero by product reset or power cycle. Wraps from 255 (-1) to 1 skipping zero.	-128...+127 The value of 0 is skipped except during module power-up.
Ptxx.Readback	BOOL	Indicates that a 24V DC power source is connected to the output circuit	<ul style="list-style-type: none"> 0 = 24V DC power is not present 1 = 24V DC power is present
Ptxx.Fault	BOOL	Indicates one of the following: <ul style="list-style-type: none"> The channel data is inaccurate and cannot be trusted for use in the application. For more information, see Module Data Quality Reporting on page 69. The channel is set to Not Used. 	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted) or set to Not Used <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, you must complete the steps described in Safety Output Fault Recovery on page 140 to reset this tag to 0.⁽¹⁾</p> <p>If the tag is 1 because the channel is set to Not Used, no action is required.</p>

Table 98 - 5069-OBV8S and 5069-OBV8SK Module Input Tags

Name	Data Type	Definition	Valid Values
Ptxx.Uncertain	BOOL	Indicates that the channel data can be inaccurate but the degree of inaccuracy is not known . For more information, see Module Data Quality Reporting on page 69 .	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data This tag is set to 1 when the module has reached a critical operating temperature or is higher the acceptable operating temperature. IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.
Ptxx.ShortCircuit	BOOL	Indicates a short circuit	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Ptxx.FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the channel.	<ul style="list-style-type: none"> 0 = No field power off condition 1 = Field power off condition
Ptxx.Status	BOOL	Indicates the channel status.	<ul style="list-style-type: none"> 0 = Bad, causing fault 1 = Good

(1) If the Point Mode for the test output is Pulse Test or Power Supply when the Short Circuit condition is detected, the condition can be corrected but you cannot set the test output to a safe state.

Output Tags

[Table 99](#) describes the 5069-OBV8S and 5069-OBV8SK module output tags.

Table 99 - 5069-OBV8S and 5069-OBV8SK Module Output Tags

Name	Size	Definition	Valid Values
Ptxx.Data	BOOL	Indicates the current output value.	<ul style="list-style-type: none"> 0 = Off 1 = On

Notes:

Application and Wiring Examples for Safety Modules

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Wiring Faults on Safety Modules	269

This appendix provides example wiring diagrams for the Compact 5000™ I/O safety modules that can be used in functional safety applications.

The wiring configuration affects the safety application level to which a Compact 5000 I/O safety module is suitable.

IMPORTANT	This section shows example wiring diagrams on the 5069-IB8S safety input module and the 5069-OBV8S safety output module. The same diagrams also apply when you use the 5069-IB8SK safety input module and the 5069-OBV8SK safety output module, respectively.
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Before You Begin

Before you wire your module, remember the following:

A system can have multiple SA power buses. You use 5069-FPD field potential distributors to establish a new SA power bus. SA power buses are isolated from each other.

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.

Connection Details

Table 100 shows the input device connection methods and their respective safety categories.

IMPORTANT You must use an SELV/PELV-listed power supply with the safety modules.

Table 100 - Input Device Connection Methods

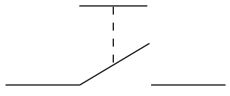
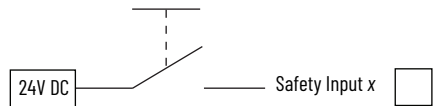
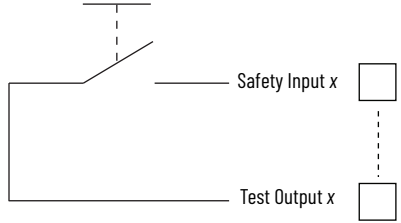
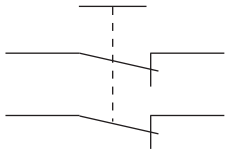
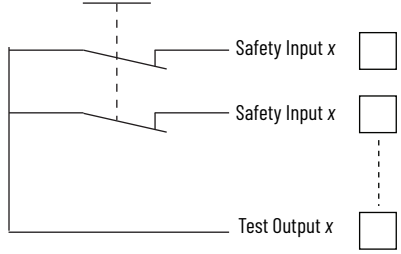
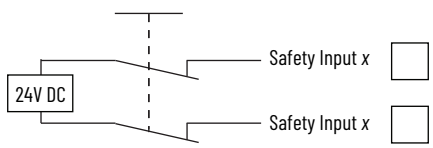
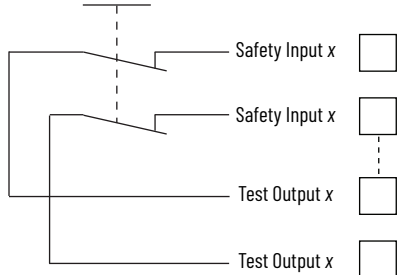
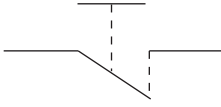
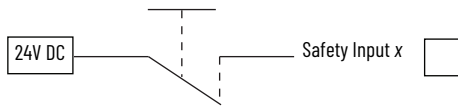
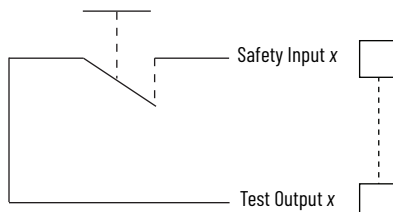
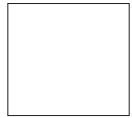
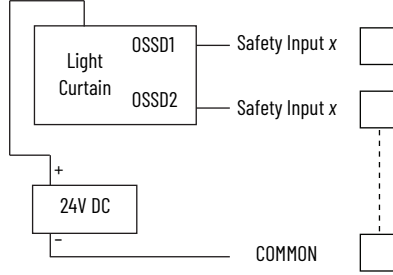
Connected Device	Test Pulse from Test Output	Connection	Schematic Diagram ⁽¹⁾	Safety Category
Push button 	No	Connect the device between a 24V DC power supply and the safety input.		1
	Yes	Connect the device between the safety input and the test output. You must configure the test output as Safety Test Pulse.		2
Emergency stop button Door monitoring switch 	No	Connect devices between the safety inputs and a test output. The test output must be connected to a 24V DC power supply.		3
		Connect devices between a 24V DC SELV/PELV-listed power supply and the safety inputs.		
	Yes	Connect devices between the safety inputs and the test outputs.		4

Table 100 - Input Device Connection Methods

Connected Device	Test Pulse from Test Output	Connection	Schematic Diagram ⁽¹⁾	Safety Category
Single-channel SIL 3 device 	No	Connect the device between a 24V DC power supply and the safety input.		3
	Yes	Connect device between the safety inputs and a test output. The test output must be connected to a 24V DC power supply.		
Light curtain 	Yes	Connect light curtain to consecutive safety inputs, respectively, for example, Safety Inputs 0 and 1. Connect the 24V DC SELV/PELV-listed power supply.		3 or 4 Based on the light curtain that is being used.

(1) X represents the channel number.

5069-IB8S or 5069-IB8SK Module Wiring Diagrams

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:

- The switches are suitable for applications that are rated up to, and including, SIL CL3, PLe, Cat. 3.
- The light curtain is suitable for applications that are rated up to, and including, SIL CL3, PLe, Cat. 4.

Channel Connections

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

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

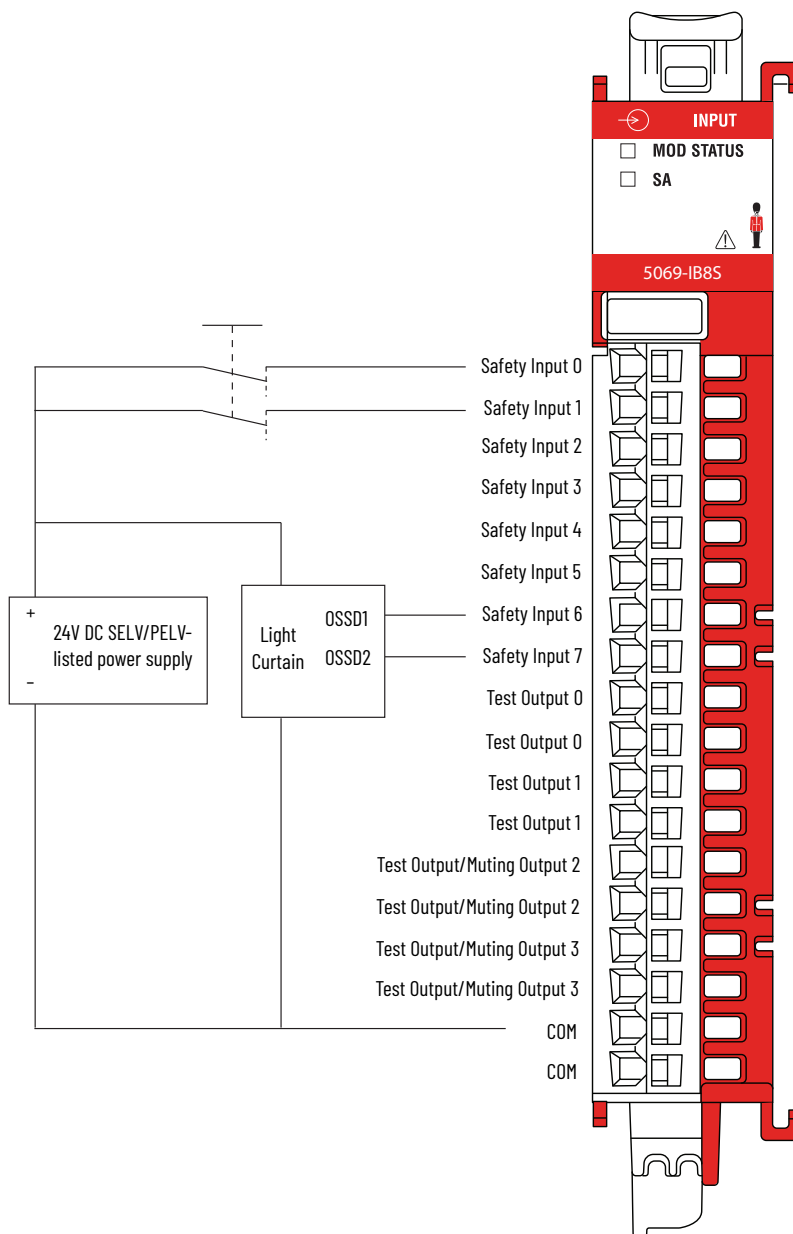
SA Power

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

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

IMPORTANT: Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA Power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA Power bus in a system. SA Power buses are isolated from each other. To keep the modules on separate SA Power buses, complete the following steps.
 1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA Power bus.
 2. Install the 5069-FPD field potential distributor to establish a second SA Power bus.
 3. Install the modules that use the other type of SA power, for example AC, on the second SA Power bus.
- The SA Power to adjacent SA Power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.



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

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

Channel Connections

The diagram shows devices that are connected to safety input channels 0 and 1, and to test outputs 0 and 1.

You are not restricted to using only those safety input channels.

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

SA Power

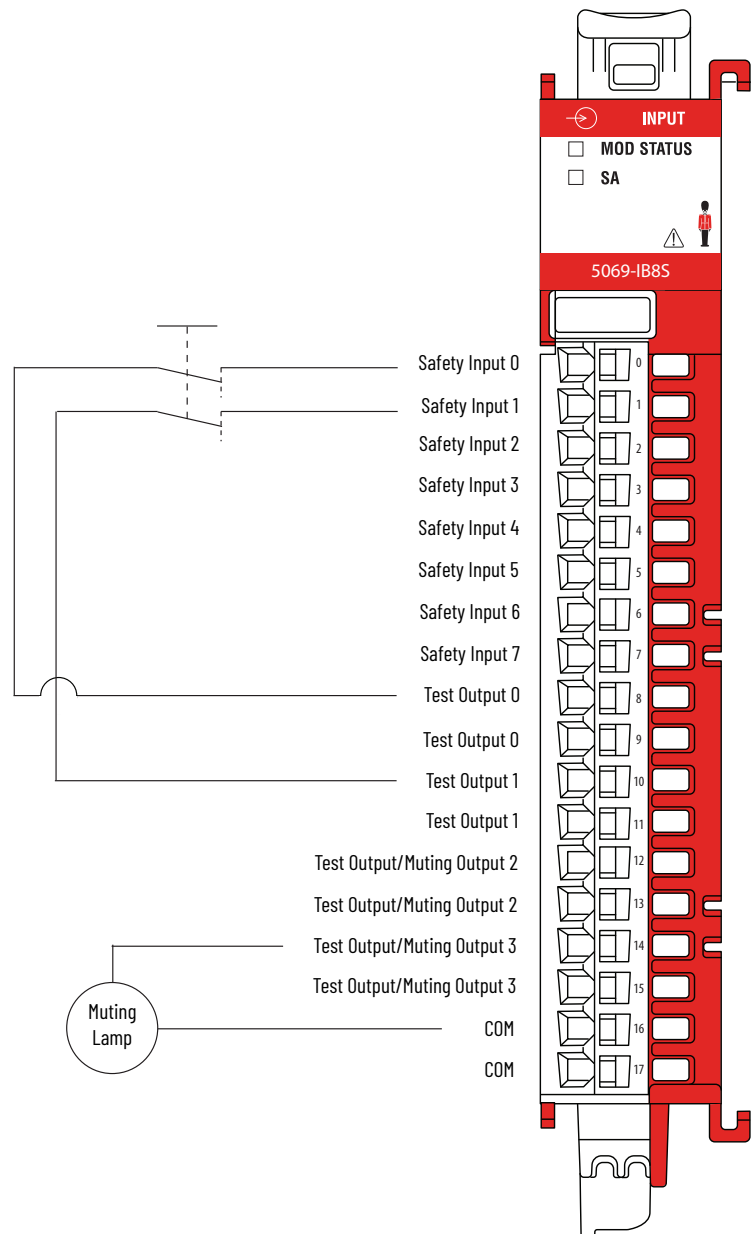
Connections to an external power supply that provides SA power via the SA Power RTB on one of the following:

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

IMPORTANT: Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA Power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA Power bus in a system. SA Power buses are isolated from each other. To keep the modules on separate SA Power buses, complete the following steps.
 1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA Power bus.
 2. Install the 5069-FPD field potential distributor to establish a second SA Power bus.
 3. Install the modules that use the other type of SA power, for example AC, on the second SA Power bus.

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 CL3, 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 devices that are connected to safety input channel 0 and test output channel 0. You are not 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 test output points and odd-numbered input points to odd-numbered test output points.

This wiring practice can maximize diagnostic independence and separation.

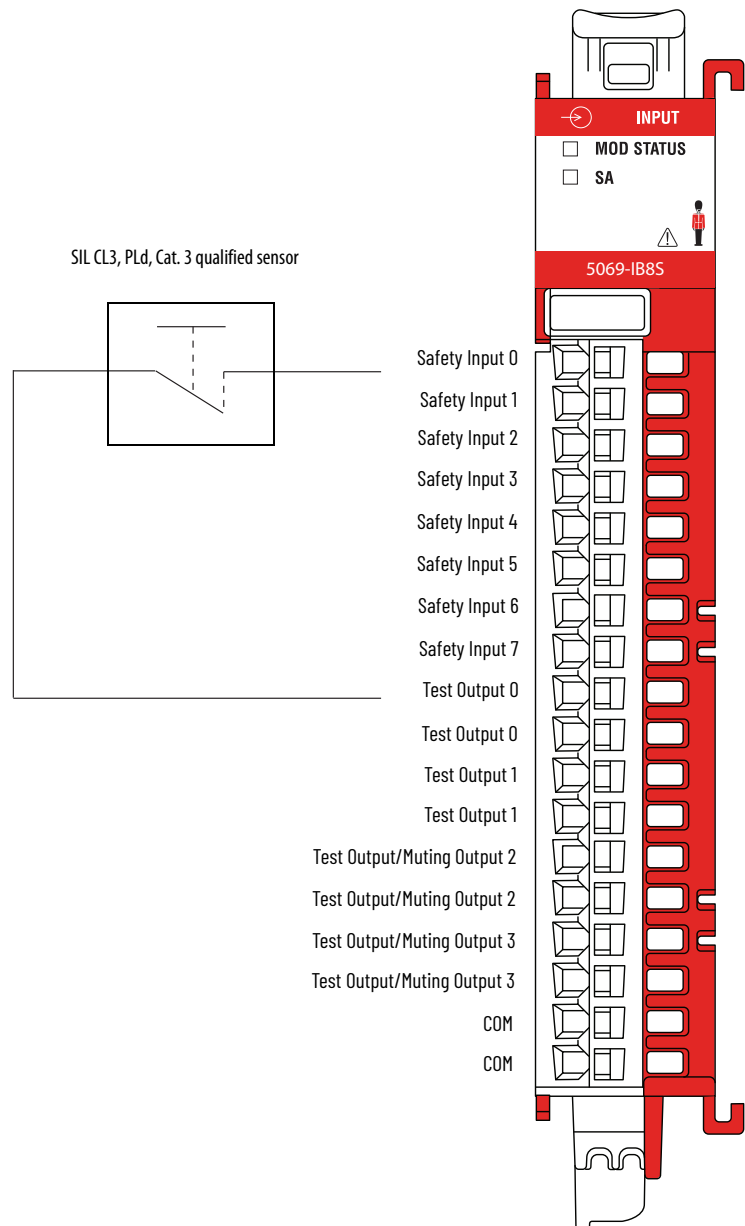
SA Power

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

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

IMPORTANT: Remember the following:

- The 5069-IB8S and 5069-IB8SK modules use DC SA power. You must connect DC power to the component, that is, controller, adapter, or field potential distributor, that provides SA Power to the modules.
- If you install modules in a system that use AC SA power and DC SA power, you must install them on separate SA power buses.
- You use a 5069-FPD field potential distributor to establish a new SA Power bus in a system. SA Power buses are isolated from each other. To keep the modules on separate SA Power buses, complete the following steps.
 1. Install the modules that use one type of SA power, for example DC, to the right of the adapter or controller, that is, the first SA Power bus.
 2. Install the 5069-FPD field potential distributor to establish a second SA Power bus.
 3. Install the modules that use the other type of SA power, for example AC, on the second SA Power bus.
- The SA Power to adjacent SA Power electrical isolation that the 5069-FPD field potential distributor provides has a rating of 240V AC (continuous) reinforced insulation type.



5069-OBV8S and 5069-OBV8SK Module Wiring Diagrams

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

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

Actuator LA Power

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

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

Connection Pairs

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

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

Channel Connections

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

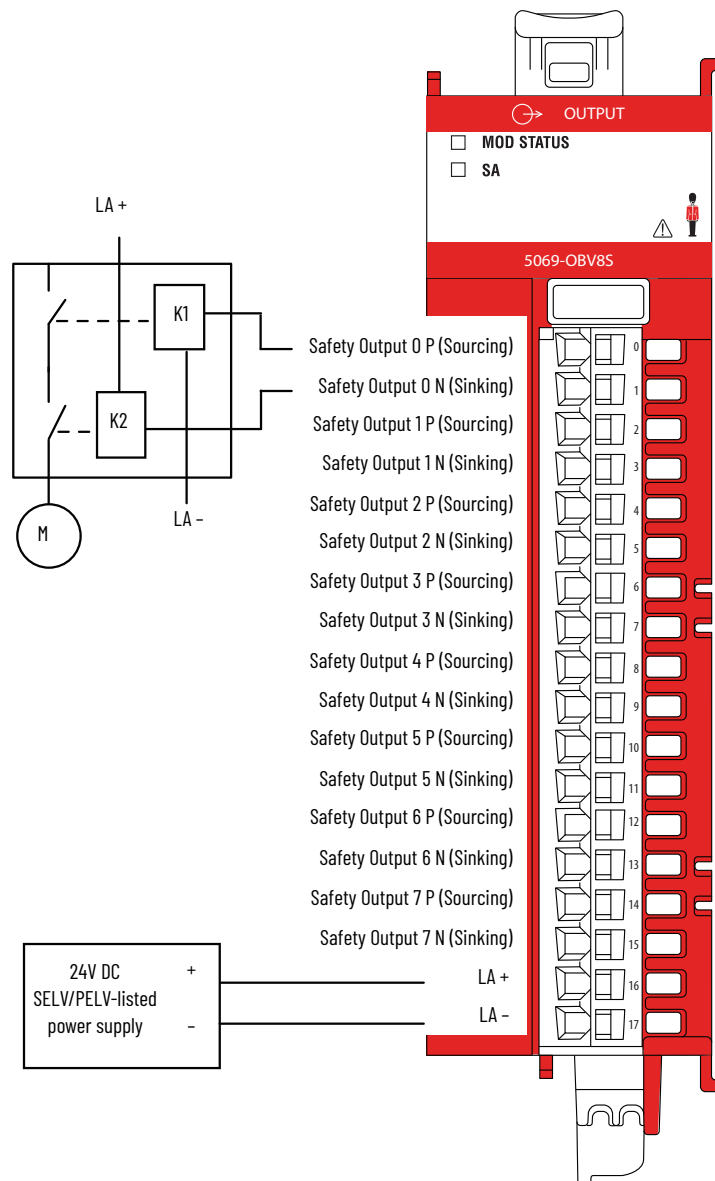
LA Power

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 Cat.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-OB8VSK module in Bipolar switching mode. For example, the Safety Output 0 P (Sourcing) terminal and Safety Output 0 N (Sinking) terminal are a Bipolar connection pair. That is, they are a P-N pair. When the module is in Bipolar switching mode, you must connect the device to both terminals.

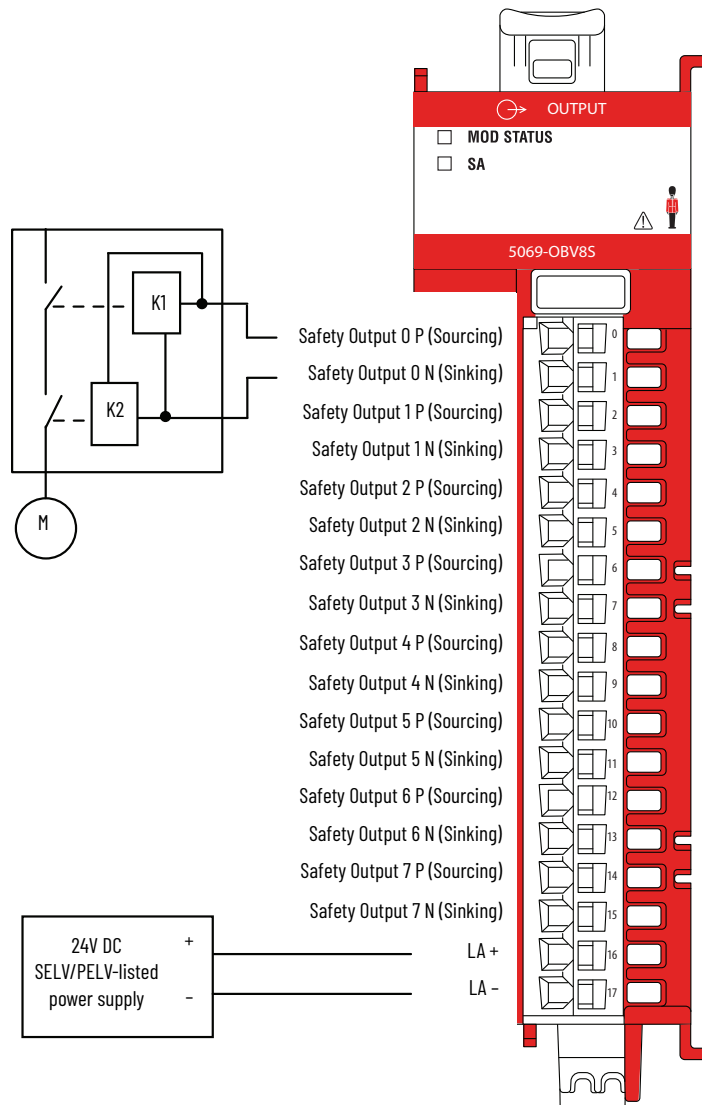
Channel Connections

This wiring example shows connections to the P-N pair for Safety Output 0. You are not 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 Cat.4 applications, if your application remains in safe state, that is, the output is off, for a prolonged duration, we recommend that you take one of the following actions:

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

Connection Pairs

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

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

Channel Connections

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

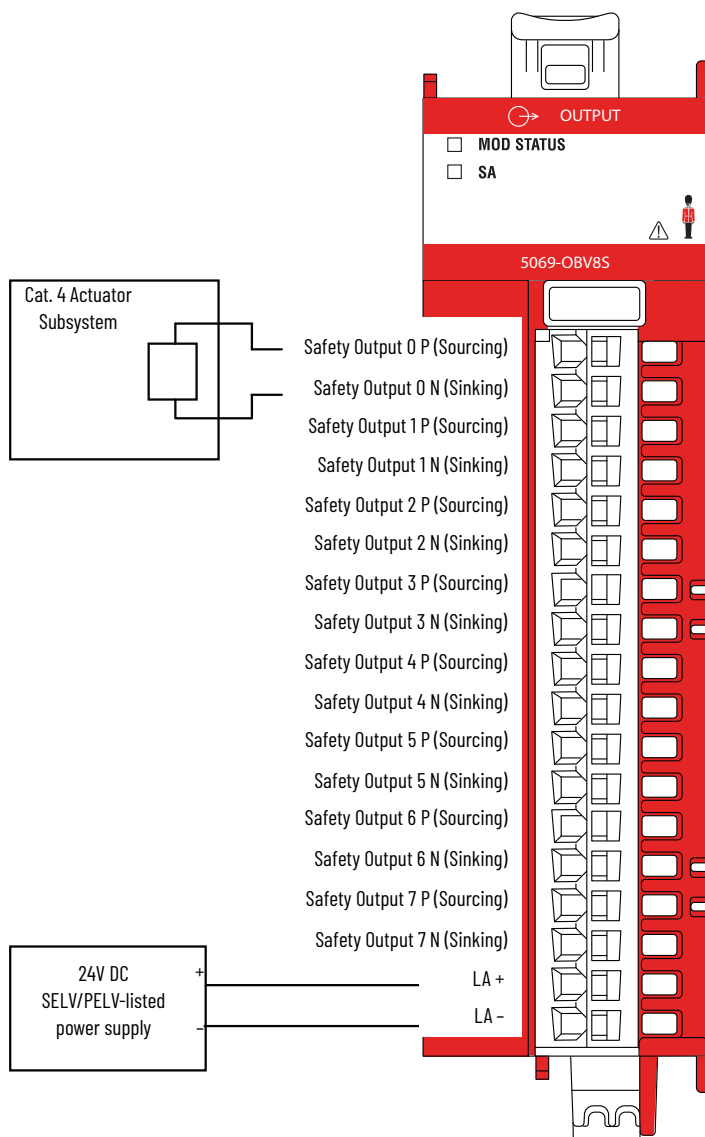
LA Power

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.

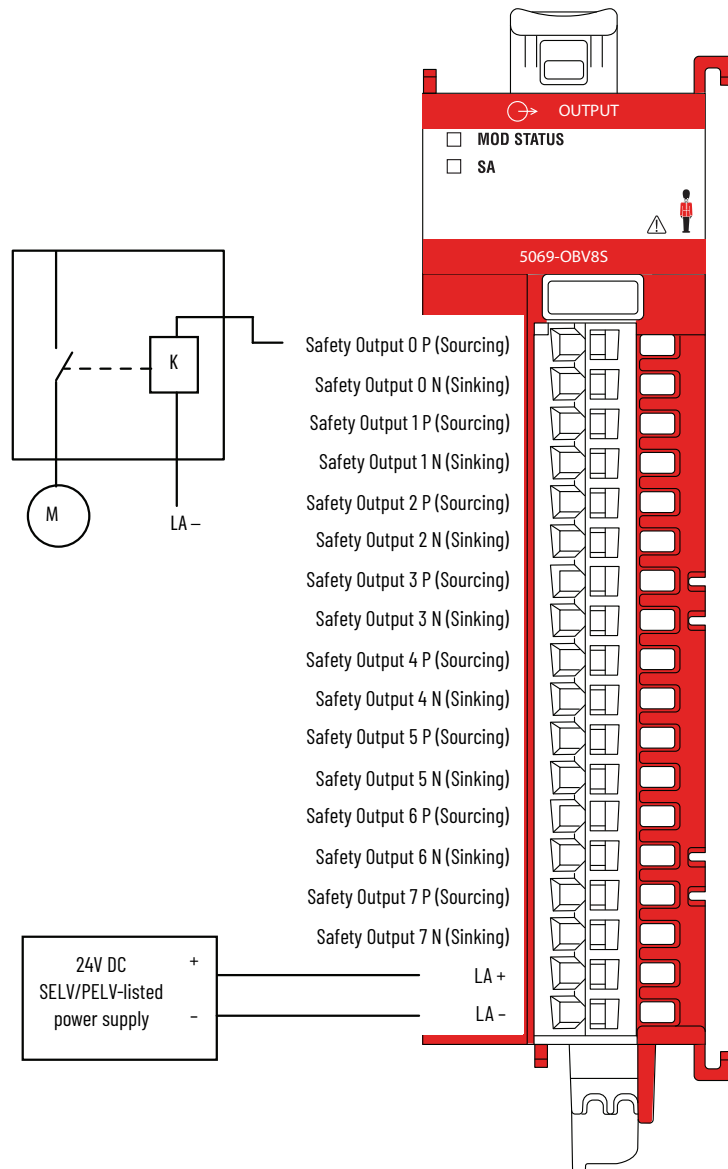
Channel Connections

This wiring example shows connection to Safety Output 0. You are not 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.
 - 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.
- 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 **Cat.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

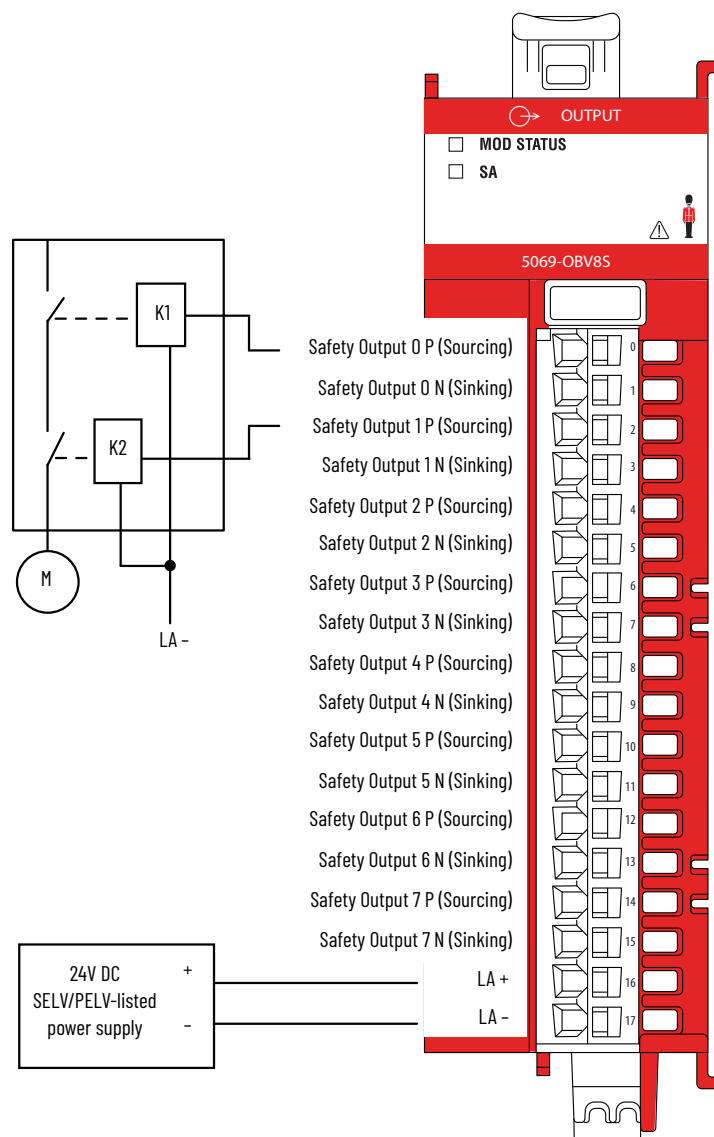
Channel Connections

This wiring example shows connections to Safety Output 0 P and Safety Output 1P. You are not 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 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 on [page 268](#), 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.

For more information on residual current, see the Compact 5000 I/O Modules and EtherNet/IP Adapters Technical Data, publication [5069-TD001](#)

- A qualified actuator must be installed, for example, in accordance with IEC 60947.

For **Cat.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.

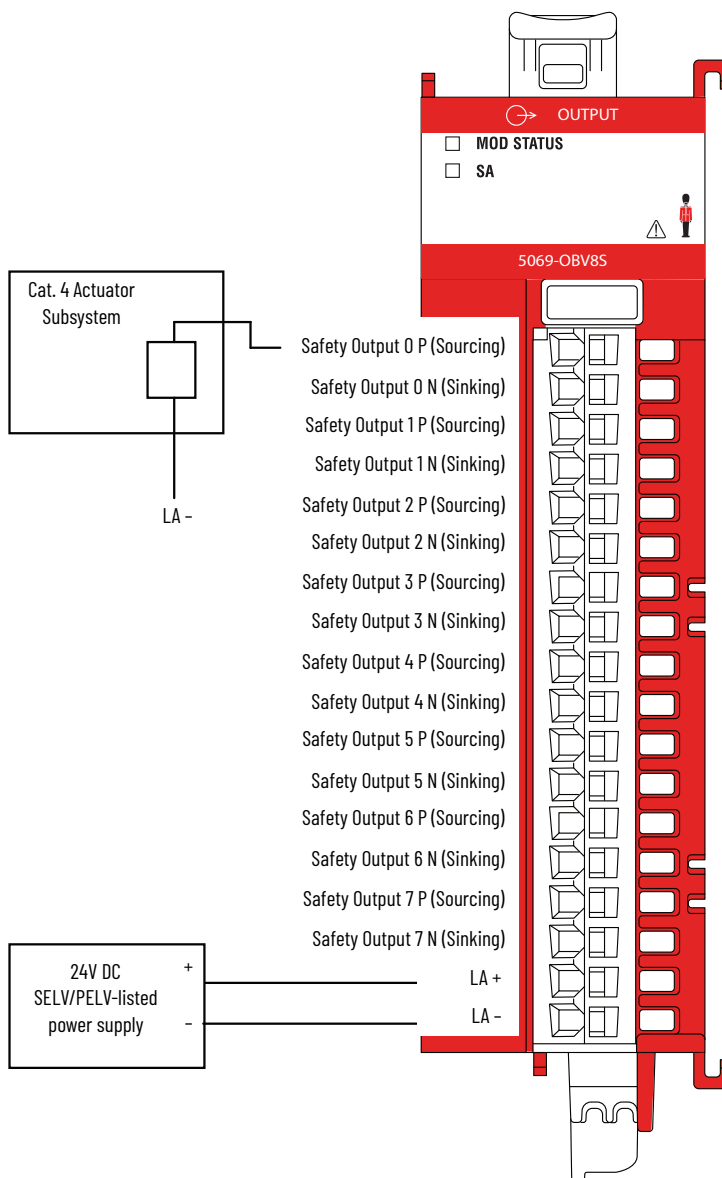
Channel Connections

This wiring example shows connections to Safety Output 0. You are not 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.



Wiring Faults on Safety Modules

A number of conditions can cause wiring faults on safety modules. We strongly recommend that you monitor your application to detect wiring faults as soon as they appear so you can troubleshoot and remedy the cause of the fault.

Examples of wiring fault causes include the following:

- Field Power Loss condition
- No Load condition
- Wiring short to power
- Wiring short across outputs

Notes:

Safety Data for Safety Modules

Topic	Page
Compact 5000 I/O Safety Input Module Safety Data	272
Compact 5000 I/O Safety Output Module Safety Data	274

This appendix lists calculated values for probability of a dangerous failure on demand (PFD), average frequency of a dangerous failure per hour (PFH), and mean time to failure (MTTF). PFD and PFH calculations comply with IEC61508, edition 2, 2010.

Calculated values of PFD and PFH appear in [Table 101 on page 272](#) for the 5069-IB8S and 5069-IB8SK modules and [Table 102 on page 274](#) for the 5069-OBV8S and 5069-OBV8SK modules. PFD and PFH must be calculated for the devices within the system to comply with the SIL level that is required for application.

You are responsible for following the requirements of ISO 13849-1:20015, to assess Performance Levels in your safety system.

You must functionally test every I/O module. To functionally test the modules, complete the following tasks:

- Input points - Toggle every input point, and verify that the system detects the input state change within the safety reaction time (SRT).
- Output points - Use the controller to toggle every output point, and verify that the output point changes state.

SRT is a consideration of delays or latencies within the safety system.

For more information, see the GuardLogix® 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual (TÜV), publication [1756-RM012](#).

Compact 5000 I/O Safety Input Module Safety Data

[Table 101](#) lists the safety data for the 5069-IB8S and 5069-IB8SK modules.

Table 101 - 5069-IB8S and 5069-IB8SK Module Safety Parameter Data

Attribute		Point Operation Type	
		Single Channel	Dual Channel (at controller instruction level)
Safety Function Architecture		0	1
Safe Failure Rate (λ_s) [failures/hr]		1.16E-06	1.49E-06
Dangerous Failure Rate (λ_D) [failures/hr]		7.38E-07	1.04E-06
Dangerous Detected Failure Rate (λ_{DD}) [failures/hr]		7.37E-07	1.04E-06
Dangerous Undetected Failure Rate (λ_{DU}) [failures/hr]		3.18E-10	2.54E-10
Safety Reaction Time, SRT [millisecond]		6	
Automatic Diagnostic Test Interval (TD) [hr]		4	
Useful Life [yr]		20	
Systematic Capability (SC)		3	
Safe Failure Fraction (SFF) [%]		99.98%	99.99%
PFH		3.18E-10	2.54E-10
PFD _{AVE}	10 yrs	1.39E-05	1.11E-05
	20 yrs	2.78E-05	2.22E-05
Diagnostic Coverage Average (DC _{AVE})		99.96%	99.98%
Spurious Trip Rate (STR)		3.65E-06	4.52E-06
MTTF [years]		60.05	45.25
MTTF _D [years]		154.75	110.10

Safety Reaction Time - 5069-IB8S and 5069-IB8SK Modules

Safety reaction time of Compact 5000™ I/O safety input modules is defined as follows:

- **SRT on Demand** - The response time interval between a signal change on the input terminal and producing or providing the safety packet on the backplane.
- **SRT on Fault** - The response time between the occurrence of an internal fault in the channel/module and the channel/module going into a safe state.
- **SRT on External Wiring Fault** - The response time between the occurrences of an external wiring fault and the channel/s going into a safe state when the channel/s is in Safety Pulse Test mode.

The following table lists SRT times for the Compact 5000 I/O safety input modules.

Safety Reaction Time	Module is NOT used in continuous demand mode AND the safety demand rate is less than once per 1.5 s	Module is used in continuous demand mode OR the safety demand rate is more than or equal to once per 1.5 s
on demand	6 ms	
on fault	6 ms	14.3 ms
on external wiring fault	102 ms	



The times in the previous table are subjected to an RPI of 2 ms, Input Delay of 0 ms and Number of Input connections of 1.

For different RPI values, extend the timing by the RPI value. For additional number of Input connections, extend the timing by 0.14 ms for each addition.

Compact 5000 I/O Safety Output Module Safety Data

[Table 102](#) lists the safety data for the 5069-OBV8S and 5069-OBV8SK modules.

Table 102 - 5069-OBV8S and 5069-OBV8SK Module Safety Data

Attribute		Output Mode		
		Sourcing		Bipolar
		Point Operation Type		Point Operation Type
		Single	Dual	Single
Safety Function Architecture		0	1	1
Safe Failure Rate (λ_s) [failures/hr]		1.17E-06	9.45E-07	9.63E-07
Dangerous Failure Rate (λ_D) [failures/hr]		9.13E-07	5.98E-07	6.25E-07
Dangerous Detected Failure Rate (λ_{DD}) [failures/hr]		9.12E-07	5.97E-07	6.24E-07
Dangerous Undetected Failure Rate (λ_{DU}) [failures/hr]		3.29E-10	3.15E-10	3.14E-10
Safety Reaction Time, SRT [millisecond]		4.5		
Automatic Diagnostic Test Interval (TD) [hr]		4		
Useful Life [yr]		20		
Systematic Capability (SC)		3		
Safe Failure Fraction (SFF) [%]		99.98%	99.98%	99.98%
PFH		3.29E-10	3.15E-10	3.14E-10
PFD _{AVE}	10 yrs	1.44E-05	1.38E-05	1.38E-05
Mission Time	20 yrs	2.89E-05	2.76E-05	2.75E-05
Diagnostic Coverage Average (DC _{AVE})		99.96%	99.95%	99.95%
Spurious Trip Rate (STR)		3.65E-06	2.34E-06	2.45E-06
MTTF [years]		54.91	74.01	71.89
MTTF _D [years]		125.07	190.99	182.70

Safety Reaction Time - 5069-OBV8S and 5069-OBV8SK Modules

Safety reaction time of Compact 5000 I/O safety output modules is defined as follows:

- **SRT on Demand** - The response time interval between the availability of the demanded safety output data on the backplane of the module and a signal change on the output channel that is associated with this demand.
- **SRT on Fault** - the response time between the occurrence of an internal fault in the channel/module and the channel/module going into a safe state.
- **SRT on External Wiring Fault** - The response time between the occurrences of an external wiring fault and the channels going into a safe state when the channels is/are in Safety Pulse Test mode.

The following table lists SRT times for the Compact 5000 I/O safety output modules.

Safety Reaction Time	Module is NOT used in continuous demand mode AND the safety demand rate is less than once per 1 s	Module is used in continuous demand mode OR the safety demand rate is more than or equal to once per 1 s
on demand	4 ms	
on fault	4.5 ms	8.3 ms
on external wiring fault	200 ms	



The times in the previous table are subjected to an RPI of 2 ms and Number of Input connections of 1.

For different RPI values, extend the timing by the RPI value. For additional number of Input connections, extend the timing by 0.14 ms for each addition.

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