



PointMax Digital I/O Modules

5034-IA8, 5034-IA8XT, 5034-IB16, 5034-IB16XT, 5034-IB8, 5034-IB8XT, 5034-OA4, 5034-OA4XT, 5034-OB16, 5034-OB16XT, 5034-OB8, 5034-OB8XT, 5034-OB4, 5034-OB4XT, 5034-OW4I, 5034-OW4IXT, 5034-UB8, 5034-UB8XT, 5034-UB8F, 5034-UB8FXT, 5034-IB8S, 5034-IB8SXT, 5034-OB8S, 5034-OB8SXT



Allen-Bradley
by ROCKWELL AUTOMATION

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.

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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.

These 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).

The following icon may appear in the text of this document.



Identifies information that is useful and can help to make a process easier to do or easier to understand.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

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Preface

About This Publication

This manual describes how to use PointMax™ digital standard and safety I/O 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
- Use of safety systems
- Studio 5000 Logix Designer® environment

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes. Translated versions are not always available for each revision.

Table 1. Summary of Changes

Topic	Page
Updated terminology table.	Terminology on page 14
Updated Additional Resources.	Additional Resources on page 12
Added 5034-IA8/XT and 5034-OA4/XT module details.	Digital I/O Modules on page 16 Input Modules on page 19 Output Modules on page 21 Field Power Loss Detection on page 50 AC and DC Mode on page 57 Zero Voltage Crossing Synchronization on page 57 5034-IA8 and 5034-IA8XT Details on page 87 5034-OA4 and 5034-OA4XT Details on page 160
Added important note for 5034-IA8/XT module.	Software Configurable Input Filters or Delays on page 31
Updated Triggered Pulse Output.	Triggered Pulse Output on page 55
Added Surge Suppressors for Relay Output Modules.	Surge Suppressors on page 283

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Table 2. Additional Resources

Resources	Description
PointMax I/O System Specifications Technical Data, publication 5034-TD001	Provides PointMax I/O system specifications.

Table 2. Additional Resources (continued)

Resources	Description
PointMax I/O System Installation Instructions, publication 5034-IN001	Provides instructions on installing a complete PointMax I/O system.
PointMax EtherNet/IP Adapter User Manual, publication 5034-UM001	Provides information on how to configure and operate PointMax EtherNet/IP adapters.
PointMax Digital I/O Modules User Manual, publication 5034-UM002	Provides information on how to configure and operate PointMax digital I/O modules.
PointMax Analog I/O Modules User Manual, publication 5034-UM003	Provides information on how to configure and operate PointMax analog I/O modules.
PointMax 4-Channel IO-Link Master Module User Manual, publication 5034-UM004	Provides information on how to configure and operate the PointMax IO-Link master module.
PointMax Serial Module User Manual, publication 5034-UM005	Provides information on how to configure and operate the PointMax serial module.
PointMax High-speed Counter/SSI Encoder Module User Manual, publication 5034-UM006	Provides information on how to configure and operate the PointMax high-speed counter/SSI encoder module.
PointMax Analog HART I/O Modules User Manual, publication 5034-UM007	Provides information on how to configure and operate the PointMax analog HART I/O modules.
PointMax Dual Stepper Drive Module User Manual, publication 5034-UM008	Provides information on how to configure and operate the PointMax dual stepper drive module.
CompactLogix 5390 Controllers Selection and Specifications Technical Data, publication 5034-TD900	Provides specifications for CompactLogix® 5390 controllers. PointMax I/O modules work as the local or remote I/O for CompactLogix 5390 controller, using Studio 5000 Logix Designer® application version 39 or later.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
E-stop, Safety Mat, and Manual Reset Via a Safety-enabled Controller Application Techniques, publication SAFETY-AT208	Describes how to wire, configure, and program an 800F E-stop, 440F safety mat, 800F reset push button, and 100S-C contactors to a ControlLogix® safety-enabled controller with PointMax safety I/O modules.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation® products in a secure system, harden the control system, manage user access, and dispose of equipment.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.

Table 2. Additional Resources (continued)

Resources	Description
Product Selection and Configuration tools website, rok.auto/systemtools	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Download Firmware, AOP, EDS, and Other Files

You can download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Terminology

This table defines the terms that are used in this publication.

Table 3. Terminology

Acronym	Full Term	Definition
BP	Backplane Power	Power that is generated from module power by the adapter and expansion power, and supplied to the I/O system through the backplane.
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 Sync™	Common Industrial Protocol Synchronization	CIP Sync provides the increased control coordination needed for control applications where absolute time synchronization is vital to achieve real-time synchronization between distributed intelligent devices and systems.
COP	Copy File	COP is a command in PLC programming. This command copies the files from one memory location to another within the system.
CPS	Synchronous Copy File	CPS is a command in PLC programming. This command copies the files from one memory location to another within the system synchronously, which means the operation completes fully before the PLC continues with the next task.
LA	Local Actuator - Power	Local Actuator Power supplied through the RTB.
MB	Mounting Base	A device that provides data and power connections from the backplane to the installed module.
MP	Module Power	Power that is supplied to the adapter and expansion power.
ODVA	Open DeviceNet Vendor Association	A nonprofit association of vendors that are established for the promotion of CIP networks.
PL	Performance Level	ISO 13849-1 safety rating
RPI	Requested Packet Interval	Time interval (usually in milliseconds) that users are requesting their data be exchanged at
RTB	Removable Terminal Block	A component that is used for wiring field devices to.

Table 3. Terminology (continued)

Acronym	Full Term	Definition
SA	Sensor Actuator - Power	Sensor Actuator Power (24V DC nominal) for the field devices.
SELV	Safety Extra Low Voltage	An electrical system where the voltage level is considered safe under normal or fault conditions, as defined in the EN and IEC standards.
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.
SRT	Safety Reaction Time	The input safety reaction time is the time from when the signal changes on an input terminal to when safety data is sent to the safety controller. The output safety reaction time is the time from when safety data is received from the safety controller to when the output terminal changes state.
VCL	Voltage Clamp Low	The low threshold for limiting the voltage level.
XT	Extreme Environment	Modules with XT at the end of their catalog numbers have design considerations and conformal coating that add a degree of protection for harsh, corrosive gas environments.

Digital I/O Modules

This chapter describes the digital I/O module types and features that are common between input and output modules, and how to construct a PointMax I/O system.

I/O Type	Catalog Number	Description
Standard input modules	5034-IA8, 5034-IA8XT	8-point 120/240V AC input module
	5034-IB16, 5034-IB16XT	16-point sinking standard input module
	5034-IB8, 5034-IB8XT	8-point sinking standard input module
Standard output modules	5034-OA4, 5034-OA4XT	4-point 120/240V AC output module
	5034-OB16, 5034-OB16XT	16-point sourcing standard output module
	5034-OB8, 5034-OB8XT	8-point sourcing standard output module
	5034-OB4, 5034-OB4XT	4-point sourcing standard output module
	5034-OW4I, 5034-OW4IXT	4-point relay isolated high current standard output module
Standard universal digital modules	5034-UB8, 5034-UB8XT	8-point configurable input/output module
	5034-UB8F, 5034-UB8FXT	8-point configurable fast input/output module
Safety input module	5034-IB8S, 5034-IB8SXT	8-point sinking safety input module
Safety output module	5034-OB8S, 5034-OB8SXT	8-point sourcing safety output module

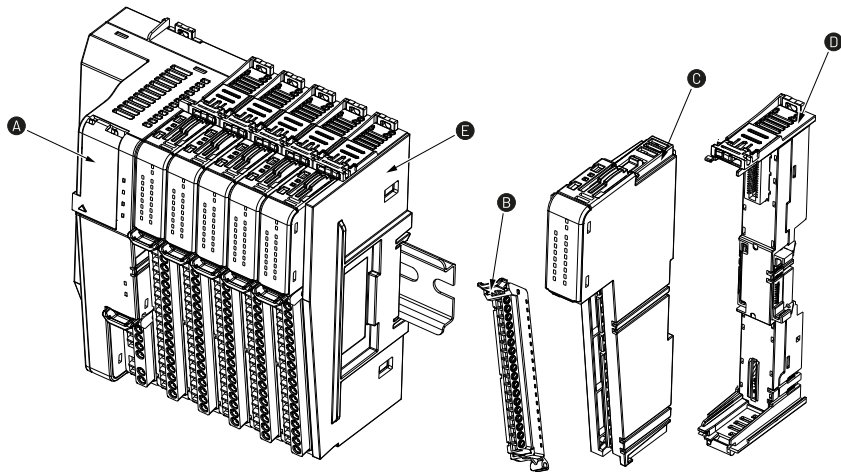
All digital I/O modules support removal and insertion under power (RIUP). You must remove the RTB first and then the I/O modules.

For technical and environmental specifications details, see PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

Construct a PointMax I/O System

The PointMax I/O system contains the components pictured below.

Figure 1. PointMax I/O System



Item	Component Name	Description
A	Adapter	The adapter transfers data between the I/O module and the controller.
B	Removable Terminal Block (RTB)	The RTB contain terminals to terminate wiring for field devices. Also it has interfaces to establish the connection between the RTB and the I/O module.
C	I/O module	The I/O module contains the Sensor Actuator (SA) or field power interface and circuitry needed to perform specific functions related to your application.
D	Mounting Base (MB)	The MB contains mechanical and electrical interfaces to establish the connection between I/O module and the backplane.
E	End cap	It is a dust protection cap for the last module in a rack.

For PointMax I/O system power requirements, see PointMax I/O System Installation Instructions, publication [5034-IN001](#).

IMPORTANT: Confirm that SA power is connected for proper operation of safety I/O modules.

Secure Access to the System

- To secure access to the device by authorized users only, consider these options:
- Use passwords to help protect the source and execution of the control program.
 - Remove the key from the controller.
 - Implement physical barriers, such as locked cabinets.

To secure access to the system, consider these options:

- Follow industry best practices to harden your personal computers and servers, including anti-virus/anti-malware and application allow-list solutions.

The recommendations are published at the Rockwell Automation technical support center in Knowledgebase Technote [Rockwell Automation Customer Hardening Guidelines](#).

- 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 confirm 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 the Knowledgebase Technote [Security Advisory Index](#), so you have access to information about security matters that affect Rockwell Automation products.

Follow recommended network practices for products with network interfaces, such as communication ports or web servers. These practices help minimize risk or exposure by unauthorized activity or users. For more information, see:

- Converged Plantwide Ethernet (CPwE) Design and Implementation Guide, publication [ENET-TD001](#)
- EtherNet/IP Network Devices User Manual, publication [ENET-UM006](#)
- Configure System Security Features User Manual, publication [SECURE-UM001](#)

PointMax I/O in a Logix 5000 Control System

IMPORTANT: Throughout this publication, the term Logix 5000 controller refers to the controllers with which you can use PointMax I/O modules in a given capacity.

You can use PointMax I/O modules as the local or remote I/O for CompactLogix 5390* controller, and the remote I/O for CompactLogix 5380, CompactLogix 5480, ControlLogix® 5590, and ControlLogix 5580 controllers, using Studio 5000 Logix Designer® application version 36 or later (*requires version 39 or later).

You cannot use PointMax I/O modules with all Logix 5000 controllers. For example, you can use PointMax I/O modules with CompactLogix® 5380 and ControlLogix® 5580 controllers but not with CompactLogix 5370 and ControlLogix 5570 controllers.

Logix 5000 controllers use I/O modules to control devices in a control system. The controllers access the modules over an EtherNet/IP network.

See [Connections for Standard I/O Modules on page 30](#) and [Connections for Safety I/O Modules on page 38](#) for the communication model between controller and I/O modules.

Controller and Software Compatibility

Controller and programming software compatibility requirements apply when you use PointMax I/O modules. A module type and how it is used affect which requirements apply.

You must use Studio 5000 Logix Designer application version 36 or later. For more information, see the Product Compatibility and Download Center at rok.auto/pcdc.

If you use GuardLogix® controllers and need to use up to chassis slot 32, you must use Studio 5000 Logix Designer application version 37 or later.

Module Firmware Updates

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

Firmware information for I/O modules is available at the Rockwell Automation Product Compatibility and Download Center (PCDC). The PCDC is available at: rok.auto/pcdc. At the PCDC, you can use the module catalog number to check for firmware updates. If the catalog number is not available, then no updates exist.

IMPORTANT: Only download firmware and access product release notes from the Rockwell Automation PCDC. Do not download firmware from non-Rockwell Automation sites.

Verify that the firmware revision of the I/O modules that you use is correct before commissioning the system. For more information on how to update your module firmware, see the ControlFLASH Plus® Quick Start Guide, publication [CFP-QS001](#).

When the firmware update is in progress, you cannot perform the following operations:

- Another firmware update request
- Module connection request
- Module reset request



WARNING: When you update the PointMax EtherNet/IP adapter firmware, the I/O modules in its chassis may reset and unable to maintain their Program Mode or Inhibit Mode states. Verify that all equipment controlled by the modules in this chassis is in a stopped state and that all safety-critical functions are unaffected.

Input Modules

Digital input modules interface to sensing devices and detect whether they are On or Off.

Digital input modules convert AC or DC On/Off signals from user devices to appropriate logic level for use within the processor. Typical input devices include the following:

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

When you design systems with digital input modules, consider these factors:

- Voltage necessary for your application
- Current leakage
- Whether your application uses sinking or sourcing wiring

Feature Comparison

Table 4. Input Module Feature Comparison

Feature	5034-IA8, 5034-IA8XT	5034-IB16, 5034-IB16XT, 5034-IB8, 5034-IB8XT	5034-UB8, 5034-UB8XT	5034-UB8F, 5034-UB8FXT	5034-IB8S, 5034-IB8SXT
Requested Packet Interval	✓	✓	✓	✓	✓
Module Inhibiting	✓	✓	✓	✓	✓
Electronic Keying	✓	✓	✓	✓	✓
Protected Operations	✓	✓	✓	✓	✓
Module Data Quality Reporting	✓	✓	✓	✓	✓
Software Configurable Input Filters or Delays	✓	✓	✓	✓	✓
Input Events				✓	
Counter Mode		✓	✓	✓	
Configure Counter State When Module is in Program Mode or Inhibited				✓	
Configure Counter State in Communication Fault Mode				✓	
Per Point Input Timestamping		✓	✓	✓	
FIFO Input Timestamping ⁽¹⁾				✓	
Use Test Output with Safety Input					✓
Muting Lamp Operation					✓
Field Power Loss Detection		✓	✓	✓	✓
Overload Protection					✓
Point Power Supply			✓	✓	

(1) This feature is only available for 5034-UB8F/XT module with firmware revision 2.011 or higher.

Output Modules

Digital output modules can be used to drive various output devices. Typical output devices compatible with digital output modules include these items:

- Motor starters
- Solenoids
- Indicators

When designing a system, make sure that the digital output modules can supply the necessary surge and continuous current for proper operation.

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

Feature Comparison

Table 5. Output Module Feature Comparison

Feature	5034-0A4, 5034-0A4XT	5034-0B4, 5034-0B4XT	5034-0B16, 5034-0B16XT, 5034-0B8, 5034-0B8XT	5034-0W4I, 5034-0W4IXT	5034-0B8, 5034-0B8XT	5034-0B8F, 5034-0B8FXT	5034-0B8S, 5034-0B8SXT
Requested Packet Interval	✓	✓	✓	✓	✓	✓	✓
Module Inhibiting	✓	✓	✓	✓	✓	✓	✓
Electronic Keying	✓	✓	✓	✓	✓	✓	✓
Protected Operations	✓	✓	✓	✓	✓	✓	✓
Module Data Quality Reporting	✓	✓	✓	✓	✓	✓	✓
Configure Output State When Module is in Program Mode or Inhibited	✓	✓	✓	✓	✓	✓	
Configure Output State in Communication Fault Mode	✓	✓	✓	✓	✓	✓	
Connection Fault Handling							✓
Data Echo	✓	✓	✓	✓	✓	✓	
Data Readback							✓
Time-scheduled Output Control			✓		✓	✓	
Time-scheduled Output Control with Pulse Width Modulation (PWM) ⁽¹⁾						✓	
Safety Mode and Safety Pulse Test Mode							✓

Table 5. Output Module Feature Comparison (continued)

Feature	5034-0A4, 5034-0A4XT	5034-0B4, 5034-0B4XT	5034-0B16, 5034-0B16XT, 5034-0B8, 5034-0B8XT	5034-0W4I, 5034-0W4IXT	5034-0B8, 5034-0B8XT	5034-0B8F, 5034-0B8FXT	5034-0B8S, 5034-0B8SXT
Field Power Loss Detection	✓ ⁽²⁾	✓	✓	✓	✓	✓	✓
No Load Detection		✓	✓		✓		✓
Short Circuit Detection/Protection		✓	✓		✓	✓	
Overload Protection		✓	✓		✓	✓	✓
Isolated Relay Output				✓			
Fast Inductive Load Turn-off		✓	✓		✓	✓	
Pulse Width Modulation						✓	
Triggered Pulse Output ⁽¹⁾						✓	
Logic Controlled Output ⁽¹⁾						✓	
AC and DC Mode	✓						
Zero Voltage Crossing Synchronization	✓						

(1) This feature is only available for 5034-0B8F/XT module with firmware revision 2.011 or higher.

(2) This feature is only available in AC mode for 5034-0A4/XT module.

Ownership

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

- Stores configuration data for every module that it owns.
- Sends the I/O module configuration data to define module behavior and begin operation in the control system.

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

When the owner-controller establishes I/O connection to the module, it sends the configuration data of the module. Two possible results are:

- If the configuration is appropriate to the module, a connection is established and operation begins.
- If the configuration is not appropriate to the module, the data is rejected and the Connection view in the Module Properties indicates that an error occurred. The configuration can be inappropriate for many reasons. For example, a mismatch in electronic keying that helps prevent operation on incompatible module.

Multiple Owners of Digital Input Modules

This section applies to standard digital input modules only.

While typically only one owner-controller is connected to an input module, multiple Logix 5000 controllers can own digital 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 without output data.
- The first controller to make a connection to the input module is the only controller that can change the configuration. Therefore, it 'owns' the module configuration.

IMPORTANT: If the controller that owns the module configuration changes the configuration, the other controllers are not notified of any changes. See [Configuration Changes in an Input Module with Multiple Owners on page 23](#) for more information.

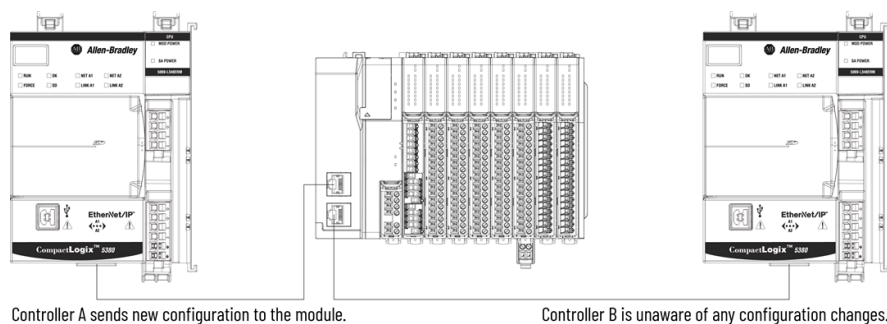
- The controllers that do maintain but do not 'own' the module configuration are similar to Listen-only controllers. The difference between the controllers is that the controllers that maintain but do not own the module configuration can use a Multicast or Unicast connection over the EtherNet/IP network.

Configuration Changes in an Input Module with Multiple Owners

This section applies to standard digital input modules only.

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, that 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 2. Module Configuration Changes with Multiple Owners



IMPORTANT: A message in Studio 5000 Logix Designer 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, you should inhibit the connection.

To prevent other owner-controllers from receiving potentially erroneous data, use these 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.
3. Repeat step 1 and step 2 for all owner-controllers, making the exact same changes in each.
4. Clear the Inhibit checkbox in each owner-controller configuration.

Requested Packet Interval

Requested Packet Interval (RPI) is a configurable parameter that defines a specific rate at which data is exchanged between the controller and the module.

You set the RPI value during initial module configuration and can adjust it as necessary after module operation has begun.

IMPORTANT: If you change the RPI while the project is online, 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 Optimization

PointMax I/O system supports automatic optimization for I/O connections.

The following conditions must be met for connections to be included in the optimization:

- I/O modules on the rack have the same RPI
- Unicast
- Sum of data sizes are within the packet limit

This is similar to how I/O systems such as POINT I/O™ support rack optimization or enhanced rack optimization. Functional safety modules, HART modules, and IO-Link master modules are excluded from the optimization.

Listen Only Mode

This section applies to standard digital I/O modules only.

Any controller in the system can listen to the data from an I/O module. An owner-controller, as described in [Ownership on page 22](#) exchanges data with I/O modules. Other controllers can use a Listen Only connection with the I/O module. In this case, the 'listening' controller can only listen to the data produced by the module. The listening controller does not own the module configuration or exchange other data with the module.

During the I/O configuration process, you can specify a Listen Only connection.

IMPORTANT:

Remember the following:

- If a controller uses a Listen Only connection, the connection must use the Multicast option. In this case, all other connections to the module, for example, the connection of the owner-controller, must also use the Multicast option.

The Listen Only connection RPI value must be the same as owner connection RPI value.

- If a controller attempts to use a Listen Only connection to a module but the owner-controller connection uses the Unicast option, the attempt at a Listen Only connection fails.

The Listen Only controller receives data from the module as long as a connection between an owner-controller and 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.
 - Due to Multicast, adding a Listen Only connection does not increase network bandwidth.
 - Only one controller can own the I/O module. The PointMax I/O modules do not support multiple owners of the same module. Other controllers must use a Listen Only connection to the module.
-

Module Inhibiting

Module inhibiting lets you indefinitely suspend a connection, including Listen Only connections, between a controller and a module without removing the module from the configuration. This process lets you temporarily stop the connection between the controller and the module.

IMPORTANT: Whenever you inhibit a module with outputs, all outputs change to the state that is configured for Program Mode (Standard modules only).

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

You can use module inhibiting in the following ways:

- You want to perform maintenance on the module.
- You want to update a module, for example, update the module firmware revision.
- 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 system.

Use the following procedure to inhibit and uninhibit the module:

1. Inhibit the module – Go to Connection view in the Module Properties dialog, select Inhibit Module and then select Apply or OK.
2. Perform the necessary update.
3. Uninhibit the module – Go to Connection view in the Module Properties dialog, clear Inhibit Module and then select Apply or OK.

Electronic Keying

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.

IMPORTANT: For safety I/O devices, do not use Disable Keying.

Attribute	Description
Vendor	The device manufacturer
Device Type	The general type of the product, for example, an 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

Table 6. Electronic Keying Options

Keying Option	Description
Compatible Module	<p>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:</p> <ul style="list-style-type: none"> • Same or compatible 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. • You can use an XT version of the module in place of a non-XT module or non-XT version of the module in place of XT module.
Disable Keying	<p>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.</p> <div>  <p>ATTENTION: Be cautious when using Disable Keying; if used incorrectly, this option can lead to personal injury or death, property damage, or economic loss.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p> </div>
Exact Match	<p>Indicates that all keying attributes must match to establish communication. If any attribute does not match precisely, communication with the device does not occur.</p> <p>When XT module is configured in the controller project, only XT Module residing on XT MB is considered as Exact Match. When non-XT module is configured, only non-XT module (with any MB) is considered as exact match.</p>

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.

For more detailed information on Electronic Keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication [LOGIX-AT001](#).

Protected Operations

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

In Protection Mode, the device deactivates services that could disrupt the operation of the device, but the device continues to function. For example, configuration operations or firmware updates are disabled to not impact the operation of the device.

The module enters Implicit Protection Mode as soon as an I/O connection is established to the module. The module exits Implicit Protection Mode as soon as all I/O connections to the module are stopped.

When the device is in Implicit Protection Mode, the mode prevents the following actions:

- Firmware update request
- Module reset request
- Connection or data format change

The following operations can be applied in Studio 5000 Logix Designer application when the modules are in Protection Mode, but as a consequence, the I/O connections are closed and reopened:

- Change Electronic Keying
- Change RPI
- Change Unicast/Multicast

The following operations are allowed when the modules are in Protection Mode:

- Listen-only connection requests from other controllers
- I/O channel configuration change. To apply configuration change without interrupting the I/O connections, there are two methods:
 - Change configurations and apply the changes in the Module Properties dialog.
 - Change configuration tag values and send a Reconfigure Module MSG to the module to apply the changes.

Unicast or Multicast Connection

During module configuration, you must configure the Connection over EtherNet/IP parameter. The configuration choice dictates how input data is broadcast over the network.

The PointMax I/O modules use one of the following methods to broadcast data:

- Multicast – Multicast connections deliver information from one sender to multiple receivers simultaneously. Copies of one transmission are passed to a selected subset of possible destinations.
- Unicast – Unicast connections are point-to-point transmissions between a source node and destination node on the network. A transmission is sent to one destination controller.

IMPORTANT: Unicast is the default setting. Use Unicast because it reduces network bandwidth usage. However, if you are using a ControlLogix 5580 controller in a high availability system, you must use Multicast.

CIP Sync Time

I/O modules use CIP Sync for timestamps. 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.

These modules are CIP Sync slave-only devices. There must be another module on the network that functions as a master clock.

You can use I/O modules to capture timestamps. The advantage is that CIP Sync is system-wide, so timestamp values are consistent across all modules in the system.

IMPORTANT: *I.CIPSyncValid* = 1 is not sufficient for an application to confirm that the module is ready for application requiring a system time synchronization to start operation. See [Grandmaster Clock Verification on page 28](#) for extra verification needed.

Grandmaster Clock Verification

The application must verify that the module is synchronized with the same Grandmaster Clock as the owner-controller.

- If Status connection is selected in the PointMax EtherNet/IP adapter Device Definition, verify that all of the following are true:
 - I/O module's *I.CipSyncValid* is 1
 - Adapter's *S.CipSyncValid* is 1
 - Adapter's *S.GrandmasterClockID* is the same as the controller's *GrandMasterClockID*
- If Status connection is not selected in the PointMax EtherNet/IP adapter Device Definition, verify that all of the followings are true:
 - I/O module's *I.CipSyncValid* is 1
 - I/O module's *GrandmasterClockID* in *GrandMasterClockInfo* attribute of *TimeSync* object is the same as the controller's *GrandmasterClockID*
- Class: 0x43
- Instance: 0x01
- Attribute: 0x08
- Response: *GrandMasterClockInfo* (see structure below)

GrandMasterClockInfo	STRUCT of
ClockIdentity	USINT[8]
ClockClass	UINT
TimeAccuracy	UINT
OffsetScaledLogVariance	UINT
CurrentUtcOffset	UINT
TimePropertyFlags	WORD
TimeSource	UINT
Priority1	UINT
Priority2	UINT

To get controller's GrandMasterClockID, access the TIMESYNCHRONE object through the GSV instruction. See [Access the TimeSynchronize object](#).

Standard Input Modules

Connections for Standard I/O Modules

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

During the module configuration, the connection type determines what data is exchanged between the controller and the module. When you uninhibit a module in online mode, or download the project with modules that are uninhibited to the controller, the controller attempts to establish a connection to each module.

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

Producer/Consumer Communication

PointMax I/O 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 eliminates the need for one controller to send the data to other controllers.

Module Data Quality Reporting

The I/O modules indicate the quality of point data that is returned to the owner-controller. Levels of data quality are reported via module input tags.

The following inputs 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 Studio 5000 Logix Designer application controls the tags. You cannot change the status of the tags. Keep in mind 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* – When the fault bit is set, this tag indicates that the reported point data is inaccurate and cannot be trusted for use in your application. Do not use the reported point data for control.

If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.

Example causes of inaccurate data include the following:

- Point fault
- Field Power Loss condition



You should troubleshoot the module for the typical causes first.

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

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

An example cause of uncertain data is the counter input signal frequency is outside its designed operating range.



You should monitor the tags in your program to make sure that the application is operating as expected with accurate point input data.

Software Configurable Input Filters or Delays

You can adjust On to Off and Off to On filter timing through the Studio 5000 Logix Designer application for all digital input modules. These filters improve noise immunity within a signal.

A larger filter value affects the length of delay time for signals from these modules. The filter values are adjustable in the Points view of the Module Properties dialog.

IMPORTANT: For a 5034-IA8/XT module operating with a 120V AC input signal, the only valid Off to On filter value is 1 ms.



For 5034-UB8F, use smaller filter values of 0...200 μ s to help achieve better accuracy performance.

Counter Mode

Counter mode is used to count input pulses. The module provides count up functionality, and counter done and counter rollover indication.

Input Events

The 5034-UB8F and 5034-UB8FXT modules can be configured with four input event definitions.

To use Input Events, select the “Data with Events” connection type in the Device definition dialog while configuring the module.

The following conditions can trigger events:

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

When the module reports an input event to the controller, the module can trigger an event task to execute in the controller. The event task lets you execute a section of logic immediately when an event, or receipt of new data, occurs.

For more information on event tasks, see the Logix 5000 Controllers Tasks, Programs, and Routines Programming Manual, publication [1756-PM005](#).

IMPORTANT: No input event is generated, if any of the participating channel is in fault condition.

Independent Point Trigger

An input state change or a counting input bit done change that triggers 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. 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. 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 that matches the pattern triggers the event.

Input Event Latching

To use input event latching, you must select the Latch Event checkbox for that input event. Set the *EO.Eventxx.LatchEn* tag to 1.

When input event latching is used, the event in the input data must be acknowledged before a new event is sent out.

To acknowledge the current event in the input data, set the *EO.Eventxx.EventNumberAck* tag to the event number (*EI.Eventxx.EventNumber* tag) in the input data.

If the current event is not acknowledged, subsequent events are stored in a queue. The queue can store up to four events. If the queue is full, excess events are dropped.

Additional Event Considerations

When you use the Input 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 the minimum duration that is determined by the input filter time specified.
- When you configure the RPI of the input event connection, consider that the minimum interval between two input data packets of event connection is one quarter of the RPI connection.
- After the event task executes, it does not execute again until the event occurs again.
- When the input event connection is reopened, the *EI.Eventxx.PtxxData* tag is reset to 0.

Per Point Input Timestamping

As a Sequence of Events feature, you can configure an input point to timestamp the input transitions and report the timestamps on per-point basis. The timestamps are based on the system time clock from CIP Sync.

Pulse Latching

Pulse Latching is supported via the Timestamping feature and Timestamp Latching. You can use Pulse Latching to detect or latch short-duration pulses.

To use Pulse Latching, you must set the Input Data parameter to Timestamp Data in the Device Definition dialog.

Location in Studio 5000 Logix Designer Application Project	Action
Module Properties → Points → Ptxx	Check the input transition type where you must latch short-duration pulses. For example, for short-duration pulses that are latched for Off to On transitions, select Off → On input transition.
Module tags	One or both of these actions. <ul style="list-style-type: none"> Change the <i>C.Ptxx.CaptureOffOnEn</i> tag to 1. Change the <i>C.Ptxx.CaptureOnOffEn</i> tag to 1.

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 Studio 5000 Logix Designer Application Project
Off to On	<ul style="list-style-type: none"> The <i>I.Ptxx.TimestampOffOnNumber</i> tag increments. The timestamp is recorded in the <i>I.Ptxx.TimestampOffOn</i> tag.
On to Off	<ul style="list-style-type: none"> The <i>I.Ptxx.TimestampOnOffNumber</i> tag increments. The time stamp is recorded in the <i>I.Ptxx.TimestampOnOff</i> tag.

When subsequent short-duration pulses are detected at the same input point, the Latching configuration dictates what changes, if any, occur in the Studio 5000 Logix Designer application project.

Latching Configuration	Input Transition Type Where Pulse Is Captured	Change in Studio 5000 Logix Designer Application Project
Disabled (default) These conditions disable Timestamp Latching. <ul style="list-style-type: none"> The Enable Timestamp Latching checkbox on the Ptxx view is cleared. The <i>C.Ptxx.TimestampLatchEn</i> tag = 0 	Off to On	The <i>I.Ptxx.TimestampOffOnNumber</i> tag increments. The new time stamp is recorded in the <i>I.Ptxx.TimestampOffOn</i> tag, which overwrites the previous time stamp.
	On to Off	The <i>I.Ptxx.TimestampOnOffNumber</i> tag increments. The new time stamp is recorded in the <i>I.Ptxx.TimestampOnOff</i> tag, which overwrites the previous time stamp.

Latching Configuration	Input Transition Type Where Pulse Is Captured	Change in Studio 5000 Logix Designer Application Project
Enabled These conditions enable Timestamp Latching. <ul style="list-style-type: none"> The Enable Timestamp Latching checkbox on the Ptxx view is selected. The <i>C.Ptxx.TimestampLatchEn</i> tag = 1 	Off to On	The <i>I.Ptxx.TimestampOffOnNumber</i> and <i>I.Ptxx.TimestampOffOn</i> 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>I.Ptxx.TimestampOnOffNumber</i> and <i>I.Ptxx.TimestampOnOff</i> 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 time stamp in *I.Ptxx.TimestampOffOn*.

You can change tag values in program logic while normal module operation continues or through the Studio 5000 Logix Designer application tag editor.

Chatter Detection

Chatter Detection is a feature that is directly related to Timestamping. You use the feature to detect when a device that is connected to the module input 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 time stamps 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.
- Chatter Time - Determines the amount of time within which the number of input transitions are counted.

FIFO Input Timestamping

IMPORTANT: This feature is only available for 5034-UB8F module with firmware revision 2.011 or higher.

As a Sequence of Events feature, you can configure the 5034-UB8F module to report input timestamps in First-In-First-Out (FIFO) mode. When specific points that are Timestamp Capture-enabled transition from Off-to-On or On-to-Off, the module timestamps the transition with the system time clock from CIP Sync. The module stores the timestamp data in onboard buffers that

hold 256 timestamp events. All eight points share the same buffer. At RPI, a FIFO buffer for 20 entries is produced for the controllers.

To enable this feature, set the Timestamp to FIFO in Device Definition.

IMPORTANT: Keep in mind that, although the module can store data for up to 256 timestamped transitions in its onboard buffers, if you manage the buffer effectively (for instance, retrieve data in a timely fashion), the module can timestamp an infinite number of input transitions and the controller is able to retrieve and use the data.

Typical Applications of FIFO Mode

FIFO mode is intended for use in applications where multiple transitions occur on multiple inputs in relatively rapid succession (that is, faster than the controller can acknowledge the data as the transitions occur).

Examples of typical FIFO mode applications are:

- During a power trip, the sequence of devices that trips can be captured and analyzed.
- Sequence monitoring
- Process and machine optimization

Retrieve Data in FIFO Mode

In FIFO Mode, the controller must retrieve the timestamp events in the order that they occur.

1. At each RPI, the module produces the oldest 20 unacknowledged events (in time sequence, oldest first) in the input tag.
2. The controller checks whether the *I.FIFO[0].EventNumber* is 0.
 - If *I.FIFO[0].EventNumber* is 0, which means the FIFO is empty, no action is required.
 - If *I.FIFO[0].EventNumber* is any value other than 0, then the controller proceeds with the following steps to retrieve the FIFO data.
3. The controller copies the *I.FIFO[0]* data to the desired location.
4. The controller repeats the Step 3 for each subsequent entry in the *I.FIFO* sequentially until one of the following scenarios is true:
 - a. An entry (*I.FIFO[n]*) with *EventNumber* = 0 is found, which means, from this entry onwards, the entries are empty.
 - b. The last entry is copied.
5. The controller updates the *O.FIFO.EventNumberAck* with the value of:
 - *I.FIFO[n-1].EventNumber* in the case of Step 4.a.
 - *I.FIFO[19].EventNumber* in the case of Step 4.b.

Whenever the module receives any value other than 0 for *O.FIFO.EventNumberAck*, it performs the following processing on the FIFO buffer to produce data for the controller and report it at the next RPI.

- Clears all FIFO entries with the *EventNumber* equal to or less than the *O.FIFO.EventNumberAck*.
- Moves unacknowledged FIFO entries to the beginning of the FIFO buffer.
- Fills the remaining FIFO entries with the oldest events in the onboard buffer of the module.



Use a Copy File (COP) or Synchronous Copy File (CPS) instruction to programmatically copy relevant input data from the controller tags to a separate array in the controller memory. Later, you can combine data from multiple modules and use a Sort routine to determine the order of events, with relative time reference, which occur in a specific period.

FIFO Event Latching

You can enable FIFO Event Latching to prevent the module from overwriting input data once it is timestamped.

- If FIFO Event Latching is enabled, the new timestamps that are detected on the input points are discarded when the onboard buffer is full.
- If FIFO Event Latching is disabled, the new timestamps that are detected on the input points overwrite the oldest timestamps that are stored in the onboard buffer when the onboard buffer is full.

Field Power (SA Power) Loss Detection

IMPORTANT: This feature is not applicable to 5034-IA8/XT module.

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

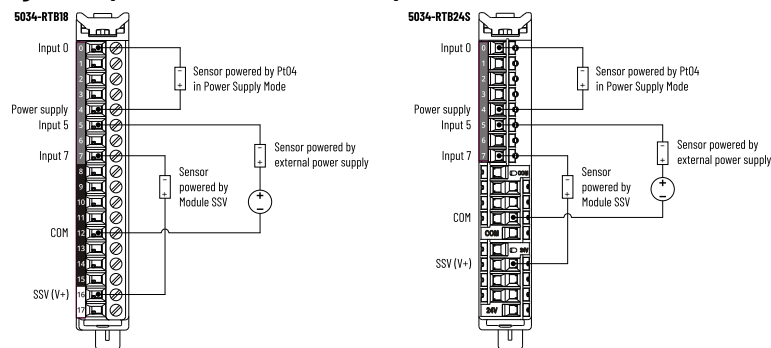
In the diagnostic assembly, the FieldPowerOff bit is set at the module and point level structure. The Fault bit is set at the point level.

Point Power Supply

You can configure the 5034-UB8 and 5034-UB8F module points to function as a power supply.

Typically, for points that are configured as an input (Digital Input, Digital Input – Timestamp, Digital Input – Counter, or Digital Input – FIFO), you can select the power source as External Power Supply, Module SSV, or Point in Power Supply mode. When the point that is configured as a power supply is faulted, the fault bit of that input point is also set.

Figure 3. Input Point Power Source Example



Configure Counter State When Module is in Program Mode or Inhibited

You can configure the counter to specific states when the module is in Program Mode or when the module is inhibited.

When the controller switches from Run mode to Program Mode or Inhibited, the counter can behave in the following ways, depending on how you configure the Counter State in Program Mode parameter:

- Continue counting – Default
- Hold its last state
- Transition to a user-defined value

You can choose to reset the stored count value when the module is in Program Mode or Inhibited.

When the module is inhibited, the counter behavior follows the Counter State in Program Mode configuration.

Configure Counter State in Communication Fault Mode

You can configure the counter to specific states when a connection fault occurs, that is, the connection between the controller and the module breaks.

Counter Behavior Immediately After a Connection Fault

When the connection between a controller and module breaks, the counter can behave in the following ways, depending on how the Counter State in Fault Mode parameter is configured:

- Continue counting – Default
- Hold its last state
- Transition to a user-defined value

You can choose to reset the stored count value when the module when is in Communication Fault Mode.

The counter remains at that state value until the connection to the controller is re-established.

When Communication Fails in Program Mode

When communication fails in Program Mode, the counter can behave in the following ways, depending on how you configure the When Communication Fails in Program Mode parameter:

- Leave counter in Program Mode state – It causes the counter to behave as defined by the Counter State in Program Mode selection.
- Change counter to Communication Fault state – It causes the counter to behave as defined by the Counter State in Communication Fault Mode selection.

Safety Input Modules

Connections for Safety I/O Modules

During module configuration, you must define the module. Among the Device Definition parameters with safety I/O 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 modules in a project, that is an external means controller.

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 connections to each module in the configuration. An owner-controller establishes two connections (safety input and safety output). A controller that is listening to the module establishes one safety input connection.

Because part of module configuration includes a slot number in the remote 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 connection request is rejected and the Studio 5000 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 prevents normal operation.

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

Producer/Consumer Communication

PointMax I/O 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. If the connection is a multicast input connection, then multiple controllers can consume the input data, including the owner-controller and external means controller.

Connection Reaction Time Limit With Safety Modules

Setting the RPI on safety modules is not as straightforward as setting it on standard modules. With safety modules, the Connection Reaction Time Limit configuration affects the RPI that is used for a module.

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 point. 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 specifying RPI rates, see the Logix 5000 Controllers Design Considerations Reference Manual, publication [1756-RM094](#).

Module Data Quality Reporting

The safety I/O modules indicate the quality of point data that is returned to the owner-controller. Levels of data quality are reported via module input tags.

The following inputs indicate the level of data quality.

IMPORTANT: Some faults are not recoverable, that is, the fault bit is not cleared, and some faults are reset according to the *Ptxx.ResetFault* tag. The Studio 5000 Logix Designer application controls the tags. You cannot change the status of the tags. Keep in mind 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* – When the fault bit is set, this tag indicates that the reported point data is inaccurate and cannot be trusted for use in your application. Do not use the reported point data for control.

If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.

Example causes of inaccurate data include the following:

- Point not used
- Point fault
- Field Power Loss condition



You should troubleshoot the module for the typical causes first.

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

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

An example cause of uncertain data is the module is operating outside its designed operating range.



You should monitor the tags in your program to make sure that the application is operating as expected with accurate point input data.

Software Configurable Input Filters or Delays

You can adjust On to Off and Off to On filter timing through the Studio 5000 Logix Designer application for all digital input modules. These filters improve noise immunity within a signal.

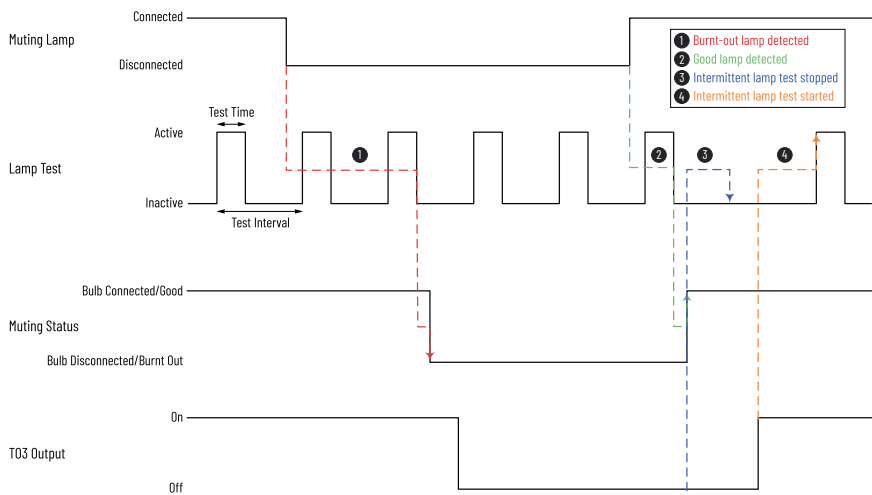
A larger filter value affects the length of delay time for signals from these modules. The filter values are adjustable in the Points view of the Module Properties dialog.

Muting Lamp Operation

To use test outputs for muting lamp operation, select Muting Lamp for the Test Output Point Mode in the Module Properties dialog.

Your controller program controls test outputs 0...3 (T00...T03) 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 4. Monitor Muting Lamp Operation, Status, and Fault Detection



The lamp test interval is 2 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 2-second interval. To allow time for two consecutive test intervals, program a minimum Test Output On Time of 4 seconds.

Table 7. Expected Behavior of Muting Status for Test Outputs

Test Output Commanded State	Lamp Condition	Muting Status Bit	Required Action
ON	Bad (open circuit)	0	Repair the lamp.
ON	Good	1	None, normal condition, the lamp is operating properly.
OFF	Bad (open circuit)	0	If the lamp remains OFF after the test output is cycled, repair the lamp.

Table 7. Expected Behavior of Muting Status for Test Outputs (continued)

Test Output Commanded State	Lamp Condition	Muting Status Bit	Required Action
OFF	Good	1	None, normal condition

- When power is applied to the safety input module and the test output remains commanded Off, the muting status bit defaults to 1.

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 you check 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 4 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 good condition, independent of the state of the test output.

Field Power (SA Power) Loss Detection

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

The Field Power Loss condition causes safety connections to fault.

In the diagnostic assembly, the FieldPowerOff bit is set at the module and point level structure. The Fault bit is set at the point level.

Overload Protection

Overload Protection helps prevent damage to a Test Output on the safety input module that can result when more current is present at the output than it can handle.

There is an Overload tag in the Diagnostic assembly.

When an overload or short circuit to ground condition is detected, the Test Output turns off and the *I.Testxx.Fault* tag is set to 1.

When an overload or short circuit to ground condition is removed, the Test Output restarts in its commanded state and the *I.Testxx.Fault* tag is reset to 0.

For more information on the maximum current that you can apply to a Test Output, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

Table 8. Test Output Recovery After Overload Condition

Cause of Fault	Correction	Recover Time
Overload condition	Remove the load from the Test Output point.	After the Overload or short circuit to ground condition occurs, the Test Output point holds fault indications

Table 8. Test Output Recovery After Overload Condition (continued)

Cause of Fault	Correction	Recover Time
Short circuit to ground condition	Correct the cause of the short circuit condition	for 10 seconds until it checks if the fieldfault is removed.

Standard Output Modules

Connections for Standard I/O Modules

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

During the module configuration, the connection type determines what data is exchanged between the controller and the module. When you uninhibit a module in online mode, or download the project with modules that are uninhibited to the controller, the controller attempts to establish a connection to each module.

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

Producer/Consumer Communication

PointMax I/O 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 eliminates the need for one controller to send the data to other controllers.

Standard Output Module Operation

The controller sends data to the output module at one of the following:

- RPI
- After an Immediate Output (IOT) instruction is executed

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

Module Data Quality Reporting

The I/O modules indicate the quality of point data that is returned to the owner-controller. Levels of data quality are reported via module input tags.

The following inputs 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 Studio 5000 Logix Designer application controls the tags. You cannot change the status of the tags. Keep in mind 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* – When the fault bit is set, this tag indicates that the reported point data is inaccurate and cannot be trusted for use in your application. Do not use the reported point data for control.

If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.

Example causes of inaccurate data include the following:

- Point fault
- Field Power Loss condition



You should troubleshoot the module for the typical causes first.

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

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

An example cause of uncertain data is the counter input signal frequency is outside its designed operating range.



You should monitor the tags in your program to make sure that the application is operating as expected with accurate point input data.

Configure Output State When Module is in Program Mode or Inhibited

You can configure individual output points to specific states when the module is in Program Mode or when the module is inhibited.

When the controller switches from Run mode to Program Mode or Inhibited, the output can behave in the following ways, depending on how you configure the Output State in Program Mode parameter:

- Off – Output is 0 or Off.
- On – Output is 1 or On.
- Hold – Output maintains the last state.
- Local Control – Output continues to operate as configured for the point.

IMPORTANT: Local Control option is only available for the output points that are controlled by local events. For example, Digital Output, Logic Controlled and Digital Output, Triggered Pulse.

When Local Control is selected for Program/Inhibit mode and Override is enabled for the output channel, the output turns off when the module enters Program/Inhibit mode.

When the module is inhibited, the output behavior follows the Output State in Program Mode configuration.

Configure Output State in Communication Fault Mode

You can configure individual output points to specific states when a connection fault occurs, that is, the connection between the controller and the module breaks.

Output Behavior Immediately After a Connection Fault

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

- Off – Output is 0 or Off.
- On – Output is 1 or On.
- Hold – Output maintains the last state.
- Local Control – Output continues to operate as configured for the point.

IMPORTANT: Local Control option is only available for the output points that are controlled by local events. For example, Digital Output, Logic Controlled and Digital Output, Triggered Pulse.

When Local Control is selected for Communication Fault mode and Override is enabled for the output channel, the output turns off when the module enters Communication Fault mode.

The output remains at that state value until the following occurs:

- The connection to the controller is re-established.
- The duration expired, which is based on the value that is defined in the Communication Fault Mode State Duration.

Communication Fault State Duration After Connection Fault

For output behavior after a connection fault, you must define how long the output remains at the specified value before it transitions to a Final Communication Fault Mode 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 Communication Fault Mode State Duration time expires, the output transitions to the user-defined Final Communication Fault Mode State.

Final Communication Fault State

The Final Communication Fault State defines the state to which the output goes after the Communication Fault Mode State Duration time expires.

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

When Communication Fails in Program Mode

When communication fails in Program Mode, the output can behave in the following ways, depending on how you configure the When Communication Fails in Program Mode parameter:

- Leave Outputs in Program Mode State – It causes the output to behave as defined by the Output State in Program Mode selection.
- Change Outputs to Communication Fault Mode State – It causes the output to behave as defined by the Output State in Communication Fault Mode selection.

Data Echo

Data Echo automatically sends point data values that match the digital value that was sent to the module's screw terminals.

At the RPI, the output module sends fault and status data, and returns a value that was sent to it by the owner-controller. The echoed value is indicated in *I.Ptxx.Data*.

Time-scheduled Output Control

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

For the timing of scheduled outputs for the modules, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

You must time sync the module. Before you start the application, you must verify that time synchronization is performed correctly. For more information, see [CIP Sync Time on page 28](#).

Schedule Outputs Using MAOC

Time-scheduled output control can be used with the Motion Arm Output Cam (MAOC) instruction. The MAOC instruction enables position-based output control in these 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 digital output modules at the coarse update rate. However, some high-speed applications require a higher degree of accuracy.

The scheduled output modules improve 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.

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

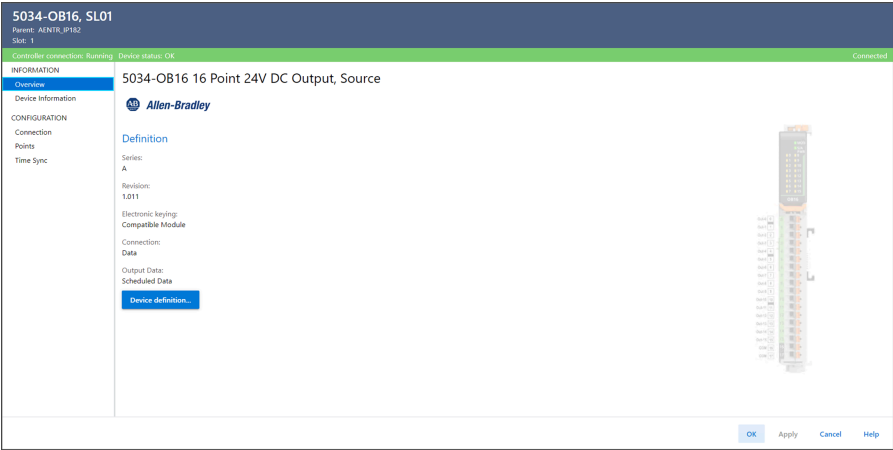
For 5034-OB16 and 5034-OB8 modules, the scheduled output connection is compatible with MAOC. For 5034-UB8 and 5034-UB8F modules, you must set MAOC Compatible Data to Yes in the Device Definition dialog to work with MAOC.

To use a MAOC instruction with schedule outputs, complete the following steps:

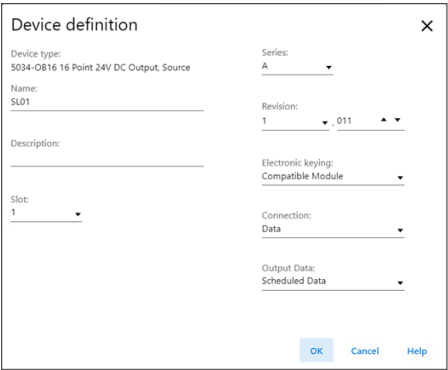
IMPORTANT:

- Before you complete the steps, confirm that Time Synchronization is enabled in the controller and, if applicable, the Ethernet module, to use scheduled outputs.
- You must verify in your logic that the grandmaster clock ID in both the controller and I/O module is identical. For more information, see [Grandmaster Clock Verification on page 28](#).

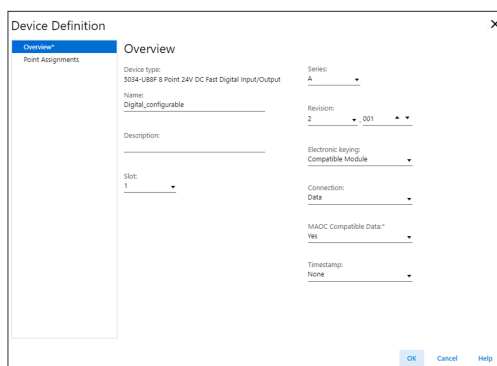
1. If necessary, add an output module to your Studio 5000 Logix Designer application project.
2. From the Overview in the Module Properties dialog, select Device definition to access the Device Definition parameters.



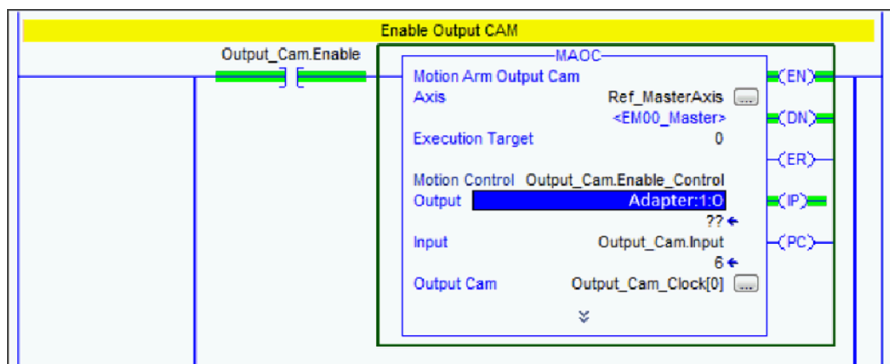
3. **For 5034-OB16 and 5034-OB8 modules:** In the Device Definition dialog, choose Scheduled Data for the Output Data.



For 5034-UB8 and 5034-UB8F modules: In the Device Definition dialog, choose Yes for the MAOC Compatible Data.



4. Select OK to close the Device Definition dialog.
5. Add an MAOC instruction to your logic.
6. In the MAOC instruction, use the module output tag in the Output operand, for example, Adapter:1:0 for the 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:

- Logix 5000 Controllers Motion Instructions Reference Manual, publication [MOTION-RM002](#)
- Position-based Output Control with the MAOC Instruction Application Technique, publication [1756-AT017](#)

Schedule Output Without Using MAOC

If you are not using MAOC instructions for scheduled output, you must adjust *O.TimeBase* manually to create schedule entries. With a specific TimeBase, the schedule time offset is up to ± 2.14 seconds.

For example:

1. An application gets five schedules to send to Module M.

Current Time = 9:10:05.000000000

TimeBase = 9:11:08.000000000

Schedules to send =

- a. 9:10:20.000000000
- b. 9:10:22.000000000
- c. 9:10:23.000000000

- d. 9:10:24.000000000
- e. 10:10:23.000000000
- 2. Set TimeBase to 9:10:22.000000000 and send schedule a (with TimeOffset as -2 seconds), b (with TimeOffset as 0 seconds), and c (with TimeOffset as 1 second) to Module M.
- 3. Wait until sequence number of a, b, c are echoed back by Module M. Set TimeBase to 9:10:24.000000000 and send d (with TimeOffset as 0 seconds) to Module M.
- 4. Wait until sequence number of d is echoed back by Module M. Set TimeBase to 10:10:23.000000000 and send schedule e to Module M.

IMPORTANT: Once the schedule entries that are based on the current TimeBase are echoed back with the same sequence numbers by the module (this typically happens within 2 RPIs from new sequence numbers are set in the output tag), a new TimeBase can be set to incorporate new schedule entry creations.

IMPORTANT: Always set Schedule[x].SequenceNumber as the last step of Schedule[x] entry creation in the output tag.

IMPORTANT: You can monitor Schedule[x].State in the input tag to verify that the schedule is performed correctly.

Time-scheduled Output Control with PWM (Scheduled PWM)

IMPORTANT: This feature is only available for 5034-UB8F module with firmware revision 2.011 or higher.

This feature functions the same way as Time-scheduled Output Control, except that instead of controlling On or Off states, the data bit O.Schedule[n].Data controls the start and stop of the pulse generation. The PWM Cycle Count Limit is not supported for Scheduled PWM. If PWM Cycle Count Limit (C.Pwmxx.CycleCountEn) is enabled, Scheduled PWM entries are discarded.

When Scheduled PWM is used, the O.Pwmxx.CycleTime and O.Pwmxx.DutyCycle are always applied immediately after the module receives the consume data (that is, queuing scheduled entries with different cycle time or duty cycle is not supported).

IMPORTANT: To use Scheduled PWM, you must set MAOC Compatible Data to No in the Device Definition.

An output point, which is configured as Scheduled PWM, can operate in the following ways that are listed below.

Table 9. Output Point Functional Behavior

C.Pwmxx.Enable	O.Ptxx.ScheduleEn	Description
0	0	The output point functions as a simple digital output. The O.Ptxx.Data bit controls the output state.
0	1	The output point functions as a scheduled output. The O.Schedule[n].Data bit controls the output state.

Table 9. Output Point Functional Behavior (continued)

C.Pwmxx.Enable	O.Ptxx.ScheduleEn	Description
1	0	The output point functions as PWM output. The O.Ptxx.Data bit controls the output PWM generation.
1	1	The output point functions as a Scheduled PWM output. The O.Schedule[n].Data bit controls the output PWM generation.

Field Power Loss Detection

Field Power Loss Detection for SA Power

IMPORTANT: All digital output modules support SA power except 5034-0A4/XT module.

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

In the diagnostic assembly, the FieldPowerOff bit is set at the module and point level structure. The Fault bit is set at the point level.

Field Power Loss Detection for LA Power

IMPORTANT: The 5034-0A4/XT module supports LA power only when the module operates in AC mode.

The Field Power Loss Detection feature monitors for the loss of field-side power at the LA power terminal on the RTB.

In the diagnostic assembly, the FieldPowerOff bit is set at the module and point level structure. The Fault bit is set at the point level.

No Load Detection

No Load Detection detects when a wire is disconnected from the output or a missing load for each output point. No Load Detection occurs only when the output point is in the Off state.

The No Load Detection feature is disabled by default. You must enable the feature in your Studio 5000 Logix Designer application project.

The *I.Ptxx.NoLoad* tag indicates the presence of a No Load condition when it is set to 1. You can monitor a module tag in your program that corresponds to the No Load Detection to check for a fault.

For the minimum load current that is supported by the module, see the PointMax I/O Systems Specifications Technical Data, publication [5034-TD001](#).

Short Circuit Detection/Protection

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

When a short circuit condition is detected, the following occurs:

- The output turns off.
- The I/O status indicator for the output flashes red.
- The *I.Ptxx.ShortCircuit* tag is set to 1.

IMPORTANT: For 5034-UB8F only: For PWM operation, the short circuit diagnostic may not be reported if the output On time is less than 1 millisecond.

When the short circuit condition is removed, the following occurs:

- The output restarts in its commanded state.
- The I/O status indicator for the output follows the commanded state (off or steady yellow).
- The *I.Ptxx.ShortCircuit* tag is reset to 0.
- If PWM is enabled, the *I.Ptxx.ShortCircuit* tag is reset to 0 after no short circuit condition is detected for one cycle time.

For more information on the maximum current that you can apply to an output, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

Isolated Relay Output

These digital output modules provide point-to-point wiring isolation:

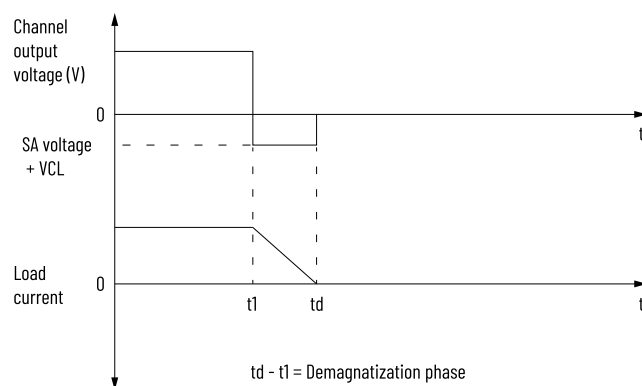
- 5034-OW4I
- 5034-OW4IXT

Fast Inductive Load Turn-off (Fast Demagnetization)

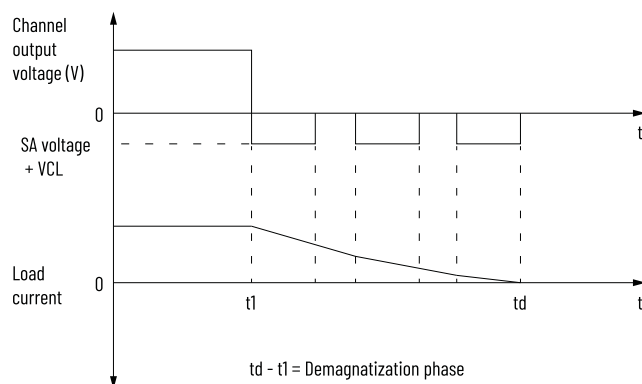
Traditionally, inductive loads (such as a solenoid drive) use a free-wheeling diode in parallel with the load to discharge stored energy to reach the Off status (zero current). This process is called Demagnetization.

PointMax standard output modules (5034-OB4, 5034-OB8, and 5034-OB16, plus 5034-UB8 and 5034-UB8F when configured with digital outputs) have the fast inductive load turn-off feature. If the inductive load is within the module's specified inductance and current rating, then no free-wheeling diode is required. Demagnetization is performed faster when compared to using an external free-wheeling diode. For the module inductance and current rating specifications, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

There are two possible demagnetization scenarios. Typically, inductive load demagnetization happens as illustrated in Demagnetization Example 1. In this scenario, demagnetization happens entirely through the output and the output voltage is at a negative voltage of (SA voltage + VCL) during the demagnetization phase.

Figure 5. Demagnetization Example 1

For 5034-UB8 and 5034-UB8F, in some situations, demagnetization happens as illustrated in Demagnetization Example 2. In this scenario, the demagnetization happens through the output. The output voltage switches between a negative voltage of (SA voltage + VCL) and approximately 0 volts during the demagnetization phase.

Figure 6. Demagnetization Example 2

Pulse Width Modulation

Pulse width modulation (PWM) provides precise, onboard control of an output's pulse train with no program variability. To configure a PWM signal, you define two real-time values for the pulse train in the module's output tags:

- Cycle time — The duration of a pulse cycle.
- Duty cycle — The percentage of the cycle time that a pulse is active.

If the cycle time or duty cycle value changes while the output is generating a PWM signal, the changes are not applied until the next cycle of the PWM output. For example, if the duty cycle is 10% and the cycle time is 1.0 second and the cycle time is changed to 0.5 second just after the output turns On, the output stays On for 0.1 second and then turns Off for 0.9 seconds to complete the cycle before the new 0.5 second cycle begins.

For another example, if the cycle time is erroneously set to an hour, a new cycle time does not go into effect until the current cycle of the hour is complete. To trigger the PWM output to restart immediately with a new cycle time or duty cycle, turn off the output and then it back On.

If the cycle time or pulse width (that is, cycle time * duty cycle or cycle time * [100% - duty cycle]) is outside the valid range for an output, the *I.Ptxx.Error* tag is set and the module responds as described in the following table.

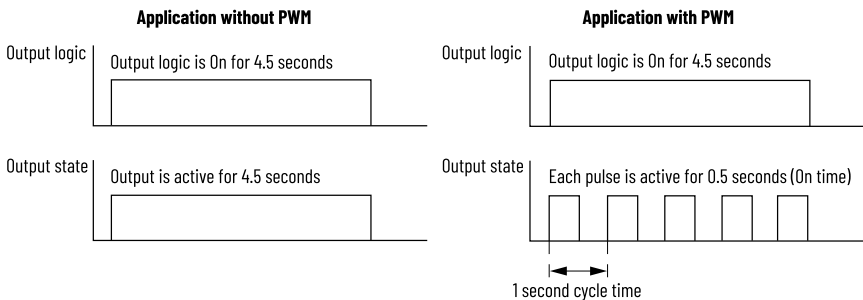
Condition	Result
CycleTime < Minimum cycle time	CycleTime = Minimum cycle time
CycleTime > Maximum cycle time	CycleTime = Maximum cycle time
Duty Cycle > 100%	Output is always in Active state.
Pulse width < Minimum pulse width	Output is always in Idle state.

IMPORTANT: Before PWM functions, you must enable PWM in the module configuration.

The figure below compares two applications in which the output is instructed to turn On for 4.5 seconds:

- In the application without PWM, a single pulse is generated. The pulse remains active for the same length of time the Data output tag is On (4.5 seconds).
- In the application with PWM, a series of pulses is generated. Each pulse is active for a configured pulse width of 0.5 seconds or 50% of the 1 second cycle time. The Data output tag is On for 4.5 seconds.

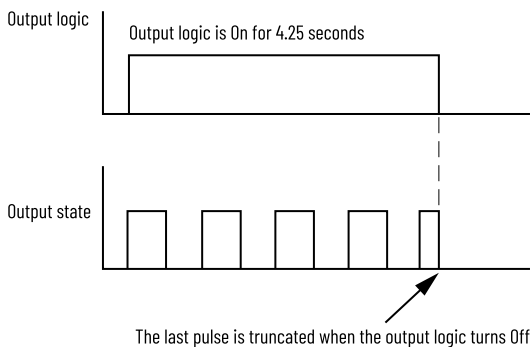
Figure 7. PWM Timing



By default, PWM is configured to continue the output pulse train until the output logic (*O.Ptxx.Data* tag) turns Off. When the output logic turns Off, the output pulse train immediately stops.

For example, in this figure, the output logic is On for 4.25 seconds and then turns Off in the middle of the last pulse. Even though the pulse width is configured for 0.5 seconds, the last pulse is only active for 0.25 seconds because it is truncated when the output logic turns Off.

Figure 8. PWM with Truncated Pulse



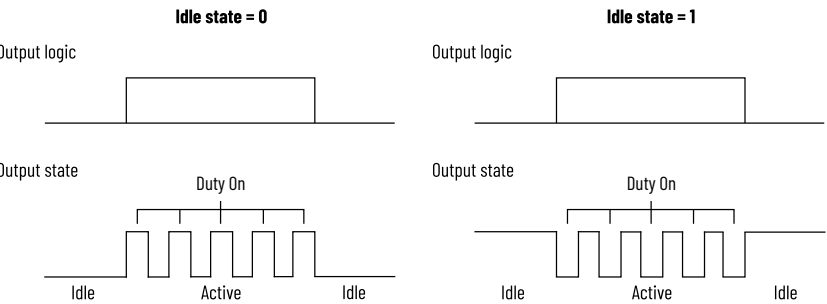
IMPORTANT: When the module goes into Program Mode, Communication Fault mode, or is inhibited, the Program Mode and Communication Fault Mode states that are configured for the module override the PWM output state.

You can modify the default PWM configuration for further control of an output's pulse train.

Idle State

The Idle state indicates the output state when the PWM pulse sequence is not running (PWM is idle).

Figure 9. Output in PWM Idle State



Enforce PTO Duty Cycle

You can limit the duty cycle to be always 50% by enabling the Enforce Duty Cycle at 50.0% for Pulse Train Output (PTO).

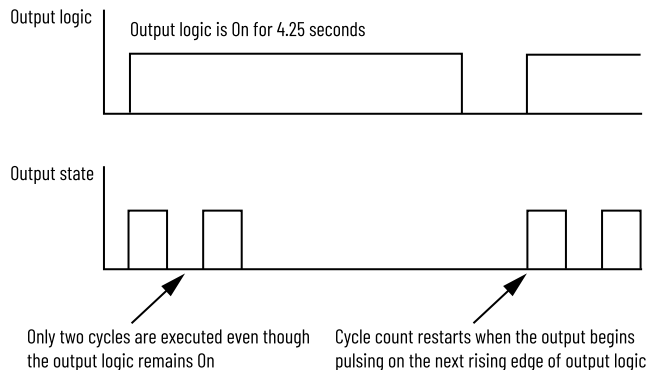
When this configuration is enabled, the *O.Pwmxx.DutyCycle* tag is ignored and generated pulse cycles have 50% duty cycle.

Cycle Count and Execute All Cycles

You can limit the number of pulse cycles that occur while an output is On. This feature is useful when you want to apply a level of output control when a process is stopped. For example, in a gluing application, you may want to apply four drops of glue to a product when the product is within a fixed window on a conveyor belt. By configuring a cycle count of four, you can make sure that only 4 drops of glue are applied even if the conveyor belt stops with the product in the window. Controlling the process with the Cycle Count feature eliminates the need to write complex logic to detect a stopped conveyor belt.

The following figure shows a PWM pulse train that is configured with a cycle count of 2. When the cycle count is reached, the PWM pulse train is stopped and the *I.Pwmxx.Active* tag is cleared.

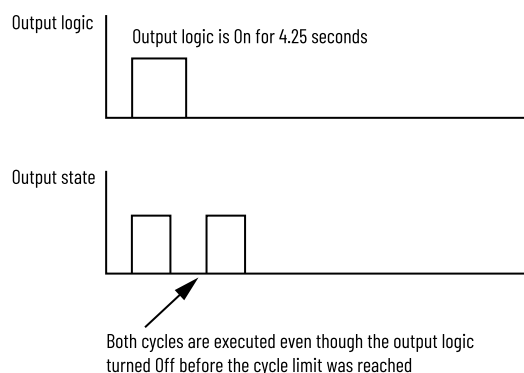
Figure 10. PWM Cycle Count



If the output logic turns Off before the cycle limit is reached, you can configure the pulse cycles to continue until the cycle limit is reached by enabling the Execute All Cycles option. The following figure shows a cycle limit of 2 with the Execute All Cycles option enabled.

IMPORTANT: When changing cycle count, you should turn off the output first or wait for the Active input tag to turn off. Otherwise, an additional pulse may be generated.

Figure 11. PWM Cycle Count with Execute All Cycles Option



Triggered Pulse Output

IMPORTANT: This feature is only available for 5034-UB8F/XT module with firmware revision 2.0T1 or higher.

The Triggered Pulse Output feature enables an output point to generate a precise, hardware-timed pulse in response to a trigger event. When a trigger is detected, the module automatically turns the output ON after a configurable delay and keeps it active for a predefined duration before turning it OFF. This functionality provides accurate and repeatable output control independent of controller scan times.

The pulse timing is executed directly by the module's onboard hardware timer. Both the pulse ON time and pulse OFF time are managed locally within the module, enabling microsecond-level timing accuracy. As pulse generation is performed in hardware, the output remains deterministic and is not affected by controller processing speed, program scan time, or network communication delays.

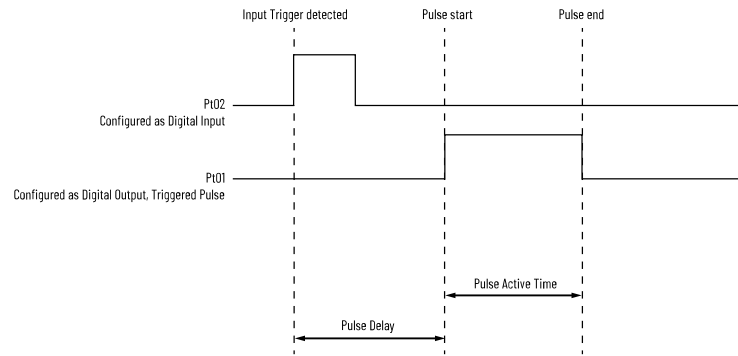
A Triggered Pulse Output can be initiated from multiple sources:

- **Controller Tag** – A controller tag (*O.Ptxx.Trigger*) triggers the pulse output directly.
- **Hardware Inputs** – A rising or falling edge of a local input signal triggers the pulse output.

To initiate the pulse output on the falling edge of the input signal, enable the Invert Trigger option in the Module Properties window.

If a triggering transition occurs while the current pulse output is already active or during the delay period (waiting), the new trigger is ignored and *I.Ptxx.TriggerMissed* bit is set to indicate that a trigger event was missed. Use the *O.Ptxx.ResetTriggerMissed* bit to reset the *I.Ptxx.TriggerMissed* bit.

Figure 12. Triggered Pulse Output Example



You can control the output pulse timing using the following parameters:

- **Pulse Delay (in seconds):** Defines the delay after the input transition before the output pulse starts.

You can configure this parameter using the output tag *O.Ptxx.PulseDelay*. The valid value range is (100 μ s + Input Filter Time)...30 s.

- **Pulse Active Time (in seconds):** Specifies how long the output pulse remains active once triggered after pulse delay.

You can configure this parameter using the output tag *O.Ptxx.PulseActiveTime*. The valid value range is 10 μ s...30 s.

Override Triggered Pulse Output

You can override the Triggered Pulse Output to immediately deactivate the screw output while a pulse is active when the application detects an unexpected condition. You can also use this feature to troubleshoot an application or test a control system outside normal operating conditions.

To override the output state, configure the following tags:

- *O.Ptxx.OverrideDataEn* – Set the tag to 1 to enable the *O.Ptxx.OverrideDataValue* to override the output state.
- *O.Ptxx.OverrideDataValue* – Set the tag to the desired value.

Logic Controlled Output

IMPORTANT: This feature is only available for 5034-UB8F module with firmware revision 2.011 or higher.

Logic Controlled Output feature allows precise automation control by configuring output point based on the logical combinations of multiple input/output points on the same module.

OR and AND logics are used to control the output point. You can select multiple points that are configured in one of the following modes to participate in the logic calculation:

- Digital Input
- Digital Input, Timestamp
- Digital Input, FIFO
- Digital Output

- Digital Output, Logic Controlled
- Digital Output, Triggered Pulse
- Digital Output, Scheduled

If you select the target logic controlled output point itself as a participant, its own *O.Ptxx.Data* participants in the logic calculation. If no point is selected in the OR and AND logics, the output is Off.

OR Logic

With OR Logic, Data bits of all participants are logically OR'ed together. You can select up to 8 points to participate in the OR logic. If there are participants only in the OR logic but there is no participant in the AND logic, then the OR logic result is applied to the output. The OR logic ensures that the output responds to the presence of at least one active point.

AND Logic

With AND Logic, Data bits of all participants are logically AND'ed together. You can select up to 8 points to participate in the AND logic. If there are participants only in the AND logic but there is no participant in the OR logic, then the AND logic result is applied to the output. The AND logic requires a collective condition to be met for the output activation.

Combined Logic (AND and OR)

When points are selected in both OR and AND logics, the module combines the OR logic result and the AND logic result with a logical AND. The output activates only when both the OR condition and the AND condition are true.

Override Logically Controlled Output

You can override the logically controlled output. This practice is commonly used when troubleshooting an application or testing a control system outside normal operating conditions.

You must change the following tags to override the output state:

- *O.Ptxx.OverrideDataEn* – Set the tag to 1 to enable the *O.Ptxx.OverrideDataValue* to override the output state.
- *O.Ptxx.OverrideDataValue* – Set the tag to the desired value.

AC and DC Mode

IMPORTANT: This feature is only applicable for 5034-0A4/XT module. This module does not support mixed AC and DC operation. All points operate in the same mode, either AC or DC, based on the module configuration.

The 5034-0A4/XT module can operate either in 120/240V AC or 240V DC.

By default the module operates in AC mode with AC power supply. You can switch to DC mode if your application requires DC output with DC power supply. You can enable DC mode by selecting the Enable DC mode checkbox on the [Points View on page 168](#).

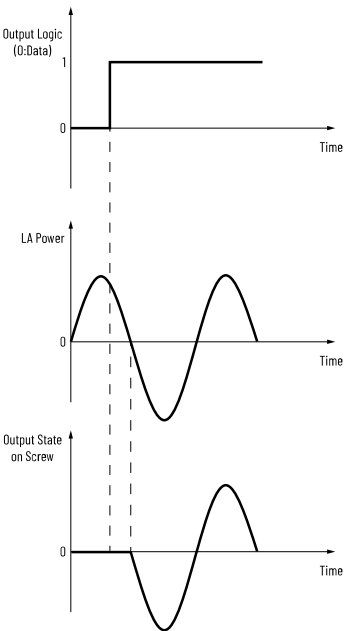
If the module is operating in DC mode, the module does not support field power loss detection.

Zero Voltage Crossing Synchronization

IMPORTANT: This feature is only applicable to the 5034-0A4/XT module when it operates in AC mode.

With Zero Voltage Crossing Synchronization, an AC output point turns On or Off only when the AC waveform crosses near 0V.

Figure 13. Zero Voltage Crossing Synchronization



Safety Output Modules

Connections for Safety I/O Modules

During module configuration, you must define the module. Among the Device Definition parameters with safety I/O 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 modules in a project, that is an external means controller.

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 connections to each module in the configuration. An owner-controller establishes two connections (safety input and safety output). A controller that is listening to the module establishes one safety input connection.

Because part of module configuration includes a slot number in the remote 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 connection request is rejected and the Studio 5000 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 prevents normal operation.

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

Producer/Consumer Communication

PointMax I/O 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. If the connection is a multicast input connection, then multiple controllers can consume the input data, including the owner-controller and external means controller.

Connection Reaction Time Limit With Safety Modules

Setting the RPI on safety modules is not as straightforward as setting it on standard modules. With safety modules, the Connection Reaction Time Limit configuration affects the RPI that is used for a module.

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 point. 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 specifying RPI rates, see the Logix 5000 Controllers Design Considerations Reference Manual, publication [1756-RM094](#).

Safety Output Module Operation

Only the owner-controller makes an output connection with the safety module and sends output data to the safety module.

IMPORTANT: Immediate Output instruction is not supported in safety applications.

The controller sends data to an output module at the output RPI, and the output module sends data to the controller at the input RPI. For example, the output module sends an indication of the point data quality.

IMPORTANT: The RPI for an output safety module is the Safety Task period. Safety output data is sent at the completion of the Safety Task scan.

The output modules reside in an I/O system that is accessible to a Logix 5000 controller over an EtherNet/IP network.

An EtherNet/IP adapter is the first component in an I/O system and connects the system to the EtherNet/IP network. Output modules receive output data from a controller. The output module also sends data to the controller.

Controller to Output Module Data Transmission

The output RPI is the same as the controller safety task period.

These events occur when the controller sends data to an output module.

1. Data is sent in one of the following ways:
 - If the controller is directly connected to the EtherNet/IP network, it sends 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 PointMax EtherNet/IP adapter in the PointMax I/O system receives the data from the network and transmits it to the backplane.
4. The digital output module receives the data from the backplane and behaves as dictated by its configuration.

Output Module to Controller Data Transmission

The output module sends readback data and status to the controller at input RPI.

The following events occur when an output module sends data to the controller at input RPI.

1. The module sends the data to the backplane.
2. The PointMax EtherNet/IP adapter in the PointMax I/O system sends the data over the EtherNet/IP network.
3. One of the following occurs:
 - 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.

Module Data Quality Reporting

The safety I/O modules indicate the quality of point data that is returned to the owner-controller. Levels of data quality are reported via module input tags.

The following inputs indicate the level of data quality.

IMPORTANT: Some faults are not recoverable, that is, the fault bit is not cleared, and some faults are reset according to the *Pttx.ResetFault* tag. The Studio 5000 Logix Designer application controls the tags. You cannot change the status of the tags. Keep in mind 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.Pttx.Fault* – When the fault bit is set, this tag indicates that the reported point data is inaccurate and cannot be trusted for use in your application. Do not use the reported point data for control.

If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.

Example causes of inaccurate data include the following:

- Point not used
- Point fault
- Field Power Loss condition



You should troubleshoot the module for the typical causes first.

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

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

An example cause of uncertain data is the module is operating outside its designed operating range.



You should monitor the tags in your program to make sure that the application is operating as expected with accurate point input data.

Connection Fault Handling

You cannot configure the safety output module behavior when a connection fault occurs, that is, the connection between the owner-controller and the output module breaks. All outputs are put in a Safe state.

The output remains in a Safe state until the connection to the owner-controller is re-established. The output returns to normal operation as defined in the module configuration.

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

Data Readback

Data Readback automatically sends point data values that read back the output at the screw, regardless if it matches the digital value that was sent to the screw terminals of the module then.

The read back value is either On or Off.

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

Field Power (SA Power) Loss Detection

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

The Field Power Loss condition causes safety connections to fault. The module does not send anything to the controller until the controller queries the diagnostic assembly.

In the diagnostic assembly, the FieldPowerOff bit is set at the module and point level structure. The Fault bit is set at the point level.

No Load Detection

No Load Detection detects when a wire is disconnected from the output or a missing load for each output point. No Load Detection occurs only when the output point is in the Off state.

The No Load Detection feature is disabled by default. You must enable the feature in your Studio 5000 Logix Designer application project.

Use the diagnostic assembly to monitor the presence of a No Load condition.

Overload Protection

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

An Overload or short circuit to ground condition can cause an increase in point temperature and trigger a thermal shutoff to prevent damage to the output.

There is an Overload tag in the Diagnostic assembly.

Table 10. Output Recovery After Overload Condition

Cause of Fault	Correction	Recover Time
Overload condition	Remove the load from the output point.	After the Overload or short circuit to ground condition occurs, the output point holds fault indications for 10 seconds until it checks if the fieldfault is removed.
Short circuit to ground condition	Correct the cause of the short circuit condition.	

Standard Module Applications

This chapter describes how to configure your standard digital I/O modules in a Studio 5000 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 Studio 5000 Logix Designer application project.

Add a New Module to a Studio 5000 Logix Designer Application Project

You must complete the following tasks before you configure the module:

1. Create a Studio 5000 Logix Designer application project.
2. Add a Logix 5000 controller to the project.
3. Add a PointMax EtherNet/IP adapter to the project.

For more information on how to add a PointMax EtherNet/IP adapter to the Studio 5000 Logix Designer application project, see the PointMax EtherNet/IP Adapter User Manual, publication [5034-UM001](#).

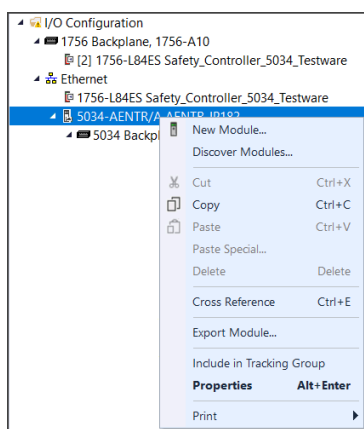
After completing above steps, add your I/O module to the project by following one of the methods:

- Discover Modules
- New Module

Discover Modules

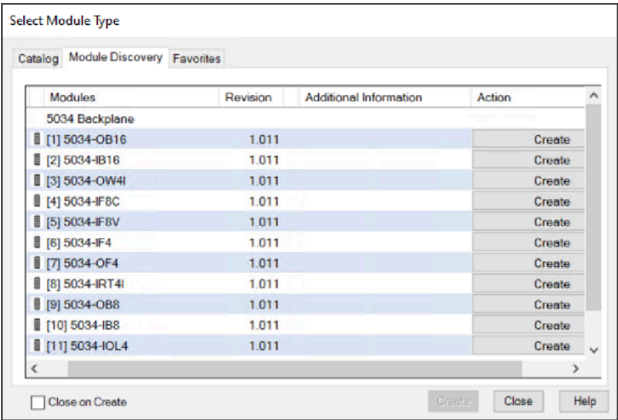
To use the Discover Modules method with PointMax I/O modules, complete these steps:

1. Go online with your Studio 5000 Logix Designer application.
The project must include a PointMax EtherNet/IP adapter.
2. Right-click the PointMax EtherNet/IP adapter and select Discover Modules.



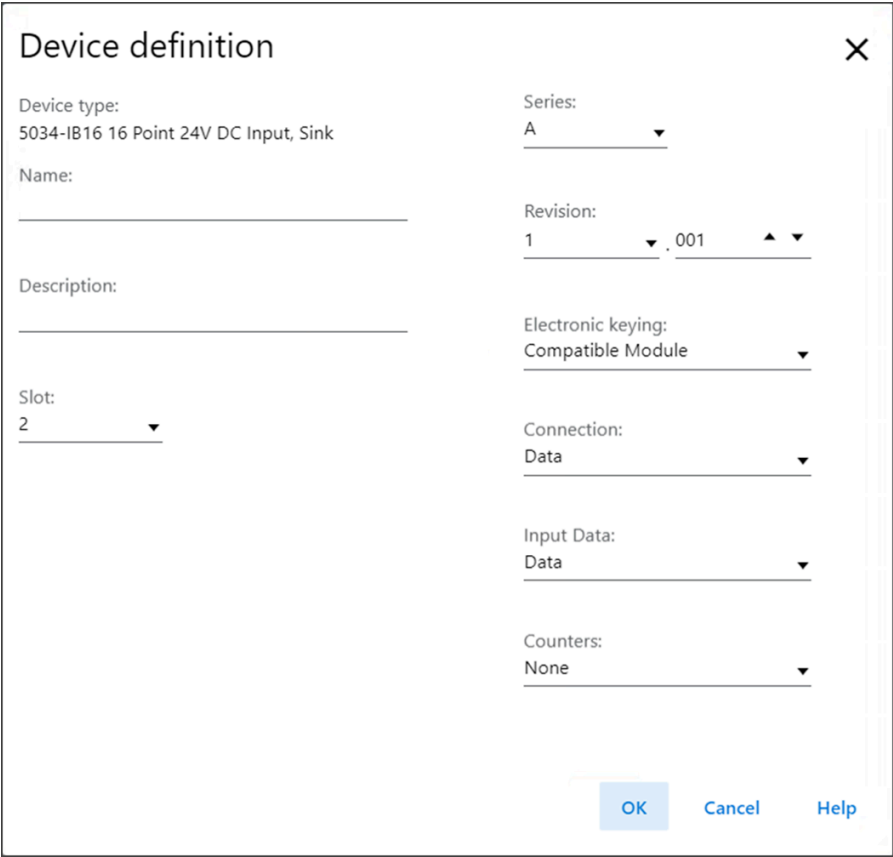
The Studio 5000 Logix Designer application automatically detects available modules that are connected to the backplane. The Select Module Type dialog appears with a list of modules detected.

3. In the Select Module Type window, select Create for the module that you want to add.

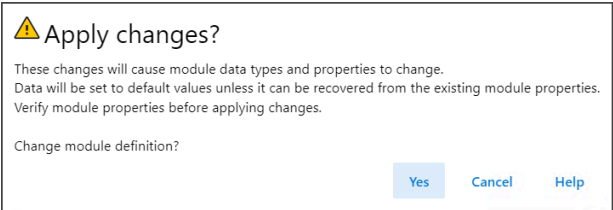


The New Module window with Device definition dialog appears.

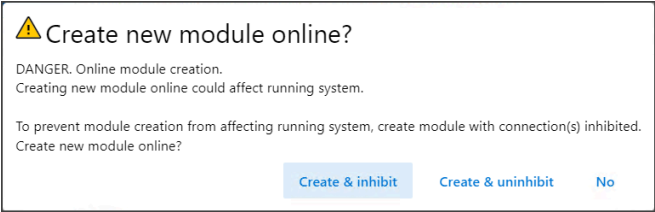
4. In the Device definition dialog, configure the module properties and select OK.



5. If Apply changes warning dialog appears, select Yes.



6. At the Create new module online warning dialog, select Create & inhibit.



7. After adding as many as module you need, close the Select Module Type dialog.
- To add additional I/O modules with this method, complete one of the following:
- If you selected the Close on Create checkbox when you created the first I/O module, repeat steps 2...7.
 - If you did not select the Close on Create checkbox when you created the first I/O module, repeat steps 3...7.

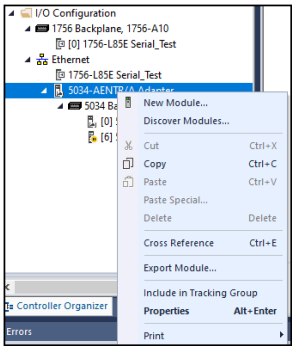
Add a New Module

To use the New Module method with PointMax I/O modules, complete these steps:

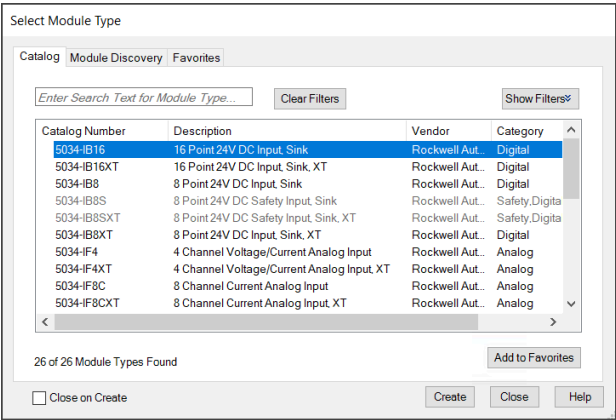
Example shows how to add a module when the Studio 5000 Logix Designer application project is offline.

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 Modules. One exception is that, in Step 1, you must choose New Module instead of Discover Modules.

1. Right-click the PointMax EtherNet/IP adapter and select New Module.



2. In the Select Module Type dialog, choose the module you want to add and select Create.



The New Module window appears with Device definition dialog.

3. You can select OK to use the default configuration as shown or edit the module configuration.

Device definition

Device type:

5034-IB16 16 Point 24V DC Input, Sink

Name:

Description:

Slot:

2

Series:

A

Revision:

1.001

Electronic keying:

Compatible Module

Connection:

Data

Input Data:

Data

Counters:

None

OK

Cancel

Help

4. After adding as many as module you need, close the Select Module Type dialog.
- To add additional remote I/O modules with this method, complete one of the following:
- If you selected the Close on Create checkbox when you created the first I/O module, repeat steps 1...3.
 - If you did not select the Close on Create checkbox when you created the first I/O module, repeat steps 2...3.

I/O Tag Name Conventions

The module tag names use defined naming conventions. The conventions are as follows:

Example tag name = *Adapter:1:I.Pt00.Data*

- Adapter = Name of the EtherNet/IP adapter in the system
- 1 = Slot number
- I = Tag type

The possible tag types are C (configuration), I (input), and O (output)

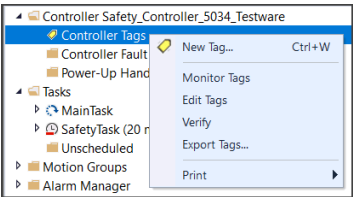
- Pt00 = Module point number
- Data = Tag function

In this case, Data represents the input data that is returned to the owner-controller.

Access I/O Tags

To access the I/O tags in the Studio 5000 Logix Designer application, proceed as follows:

1. Open your Studio 5000 Logix Designer application project.
2. Right-click Controller Tags and select Monitor Tags.



3. Open the tags as necessary to view specific tags.

A screenshot of the 'Controller Tags' window in Studio 5000 Logix Designer. The window title is 'Controller Tags - Safety_Controller_5034_Testware(controller)'. It shows a list of tags for the 'Safety_Controller_5' scope. The table has columns for Name, Value, Force Mask, Style, and Data Type. The tags are organized into a tree structure under 'Adapter:2:C'.

Name	Value	Force Mask	Style	Data Type
Adapter:2:C	[...]	[...]		AB:5000_DI12_Counter4:C:0
Adapter:2:C.Counter00	[...]	[...]		AB:5000_DI_Counter_Channel:C:0
Adapter:2:C.Counter00.InputOffOnFilter	13		Decimal	SINT
Adapter:2:C.Counter00.InputOnOffFilter	13		Decimal	SINT
Adapter:2:C.Counter00.RolloverAtPreset	0		Decimal	BOOL
Adapter:2:C.Counter01	[...]	[...]		AB:5000_DI_Counter_Channel:C:0
Adapter:2:C.Counter02	[...]	[...]		AB:5000_DI_Counter_Channel:C:0
Adapter:2:C.Counter03	[...]	[...]		AB:5000_DI_Counter_Channel:C:0
Adapter:2:C.Pt04	[...]	[...]		AB:5000_DI_Channel:C:0
Adapter:2:C.Pt04.InputOffOnFilter	13		Decimal	SINT
Adapter:2:C.Pt04.InputOnOffFilter	13		Decimal	SINT
Adapter:2:C.Pt05	[...]	[...]		AB:5000_DI_Channel:C:0
Adapter:2:C.Pt06	[...]	[...]		AB:5000_DI_Channel:C:0
Adapter:2:C.Pt07	[...]	[...]		AB:5000_DI_Channel:C:0

Troubleshoot Your Module

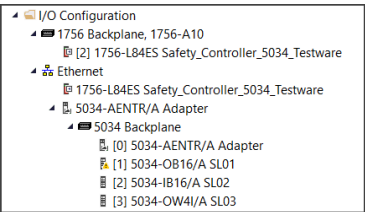
You can use one of the following methods to troubleshoot your module:

- Use Module Status Indicators
See the respective module-specific sections for information on status indicators.
- Use Studio 5000 Logix Designer application.

Use Studio 5000 Logix Designer Application

Check the Controller Organizer to see if there is a warning icon on the module.

Figure 14. Warning Icon in Controller Organizer



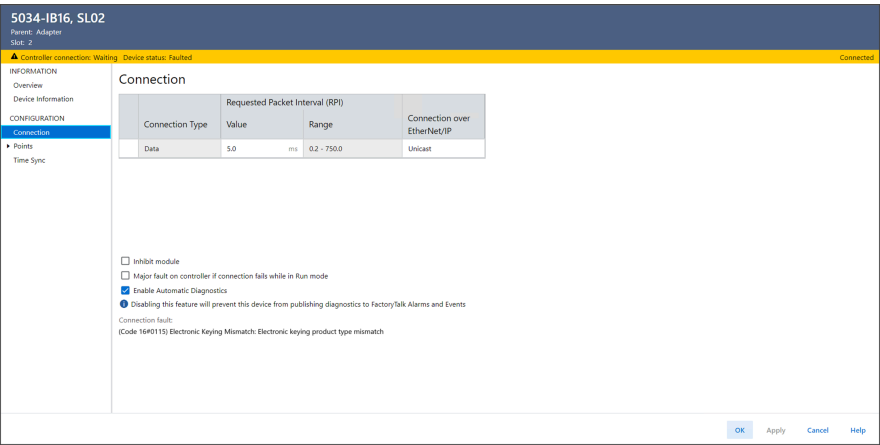
If a warning icon is present, open the module properties and check the status bar to identify the type of fault.

Figure 15. Fault Message in Status Bar



If connection is faulted, go to the Connection view and check the error code in the Connection Fault area.

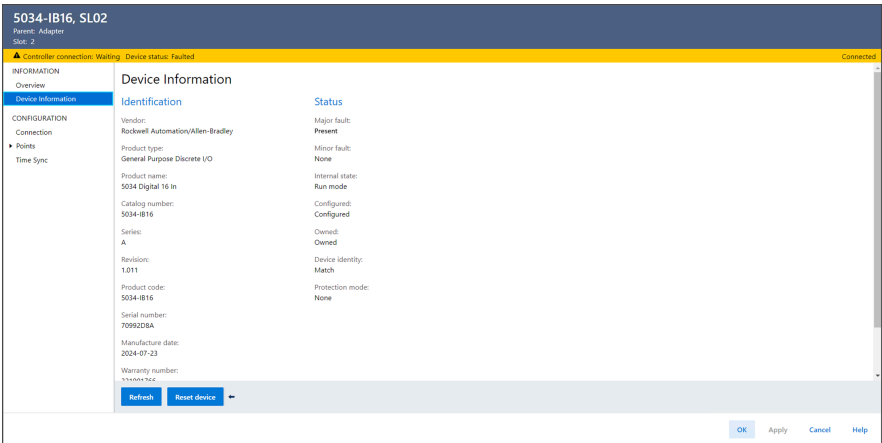
Figure 16. Connection Fault Description with Error Code



Error Code	Action
0x204	<ol style="list-style-type: none">Open the adapter module properties.Go to Chassis Information view and check the base status. If there is a fault, check the base details to identify the fault.
Keying Error	<p>Go to Device Information view to confirm that the physical module is compliant or matches the configured identity.</p> <p>For more information, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001.</p>

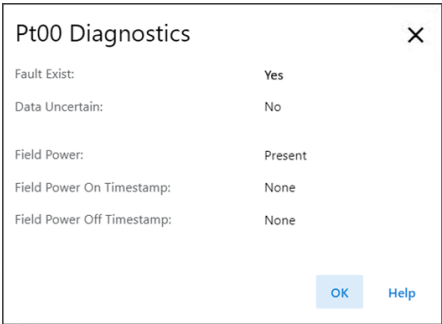
Error Code	Action
0x10	<div>Go to Device Information view and check the firmware revision and major fault status.</div> <ul style="list-style-type: none">• If firmware update is required, update the firmware.• If the major fault is recoverable, reset the module.• If the major fault is unrecoverable, replace the module.

Figure 17. Example for Device Information View with Major Fault Present



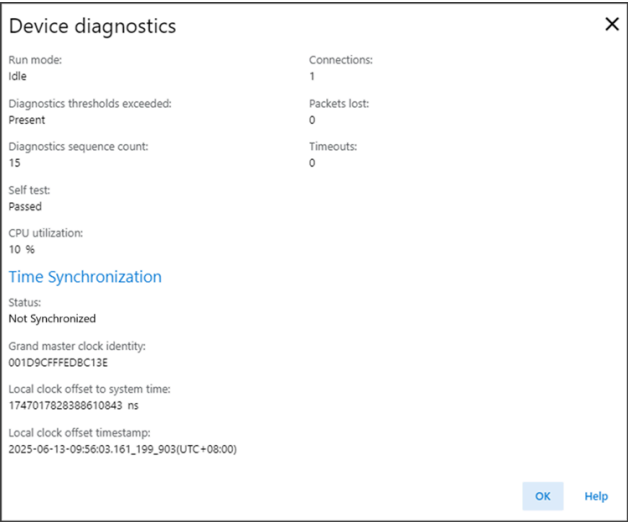
If a point is faulted, go to the Points view and check the Diagnostics for the point to see the diagnostic condition.

Figure 18. Example for Point Diagnostics



If a Time Sync fault is present, go to the Device Diagnostics dialog to check the Time Synchronization status and Grandmaster clock identity.

Figure 19. Example for Device Diagnostics



The Grandmaster clock identity must match with the network Grandmaster clock identity. Also, check the Time Synchronization status of the adapter in the adapter Device Diagnostics dialog.

Safety Module Applications

Safety digital I/O modules have additional items to be aware of. Type approval, certification, and suitability for use in safety applications vary by catalog number.

These modules can be used with GuardLogix 5580 and Compact GuardLogix 5380 safety controllers in applications up to SIL 3, PLe, Cat. 4 in single-channel and dual-channel configurations. The Studio 5000 Logix Designer application, version 36 or later, is the configuration and programming tool for these modules.

IMPORTANT: TÜV Rheinland has approved GuardLogix 5580 and Compact GuardLogix 5380 controller systems for use in safety-related applications where the de-energized state is always considered to be the safe state. You must confirm that the configuration of each channel of the safety I/O module is set to "Off" to consider those output points as part of the safety function of any equipment.

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

The Probability of 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 ambient operating temperature specification for PointMax I/O safety modules, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

These restrictions 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 Performance Level e (PLe), category 4 per ISO 13849-1.
-

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

For more information on safety application suitability levels with the PointMax safety I/O modules, see the respective module details.

Single-channel or Dual-channel Mode

You can use safety I/O 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.

For safety input modules: The module does not support dual-channel mode. You can use instructions with any channels. There is no requirement to use one even and one odd.

For safety output modules: You select the predefined dual-channel pairs in the module properties.

Use with Safety Controllers

You can use only the Compact GuardLogix 5380 or GuardLogix 5580 controllers with the PointMax I/O safety modules.

For more information on which controllers you can use with PointMax safety I/O modules, see the Product Compatibility and Download Center at rok.auto/pcdc.

You must use the Studio 5000 Logix Designer application, version 36 or later, to configure the PointMax safety I/O 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.

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 these precautions for the proper use of safety I/O modules.



ATTENTION:

As serious injury can occur due to loss of required safety function, follow these 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 safety I/O modules as shown in the PointMax I/O Systems Specifications Technical Data, publication [5034-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 starting system operation.
-



ATTENTION: 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 17](#).

Install and Replace Modules



ATTENTION:

- Clear previous configuration data before connecting 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.
-

Safety Application Requirements

Safety application requirements include evaluating the following:

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

Creating, recording, and verifying 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 safety network number (SNN), verifying the safety signature, functional verification test intervals, system reaction time, and PFD/PFH calculations, see the GuardLogix 5580 and Compact GuardLogix 5380 Controllers 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 PointMax I/O safety modules.

Configuration Signature and Ownership

Every 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.

If you choose to configure safety connections with a Safety Configuration Identifier, SCID = 0, you are responsible for ensuring that originators and targets have the correct configurations.

IMPORTANT: The signature can only be considered "verified" (and configuration locked) after user testing.

Configuration Ownership

The connection between the owner-controller and the safety module is based on the following:

- Safety module node number
- 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 safety module
- Configuration signature

If any differences are detected, the connection between the owner-controller and the 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. In this case, the module configuration signature in the Logix Designer 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, the configuration signature parameter is disabled.

Safety Input Modules in CIP Safety Systems

The following apply to the safety inputs:

- You can connect safety devices, such as Emergency Stop Push Button, gate switches, and safety light curtains.
- 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.
- If you configure inputs as Safety Pulse Test, you must choose a test source.
- Diagnostics. See Point Diagnostics.
- Safety input points are configured as the following:
 - Not Used
 - Safety Pulse Test
 - Safety

The following apply to the test outputs:

- Test outputs can be configured as the following:
 - Not Used
 - Standard Output
 - Pulse Test
 - Power Supply
 - Muting Lamp
- 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.

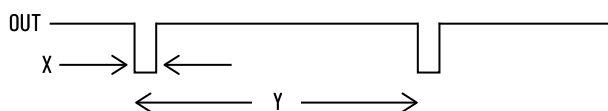
Use Test Output with a Safety Input

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

Configure the test output as a pulse test source and associate it to a specific safety input. The associated safety input must use a Point Mode = Safety Pulse Test.

One test output can be assigned to a maximum of four safety inputs.

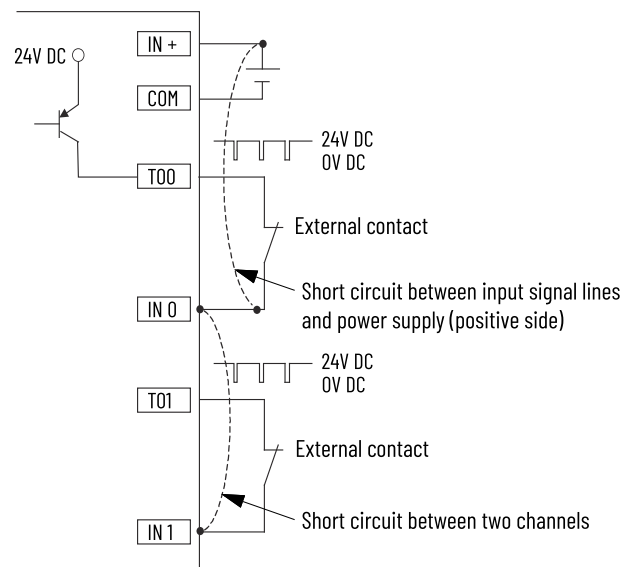
Figure 20. Test Pulse in a Cycle



On the safety input modules, the pulse width (X) is less than 700 μ s; the pulse period (Y) is less than 524 ms.

When an external 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 power supply (positive), and between input signal lines can be detected. However, a short circuit between two input channels cannot be detected if these two channels correspond to the same Test Output. For example, you associate Test Output 0 to Safety Input 0 and 7. If these two channels short circuit, it cannot be detected.

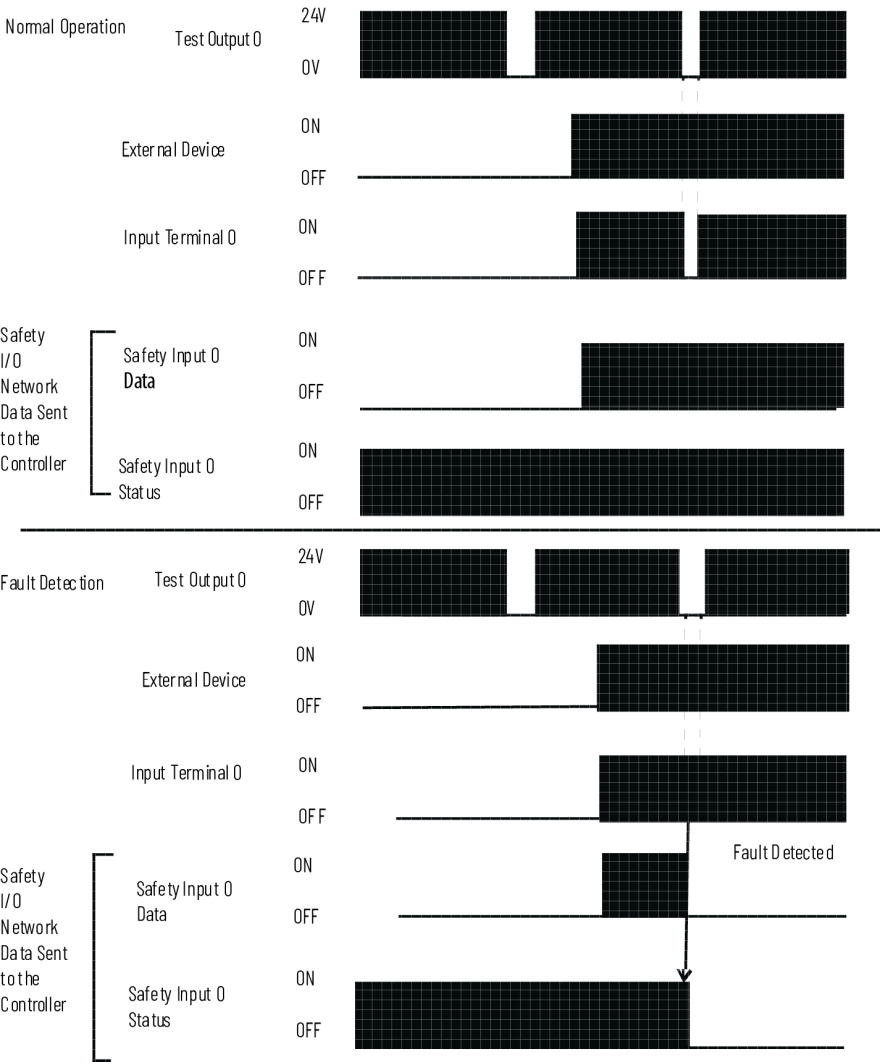
Figure 21. Short Circuit Between Input Signal Lines



Single-channel Mode

If an error is detected on the input channel, Safety Input Data and Safety Input Status change to the off state.

Figure 22. Normal Operation and Fault Detection (Not to Scale)



Safety Input Fault Reset

The I/O channel supports a module-level user-configurable ‘Latch Fault until Reset via Output Tag’ mode and recovers from a Safety Input Short Circuit fault.

 Other types of Safety Input faults are non-recoverable. You must cycle power to the module.

Latch Fault until Reset via Output Tag mode is Enabled

When Latch Fault mode is Enabled, the I/O channel holds safety input fault indications until it checks that the fault is removed. If the fault is removed, the channel clears the fault status only upon detecting that the ResetFault in its consume assembly channel sees a transition from 0 to 1.

Latch Fault until Reset via Output Tag mode is Disabled

When Latch Fault mode is Disabled (default), the I/O channel holds safety input fault indications for 1 second until it checks if the fault is removed. If the fault is removed, the channel clears the fault status only upon detecting the safety input is low on the screw. If not, the channel continues to check if the fault is removed.

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. The increase in time is a delay of the signal from the module to the controller.

The delay time is added to the RPI. 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.

When chattering or low frequency noise coupling is present on the input signal, an increase in the time it takes to transition from one state to another improves noise immunity within a signal.

Table 11. Off to On Delay Time

Description	Transition Delay Times	Diagram
<p>An input signal is treated as Logic 0 during the Off to On delay time after the rising edge of the input contact.</p> <p>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.</p>	<ul style="list-style-type: none"> 0 ms 2 ms 5 ms 10 ms 20 ms 50 ms 	<div> <div> <div>Input signal</div> <div>ON</div> <div>OFF</div> </div> <div> <div>Safety input network data</div> <div>ON</div> <div>OFF</div> </div> </div>

Table 12. On to Off Delay Time

Description	Transition Delay Times	Diagram
<p>An input signal is treated as Logic 1 during the On to Off delay time after the falling edge of the input contact.</p> <p>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.</p>	<ul style="list-style-type: none"> 0 ms 2 ms 5 ms 10 ms 20 ms 50 ms 	<div> <div> <div>Input signal</div> <div>ON</div> <div>OFF</div> </div> <div> <div>Safety input network data</div> <div>ON</div> <div>OFF</div> </div> </div>

Safety Output Modules in CIP Safety Systems

The following apply to the safety outputs:

- You can connect safety devices, such as safety relays, safety contactors.
- An external wiring short-circuit check between channels or supply is possible when the safety output is configured as Safety Pulse Test mode. The detection of external wiring fault is ≤ 1024 msec.
- Diagnostics. See Status and Fault Information in Module Properties.
- Safety output points are configured as the following:
 - Not Used
 - Safety
 - Safety Pulse Test

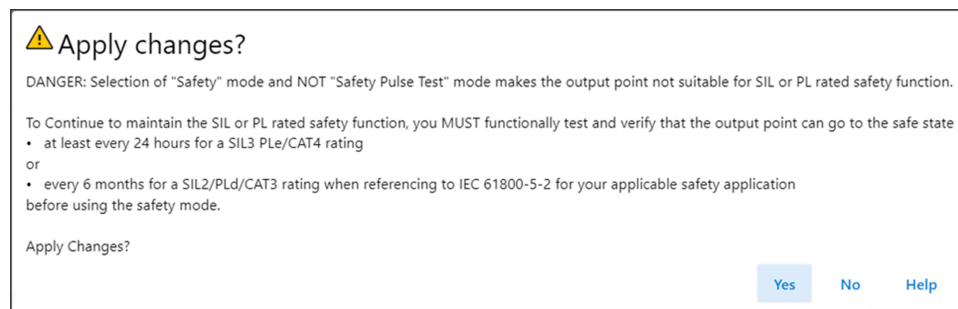
Safety Mode and Safety Pulse Test Mode

The Safety Output can be configured to two types of point modes:

- Safety Mode
- Safety Pulse Test Mode

Safety Mode

When the safety output is configured to Safety Mode, a warning message prompt occurs.



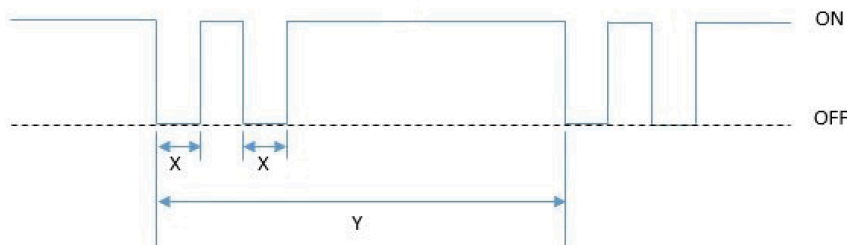
You are responsible to command the Safety Output to Safe State at the stated interval in order to achieve the desired safety level.

Safety Pulse Test Mode

When the safety output is configured to Safety Pulse Test Mode, the safety output channel continuously test the ability of the safety output to remove power from the output terminals of the module. The safety output turn off momentarily during the pulse test duration.

If an error is detected, the safety output data and individual safety output status turn off.

Figure 23. Safety Output Voltage Variation During Pulse Test When Safety Pulse Test Mode is Configured



On the safety output modules, the pulse width (X) is less than 700 μ s, and the pulse period (Y) is less than 524 ms.



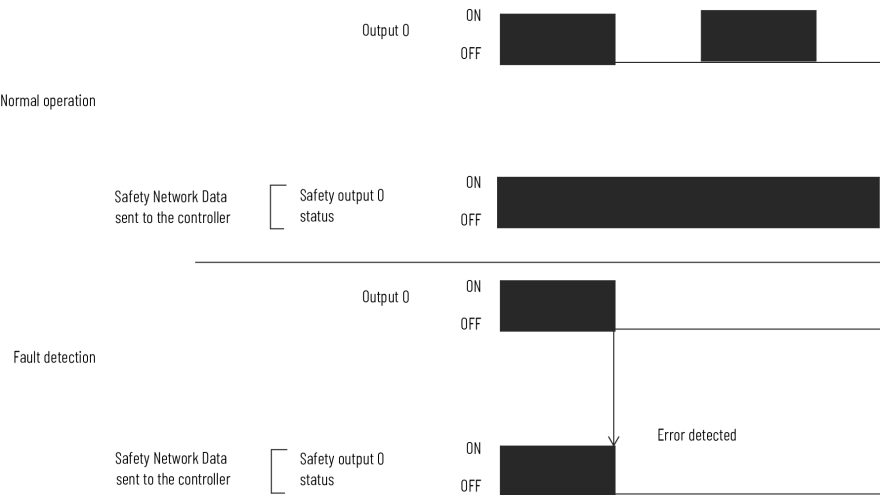
To help prevent the test pulse from causing the connected device to malfunction, pay careful attention to the input response time of the output device.

See [Wiring Diagrams for Safety Mode and Safety Pulse Mode on page 463](#) for more details about applying Safety Mode and Safety Pulse Test Mode in your application.

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 is de-energized and individual safety output status turn off.

Figure 24. Single-channel Normal Operation and Fault Detection (Not to Scale)



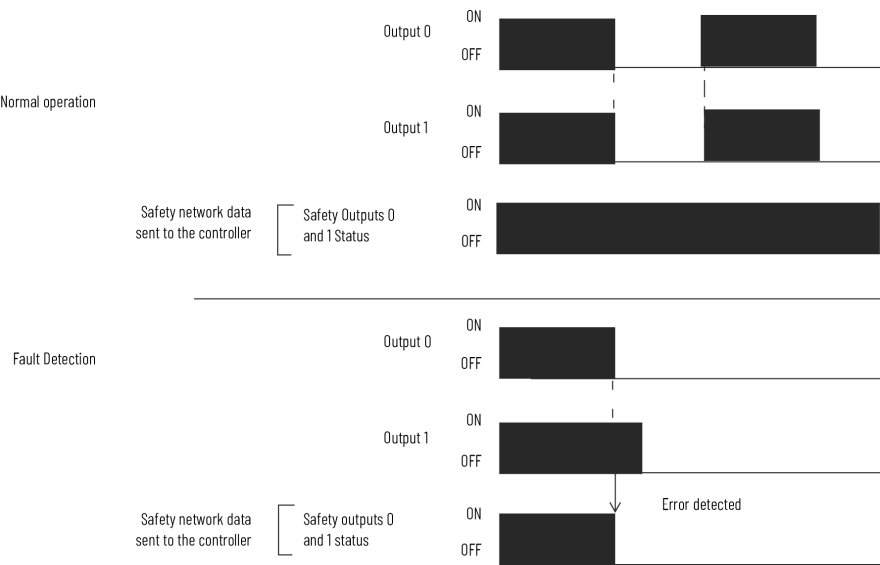
Dual-channel Mode

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

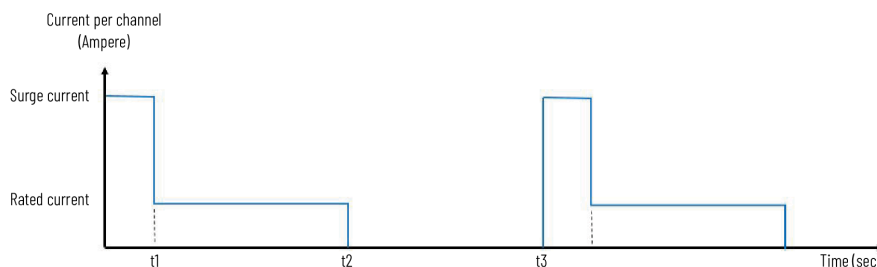
When both output channels in a connection pair are in the On state and without any faults, the safety outputs are turned on.

Figure 25. Dual-channel Normal Operation and Fault Detection (Not to Scale)



Surge Capability of Safety Output

The safety output supports temporary surge of current when transitioning from OFF to ON.

Figure 26. Surge Capability

Safety Output Fault Reset

The I/O channel supports a module-level user-configurable 'Latch Fault until reset via output tag' mode and recovers from only these field faults:

- Safety Output Overload
- Safety Output NoLoad



Other types of Safety Output faults are non-recoverable. You must cycle power to the module.

Latch Fault until Reset via Output Tag mode is Enabled

When Latch Fault mode is Enabled, the I/O channel holds safety output fault indications until it checks that the field fault is removed. If the field fault is removed, the channel clears the fault status only upon detecting that the ResetFault in its consume assembly channel sees a rising edge.

Latch Fault until Reset via Output Tag mode is Disabled

When Latch Fault mode is Disabled (default), the I/O channel holds safety output fault indications for 1 second until it checks if the field fault is removed. If the field fault is removed, the channel clears the fault status only upon detecting the consume data bit is low. The fault status can also be cleared by a module reset or power cycle.

After the channel clears the fault, the I/O indicator (red) turns off. The output data can now be controlled.

IMPORTANT: If the module outputs experience persistent high faults, consider cycling power to the module to clear the error.

Replace a Safety I/O Module

Replacing a safety module that sits on a CIP Safety network requires more effort 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 of the 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 also devices on the subnet.

However, each safety I/O 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 make up the DeviceID of the safety module.

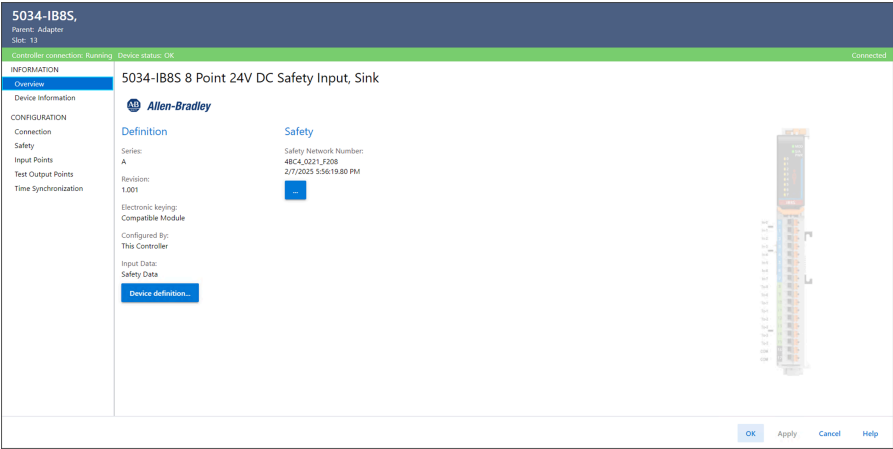
Set the SNN Manually

The SNN is used to provide integrity on the initial download to a safety module.

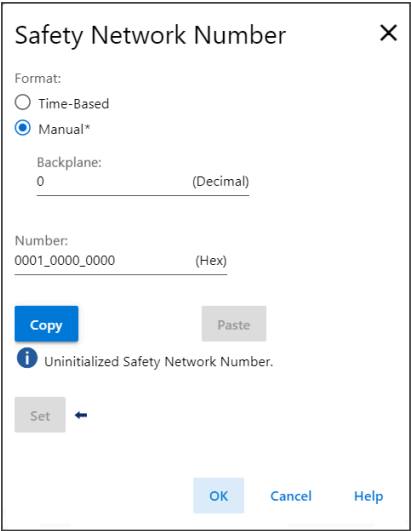
If a safety signature exists, the safety module must have DeviceID that matches the module in the safety controller project, before it can receive its configuration.

To maintain integrity, the module SNN must be set manually.

- 1. On the Overview view of the Module Properties dialog, select the ellipsis under Safety Network Number.



- 2. On the Safety Network Number dialog, select Manual.



- 3. Type the SNN in the Number field and select OK.
- 4. On the Module Properties dialog, select OK.

Reset to Out-of-Box Configuration

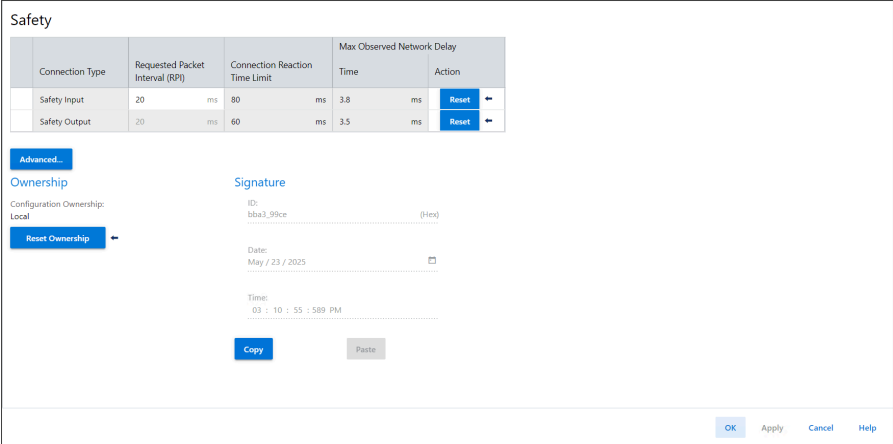
When the Studio 5000 Logix Designer application is online, the Safety tab of the Module Properties dialog box displays the current configuration ownership. When the opened project owns the configuration, Local is displayed.

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.

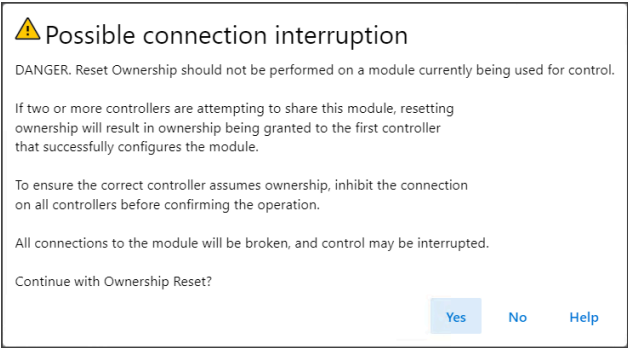
If the connection is Local, you must inhibit the module connection before you reset ownership.

Follow these 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 view, select Reset Ownership.



- 3. When a dialog box appears asking if you want to continue with the reset, read it and select Yes.



Replace a Safety Module in a Logix 5000 System

Consider the following conditions before you replace a safety I/O 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 the table to replace a safety I/O 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 13. Replace a Safety I/O 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 83 .
Yes	Different SNN from original safety task configuration	1. Reset to Out-of-Box Configuration on page 83 .
No		2. Set the SNN Manually on page 83 .
		1. Reset to Out-of-Box Configuration on page 83 .
		2. Follow your company-prescribed procedures to functionally test the replaced I/O device and system and to authorize the system for use.

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 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 safety I/O 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. Select the Safety tab.
4. Select Reset Ownership.
5. Select OK.
6. Follow your company-prescribed procedures to functionally test the replaced I/O module and system and to authorize the system for use.

5034-IA8 and 5034-IA8XT Details

5034-IA8 and 5034-IA8XT Digital 8 AC Input Modules

Figure 27. 5034-IA8 and 5034-IA8XT Wiring Diagram

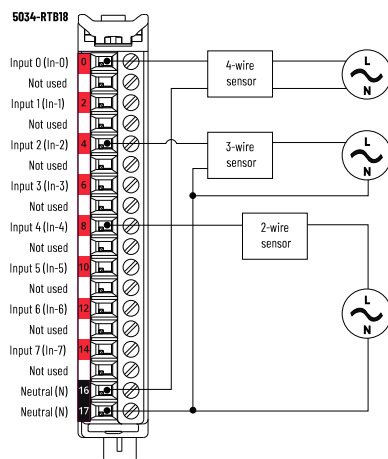


Figure 28. 5034-IA8 and 5034-IA8XT Functional Block Diagram

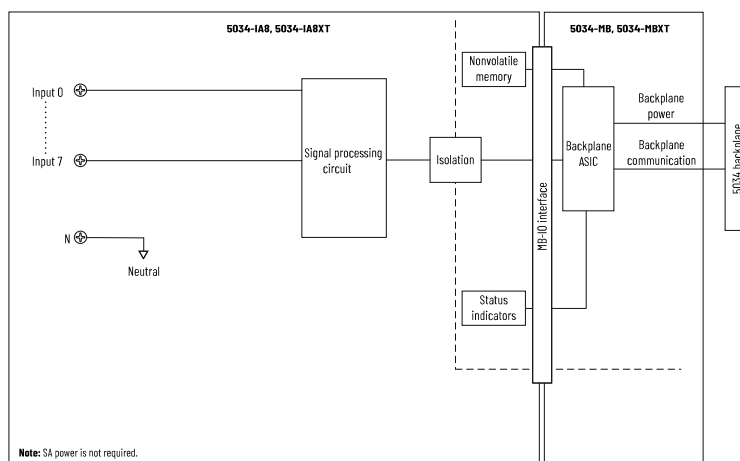


Table 14. Technical Specifications - 5034-IA8, 5034-IA8XT

Attribute	5034-IA8, 5034-IA8XT
On-state voltage, min	74V AC
On-state voltage, nom	120/240V AC
On-state voltage, max	264V AC
Off-state voltage, max	40V AC
On-state current, min	3.5 mA @ 74V AC 5 mA @ 159V AC

Table 14. Technical Specifications - 5034-IA8, 5034-IA8XT (continued)

Attribute	5034-IA8, 5034-IA8XT
On-state current, nom	7.5 mA @ 120V AC 50/60 Hz 13.5 mA @ 240V AC 50/60 Hz
On-state current, max	15 mA @ 139V AC 50/60 Hz 15 mA @ 264V AC 50 Hz 17 mA @ 264V AC 60 Hz
Off-state current, max	3 mA
Input impedance, nom	17.5 k Ω @ 120V AC 50/60 Hz 17.0 k Ω @ 240V AC 50/60 Hz
Input impedance, min	11 k Ω @ 264V AC/63 Hz
Inrush current, max	600 mA
Input delay time (screw to backplane), max	12 ms
Off-to-On	
On-to-Off	
Input filter times ⁽¹⁾	User-selectable filter times:
Off-to-On	<ul style="list-style-type: none"> 120V AC input – 1 ms 240V AC input – 1 ms, 2 ms, 5 ms
Input filter times	User-selectable filter times:
On-to-Off	<ul style="list-style-type: none"> 120V AC input – 10 ms, 20 ms 240V AC input – 10 ms, 20 ms

(1) For the 5034-IA8/XT module, the Studio 5000 Logix Designer application lets you select multiple filter values, including values that are invalid for some input signals. For example, 1 ms is the only valid Off-to-On filter value when a 120V AC signal is connected to the module. However, the Studio 5000 Logix Designer application lets you select 1 ms, 2 ms, or 5 ms. If you select an invalid filter value, the module can read signal levels incorrectly.

For more information, see the PointMax Digital I/O Modules User Manual, publication [5034-UM002](#).

Table 15. General Specifications - 5034-IA8, 5034-IA8XT

Attribute	5034-IA8, 5034-IA8XT
Number of inputs	8 channels (1 group of 8)
Voltage category	120/240V AC
Input voltage range	74...264V AC
Input voltage frequency	47...63 Hz

Table 15. General Specifications - 5034-IA8, 5034-IA8XT (continued)

Attribute	5034-IA8, 5034-IA8XT
Power dissipation, max ⁽¹⁾	1.25 W
Thermal dissipation, max ⁽¹⁾	4.26 BTU/hr
Isolation voltage	250V (continuous), Reinforced Insulation Type, System ⁽²⁾ to Field No isolation between individual inputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	5, 13, 15
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽³⁾	1 - Input ports 1 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 8 yellow I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	43.0 g (1.52 oz) - 5034-IA8 47.0 g (1.66 oz) - 5034-IA8XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) For the System to Field isolation attribute, System refers to the backplane.

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

Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

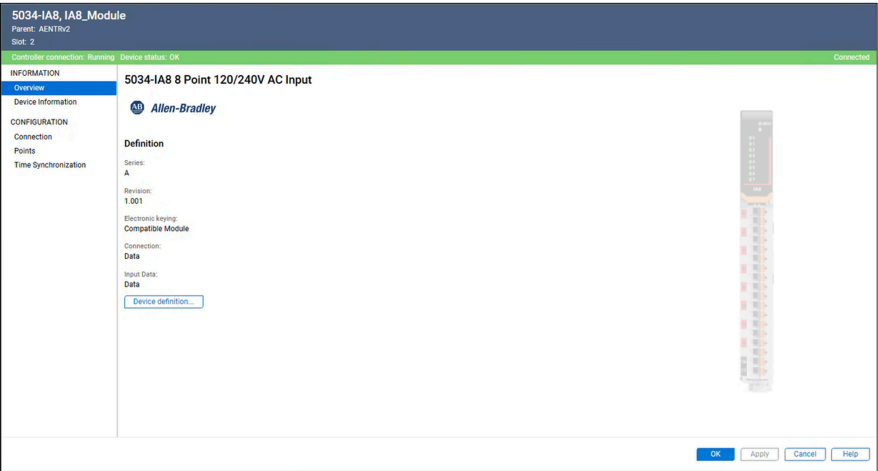
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 29. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 30. Device Definition Example

Device definition

Device type:
5034-IA8 8 Point 120/240V AC Input

Name:
AC_Input_Module

Description:

Slot:
1

Series:
A

Revision:
1 . 011

Electronic keying:
Compatible Module

Connection:
Data

Input Data:
Packed Data

OK

Cancel

Help

Device Definition includes these parameters:

Table 16. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific

Table 16. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	<p>Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.</p> <p>For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001.</p>	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying <hr/> <div>  <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p> </div> <hr/>
Connection	<p>Specify the type of data transferred between the device and controller.</p> <p>For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.</p>	<ul style="list-style-type: none"> Data Listen Only Data
Input Data	Select the input data type for the device.	<ul style="list-style-type: none"> Data Packed Data

Device Information View

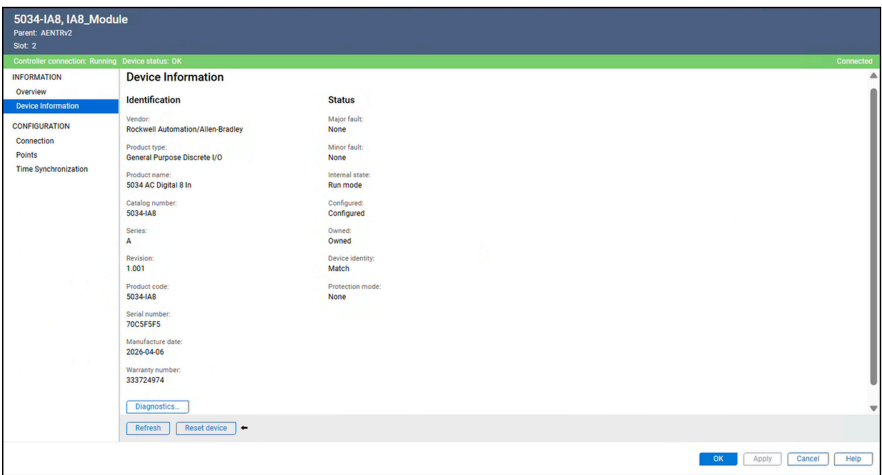
Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.

- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

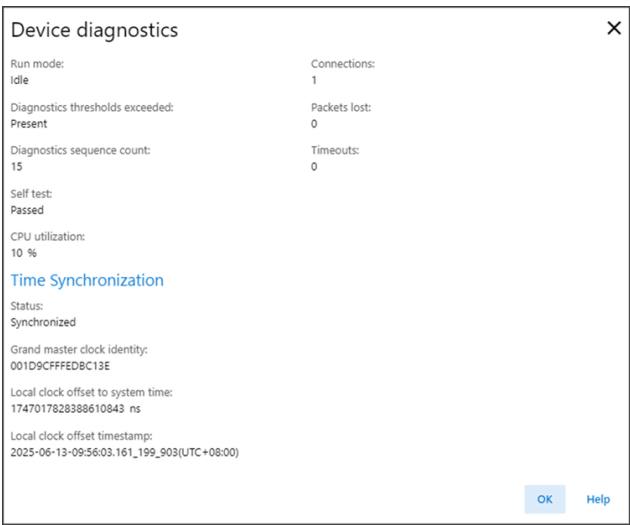
Figure 31. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 32. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).

- View the reason of Connection Fault.



If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 33. Connection View Example

5034-IA8, IA8_Module
Parent: AEN1rv2
Slot: 2

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Synchronization

Connection

Connection Type	Value	Range	Connection over Ethernet/IP
Data	5.0	ms 0.2 - 750.0	Unicast

☐ Inhibit module
☐ Major fault on controller if connection fails while in Run mode
☒ Enable Automatic Diagnostics
Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events

Connection fault:

OK Apply Cancel Help

Points View

Use Points to view or configure the points for the device.

Figure 34. Points View Example

5034-IA8, IA8_Module
Parent: AEN1rv2
Slot: 2

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Synchronization

Points

Point	Input Filter Time	
	Off → On	On → Off
00	2 ms	10 ms
01	1 ms	10 ms
02	1 ms	10 ms
03	1 ms	10 ms
04	1 ms	10 ms
05	1 ms	10 ms
06	1 ms	10 ms
07	1 ms	10 ms

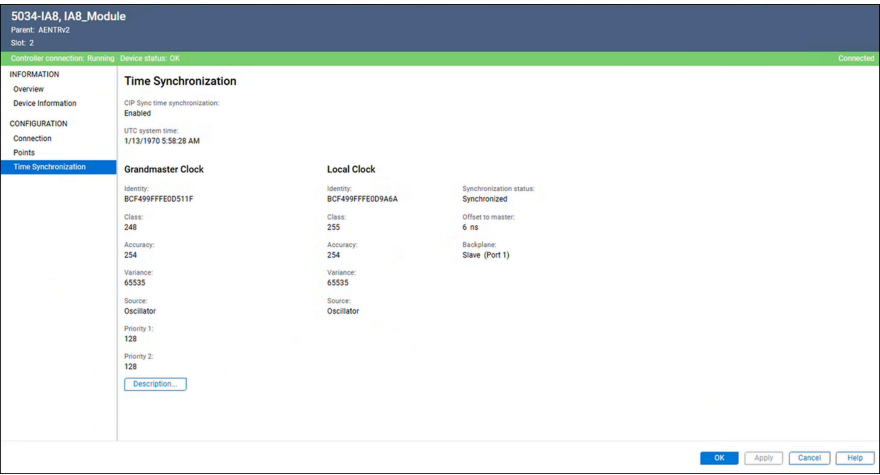
OK Apply Cancel Help

Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Synchronization view displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 35. Time Synchronization View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Synchronization view.

Figure 36. Grandmaster Clock Description Example

Grandmaster clock description

User name:

User location:

Protocol address:00.00.00.00

Physical address:00-00-00-00

Clock type:Boundary, and End-to-End Transpare...

Manufacturer name:Rockwell Automation

Model:5034-AENTR/A

Serial number:709990FF

Hardware revision:2.1

Firmware revision:2.11.3

Software revision:

Profile identity:00-21-6C-00-01-00

Physical protocol:Backplane

Network protocol:Local

Port number:1

Close

Help

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 17. 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.	<div><div>• 13 = 1 ms</div><div>• 14 = 2 ms</div><div>• 15 = 5 ms</div></div> <div>NOTE: For the module operating with a 120V AC input signal, the only valid Off to On filter value is 1 ms.</div>
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.	<div><div>• 16 = 10 ms</div><div>• 17 = 20 ms</div></div>

Input Tag Definitions

Table 18. Input Tag Definitions

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates that the data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Ptxx.Data PtxxData (Packed data)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault

Table 18. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
Fault (Packed data)	INT	<p>Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03.</p> <p>Fault state indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data

Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type that you are using.

Module Status Indicators

Table 19. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> Confirm that the system is powered. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.

Table 19. Interpret Module Status Indicator (continued)

Indicator State	Description	Recommended Action
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 20. Interpret Point Status Indicators

Indicator State	Description	Recommended Action
Off	The point is Off.	Confirm that the point is configured properly.
Steady yellow	The point is On.	—

Diagnostic Assembly

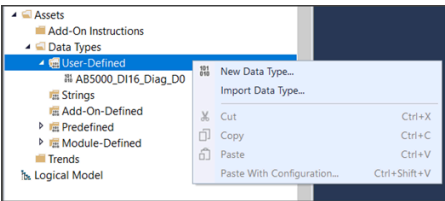
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

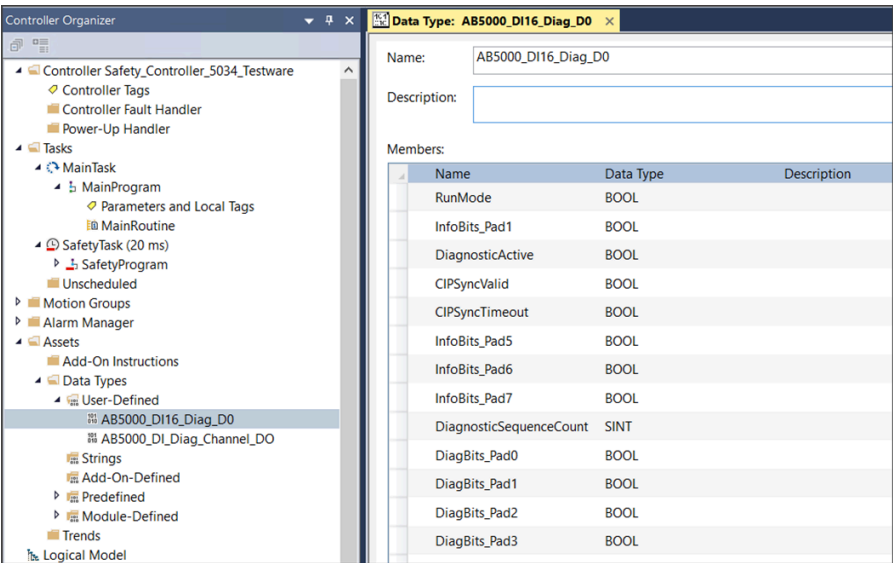
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

- 1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
- 2. Right-click on the User-Defined folder and select New Data Type.



- 3. Add a Name and Description (optional) for your diagnostic assembly.
- 4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301(769)
- Size = 16 bytes

Table 21. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	

Table 21. Diagnostic Assembly Instance - 769 (continued)

Name	Data Type	Size in Bytes
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Definitions for Diagnostic Assembly Parameters

Table 22. Definitions for Diagnostic Assembly Parameters

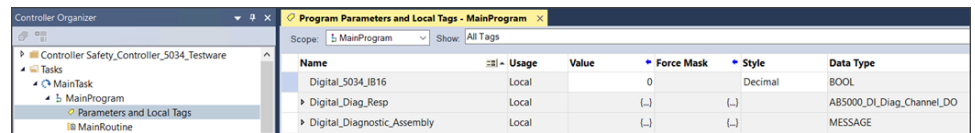
Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 22. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none">- Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none">• 0 = No diagnostics are 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.	-128...+127 The value of 0 is skipped except during module powerup.
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



Name	Usage	Value	Force Mask	Style	Data Type
Digital_5034_IB16	Local	0		Decimal	BOOL
Digital_Diag_Resp	Local	(...)	(...)		AB5000_DI_Diag_Channel_DO
Digital_Diagnostic_Assembly	Local	(...)	(...)		MESSAGE

From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.

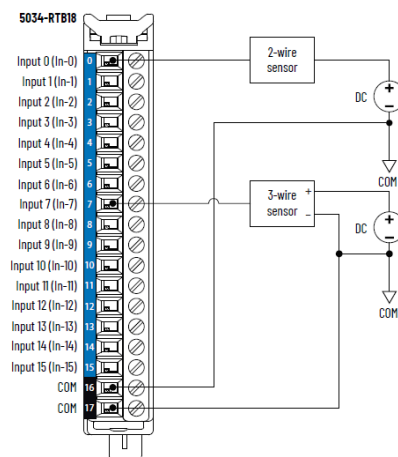


4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-IB16 and 5034-IB16XT Details

5034-IB16 and 5034-IB16XT Digital 16 Input Modules

Figure 37. 5034-IB16 and 5034-IB16XT Wiring Diagram



To establish more COM connections, install a 5034-MBPTM or 5034-MBPTMXT next to the module. You can install up to two 5034-MBPTM or 5034-MBPTMXT modules consecutively to the right of the digital 16 input module for 3-wire sensor applications.

Figure 38. 5034-IB16 and 5034-IB16XT Functional Block Diagram

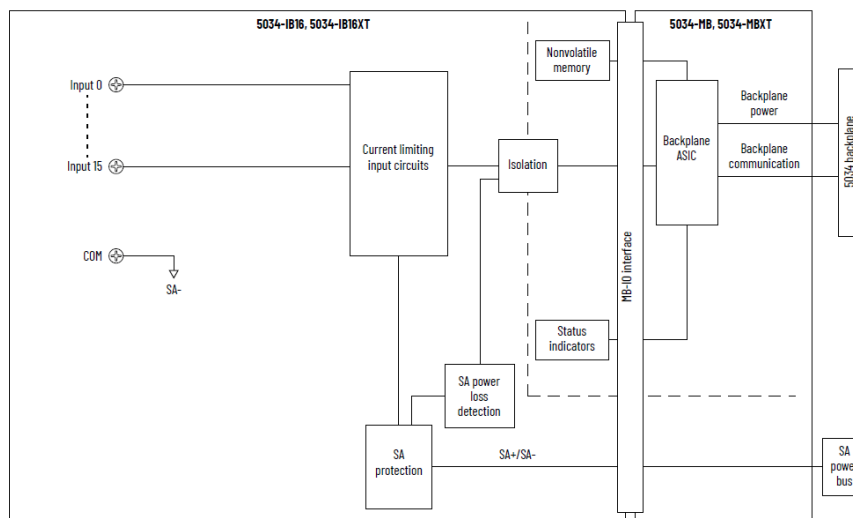


Table 23. Technical Specifications - 5034-IB16, 5034-IB16XT

Attribute	5034-IB16, 5034-IB16XT
On-state voltage range	10...30V DC
On-state current, min	2 mA

Table 23. Technical Specifications - 5034-IB16, 5034-IB16XT (continued)

Attribute	5034-IB16, 5034-IB16XT
On-state current, nom	2.4 mA
On-state current, max	2.8 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input impedance, min	3.57 k Ω @ 10V DC
Input impedance, nom	10 k Ω @ 24V DC
Input impedance, max	15 k Ω @ 30V DC
Input delay time (screw to backplane), max Off-to-On On-to-Off	150 μ s
Input pulse width, min Off-to-On On-to-Off	125 μ s
Input filter time Off-to-On On-to-Off	0 μ s, 100 μ s, 200 μ s, 500 μ s, 1 ms (Default), 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Simple counters, counter frequency	0...f _{max} = 4000 Hz 4 (with 12 points as standard inputs) or 8 (with 8 points as standard inputs) Point 0...7 only
Timestamp of inputs (sequence of events)	Yes, $\pm$ 100 μ s accuracy
Events	Not supported

Table 24. General Specifications - 5034-IB16, 5034-IB16XT

Attribute	5034-IB16, 5034-IB16XT
Number of inputs	16 channels (1 group of 16), sinking
Voltage category	12/24V DC sink
Input voltage, nom	24V DC
Input voltage range	10...30V DC

Table 24. General Specifications - 5034-IB16, 5034-IB16XT (continued)

Attribute	5034-IB16, 5034-IB16XT
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	20 mA
SA power current, max	0.1 A
SA power current at no load	10 mA
SA reverse polarity protection	Yes
Power dissipation, max ⁽¹⁾	1.45 W
Thermal dissipation, max ⁽¹⁾	4.95 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System ⁽²⁾ to Field No isolation between SA power and inputs No isolation between individual inputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 4, 11
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽³⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	43.0 g (1.52 oz.) - 5034-IB16 45.0 g (1.59 oz.) - 5034-IB16XT
Enclosure type	None (Open-style)
North American temp code	T4

Table 24. General Specifications - 5034-IB16, 5034-IB16XT (continued)

Attribute	5034-IB16, 5034-IB16XT
UKEX/ATEX temp code	T4
IECEx temp code	T4

- (1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.
- (2) For the System to Field isolation attribute, System refers to the backplane and Field refers to the SA side of the module. Unless otherwise specified, this definition applies to all modules.
- (3) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

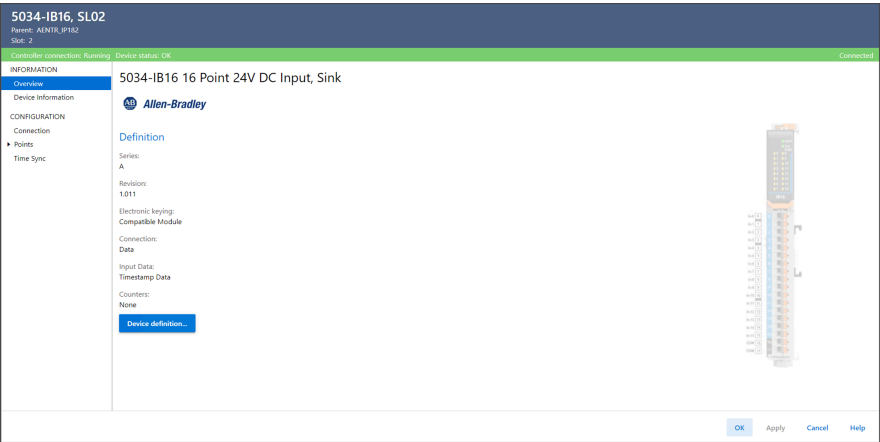
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 39. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 40. Device Definition Example

Device definition

Device type:

5034-IB16 16 Point 24V DC Input, Sink

Name:

SLO2

Description:

Slot:

2

Series:

A

Revision:

1

- 011

Electronic keying:

Compatible Module

Connection:

Data

Input Data:

Data

Counters:

8

OK

Cancel

Help

Device Definition includes these parameters:

Table 25. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying

Table 25. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p>
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	<ul style="list-style-type: none"> • Data • Listen Only Data
Input Data	Select the input data type for the device.	<ul style="list-style-type: none"> • Data • Timestamp Data • Packed Data
Counters	Select the counter number for the device.	<ul style="list-style-type: none"> • None • 4 • 8

Device Information View

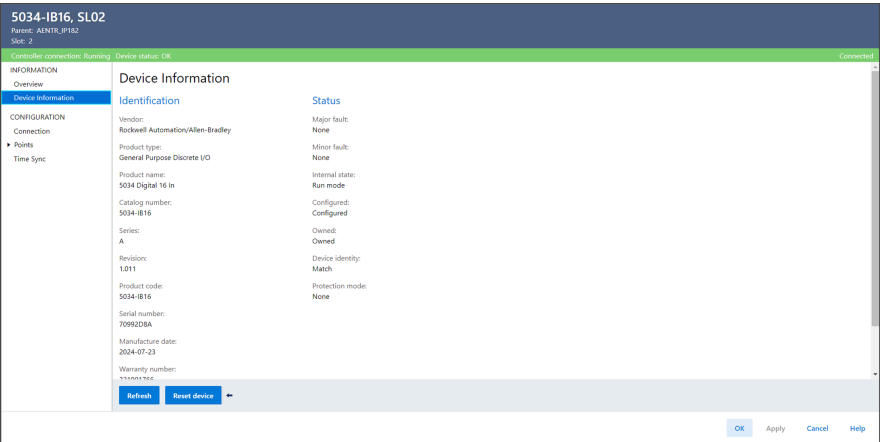
Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.

- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

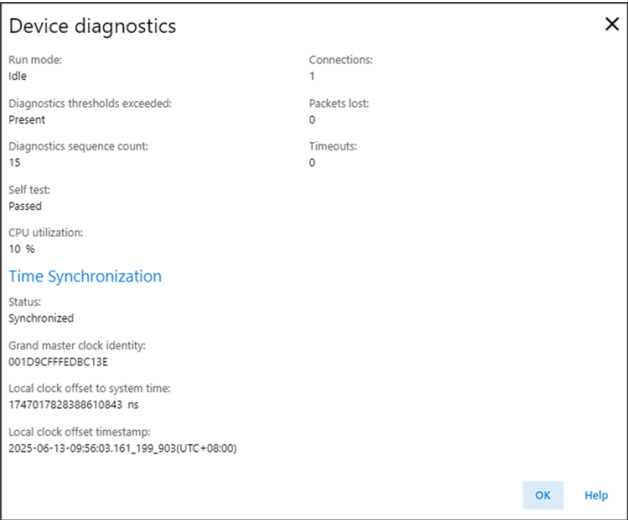
Figure 41. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 42. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



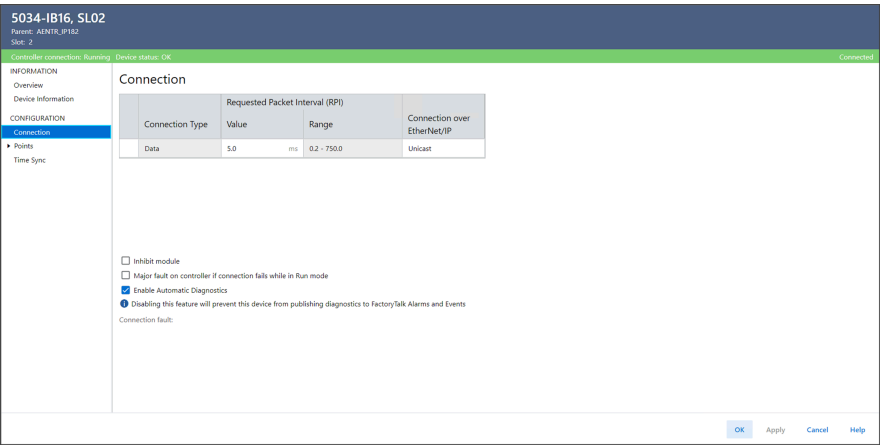
If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 43. Connection View Example

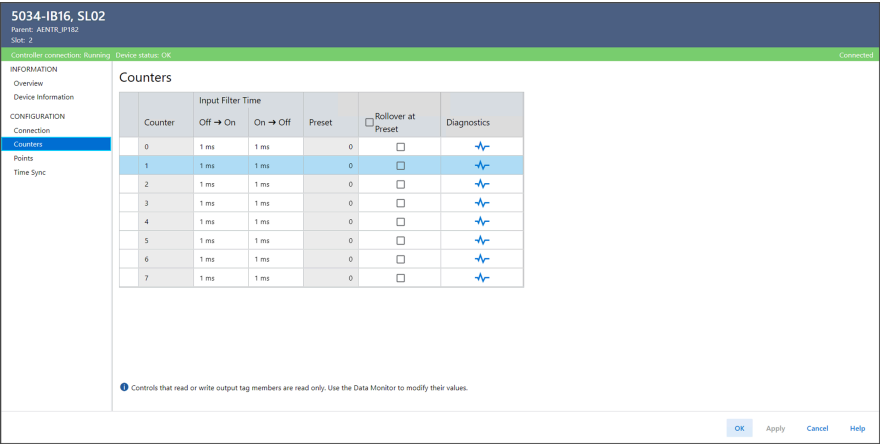


Counters View

Counters is available only if you choose a value for the Counters parameter in the Device Definition dialog.

Counters show the configuration options that are 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 enable Rollover at Preset. To modify the counter preset value, use *0.Counterxx.Preset* in the controller tags.

Figure 44. Counters View Example

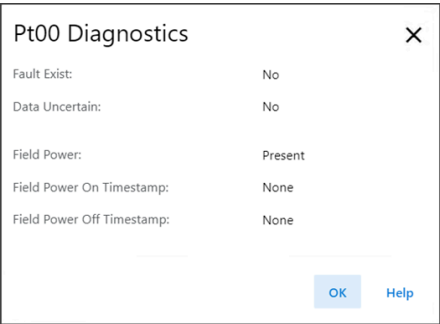


IMPORTANT: The total number of Counters subtracts from the available number of Points. For example, if you configure a 5034-IB16 module to use eight counters, the first eight terminals are not available to use as points. The number of points available on the module in this case is 8. That is, points 8...15.

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Counters view.

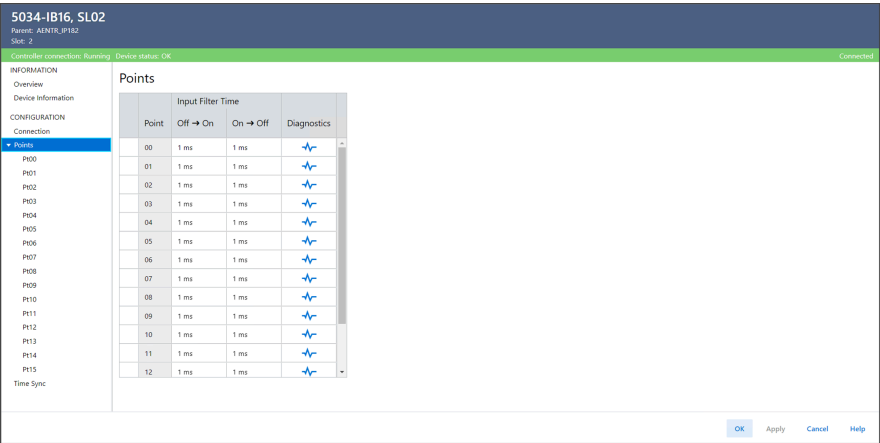
Figure 45. Pttx Diagnostics Example



Points View

Use Points to view or configure the points for the device.

Figure 46. Points View Example

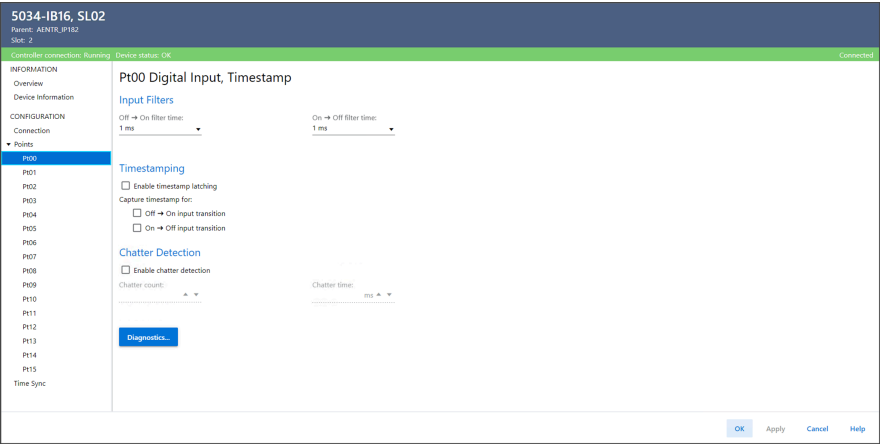


Pttx View

If you choose Timestamp Data for Input Data in the Device Definition dialog, the Points view expands.

The Pttx view shows the configuration options available when you use Timestamping on a point. Select each Pttx to configure it as necessary for your application.

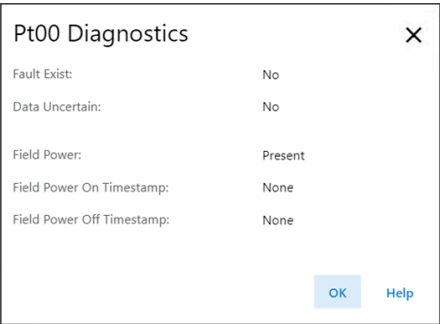
Figure 47. Ptxx View Example



Ptxx Diagnostics

To view the Ptxx diagnostics, select Diagnostics in the Points or Ptxx view.

Figure 48. Ptxx Diagnostics Example

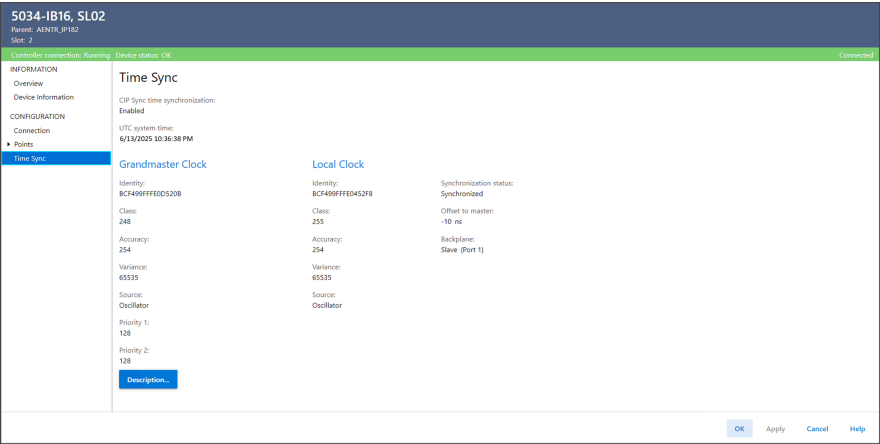


Time Sync View

The Time Sync view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

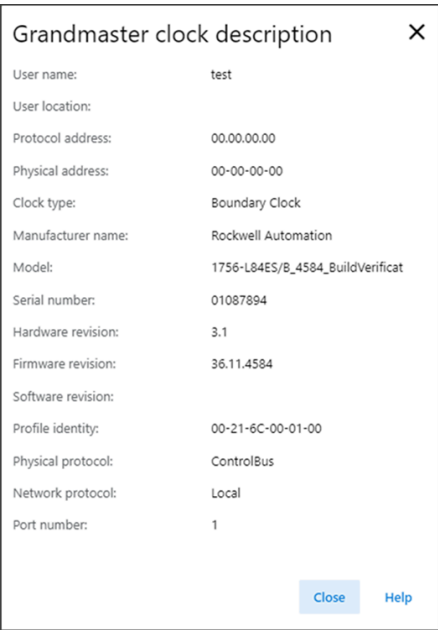
Figure 49. Time Sync View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 50. Grandmaster Clock Description Example



Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 26. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: <ol style="list-style-type: none"> 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: <ul style="list-style-type: none"> - Check that the SA voltage is in the correct range. - If an external power supply is used, confirm that the power supply is turned on. - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 27. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
Flashing red	One of the following conditions exists: <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. 	Complete one of the following: <ul style="list-style-type: none"> • Let the firmware update process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view.

Table 27. Interpret Module Status Indicator (continued)

Indicator State	Description	Recommended Action
		<p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 28. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	<p>One of the following:</p> <ul style="list-style-type: none"> • The point is Off. • There is no backplane power. • A Field Power Loss condition exists. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Confirm that the point is configured properly. • Confirm that there is backplane power supplied through the EtherNet/IP adapter. • Locate and correct the cause of field power loss condition.
Steady yellow	The point is On.	None

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 29. Configuration Tags

Name	Data Type	Definition	Valid Values
Counterxx.InputOffOnFilter	SINT	<p>The amount of time that a signal must be in the On state before the input data indicates the On state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 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	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 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 will rollover to 0 at the Preset value.	<ul style="list-style-type: none"> 0 = No rollover at the Preset value <p>When the counter counts to the Preset value, the Done bit is set.</p> <p>When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set.</p> <ul style="list-style-type: none"> 1 = Rollover at the Preset value <p>When the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0.</p>
Ptxx.InputOffOnFilter	SINT	<p>The amount of time that a signal must be in the On state before the input data indicates the On state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs

Table 29. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Ptxx.InputOnOffFilter	SINT	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 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.ChatterTime	INT	A value from 1...10,000 ms in whole ms increments	1...10,000
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 timestamps. If cleared, the point does not record Off to On timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for Off to On input transitions 1 = Capture enabled for Off to On input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off timestamps. If cleared, the point does not record On to Off timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for On to Off input transitions 1 = Capture enabled for On to Off input transitions
Ptxx.TimestampLatchEn	BOOL	Determines whether timestamps latching is enabled.	<ul style="list-style-type: none"> 0 = Timestamps are overwritten with each successive transition The new timestamp overwrites the reported timestamp immediately, even if the controller has yet to extract that data. 1 = Timestamps are latched until acknowledged The reported timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset.

Table 29. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<p>Timestamp is acknowledged by copying the value from input tag TimestampOffOnNumber/TimestampOnOffNumber to output tag TimestampOffOnNumberAck/TimestampOnOffNumberAck.</p> <p>The acknowledgment also clears TimestampOverflowOffOn/TimestampOverflowOnOff.</p>

Input Tag Definitions

Table 30. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp).
ConnectionFaulted	BOOL	<p>Indicates if a connection to the target is running.</p> <p>The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.</p>	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
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.

Table 30. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	
CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Counterxx.Data	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Counterxx.Fault	BOOL	<p>Indicates that counter data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Counterxx.Uncertain	BOOL	<p>Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Counterxx.Done	BOOL	<p>If RolloverAtPreset is set, indicates if Count $\geq$ Preset.</p> <p>If RolloverAtPreset is not set, always 0.</p>	<ul style="list-style-type: none"> 0 = Counter has not reached the Preset value 1 = Counter has reached the Preset value
Counterxx.Rollover	BOOL	<p>The counter counted up to Preset -1 and continued counting from 0.</p> <p>The RolloverAck bit transitioning from 0 to 1 or the Reset bit transitioning from 0 to 1 clears this bit.</p>	<ul style="list-style-type: none"> 0 = Counter has not rolled over from Preset -1 to 0 1 = Counter counted up to Preset -1 and continued counting from 0

Table 30. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Counterxx.Count	DINT	The number of rising edge of input signal counted by the counter	All values
Ptxx.Data PtxxData (Packed data)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Fault (Packed data)	INT	Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03. Fault state indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	For each point: <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
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 timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1

Table 30. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Ptxx.TimestampOverflowOnOff	BOOL	Indicates an On to Off timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1
Ptxx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
Ptxx.TimestampOffOnNumber	INT	An Off to On timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOnOffNumber	INT	An On to Off timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOffOn	LINT	64-bit timestamp corresponding to when a change of state Off to On was recorded at the input	All values
Ptxx.TimestampOnOff	LINT	64-bit timestamp corresponding to when a change of state On to Off was recorded at the input	All values

Output Tag Definitions

Table 31. Output Tags

Name	Data Type	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, Count and Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Count and Rollover values are not set to 0 1 = Count and 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 = Rollover bit is not cleared 1 = Rollover bit is cleared
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, when the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0. 	0...2,147,483,647

Table 31. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		<ul style="list-style-type: none"> If RolloverAtPreset is not set, when the counter counts to the Preset value, the Done bit is set. <p>When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set.</p>	
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input point 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 the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module is then allowed to produce a new timestamp.</p>	All values
Ptxx.TimestampOnOffNumberAck	INT	<p>An On to Off timestamp identifier that the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module is then allowed to produce a new timestamp.</p>	All values

Diagnostic Assembly

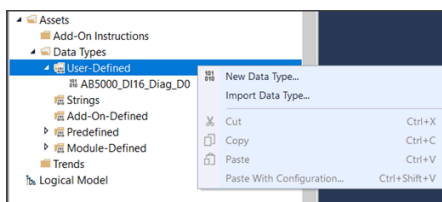
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

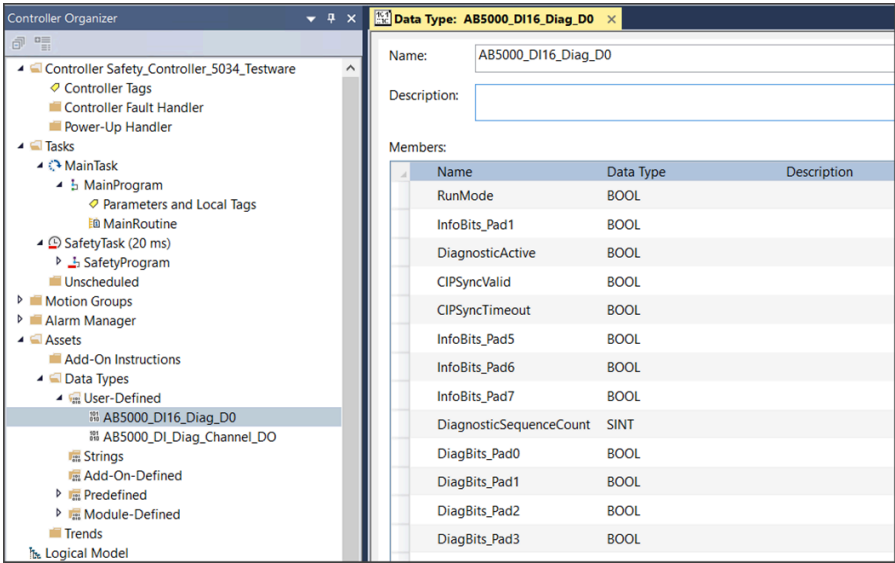
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



- 3. Add a Name and Description (optional) for your diagnostic assembly.
- 4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

- Diagnostic Digital 16 Point with Diagnostics Assembly
- Instance ID = 0x315 (789)
 - Size = 416 bytes

Table 32. Diagnostic Assembly Instance - 789

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	

Table 32. Diagnostic Assembly Instance – 789 (continued)

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...15]	See Diagnostic Digital with Diagnostics Channel (Input)	384

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 33. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
CIPConnections	INT	
CIPLostPackets	DINT	
CIPTimeouts	DINT	
CPUUtilization	INT	
Pad	INT	

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Input)

- Size = 24 bytes

Table 34. Structure for Diagnostic Digital with Diagnostics Channel (Input)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
DataBits_Pad3	BOOL	
DataBits_Pad4	BOOL	
DataBits_Pad5	BOOL	

Table 34. Structure for Diagnostic Digital with Diagnostics Channel (Input) (continued)

Name	Data Type	Size in Bytes
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 35. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 35. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> • 0 = No diagnostics are active. • 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds • uuu = microseconds • nnn = nanoseconds • UTC-00:00 = Time zone

Table 35. Definitions for Diagnostic Assembly Parameters (continued)

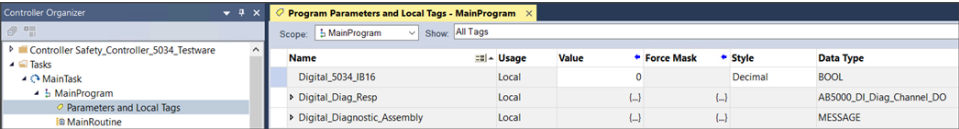
Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are	0...2,147,483,647

Table 35. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
		skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

- 1. Create MESSAGE type user tags for each request.
- 2. Create associated response user tags for each new user-defined diagnostic assembly type.
- 3. Add the user tags to your ladder program.



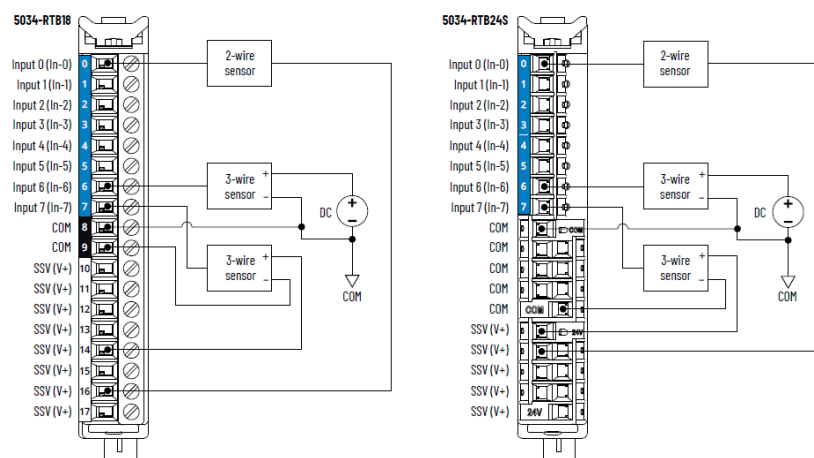
- 4. Expand the message tag to open the message configuration dialog.
- 5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 789 (315h) Diagnostic Digital 16 Point with Diagnostics Assembly
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
- 6. On the Communication tab, select the path to the module that you wish to send the messages to.

7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-IB8 and 5034-IB8XT Details

5034-IB8 and 5034-IB8XT Digital 8 Input Modules

Figure 51. 5034-IB8 and 5034-IB8XT Wiring Diagram



To establish more COM/V+ connections, use a 5034-RTB24S, or install a 5034-MBPTM or 5034-MBPTMTX next to the module.

Figure 52. 5034-IB8 and 5034-IB8XT Functional Block Diagram

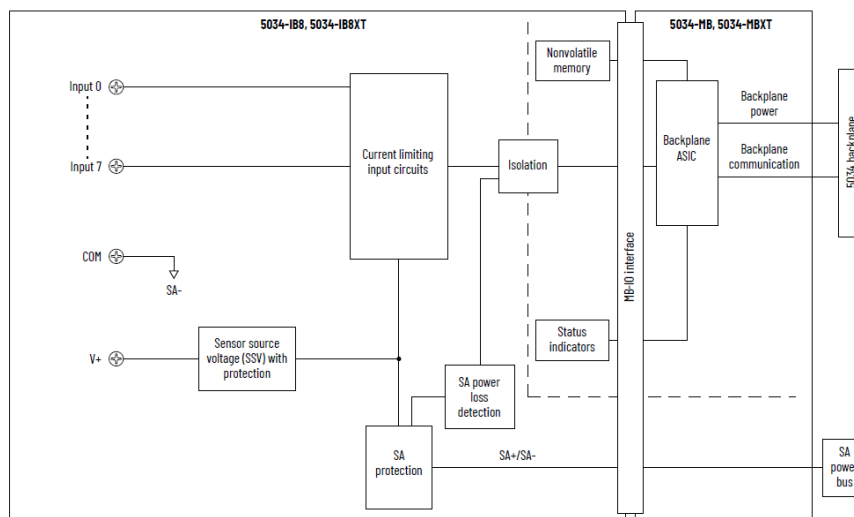


Table 36. Technical Specifications - 5034-IB8, 5034-IB8XT

Attribute	5034-IB8, 5034-IB8XT
On-state voltage range	10...30V DC
On-state current, min	2 mA
On-state current, nom	2.4 mA

Table 36. Technical Specifications - 5034-IB8, 5034-IB8XT (continued)

Attribute	5034-IB8, 5034-IB8XT
On-state current, max	2.8 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input impedance, min	3.57 k Ω @ 10V DC
Input impedance, nom	10 k Ω @ 24V DC
Input impedance, max	15 k Ω @ 30V DC
Input delay time (screw to backplane), max Off-to-On On-to-Off	150 μ s
Input pulse width, min Off-to-On On-to-Off	125 μ s
Input filter time Off-to-On On-to-Off	0 μ s, 100 μ s, 200 μ s, 500 μ s, 1 ms (Default), 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Simple counters, counter frequency	0...f _{max} = 4000 Hz 4 (with 4 points as standard inputs) Point 0...3 only
Timestamp of inputs (sequence of events)	Yes, $\pm$ 100 μ s accuracy
Events	Not supported

Table 37. General Specifications - 5034-IB8, 5034-IB8XT

Attribute	5034-IB8, 5034-IB8XT
Number of inputs	8 channels (1 group of 8), sinking
Voltage category	12/24V DC sink
Input voltage, nom	24V DC
Input voltage range	10...30V DC
SA power voltage, nom	24V DC

Table 37. General Specifications - 5034-IB8, 5034-IB8XT (continued)

Attribute	5034-IB8, 5034-IB8XT
SA power voltage range	10...30V DC
SA power current, nom	250 mA
SA power current, max	0.3 A
SA power current at no load	10 mA
SA reverse polarity protection	Yes
SSV voltage range	Follow SA supply
SSV current, max	0.2 A
SSV short-circuit protection	Yes
Power dissipation, max ⁽¹⁾	1.15 W
Thermal dissipation, max ⁽¹⁾	3.92 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and inputs No isolation between individual inputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 4, 8
RTB supported	5034-RTB18, 5034-RTB18S, 5034-RTB24S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	43.0 g (1.52 oz.) - 5034-IB8 46.0 g (1.62 oz.) - 5034-IB8XT

Table 37. General Specifications - 5034-IB8, 5034-IB8XT (continued)

Attribute	5034-IB8, 5034-IB8XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

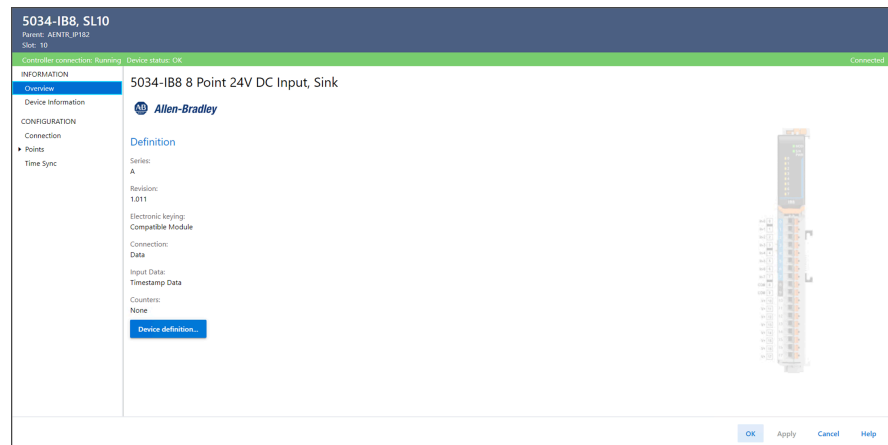
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 53. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 54. Device Definition Example

Device definition

Device type

5034-IB8 8 Point 24V DC Input, Sink

Name

SL10

Description

Slot

10

Series

A

Revision

1

011

Electronic keying

Compatible Module

Connection

Data

Input Data

Data

Counters

4

OK

Cancel

Help

Device Definition includes these parameters:

Table 38. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying

Table 38. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p>
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	<ul style="list-style-type: none"> • Data • Listen Only Data
Input Data	Select the input data type for the device.	<ul style="list-style-type: none"> • Data • Timestamp Data • Packed Data
Counters	Select the counter number for the device.	<ul style="list-style-type: none"> • None • 4

Device Information View

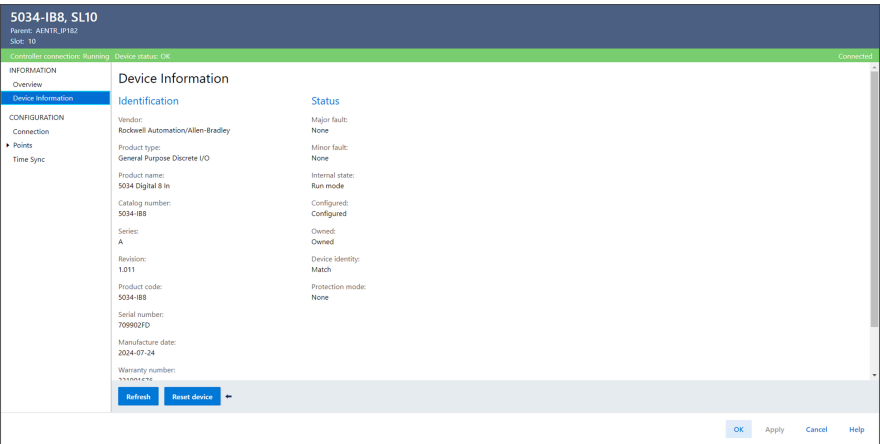
Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.

- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

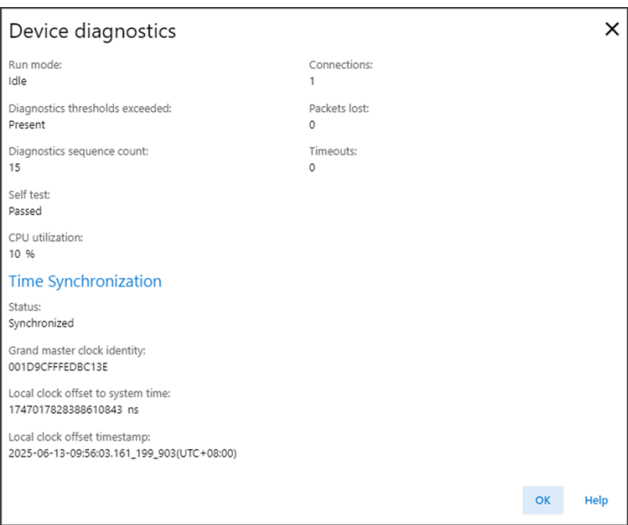
Figure 55. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 56. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



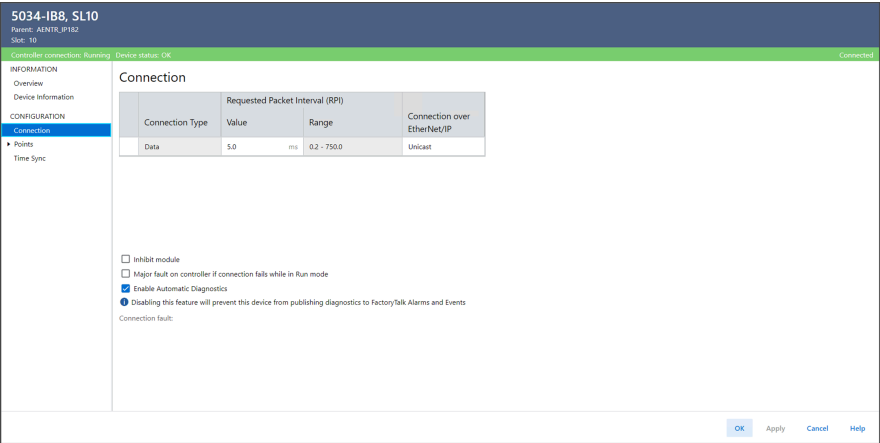
If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 57. Connection View Example

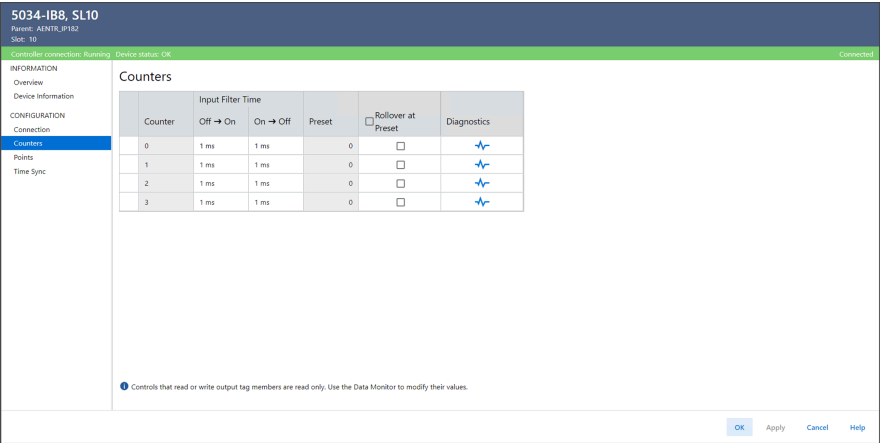


Counters View

Counters is available only if you choose a value for the Counters parameter in the Device Definition dialog.

Counters show the configuration options that are 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 enable Rollover at Preset. To modify the counter preset value, use *0.Counterxx.Preset* in the controller tags.

Figure 58. Counters View Example

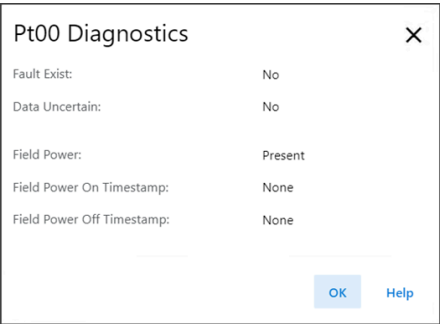


IMPORTANT: The total number of Counters subtracts from the available number of Points. For example, if you configure a 5034-IB8 module to use four counters, the first four terminals are not available to use as points. The number of points available on the module in this case is 4. That is, points 4...7.

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Counters view.

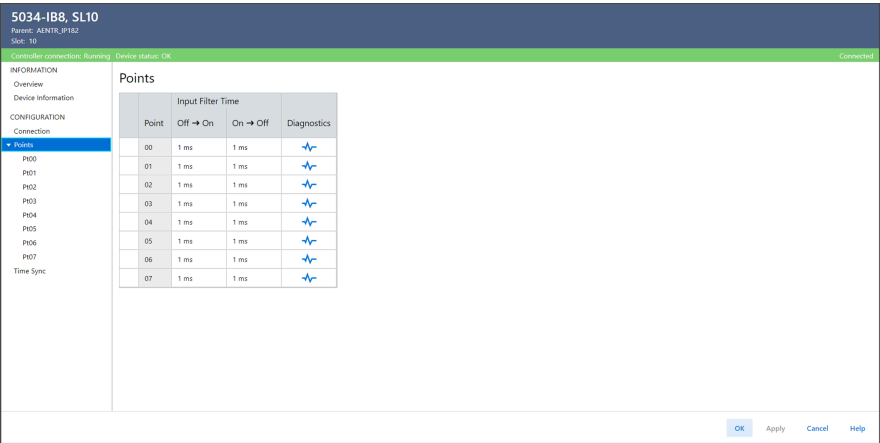
Figure 59. Pttx Diagnostics Example



Points View

Use Points to view or configure the points for the device.

Figure 60. Points View Example

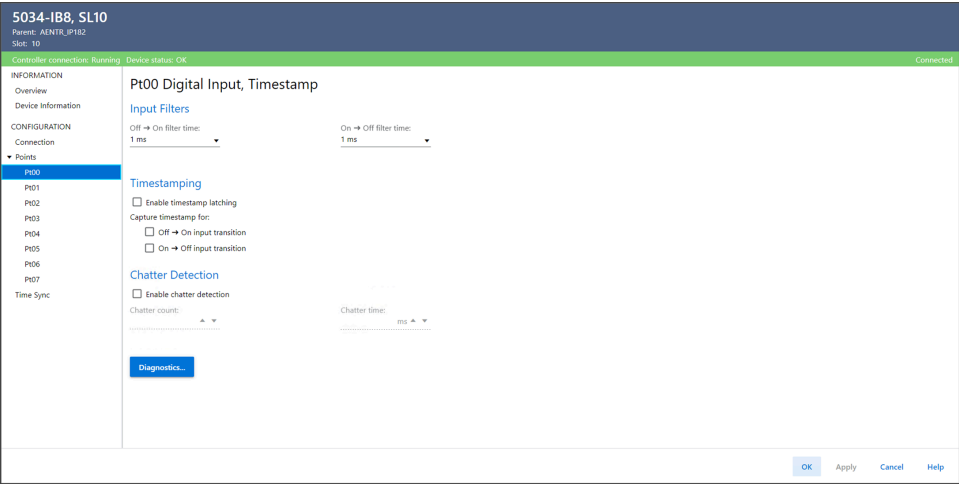


Pttx View

If you choose Timestamp Data for Input Data in the Device Definition dialog, the Points view expands.

The Pttx view shows the configuration options available when you use Timestamping on a point. Select each Pttx to configure it as necessary for your application.

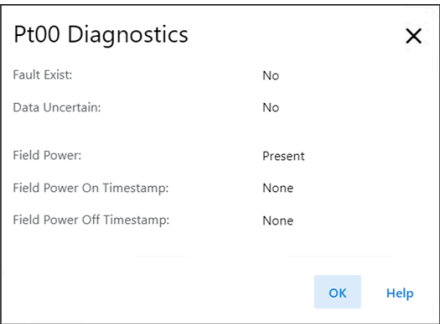
Figure 61. Ptxx View Example



Ptxx Diagnostics

To view the Ptxx diagnostics, select Diagnostics in the Points or Ptxx view.

Figure 62. Ptxx Diagnostics Example

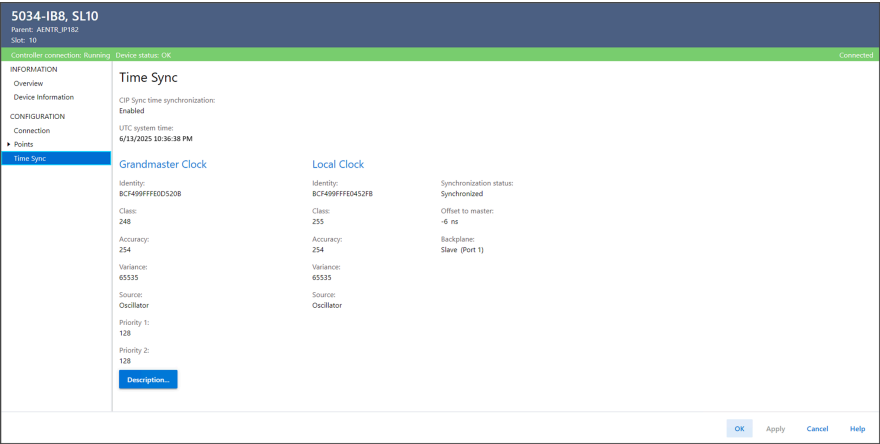


Time Sync View

The Time Sync view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

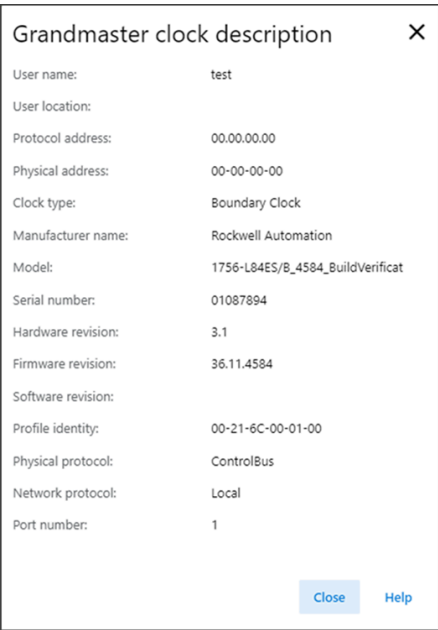
Figure 63. Time Sync View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 64. Grandmaster Clock Description Example



Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 39. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: <ul style="list-style-type: none"> - Check that the SA voltage is in the correct range. - If an external power supply is used, confirm that the power supply is turned on. - Make sure that the mounting base to mounting base connection is properly secured. Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.

Module Status Indicators

Table 40. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
Flashing red	One of the following conditions exists: <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. 	Complete one of the following: <ul style="list-style-type: none"> • Let the firmware update process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view.

Table 40. Interpret Module Status Indicator (continued)

Indicator State	Description	Recommended Action
		<p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 41. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	<p>One of the following:</p> <ul style="list-style-type: none"> • The point is Off. • There is no backplane power. • A Field Power Loss condition exists. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Confirm that the point is configured properly. • Confirm that there is backplane power supplied through the EtherNet/IP adapter. • Locate and correct the cause of field power loss condition.
Steady yellow	The point is On.	None

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 42. 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.	<ul style="list-style-type: none"> • 5 = 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.	<ul style="list-style-type: none"> • 5 = 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 will rollover to 0 at the Preset value.	<ul style="list-style-type: none"> • 0 = No rollover at the Preset value When the counter counts to the Preset value, the Done bit is set. When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set. • 1 = Rollover at the Preset value When the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0.
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.	<ul style="list-style-type: none"> • 5 = 0 μs • 10 = 100 μs • 11 = 200 μs • 12 = 500 μs

Table 42. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Ptxx.InputOnOffFilter	SINT	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 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.ChatterTime	INT	A value from 1...10,000 ms in whole ms increments	1...10,000
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 timestamps. If cleared, the point does not record Off to On timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for Off to On input transitions 1 = Capture enabled for Off to On input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off timestamps. If cleared, the point does not record On to Off timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for On to Off input transitions 1 = Capture enabled for On to Off input transitions
Ptxx.TimestampLatchEn	BOOL	Determines whether timestamps latching is enabled.	<ul style="list-style-type: none"> 0 = Timestamps are overwritten with each successive transition The new timestamp overwrites the reported timestamp immediately, even if the controller has yet to extract that data. 1 = Timestamps are latched until acknowledged The reported timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset.

Table 42. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<p>Timestamp is acknowledged by copying the value from input tag TimestampOffOnNumber/TimestampOnOffNumber to output tag TimestampOffOnNumberAck/TimestampOnOffNumberAck.</p> <p>The acknowledgment also clears TimestampOverflowOffOn/TimestampOverflowOnOff.</p>

Input Tag Definitions

Table 43. Input Tag Definitions

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp).
ConnectionFaulted	BOOL	<p>Indicates if a connection to the target is running.</p> <p>The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.</p>	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
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.

Table 43. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
		A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	
CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Counterxx.Data	BOOL	Indicates the current digital 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. 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.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Counterxx.Uncertain	BOOL	Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known. 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.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Counterxx.Done	BOOL	If RolloverAtPreset is set, indicates if Count $\geq$ Preset. If RolloverAtPreset is not set, always 0.	<ul style="list-style-type: none"> 0 = Counter has not reached the Preset value 1 = Counter has reached the Preset value
Counterxx.Rollover	BOOL	The counter counted up to Preset -1 and continued counting from 0. The RolloverAck bit transitioning from 0 to 1 or the Reset bit transitioning from 0 to 1 clears this bit.	<ul style="list-style-type: none"> 0 = Counter has not rolled over from Preset -1 to 0 1 = Counter counted up to Preset -1 and continued counting from 0

Table 43. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
Counterxx.Count	DINT	The number of rising edge of input signal counted by the counter	All values
Ptxx.Data PtxxData (Packed data)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Fault (Packed data)	INT	Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03. Fault state indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	For each point: <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
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 timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1

Table 43. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
Ptxx.TimestampOverflowOnOff	BOOL	Indicates an On to Off timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1
Ptxx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
Ptxx.TimestampOffOnNumber	INT	An Off to On timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOnOffNumber	INT	An On to Off timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOffOn	LINT	64-bit timestamp corresponding to when a change of state Off to On was recorded at the input	All values
Ptxx.TimestampOnOff	LINT	64-bit timestamp corresponding to when a change of state On to Off was recorded at the input	All values

Output Tag Definitions

Table 44. Output Tags

Name	Data Type	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, Count and Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Count and Rollover values are not set to 0 1 = Count and 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 = Rollover bit is not cleared 1 = Rollover bit is cleared
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, when the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0. 	0...2,147,483,647

Table 44. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		<ul style="list-style-type: none"> If RolloverAtPreset is not set, when the counter counts to the Preset value, the Done bit is set. <p>When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set.</p>	
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input point 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 the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module is then allowed to produce a new timestamp.</p>	All values
Ptxx.TimestampOnOffNumberAck	INT	<p>An On to Off timestamp identifier that the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module is then allowed to produce a new timestamp.</p>	All values

Diagnostic Assembly

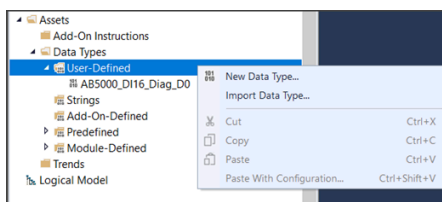
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

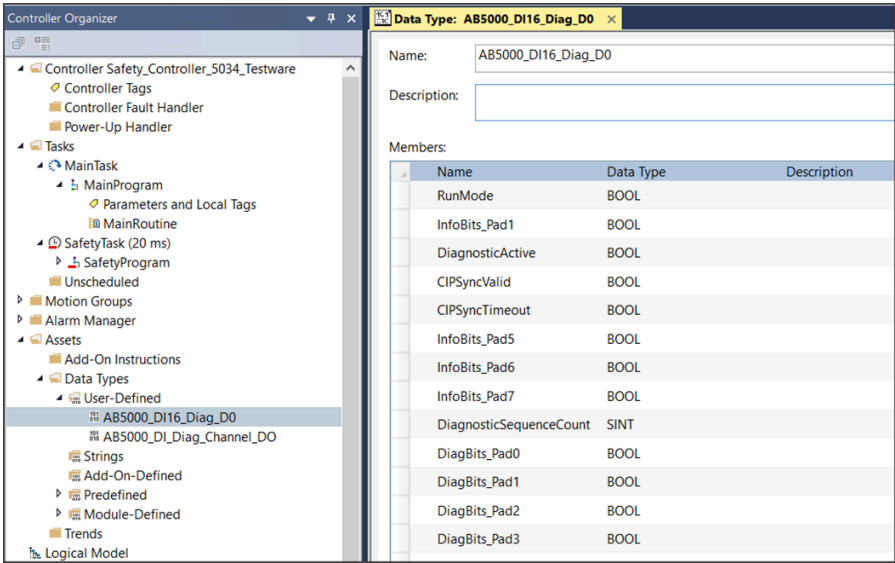
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



- 3. Add a Name and Description (optional) for your diagnostic assembly.
- 4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

Diagnostic Digital 8 Point with Diagnostics Assembly

- Instance ID = 0x3CE (974)
- Size = 224 bytes

Table 45. Diagnostic Assembly Instance - 974

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	

Table 45. Diagnostic Assembly Instance - 974 (continued)

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...7]	See Diagnostic Digital with Diagnostics Channel (Input)	192

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 46. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Input)

- Size = 24 bytes

Table 47. Structure for Diagnostic Digital with Diagnostics Channel (Input)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
DataBits_Pad3	BOOL	
DataBits_Pad4	BOOL	
DataBits_Pad5	BOOL	

Table 47. Structure for Diagnostic Digital with Diagnostics Channel (Input) (continued)

Name	Data Type	Size in Bytes
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 48. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 48. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> • 0 = No diagnostics are active. • 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds • uuu = microseconds • nnn = nanoseconds • UTC-00:00 = Time zone

Table 48. Definitions for Diagnostic Assembly Parameters (continued)

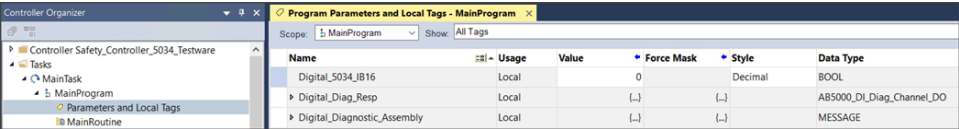
Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are	0...2,147,483,647

Table 48. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
		skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 974 (3CEh) Diagnostic Digital 8 Point with Diagnostics Assembly
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.

7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-0A4 and 5034-0A4XT Details

5034-0A4 and 5034-0A4XT Digital 4 AC Output Modules

Figure 65. 5034-0A4 and 5034-0A4XT Wiring Diagram

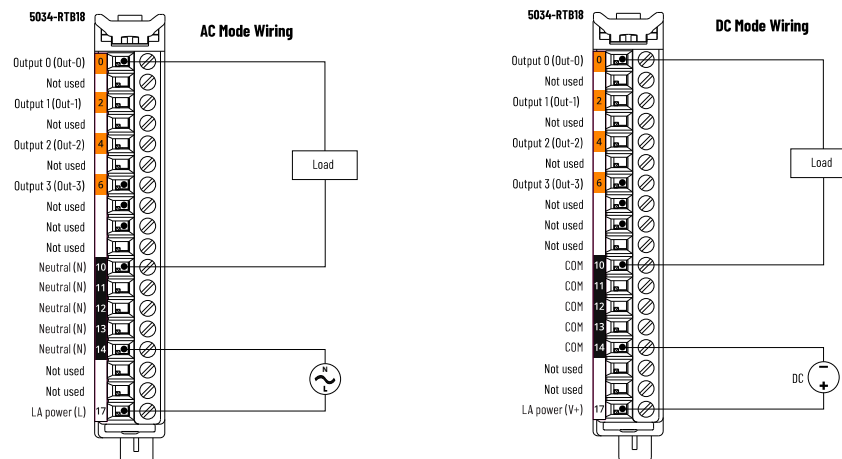


Figure 66. 5034-0A4 and 5034-0A4XT Functional Block Diagram

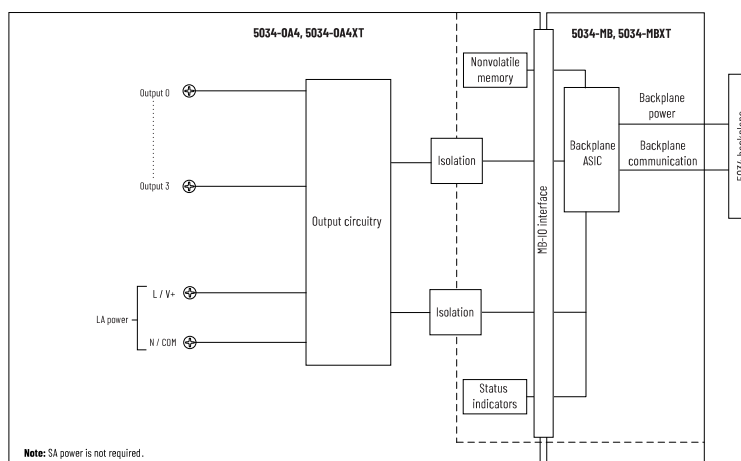


Table 49. Technical Specifications - 5034-0A4, 5034-0A4XT

Attribute	5034-0A4, 5034-0A4XT (1)	
	AC Mode	DC Mode
On-state voltage, min	85V AC	10V DC
On-state voltage, nom	120/240V AC	240V DC
On-state voltage, max	264V AC	250V DC

Table 49. Technical Specifications - 5034-0A4, 5034-0A4XT (continued)

Attribute	5034-0A4, 5034-0A4XT ⁽¹⁾	
	AC Mode	DC Mode
On-state voltage drop, max	1.5V AC @ 0.75 A	1.5V DC @ 0.75 A
Output current per point, min	5 mA	
Output current per point, max	0.75 A	
Output current per module, max	3 A	
Off-state leakage current, max ⁽²⁾	1 mA	
Surge current per point	5 A max for 25 ms, repeatable every 2 s 7 A max for 40 ms, repeatable every 8 s	5 A max for 25 ms, repeatable every 2 s
Output delay time (Backplane to screw) Off-to-On On-to-Off	1/2 cycle time (typ)	1.5 ms (typ)
Field (LA) power loss detection	Yes	No
Inductive load allowed per point, max	40 mH	
No load detection diagnostics	Not supported	
Output short circuit/overload/over temperature detection		
Output short circuit/overload protection		
Pilot duty rating	Resistive/General/Pilot Duty	Resistive/General/Pilot Duty

Table 49. Technical Specifications - 5034-0A4, 5034-0A4XT (continued)

Attribute	5034-0A4, 5034-0A4XT (1)	
	AC Mode	DC Mode
	5 A inrush current, 0.75 A rated current @ 85...264V AC, 47...63 Hz	5 A inrush current, 0.75 A rated current @ 10...250V DC
Output states in program mode per point	<ul style="list-style-type: none"> • Hold Last State • On • Off (default) 	
Output states in communication fault mode per point		
Duration of communication fault mode per point	<ul style="list-style-type: none"> • 1 s • 2 s • 5 s • 10 s • Forever (default) 	
Output final state after communication fault mode per point	<ul style="list-style-type: none"> • On • Off (default) 	

(1) The module does not support mixed AC and DC operation. All points operate in the same mode, either AC or DC, based on the module configuration.

(2) Recommended Loading Resistor - To limit the effects of leakage current through solid-state outputs, connect a loading resistor in parallel with the load during the Off-state. For example, use a 24 kΩ, 2 W resistor for 120V AC operation and a 48 kΩ, 5 W resistor for 240V AC operation.

Table 50. General Specifications - 5034-0A4, 5034-0A4XT

Attribute	5034-0A4, 5034-0A4XT (1)	
	AC Mode	DC Mode
Number of outputs	4 channels (1 group of 4), Sourcing	
Voltage category	120/240V AC	—
Output voltage, nom	240V AC	240V DC
Output voltage range	85...264V AC	10...250V DC
LA Power voltage range	85...264V AC, 47...63 Hz	10...250V DC

Table 50. General Specifications - 5034-0A4, 5034-0A4XT (continued)

Attribute	5034-0A4, 5034-0A4XT ⁽¹⁾	
	AC Mode	DC Mode
LA Power current, max	3 A @ 120/240V AC, 50/60 Hz	3 A @ 250V DC
Power dissipation, max ⁽²⁾	1.31 W	
Thermal dissipation, max ⁽²⁾	4.45 BTU/hr	
Isolation voltage	250V (continuous), Reinforced Insulation Type, System to Field No isolation between LA Power and Output ports No isolation between individual Output ports	
RIUP support	Yes	
CIP Sync	Yes, slave only ordinary clock	
Electronic keying	Electronic keying via programming software	
RTB key positions (slot)	6, 13, 15	
RTB supported	5034-RTB18, 5034-RTB18S	
Wiring category ⁽³⁾	1 - Output ports 1 - Power ports	
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001	
Indicators	1 green/red module status indicator 4 yellow/red I/O status indicators 1 green/red LA power status indicator	1 green/red module status indicator 4 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)	
Weight, approx	44.0 g (1.55 oz) – 5034-0A4 48.0 g (1.69 oz) – 5034-0A4XT	
Enclosure type	None (Open-style)	
North American temp code	T4	

Table 50. General Specifications - 5034-OA4, 5034-OA4XT (continued)

Attribute	5034-OA4, 5034-OA4XT (1)	
	AC Mode	DC Mode
UKEX/ATEX temp code	T4	
IECEx temp code	T4	

(1) The module does not support mixed AC and DC operation. All points operate in the same mode, either AC or DC, based on the module configuration.

(2) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

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

Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

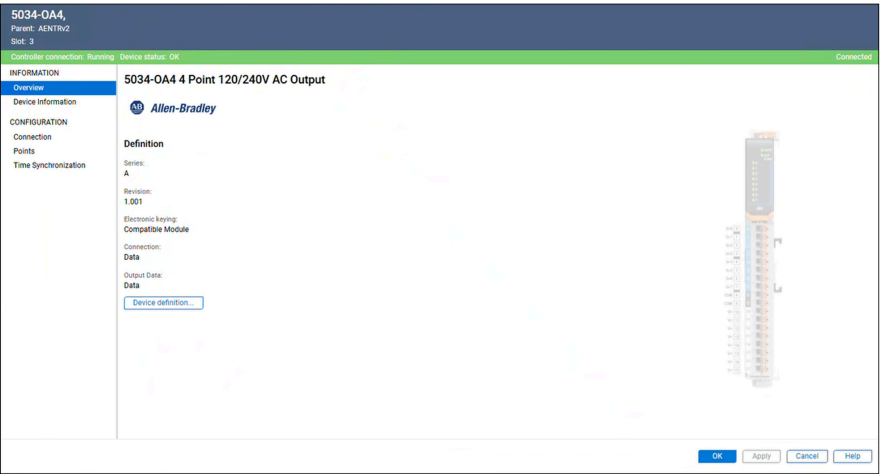
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 67. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 68. Device Definition Example

Device definition

Device type:
5034-0A4 4 Point 120/240V AC Output

Name:
AC_Output_Module

Description:

Slot:
2

Series:
A

Revision:
1 . 011

Electronic keying:
Compatible Module

Connection:
Data

Output Data:
Packed Data

OK

Cancel

Help

Device Definition includes these parameters:

Table 51. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific

Table 51. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	<p>Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.</p> <p>For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001.</p>	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying <hr/> <div>  <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p> </div> <hr/>
Connection	<p>Specify the type of data transferred between the device and controller.</p> <p>For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.</p>	<ul style="list-style-type: none"> Data Listen Only Data
Output Data	Select the output data type for the device.	<ul style="list-style-type: none"> Data Packed Data

Device Information View

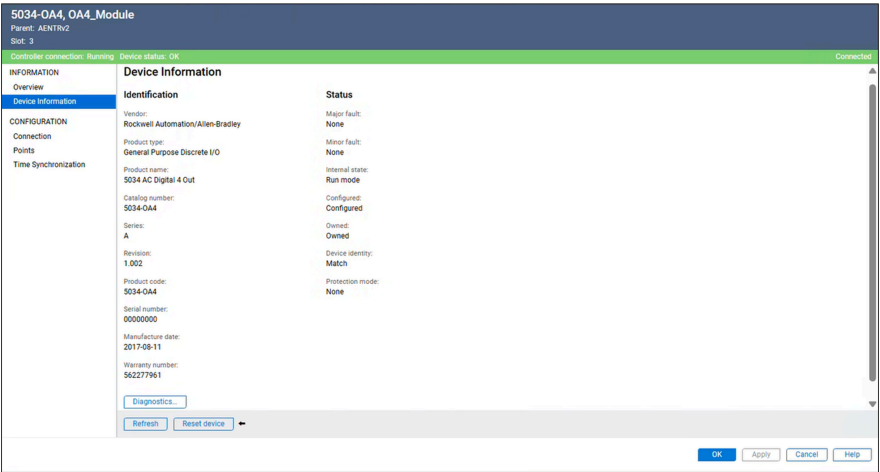
Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.

- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

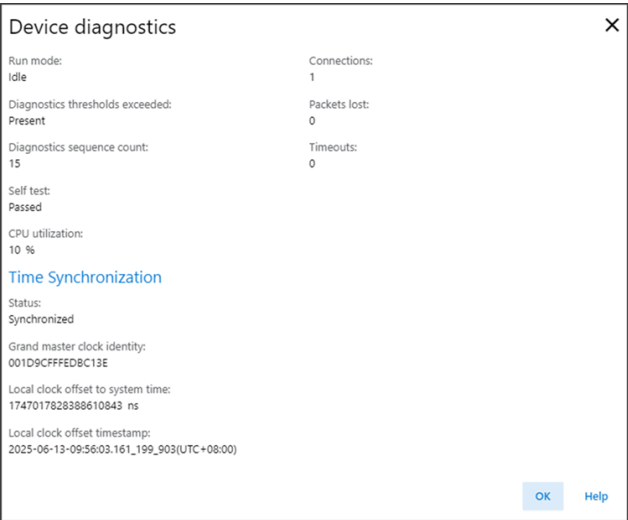
Figure 69. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 70. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).

- View the reason of Connection Fault.



If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 71. Connection View Example

5034-OA4, OA4_Module
Parent: AENTrv2
Stat: 3

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Synchronization

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Data	5.0	ms 0.2 - 750.0	Unicast

☐ Inhibit module
☐ Major fault on controller if connection fails while in Run mode
☒ Enable Automatic Diagnostics
☐ Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events

Connection fault:

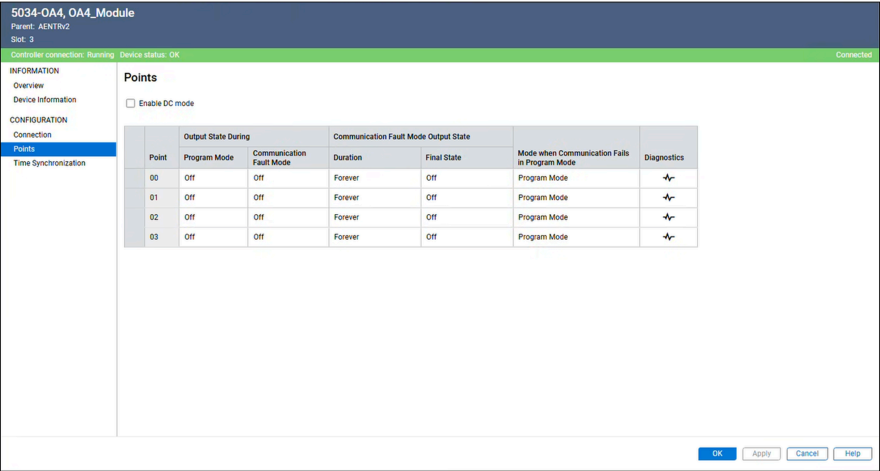
OK Apply Cancel Help

Points View

Use Points to view or configure the points for the device.

IMPORTANT: The module does not support mixed AC and DC operation. All points operate in either AC mode or DC mode. By default, the module operates in AC mode. When DC mode is enabled, all points operate in DC mode.

Figure 72. Points View Example



Points Diagnostics

To view the Points diagnostics, select Diagnostics in the Points view.

Figure 73. Points Diagnostics Example – DC Mode

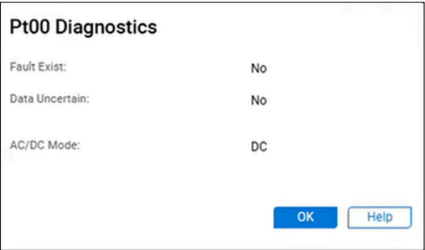
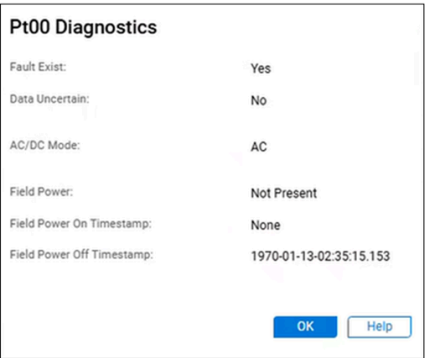


Figure 74. Points Diagnostics Example – AC Mode



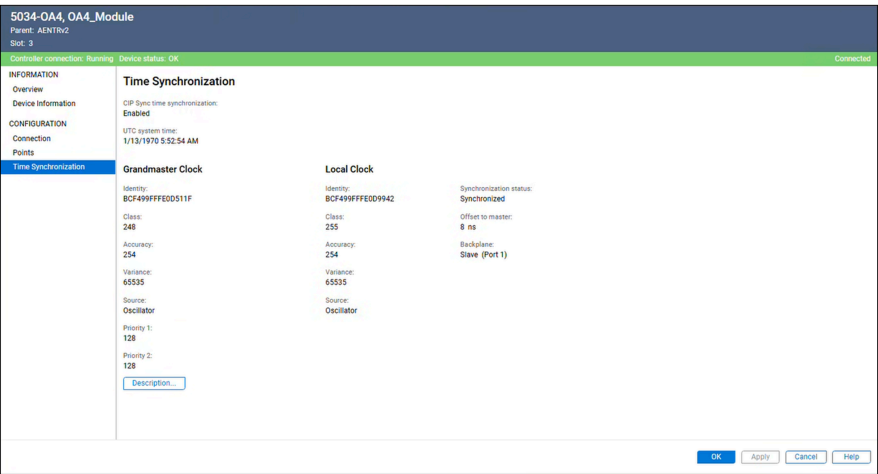
Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Synchronization view displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information

- Grandmaster Clock description
- Local Clock information

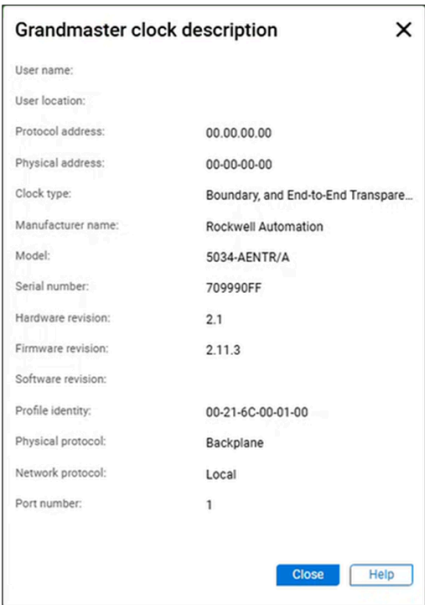
Figure 75. Time Synchronization View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Synchronization view.

Figure 76. Grandmaster Clock Description Example



Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 52. Configuration Tags

Name	Data Type	Definition	Valid Values
DCModeEn	BOOL	Defines the output point mode.	<ul style="list-style-type: none"> 0 = All output points are in AC mode. 1 = All output points are in DC mode.
Ptxx.FaultMode	BOOL	Selects the behavior that the output point 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 = Go to a user-defined value 1 = Hold last state
Ptxx.FaultValue	BOOL	Defines the value that the discrete 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 point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit mode
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds

Input Tag Definitions

Table 53. Input Tag Definitions

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection.

Table 53. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. • 1 = Run – It means the following: <ul style="list-style-type: none"> - Connection is up. - Module is producing data for the connection. - Output tag data is being applied.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> • 0 = Connection is running. • 1 = Connection is 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 are active. • 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range, or data is under manual or override control.	<ul style="list-style-type: none"> • 0 = Good data • 1 = Uncertain data
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Pttx.Data PttxData (Packed data)	BOOL	Echo of the current digital output value	<ul style="list-style-type: none"> • 0 = Off • 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> • 0 = Off • 1 = On
Pttx.Fault PttxFault (Packed data)	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. 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.	<ul style="list-style-type: none"> • 0 = Good • 1 = Bad, causing fault
Fault (Packed data)	INT	Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03. Fault state indicates that point data is inaccurate and cannot be trusted for use in the application.	For each point: <ul style="list-style-type: none"> • 0 = Good • 1 = Bad, causing fault

Table 53. Input Tag Definitions (continued)

Name	Data Type	Definition	Valid Values
		<p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	
Ptxx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data

Output Tag Definitions

Table 54. Output Tags

Name	Data Type	Definition	Valid Values
Ptxx.Data PtxxData (Packed data)	BOOL	Current digital output data to be applied	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Off 1 = On

Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- LA Power Status Indicator – This indicator operates only in AC mode.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type that you are using.

LA Power Status Indicator

Table 55. Interpret LA Power Status Indicator

Indicator State	AC Mode		DC Mode	
	Description	Recommended Action	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.	Always stays in off condition.	—
	The module mode is configured as DC instead of AC.	If your application requires AC input but you have configured the module as DC mode, then change DC mode to AC mode by following these steps: 1. Launch Studio 5000 Logix Designer application. 2. Open Module Properties. 3. Go to Points view and deselect the Enable DC mode. 4. Select Apply or OK, then download the project to the controller.		
Steady green	The LA power is present.	—	—	—
Steady red	There is no LA power present.	Check the following: • Confirm that LA power wiring is properly connected to the module RTB. • Check that the LA voltage is in the correct range. • If an external power supply is used, confirm that the power supply is turned on. • Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.	—	—
	The module mode is configured as AC while the LA power supplied is DC.	Check the power type your application uses: • If the application uses AC LA power, change the supply to AC. • If the application uses DC LA power, reconfigure the module to DC mode.		

Module Status Indicators

Table 56. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
Flashing red	One of the following conditions exists: <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. 	Complete one of the following: <ul style="list-style-type: none"> • Let the firmware update process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	Complete the following actions: <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 57. Interpret Point Status Indicators

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none">The point is Off.There is no backplane power.	One of the following: <ul style="list-style-type: none">Confirm that the point is configured properly.Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	—
Flashing red ⁽¹⁾	A Field Power Loss condition exists.	Locate and correct the cause of field power loss condition.

(1) Flashing red indication only happens when the module is operating in AC mode.

Diagnostic Assembly

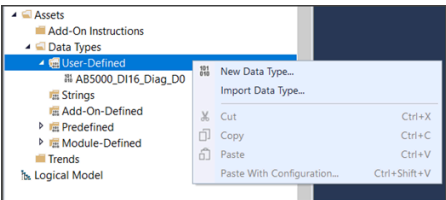
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

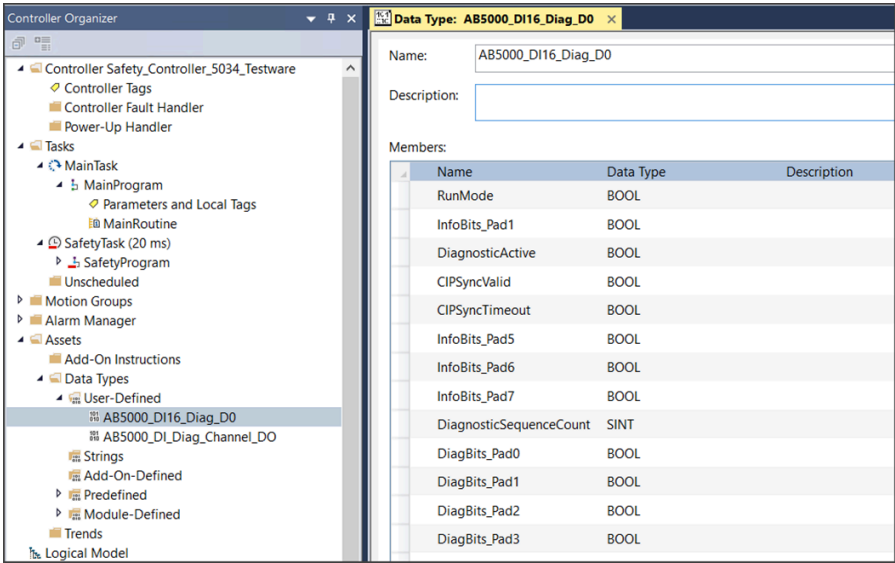
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

- From the Controller Organizer pane, go to Assets → Data types → User-Defined.
- Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

- Diagnostic Digital 4 Point with Diagnostics Assembly (Output)
- Instance ID = 0x8018 (32792)
 - Size = 192 bytes

Table 58. Diagnostic Assembly Instance - 32792

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	

Table 58. Diagnostic Assembly Instance – 32792 (continued)

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
Pad1	INT	2
DCModeEnabled	BOOL	1
ModuleStatus_Pad1		
ModuleStatus_Pad2		
ModuleStatus_Pad3		
ModuleStatus_Pad4		
ModuleStatus_Pad5		
ModuleStatus_Pad6		
ModuleStatus_Pad7		
Pad2	SINT	1
Pad3	INT	2
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...3]	See Diagnostic Digital with Diagnostics Channel (Output)	160

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 59. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	

Table 59. Diagnostic Assembly Instance – 769 (continued)

Name	Data Type	Size in Bytes
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Output)

- Size = 40 bytes

Table 60. Structure for Diagnostic Digital with Diagnostics Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
DataBits_Pad3	BOOL	
DataBits_Pad4	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	

Table 60. Structure for Diagnostic Digital with Diagnostics Channel (Output) (continued)

Name	Data Type	Size in Bytes
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
Pad1	INT	2
Pad2	DINT	4
Pad3	LINT	8
Pad4	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 61. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 61. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> • 0 = No diagnostics are active. • 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds • uuu = microseconds • nnn = nanoseconds • UTC-00:00 = Time zone

Table 61. Definitions for Diagnostic Assembly Parameters (continued)

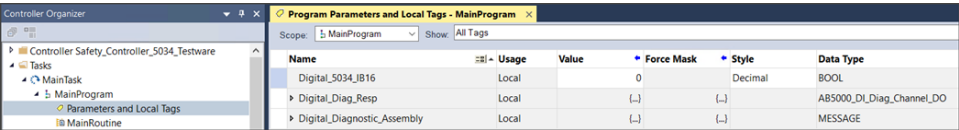
Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
DCModeEnabled	BOOL	Indicates the output point mode.	<ul style="list-style-type: none"> 0 = AC mode is enabled. 1 = DC mode is enabled.
FieldPowerOff	BOOL	<p>Indicates that a field power loss condition exists on the point.</p> <hr/> <p>NOTE: This diagnostic member is applicable only for AC mode.</p> <hr/>	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	<p>Indicates the time of the last field power turned on event.</p> <hr/> <p>NOTE: This diagnostic member is applicable only for AC mode.</p> <hr/>	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	<p>Indicates the time of the last field power turned off event.</p> <hr/> <p>NOTE: This diagnostic member is applicable only for AC mode.</p> <hr/>	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes

Table 61. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> SS = seconds mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



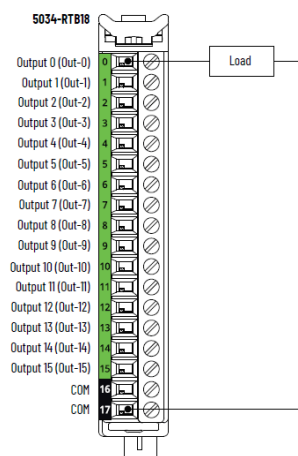
4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3

- Instance:
 - 32792 (8018h) Diagnostic Digital 4 Point with Diagnostics Assembly (Output)
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
 7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-OB16 and 5034-OB16XT Details

5034-OB16 and 5034-OB16XT Digital 16 Output Modules

Figure 77. 5034-OB16 and 5034-OB16XT Wiring Diagram



To establish more COM connections, install a 5034-MBPTM or 5034-MBPTMXT next to the module.

Figure 78. 5034-OB16 and 5034-OB16XT Functional Block Diagram

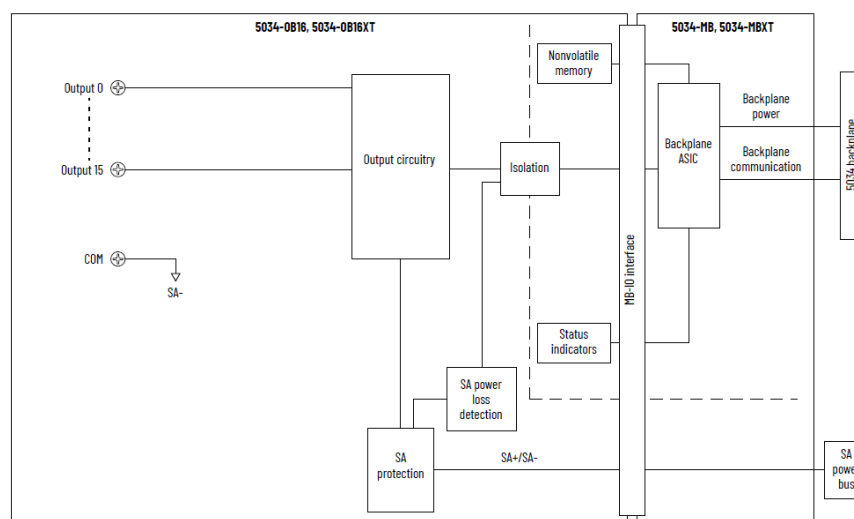


Table 62. Technical Specifications - 5034-OB16, 5034-OB16XT

Attribute	5034-OB16, 5034-OB16XT
On-state voltage range	10...30V DC
On-state voltage drop, max	0.25V DC
On-state current per point, min	1 mA
Off-state voltage, max	5V DC with 1 mA min load

Table 62. Technical Specifications - 5034-OB16, 5034-OB16XT (continued)

Attribute	5034-OB16, 5034-OB16XT
Off-state open wire detection disabled	
Off-state voltage, max	5V DC with 5 mA min load
Off-state open wire detection enabled	
Off-state leakage current per point, max	0.05 mA
Off-state open wire detection disabled	
Off-state leakage current per point, max ⁽¹⁾	0.5 mA
Off-state open wire detection enabled	
Output current rating per point, max	0.5 A
Output current rating per module, max	5 A
Surge current per point, max	1.5 A for 10 ms, repeatable every 3 s
Fast inductive load turn-off	Yes
Inductive load allowed, max	1.2 H
Output clamping voltage for inductive load when turn off	SA voltage - 44V Typical is -20V when SA voltage is 24V
Output delay time (backplane to screw), max	120 μ s @ 0.5 A
Off-to-On	
On-to-Off	
Pulse width, min	200 μ s
Open load detection diagnostics	Yes, configurable (Default is off)
Output short circuit/overload detection	Yes
Output short circuit/overload protection	Yes
Pilot duty rating	1.5 A inrush current, 0.5 A rated current, DC-14

Table 62. Technical Specifications - 5034-OB16, 5034-OB16XT (continued)

Attribute	5034-OB16, 5034-OB16XT
Output states in program mode per point	Hold Last State On Off (Default)
Output states in communication fault mode per point	Hold Last State On Off (Default)
Duration of communication fault mode per point	1 s 2 s 5 s 10 s Forever (Default)
Output final state after communication fault mode per point	On Off (Default)
Scheduled outputs	Supported, accuracy $\pm 100 \mu\text{s}$

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

Table 63. General Specifications - 5034-OB16, 5034-OB16XT

Attribute	5034-OB16, 5034-OB16XT
Number of outputs	16 channels (1 group of 16), sourcing
Voltage category	24V DC source
Output voltage, nom	24V DC
Output voltage range	10...30V DC
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	5.1 A
SA power current, max	5.2 A
SA power current at no load	13 mA
SA reverse polarity protection	Yes

Table 63. General Specifications - 5034-OB16, 5034-OB16XT (continued)

Attribute	5034-OB16, 5034-OB16XT
Power dissipation, max ⁽¹⁾	1.02 W
Thermal dissipation, max ⁽¹⁾	3.48 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and outputs No isolation between individual outputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 5, 11
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 16 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	43.0 g (1.52 oz.) - 5034-OB16 45.0 g (1.59 oz.) - 5034-OB16XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

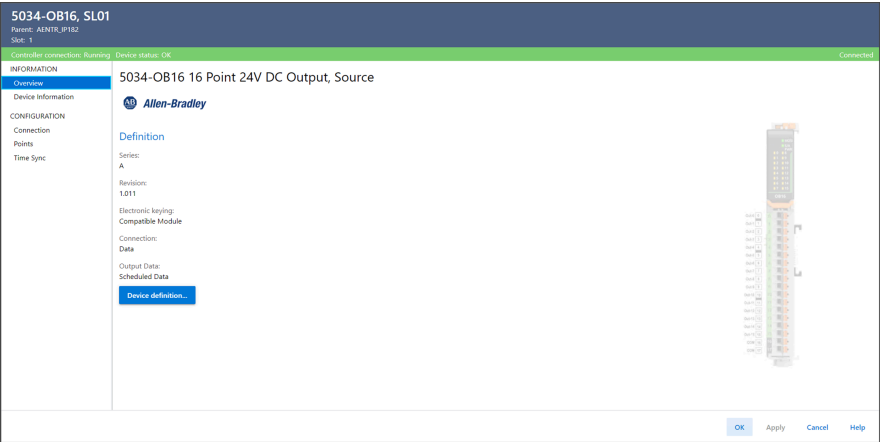
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

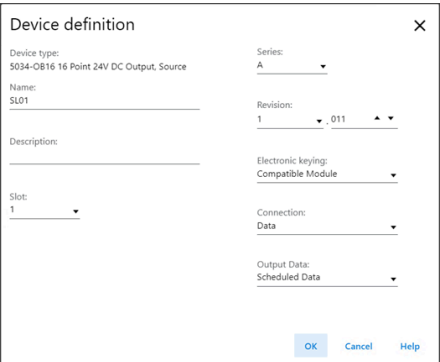
Figure 79. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 80. Device Definition Example



Device Definition includes these parameters:

Table 64. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying

Table 64. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p>
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	<ul style="list-style-type: none"> • Data • Listen Only Data
Output Data	Select the output data type for the device.	<ul style="list-style-type: none"> • Data • Packed Data • Scheduled Data

Device Information View

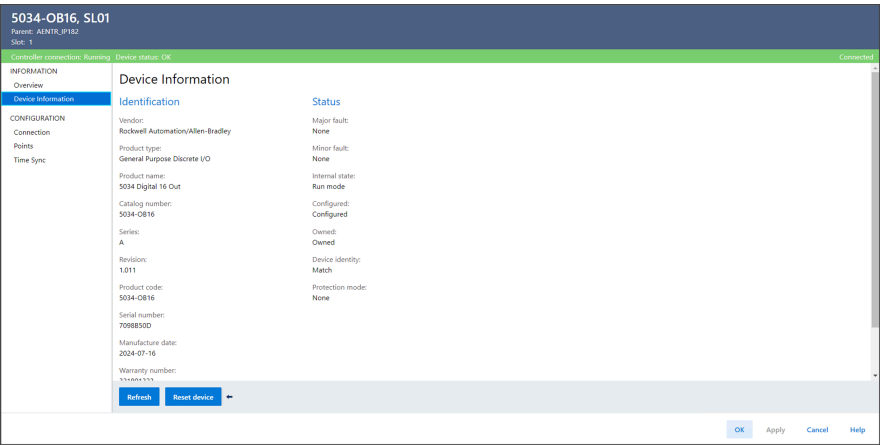
Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.

- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

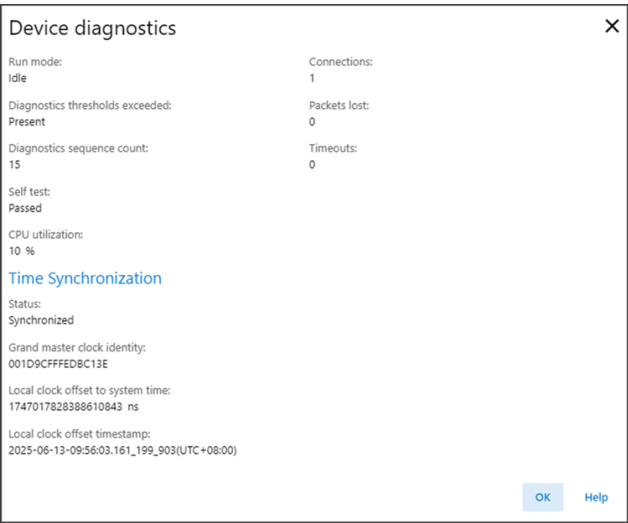
Figure 81. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 82. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 83. Connection View Example

5034-OB16, SL01
Parent: AENTRUP182
Slot: 1

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Sync

Connection

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Data	5.0	ms 0.2 - 750.0	Unicast

☐ Inhibit module
☐ Major fault on controller if connection fails while in Run mode
☒ Enable Automatic Diagnostics
● Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events

Connection fault:

OK Apply Cancel Help

Points View

Use Points to view or configure the points for the device.

Figure 84. Points View Example

5034-OB16, SL01
Parent: AENTRUP182
Slot: 1

Controller connection: Running Device status: OK Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Sync

Points

Point	Output State During		Duration	Communication Fault Mode Output State		Mode when Communication Fails in Program Mode	Enable No Load Diagnostics	Diagnostics
	Program Mode	Communication Fault Mode		Final State				
00	Off	Off	Forever	Off	Program Mode	☐		
01	Off	Off	Forever	Off	Program Mode	☐		
02	Off	Off	Forever	Off	Program Mode	☐		
03	Off	Off	Forever	Off	Program Mode	☐		
04	Off	Off	Forever	Off	Program Mode	☐		
05	Off	Off	Forever	Off	Program Mode	☐		
06	Off	Off	Forever	Off	Program Mode	☐		
07	Off	Off	Forever	Off	Program Mode	☐		
08	Off	Off	Forever	Off	Program Mode	☐		
09	Off	Off	Forever	Off	Program Mode	☐		
10	Off	Off	Forever	Off	Program Mode	☐		
11	Off	Off	Forever	Off	Program Mode	☐		
12	Off	Off	Forever	Off	Program Mode	☐		

OK Apply Cancel Help

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points or Pttx view.

Figure 85. Ptxx Diagnostics Example

Pt00 Diagnostics

Fault Exist:

No

Data Uncertain:

No

Field Power:

Present

Field Power On Timestamp:

None

Field Power Off Timestamp:

None

Short Circuit Fault:

Not Present

Short Circuit Fault Timestamp:

None

No Load Fault:

Not Present

No Load Fault Timestamp:

None

OK

Help

Time Sync View

The Time Sync view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 86. Time Sync View Example

5034-OB16, SL01

Param: ABNTB_01152

Slot: 1

Controller connection: Running Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Points

Time Sync

Time Sync

CIP Sync time synchronization:
Enabled

UTC system time:
6/13/2025 10:36:38 PM

Grandmaster Clock

Local Clock

Identity:
BCF499FFED05208

Class:
240

Accuracy:
254

Variance:
65535

Source:
Oscillator

Priority 1:
128

Priority 2:
128

Description...

Identity:
BCF499FFED0773A

Class:
255

Accuracy:
254

Variance:
65535

Source:
Oscillator

Synchronization status:
Synchronized

Offset to master:
-4 ns

Backplane:
Slave (Port 1)

OK

Apply

Cancel

Help

Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

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Rockwell Automation, Inc.

Figure 87. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

- PointMax I/O modules use the following status indicators:
- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
 - Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
 - Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 65. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: <ul style="list-style-type: none">- Check that the SA voltage is in the correct range.- If an external power supply is used, confirm that the power supply is turned on.

Table 65. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 66. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 67. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> A Field Power Loss condition exists. A No Load or Short Circuit condition is detected. 	One of the following: <ul style="list-style-type: none"> Locate and correct the cause of field power loss condition. A No Load or Short Circuit condition is detected.

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 68. Configuration Tags

Name	Data Type	Definition	Valid Values
Pttx.FaultMode	BOOL	Selects the behavior that the output point takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value. IMPORTANT: When Pttx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Pttx.FaultValue	BOOL	Defines the value that the discrete output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.ProgMode	BOOL	Selects the behavior that the output point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state

Table 68. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit mode
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds
Ptxx.NoLoadEn	BOOL	Enables No Load detection for output points.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable

Input Tag Definitions

Table 69. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle - It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run - It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is not running.

Table 69. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range, or data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
Ptxx.Data PtxxData (Packed data)	BOOL	Echo of the current digital output value	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	<p>Indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault

Table 69. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Fault (Packed data)	INT	<p>Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03.</p> <p>Fault state indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Ptxx.NoLoad	BOOL	Indicates that the signal wire is disconnected from one of the RTB terminals or the RTB is removed.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Ptxx.ShortCircuit	BOOL	Indicates a short to high is detected on the safety input point.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Schedule[x].State	SINT	Current state of the schedule tags at index x	<ul style="list-style-type: none"> 0 = Inactive 1 = Active – Schedule is next to be applied to the output 2 = Queued – Schedule is queued after the Active schedule 3 = Expired – Schedule has been applied 4 = Discarded – One of the following: <ul style="list-style-type: none"> The requested schedule was late (received after its scheduled application time) and a more recent schedule has already been applied to that output. The output point does not exist or scheduling is not enabled on the output point. 5 = Late – Schedule is received after the time scheduled (schedule is applied immediately)
Schedule[x].ScheduleNumber	SINT	Echo of SequenceNumber from the output tag	All values

Table 69. Input Tags (continued)

Name	Data Type	Definition	Valid Values
LateScheduleCount	INT	Count of schedules that arrive late. That is, the arrival time is after scheduled time. Counter rolls over every 65,535 late updates. The output is still being 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 65,535 lost updates.	All values

Output Tag Definitions

Table 70. Output Tags

Name	Data Type	Definition	Valid Values
Ptxx.Data PtxxData (Packed data)	BOOL	Current digital output data to be applied	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <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
TimeBase	LINT	Indicates the TimeBase for all schedule times. When a new schedule entry is received, the module uses TimeBase + Schedule[n].TimeOffset to determine the time for the schedule entry. Once the schedule entries that are based on the current TimeBase are echoed back by the module, a new TimeBase can be set to incorporate new schedule entry creations.	Any positive value
Schedule[x].ID	SINT	Indicates which hardware scheduler to use. Typically, you set the ID to the schedule index x + 1. If you use an ID before that same ID of the previous schedule is completed, the new schedule overwrites the old schedule.	<ul style="list-style-type: none"> 0 = No schedule 1...32 = Valid hardware scheduler ID

Table 70. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		The schedule is considered complete when the schedule state is reported as Expired, Late, or Discarded.	
Schedule[x].SequenceNumber	SINT	For every new schedule of Schedule[x], the sequence number is increased. The expected sequence to request the module to perform a new schedule is: 1. Set all other Schedule[x] members properly in the output tag. 2. Increase the sequence number after step 1 is completed. Once the module receives a new sequence number of Schedule[x], it starts processing it.	All values
Schedule[x].OutputPointSelect	SINT	Selects the output point that this schedule applies to. 0xFF means no output point selected.	0...15
Schedule[x].Data	BOOL	Output data to be applied at time that is specified in schedule	0 or 1
Schedule[x].TimeOffset	DINT	Offset from schedule base time. For more information, see the definition for TimeBase.	All values

Diagnostic Assembly

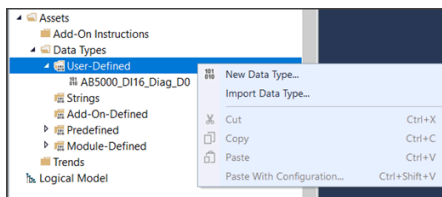
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

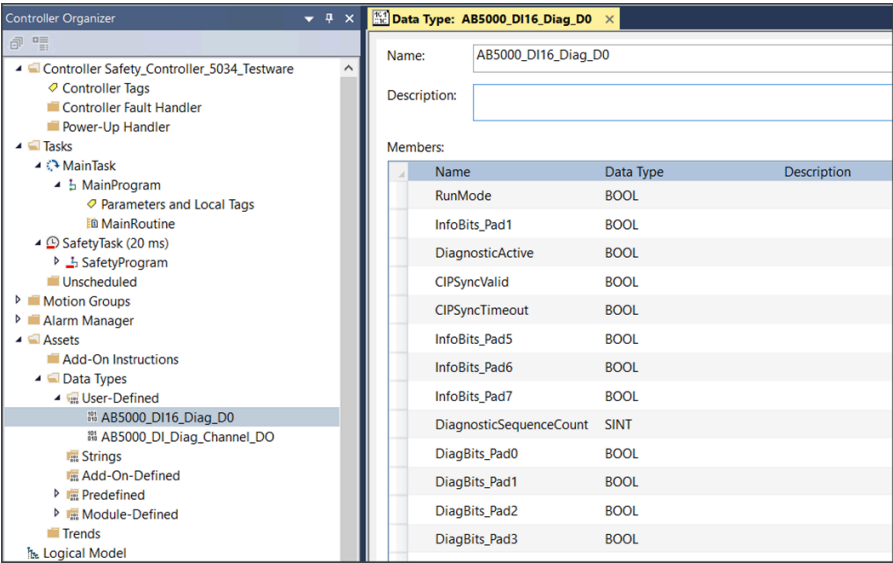
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

1. Diagnostic Digital 16 Point with Diagnostics Assembly A
 - Instance ID = 0x316 (790)
 - Size = 352 bytes

Table 71. Diagnostic Assembly Instance - 790

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...7]	See Diagnostic Digital with Diagnostics Channel (Output)	320

2. Diagnostic Digital 16 Point with Diagnostics Assembly B
 - Instance ID = 0x317 (791)
 - Size = 320 bytes

Table 72. Diagnostic Assembly Instance - 791

Name	Data Type	Size in Bytes
Points [8...15]	See Diagnostic Digital with Diagnostics Channel (Output)	320

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 73. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Output)

- Size = 40 bytes

Table 74. Structure for Diagnostic Digital with Diagnostics Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 75. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> YYYY = year MM = month

Table 75. Definitions for Diagnostic Assembly Parameters (continued)

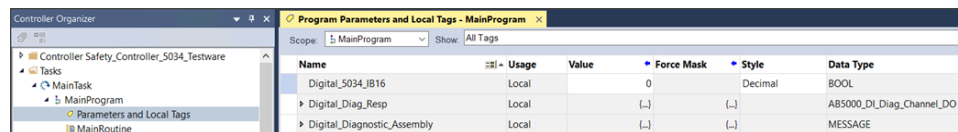
Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day

Table 75. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> • 0 = No Load condition does not exist • 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



Name	Usage	Value	Force Mask	Style	Data Type
Digital_5034_IB16	Local	0		Decimal	BOOL
Digital_Diag_Resp	Local	(-)	(-)		ABS000_DL_Diag_Channel_DO
Digital_Diagnostic_Assembly	Local	(-)	(-)		MESSAGE

From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 790 (316h) Diagnostic Digital 16 Point with Diagnostics Assembly A
 - 791 (317h) Diagnostic Digital 16 Point with Diagnostics Assembly B
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-OB8 and 5034-OB8XT Details

5034-OB8 and 5034-OB8XT Digital 8 Output Modules

Figure 88. 5034-OB8 and 5034-OB8XT Wiring Diagram

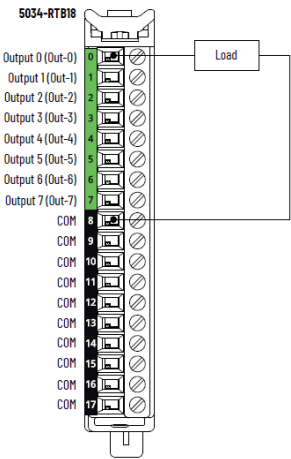


Figure 89. 5034-OB8 and 5034-OB8XT Wiring Diagram - Individual Load Return Wiring on COM Pins

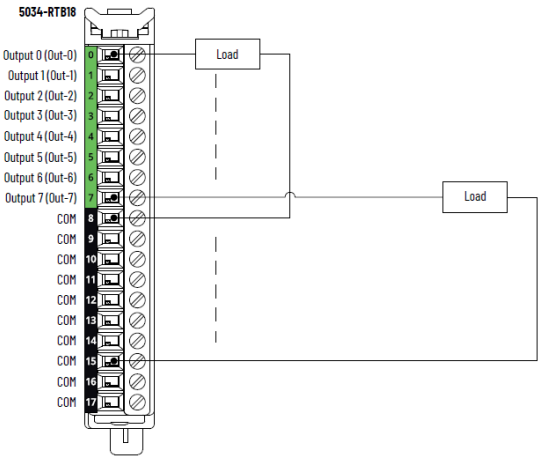
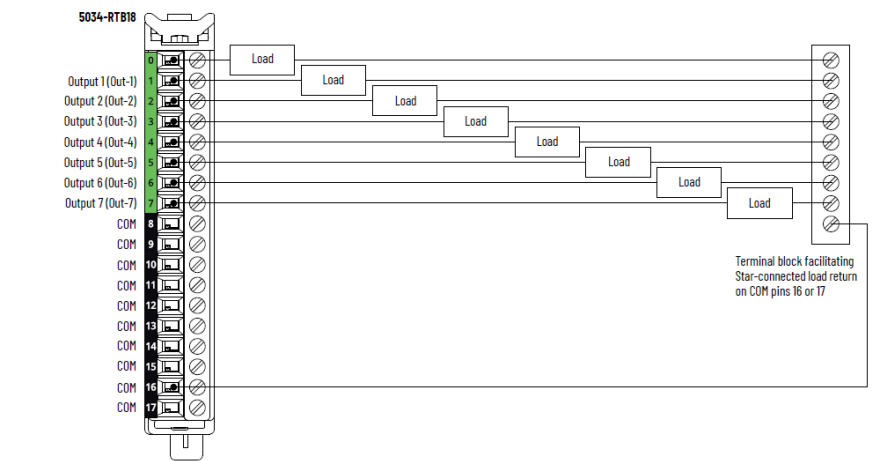


Figure 90. 5034-OB8 and 5034-OB8XT Wiring Diagram – Star-connected Load Return Wiring on COM Pins



IMPORTANT: Use only COM pins 16 and 17 for the star-connected load return wiring.

Figure 91. 5034-OB8 and 5034-OB8XT Functional Block Diagram

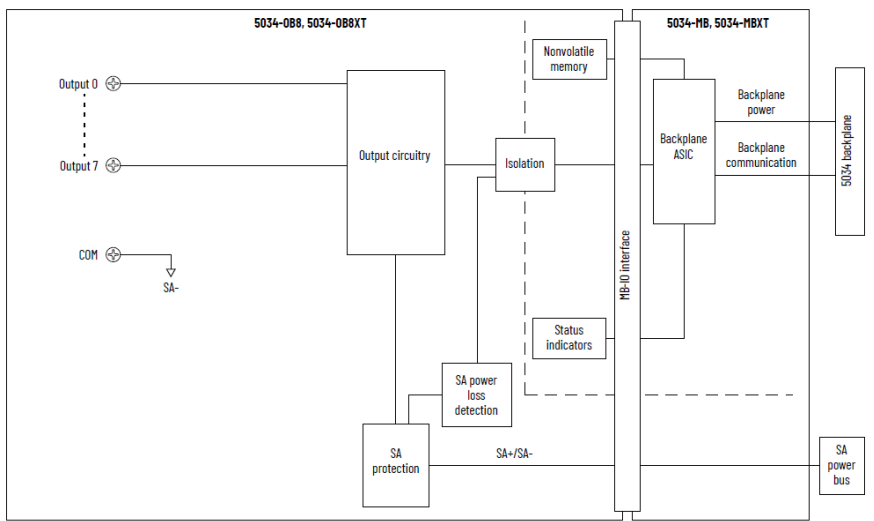


Table 76. Technical Specifications - 5034-OB8, 5034-OB8XT

Attribute	5034-OB8, 5034-OB8XT
On-state voltage range	10...30V DC
On-state voltage drop, max	0.25V DC
On-state current per point, min	1 mA
Off-state voltage, max	5V DC with 1 mA min load
Off-state open wire detection disabled	
Off-state voltage, max	5V DC with 5 mA min load

Table 76. Technical Specifications - 5034-OB8, 5034-OB8XT (continued)

Attribute	5034-OB8, 5034-OB8XT
Off-state open wire detection enabled	
Off-state leakage current per point, max	0.05 mA
Off-state open wire detection disabled	
Off-state leakage current per point, max ⁽¹⁾	0.5 mA
Off-state open wire detection enabled	
Output current rating per point, max	0.5 A
Output current rating per module, max	4 A
Surge current per point, max	1.5 A for 10 ms, repeatable every 3 s
Fast inductive load turn-off	Yes
Inductive load allowed, max	1.2 H
Output clamping voltage for inductive load when turn off	SA voltage - 44V Typical is -20V when SA voltage is 24V
Output delay time (backplane to screw), max	120 μ s @ 0.5 A
Off-to-On	
On-to-Off	
Pulse width, min	200 μ s
Open load detection diagnostics	Yes, configurable (Default is off)
Output short circuit/overload detection	Yes
Output short circuit/overload protection	Yes
Pilot duty rating	1.5 A inrush current, 0.5 A rated current, DC-14
Output states in program mode per point	Hold Last State On Off (Default)

Table 76. Technical Specifications - 5034-OB8, 5034-OB8XT (continued)

Attribute	5034-OB8, 5034-OB8XT
Output states in communication fault mode per point	Hold Last State On Off (Default)
Duration of communication fault mode per point	1 s 2 s 5 s 10 s Forever (Default)
Output final state after communication fault mode per point	On Off (Default)
Scheduled outputs	Supported, accuracy $\pm 100 \mu\text{s}$

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

Table 77. General Specifications - 5034-OB8, 5034-OB8XT

Attribute	5034-OB8, 5034-OB8XT
Number of outputs	8 channels (1 group of 8), sourcing
Voltage category	24V DC source
Output voltage, nom	24V DC
Output voltage range	10...30V DC
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	4.1 A
SA power current, max	4.2 A
SA power current at no load	12 mA
SA reverse polarity protection	Yes
Power dissipation, max ⁽¹⁾	0.91 W
Thermal dissipation, max ⁽¹⁾	3.11 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field

Table 77. General Specifications - 5034-OB8, 5034-OB8XT (continued)

Attribute	5034-OB8, 5034-OB8XT
	No isolation between SA power and outputs No isolation between individual outputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 5, 11
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	43.0 g (1.52 oz.) - 5034-OB8 45.0 g (1.59 oz.) - 5034-OB8XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

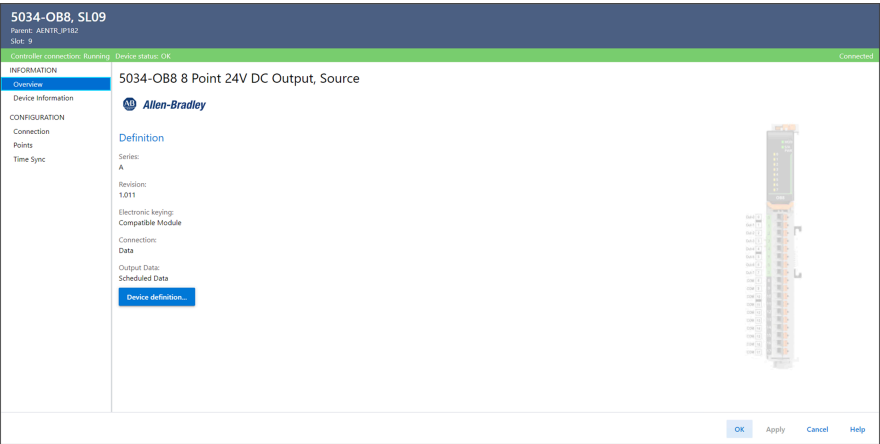
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

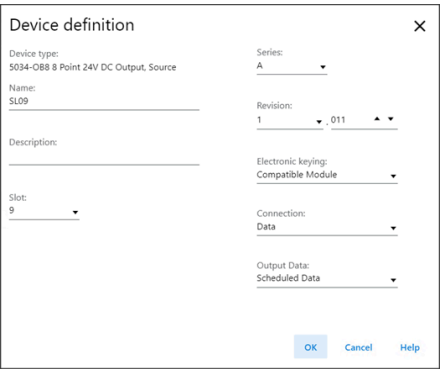
Figure 92. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 93. Device Definition Example



Device Definition includes these parameters:

Table 78. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name.	All valid values

Table 78. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs. For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying <hr/>  <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p> <hr/>
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish	<ul style="list-style-type: none"> Data Listen Only Data

Table 78. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	
Output Data	Select the output data type for the device.	<ul style="list-style-type: none"> Data Packed Data Scheduled Data

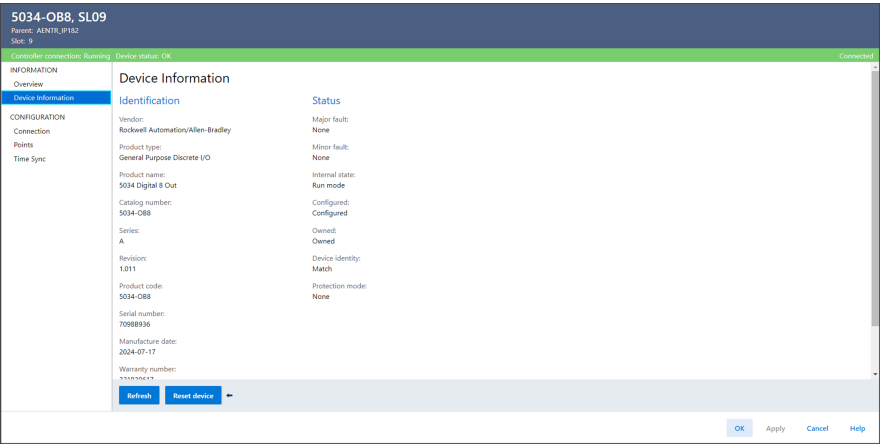
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

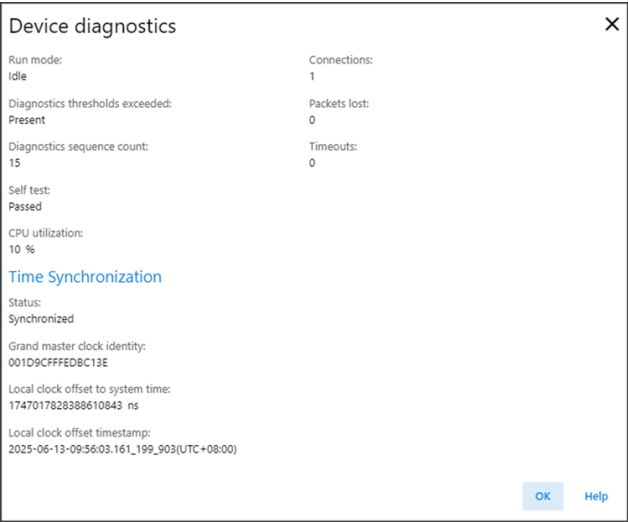
Figure 94. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 95. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



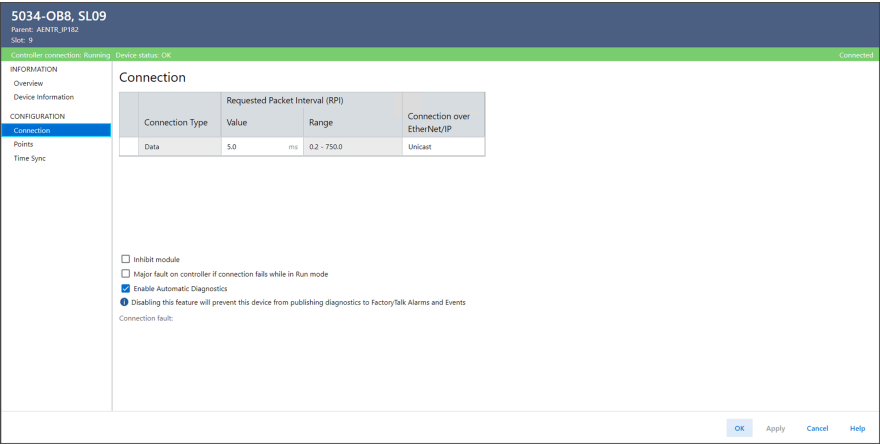
If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

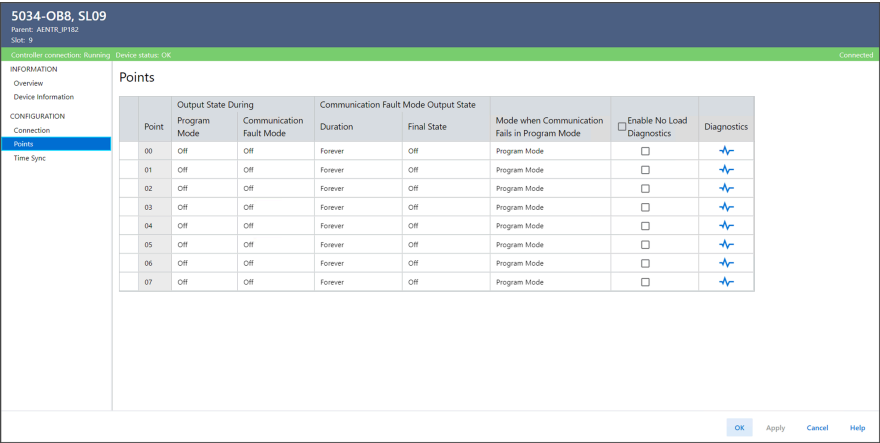
Figure 96. Connection View Example



Points View

Use Points to view or configure the points for the device.

Figure 97. Points View Example



Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points or Pttx view.

Figure 98. Ptxx Diagnostics Example

Pt00 Diagnostics
×

Fault Exist:	No
Data Uncertain:	No
Field Power:	Present
Field Power On Timestamp:	None
Field Power Off Timestamp:	None
Short Circuit Fault:	Not Present
Short Circuit Fault Timestamp:	None
No Load Fault:	Not Present
No Load Fault Timestamp:	None

OK
Help

Time Sync View

The Time Sync view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 99. Time Sync View Example

5034-OB8, SL09

Param: AENTR_IP182
Slot: 9

Controller connection: Running
Device status: OK
Connected

INFORMATION
Overview
Device Information
CONFIGURATION
Connection
Points
Time Sync

Time Sync

CIP Sync time synchronization: Enabled
UTC system time: 6/13/2025 10:36:38 PM

Grandmaster Clock

Identity: 8C7459FFFD05208
Class: 248
Accuracy: 254
Variance: 65535
Source: Oscillator
Priority 1: 128
Priority 2: 128
Description...

Local Clock

Identity: 8C7459FFFD0187E
Class: 255
Accuracy: 254
Variance: 65535
Source: Oscillator

Synchronization status: Synchronized
Offset to master: -10 ns
Backplane: Slave (Port 1)

OK
Apply
Cancel
Help

Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 100. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 79. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol style="list-style-type: none"> Confirm that the system is powered. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: <ol style="list-style-type: none"> Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. Check the following: <ul style="list-style-type: none"> Check that the SA voltage is in the correct range. If an external power supply is used, confirm that the power supply is turned on.

Table 79. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 80. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 81. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> A Field Power Loss condition exists. A No Load or Short Circuit condition is detected. 	One of the following: <ul style="list-style-type: none"> Locate and correct the cause of field power loss condition. A No Load or Short Circuit condition is detected.

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 82. Configuration Tags

Name	Data Type	Definition	Valid Values
Pttx.FaultMode	BOOL	Selects the behavior that the output point takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value. IMPORTANT: When Pttx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Pttx.FaultValue	BOOL	Defines the value that the discrete output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.ProgMode	BOOL	Selects the behavior that the output point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state

Table 82. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit mode
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds
Ptxx.NoLoadEn	BOOL	Enables No Load detection for output points.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable

Input Tag Definitions

Table 83. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle - It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run - It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is not running.

Table 83. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range, or data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
Ptxx.Data PtxxData (Packed data)	BOOL	Echo of the current digital output value	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	<p>Indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault

Table 83. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Fault (Packed data)	INT	<p>Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03.</p> <p>Fault state indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<p>For each point:</p> <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Ptxx.NoLoad	BOOL	Indicates that the signal wire is disconnected from one of the RTB terminals or the RTB is removed.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Ptxx.ShortCircuit	BOOL	Indicates a short to high is detected on the safety input point.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Schedule[x].State	SINT	Current state of the schedule tags at index x	<ul style="list-style-type: none"> 0 = Inactive 1 = Active – Schedule is next to be applied to the output 2 = Queued – Schedule is queued after the Active schedule 3 = Expired – Schedule has been applied 4 = Discarded – One of the following: <ul style="list-style-type: none"> The requested schedule was late (received after its scheduled application time) and a more recent schedule has already been applied to that output. The output point does not exist or scheduling is not enabled on the output point. 5 = Late – Schedule is received after the time scheduled (schedule is applied immediately)
Schedule[x].ScheduleNumber	SINT	Echo of SequenceNumber from the output tag	All values

Table 83. Input Tags (continued)

Name	Data Type	Definition	Valid Values
LateScheduleCount	INT	Count of schedules that arrive late. That is, the arrival time is after scheduled time. Counter rolls over every 65,535 late updates. The output is still being 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 65,535 lost updates.	All values

Output Tag Definitions

Table 84. Output Tags

Name	Data Type	Definition	Valid Values
Ptxx.Data PtxxData (Packed data)	BOOL	Current digital output data to be applied	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <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
TimeBase	LINT	Indicates the TimeBase for all schedule times. When a new schedule entry is received, the module uses TimeBase + Schedule[n].TimeOffset to determine the time for the schedule entry. Once the schedule entries that are based on the current TimeBase are echoed back by the module, a new TimeBase can be set to incorporate new schedule entry creations.	Any positive value
Schedule[x].ID	SINT	Indicates which hardware scheduler to use. Typically, you set the ID to the schedule index x + 1. If you use an ID before that same ID of the previous schedule is completed, the new schedule overwrites the old schedule.	<ul style="list-style-type: none"> 0 = No schedule 1...32 = Valid hardware scheduler ID

Table 84. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		The schedule is considered complete when the schedule state is reported as Expired, Late, or Discarded.	
Schedule[x].SequenceNumber	SINT	For every new schedule of Schedule[x], the sequence number is increased. The expected sequence to request the module to perform a new schedule is: 1. Set all other Schedule[x] members properly in the output tag. 2. Increase the sequence number after step 1 is completed. Once the module receives a new sequence number of Schedule[x], it starts processing it.	All values
Schedule[x].OutputPointSelect	SINT	Selects the output point that this schedule applies to. 0xFF means no output point selected.	0...15
Schedule[x].Data	BOOL	Output data to be applied at time that is specified in schedule	0 or 1
Schedule[x].TimeOffset	DINT	Offset from schedule base time. For more information, see the definition for TimeBase.	All values

Diagnostic Assembly

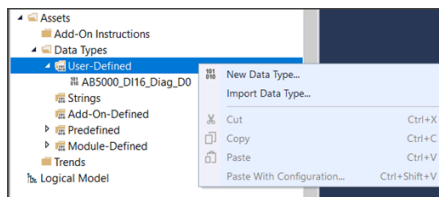
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

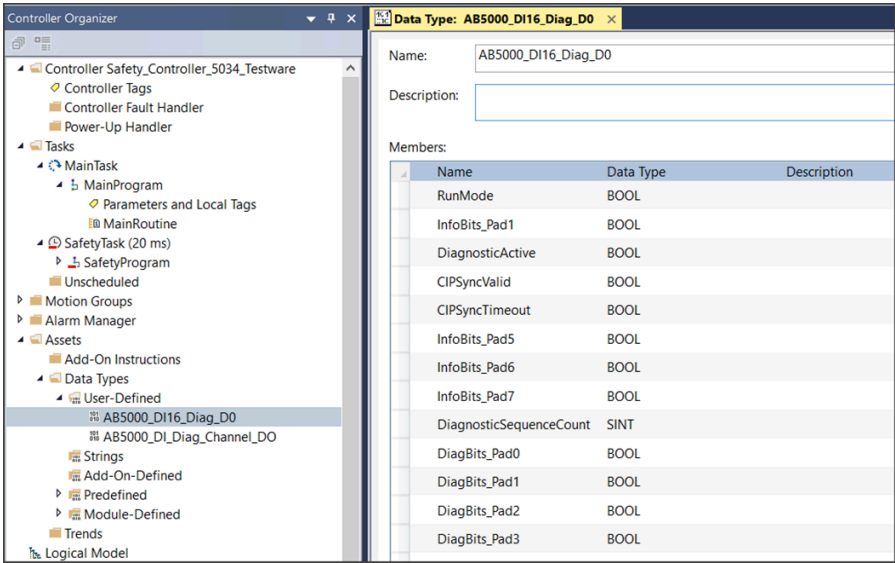
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

Diagnostic Digital 16 Point with Diagnostics Assembly A

- Instance ID = 0x316 (790)
- Size = 352 bytes

Table 85. Diagnostic Assembly Instance - 790

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	

Table 85. Diagnostic Assembly Instance – 790 (continued)

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...7]	See Diagnostic Digital with Diagnostics Channel (Output)	320

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 86. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
CIPConnections	INT	
CIPLostPackets	DINT	
CIPTimeouts	DINT	
CPUUtilization	INT	
Pad	INT	

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Output)

- Size = 40 bytes

Table 87. Structure for Diagnostic Digital with Diagnostics Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	

Table 87. Structure for Diagnostic Digital with Diagnostics Channel (Output) (continued)

Name	Data Type	Size in Bytes
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 88. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead.

Table 88. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone

Table 88. Definitions for Diagnostic Assembly Parameters (continued)

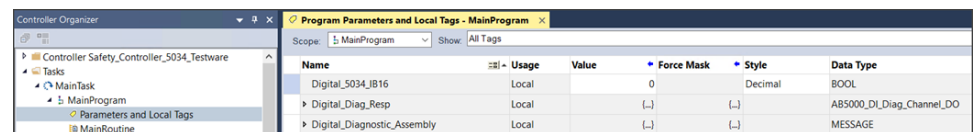
Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> 0 = No Load condition does not exist 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	A valid time or None if there is no recorded event time.

Table 88. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

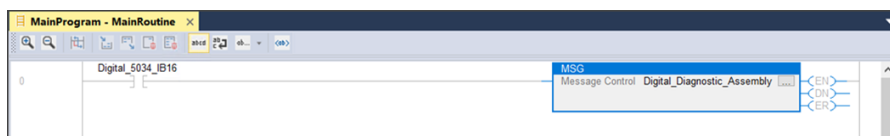
Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 790 (316h) Diagnostic Digital 16 Point with Diagnostics Assembly A
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-OB4 and 5034-OB4XT Details

5034-OB4 and 5034-OB4XT Digital 4 Output 2 A Modules

Figure 101. 5034-OB4 and 5034-OB4XT Wiring Diagram

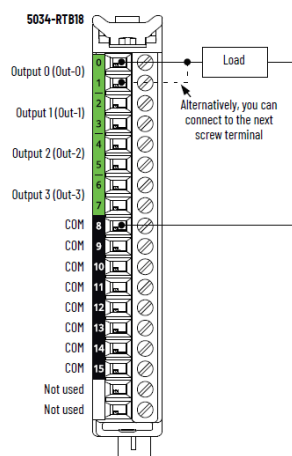


Figure 102. 5034-OB4 and 5034-OB4XT Functional Block Diagram

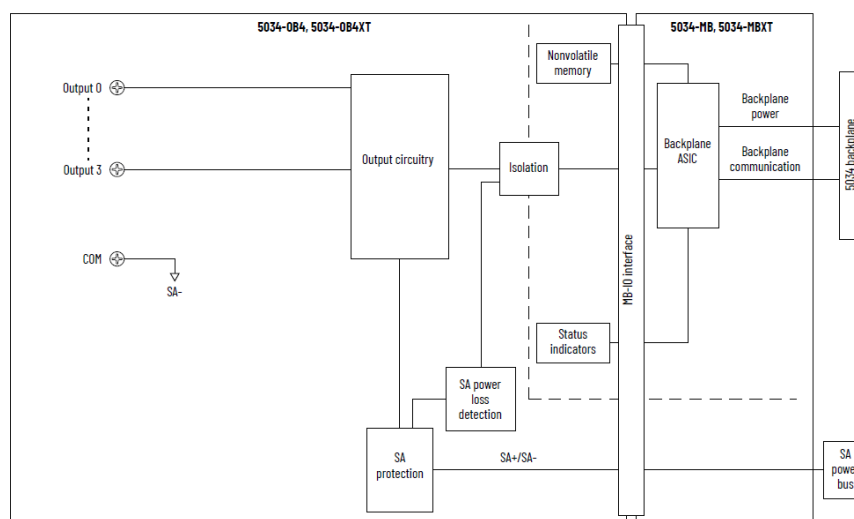


Table 89. Technical Specifications - 5034-OB4, 5034-OB4XT

Attribute	5034-OB4, 5034-OB4XT
On-state voltage range	10...30V DC
On-state voltage drop, max	0.25V DC
On-state current per point, min	1 mA
Off-state voltage, max	5V DC with 1 mA min load

Table 89. Technical Specifications - 5034-OB4, 5034-OB4XT (continued)

Attribute	5034-OB4, 5034-OB4XT
Off-state open wire detection disabled	
Off-state voltage, max	5V DC with 5 mA min load
Off-state open wire detection enabled	
Off-state leakage current per point, max	0.05 mA
Off-state open wire detection disabled	
Off-state leakage current per point, max ⁽¹⁾	0.5 mA
Off-state open wire detection enabled	
Output current rating per point, max	2 A
Output current rating per module, max	6 A
Surge current per point, max	3.0 A for 10 ms, repeatable every 3 s
Fast inductive load turn-off	Yes
Inductive load allowed, max	1.2 H
Output clamping voltage for inductive load when turn off	SA voltage - 44V Typical is -20V when SA voltage is 24V
Output delay time (backplane to screw), max	200 μ s @ 2 A
Off-to-On	
On-to-Off	
Pulse width, min	200 μ s
Open load detection diagnostics	Yes, configurable (Default is off)
Output short circuit/overload detection	Yes
Output short circuit/overload protection	Yes
Pilot duty rating	3 A inrush current, 2 A rated current, DC-14

Table 89. Technical Specifications - 5034-OB4, 5034-OB4XT (continued)

Attribute	5034-OB4, 5034-OB4XT
Output states in program mode per point	Hold Last State On Off (Default)
Output states in communication fault mode per point	Hold Last State On Off (Default)
Duration of communication fault mode per point	1 s 2 s 5 s 10 s Forever (Default)
Output final state after communication fault mode per point	On Off (Default)
Scheduled outputs	Not supported

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

Table 90. General Specifications - 5034-OB4, 5034-OB4XT

Attribute	5034-OB4, 5034-OB4XT
Number of outputs	4 channels (1 group of 4), sourcing
Voltage category	24V DC source
Output voltage, nom	24V DC
Output voltage range	10...30V DC
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	6.1 A
SA power current, max	6.2 A
SA power current at no load	9 mA
SA reverse polarity protection	Yes

Table 90. General Specifications - 5034-OB4, 5034-OB4XT (continued)

Attribute	5034-OB4, 5034-OB4XT
Power dissipation, max ⁽¹⁾	1.55 W
Thermal dissipation, max ⁽¹⁾	5.29 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and outputs No isolation between individual outputs
RIUP support	Yes
CIP Sync	Slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 7, 11
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 4 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	45.0 g (1.59 oz.) - 5034-OB4 47.0 g (1.66 oz.) - 5034-OB4XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

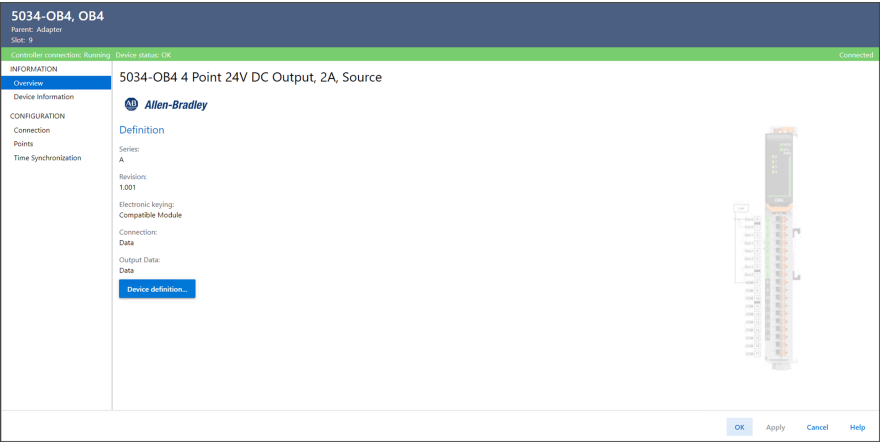
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

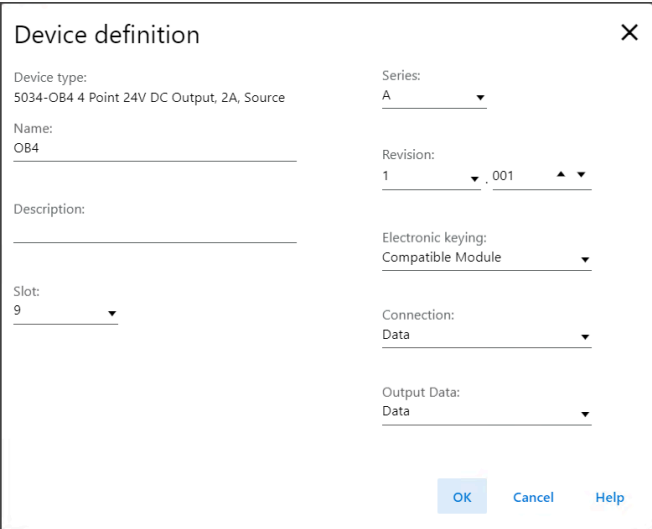
Figure 103. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 104. Device Definition Example



Device Definition includes these parameters:

Table 91. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying

Table 91. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p>
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	<ul style="list-style-type: none"> • Data • Listen Only Data
Output Data	Select the output data type for the device.	<ul style="list-style-type: none"> • Data • Packed Data

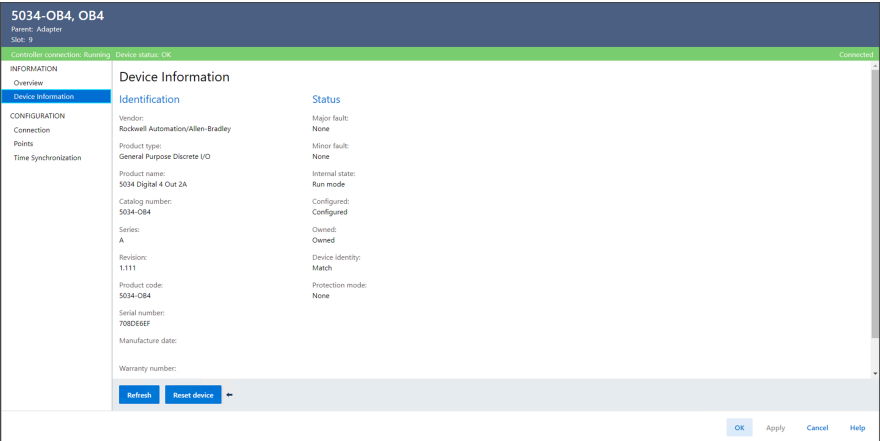
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

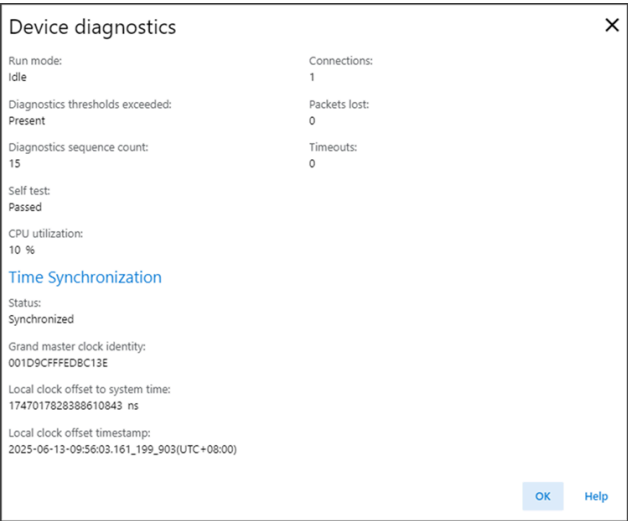
Figure 105. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 106. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.

- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 107. Connection View Example

5034-OB4, OB4
Parent: Adapter
Stat: 9

Controller connection: Running Device status: OK

Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Synchronization

Connection

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Data	5.0	ms 0.2 - 750.0	Unicast

☐ Inhibit module
☐ Major fault on controller if connection fails while in Run mode
☒ Enable Automatic Diagnostics
Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events

Connection fault:

OK

Apply

Cancel

Help

Points View

Use Points to view or configure the points for the device.

Figure 108. Points View Example

5034-OB4, OB4
Parent: Adapter
Stat: 9

Controller connection: Running Device status: OK

Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Points
Time Synchronization

Points

Point	Output State During		Communication Fault Mode	Duration	Final State	Mode when Communication Fails in Program Mode	☐ Enable No Load Diagnostics	Diagnostics
	Program Mode	Communication Fault Mode						
00	Off	Off	Forever	Off	Program Mode	☐	↕	
01	Off	Off	Forever	Off	Program Mode	☐	↕	
02	Off	Off	Forever	Off	Program Mode	☐	↕	
03	Off	Off	Forever	Off	Program Mode	☐	↕	

OK

Apply

Cancel

Help

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points or Pttx view.

Figure 109. Ptxx Diagnostics Example

Pt00 Diagnostics

Fault Exist:

No

Data Uncertain:

No

Field Power:

Present

Field Power On Timestamp:

None

Field Power Off Timestamp:

None

Short Circuit Fault:

Not Present

Short Circuit Fault Timestamp:

None

No Load Fault:

Not Present

No Load Fault Timestamp:

None

OK

Help

Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. Time Synchronization displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 110. Time Synchronization View Example

5034-OB4, OB4

Parent: Adapter

Stat: 9

Configure connection Running

Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Points

Input Events

Time Synchronization

Time Synchronization

CIP Sync time synchronization:
Enabled

UTC system time:
1/1/1970 10:10:58 PM

Grandmaster Clock

Identity:
BCF499FFFFE05208

Class:
240

Accuracy:
254

Variance:
65535

Source:
Oscillator

Priority 1:
128

Priority 2:
128

Description...

Local Clock

Identity:
BCF499FFFFE05335

Class:
255

Accuracy:
254

Variance:
65535

Source:
Oscillator

Synchronization status:
Synchronized

Offset to master:
2 ns

Backup plane:
Slave (Port 1)

OK

Apply

Cancel

Help

Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 111. Grandmaster Clock Description Example

Grandmaster clock description ✕

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

- PointMax I/O modules use the following status indicators:
- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
 - Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
 - Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 92. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: <ul style="list-style-type: none">- Check that the SA voltage is in the correct range.- If an external power supply is used, confirm that the power supply is turned on.

Table 92. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 93. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 94. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> A Field Power Loss condition exists. A No Load or Short Circuit condition is detected. 	One of the following: <ul style="list-style-type: none"> Locate and correct the cause of field power loss condition. A No Load or Short Circuit condition is detected.

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 95. Configuration Tags

Name	Data Type	Definition	Valid Values
Pttx.FaultMode	BOOL	Selects the behavior that the output point takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value. IMPORTANT: When Pttx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Pttx.FaultValue	BOOL	Defines the value that the discrete output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.ProgMode	BOOL	Selects the behavior that the output point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state

Table 95. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit mode
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds
Ptxx.NoLoadEn	BOOL	Enables No Load detection for output points.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable

Input Tag Definitions

Table 96. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle - It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run - It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is not running.

Table 96. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range, or data is under manual or override control.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Ptxx.Data PtxxData (Packed data)	BOOL	Echo of the current digital output value	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault PtxxFault (Packed data)	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Fault (Packed data)	INT	Indicates the fault state for all points of the module. Each bit represents 1 point. For example, Bit.3 represents Fault status of Pt03. Fault state indicates that point data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	For each point: <ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data

Table 96. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	
Pttx.NoLoad	BOOL	Indicates that the signal wire is disconnected from one of the RTB terminals or the RTB is removed.	<ul style="list-style-type: none"> 0 = No fault 1 = Fault
Pttx.ShortCircuit	BOOL	Indicates a short to high is detected on the safety input point.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit

Output Tag Definitions

Table 97. Output Tags

Name	Data Type	Definition	Valid Values
Pttx.Data PttxData (Packed data)	BOOL	Current digital output data to be applied	<ul style="list-style-type: none"> 0 = Off 1 = On
Data (Packed data)	INT	Indicates the current values for all points of the module. Each bit represents 1 point. For example, Bit.3 represents the Data of Pt03.	For each point: <ul style="list-style-type: none"> 0 = Off 1 = On

Diagnostic Assembly

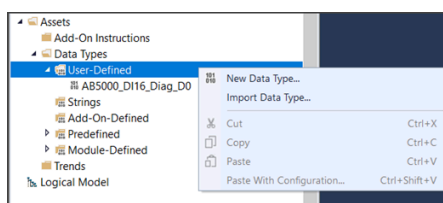
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

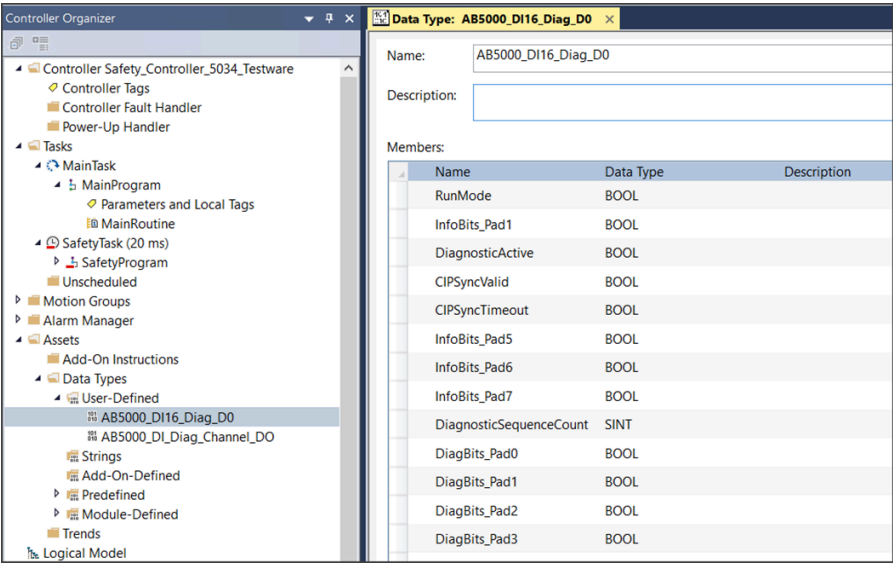
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

Diagnostic Digital 4 Point with Diagnostics Assembly

- Instance ID = 0x8018 (32,792)
- Size = 192 bytes

Table 98. Diagnostic Assembly Instance – 32,792

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	

Table 98. Diagnostic Assembly Instance – 32,792 (continued)

Name	Data Type	Size in Bytes
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...3]	See Diagnostic Digital with Diagnostics Channel (Output)	160

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 99. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Output)

- Size = 40 bytes

Table 100. Structure for Diagnostic Digital with Diagnostics Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	

Table 100. Structure for Diagnostic Digital with Diagnostics Channel (Output) (continued)

Name	Data Type	Size in Bytes
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 101. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead.

Table 101. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone

Table 101. Definitions for Diagnostic Assembly Parameters (continued)

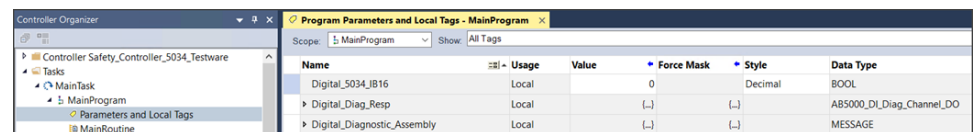
Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> 0 = No Load condition does not exist 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	A valid time or None if there is no recorded event time.

Table 101. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

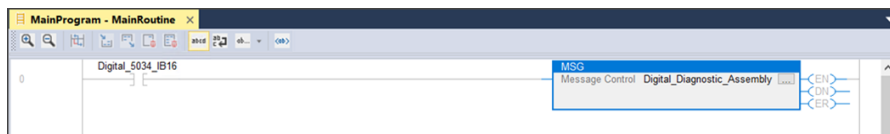
Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 32,792 (8018h) Diagnostic Digital 4 Point with Diagnostics Assembly
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-0W4I and 5034-0W4IXT Details

5034-0W4I and 5034-0W4IXT Relay 4 Output Isolated 2 A Modules

Figure 112. 5034-0W4I and 5034-0W4IXT Wiring Diagram

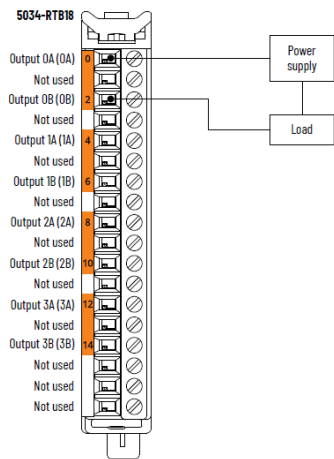


Figure 113. 5034-0W4I and 5034-0W4IXT Functional Block Diagram

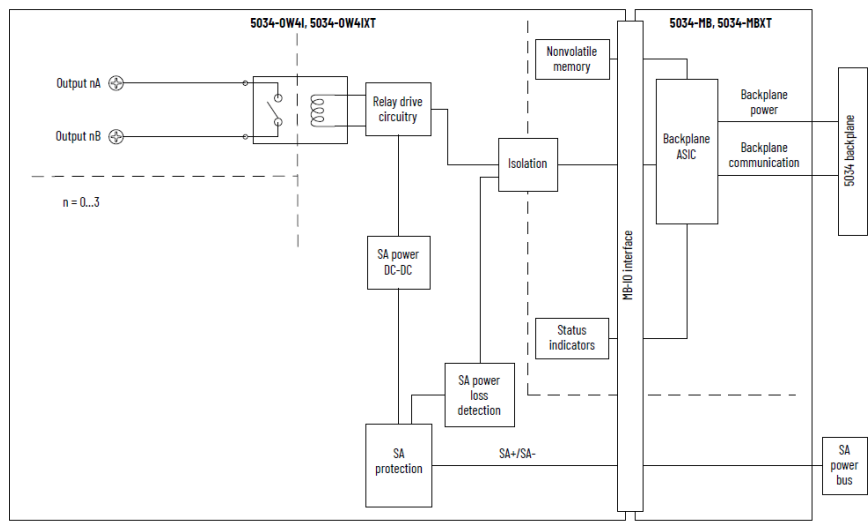


Table 102. Technical Specifications - 5034-0W4I, 5034-0W4IXT

Attribute	5034-0W4I, 5034-0W4IXT
Relay rating ⁽¹⁾	2 A resistive/channel @ 5...30V DC 2 A resistive/channel @ 120V AC, 50/60 Hz 2 A resistive/channel @ 240V AC, 50/60 Hz
Off-state leakage	0 mA Dry contact, no onboard snubbers

Table 102. Technical Specifications - 5034-0W4I, 5034-0W4IXT (continued)

Attribute	5034-0W4I, 5034-0W4IXT
Output current rating, max	2 A resistive/channel @ 5...30V DC 2 A resistive/channel @ 120V AC, 50/60 Hz 2 A resistive/channel @ 240V AC, 50/60 Hz
Output delay time (backplane to screw), max	10 ms
Off-to-On	
On-to-Off	
Initial contact resistance, max	30 mΩ
Output states in program mode per point	Hold Last State On Off (Default)
Output states in communication fault mode per point	Hold Last State On Off (Default)
Duration of communication fault mode per point	1 s 2 s 5 s 10 s Forever (Default)
Output final state after communication fault mode per point	On Off (Default)
On-state current per point, min	100 μA @ 100 mV DC
Switching frequency, max	1 operation/3 sec (0.3 Hz @ rated load)
Expected contact life, electrical	2 A, 240V AC (resistive): Min 1x10 ⁵ operating cycles (@ 20 times/min) 2 A, 30V DC (resistive): Min 1x10 ⁵ operating cycles (@ 20 times/min)
Expected contact life, mechanical	Min 2x10 ⁷ operating cycles (@ 180 times/min)
Pilot duty rating	5...240V AC, 50/60 Hz, C300 pilot duty per channel 5...125V DC, R150 pilot duty per channel

(1) Surge Suppression - Connecting surge suppressors across your external inductive load extends the life of the module. For additional details, see the following publications:

- PointMax Digital I/O Modules User Manual, publication [5034-UM002](#)
- Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#)

Table 103. General Specifications - 5034-0W4I, 5034-0W4IXT

Attribute	5034-0W4I, 5034-0W4IXT
Number of outputs	4 Form A (normally open)
Output voltage range	5...30V DC 5...240V AC
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	100 mA
SA power current, max	200 mA
SA power current at no load	3.0 mA
SA reverse polarity protection	Yes
Power dissipation, max ⁽¹⁾	0.74 W
Thermal dissipation, max ⁽¹⁾	2.52 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to SA 250V (continuous), Reinforced Insulation Type, System to Channel 250V (continuous), Reinforced Insulation Type, SA to Channel 250V (continuous), Reinforced Insulation Type, Channel to Channel
RIUP support	Yes
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	7, 12, 15
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 4 yellow I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	53.0 g (1.87 oz.) - 5034-0W4I 55.0 g (1.94 oz.) - 5034-0W4IXT

Table 103. General Specifications - 5034-OW4I, 5034-OW4IXT (continued)

Attribute	5034-OW4I, 5034-OW4IXT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

- (1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.
- (2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

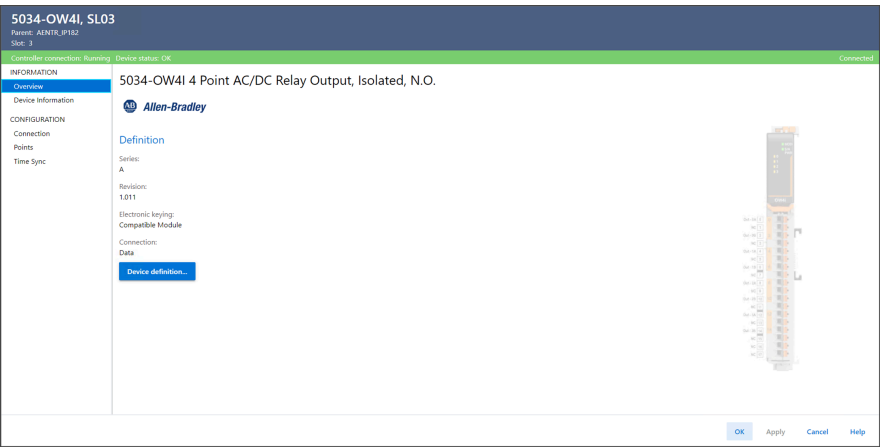
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 114. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 115. Device Definition Example

Device definition

Device type:
5034-OW4I 4 Point AC/DC Relay Output, Isolated, N.O.

Series:
A

Name:
SL03

Revision:
1 011

Description:

Electronic keying:
Compatible Module

Slot:
3

Connection:
Data

OK

Cancel

Help

Device Definition includes these parameters:

Table 104. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none">Exact MatchCompatible ModuleDisable Keying

Table 104. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 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 suggest 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.
Connection	Specify the type of data transferred between the device and controller. For the Listen Only Data choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.	<ul style="list-style-type: none">• Data• Listen Only Data

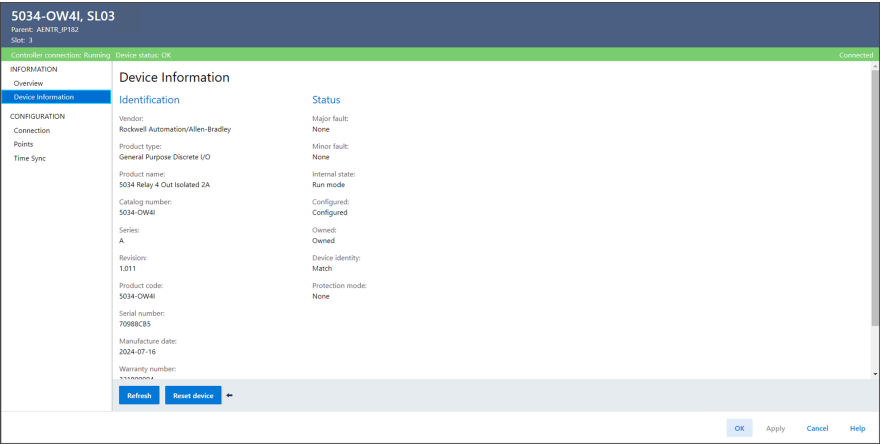
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

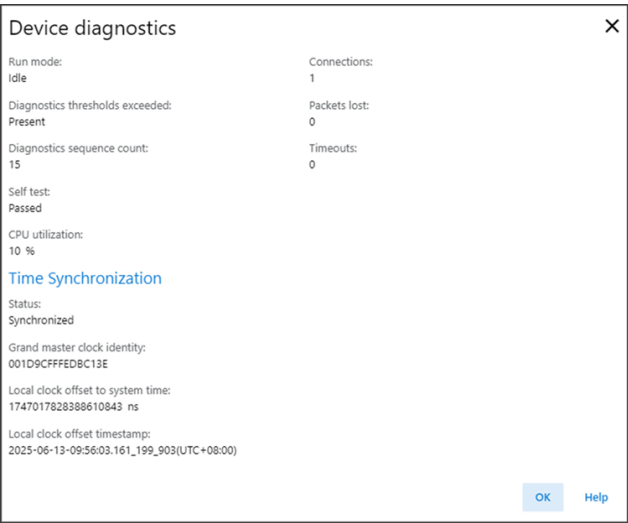
Figure 116. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 117. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.

- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 118. Connection View Example

5034-OW4I, SL03

Parent: AENTR_IP182

Slot: 3

Controller connection: Running Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Points

Time Sync

Connection

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Data	5.0	ms 0.2 - 750.0	Unicast

☐ Inhibit module

☐ Major fault on controller if connection fails while in Run mode

☒ Enable Automatic Diagnostics

☐ Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events

Connection fault:

OK

Apply

Cancel

Help

Points View

Use Points to view or configure the points for the device.

Figure 119. Points View Example

5034-OW4I, SL03

Parent: AENTR_IP182

Slot: 3

Controller connection: Running Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Points

Time Sync

Points

Point	Output State During		Communication Fault Mode Output State		Diagnostics	
	Program Mode	Communication Fault Mode	Duration	Final State		
00	Off	Off	Forever	Off	Program Mode	
01	Off	Off	Forever	Off	Program Mode	
02	Off	Off	Forever	Off	Program Mode	
03	Off	Off	Forever	Off	Program Mode	

OK

Apply

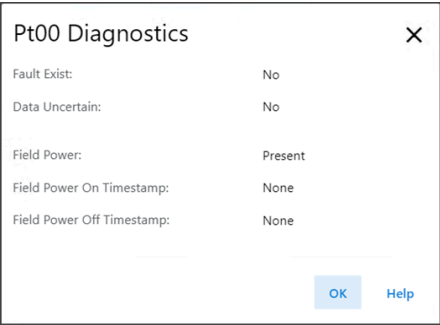
Cancel

Help

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points or Pttx view.

Figure 120. Ptxx Diagnostics Example

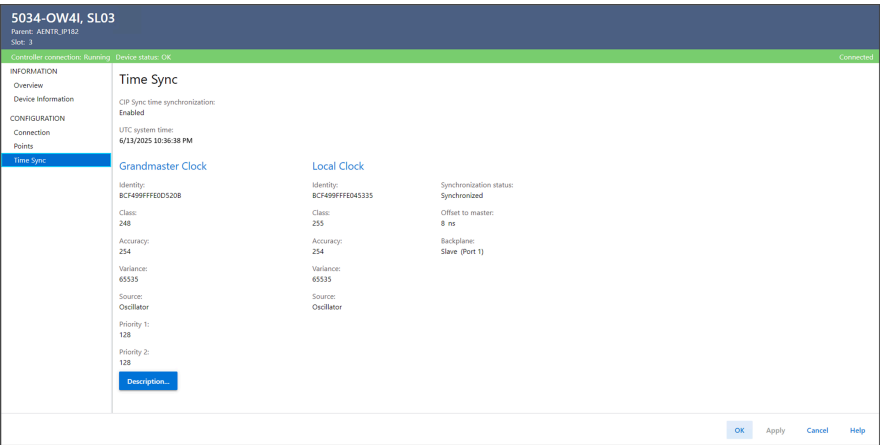


Time Sync View

The Time Sync view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Sync category displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 121. Time Sync View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 122. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

- PointMax I/O modules use the following status indicators:
- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
 - Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
 - Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 105. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: - Check that the SA voltage is in the correct range. - If an external power supply is used, confirm that the power supply is turned on.

Table 105. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 106. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 107. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. A Field Power Loss condition exists. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter. Locate and correct the cause of field power loss condition.
Steady yellow	The point is On.	None

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 108. Configuration Tags

Name	Data Type	Definition	Valid Values
Pttx.FaultMode	BOOL	Selects the behavior that the output point takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value. IMPORTANT: When Pttx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Pttx.FaultValue	BOOL	Defines the value that the discrete output assumes if a communication fault occurs when FaultMode = 0.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.ProgMode	BOOL	Selects the behavior that the output point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state

Table 108. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit mode
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds

Input Tag Definitions

Table 109. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
ConnectionFaulted	BOOL	Indicates if a connection to the target is running.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is not running.

Table 109. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are 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.	-128...+127 The value of 0 is skipped except during module powerup.
Pttx.Data	BOOL	Echo of the current digital relay output value	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.Fault	BOOL	<p>Indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Pttx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data

Output Tag Definitions

Table 110. Output Tags

Name	Data Type	Definition	Valid Values
Pttx.Data	BOOL	Current digital output data to be applied	<ul style="list-style-type: none"> 0 = Off 1 = On

Diagnostic Assembly

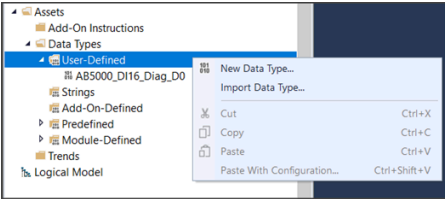
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.

Controller Organizer

- Controller Safety_Controller_5034_Testware
 - Controller Tags
 - Controller Fault Handler
 - Power-Up Handler
- Tasks
 - MainTask
 - MainProgram
 - Parameters and Local Tags
 - MainRoutine
 - SafetyTask (20 ms)
 - SafetyProgram
 - Unscheduled
 - Motion Groups
 - Alarm Manager
 - Assets
 - Add-On Instructions
 - Data Types
 - User-Defined
 - AB5000_DI16_Diag_D0
 - AB5000_DI_Diag_Channel_DO
 - Strings
 - Add-On-Defined
 - Predefined
 - Module-Defined
 - Trends
 - Logical Model

Data Type: AB5000_DI16_Diag_D0

Name: AB5000_DI16_Diag_D0

Description:

Members:

Name	Data Type	Description
RunMode	BOOL	
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	
DiagBits_Pad0	BOOL	
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	

IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

Diagnostic Digital 4 Point with Diagnostics Assembly

- Instance ID = 0x8018 (32,792)
- Size = 192 bytes

Table 111. Diagnostic Assembly Instance – 32,792

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4

Table 111. Diagnostic Assembly Instance – 32,792 (continued)

Name	Data Type	Size in Bytes
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...3]	See Diagnostic Digital with Diagnostics Channel (Output)	160

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 112. Diagnostic Assembly Instance – 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Output)

- Size = 40 bytes

Table 113. Structure for Diagnostic Digital with Diagnostics Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
DiagBits_Pad0...DiagBits_Pad15	INT	2
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 114. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Because the controller is in Program Mode, the module is not applying new output tag data but is applying the Program Mode state of the output point instead. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied.
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	A valid time or None if there is no recorded event time. Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00). <ul style="list-style-type: none"> YYYY = year MM = month

Table 114. Definitions for Diagnostic Assembly Parameters (continued)

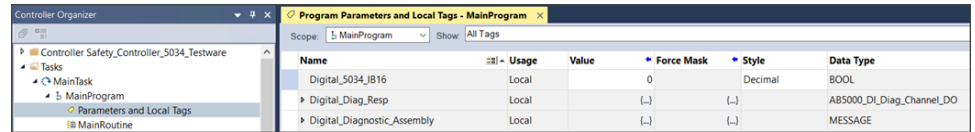
Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day

Table 114. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> • 0 = No Load condition does not exist • 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



Name	Usage	Value	Force Mask	Style	Data Type
Digital_5034_IB16	Local	0		Decimal	BOOL
Digital_Diag_Resp	Local	(-)	(-)		ABS000_DL_Diag_Channel_DO
Digital_Diagnostic_Assembly	Local	(-)	(-)		MESSAGE

From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 32,792 (8018h) Diagnostic Digital 4 Point with Diagnostics Assembly
 - 769 (301h) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

Surge Suppressors

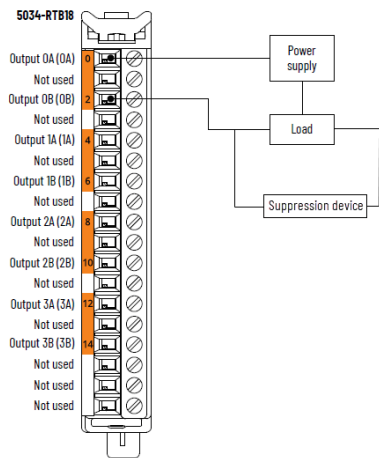
This chapter provides information on the use of surge suppressors to protect the relay output contacts of the relay output module when switching inductive loads. It also describes recommended surge suppressors for AC and DC load applications.

Because of the potentially high current surges that occur when switching inductive load devices, such as motor starters and solenoids, the use of some type of surge suppression to protect and extend the operating life of the I/O module's output contacts is required. Switching inductive loads without surge suppression can significantly reduce the life expectancy of relay contacts. By adding a suppression device directly across the coil of an inductive device, you

prolong the life of the output or relay contacts. You also reduce the effects of voltage transients and electrical noise from radiating into adjacent systems.

The following figure shows an output with a suppression device for the 5034-0W4I relay output module. We recommend that you locate the suppression device as close as possible to the inductive load device.

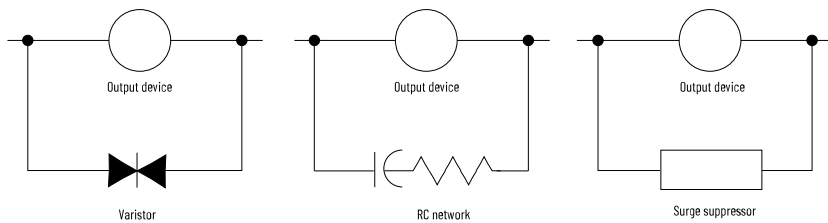
Figure 123. 5034-0W4I Relay Output Module with a Suppression Device



For DC outputs driving inductive loads, use an appropriate diode for surge suppression. These surge suppression circuits can be connected directly across the load device.

Suitable surge suppression methods for inductive AC load devices include a varistor, an RC network, or an Allen-Bradley® surge suppressor, as shown in the following figure. These components must be appropriately rated to suppress the switching transient characteristic of the particular inductive device. See [Table 115: Recommended Surge Suppressors on page 284](#) for recommended devices.

Figure 124. Surge Suppression for Inductive AC Load Devices



Recommended Surge Suppressors

Use the Allen-Bradley surge suppressors shown in the table below with relays, contactors, and starters.

Table 115. Recommended Surge Suppressors

Device	Coil Voltage (Original)	Suppressor Catalog Number	Type ⁽¹⁾
Bulletin 100/104K 700K	24...48V AC	100-KFSC50	Resistor Capacitor (RC)
	110...280V AC ⁽⁵⁾	100-KFSC280	
	12...55V AC	100-KFSV55	Metal Oxide Varistor (MOV)

Table 115. Recommended Surge Suppressors (continued)

Device	Coil Voltage (Original)	Suppressor Catalog Number	Type ⁽¹⁾
	12...77V DC	100-KFSV136	
	56...136V AC		
	78...180V DC ⁽⁵⁾		
	137...277V AC ⁽⁵⁾	100-KFSV277	
	12...250V DC ⁽⁵⁾	100-KFSD250	Diode
Bulletin 100C (C09...C97)	24...48V AC	100-FSC48 ⁽²⁾	RC
	110...280V AC ⁽⁵⁾	100-FSC280 ⁽¹⁾	
	12...55V AC	100-FSV55 ⁽¹⁾	MOV
	12...77V DC		
	56...136V AC	100-FSV136 ⁽¹⁾	
	78...180V DC ⁽⁵⁾		
	137...277V AC ⁽⁵⁾	100-FSV277 ⁽¹⁾	
	12...250V DC ⁽⁵⁾	100-FSD250 ⁽¹⁾	Diode
Bulletin 509 Motor Starter Size 0...5	12...120V AC	599-K04	MOV
	240...264V AC ⁽⁵⁾	599-KA04	
Bulletin 509 Motor Starter Size 6	12...120V AC	199-FSMA1 ⁽³⁾	RC
	12...120V AC	199-GSMA1 ⁽⁴⁾	MOV
Bulletin 700 R/RM Relay	AC coil	Not required	–
	24...48V DC	199-FSMA9	MOV
	50...120V DC	199-FSMA10	
Bulletin 700 Type N, P, PK, or PH Relay	6...150V AC/DC ⁽⁵⁾	700-N24	RC
	24...48V AC/DC	199-FSMA9	MOV
	50...120V AC/DC	199-FSMA10	
	130...250V AC/DC ⁽⁵⁾	199-FSMA11	
	6...300V DC ⁽⁵⁾	199-FSMZ-1	Diode

Table 115. Recommended Surge Suppressors (continued)

Device	Coil Voltage (Original)	Suppressor Catalog Number	Type ⁽¹⁾
Miscellaneous electromagnetic devices limited to 35 sealed VA	6...150V AC/DC ⁽⁵⁾	700-N24	RC

- (1) Do not use RC Type with Triac outputs. Varistor is not recommended for use on the relay outputs.
- (2) Catalog numbers for screwless terminals include the string 'CR' after '100-'. For example: Catalog number 100-FSC48 becomes 100-CRFSC48; Catalog number 100-FSV55 becomes 100-CRFSV55; and so on.
- (3) For use on the interposing relay.
- (4) For use on the contactor or starter.
- (5) For contact ratings, see the PointMax I/O System Specifications Technical Data, publication [5034-TD001](#).

5034-UB8 and 5034-UB8XT Details

5034-UB8 and 5034-UB8XT Digital 8 Input/Output Modules

Figure 125. 5034-UB8 and 5034-UB8XT Wiring Diagram – Output Mode

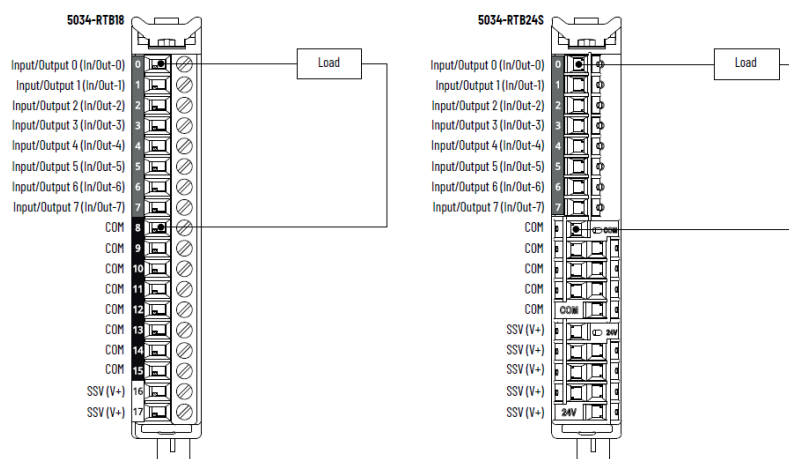
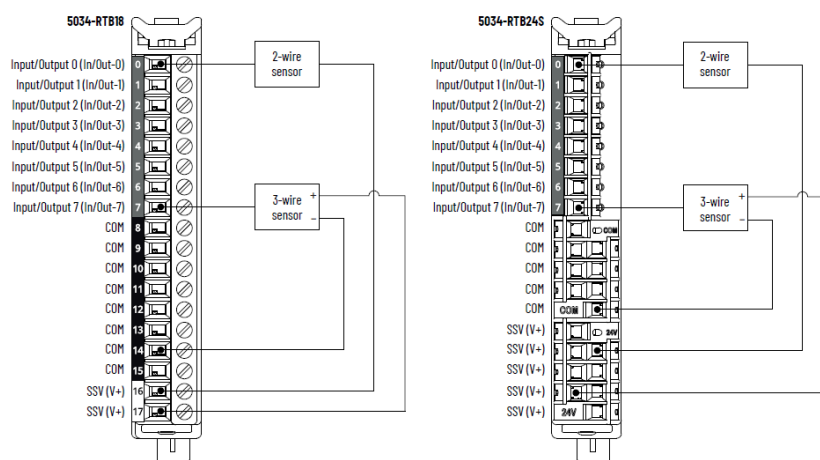


Figure 126. 5034-UB8 and 5034-UB8XT Wiring Diagram – Input Mode



To establish more COM/V+ connections, especially in a mixed input/output configuration, use a 5034-RTB24S, or install a 5034-MBPTM or 5034-MBPTMXT next to the module.

Use SSV (V+) only for powering sensors that are interfaced with a point that is configured as a digital input mode.

Figure 127. 5034-UB8 and 5034-UB8XT Functional Block Diagram

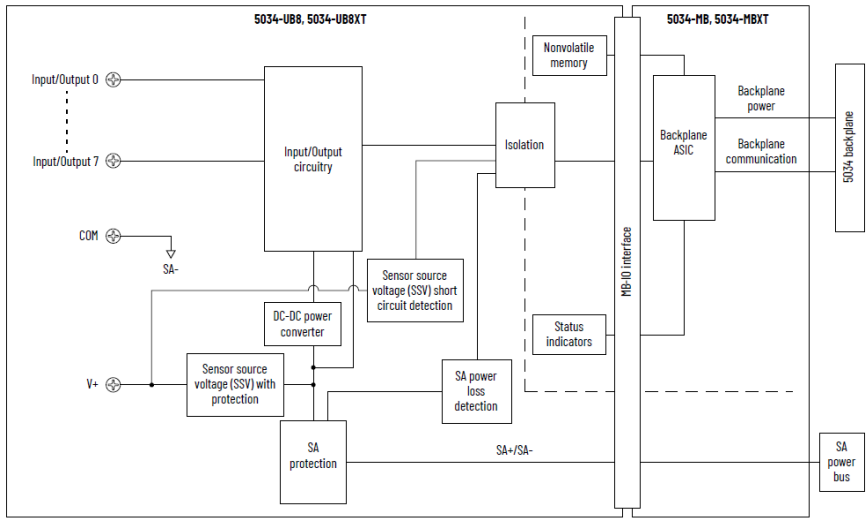


Table 116. Technical Specifications - 5034-UB8, 5034-UB8XT - Input

Attribute	5034-UB8, 5034-UB8XT
On-state voltage range	10...30V DC
On-state current, min	2 mA
On-state current, nom	4.5 mA
On-state current, max	5 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input impedance, min	2 kΩ @ 10V DC
Input impedance, nom	5.3 kΩ @ 24V DC
Input impedance, max	15 kΩ @ 30V DC
Input delay time (screw to backplane), max	250 μs
Off-to-On	
On-to-Off	
Input pulse width, min	250 μs
Off-to-On	
On-to-Off	
Input filter time	0 μs, 500 μs, 1 ms (Default), 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Off-to-On	
On-to-Off	

Table 116. Technical Specifications - 5034-UB8, 5034-UB8XT - Input (continued)

Attribute	5034-UB8, 5034-UB8XT
Simple counters, counter frequency	0...f _{max} = 2000 Hz
Timestamp of inputs (sequence of events)	Yes, ±200 µs accuracy
Events	Not supported

Table 117. Technical Specifications - 5034-UB8, 5034-UB8XT - Output

Attribute	5034-UB8, 5034-UB8XT
On-state voltage range	10...30V DC
On-state voltage drop, max	0.25V DC
On-state current per point, min	1.0 mA
Off-state voltage, max Off-state open wire detection disabled	5V DC with 1 mA min load
Off-state voltage, max Off-state open wire detection enabled	5V DC with 5 mA min load
Off-state leakage current per point, max Off-state open wire detection disabled	0.1 mA
Off-state leakage current per point, max ⁽¹⁾ Off-state open wire detection enabled	0.5 mA
Output current rating per point, max	0.5 A
Output current rating per module, max	4 A
Surge current per point, max	1.2 A for 10 ms, repeatable every 3 s
Inductive load allowed, max	1.2 H
Output clamping voltage for inductive load when turn off	(SA voltage + VCL)...0 VCL value: Minimum is -63V, Typical is -55V, Maximum is -49V

Table 117. Technical Specifications - 5034-UB8, 5034-UB8XT - Output (continued)

Attribute	5034-UB8, 5034-UB8XT
	For more information, see the PointMax Digital I/O Modules User Manual, publication 5034-UM002 .
Output delay time (backplane to screw), max Off-to-On On-to-Off	150 μ s @ 0.5 A
Pulse width, min	200 μ s
Scheduled outputs	Supported, accuracy ± 100 μ s
Open load detection diagnostics	Yes, configurable (Default is off)
Output short circuit/overload detection	Yes
Output short circuit/overload protection	Yes
Pilot duty rating	1.2 A inrush current, 0.5 A rated current, DC-14
Output states in program mode per point	Hold Last State On Off (Default)
Output states in communication fault mode per point	Hold Last State On Off (Default)
Duration of communication fault mode per point	1 s 2 s 5 s 10 s Forever (Default)
Output final state after communication fault mode per point	On Off (Default)

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

Table 118. General Specifications - 5034-UB8, 5034-UB8XT

Attribute	5034-UB8, 5034-UB8XT
Number of inputs/outputs	8 channels, configurable, sinking input, sourcing output
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	4.1 A
SA power current, max	4.2 A
SA power current at no load	14 mA
SA reverse polarity protection	Yes
SSV voltage range	Follow SA supply
SSV current, max	0.8 A
SSV short-circuit detection	Yes
Power dissipation, max ⁽¹⁾	1.36 W
Thermal dissipation, max ⁽¹⁾	4.63 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and input/output ports No isolation between individual input/output ports
RIUP support	Yes
CIP Sync	Slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 5, 8
RTB supported	5034-RTB18, 5034-RTB18S, 5034-RTB24S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)

Table 118. General Specifications - 5034-UB8, 5034-UB8XT (continued)

Attribute	5034-UB8, 5034-UB8XT
Weight, approx	45.0 g (1.59 oz.) - 5034-UB8 47.0 g (1.66 oz.) - 5034-UB8XT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEX temp code	T4

- (1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.
- (2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

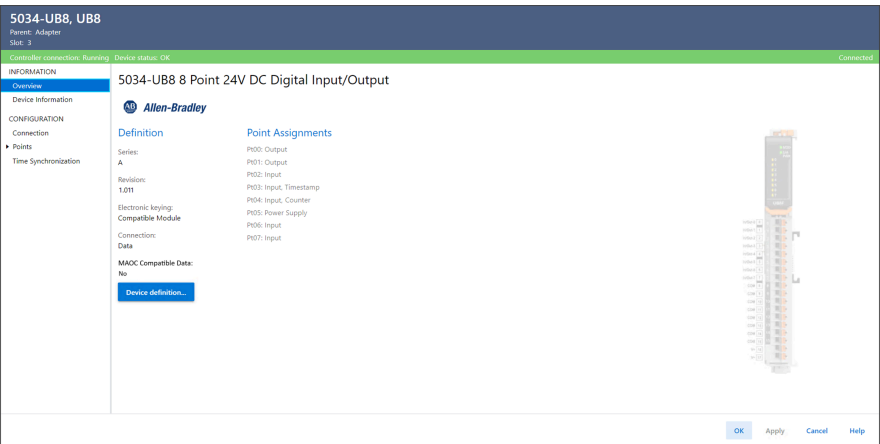
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 128. Overview View Example



Device Definition

This section shows definitions for specific configurations that are chosen in the Device Definition dialog.

To change the definition of a device, select Device definition in the Overview view.

Device Definition Overview

Figure 129. Device Definition Overview Example

Device Definition

Overview

Point Assignments

Overview

Device type:
5034-UB8 8 Point 24V DC Digital Input/Output

Name:
UB8

Description:

Slot:
3

Series:
A

Revision:
1 . 011

Electronic keying:
Compatible Module

Connection:
Data

MAOC Compatible Data:
No

OK

Cancel

Help

Overview includes these parameters:

Table 119. Overview Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position.	1...32

Table 119. Overview Parameters (continued)

Parameter	Definition	Available Choices
	When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	<p>Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.</p> <p>For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001.</p>	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying <hr/>  <p>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.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p> <hr/>
Connection	<p>Specify the type of data transferred between the device and controller.</p> <p>For the Listen Only choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.</p>	<ul style="list-style-type: none"> Data Listen Only Data
MAOC Compatible Data	<p>Specifies whether the data is compatible with Motion Arm Output Cam (MAOC) instruction.</p> <p>If the data is not compatible with MAOC, you cannot use this module with MAOC instruction.</p>	<ul style="list-style-type: none"> No Yes

Table 119. Overview Parameters (continued)

Parameter	Definition	Available Choices
	Some point assignment options are not available when Yes is selected.	

Define Point Assignments

Figure 130. Define Point Assignment Example

Device Definition ✕

Overview

Point Assignments

Point	Selected Mode
00	Output
01	Output
02	Input
03	Input, Timestamp
04	Input, Counter
05	Power Supply
06	Input
07	Input

OK

Cancel

Help

Define Output Assignments includes these parameters:

Table 120. Define Output Assignments – Parameters

Parameter	Definition	Available Choices
Point	Indicates the point to which this configuration applies.	0...7
Selected Mode	Defines the mode in which the output operates.	<div>When MAOC Compatible Data is configured as No:<ul style="list-style-type: none">DisabledDigital InputDigital Input, CounterDigital Input, TimestampDigital OutputPower Supply</div> <div>When MAOC Compatible Data is configured as Yes:<ul style="list-style-type: none">DisabledDigital Input</div>

Table 120. Define Output Assignments - Parameters (continued)

Parameter	Definition	Available Choices
		<ul style="list-style-type: none"> Digital Output, Scheduled Power Supply

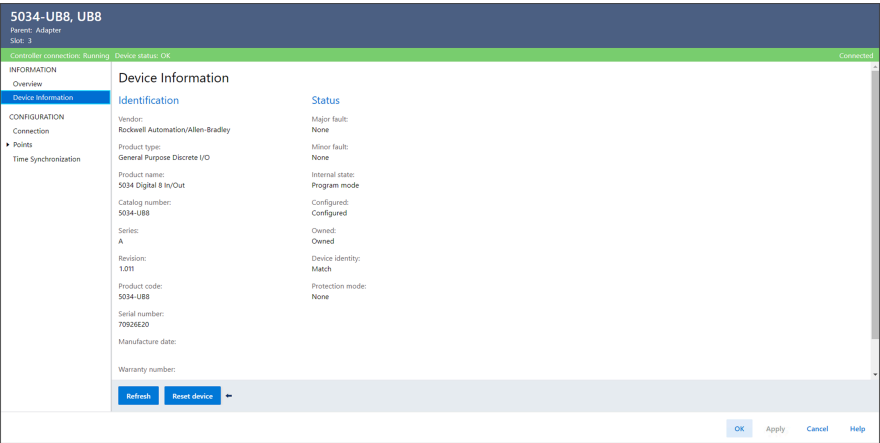
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

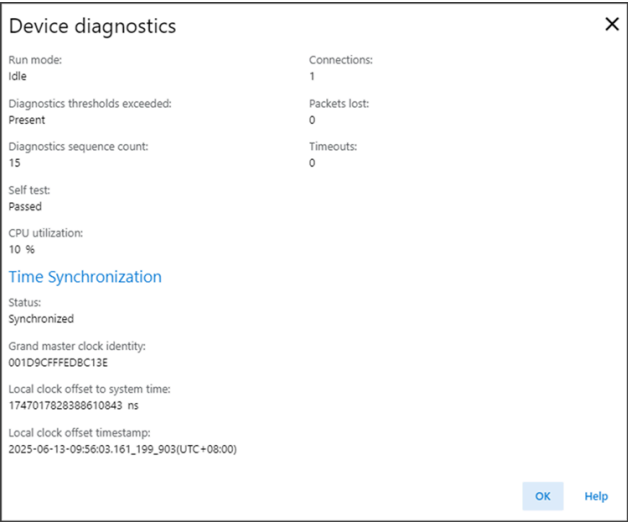
Figure 131. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 132. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



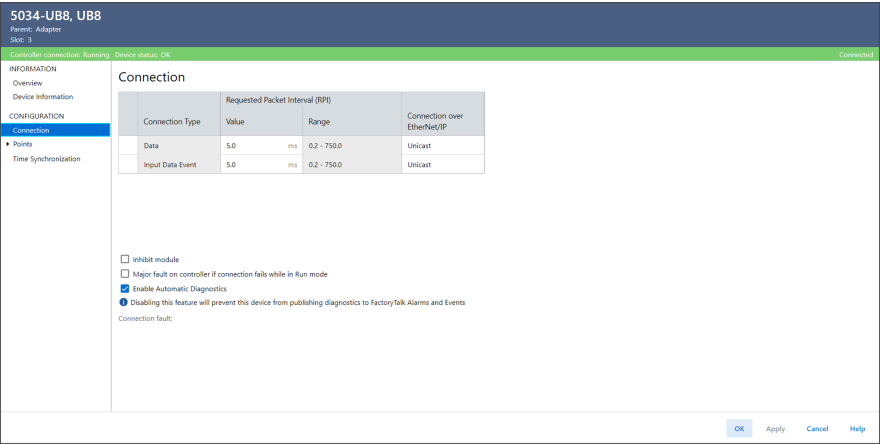
If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

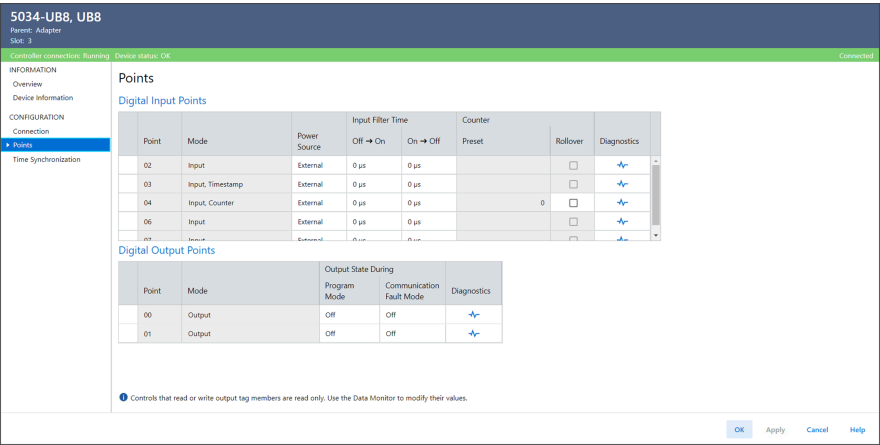
Figure 133. Connection View Example



Points View

Use Points to view or configure the points for the device.

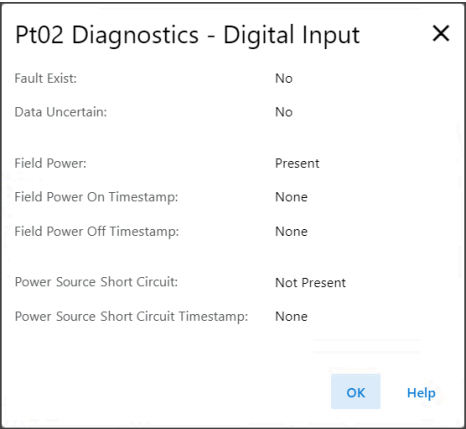
Figure 134. Points View Example



Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points or Pttx view.

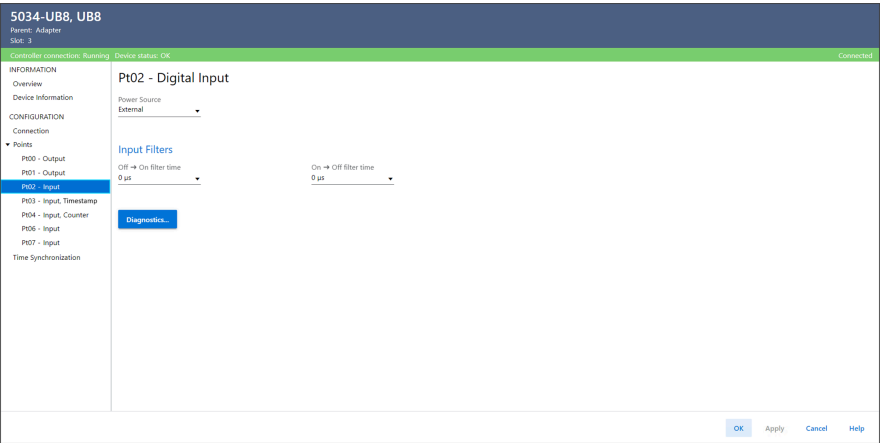
Figure 135. Pttx Diagnostics Example



Ptxx – Digital Input View

Use Ptxx – Digital Input to view or configure the points for the device.

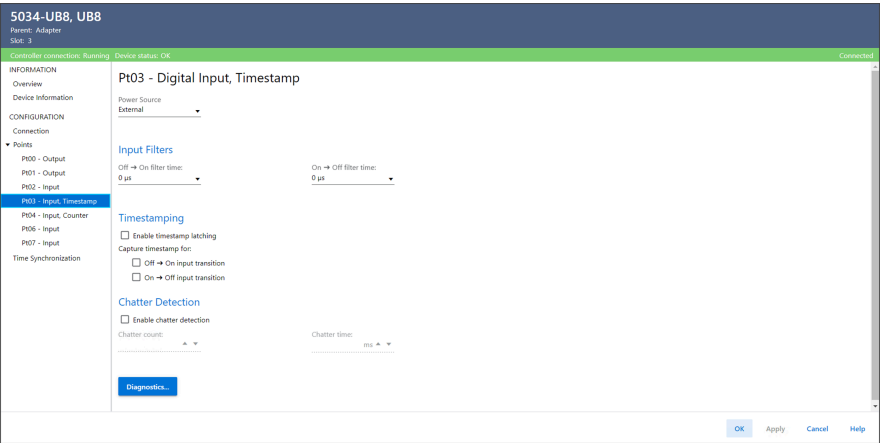
Figure 136. Ptxx – Digital Input View Example



Ptxx – Digital Input, Timestamp View

Use Ptxx – Digital Input, Timestamp to view or configure the points for the device.

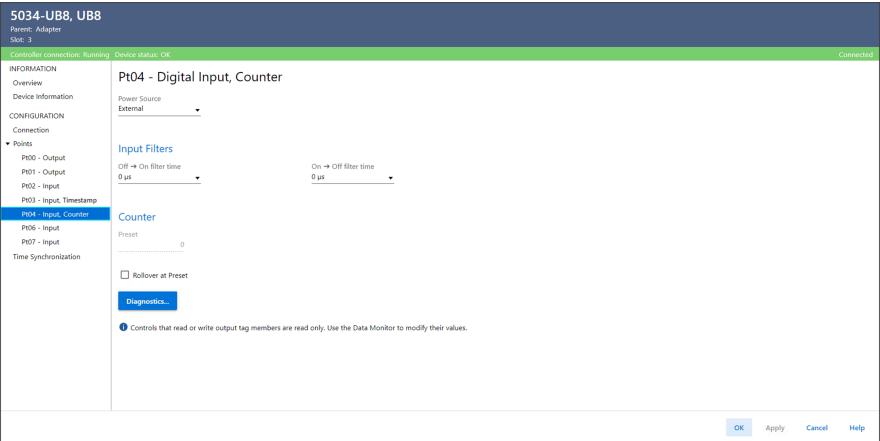
Figure 137. Ptxx – Digital Input, Timestamp View Example



Ptxx – Digital Input, Counter View

Use Ptxx – Digital Input, Counter to view or configure the points for the device.

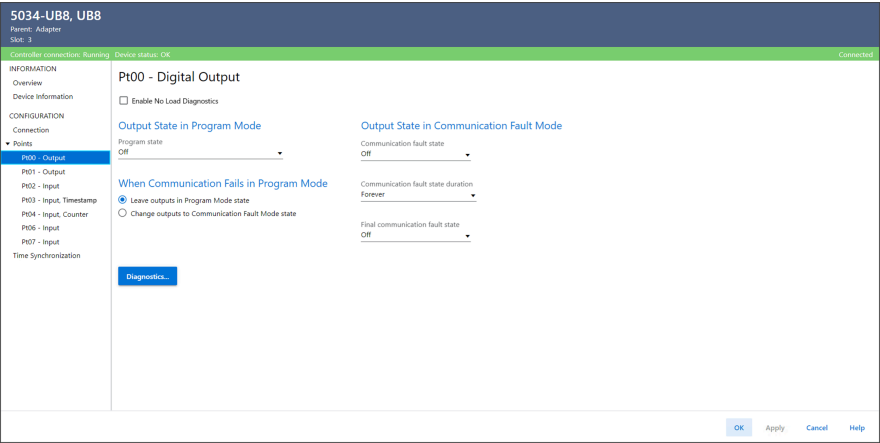
Figure 138. Ptxx – Digital Input, Counter View Example



Pttx – Digital Output View

Use Pttx – Digital Output to view or configure the points for the device.

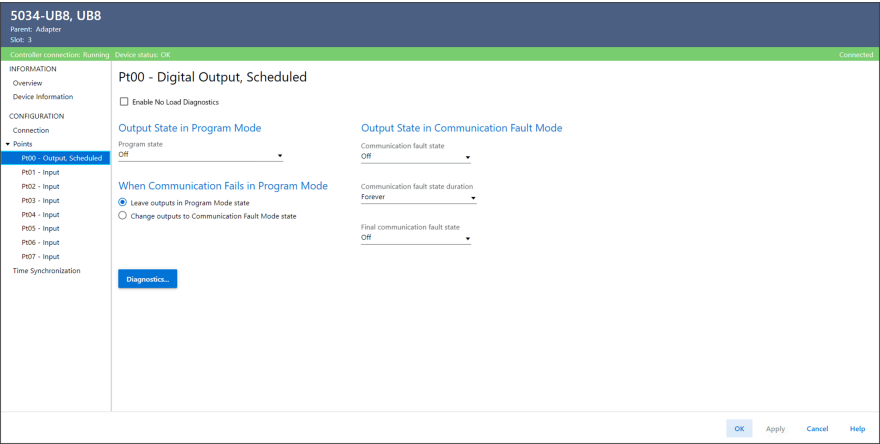
Figure 139. Pttx – Digital Output View Example



Pttx – Digital Output, Scheduled View

Use Pttx – Digital Output, Scheduled to view or configure the points for the device.

Figure 140. Ptxx – Digital Output, Scheduled View Example

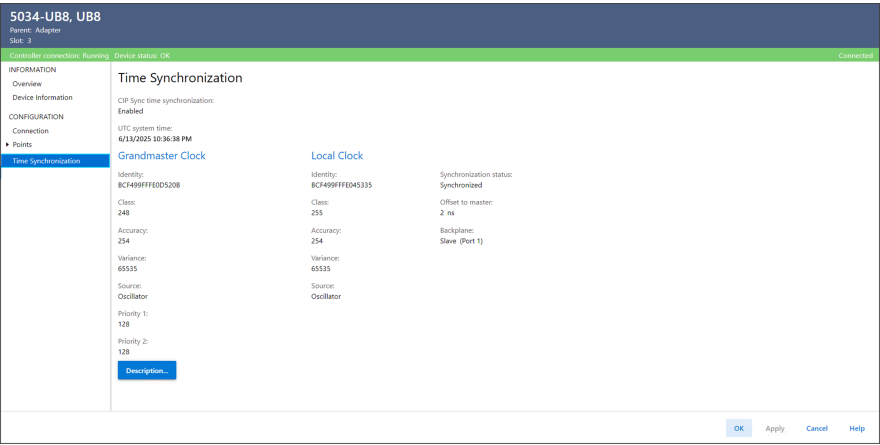


Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Synchronization view displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 141. Time Synchronization View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 142. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

- PointMax I/O modules use the following status indicators:
- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
 - Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
 - Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 121. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: - Check that the SA voltage is in the correct range. - If an external power supply is used, confirm that the power supply is turned on.

Table 121. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 122. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 123. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> A Field Power Loss condition exists. A No Load or Short Circuit condition is detected (Output Mode). A Power Source Short Circuit condition is detected (Input Mode). 	One of the following: <ul style="list-style-type: none"> Locate and correct the cause of field power loss condition. Locate and correct the source of No Load or Short Circuit condition (Output Mode). On the configured Power Source, locate and correct the source of Short Circuit condition (Input Mode).

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 124. 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.	<ul style="list-style-type: none"> 5 = 0 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.	<ul style="list-style-type: none"> 5 = 0 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms

Table 124. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms
Counterxx.RolloverAtPreset	BOOL	Determines whether the simple counter will rollover to 0 at the Preset value.	<ul style="list-style-type: none"> 0 = No rollover at the Preset value When the counter counts to the Preset value, the Done bit is set. When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set. 1 = Rollover at the Preset value When the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0.
Ptxx.InputOffOnFilter	SINT	<p>The amount of time that a signal must be in the On state before the input data indicates the On state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 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	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms 17 = 20 ms 18 = 50 ms

Table 124. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
Ptxx.ChatterTime	INT	A value from 1...10,000 ms in whole ms increments	1...10,000
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 timestamps. If cleared, the point does not record Off to On timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for Off to On input transitions 1 = Capture enabled for Off to On input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off timestamps. If cleared, the point does not record On to Off timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for On to Off input transitions 1 = Capture enabled for On to Off input transitions
Ptxx.TimestampLatchEn	BOOL	Determines whether timestamps latching is enabled.	<ul style="list-style-type: none"> 0 = Timestamps are overwritten with each successive transition The new timestamp overwrites the reported timestamp immediately, even if the controller has yet to extract that data. 1 = Timestamps are latched until acknowledged The reported timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset. Timestamp is acknowledged by copying the value from input tag TimestampOffOnNumber/TimestampOnOffNumber to output tag TimestampOffOnNumberAck/TimestampOnOffNumberAck. The acknowledgment also clears TimestampOverflowOffOn/TimestampOverflowOnOff.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
Ptxx.FaultMode	BOOL	<p>Selects the behavior that the output point takes if a communication fault occurs. FaultValue defines the value to go to when set to user-defined value.</p> <hr/> <p>IMPORTANT: When Ptxx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.</p>	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state
Ptxx.FaultValue	BOOL	Defines the value that the discrete 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 point takes when transitioned into Program Mode or Inhibit mode.	<ul style="list-style-type: none"> 0 = Go to a user-defined value 1 = Hold last state

Table 124. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		<p>ProgValue defines the value to go to when set to user-defined value.</p> <hr/> <p>IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.</p> <hr/>	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit 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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds
Ptxx.NoLoadEn	BOOL	Enables No Load detection for output points.	<ul style="list-style-type: none"> 0 = Disable 1 = Enable
Ptxx.PowerSource	SINT	Indicates the power source that is used for the point.	<ul style="list-style-type: none"> 0...7 = Point number of the Power Supply mode point that is used as SSV to the Ptxx input. -1 = External power supply -2 = Module SSV power

Input Tag Definitions

Table 125. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 125. Input Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp).
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> • 0 = Connection is running. • 1 = Connection is 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 are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
Counterxx.Data	BOOL	Indicates the current digital 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. 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.	<ul style="list-style-type: none"> • 0 = Good • 1 = Bad, causing fault
Counterxx.Uncertain	BOOL	Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> • 0 = Good data • 1 = Uncertain data

Table 125. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	
Counterxx.Done	BOOL	If RolloverAtPreset is set, indicates if Count $\geq$ Preset. If RolloverAtPreset is not set, always 0.	<ul style="list-style-type: none"> 0 = Counter has not reached the Preset value 1 = Counter has reached the Preset value
Counterxx.Rollover	BOOL	The counter counted up to Preset -1 and continued counting from 0. The RolloverAck bit transitioning from 0 to 1 or the Reset bit transitioning from 0 to 1 clears this bit.	<ul style="list-style-type: none"> 0 = Counter has not rolled over from Preset -1 to 0 1 = Counter counted up to Preset -1 and continued counting from 0
Counterxx.Count	DINT	The number of rising edge of input signal counted by the counter	All values
Ptxx.Data (Input mode)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Data (Output mode)	BOOL	Indicates the current digital output value applied at the screw.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application. 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.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Ptxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. 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.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
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 timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1

Table 125. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Ptxx.TimestampOverflowOnOff	BOOL	Indicates an On to Off timestamp was lost. A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.	0 or 1
Ptxx.CIPSyncValid	BOOL	Indicates whether the module is synced with a 1588 master. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
Ptxx.TimestampOffOnNumber	INT	An Off to On timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOnOffNumber	INT	An On to Off timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOffOn	LINT	64-bit timestamp corresponding to when a change of state Off to On was recorded at the input	All values
Ptxx.TimestampOnOff	LINT	64-bit timestamp corresponding to when a change of state On to Off was recorded at the input	All values
Schedule[x].State	SINT	Current state of the schedule tags at index x	<ul style="list-style-type: none"> 0 = Inactive 1 = Active - Schedule is next to be applied to the output 2 = Queued - Schedule is queued after the Active schedule 3 = Expired - Schedule has been applied 4 = Discarded - One of the following: <ul style="list-style-type: none"> The requested schedule was late (received after its scheduled application time) and a more recent schedule has already been applied to that output. The output point does not exist or scheduling is not enabled on the output point. 5 = Late - Schedule is received after the time scheduled (schedule is applied immediately)

Table 125. Input Tags (continued)

Name	Data Type	Definition	Valid Values
Schedule[x].ScheduleNumber	SINT	Echo of SequenceNumber from the output tag	All values
LateScheduleCount	INT	Count of schedules that arrive late. That is, the arrival time is after scheduled time. Counter rolls over every 65,535 late updates. The output is still being 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 65,535 lost updates.	All values

Output Tag Definitions

Table 126. Output Tags

Name	Data Type	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, Count and Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Count and Rollover values are not set to 0 1 = Count and 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 = Rollover bit is not cleared 1 = Rollover bit is cleared
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, when the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0. If RolloverAtPreset is not set, when the counter counts to the Preset value, the Done bit is set. <p>When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set.</p>	0...2,147,483,647
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input point 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	An Off to On timestamp identifier that the controller writes 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	All values

Table 126. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		recent timestamp that is produced, the module is then allowed to produce a new timestamp.	
Ptxx.TimestampOnOffNumberAck	INT	An On to Off timestamp identifier that the controller writes 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 is then allowed to produce a new timestamp.	All values
Ptxx.Data	BOOL	Current digital output data to be applied	<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
TimeBase	LINT	Indicates the TimeBase for all schedule times. When a new schedule entry is received, the module uses TimeBase + Schedule[n].TimeOffset to determine the time for the schedule entry. Once the schedule entries that are based on the current TimeBase are echoed back by the module, a new TimeBase can be set to incorporate new schedule entry creations.	Any positive value
Schedule[x].ID	SINT	Indicates which hardware scheduler to use. Typically, you set the ID to the schedule index x + 1. If you use an ID before that same ID of the previous schedule is completed, the new schedule overwrites the old schedule. The schedule is considered complete when the schedule state is reported as Expired, Late, or Discarded.	<ul style="list-style-type: none"> 0 = No schedule 1...32 = Valid hardware scheduler ID
Schedule[x].SequenceNumber	SINT	For every new schedule of Schedule[x], the sequence number is increased. The expected sequence to request the module to perform a new schedule is: <ol style="list-style-type: none"> Set all other Schedule[x] members properly in the output tag. Increase the sequence number after step 1 is completed. Once the module receives a new sequence number of Schedule[x], it starts processing it.	All values
Schedule[x].OutputPointSelect	SINT	Selects the output point that this schedule applies to.	0...15

Table 126. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		0xFF means no output point selected.	
Schedule[x].Data	BOOL	Output data to be applied at time that is specified in schedule	0 or 1
Schedule[x].TimeOffset	DINT	Offset from schedule base time. For more information, see the definition for TimeBase.	All values

Diagnostic Assembly

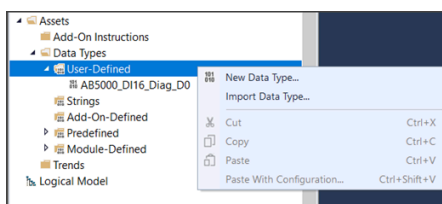
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

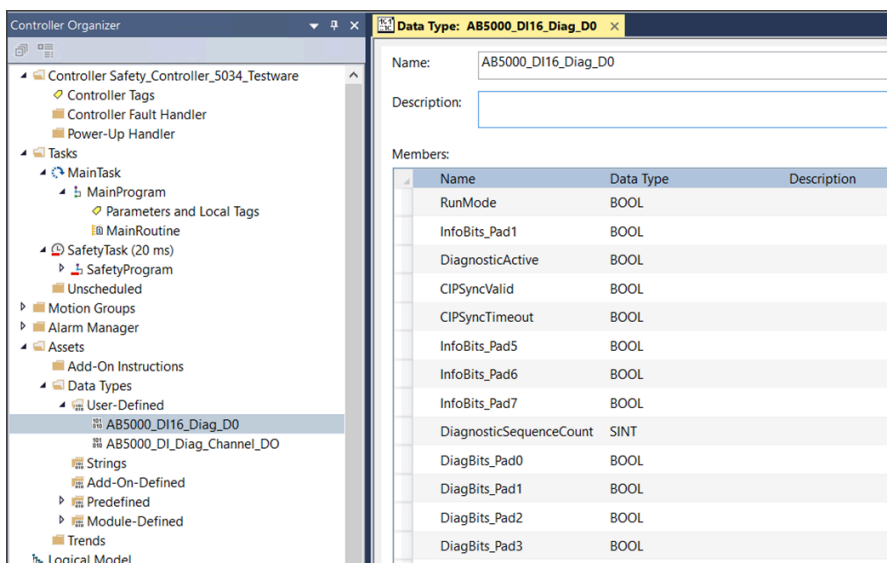
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

1. Diagnostic Digital Configurable 8 Point with Diagnostics Assembly A
 - Instance ID = 0x801B (32,795)
 - Size = 232 bytes

Table 127. Diagnostic Assembly Instance - 32,795

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	

Name	Data Type	Size in Bytes
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
ChannelMode00	SINT	1
ChannelMode01	SINT	1
ChannelMode02	SINT	1
ChannelMode03	SINT	1
Pad	INT	4
Ch00	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch01	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch02	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch03	Diagnostic Digital with Diagnostics Channel (Configurable)	48

2. Diagnostic Digital Configurable 8 Point with Diagnostics Assembly B
 - Instance ID = 0x801C (32,796)
 - Size = 200 bytes

Table 128. Diagnostic Assembly Instance - 32,796

Name	Data Type	Size in Bytes
ChannelMode04	SINT	1
ChannelMode05	SINT	1
ChannelMode06	SINT	1
ChannelMode07	SINT	1
Pad	INT	4
Ch04	See Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch05	See Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch06	See Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch07	See Diagnostic Digital with Diagnostics Channel (Configurable)	48

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 129. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	

Table 129. Diagnostic Assembly Instance - 769 (continued)

Name	Data Type	Size in Bytes
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Configurable)

- Size = 48 bytes

Table 130. Structure for Diagnostic Digital with Diagnostics Channel (Configurable)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
SSVShortCircuit	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	

Table 130. Structure for Diagnostic Digital with Diagnostics Channel (Configurable) (continued)

Name	Data Type	Size in Bytes
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
Pad1	SINT	1
Pad2	SINT	1
Pad3	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8
SSVShortCircuitTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 131. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection.

Table 131. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> • 0 = No diagnostics are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds • uuu = microseconds • nnn = nanoseconds • UTC-00:00 = Time zone

Table 131. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> 0 = No Load condition does not exist 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	A valid time or None if there is no recorded event time.

Table 131. Definitions for Diagnostic Assembly Parameters (continued)

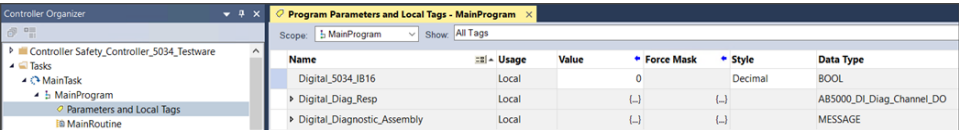
Name	Data Type	Definition	Valid Values
			Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
SSVShortCircuit		Indicates whether an SSV short circuit or overcurrent fault is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
SSVShortCircuitTimestamp	LINT	Indicates the time of the last SSV short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647

Table 131. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

- 1. Create MESSAGE type user tags for each request.
- 2. Create associated response user tags for each new user-defined diagnostic assembly type.
- 3. Add the user tags to your ladder program.



- 4. Expand the message tag to open the message configuration dialog.
- 5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 32,795 (801b) Diagnostic Digital Configurable 8 Point with Diagnostics Assembly A
 - 32,796 (801c) Diagnostic Digital Configurable 8 Point with Diagnostics Assembly B
 - 769 (301c) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
- 6. On the Communication tab, select the path to the module that you wish to send the messages to.
- 7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-UB8F and 5034-UB8FXT Details

5034-UB8F and 5034-UB8FXT Fast Digital 8 Input/Output Modules

Figure 143. 5034-UB8F and 5034-UB8FXT Wiring Diagram – Output Mode

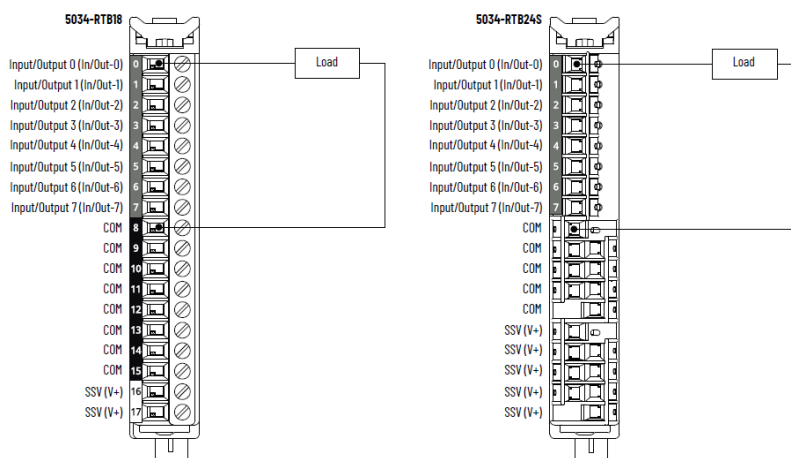
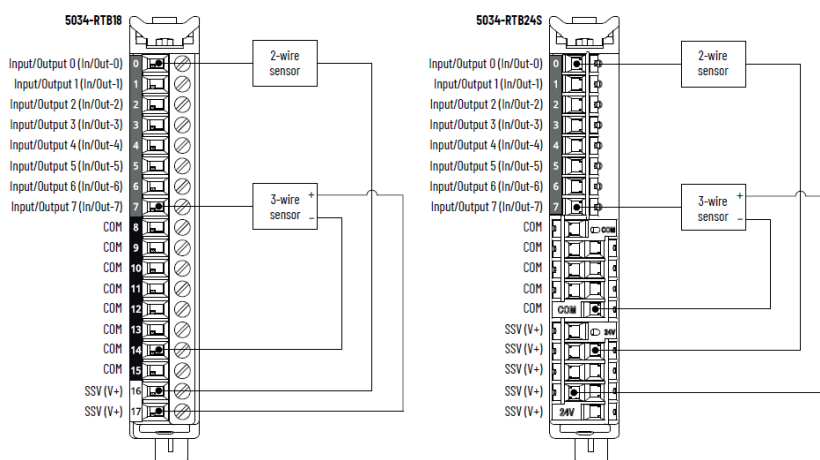


Figure 144. 5034-UB8F and 5034-UB8FXT Wiring Diagram – Input Mode



To establish more COM/V+ connections, especially in a mixed input/output configuration, use a 5034-RTB24S, or install a 5034-MBPTM or 5034-MBPTMXT next to the module.

Use SSV (V+) only for powering sensors that are interfaced with a point that is configured as a digital input mode.

Figure 145. 5034-UB8F and 5034-UB8FXT Functional Block Diagram

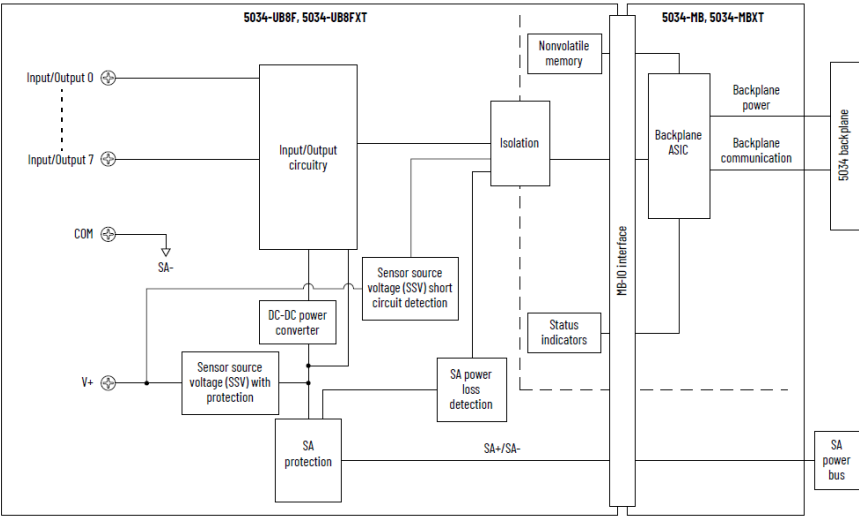


Table 132. Technical Specifications - 5034-UB8F, 5034-UB8FXT - Input

Attribute	5034-UB8F, 5034-UB8FXT
On-state voltage range	10...30V DC
On-state current, min	2 mA
On-state current, nom	4.5 mA
On-state current, max	5 mA
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input impedance, min	2 kΩ @ 10V DC
Input impedance, nom	5.3 kΩ @ 24V DC
Input impedance, max	15 kΩ @ 30V DC
Input delay time (screw to backplane), max	40 μs
Off-to-On	
On-to-Off	
Input pulse width, min	10 μs
Off-to-On	
On-to-Off	
Input filter time	0 μs (Default), 5 μs, 10 μs, 20 μs, 50 μs, 100 μs, 200 μs, 500 μs, 1 ms, 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Off-to-On	
On-to-Off	

Table 132. Technical Specifications - 5034-UB8F, 5034-UB8FXT - Input (continued)

Attribute	5034-UB8F, 5034-UB8FXT
Simple counters, counter frequency	0...f _{max} = 50,000 Hz
Per point timestamp of inputs (sequence of events)	Yes, ±10 µs accuracy
FIFO timestamp of inputs (sequence of events)	Yes
Events	Yes

Table 133. Technical Specifications - 5034-UB8F, 5034-UB8FXT - Output

Attribute	5034-UB8F, 5034-UB8FXT
On-state voltage range	10...30V DC
On-state voltage drop, max	0.25V DC
On-state current per point, min	1.0 mA
Off-state voltage, max	5V DC with 1 mA min load
Off-state leakage current per point, max ⁽¹⁾	0.5 mA
Output current rating per point, max	0.5 A
Output current rating per module, max	4 A
Surge current per point, max	1.2 A for 10 ms, repeatable every 3 s
Inductive load allowed, max	1.2 H
Output clamping voltage for inductive load when turn off	(SA voltage + VCL)...0 VCL value: Minimum is -63V, Typical is -55V, Maximum is -49V For more information, see the PointMax Digital I/O Modules User Manual, publication 5034-UM002 .
Output delay time (backplane to screw), max Off-to-On On-to-Off	20 µs @ 0.5 A
Pulse width, min	20 µs
Scheduled outputs	Supported, accuracy ±10 µs
PWM/PTO support	Yes

Table 133. Technical Specifications - 5034-UB8F, 5034-UB8FXT - Output (continued)

Attribute	5034-UB8F, 5034-UB8FXT
	<p>Maximum switching frequency: 100 kHz (10 μs period)</p> <p>Minimum switching frequency: 0.033 Hz (30 s period)</p> <p>Minimum pulse width: 5 μs</p> <p>Maximum load current (resistive type) per point:</p> <ul style="list-style-type: none"> 200 mA for $F_{SW} \leq 10$ kHz 100 mA for $10 \text{ kHz} < F_{SW} \leq 25$ kHz 40 mA for $25 \text{ kHz} < F_{SW} \leq 100$ kHz <p>Where F_{SW} is the switching frequency</p>
Logic controlled output support	Yes
Triggered pulse output support	Yes
Open load detection diagnostics	Not supported
Output short circuit/overload detection	Yes
Output short circuit/overload protection	Yes
Pilot duty rating	1.2 A inrush current, 0.5 A rated current, DC-14
Output states in program mode per point	<p>Hold Last State</p> <p>On</p> <p>Off (Default)</p> <p>Local Control</p>
Output states in communication fault mode per point	<p>Hold Last State</p> <p>On</p> <p>Off (Default)</p> <p>Local Control</p>
Duration of communication fault mode per point	<p>1 s</p> <p>2 s</p> <p>5 s</p> <p>10 s</p> <p>Forever (Default)</p>
Output final state after communication fault mode per point	<p>On</p> <p>Off (Default)</p>

Table 133. Technical Specifications - 5034-UB8F, 5034-UB8FXT - Output (continued)

Attribute	5034-UB8F, 5034-UB8FXT
(1) Recommended Loading Resistor - To limit the effects of leakage current through solid-state outputs, you can connect a loading resistor in parallel with your load. For 24V DC operation, use a 5.6 kΩ, 0.5 W resistor for transistor operation.	

Table 134. General Specifications - 5034-UB8F, 5034-UB8FXT

Attribute	5034-UB8F, 5034-UB8FXT
Number of inputs/outputs	8 channels, configurable, sinking input, sourcing output
SA power voltage, nom	24V DC
SA power voltage range	10...30V DC
SA power current, nom	4.1 A
SA power current, max	4.2 A
SA power current at no load	14.3 mA
SA reverse polarity protection	Yes
SSV voltage range	Follow SA supply
SSV current, max	0.8 A
SSV short-circuit detection	Yes
Power dissipation, max ⁽¹⁾	1.43 W
Thermal dissipation, max ⁽¹⁾	4.87 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and input/output ports No isolation between individual input/output ports
RIUP support	Yes
CIP Sync	Slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 5, 8
RTB supported	5034-RTB18, 5034-RTB18S, 5034-RTB24S
Wiring category ⁽²⁾	2 - Signal ports 2 - Power ports

Table 134. General Specifications - 5034-UB8F, 5034-UB8FXT (continued)

Attribute	5034-UB8F, 5034-UB8FXT
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	45.0 g (1.59 oz.) - 5034-UB8F 47.0 g (1.66 oz.) - 5034-UB8FXT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Value is measured at 60 °C (140 °F). Power dissipation varies with temperature.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

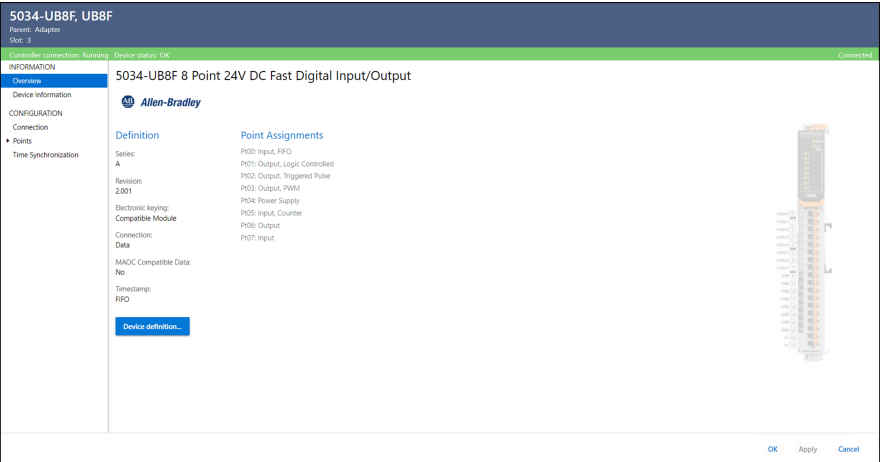
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 146. Overview View Example



The Overview view includes these parameters:

Parameter	Description
Series	Displays the series of the device.
Revision	Displays the revision of the device.
Electronic Keying	Displays the electronic keying that is used for the device.
Connection	Displays the connection type and the communication format.
MAOC Compatible Data	<p>Specifies whether the data is compatible with Motion Arm Output Cam (MAOC) instruction.</p> <p>If the data is not compatible with MAOC, you cannot use this module with MAOC instruction.</p> <p>Some point assignment options are not available when Yes is selected.</p>
Timestamp	<p>Specifies how the timestamp information is saved and reported for the digital input events.</p> <ul style="list-style-type: none">Per Point – Enables timestamping for the points configured as Digital Input, Timestamp only. Records timestamps for up to 2 input transitions per point, one for Off-to-On transition and another for On-to-Off transition. These timestamps are reported in Input tag on a per point basis. <p>This option is only available when MAOC Compatible Data is set to No.</p> <ul style="list-style-type: none">FIFO – Enables timestamping for the points configured as Digital Input, FIFO only. Records timestamps for multiple input points in onboard buffer for up to 256 timestamp events. Events are recorded and retrieved in order (first-in, first

Parameter	Description
	out), allowing precise tracking of multiple fast transitions. This option is only available if any of the following conditions are true: <ul style="list-style-type: none">- The Connection is configured as Data or Listen Only Data.- The MAOC Compatible Data is set to No. <ul style="list-style-type: none">• None - Disables timestamping. The module does not record timestamps for input points in Data connection. This option is only available when MAOC Compatible Data is set to Yes.
Points Assignments	Displays the operating mode that is assigned for each point.
Device Definition	Opens Device definition dialog to change the revision, electronic keying, point mode, and other device-specific values.

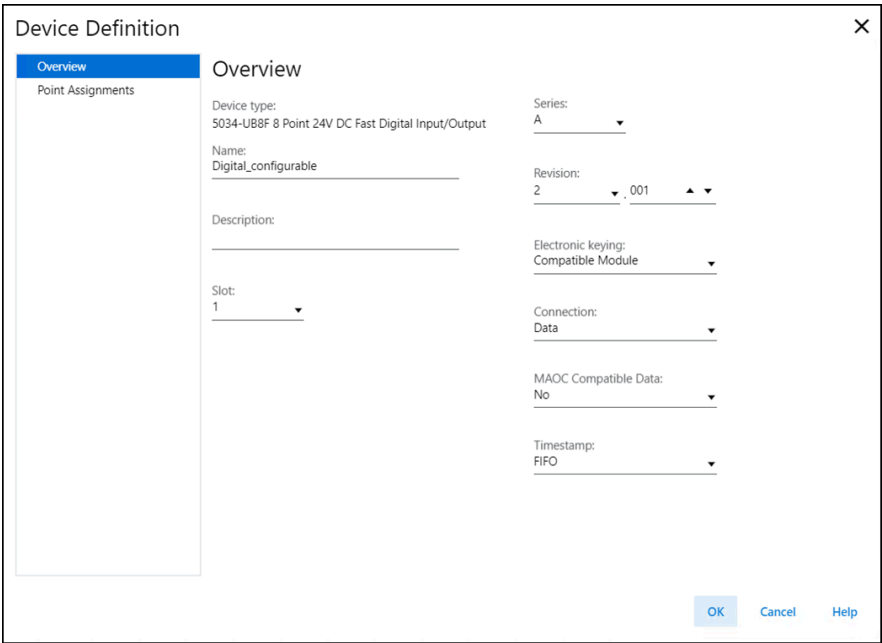
Device Definition

This section shows definitions for specific configurations that are chosen in the Device Definition dialog.

To change the definition of a device, select Device definition in the Overview view.

Device Definition Overview

Figure 147. Device Definition Overview Example



Overview includes these parameters:

Table 135. Overview Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs.	<ul style="list-style-type: none"> Exact Match Compatible Module Disable Keying

Table 135. Overview Parameters (continued)

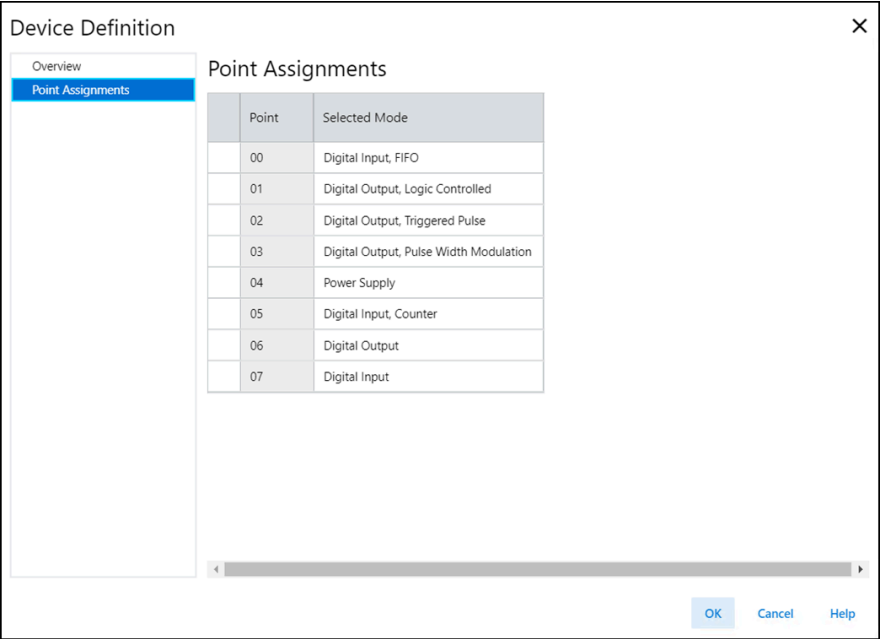
Parameter	Definition	Available Choices
	For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	 <p>ATTENTION: Be extremely cautious when using Disable Keying; if used incorrectly, this option can lead to personal injury or death, property damage, or economic loss.</p> <p>We strongly suggest that you do not use Disable Keying.</p> <p>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.</p>
Connection	<p>Specify the type of data transferred between the device and controller.</p> <p>For the Listen Only choice, the controller and device establish communication without the controller sending any configuration or output data to the device. A full input data connection is established but depends on the connection between the owner-controller and the device.</p>	<ul style="list-style-type: none"> • Data • Listen Only Data • Data with Events • Listen Only Data with Events
Timestamp	Specifies how the timestamp information is saved and reported for the digital input events.	<ul style="list-style-type: none"> • Per Point – Enables timestamping for the points configured as Digital Input, Timestamp only. Records timestamps for up to 2 input transitions per point, one for Off-to-On transition and another for On-to-Off transition. These timestamps are reported in Input tag on a per point basis. This option is only available when MAOC Compatible Data is set to No. • FIFO – Enables timestamping for the points configured as Digital Input, FIFO only. Records timestamps for multiple input points in onboard buffer for up to 256 timestamp events. Events are recorded and retrieved in order (first-in, first out), allowing precise tracking of multiple fast transitions.

Table 135. Overview Parameters (continued)

Parameter	Definition	Available Choices
		<p>This option is only available if any of the following conditions are true:</p> <ul style="list-style-type: none"> - The Connection is configured as Data or Listen Only Data. - The MAOC Compatible Data is set to No. <ul style="list-style-type: none"> • None – Disables timestamping. The module does not record timestamps for input points in Data connection. <p>This option is only available when MAOC Compatible Data is set to Yes.</p>
MAOC Compatible Data	<p>Specifies whether the data is compatible with Motion Arm Output Cam (MAOC) instruction.</p> <p>If the data is not compatible with MAOC, you cannot use this module with MAOC instruction.</p> <p>Some point assignment options are not available when Yes is selected.</p>	<ul style="list-style-type: none"> • No • Yes

Define Point Assignments

Figure 148. Define Point Assignment Example



Define Output Assignments includes these parameters:

Table 136. Define Output Assignments - Parameters

Parameter	Definition	Available Choices
Point	Indicates the point to which this configuration applies.	0...7
Selected Mode	Defines the mode in which the output operates.	<p>When MAOC Compatible Data is set to No and Timestamp is configured as Per Point:</p> <ul style="list-style-type: none">• Disabled• Digital Input• Digital Input, Counter• Digital Input, Timestamp• Digital Output• Digital Output, Logic Controlled• Digital Output, Pulse Width Modulation• Digital Output, Scheduled• Digital Output, Scheduled, Pulse Width Modulation• Digital Output, Triggered Pulse• Power Supply <p>When MAOC Compatible Data is set to No and Timestamp is configured as FIFO:</p> <ul style="list-style-type: none">• Disabled• Digital Input• Digital Input, Counter• Digital Input, FIFO• Digital Output• Digital Output, Logic Controlled• Digital Output, Pulse Width Modulation• Digital Output, Triggered Pulse• Power Supply <p>When MAOC Compatible Data is configured as Yes:</p> <ul style="list-style-type: none">• Disabled• Digital Input• Digital Output, Scheduled• Power Supply

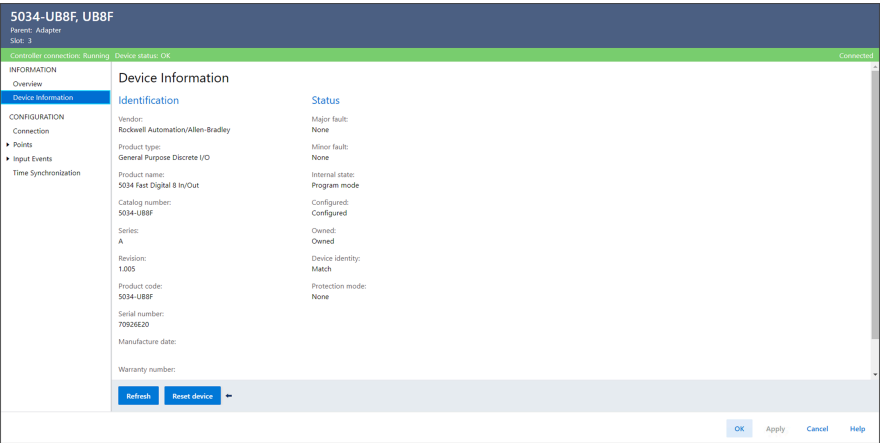
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

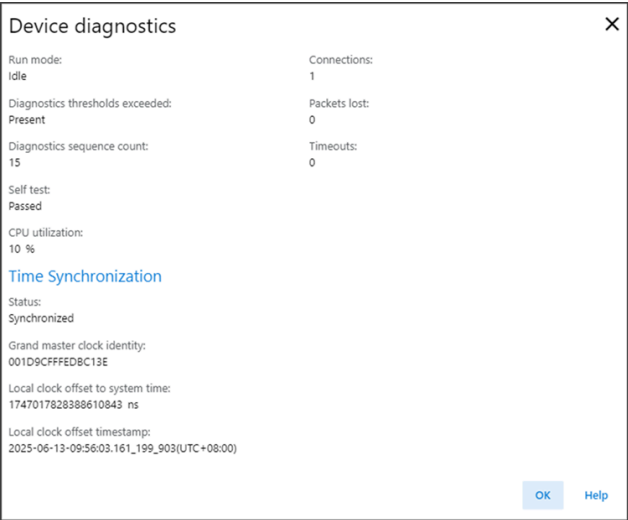
Figure 149. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 150. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

- Set the RPI rate. For more information, see [Requested Packet Interval on page 24](#).
- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



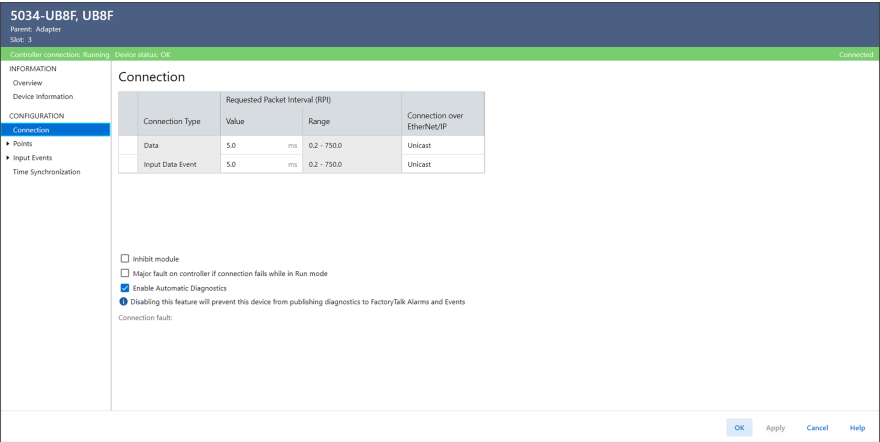
If there is a connection fault, the Connection Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

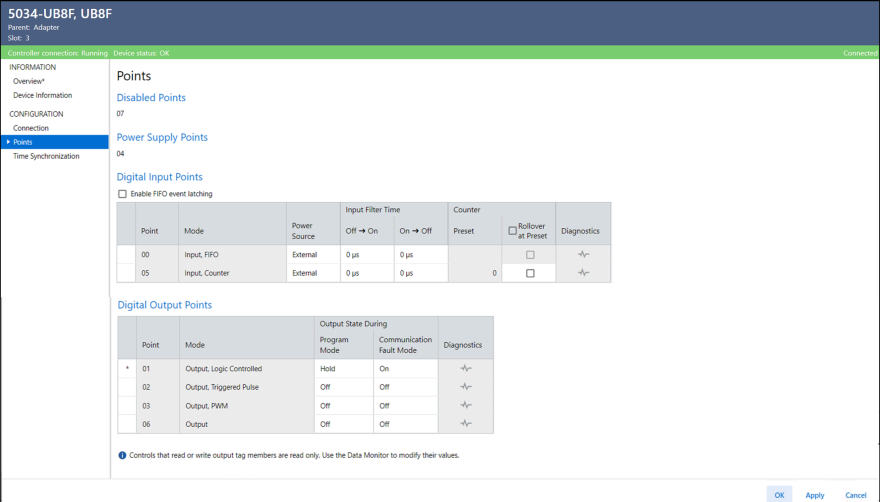
Figure 151. Connection View Example



Points View

Use Points to view or configure the points for the device.

Figure 152. Points View Example



The Points view includes these parameters for Disabled Points:

Parameter	Description
Disabled Points	Displays the points that have been disabled.

The **Points** view includes these parameters for Power Supply Points:

Parameter	Description
Power Supply Points	Displays the points that are configured as Power Supply.

The Points view includes these parameters for Digital Input Points:

Parameter	Description
Enable FIFO event latching	Determines whether the FIFO event latching is enabled. NOTE: This parameter is only available when input point is configured as Digital Input, FIFO.
Point	Displays the point number to which this configuration applies.
Mode	Displays the mode for the point.
Power Source	Defines the power source for the point. <ul style="list-style-type: none">Ptxx – Power is supplied to the sensor from point xx of this module, which is configured to function as a power supply. If a short circuit is detected on the Power Supply point, the fault is rolled-up to the Digital Input point.External – Power is supplied to the sensor from an external power supply.

Parameter	Description
	<ul style="list-style-type: none"> SSV – Power is supplied to the sensor from the SSV terminal of this module. <p>If an SSV short circuit is detected, the fault is rolled-up to the Digital Input point.</p>
Input Filter Time Off → On	Defines how long an Off to On input transition must remain in the On state before the device considers the transition valid.
Input Filter Time On → Off	Defines how long an On to Off input transition must remain in the Off state before the device considers the transition valid.
Counter Preset	Displays the value, set in the output tag Preset, to use for counter preset. The value can range from 0...2,147,483,647.
Counter Rollover at Preset	<p>Determines the action that is taken when the input tag Count reaches the output tag Preset value.</p> <ul style="list-style-type: none"> If selected, the counter counts to the Preset value, rolls over to zero, and then sets the Rollover bit. The Done bit is not set. If cleared, the counter counts to the Preset value and sets the Done bit, then continues counting up to the maximum DINT value. The Rollover is set when Count transitions from 2,147,483,647 to 0.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

The Points view includes these parameters for Digital Output Points:

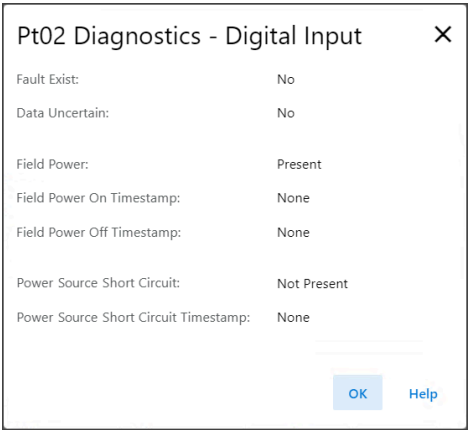
Parameter	Description
Point	Displays the point number to which this configuration applies.
Mode	Displays the mode for the point.
Output State During Program Mode	<p>Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows:</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the last state. Local Control – Output continues to operate as configured for this point.

Parameter	Description
	<p>NOTE: Local Control option is only available for the output points that are controlled by local events. For example, Digital Output, Logic Controlled and Digital Output, Triggered Pulse.</p>
Output State During Communication Fault Mode	<p>Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode.</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the current level. Local Control – Output continues to operate as configured for this point. <p>NOTE: Local Control option is only available for the output points that are controlled by local events. For example, Digital Output, Logic Controlled and Digital Output, Triggered Pulse.</p>
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

Ptxx Diagnostics

To view the Ptxx diagnostics, select Diagnostics in the Points or Ptxx view.

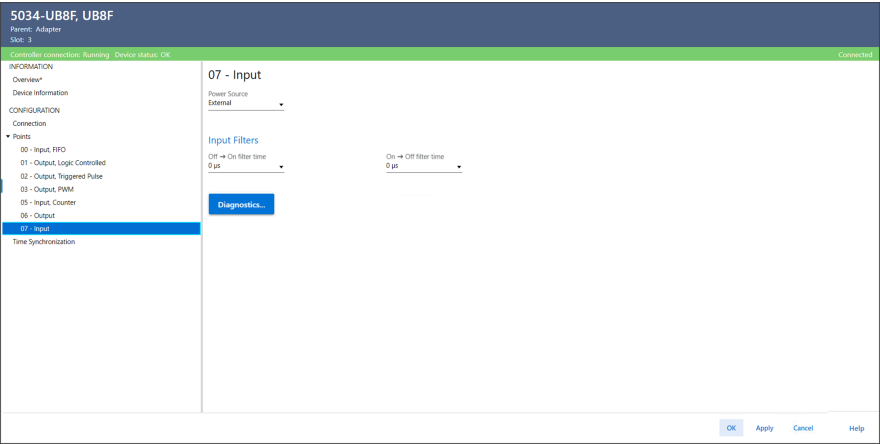
Figure 153. Ptxx Diagnostics Example



XX – Input View

Use XX – Input to view or configure the points for the device.

Figure 154. XX – Input View Example



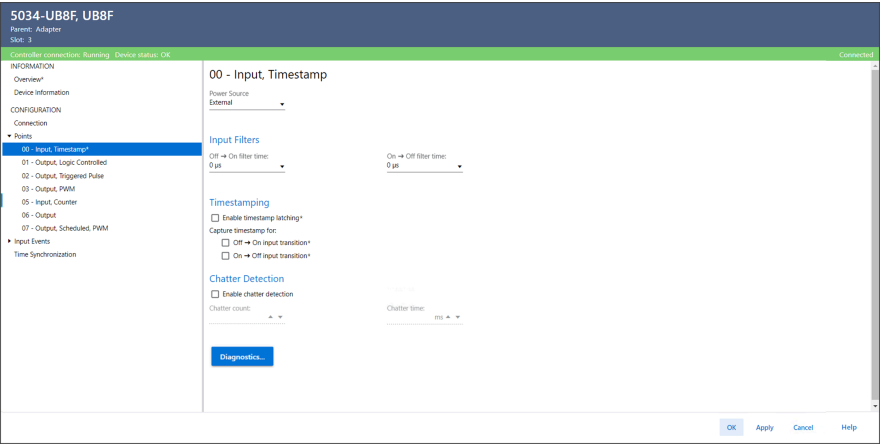
The XX – Input view includes these parameters:

Parameter	Description
Power Source	<p>Defines the power source for the point.</p> <ul style="list-style-type: none">• Ptxx – Power is supplied to the sensor from point xx of this module, which is configured to function as a power supply.• If a short circuit is detected on the Power Supply point, the fault is rolled-up to the Digital Input point.• External – Power is supplied to the sensor from an external power supply.• SSV – Power is supplied to the sensor from the SSV terminal of this module.• If an SSV short circuit is detected, the fault is rolled-up to the Digital Input point.
Input Filters Off → On Filter Time	<p>Defines how long an Off to On input transition must remain in the On state before the device considers the transition valid.</p>
Input Filters On → Off Filter Time	<p>Defines how long an On to Off input transition must remain in the Off state before the device considers the transition valid.</p>
Diagnostics	<p>Opens the Diagnostics dialog, which contains diagnostic information.</p>

XX – Input, Timestamp View

Use XX – Input, Timestamp to view or configure the points for the device.

Figure 155. XX – Input, Timestamp View Example



The XX – Input, Timestamp view includes these parameters:

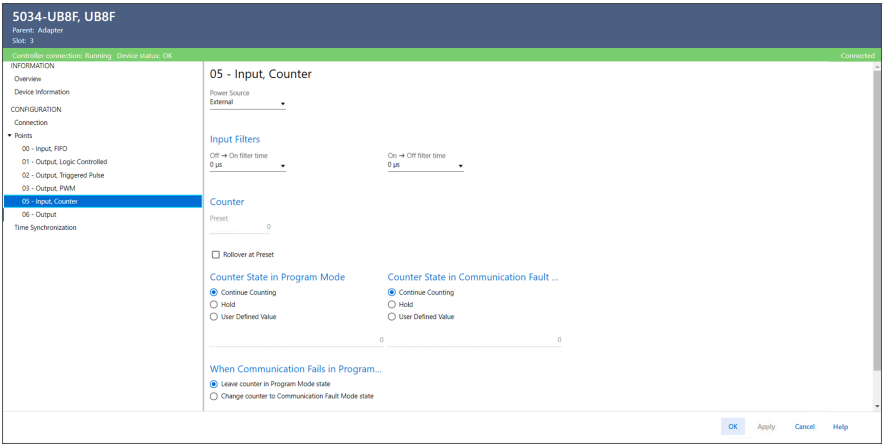
Parameter	Description
Power Source	<p>Defines the power source for the point.</p> <ul style="list-style-type: none">Ptxx – Power is supplied to the sensor from point xx of this module, which is configured to function as a power supply. <p>If a short circuit is detected on the Power Supply point, the fault is rolled-up to the Digital Input point.</p> <ul style="list-style-type: none">External – Power is supplied to the sensor from an external power supply.SSV – Power is supplied to the sensor from the SSV terminal of this module. <p>If an SSV short circuit is detected, the fault is rolled-up to the Digital Input point.</p>
Input Filters Off → On Filter Time	<p>Defines how long an Off to On input transition must remain in the On state before the device considers the transition valid.</p>
Input Filters On → Off Filter Time	<p>Defines how long an On to Off input transition must remain in the Off state before the device considers the transition valid.</p>
Enable Timestamp Latching	<p>Determines whether timestamps are latched.</p> <ul style="list-style-type: none">When enabled, the device timestamps are not overwritten until acknowledged.When disabled, the device timestamps may be overwritten.
Capture Timestamp for Off → On Input Transition	<p>Determines whether a timestamp is recorded for the Off to On input transition.</p>

Parameter	Description
Capture Timestamp for On → Off Input Transition	Determines whether a timestamp is recorded for the On to Off input transition.
Enable Chatter Detection	<p>Sets chatter detection. When enabled, chatter from a device that is connected to one of its inputs (for example, rapid transitions from a failed contact) is ignored.</p> <p>Chatter can cause the device to timestamp invalid input transitions. Typically, chattering signals cause inputs to transition falsely many times in a relatively short period of time.</p>
Chatter Count	<p>Determines the number of acceptable input transitions that can occur in a given time period before considering the input to be chatter.</p> <p>Valid values are 2...127.</p>
Chatter Time	Determines the amount of time, from 1...10,000 milliseconds, within which the number of input transitions are counted.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Input, Counter View

Use XX – Input, Counter to view or configure the points for the device.

Figure 156. XX – Input, Counter View Example



The XX – Input, Counter view includes these parameters:

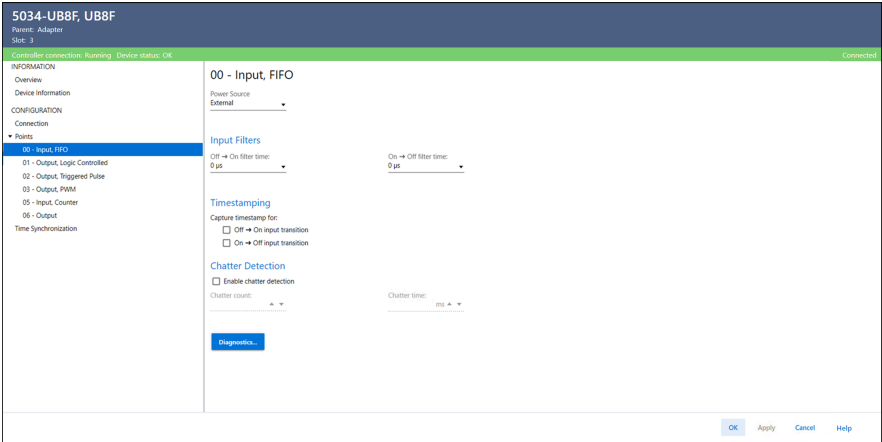
Parameter	Description
Power Source	<p>Defines the power source for the point.</p> <ul style="list-style-type: none"> Ptxx – Power is supplied to the sensor from point xx of this module, which is configured to function as a power supply. <p>If a short circuit is detected on the Power Supply point, the fault is rolled-up to the Digital Input point.</p> <ul style="list-style-type: none"> External – Power is supplied to the sensor from an external power supply. SSV – Power is supplied to the sensor from the SSV terminal of this module. <p>If an SSV short circuit is detected, the fault is rolled-up to the Digital Input point.</p>
Input Filters Off → On Filter Time	<p>Defines how long an Off to On input transition must remain in the On state before the device considers the transition valid.</p>
Input Filters On → Off Filter Time	<p>Defines how long an On to Off input transition must remain in the Off state before the device considers the transition valid.</p>
Counter Preset	<p>Displays the value, set in the output tag Preset, to use for counter preset. The value can range from 0...2,147,483,647.</p>
Counter Rollover at Preset	<p>Determines the action that is taken when the input tag Count reaches the output tag Preset value.</p> <ul style="list-style-type: none"> If selected, the counter counts to the Preset value, rolls over to zero, and then sets the Rollover bit. The Done bit is not set. If cleared, the counter counts to the Preset value and sets the Done bit, then continues counting up to the maximum DINT value. The Rollover is set when Count transitions from 2,147,483,647 to 0.
Counter State in Program Mode	<p>Determines the behavior of each counter when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, the counter behaves as follows:</p> <ul style="list-style-type: none"> Continue counting Hold – Retain the last count and resume counting from this count when the controller transitions to Run Mode. User-defined value – Set the count to the user-defined value and resume counting from this value when the controller transitions to Run Mode.

Parameter	Description
Counter State in Program Mode User-defined Value	Defines the value that is set to count when Counter State in Program Mode is selected as User-defined value.
Counter State in Communication Fault Mode	<p>Determines what happens to the counter after a communication fault occurs and the module enters Communication Fault Mode.</p> <ul style="list-style-type: none"> Continue counting Hold - Retain the last count and resume counting from this count when the controller transitions to Run Mode. User-defined value - Set the count to the user-defined value and resume counting from this value when the controller transitions to Run Mode.
Counter State in Communication Fault Mode User-defined Value	Defines the value that is set to count when Counter State in Communication Fault Mode is selected as User-defined value.
Counter State When Communication Fails in Program Mode	<p>Determines the counter action if communication fails in Program Mode.</p> <ul style="list-style-type: none"> Program Mode - Follow the behavior for Program Mode. Communication Fault Mode - Follow the behavior for Communication Fault Mode.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX - Input, FIFO View

Use XX - Input, FIFO to view or configure the points for the device.

Figure 157. XX - Input, FIFO View Example



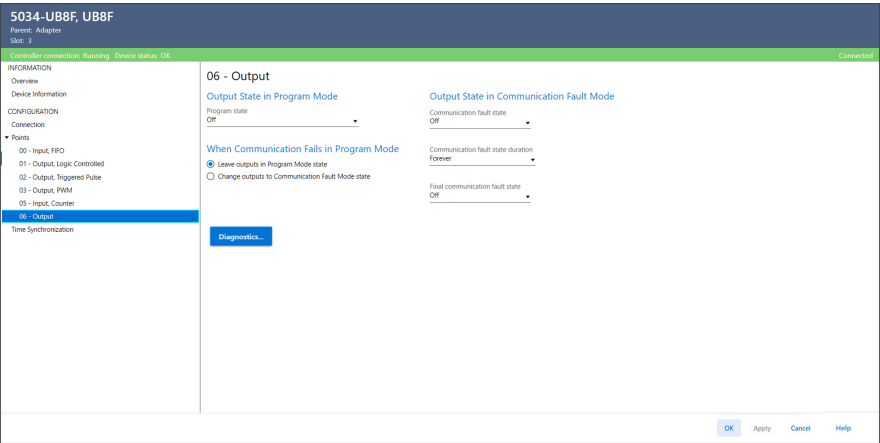
The XX - Input, FIFO view includes these parameters:

Parameter	Description
Power Source	<p>Defines the power source for the point.</p> <ul style="list-style-type: none"> Ptxx – Power is supplied to the sensor from point xx of this module, which is configured to function as a power supply. <p>If a short circuit is detected on the Power Supply point, the fault is rolled-up to the Digital Input point.</p> <ul style="list-style-type: none"> External – Power is supplied to the sensor from an external power supply. SSV – Power is supplied to the sensor from the SSV terminal of this module. <p>If an SSV short circuit is detected, the fault is rolled-up to the Digital Input point.</p>
Input Filters Off → On Filter Time	Defines how long an Off to On input transition must remain in the On state before the device considers the transition valid.
Input Filters On → Off Filter Time	Defines how long an On to Off input transition must remain in the Off state before the device considers the transition valid.
Capture Timestamp for Off → On Input Transition	Determines whether a timestamp is recorded for the Off to On input transition.
Capture Timestamp for On → Off Input Transition	Determines whether a timestamp is recorded for the On to Off input transition.
Enable Chatter Detection	<p>Sets chatter detection. When enabled, chatter from a device that is connected to one of its inputs (for example, rapid transitions from a failed contact) is ignored.</p> <p>Chatter can cause the device to timestamp invalid input transitions. Typically, chattering signals cause inputs to transition falsely many times in a relatively short period of time.</p>
Chatter Count	<p>Determines the number of acceptable input transitions that can occur in a given time period before considering the input to be chatter.</p> <p>Valid values are 2...127.</p>
Chatter Time	Determines the amount of time, from 1...10,000 milliseconds, within which the number of input transitions are counted.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Output View

Use XX – Output to view or configure the points for the device.

Figure 158. XX – Output View Example



The XX – Output view includes these parameters:

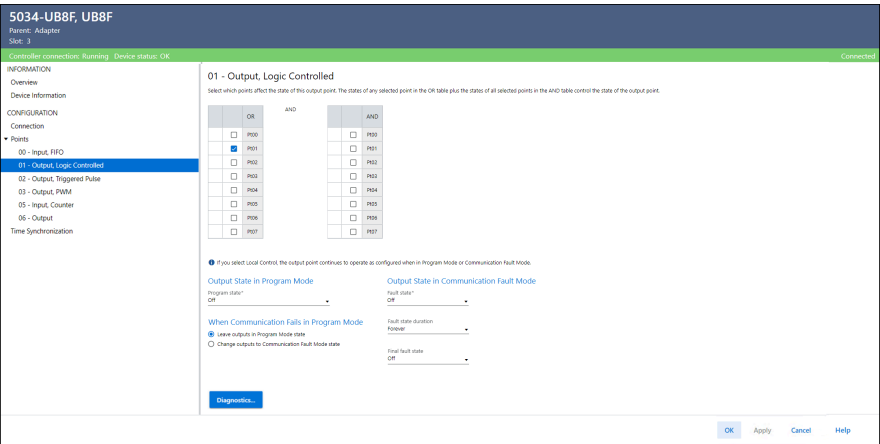
Parameter	Description
Output State in Program Mode Program State	Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows: <ul style="list-style-type: none">Off – Output is 0 or Off.On – Output is 1 or On.Hold – Output maintains the last state.
Output State in Communication Fault Mode Communication Fault State	Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode. <ul style="list-style-type: none">Off – Output is 0 or Off.On – Output is 1 or On.Hold – Output maintains the current level.
Output State in Communication Fault Mode Communication Fault State Duration	Determines the length of time the Communication Fault Mode is held before the Final Fault State.
Output State in Communication Fault Mode Final Communication Fault State	Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off. If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.

Parameter	Description
Output State When Communication Fails in Program Mode	Determines the output action if communication fails in Program Mode. <ul style="list-style-type: none">Program Mode - Indicates leaving outputs in Program Mode state.Communication Fault Mode - Indicates changing outputs to Communication Fault Mode state.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Output, Logic Controlled View

Use XX – Output, Logic Controlled to view or configure the points for the device.

Figure 159. XX – Output, Logic Controlled View Example



The XX – Output, Logic Controlled view includes these parameters:

Parameter	Description
OR	<p>Specifies whether Ptxx.Data participates in the OR logic calculation.</p> <p>Select which points affect the state of this output point. The state of the output point is determined by the logical OR of the selected points in the OR table, combined with logical AND of the selected points in the AND table.</p> <p>You can select multiple points, each configured in one of the following modes, to participate in the logic calculation:</p> <ul style="list-style-type: none">Digital InputDigital Input, TimestampDigital Input, FIFODigital OutputDigital Output, Logic Controlled

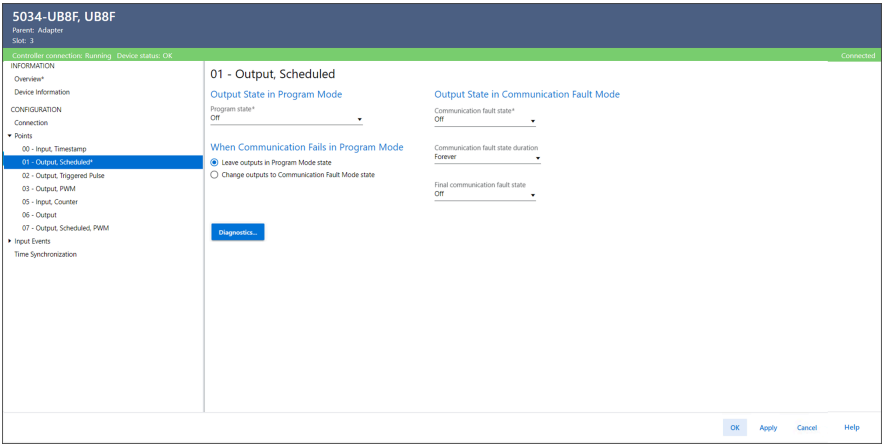
Parameter	Description
	<ul style="list-style-type: none"> Digital Output, Triggered Pulse Digital Output, Scheduled
AND	<p>Specifies whether Ptxx.Data participates in the AND logic calculation.</p> <p>Select which points affect the state of this output point. The state of the output point is determined by the logical OR of the selected points in the OR table, combined with logical AND of the selected points in the AND table.</p> <p>You can select multiple points, each configured in one of the following modes, to participate in the logic calculation:</p> <ul style="list-style-type: none"> Digital Input Digital Input, Timestamp Digital Input, FIFO Digital Output Digital Output, Logic Controlled Digital Output, Triggered Pulse Digital Output, Scheduled
Output State in Program Mode Program State	<p>Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows:</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the last state. Local Control – Output continues to operate as configured for this point.
Output State in Communication Fault Mode Communication Fault State	<p>Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode.</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the last state. Local Control – Output continues to operate as configured for this point.
Output State in Communication Fault Mode Communication Fault State Duration	<p>Determines the length of time the Communication Fault Mode is held before the Final Fault State.</p>

Parameter	Description
Output State in Communication Fault Mode Final Communication Fault State	Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off. If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.
Output State When Communication Fails in Program Mode	Determines the output action if communication fails in Program Mode. <ul style="list-style-type: none">• Leave Outputs in Program Mode State - Indicates leaving outputs in Program Mode state.• Change Outputs to Communication Fault Mode State - Indicates changing outputs to Communication Fault Mode state.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Output, Scheduled View

Use XX – Output, Scheduled to view or configure the points for the device.

Figure 160. XX – Output, Scheduled View Example



The XX – Output, Scheduled view includes these parameters:

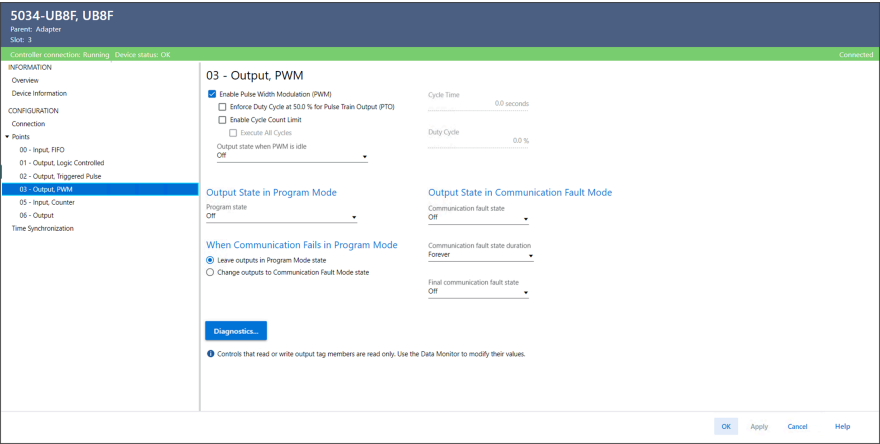
Parameter	Description
Output State in Program Mode Program State	Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from

Parameter	Description
	<p>the controller are ignored and the output behaves as follows:</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the last state.
Output State in Communication Fault Mode Communication Fault State	<p>Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode.</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Hold – Output maintains the current level.
Output State in Communication Fault Mode Communication Fault State Duration	<p>Determines the length of time the Communication Fault Mode is held before the Final Fault State.</p>
Output State in Communication Fault Mode Final Communication Fault State	<p>Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off.</p> <p>If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.</p>
Output State When Communication Fails in Program Mode	<p>Determines the output action if communication fails in Program Mode.</p> <ul style="list-style-type: none"> Program Mode – Indicates leaving outputs in Program Mode state. Communication Fault Mode – Indicates changing outputs to Communication Fault Mode state.
Diagnostics	<p>Opens the Diagnostics dialog, which contains diagnostic information.</p>

XX – Output, PWM View

Use XX – Output, PWM to view or configure the points for the device.

Figure 161. XX – Output, PWM View Example



The XX – Output, PWM view includes these parameters:

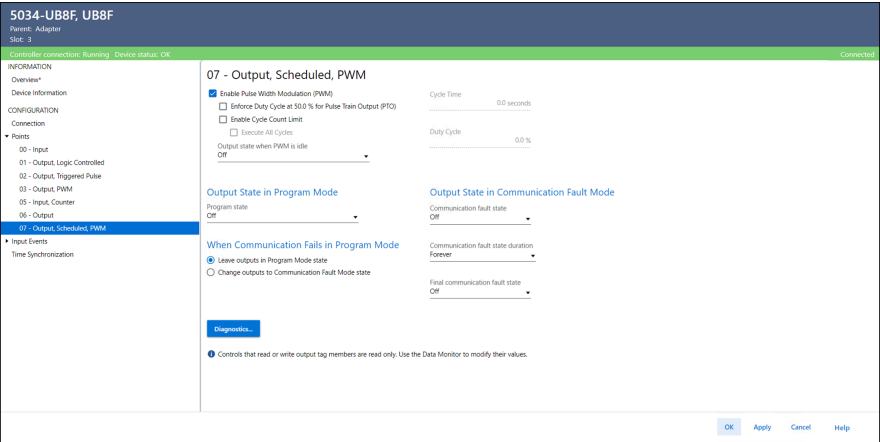
Parameter	Description
Enable Pulse Width Modulation (PWM)	Determines whether the output is Pulse Width Modulation or Digital Output.
Enforce Duty Cycle at 50.0% for Pulse Train Output (PTO)	Determines whether to enforce the PTO specific duty cycle, which is fixed at 50%. If enabled, <i>O.Pwmxx.DutyCycle</i> is ignored.
Enable Cycle Count Limit	Determines whether to generate a defined number of pulse cycles when there is a rising edge in the data or continuous pulse cycles when data is On. <ul style="list-style-type: none">0 = Pulse cycles continue to occur until <i>O.Ptxx.Data</i> is set to 0.1 = Allow only a fixed number of pulse cycles to occur when there is a rising edge in <i>O.Ptxx.Data</i>.
Execute All Cycles	Only applicable when Enable Cycle Count Limit is enabled. When <i>O.Ptxx.Data</i> transitions to 0: <ul style="list-style-type: none">0 = Stop generating pulses immediately1 = Continue generating pules until the Pulse Cycle Limit is reached
Output State when PWM is Idle	Determines the state of the output when PWM is idle. <ul style="list-style-type: none">0 = When PWM is idle, the output is Off. It also means that when PWM is running, the active state per <i>O.Pwmxx.DutyCycle</i> is the output in On state.1 = When PWM is idle, the output is On. It also means that when PWM is running, the active state per <i>O.Pwmxx.DutyCycle</i> is the output in Off state.
Cycle Time	Displays the period in seconds of one pulse cycle.

Parameter	Description
Duty Cycle	Displays the percentage of the pulse cycle time when the output is in an active state.
Cycle Count Limit	Displays the number of pulse cycles to generate when there is a rising edge in the data. Only applicable when Enable Cycle Count Limit is enabled.
Output State in Program Mode Program State	Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows: <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On.
Output State in Communication Fault Mode Communication Fault State	Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode. <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On.
Output State in Communication Fault Mode Communication Fault State Duration	Determines the length of time the Communication Fault Mode is held before the Final Fault State.
Output State in Communication Fault Mode Final Communication Fault State	Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off. If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.
Output State When Communication Fails in Program Mode	Determines the output action if communication fails in Program Mode. <ul style="list-style-type: none"> Program Mode – Indicates leaving outputs in Program Mode state. Communication Fault Mode – Indicates changing outputs to Communication Fault Mode state.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Output, Scheduled PWM View

Use XX – Output, Scheduled PWM to view or configure the points for the device.

Figure 162. XX – Output, Scheduled PWM View Example



The XX – Output, Scheduled PWM view includes these parameters:

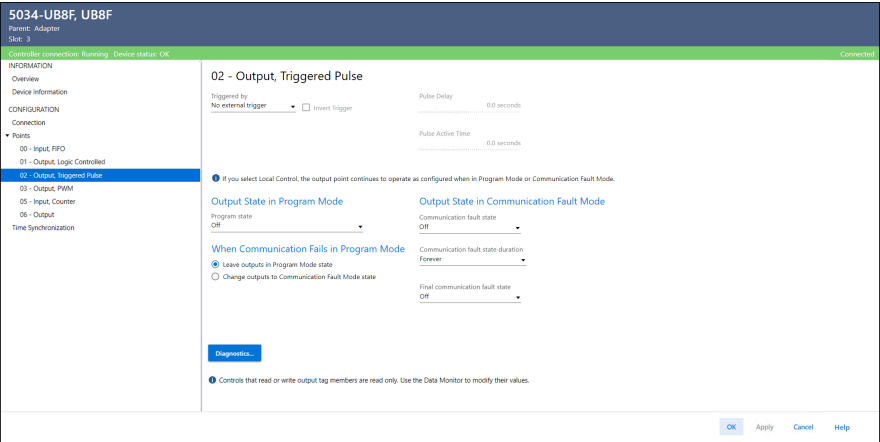
Parameter	Description
Enable Pulse Width Modulation (PWM)	Determines whether the output is Pulse Width Modulation or Digital Output.
Enforce Duty Cycle at 50.0% for Pulse Train Output (PTO)	Determines whether to enforce the PTO specific duty cycle, which is fixed at 50%. If enabled, <i>O.Pwmxx.DutyCycle</i> is ignored.
Enable Cycle Count Limit	Determines whether to generate a defined number of pulse cycles when there is a rising edge in the data or continuous pulse cycles when data is On. <ul style="list-style-type: none">0 = Pulse cycles continue to occur until <i>O.Ptxx.Data</i> is set to 0.1 = Allow only a fixed number of pulse cycles to occur when there is a rising edge in <i>O.Ptxx.Data</i>. <p>NOTE: The Cycle Count Limit is not supported when <i>O.Ptxx.ScheduleEn</i> is 1.</p>
Execute All Cycles	Only applicable when Enable Cycle Count Limit is enabled. When <i>O.Ptxx.Data</i> transitions to 0: <ul style="list-style-type: none">0 = Stop generating pulses immediately1 = Continue generating pules until the Pulse Cycle Limit is reached
Output State when PWM is Idle	Determines the state of the output when PWM is idle. <ul style="list-style-type: none">0 = When PWM is idle, the output is Off. It also means that when PWM is running, the active state per <i>O.Pwmxx.DutyCycle</i> is the output in On state.1 = When PWM is idle, the output is On. It also means that when PWM is running, the active state per <i>O.Pwmxx.DutyCycle</i> is the output in Off state.

Parameter	Description
Cycle Time	Displays the period in seconds of one pulse cycle.
Duty Cycle	Displays the percentage of the pulse cycle time when the output is in an active state.
Cycle Count Limit	Displays the number of pulse cycles to generate when there is a rising edge in the data. Only applicable when Enable Cycle Count Limit is enabled.
Output State in Program Mode Program State	Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows: <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On.
Output State in Communication Fault Mode Communication Fault State	Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode. <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On.
Output State in Communication Fault Mode Communication Fault State Duration	Determines the length of time the Communication Fault Mode is held before the Final Fault State.
Output State in Communication Fault Mode Final Communication Fault State	Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off. If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.
Output State When Communication Fails in Program Mode	Determines the output action if communication fails in Program Mode. <ul style="list-style-type: none"> Program Mode – Indicates leaving outputs in Program Mode state. Communication Fault Mode – Indicates changing outputs to Communication Fault Mode state.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

XX – Output, Triggered Pulse View

Use XX – Output, Triggered Pulse to view or configure the points for the device.

Figure 163. XX – Output, Triggered Pulse View Example



The XX – Output, Triggered Pulse view includes these parameters:

Parameter	Description
Triggered by	<p>Specifies the input that triggers the pulse function.</p> <ul style="list-style-type: none"> No external trigger – No external trigger is selected. However, you can use O.Ptxx.Trigger tag to trigger the pulse. Ptxx – Point xx activates the output pulse. Only points configured with the channel mode "Digital Input", "Digital Input, Timestamp" or "Digital Input, FIFO" are available for selection.
Invert Trigger	<p>This option inverts the trigger edge for the input point selected in the 'Trigger by' parameter.</p> <ul style="list-style-type: none"> 0 = The output pulse is triggered by a rising edge of the input. 1 = The output pulse is triggered by a falling edge of the input.
Pulse Delay	<p>Specifies the delay time in seconds between the trigger event and the start of the output pulse.</p>
Pulse Active Time	<p>Specifies the active duration in seconds for the generated output pulse.</p>
Output State in Program Mode Program State	<p>Determines the behavior of each output when the controller transitions to Program Mode or Inhibit mode. While in Program Mode or Inhibit mode, outputs from the controller are ignored and the output behaves as follows:</p> <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Local Control – Output continues to operate as configured for this point.

Parameter	Description
Output State in Communication Fault Mode Communication Fault State	Determines what happens to the output of each point after a communication fault occurs and the module enters Communication Fault Mode. <ul style="list-style-type: none"> Off – Output is 0 or Off. On – Output is 1 or On. Local Control – Output continues to operate as configured for this point.
Output State in Communication Fault Mode Communication Fault State Duration	Determines the length of time the Communication Fault Mode is held before the Final Fault State.
Output State in Communication Fault Mode Final Communication Fault State	Determines whether the module transitions to On or Off after the Communication Fault Mode Output State Duration elapses. The default final state is Off. If you choose Forever for Duration, you cannot choose a final state. The module retains its current Communication Fault Mode state.
Output State When Communication Fails in Program Mode	Determines the output action if communication fails in Program Mode. <ul style="list-style-type: none"> Leave Outputs in Program Mode State – Indicates leaving outputs in Program Mode state. Change Outputs to Communication Fault Mode State – Indicates changing outputs to Communication Fault Mode state.
Diagnostics	Opens the Diagnostics dialog, which contains diagnostic information.

Input Events View

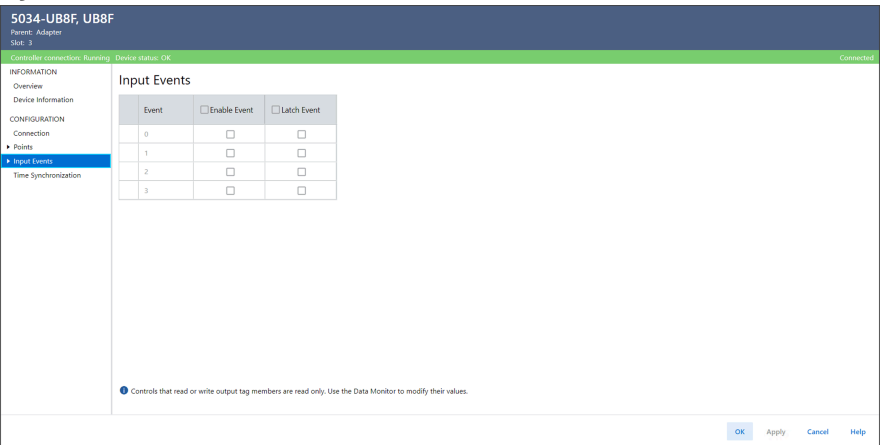
The Input Events view shows an overview of the configuration values for all input events. You can perform certain tasks only when the project is online.

This view is only available when you select the “Data with Events” connection type in the Device definition. See [Device Definition on page 330](#).

IMPORTANT: You cannot configure events on the Input Events view. The parameters that are displayed in this view are read-only.

You must use the Event Output tags to configure an event. For more information, see [Event Output Tag Definitions on page 380](#).

Figure 164. Input Events View Example



The Input Events view include these parameters:

Parameter	Description	Member Name	Value
Event	The event number to which this configuration applies.	—	—
Enable Event	Displays whether the corresponding event trigger is active. Events are triggered when conditions match the event definition.	EO.Eventxx.En	<ul style="list-style-type: none"> 0 = Event trigger definition is not active. 1 = Event trigger definition is active.
Latch Event	Displays whether an event is latched until it is acknowledged.	EO.Eventxx.LatchEvent	<ul style="list-style-type: none"> 0 = Event is not latched. New events overwrite old events. 1 = Event is latched. Events are latched until acknowledged. New events are not reported until the current event is acknowledged. Up to four new events are stored in the memory buffer. When the memory buffer is full, additional events are lost.

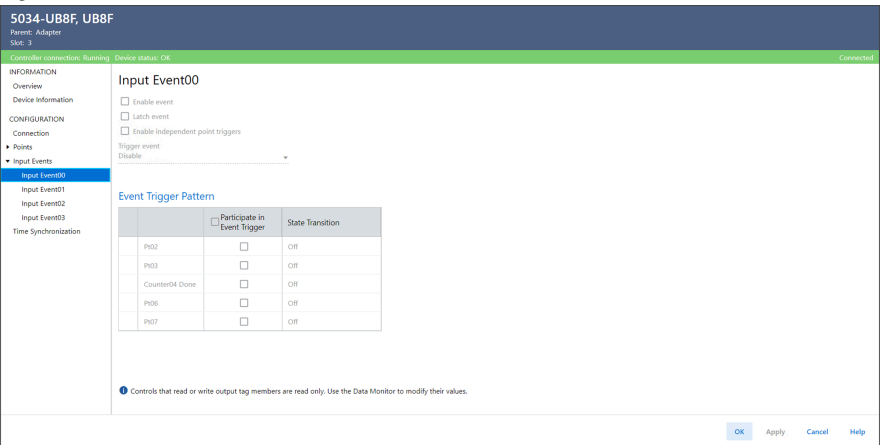
Input Eventxx View

The Input Eventxx view, where 'xx' represents the index of an event definition, shows the configuration options available for that event. You cannot configure the parameters from this view, you must use the configuration tags.

Use this view to review the following tasks:

- Whether the input event is enabled.
- Whether the input event is latched.
- Whether independent point triggers for the input event is enabled.
- Check the trigger condition for the input event.
- Check the participants and their State Transition behavior for the input event.

Figure 165. Input Eventxx View Example



The Input Eventxx view includes these parameters.

Parameter	Description	Member Name	Value
Enable Event	Displays whether the corresponding event trigger is active. Events are triggered when conditions match the event definition.	EO.Eventxx.En	<ul style="list-style-type: none">0 = Event trigger definition is not active.1 = Event trigger definition is active.
Latch Event	Displays whether an event is latched until it is acknowledged.	EO.Eventxx.LatchEvent	<ul style="list-style-type: none">0 = Event is not latched. New events overwrite old events.1 = Event is latched. Events are latched until acknowledged. New events are not reported until the current event is acknowledged. Up to four new events are stored in the memory buffer. When the memory buffer is full, additional events are lost.
Enable Independent Point Triggers	Displays whether each condition indicated in the Event trigger definition can initiate an event independently.	EO.Eventxx.IndependentConditionTriggerEn	<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.
Trigger Event	Triggers an event each time an input state change results in one of the following conditions: <ul style="list-style-type: none">Matching the event trigger definitionNo longer matching the event trigger definition	EO.Eventxx.EventRisingEn EO.Eventxx.EventFallingEn	Values (EventRisingEn, EventFallingEn) represent: <ul style="list-style-type: none">(0, 0): Event trigger is disabled.(1, 0): Event triggers on input transitions to matching the configured pattern.(0, 1): Event triggers on input transitions to not matching the configured pattern.(1, 1): Event triggers on input transitions to either matching or not matching the configured pattern.
Event Trigger Pattern - Participate in Event Trigger	Displays whether the specified point participates in the Event trigger definition for the event.	EO.Eventxx.CounterxxSelect EO.Eventxx.PtxxDataSelect	<ul style="list-style-type: none">0 = Point does not participate in the Event trigger definition.1 = Point participates in the Event trigger definition.

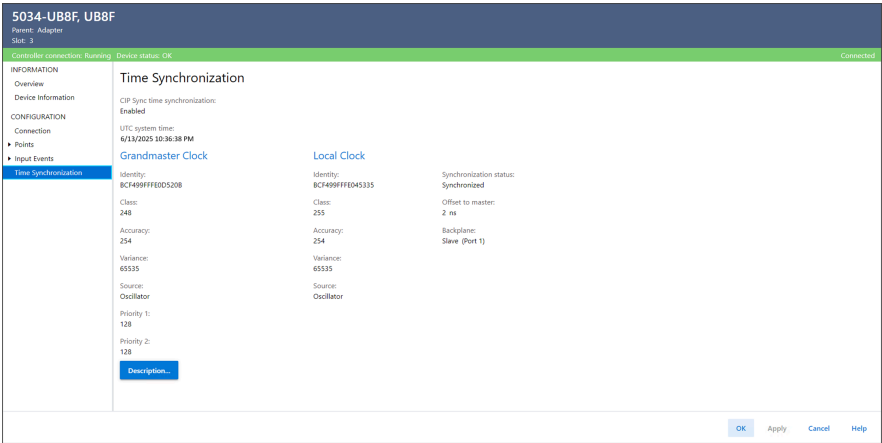
Parameter	Description	Member Name	Value
Event Trigger Pattern – State Transition	Displays the state of the input to match after the transition.	EO.Eventxx.CounterxxValue EO.Eventxx.PtxxDataValue	For PtxxDataValue: <ul style="list-style-type: none"> 0 = Off (default) 1 = On For CounterxxValue: <ul style="list-style-type: none"> 0 = Not done (default) 1 = Done

Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. The Time Synchronization view displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 166. Time Synchronization View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Sync view.

Figure 167. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 137. Interpret SA Power Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	There is SA power to the module.	None
Steady red	There is no SA power to the module or SA power voltage is not in the valid range.	Complete the following actions: 1. Confirm that SA power wiring is properly connected to the adapter, expansion power module, or 5034-MBSA mounting base. 2. Check the following: <ul style="list-style-type: none">- Check that the SA voltage is in the correct range.- If an external power supply is used, confirm that the power supply is turned on.

Table 137. Interpret SA Power Status Indicator (continued)

Indicator State	Description	Recommended Action
		<ul style="list-style-type: none"> - Make sure that the mounting base to mounting base connection is properly secured. <p>Go to Chassis Information view in the Module Properties of the adapter to check the Field Power status of mounting bases installed in all slots.</p>

Module Status Indicators

Table 138. Interpret Module Status Indicator

Indicator State	Description	Recommended Action
Off	The module is not powered.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.
Steady green	The module is operational and all I/O connections are active.	None
Flashing green	The module has no I/O connections.	Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue.
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 process complete. • Reattempt a firmware update after one fails. • Use the Studio 5000 Logix Designer application to determine whether a module recoverable fault is occurred. It is shown in Device Information view. <p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset device in the Studio 5000 Logix Designer project via the Device Information view of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Steady red	The module experienced a nonrecoverable fault.	<p>Complete the following actions:</p> <ol style="list-style-type: none"> 1. Cycle power to the module. 2. If the status indicator remains in the steady red state, replace the module.

Point Status Indicators

Table 139. Interpret Point Status Indicators – Standard I/O Modules

Indicator State	Description	Recommended Action
Off	One of the following: <ul style="list-style-type: none"> The point is Off. There is no backplane power. 	One of the following: <ul style="list-style-type: none"> Confirm that the point is configured properly. Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	One of the following: <ul style="list-style-type: none"> A Field Power Loss condition exists. A Short Circuit condition is detected (Output Mode). A Power Source Short Circuit condition is detected (Input Mode). 	One of the following: <ul style="list-style-type: none"> Locate and correct the cause of field power loss condition. Locate and correct the source of Short Circuit condition (Output Mode). On the configured Power Source, locate and correct the source of Short Circuit condition (Input Mode).

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Configuration Tag Definitions

Table 140. 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.	<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

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 17 = 20 ms 18 = 50 ms
Counterxx.InputOnOffFilter	SINT	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 μs 6 = 5 μs 7 = 10 μs 8 = 20 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 will rollover to 0 at the Preset value.	<ul style="list-style-type: none"> 0 = No rollover at the Preset value When the counter counts to the Preset value, the Done bit is set. When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set. 1 = Rollover at the Preset value When the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0.
Counterxx.ProgramToFaultEn	BOOL	Determines if the counter transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
Counterxx.FaultMode	SINT	Selects the behavior that the counter 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 = Continue counting 1 = Hold counting 2 = Set to a user-defined value

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
Counterxx.FaultValue	DINT	Defines the value that the counter assumes when a communication fault occurs if FaultMode is set to user-defined value.	All values
Counterxx.ProgMode	SINT	Selects the behavior that the counter takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none"> 0 = Continue counting 1 = Hold counting 2 = Set to a user-defined value
Counterxx.ProgValue	DINT	Defines the value that the counter assumes when the connection transitions to Program Mode or Inhibit mode if ProgMode set to user-defined value.	All values
Ptxx.InputOffOnFilter	SINT	<p>The amount of time that a signal must be in the On state before the input data indicates the On state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 μs 6 = 5 μs 7 = 10 μs 8 = 20 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	<p>The amount of time that a signal must be in the Off state before the input data indicates the Off state.</p> <p>The amount of time is indicated using an enumeration.</p>	<ul style="list-style-type: none"> 5 = 0 μs 6 = 5 μs 7 = 10 μs 8 = 20 μs 10 = 100 μs 11 = 200 μs 12 = 500 μs 13 = 1 ms 14 = 2 ms 15 = 5 ms 16 = 10 ms

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 17 = 20 ms 18 = 50 ms
Ptxx.ChatterTime	INT	A value from 1...10,000 ms in whole ms increments	1...10,000
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 timestamps. If cleared, the point does not record Off to On timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for Off to On input transitions 1 = Capture enabled for Off to On input transitions
Ptxx.CaptureOnOffEn	BOOL	Enables capturing On to Off timestamps. If cleared, the point does not record On to Off timestamps.	<ul style="list-style-type: none"> 0 = Capture disabled for On to Off input transitions 1 = Capture enabled for On to Off input transitions
Ptxx.TimestampLatchEn	BOOL	Determines whether timestamps latching is enabled.	<ul style="list-style-type: none"> 0 = Timestamps are overwritten with each successive transition The new timestamp overwrites the reported timestamp immediately, even if the controller has yet to extract that data. 1 = Timestamps are latched until acknowledged The reported timestamp is not overwritten until acknowledged. All subsequent transitions on that point are ignored until acknowledged/reset. Timestamp is acknowledged by copying the value from input tag TimestampOffOnNumber/TimestampOnOffNumber to output tag TimestampOffOnNumberAck/TimestampOnOffNumberAck. The acknowledgment also clears TimestampOverflowOffOn/TimestampOverflowOnOff.
Ptxx.ProgramToFaultEn	BOOL	Determines if an output transitions to the Communication Fault Mode if the connection faults while in Program Mode.	<ul style="list-style-type: none"> 0 = Stay in Program Mode state 1 = Go to Communication Fault Mode state
Ptxx.FaultMode	BOOL	Selects the behavior that the output point 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 = Go to a user-defined value 1 = Hold last state

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.FaultModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.FaultValue	BOOL	Defines the value that the discrete 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 point takes when transitioned into Program Mode or Inhibit mode. ProgValue defines the value to go to when set to user-defined value.	<ul style="list-style-type: none">• 0 = Go to a user-defined value• 1 = Hold last state

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
		IMPORTANT: When Ptxx.ProgModeLocalControl tag exists and is set to 1, this configuration is ignored.	
Ptxx.ProgValue	BOOL	Defines the value that the output takes when the connection transitions to Program Mode or Inhibit 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 or Inhibit mode 1 = The output state is On during Program Mode or Inhibit 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.FaultValueStateDuration	SINT	This value determines the length of time the Communication Fault Mode state is held before the FaultFinalState is applied.	<ul style="list-style-type: none"> 0 = Hold forever 1, 2, 5, or 10 seconds
Ptxx.FaultModeLocalControl	BOOL	Indicates whether the output continues to operate when communication fault occurs.	<ul style="list-style-type: none"> 0 = FaultMode is applied to the output state. 1 = In Communication Fault mode, the output continues to operate as configured for this point.
Ptxx.ProgModeLocalControl	BOOL	Indicates whether the output continues to operate when transitioning to Program or Inhibit mode.	<ul style="list-style-type: none"> 0 = ProgMode is applied to the output state. 1 = In Program or Inhibit mode, the output continues to operate as configured for this point.
Ptxx.PowerSource	SINT	Indicates the power source that is used for the point.	<ul style="list-style-type: none"> 0...7 = Point number of the Power Supply mode point that is used as SSV to the Ptxx input. -1 = External power supply -2 = Module SSV power
Pwmxx.Enable	BOOL	Determines whether the output is Pulse Width Modulation or Digital Output.	<ul style="list-style-type: none"> 0 = Point is used as Digital Output 1 = Point is used as Pulse Width Modulation Output
Pwmxx.CycleCountEn	BOOL	Indicates whether to stop generating pulse cycles after a defined number or continue generating pulse cycles until stopped.	<ul style="list-style-type: none"> 0 = Continue generating pulse cycles until stopped 1 = Generate a defined number of pulse cycles
Pwmxx.ExecuteAllCycles	BOOL	Determines the PWM action when 0.Ptxx.Data transitions to 0. Only applicable when C.Pwmxx.CycleCountEn = 1.	<ul style="list-style-type: none"> 0 = Stop generating pulses immediately 1 = Continue generating pulses until 0.Pwmxx.CycleCountLimit is reached
Pwmxx.EnforcePTODutyCycle	BOOL	Indicates whether to enforce the PTO specific duty cycle, which is fixed at 50%.	<ul style="list-style-type: none"> 0 = 0.Pwmxx.DutyCycle is used

Table 140. Configuration Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> 1 = 50% duty cycle is used. 0.Pwmxx.DutyCycle is ignored.
Pwmxx.IdleState	BOOL	Determines the state of the output when PWM is idle.	<ul style="list-style-type: none"> 0 = When PWM is idle, the output is Off. It also means that when PWM is running, the active state per 0.Pwmxx.DutyCycle is the output in On state. 1 = When PWM is idle, the output is On. It also means that when PWM is running, the active state per 0.Pwmxx.DutyCycle is the output in Off state.
Ptxx.OrPt[yy]Select	BOOL	<p>Indicates whether Pt[yy].Data participates in the logic OR calculation.</p> <p>The state of the output point is determined by the logical OR of the selected points in the OR table, combined with logical AND of the selected points in the AND table.</p>	<ul style="list-style-type: none"> 0 = Pt[yy] does not participate in the logic OR calculation. 1 = Pt[yy] participates in the logic OR calculation.
Ptxx.AndPt[yy]Select	BOOL	<p>Indicates whether Pt[yy].Data participates in the logic AND calculation.</p> <p>The state of the output point is determined by the logical OR of the selected points in the OR table, combined with logical AND of the selected points in the AND table.</p>	<ul style="list-style-type: none"> 0 = Pt[yy] does not participate in the logic AND calculation. 1 = Pt[yy] participates in the logic AND calculation.
Ptxx.TriggerSelect	SINT	Specifies the input that triggers the pulse function.	<ul style="list-style-type: none"> -1 = No external trigger <p>You can only use the 0.Ptxx.Trigger tag to initiate the output pulse.</p> <ul style="list-style-type: none"> 0...7 = Point 00...Point 07 <p>Other point is selected as trigger to initiate the output pulse.</p>
Ptxx.InvertTrigger	BOOL	Indicates whether the output pulse is triggered on the rising or falling edge of the input.	<ul style="list-style-type: none"> 0 = Output pulse is triggered on the rising edge. 1 = Output pulse is triggered on the falling edge.
FIFOLatchEvents	BOOL	Indicates whether the FIFO event latching is enabled.	<ul style="list-style-type: none"> 0 = FIFO event latching is disabled. <p>When the internal buffer is full, new timestamps detected on the input point overwrite the oldest timestamps stored in the internal buffer.</p> <ul style="list-style-type: none"> 1 = FIFO event latching is enabled. <p>When the internal buffer is full, new timestamps detected on the input point are discarded.</p>

Input Tag Definitions

Table 141. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp).
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
EventsQueuedCount	DINT	Specifies the number of unacknowledged timestamp events that are queued in the module's buffer. This	0...276

Table 141. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		includes events that are stored in the internal FIFO buffer and produce FIFO buffer.	
Counterxx.Data	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Counterxx.Fault	BOOL	<p>Indicates that counter data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Counterxx.Uncertain	BOOL	<p>Indicates that the counter data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Counterxx.Done	BOOL	<p>If RolloverAtPreset is set, indicates if Count $\geq$ Preset.</p> <p>If RolloverAtPreset is not set, always 0.</p>	<ul style="list-style-type: none"> 0 = Counter has not reached the Preset value 1 = Counter has reached the Preset value
Counterxx.Rollover	BOOL	<p>The counter counted up to Preset -1 and continued counting from 0.</p> <p>The RolloverAck bit transitioning from 0 to 1 or the Reset bit transitioning from 0 to 1 clears this bit.</p>	<ul style="list-style-type: none"> 0 = Counter has not rolled over from Preset -1 to 0 1 = Counter counted up to Preset -1 and continued counting from 0
Counterxx.Count	DINT	The number of rising edge of input signal counted by the counter	All values
Ptxx.Data (Input mode)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Data (Output mode)	BOOL	Indicates the current digital output value applied at the screw.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	<p>Indicates that point data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault

Table 141. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		<p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	
Ptxx.Uncertain	BOOL	<p>Indicates that the point data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Ptxx.TriggerMissed	BOOL	Indicates that at least one trigger is missed.	<ul style="list-style-type: none"> 0 = No trigger is missed 1 = At least one trigger is missed. Possible causes are: <ul style="list-style-type: none"> The output pulse triggered by the previous trigger is already active (not completed) or in the delay period (waiting). An invalid PulseDelay or PulseActiveTime.
Ptxx.EventOverflow	BOOL	Indicates whether the timestamp is discarded after the internal buffer is full.	<ul style="list-style-type: none"> 0 = No timestamp is discarded. 1 = At least one Timestamp is discarded.
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	<p>Indicates an Off to On timestamp was lost.</p> <p>A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.</p>	0 or 1
Ptxx.TimestampOverflowOnOff	BOOL	<p>Indicates an On to Off timestamp was lost.</p> <p>A timestamp can be lost when TimestampLatchEn is set but the reported timestamp is not acknowledged in time.</p>	0 or 1
Ptxx.CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p>	<ul style="list-style-type: none"> 0 = CIP Sync is not available. 1 = CIP Sync is available.

Table 141. Input Tags (continued)

Name	Data Type	Definition	Valid Values
		You must compare the Grandmaster Clock ID of both the module and the owner controller.	
Ptxx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but the module is not synced 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 master time.
Ptxx.TimestampOffOnNumber	INT	An Off to On timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOnOffNumber	INT	An On to Off timestamp identifier for the currently produced timestamp	All values
Ptxx.TimestampOffOn	LINT	64-bit timestamp corresponding to when a change of state Off to On was recorded at the input	All values
Ptxx.TimestampOnOff	LINT	64-bit timestamp corresponding to when a change of state On to Off was recorded at the input	All values
Schedule[x].State	SINT	Current state of the schedule tags at index x	<ul style="list-style-type: none"> 0 = Inactive 1 = Active – Schedule is next to be applied to the output 2 = Queued – Schedule is queued after the Active schedule 3 = Expired – Schedule has been applied 4 = Discarded – One of the following: <ul style="list-style-type: none"> The requested schedule was late (received after its scheduled application time) and a more recent schedule has already been applied to that output. The output point does not exist or scheduling is not enabled on the output point. 5 = Late – Schedule is received after the time scheduled (schedule is applied immediately)
Schedule[x].ScheduleNumber	SINT	Echo of SequenceNumber from the output tag	All values
LateScheduleCount	INT	<p>Count of schedules that arrive late. That is, the arrival time is after scheduled time. Counter rolls over every 65,535 late updates.</p> <p>The output is still being 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.</p>	All values

Table 141. Input Tags (continued)

Name	Data Type	Definition	Valid 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 65,535 lost updates.	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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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. <p>The module is using its local clock and can be drifting away from the last known master time.</p>
EventStatus[x].EventReset	BOOL	When Eventxx.ResetEvent transitions from 0 to 1, EventStatus[x].EventReset transitions to 1 to indicate that the reset was received and completed. It stays 1 until Eventxx.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 module. 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 for each new time event. The originator sets Eventxx.EventNumberAck to Eventxx.EventNumber to acknowledge receipt of the event. When the number of events reaches its maximum value and rolls over, it rolls over to 1, not 0.	All values
Pwmxx.Active	BOOL	Indicates whether the output is generating PWM pulses.	<ul style="list-style-type: none"> 0 = The output is not generating pulses 1 = The output is generating pulses
Pwmxx.Error	BOOL	Indicates whether there is an error with generating the PWM pulse.	<ul style="list-style-type: none"> 0 = There is no error present 1 = One of the following errors is present: <ul style="list-style-type: none"> 0.Pwmxx.CycleTime < minimum cycle time 0.Pwmxx.CycleTime > maximum cycle time

Table 141. Input Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> - $0.Pwmxx.DutyCycle * \text{cycle time} < \text{minimum pulse width}$ - $(100\% - 0.Pwmxx.DutyCycle) * \text{cycle time} < \text{minimum pulse width}$
FIFO[x].CIPSyncTimeout	BOOL	Indicates the time sync timeout status when the timestamp event is captured.	<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. <p>The module is using its local clock and can be drifting away from the last known master time.</p>
FIFO[x].CIPSyncValid	BOOL	Indicates the time sync status when the timestamp event is captured	<ul style="list-style-type: none"> • 0 = CIP Sync is not available. • 1 = CIP Sync is available.
FIFO[x].Data	BOOL	Indicates the state of the input when the timestamp event is captured.	<ul style="list-style-type: none"> • 0 = Off • 1 = On
FIFO[x].EventNumber	DINT	A running count of events, which increment by one for each new event. Write this EventNumber into the output data field EventNumberAck to acknowledge receipt of the event. If the EventNumber reaches its maximum value, it rolls over to 1 instead of 0.	0...4,294,967,296
FIFO[x].Fault	BOOL	Indicates that point data is inaccurate and cannot be trusted for use in the application when the timestamp event is captured. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> • 0 = Good • 1 = Bad, causing fault
FIFO[x].Point	SINT	Indicates the point at which the event is recorded.	0...7
FIFO[x].TimeStamp	LINT	Indicates the timestamp of the captured event.	All positive values
FIFO[x].Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known when the timestamp event is captured. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> • 0 = Good data • 1 = Uncertain data

Output Tag Definitions

Table 142. Output Tags

Name	Data Type	Definition	Valid Values
Counterxx.Reset	BOOL	When this bit transitions from 0 to 1, Count and Rollover are set to zero.	<ul style="list-style-type: none"> 0 = Count and Rollover values are not set to 0 1 = Count and 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 = Rollover bit is not cleared 1 = Rollover bit is cleared
Counterxx.Preset	DINT	<ul style="list-style-type: none"> If RolloverAtPreset is set, when the counter reaches Preset-1 and continues counting, it rolls over to 0 and the Rollover bit is set. The Done bit is always 0. If RolloverAtPreset is not set, when the counter counts to the Preset value, the Done bit is set. <p>When the counter reaches maximum DINT (2,147,483,647) and continues counting, it rolls over to 0 and the Rollover bit is set.</p>	0...2,147,483,647
Ptxx.ResetTimestamps	BOOL	Erases all recorded timestamps for the input point 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 the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most recent timestamp that is produced, the module is then allowed to produce a new timestamp.</p>	All values
Ptxx.TimestampOnOffNumberAck	INT	<p>An On to Off timestamp identifier that the controller writes to indicate that the identified timestamp has been seen and acted on.</p> <p>When Latching is enabled and the Timestamp Number that is received from the controller matches the most</p>	All values

Table 142. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		recent timestamp that is produced, the module is then allowed to produce a new timestamp.	
Ptxx.Data	BOOL	Current digital output data to be applied	<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
Ptxx.OverrideDataEn	BOOL	Enables the output state to be overridden by the OverrideDataValue tag.	<ul style="list-style-type: none"> 0 = Output operates as configured. 1 = Output state is controlled by Ptxx.OverrideDataValue. <hr/> <p>IMPORTANT: If you reset the OverrideDataEn tag to 0 (disabled) later, the output does not continue from its previous state.</p> <hr/>
Ptxx.OverrideDataValue	BOOL	Indicates the forced output state when the OverrideDataEn tag is set to 1.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.PulseActiveTime	REAL	Specifies the active duration in seconds for the generated output pulse.	All positive values
Ptxx.PulseDelay	REAL	Specifies the delay time in seconds between the trigger event and the start of the output pulse.	All positive values
Ptxx.ResetTriggerMissed	BOOL	Resets I.Ptxx.TriggerMissed bit.	A rising edge of ResetTriggerMissed bit clears the I.Ptxx.TriggerMissed bit.
Ptxx.Trigger	BOOL	Triggers the output pulse.	A rising edge of this bit triggers the output pulse. The Ptxx.PulseDelay and Ptxx.PulseActiveTime still apply.
TimeBase	LINT	<p>Indicates the TimeBase for all schedule times.</p> <p>When a new schedule entry is received, the module uses TimeBase + Schedule[n].TimeOffset to determine the time for the schedule entry.</p> <p>Once the schedule entries that are based on the current TimeBase are echoed back by the module, a new TimeBase can be set to incorporate new schedule entry creations.</p>	Any positive value
Schedule[x].ID	SINT	<p>Indicates which hardware scheduler to use. Typically, you set the ID to the schedule index x + 1.</p> <p>If you use an ID before that same ID of the previous schedule is completed, the new schedule overwrites the old schedule.</p>	<ul style="list-style-type: none"> 0 = No schedule 1...32 = Valid hardware scheduler ID

Table 142. Output Tags (continued)

Name	Data Type	Definition	Valid Values
		The schedule is considered complete when the schedule state is reported as Expired, Late, or Discarded.	
Schedule[x].SequenceNumber	SINT	For every new schedule of Schedule[x], the sequence number is increased. The expected sequence to request the module to perform a new schedule is: 1. Set all other Schedule[x] members properly in the output tag. 2. Increase the sequence number after step 1 is completed. Once the module receives a new sequence number of Schedule[x], it starts processing it.	All values
Schedule[x].OutputPointSelect	SINT	Selects the output point that this schedule applies to. 0xFF means no output point selected.	0...15
Schedule[x].Data	BOOL	Output data to be applied at time that is specified in schedule	0 or 1
Schedule[x].TimeOffset	DINT	Offset from schedule base time. For more information, see the definition for TimeBase.	All values
Pwmxx.CycleTime	REAL	Indicates the period in seconds of one pulse cycle.	10 μ s...30 s
Pwmxx.DutyCycle	REAL	Indicates in percentage of the pulse cycle time when output is in the active state.	0...100%
Pwmxx.CycleCountLimit	DINT	Determines the number of pulse cycles to be generated when there is a rising edge in the Data. Only applicable when C.Pwmxx.CycleCountLimitEn = 1.	0...2,147,483,647
FIFO.EventNumberAck	DINT	Acknowledges all events with EventNumber less than or equal to this number. IMPORTANT: If EventNumberAck does not match any event in the FIFO produce buffer, no event is acknowledged.	All values
FIFO.ResetEvents	BOOL	Erases all recorded timestamped events.	A rising edge of this bit clears all the timestamp events in the internal buffer and FIFO produce buffer, and resets I.Ptxx.EventOverflow bit.

Event Input Tag Definitions

Table 143. Event Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The point's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied or there is no output tag data for the connection (for example, all points configured as digital input without timestamp).
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
DiagnosticSequenceCount	BOOL	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Eventxx.Fault	BOOL	Detects whether the signal is good data. The fault is set to 1 by the originator when the connection is lost. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Eventxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data

Table 143. Event Input Tags (continued)

Name	Data Type	Definition	Valid Values
		<p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p>	
Eventxx.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
Eventxx.EventRising	BOOL	Indicates whether an event triggered when an input transition results in an event pattern being matched.	<ul style="list-style-type: none"> 0 = Event is not triggered 1 = Event is triggered
Eventxx.EventFalling	BOOL	Indicates whether an event triggered when an input transition resulted in an event pattern no longer being matched.	<ul style="list-style-type: none"> 0 = Event is not triggered 1 = Event is triggered
Eventxx.CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<ul style="list-style-type: none"> 0 = CIP Sync is not available. 1 = CIP Sync is available.
Eventxx.CIPSyncTimeout	BOOL	Indicates that the module was once synced with a 1588 master, but the module is not synced 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. <p>The module is using its local clock and can be drifting away from the last known master time.</p>
Eventxx.EventsPending	SINT	<p>The number of events currently queued in the module.</p> <p>A value greater than zero indicates that the controller is not currently keeping up with the rate of events.</p>	All positive values
Eventxx.EventNumber	DINT	<p>Running count of events, which increments by one for each new time event.</p> <p>The originator sets Eventxx.EventNumberAck to Eventxx.EventNumber to acknowledge receipt of the event.</p> <p>When the number of events reaches its maximum value and rolls over, it rolls over to 1, not 0.</p>	All values

Table 143. Event Input Tags (continued)

Name	Data Type	Definition	Valid Values
Eventxx.EventTimestamp	LINT	The time that the event occurred	All positive values
Eventxx.CounterxxDone	BOOL	Indicates the Done status of Counterxx when event was triggered.	<ul style="list-style-type: none"> 0 = Not done 1 = Done
Eventxx.CounterxxFault	BOOL	Indicates the fault status of Counterxx when event is triggered.	<ul style="list-style-type: none"> 0 = No fault 1 = Faulted
Eventxx.PtxxData	BOOL	Indicates the data value of input Ptxx when event was triggered.	<ul style="list-style-type: none"> 0 = Off 1 = On
Eventxx.PtxxFault	BOOL	Indicates the fault status of input Ptxx when event is triggered.	<ul style="list-style-type: none"> 0 = No fault 1 = Faulted

Event Output Tag Definitions

Table 144. Event Output Tags

Name	Data Type	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	Triggers an event each time a condition change results in conditions that match the event trigger definition.	Values (EventRisingEn, EventFallingEn) represent: <ul style="list-style-type: none"> (0, 0): Event trigger is disabled. (1, 0): Event triggers on input transitions to matching the configured pattern. (0, 1): Event triggers on input transitions to not matching the configured pattern. (1, 1): Event triggers on input transitions to either matching or not matching the configured pattern.
Eventxx.EventFallingEn	BOOL	Triggers an event each time a condition change results in conditions that do not match the event trigger definition.	Values (EventRisingEn, EventFallingEn) represent: <ul style="list-style-type: none"> (0, 0): Event trigger is disabled. (1, 0): Event triggers on input transitions to matching the configured pattern.

Table 144. Event Output Tags (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> (0, 1): Event triggers on input transitions to not matching the configured pattern. (1, 1): Event triggers on input transitions to either matching or not matching the configured pattern.
Eventxx.LatchEn	BOOL	When set, events are latched until acknowledged. When not set, new events overwrite old events.	<ul style="list-style-type: none"> 0 = Event is not latched 1 = Event is latched
Eventxx.ResetEvent	BOOL	A transition from 0 to 1 resets all events and clears the event queue on the Eventxx.	<ul style="list-style-type: none"> 0 = Do not reset 1 = Reset
Eventxx.IndependentConditionTriggerEn	SINT	Determines whether an input state change or a pattern of input state changes triggers an event.	<ul style="list-style-type: none"> 0 = Event is triggered when all participating inputs in the event trigger achieve their configured values 1 = Event is triggered when any participating input in the event trigger achieves their configured value
Eventxx.EventNumberAck	DINT	The controller writes back EventNumber into EventNumberAck to indicate receipt of the event.	All values
Eventxx.CounterxxSelect	BOOL	Determines whether the counter participates in the event trigger.	<ul style="list-style-type: none"> 0 = Does not participate in event trigger 1 = Participates in event trigger
Eventxx.CounterxxDataValue	BOOL	Determines the done state of the counter to match after the transition.	<ul style="list-style-type: none"> 0 = Not done 1 = Done
Eventxx.PtxxDataSelect	BOOL	Determines whether the input participates in the event trigger.	<ul style="list-style-type: none"> 0 = Does not participate in event trigger 1 = Participates in event trigger
Eventxx.PtxxDataValue	BOOL	Determines the state of the input to match after the transition.	<ul style="list-style-type: none"> 0 = Off 1 = On

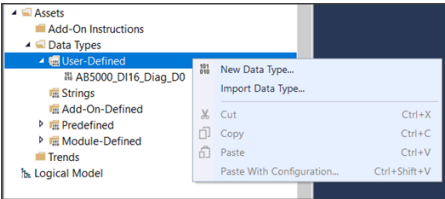
Diagnostic Assembly

Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

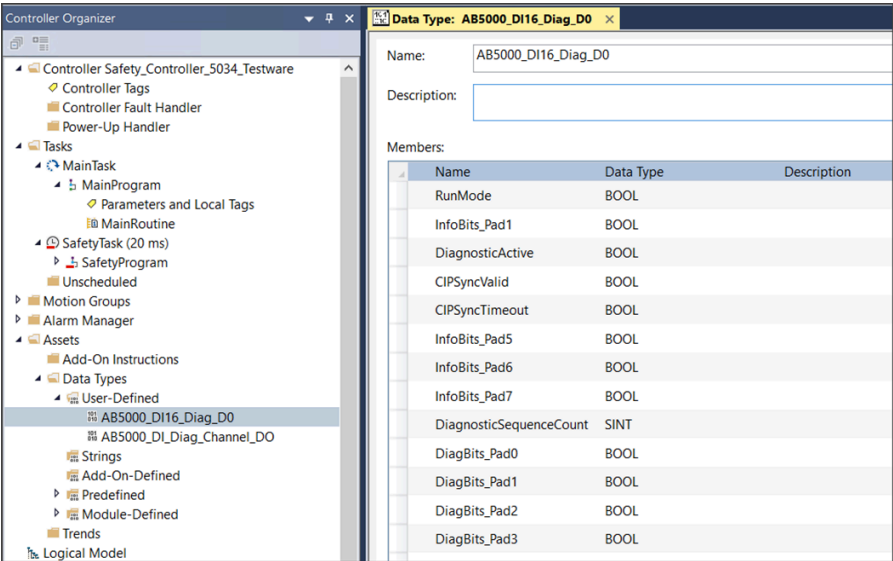
Create User-defined Diagnostic Assembly Types

You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

- Create user-defined diagnostic assembly by following the below steps:
- From the Controller Organizer pane, go to Assets → Data types → User-Defined.
 - Right-click on the User-Defined folder and select New Data Type.



- Add a Name and Description (optional) for your diagnostic assembly.
- Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

- Diagnostic Digital Configurable 8 Point with Diagnostics Assembly A
 - Instance ID = 0x801B (32,795)
 - Size = 232 bytes

Table 145. Diagnostic Assembly Instance - 32,795

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	

Name	Data Type	Size in Bytes
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault	BOOL	
BaseIDFault	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	INT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8

Name	Data Type	Size in Bytes
ChannelMode00	SINT	1
ChannelMode01	SINT	1
ChannelMode02	SINT	1
ChannelMode03	SINT	1
Pad	INT	4
Ch00	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch01	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch02	Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch03	Diagnostic Digital with Diagnostics Channel (Configurable)	48

2. Diagnostic Digital Configurable 8 Point with Diagnostics Assembly B
 - Instance ID = 0x801C (32,796)
 - Size = 200 bytes

Table 146. Diagnostic Assembly Instance – 32,796

Name	Data Type	Size in Bytes
ChannelMode04	SINT	1
ChannelMode05	SINT	1
ChannelMode06	SINT	1
ChannelMode07	SINT	1
Pad	INT	4
Ch04	See Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch05	See Diagnostic Digital with Diagnostics Channel (Configurable)	48

Name	Data Type	Size in Bytes
Ch06	See Diagnostic Digital with Diagnostics Channel (Configurable)	48
Ch07	See Diagnostic Digital with Diagnostics Channel (Configurable)	48

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 147. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital with Diagnostics Channel (Configurable)

- Size = 48 bytes

Table 148. Structure for Diagnostic Digital with Diagnostics Channel (Configurable)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
DataBits_Pad3	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
SSVShortCircuit	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
Pad1	SINT	1
Pad2	SINT	1
Pad3	DINT	4
Pad4	LINT	8
ShortCircuitTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8
SSVShortCircuitTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 149. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle – It means one of the following: <ul style="list-style-type: none"> Connection is not up. Connection has been opened but the module has not started producing data for the connection. Module is not applying new output tag data because the controller is in Program Mode. 1 = Run – It means the following: <ul style="list-style-type: none"> Connection is up. Module is producing data for the connection. Output tag data is being applied or there is no output tag data for the connection (For example, all points configured as digital input without timestamp)
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
CIPSyncValid	BOOL	<p>Indicates whether the module is synced with a 1588 master.</p> <p>A set bit alone cannot indicate that it is synced to the same master clock of the owner controller.</p> <p>You must compare the Grandmaster Clock ID of both the module and the owner controller.</p>	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	A valid time or None if there is no recorded event time.

Table 149. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00). <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds • uuu = microseconds • nnn = nanoseconds • UTC-00:00 = Time zone
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	Indicates that the data is inaccurate and cannot be trusted for use in the application. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> • 0 = Good • 1 = Bad, causing fault
Uncertain	BOOL	Indicates that the data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy. <hr/> IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.	<ul style="list-style-type: none"> • 0 = Good data • 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> • 0 = Field power off condition does not exist • 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds

Table 149. Definitions for Diagnostic Assembly Parameters (continued)

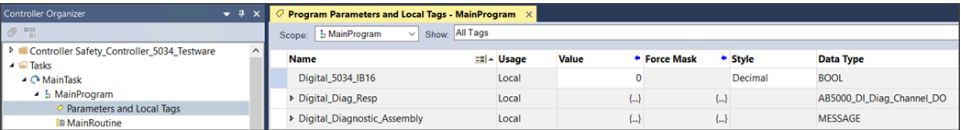
Name	Data Type	Definition	Valid Values
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> • 0 = No Load condition does not exist • 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
SSVShortCircuit		Indicates whether an SSV short circuit or overcurrent fault is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
SSVShortCircuitTimestamp	LINT	Indicates the time of the last SSV short circuit fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes

Table 149. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> SS = seconds mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3

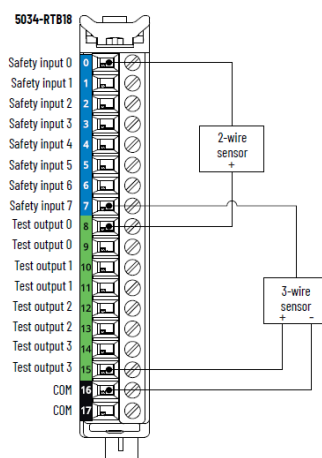
- Instance:
 - 32,795 (801b) Diagnostic Digital Configurable 8 Point with Diagnostics Assembly A
 - 32,796 (801c) Diagnostic Digital Configurable 8 Point with Diagnostics Assembly B
 - 769 (301c) Diagnostic Counters Base I/O Assembly
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
 7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

5034-IB8S and 5034-IB8SXT Details

5034-IB8S and 5034-IB8SXT Safety Digital 8 Input Modules

For more examples of wiring diagrams for 5034-IB8S and 5034-IB8SXT that can be used in functional safety applications, see the PointMax Digital I/O Modules User Manual, publication [5034-UM002](#). The wiring configuration affects the safety application level to which a PointMax safety I/O module is suitable.

Figure 168. 5034-IB8S and 5034-IB8SXT Wiring Diagram – 2-wire and 3-wire Sensor Wiring



All test outputs support muting lamp outputs.

Figure 169. 5034-IB8S and 5034-IB8SXT Functional Block Diagram

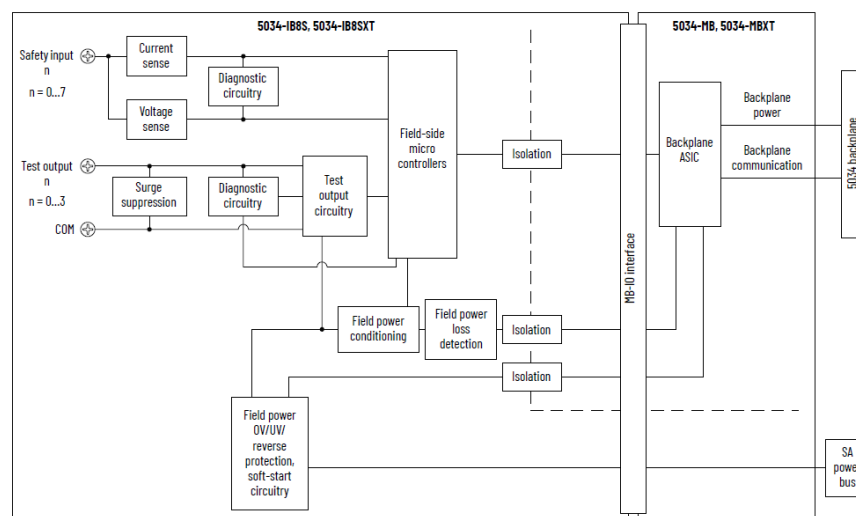


Table 150. Technical Specifications - 5034-IB8S, 5034-IB8SXT

Attribute	5034-IB8S, 5034-IB8SXT
On-state voltage range	10...30V DC
On-state current, min	2.2 mA @ 10V DC
On-state current, nom	2.4 mA @ 24V DC
On-state current, max	2.5 mA @ 30V DC
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
Input delay time Off-to-On, user-selectable filter time	0 ms (Default), 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Input delay time On-to-Off, user-selectable filter time	0 ms (Default), 2 ms, 5 ms, 10 ms, 20 ms, 50 ms
Safety class ⁽¹⁾	Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL 3 acc. to IEC 61508
SRT	7 ms @ RPI of 2 ms
Test output current per point, max	0.7 A
Test output current per module, total	2.8 A
Test output pulse width, max	0.7 ms
Test output pulse period, typical	512 ms
Test output field capacitance, max	100 nF
Surge current per test output, max	2.4 A for 50 ms, repeatable every 2 s The module current rating cannot exceed 5 A.
Test output on-state voltage drop, max	0.5V DC @ 0.7 A
Test output off-state leakage current, max	0.5 mA
Test output off-state voltage, max	5V DC
Muting lamp fault threshold current, max	6 mA
Muting lamp fault threshold current, min	1.8 mA

Table 150. Technical Specifications - 5034-IB8S, 5034-IB8SXT (continued)

Attribute	5034-IB8S, 5034-IB8SXT
Test output short to ground/overload protection	Yes (per point), 4 A typical
Module over-temperature detection	Yes
SA supply reverse voltage protection	Yes
SA supply overvoltage protection, max	60V DC

(1) See the PointMax Digital I/O Modules User Manual, publication [5034-UM002](#), for Safety Application Suitability Levels and Safety Data for safety modules.

Table 151. General Specifications - 5034-IB8S, 5034-IB8SXT

Attribute	5034-IB8S, 5034-IB8SXT
Number of safety inputs	8
Input type	IEC 61131-2 (Type 3), current sinking
Number of Test outputs/Muting Lamp outputs	4
Test output type	Sourcing
SA power nominal operating supply voltage	24V DC
SA power operating voltage range	18...30V DC
SA power current, nom	2.9 A
SA power current, max	2.9 A
SA power current at no load	19 mA @ 24V DC
Power dissipation, max	1.55 W
Thermal dissipation, max	5.29 BTU/hr
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and input ports No isolation between individual inputs
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock

Table 151. General Specifications - 5034-IB8S, 5034-IB8SXT (continued)

Attribute	5034-IB8S, 5034-IB8SXT
Electronic keying	Electronic keying via programming software
RTB key positions	1, 4, 14
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽¹⁾	2 - Signal ports 2 - Power ports
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	46.0 g (1.62 oz.) - 5034-IB8S 49.0 g (1.73 oz.) - 5034-IB8SXT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

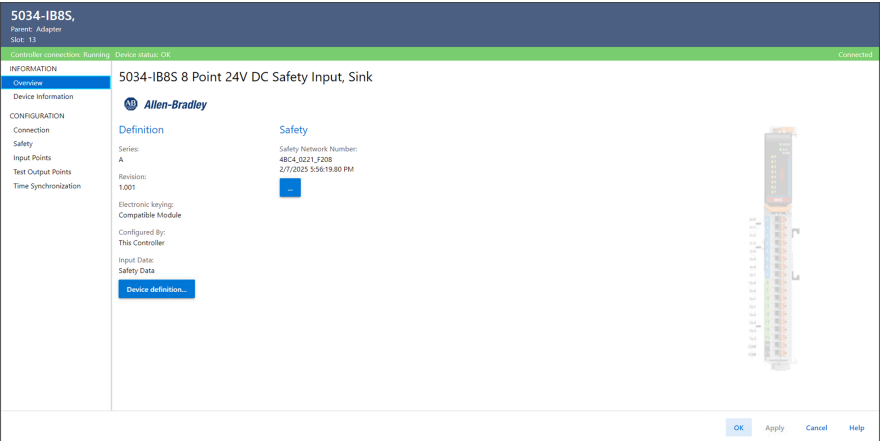
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

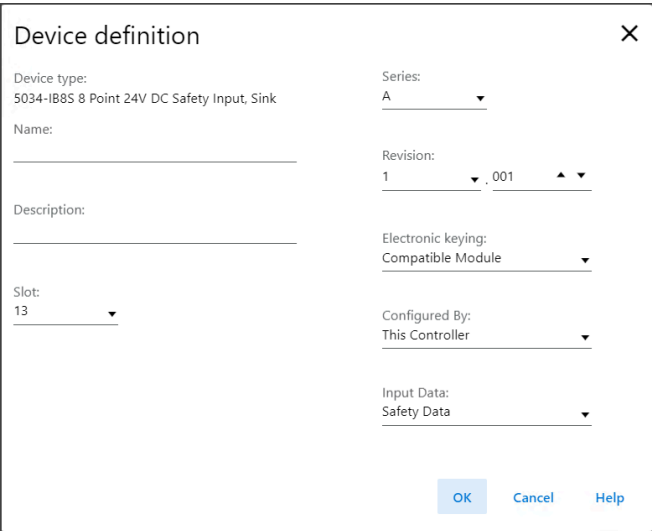
Figure 170. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 171. Device Definition Example



Device Definition includes these parameters:

Table 152. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values
Description	Enter the description of the device.	All valid values

Table 152. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs. For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	<ul style="list-style-type: none"> Exact Match Compatible Module
Configured By	Determines which tags are generated when configuration is complete. For the External Means choice, the controller and module establish communication without the controller sending any configuration or output data to the module.	<ul style="list-style-type: none"> External Means This Controller
Input Data	Select the input data type for the device.	<ul style="list-style-type: none"> Safety Data Safety Packed Data

Safety Network Number

The Studio 5000 Logix Designer application automatically assigns a Safety Network Number (SNN) to 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 safety modules in a same system use the same SNN and are automatically assigned the same SNN by default.

The Studio 5000 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 Controllers Safety Reference Manual, publication [1756-RM012](#).

To change the SNN of a device, select the ellipses next to the SNN field in the General view.

Figure 172. Safety Network Number Example

Safety Network Number

Format:

☒ Time-Based

☐ Manual

2/7/2025 5:56:19.80 PM

Generate

Number:

4BC4_0221_F208

(Hex)

Copy

Paste

Set

OK

Cancel

Help

Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

Figure 173. Device Information View Example

5034-IB8S,
Reset: Adapter
Size: 13

Controller connection: Running

Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Safety

Input Points

Test Output Points

Time Synchronization

Device Information

Identification

Status

Vendor:
Rockwell Automation/Allen-Bradley

Product type:
Safety Discrete I/O Device

Product name:
5034 Safety Digital I In

Catalog number:
5034-IB8S

Series:
A

Revision:
1.011

Product code:
5034-IB8S

Serial number:
70907C72

Manufacture date:
2024-11-10

Warranty number:
00000000000000000000

Major fault:
None

Minor fault:
None

Internal state:
Run mode

Configured:
Configured

Owned:
Owned

Device identity:
Match

Protection mode:
None

Refresh

Reset device

OK

Apply

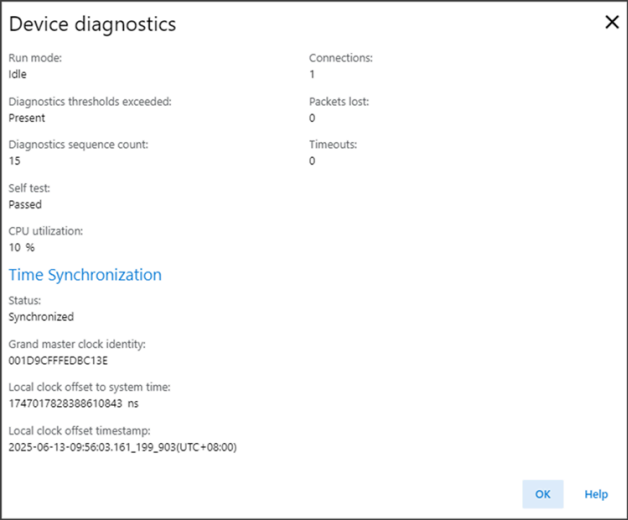
Cancel

Help

Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 174. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

IMPORTANT: For PointMax safety I/O modules, you set the RPI on the Safety view.

- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



If there is a connection fault, the Module Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).
- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 175. Connection View Example

5034-IB8S,
Parent: Adapter
Slot: 13

Controller connection: Running Device status: OK

Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Safety
Input Points
Test Output Points
Time Synchronization

Connection

Connection Type	Requested Packet Interval (RPI)		Connection over EtherNet/IP
	Value	Range	
Safety Input	20.0	ms Set on Safety View	Unicast
Safety Output	20.0	ms Set by Safety Task	N/A

☐ Inhibit module
☐ Major fault on controller if connection fails while in Run mode
☒ Enable Automatic Diagnostics
Disabling this feature will prevent this device from publishing diagnostics to FactoryTalk Alarms and Events
Connection fault:

OK

Apply

Cancel

Help

Connection over EtherNet/IP

PointMax 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, the connection is set to Unicast and N/A is shown. You cannot change this parameter.

Safety View

Safety lets you set the RPI rate.

Figure 176. Safety View Example

5034-IB8S,
Parent: Adapter
Slot: 13

Controller connection: Running Device status: OK

Connected

INFORMATION
Overview
Device Information

CONFIGURATION
Connection
Safety
Input Points
Test Output Points
Time Synchronization

Safety

Connection Type	Requested Packet Interval (RPI)	Connection Reaction Time Limit	Max Observed Network Delay		Action
			Time	ms	
Safety Input	20	80	ms	3.8	ms <div>Reset</div>
Safety Output	20	60	ms	3.5	ms <div>Reset</div>

Advanced...

Ownership
Configuration Ownership
Local

Reset Ownership

Signature
ID: 1bba3_0fice (1 hex)
Date: May / 23 / 2025
Time: 03 : 10 : 55 : 589 PM

Copy

Paste

OK

Apply

Cancel

Help

Connection Reaction Time Limit

To change the Connection Reaction Time Limit configuration, select Advanced in the Safety view. For more information, see [Connection Reaction Time Limit With Safety Modules on page 38](#).

IMPORTANT: The Safety Task Period determines the output RPI.

Figure 177. Advanced Connection Reaction Time Limit Configuration Example

Advanced connection reaction time limit

Input

Requested Packet Interval (RPI):
20 ms
(2 - 500)

Timeout multiplier:
2
(1 - 4)

Network delay multiplier:
200 %
(10 - 600)

Connection reaction time limit:
80 ms

Output

Requested Packet Interval (RPI):
20 ms

Safety Task Period

Timeout multiplier:
2
(1 - 4)

Network delay multiplier:
200 %
(10 - 600)

Connection reaction time limit:
60 ms

OK

Cancel

Help

Input Points View

Input Points is only available if you choose This Controller for the Configured By parameter on the Device Definition dialog.

You must configure each point to use it in a safety application. The inputs are disabled by default.

Figure 178. Input Points View Example

5034-IB8S,
Parent: Adapter
Step 13

Controller connections: Running Device status: OK

Connected

INFORMATION
Overview
Device Information
CONFIGURATION
Connection
Safety
Input Points
Test Output Points
Time Synchronization

Input Points

Point	Point Mode	Test Source	Input Delay Time		Diagnostics
			Off → On	On → Off	
00	Safety	None	0 ms	0 ms	✓
01	Safety Pulse Test	Test Source 1	0 ms	0 ms	✓
02	Not Used	None	0 ms	0 ms	✓
03	Not Used	None	0 ms	0 ms	✓
04	Not Used	None	0 ms	0 ms	✓
05	Not Used	None	0 ms	0 ms	✓
06	Not Used	None	0 ms	0 ms	✓
07	Not Used	None	0 ms	0 ms	✓

☐ Latch fault until reset via output tag

OK

Apply

Cancel

Help

For more information on input delay times, see [Safety Input Delay Time on page 79](#).

Ptxx Diagnostics

To view the Ptxx diagnostics, select Diagnostics in the Input Points view.

Figure 179. Ptxx Diagnostics Example

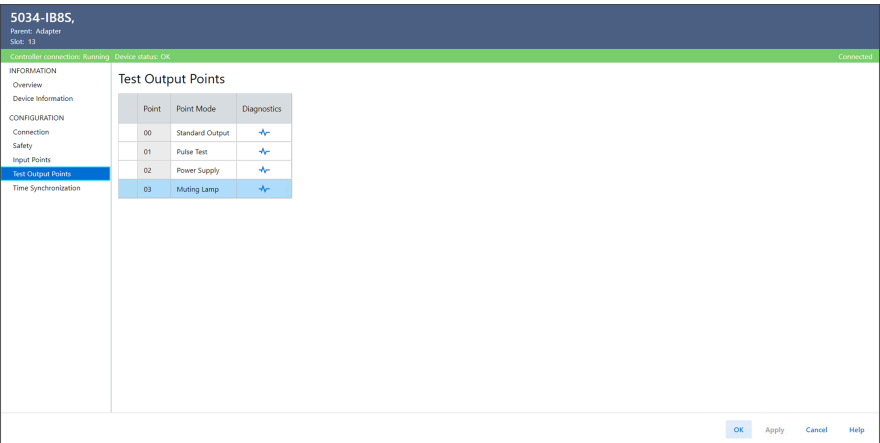


Test Outputs Points View

Test Output Points is only available if you choose This Controller for the Configured By parameter on the Device Definition dialog.

You must configure each point to use it in a safety application. The outputs are disabled by default.

Figure 180. Test Output Points View Example



Test Output Ptxx Diagnostics

To view the Test Output Ptxx diagnostics, select Diagnostics in the Test Output Points view.

Figure 181. Test Output Ptxx Diagnostics Example

Pt03 Diagnostics

Fault Exists:

No

Field Power:

Present

Field Power On Timestamp:

None

Field Power Off Timestamp:

None

Short Circuit Fault:

Not Present

Short Circuit Fault Timestamp:

None

Overload Fault:

Not Present

Overload Fault Timestamp:

None

Internal Fault:

Not Present

Internal Fault Timestamp:

None

No Load Fault:

Not Present

No Load Fault Timestamp:

None

OK

Help

Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. Time Synchronization displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

Figure 182. Time Synchronization View Example

5034-IB8S,
Parent: Adapter
Slot: 13

Controller connections: Running Device status: OK

Connected

INFORMATION

Overview

Device Information

CONFIGURATION

Connection

Safety

Input Points

Test Output Points

Time Synchronization

Time Synchronization

CIP Sync time synchronization:
Enabled

UTC system time:
6/16/2025 10:36:38 PM

Grandmaster Clock

Identity:
8C499FFED05208

Class:
248

Accuracy:
254

Variance:
65535

Source:
Oscillator

Priority 1:
128

Priority 2:
128

Description...

Local Clock

Identity:
8C499FFED01980

Class:
255

Accuracy:
254

Variance:
65535

Source:
Oscillator

Synchronization status:
Synchronized

Offset to master:
10 ns

Backplane:
Slave (Port 1)

OK

Apply

Cancel

Help

Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Synchronization view.

Figure 183. Grandmaster Clock Description Example

Grandmaster clock description

User name:

test

User location:

Protocol address:

00.00.00.00

Physical address:

00-00-00-00

Clock type:

Boundary Clock

Manufacturer name:

Rockwell Automation

Model:

1756-L84ES/B_4584_BuildVerificat

Serial number:

01087894

Hardware revision:

3.1

Firmware revision:

36.11.4584

Software revision:

Profile identity:

00-21-6C-00-01-00

Physical protocol:

ControlBus

Network protocol:

Local

Port number:

1

Close

Help

Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 153. Interpret SA Power Indicator – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	The module is not powered. A safety connection cannot be made or maintained.	Complete the following actions: <div><div>1.</div><div>Confirm that the system is powered.</div></div> <div><div>2.</div><div>Confirm that the module is installed properly.</div></div>

Table 153. Interpret SA Power Indicator – Safety I/O Modules (continued)

Indicator State	Description	Recommended Action
Steady green	There is SA power to the module	None
Steady red	<ul style="list-style-type: none"> There is no SA power to the module. SA voltage is not within a valid range. A safety connection cannot be made or maintained.	Complete the following actions: <ol style="list-style-type: none"> Confirm that the SA Power wiring on the terminal block is installed properly. Check the following: <ul style="list-style-type: none"> Confirm that there is sufficient voltage supplied to the module. If an external power supply is used, confirm that the power supply is turned on. Confirm that the SA voltage is within the correct range (18...30V).

Module Status Indicators

Table 154. Interpret Module Status Indicator – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol 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 a controller and is operating normally.	None
Flashing green	One of the following conditions exist: <ul style="list-style-type: none"> The module has powered up successfully. The module is OK, but it does not have a connection. No connection can result from missing, incomplete, or incorrect module configuration. <ul style="list-style-type: none"> A connection can be established with the controller, but initial time coordination exchange is not complete. Connection to an output module is in the idle state. 	Complete the following actions: <ul style="list-style-type: none"> Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue. Confirm that the system conditions require the controller to be in Remote Run mode or Run mode, transition the controller to one of those modes.
Steady red	The module experienced a nonrecoverable fault.	Complete the following actions: <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	One of the following conditions exist: <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. 	Complete one of the following: <ul style="list-style-type: none"> Let the firmware update progress complete. Reattempt a firmware update after one fails. Use the Studio 5000 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.

Table 154. Interpret Module Status Indicator – Safety I/O Modules (continued)

Indicator State	Description	Recommended Action
		<p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset Module in the Studio 5000 Logix Designer project via the Module Info category of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Flashing red/green	This pattern indicates that a UNID for the safety device needs to be configured.	None

Point Status Indicators – Safety Digital I/O Modules

Table 155. Point Status Indicators – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	<p>One of the following:</p> <ul style="list-style-type: none"> • The point is Off. • There is no backplane power. • The point is not used. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Confirm that the point is configured properly. • Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	The module experienced one or more recoverable faults.	Locate and correct the faults.
Steady red	<p>One of the following:</p> <ul style="list-style-type: none"> • A Field Power Loss condition exists. • An internal channel fault exists. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Locate and correct the cause of field power loss condition. • Locate and correct the internal fault.

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Input Tag Definitions

Table 156. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range (such as temperature). If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Ptxx.Data PtxxData (Packed data)	BOOL	Indicates the current digital input value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.Fault	BOOL	One of the following: <ul style="list-style-type: none"> Indicates that point data is inaccurate and cannot be trusted for use in the application. The point is set to Not Used. If the tag is set to 1, you must troubleshoot the module to correct the cause of the fault.	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted), or set to Not Used
Ptxx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Ptxx.ShortCircuit	BOOL	Indicates a short to high is detected on the safety input point.	<ul style="list-style-type: none"> 0 = No short circuit 1 = Short circuit
Ptxx.Status	BOOL	Indicates the status of the point.	<ul style="list-style-type: none"> 0 = Bad data (faulted), or set to Not Used 1 = Good

Table 156. Input Tags (continued)

Name	Data Type	Definition	Valid Values
PtxxStatus (Packed data)			
Testxx.Readback	BOOL	Indicates the current test output value at the test output.	<ul style="list-style-type: none"> 0 = Off 1 = On
Testxx.Fault	BOOL	<p>One of the following:</p> <ul style="list-style-type: none"> Indicates that point data is inaccurate and cannot be trusted for use in the application. The point is set to Not Used. <p>If the tag is set to 1:</p> <ul style="list-style-type: none"> You must troubleshoot the module to correct the cause of the inaccuracy. If the point is set to Not Used, no action is required. 	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted), or set to Not Used
Testxx.Uncertain	BOOL	<p>One of the following:</p> <ul style="list-style-type: none"> Indicates that point data is inaccurate and cannot be trusted for use in the application. The point is set to Not Used. <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Testxx.Status PtxxTestOutputStatus (Packed data)	BOOL	Indicates the status of the test output.	<ul style="list-style-type: none"> 0 = Fault or set to Not Used 1 = Good

Output Tag Definitions

Table 157. Output Tags

Name	Data Type	Definition	Valid Values
Ptxx.ResetFault PtxxResetFault (Packed data)	BOOL	<p>When Latch Fault until Reset via Output Tag is enabled, the I/O point holds safety output fault indications until it checks that the fault is removed.</p> <p>If the fault is removed, it clears only the fault status upon detecting that the ResetFault bit in its point sees a 0 to 1 transition.</p>	A 0 to 1 transition unlatches the fault.
Testxx.Data TestxxData (Packed data)	BOOL	Indicates the current test output value.	<ul style="list-style-type: none"> 0 = Off 1 = On

Diagnostic Assembly

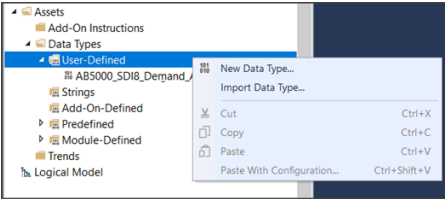
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

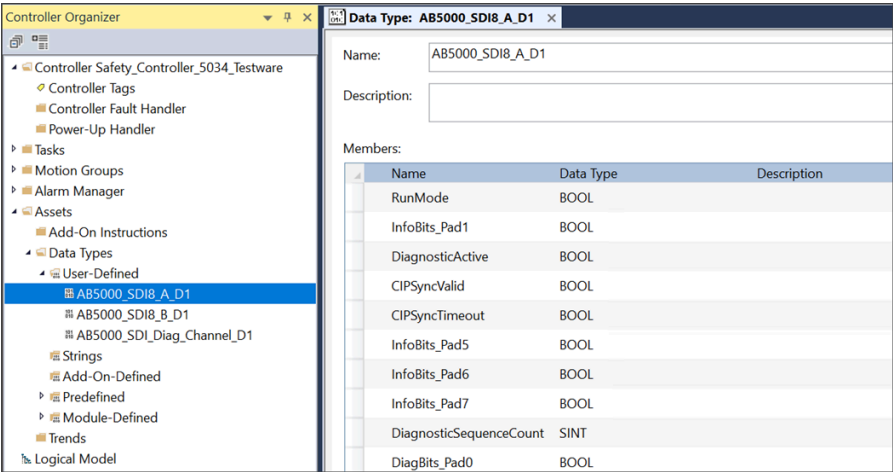
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

1. From the Controller Organizer pane, go to Assets → Data types → User-Defined.
2. Right-click on the User-Defined folder and select New Data Type.



3. Add a Name and Description (optional) for your diagnostic assembly.
4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

1. Diagnostic Digital Safety 8 Point Assembly A
 - Instance ID = 0x8013 (32,787)
 - Size = 320 bytes

Table 158. Diagnostic Assembly Instance - 32,787

Name	Data Type	Size in Bytes
RunMode	BOOL	1

Name	Data Type	Size in Bytes
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault This field is not used, but you must include it in the data structure.	BOOL	
BaseIDFault This field is not used, but you must include it in the data structure.	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	

Name	Data Type	Size in Bytes
Pad	DINT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...3]	See Diagnostic Digital Diagnostics Safety Channel with Demand (Input)	288

2. Diagnostic Digital Safety 8 Point Assembly B
 - Instance ID = 0x8014 (32,788)
 - Size = 288 bytes

Table 159. Diagnostic Assembly Instance - 32,788

Name	Data Type	Size in Bytes
Points [4...7]	See Diagnostic Digital Diagnostics Safety Channel with Demand (Input)	288

3. Diagnostic Digital Safety 16 Point Assembly C
 - Instance ID = 0x31F (799)
 - Size = 352 bytes

Table 160. Diagnostic Assembly Instance - 799

Name	Data Type	Size in Bytes
Points [8...11]	Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)	352

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 161. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1

Table 161. Diagnostic Assembly Instance - 769 (continued)

Name	Data Type	Size in Bytes
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

1. Diagnostic Digital Diagnostics Safety Channel with Demand (Input)
 - Size = 72 bytes

Table 162. Structure for Diagnostic Digital Diagnostics Safety Channel with Demand (Input)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
DataBits_Pad3	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	

Name	Data Type	Size in Bytes
DataBits_Pad7	BOOL	
DataBits_Pad8	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	
InternalFault	BOOL	2
OverTemperature	BOOL	
CriticalTemperature	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
DiagBits_Pad10	BOOL	
DiagBits_Pad11	BOOL	
DiagBits_Pad12	BOOL	
DiagBits_Pad13	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	DINT	4
ShortCircuitTimestamp	LINT	8

Name	Data Type	Size in Bytes
InternalFaultTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8
OverTemperatureTimestamp	LINT	8
CriticalTemperatureTimestamp	LINT	8
OnToOffTimestamp	LINT	8
OffToOnTimestamp	LINT	8

2. Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)
 - Size = 88 bytes

Table 163. Structure for Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DualChannelFault	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	

Name	Data Type	Size in Bytes
InternalFault	BOOL	2
Overload	BOOL	
ShortCircuitGround	BOOL	
OverTemperature	BOOL	
CriticalTemperature	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
DiagBits_Pad10	BOOL	
DiagBits_Pad11	BOOL	
DiagBits_Pad12	BOOL	
DiagBits_Pad13	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
DualChannelFaultTimestamp	LINT	8
InternalFaultTimestamp	LINT	8
OverloadTimestamp	LINT	8
ShortCircuitGroundTimestamp	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8
OverTemperatureTimestamp	LINT	8
CriticalTemperatureTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 164. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone

Table 164. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> 0 = No Load condition does not exist 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	A valid time or None if there is no recorded event time.

Table 164. Definitions for Diagnostic Assembly Parameters (continued)

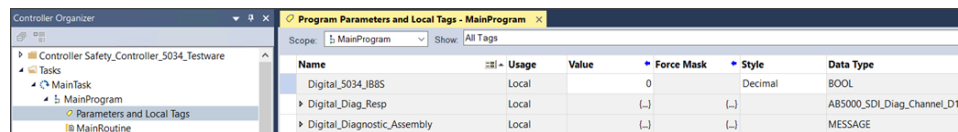
Name	Data Type	Definition	Valid Values
			Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
InternalFault	BOOL	Indicates whether an internal fault is present. If there is an internal fault, cycle power to the module. If the problem persists, contact Technical Support.	<ul style="list-style-type: none"> • 0 = No internal issue found in the product • 1 = One or more of several internal diagnostics indicate an internal issue in the product
InternalFaultTimestamp	LINT	Indicates the time of the last internal fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
Overload	BOOL	Indicates whether an overload fault is present on the point.	<ul style="list-style-type: none"> • 0 = Overload condition does not exist • 1 = Overload condition exists
OverloadTimestamp	LINT	Indicates the time of the last overload fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes

Table 164. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> SS = seconds mmm = milliseconds
OverTemperature	BOOL	Indicates whether an over temperature condition is present on the module. Over temperature means that the device is at a higher temperature than its rated operating limits.	<ul style="list-style-type: none"> 0 = Over temperature condition does not exist 1 = Module is at a higher temperature than its rated operating limits
OverTemperatureTimestamp	LINT	Indicates the time of the last over temperature condition.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
CriticalTemperature	BOOL	Indicates whether a critical temperature condition is present. Critical temperature means that the device is above the critical temperature limit for proper operation and may shut down without further warning.	<ul style="list-style-type: none"> 0 = Critical temperature condition does not exist 1 = Module is above the critical temperature limit
CriticalTemperatureTimestamp	LINT	Indicates the time of the last critical temperature condition.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:SS.mmm. <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



Name	Usage	Value	Force Mask	Style	Data Type
Digital_5034_IB8S	Local	0		Decimal	BOOL
Digital_Diag_Resp	Local	(-)	(-)		ABS000_SDI_Diag_Channel_D1
Digital_Diagnostic_Assembly	Local	(-)	(-)		MESSAGE

From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 32,787 (8013h) Diagnostic Digital Safety 8 Point Assembly A
 - 32,788 (8014h) Diagnostic Digital Safety 8 Point Assembly B
 - 799 (31Fh) Diagnostic Digital Safety 16 Point Assembly C
 - Destination element: User-defined data type suitable for the instance entered.
6. On the Communication tab, select the path to the module that you wish to send the messages to.
7. Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

Safety Function for Safety Input Module

The safety input module communicates the safe state of its input via the input data value on demand to the safety controller.

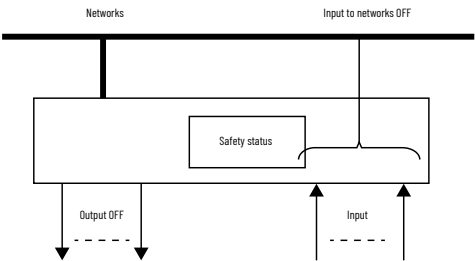
Safe State for Safety Input Module



- ATTENTION:**
- The safe state of the module and its data is defined as the off state.
 - Use safety modules only in applications where the off state is the safe state.

The safe state of the safety input module is safety input data to network = OFF.

Figure 184. Safety Status



Safety Application Suitability Levels

Table 165. Safety Application Suitability for PointMax Safety Input Modules

Suitability Level	Conditions	Notes
Applications that are rated up to, and including, SIL 2 as defined in IEC 61508, and PLc, Cat. 2 as defined in ISO 13849-1	The modules uses single-channel mode: <ul style="list-style-type: none">• Point mode is Safety Pulse Test• Point mode is Safety	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 3 applications regardless of channel mode type.
Applications that are rated up to, and including, SIL 3 as defined in IEC 61508, and PLc, Cat. 4 as defined in ISO 13849-1	<p>The modules use single-channel mode:</p> <ul style="list-style-type: none">• Point mode is Safety Pulse Test• Point mode is Safety• External Wiring Fault exclusion – Faults by the external cabling out of the protective enclosure must be avoided according to the requirements for fault exclusion by EN ISO 13849-2, Table D.4. <p>This can be handled by at least one of these measures:</p> <ul style="list-style-type: none">- Separate multicore cables- Individually shielded with earth connection <p>The modules use dual-channel mode:</p> <ul style="list-style-type: none">• Point mode is Safety Pulse Test <p>The modules use dual-channel mode:</p> <ul style="list-style-type: none">• Point mode is Safety• External Wiring Fault exclusion – Faults by the external cabling out of the protective enclosure must be avoided according to the requirements for fault exclusion by EN ISO 13849-2, Table D.4.	<ul style="list-style-type: none">• To achieve SIL 3 single-channel, the sensor that is used must be SIL 3 single-channel as well.• The requirement that Point mode be Safety Pulse Test assumes that only the safety I/O module provides diagnostics to a specific Suitability Level. <p>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.</p> <p>To achieve the specific Safety Integrity Level, see the wiring diagrams for the respective safety module.</p>

Table 165. Safety Application Suitability for PointMax Safety Input Modules (continued)

Suitability Level	Conditions	Notes
	This can be handled by at least one of these measures: <ul style="list-style-type: none"> - Separate multicore cables - Individually shielded with earth connection 	

Safety Data for Safety I/O Module

The Digital Safety Parameter Data tables list 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 IEC 61508, edition 2010.

PFD and PFH must be calculated for the devices within the system to comply with the SIL level that is required for application.

You must be responsible for following the requirements of ISO 13849-1:2023, to assess Performance Levels in their safety system.

You must validate the system functionality before starting operation. You are responsible for making sure that the system meets what is indicated in your Safety Requirement Specification. You can validate the system functionality as follows:

- You must functionally test every I/O module by individually toggling each input point and also verify that the controller detects it within the safety reaction time (SRT).
- You must individually toggle each output point by the controller and verify that the output point changes state.

For more information, see the safety controller manuals that are listed in [Additional Resources on page 12](#).

Safety Input Module Safety Data

Table 166. 5034-IB8S and 5034-IB8SXT Digital Safety Parameter Data

Attribute	Point Operation Type	
	Single Channel	Dual Channel (at controller instruction)
Total Failure Rate (λ (safety related))	3.93497E-06	3.98296E-06
Safe Failure Fraction (SFF)	99.997%	99.997%
Safe Failure Rate (λ_S)	1.96748E-06	1.99148E-06
Diagnostic Coverage (DC)	99.993%	99.994%
Safe Detected Failure Rate (λ_{SD})	1.96736E-06	1.99136E-06
Safe Undetected Failure Rate (λ_{SU})	1.28515E-10	1.23271E-10
Dangerous Failure Rate (λ_D)	1.96748E-06	1.99148E-06

Table 166. 5034-IB8S and 5034-IB8SXT Digital Safety Parameter Data (continued)

Attribute	Point Operation Type	
	Single Channel	Dual Channel (at controller instruction)
Dangerous Detected Failure Rate (λ_{DD})	1.96736E-06	1.99136E-06
Dangerous Undetected Failure Rate (λ_{DU})	1.28515E-10	1.23271E-10
Diagnostic Test Interval (DTI) (hours)	8	8
Hardware Fault Tolerance (HFT)	0	1
Spurious Trip Rate (STR)	3.949E-06	4.118E-06
Mean Time to Failure, Spurious (MTTF-spurious), (hours)	253259	242837
PFH (1/hours)	1.285E-10	1.233E-10
PFD _{avg} , at Mission Time of 20 years	1.126E-05	1.080E-05
Safety Reaction Time (SRT), (millisecond) If RPI changes, SRT (ms) = (RPI - 2) + 7 ms	7 @ RPI of 2 ms	7 @ RPI of 2 ms
Mean Time to Fail Dangerous (MTTF _D) = $1/\lambda_D$		
Mean Time to Repair (MTTR) is 8 Hours = DTI		
IMPORTANT: Faulty module is non-repairable and must be replaced with a new module within MTTR.		

Wiring Diagrams for Safety Mode and Safety Pulse Mode

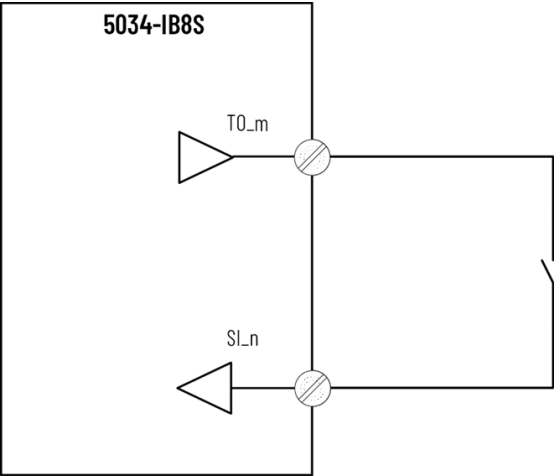
The following wiring diagrams show the input modules in Safety Mode and Safety Pulse Mode.

A Test Output (TO) can be associated to any Safety Input (SI). One TO can only be wired to a maximum of four SI.

In Safety Pulse Mode, if the external wiring shorts two SI from the same TO point, the short circuit is not detectable. Therefore, connect two SI from different TO points when in Safety Pulse Mode.

IMPORTANT: You must use an SELV/PELV-listed power supply with the safety modules.

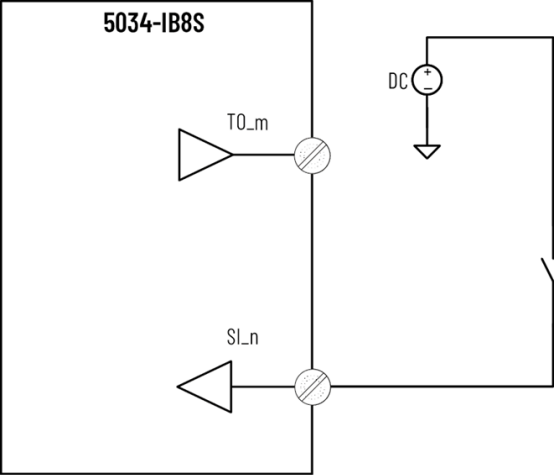
Figure 185. 5034-IB8S and 5034-IB8SXT – SIL 2, PLc, Cat. 2 in Single-channel Safety Pulse Mode



- SI_n (n = 0...7)
- T0_m (m = 0...3)
- T0 configured to pulse test mode

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 2, PLc, Cat. 2	None	External connected device must be SIL 2 rated	Safety Pulse Mode

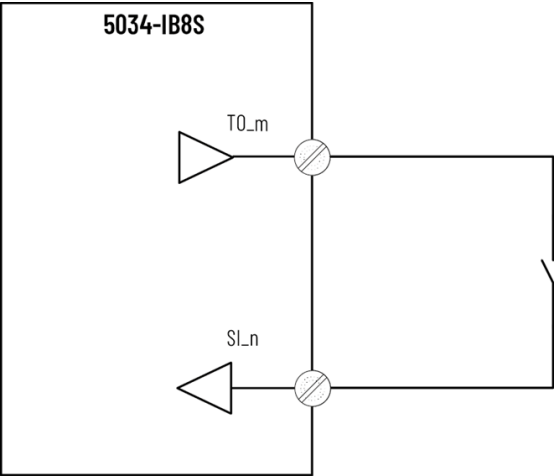
Figure 186. 5034-IB8S and 5034-IB8SXT – SIL 2, PLc, Cat. 2 in Single-channel Safety Mode



- SI_n (n = 0...7)
- T0_m (m = 0...3)
- Any T0 in power supply mode or external power supply can be used

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 2, PLc, Cat. 2	None	External connected device must be SIL 2 rated	Safety Mode

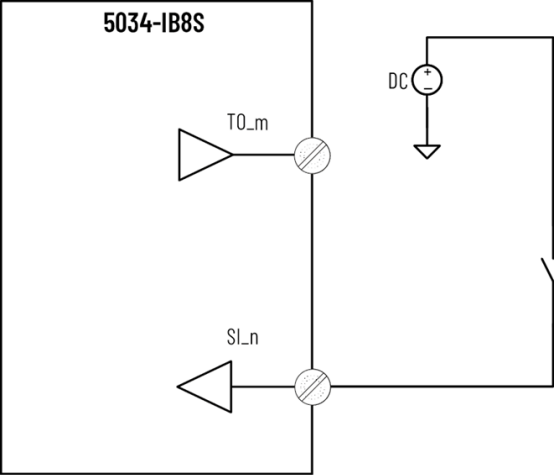
Figure 187. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Single-channel Safety Pulse Mode



- SI_n (n = 0...7)
- T0_m (m = 0...3)
- T0 configured to pulse test mode

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 3, PLe, Cat. 4	External Wiring Fault	Use SIL 3, PLe, Cat. 4 qualified sensor	Safety Pulse Mode

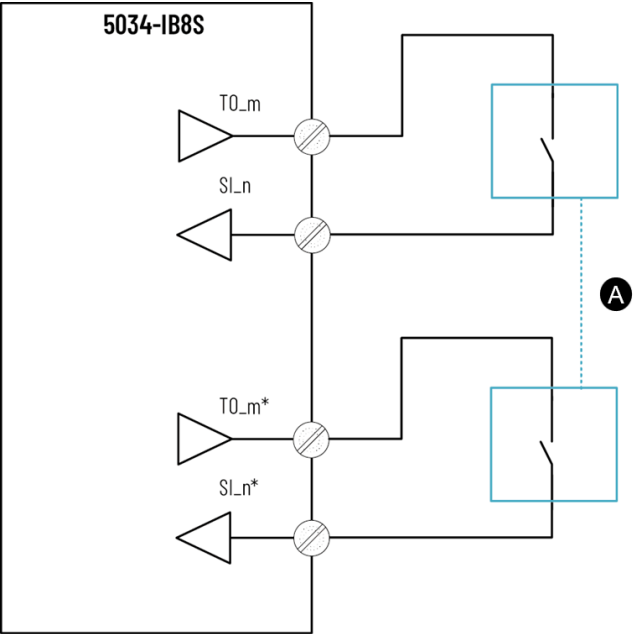
Figure 188. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Single-channel Safety Mode



- SL_n (n = 0...7)
- T0_m (m = 0...3)
- Any T0 in power supply mode or external power supply can be used

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 3, PLe, Cat. 4	External Wiring Fault	Use SIL 3, PLe, Cat. 4 qualified sensor	Safety Mode

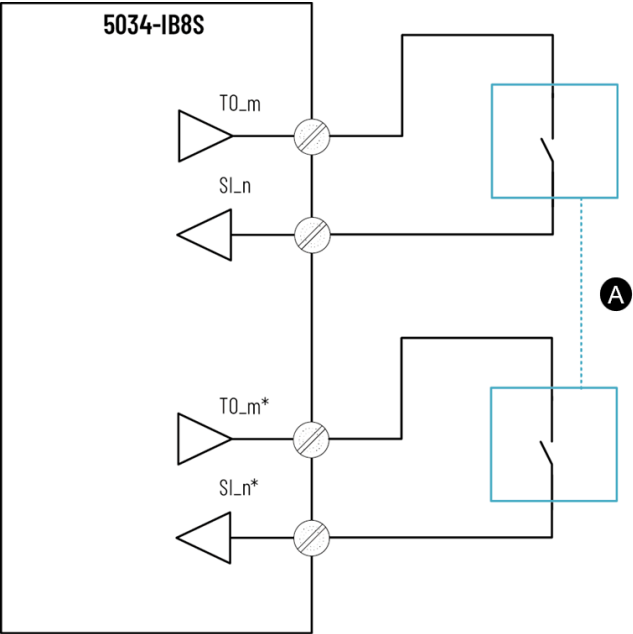
Figure 189. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Safety Pulse Mode Using 2 Single-channel



- A = Two single-channel sensors sensing same process value
- SI_n (n = 0...7)
- T0_m (m = 0...3)
- n ≠ n*
- m ≠ m*
- T0 configured to pulse test mode

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	None	Safety Pulse Mode

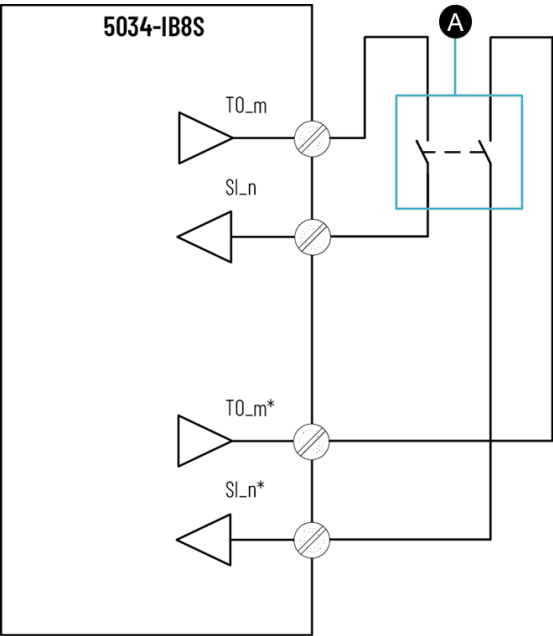
Figure 190. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Safety Mode Using 2 Single-channel



- A = Two single-channel sensors sensing same process value
- SI_n (n = 0...7)
- TO_m (m = 0...3)
- n ≠ n*
- Any TO in power supply mode or external power supply can be used

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	External Wiring Fault	Safety Mode

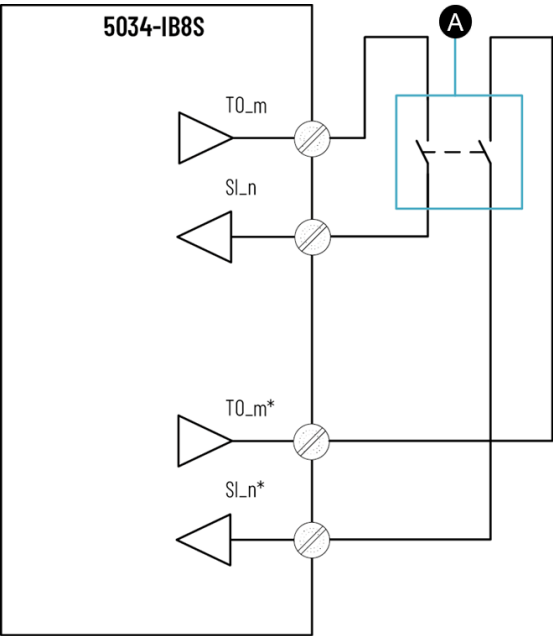
Figure 191. 5034-IB8S and 5034-IB8SXT - SIL 3, PLe, Cat. 4 in Safety Pulse Mode Using 2 Single-channel



- A = Equivalent sensor
- SI_n (n = 0...7)
- T0_m (m = 0...3)
- n ≠ n*
- m ≠ m*
- T0 configured to pulse test mode

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	None	Safety Pulse Mode

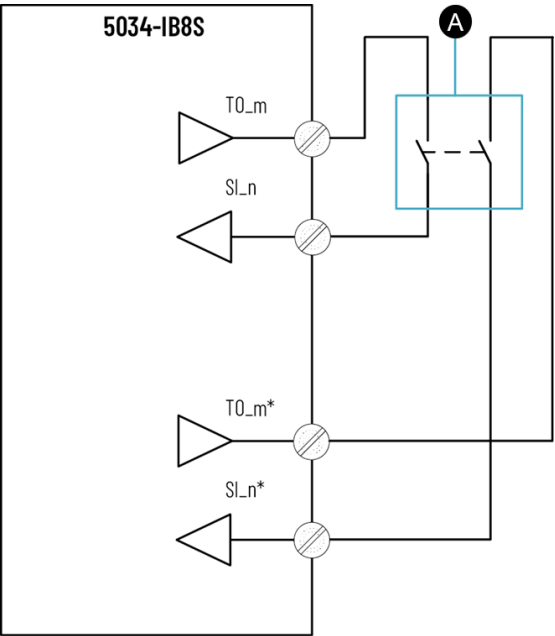
Figure 192. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Safety Mode Using 2 Single-channel



- A = Equivalent sensor
- SI_n (n = 0...7)
- T0_m (m = 0...3)
- n ≠ n*
- Any T0 in power supply mode or external power supply can be used

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	External Wiring Fault	Safety Mode

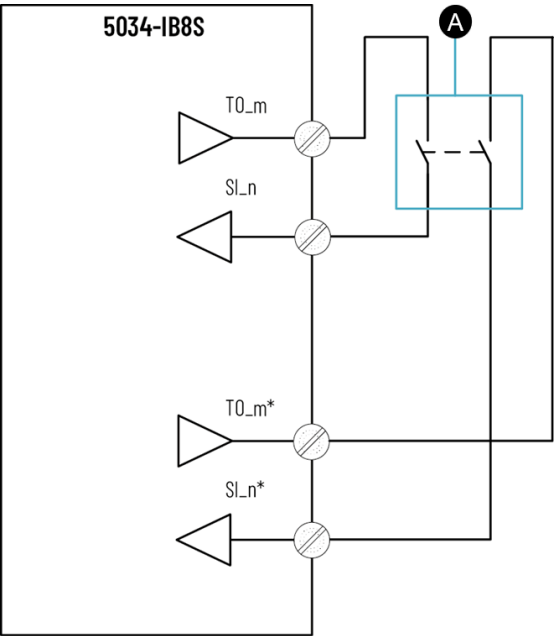
Figure 193. 5034-IB8S and 5034-IB8SXT – SIL 3, PL_e, Cat. 4 in Safety Pulse Mode Using 2 Single-channel



- A = Non-equivalent sensor
- SI_n (n = 0...7)
- T0_m (m = 0...3)
- n ≠ n*
- m ≠ m*
- T0 configured to pulse test mode

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PL _e , Cat. 4	None	Safety Pulse Mode

Figure 194. 5034-IB8S and 5034-IB8SXT – SIL 3, PLe, Cat. 4 in Safety Mode using 2 Single-channel



- A = Non-equivalent sensor
- SI_n (n = 0...7)
- T0_m (m = 0...3)
- n ≠ n*
- Any T0 in power supply mode or external power supply can be used

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	External Wiring Fault	Safety Mode

5034-OB8S and 5034-OB8SXT Details

5034-OB8S and 5034-OB8SXT Safety Digital 8 Output Modules

For more examples of wiring diagrams for 5034-OB8S and 5034-OB8SXT that can be used in functional safety applications, see the PointMax Digital I/O Modules User Manual, publication [5034-UM002](#). The wiring configuration affects the safety application level to which a PointMax safety I/O module is suitable.

Figure 195. 5034-OB8S and 5034-OB8SXT Wiring Diagram

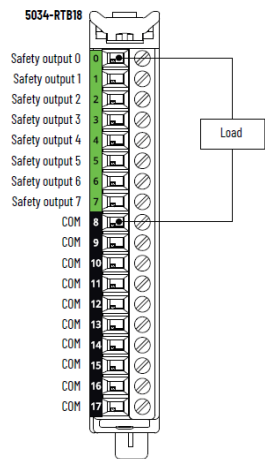


Figure 196. 5034-OB8S and 5034-OB8SXT Functional Block Diagram

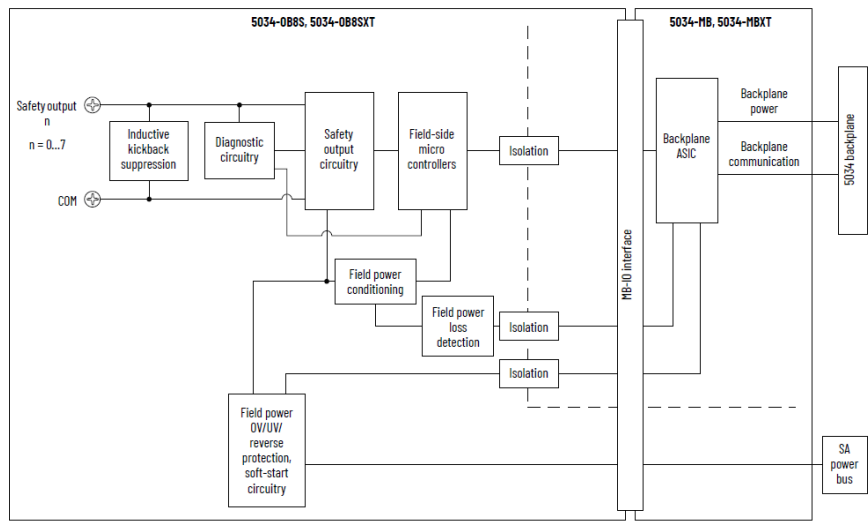


Table 167. Technical Specifications - 5034-OB8S, 5034-OB8SXT

Attribute	5034-OB8S, 5034-OB8SXT
On-state voltage range	17.5...30V DC
On-state voltage drop, max	0.5V DC @ 1 A

Table 167. Technical Specifications - 5034-OB8S, 5034-OB8SXT (continued)

Attribute	5034-OB8S, 5034-OB8SXT
Off-state voltage, max	5V DC with min 10 k Ω load
Off-state leakage current per point, max	0.5 mA
Output current rating per point, max	1 A @ 40 °C (104 °F) 0.5 A @ 60 °C (140 °F)
Output current rating per module, total	8 A @ 40 °C (104 °F) 4 A @ 60 °C (140 °F)
Field capacitance limit permitted per output, max	100 nF
Field inductance limit permitted per output, max	1.2 H @ 0.5 A
Output clamping voltage for inductive load when turned off, max	53V DC
Surge current per point, max	2.4 A for 50 ms, repeatable every 2 s The module current rating cannot exceed 10 A.
Safety class ⁽¹⁾	Up to and including Cat. 4 / PL e acc. to EN ISO 13849-1, SIL 3 acc. to IEC 61508
SRT	6 ms
Safety Test Pulse width, max	0.7 ms
Safety Test Pulse period, typical	512 ms
Open load detection diagnostics	Off state (can be enabled manually)
Output overload detection	Yes, 4 A typical
Output short to high detection	Yes in Safety Pulse Test mode
Channel-to-channel short-circuit detection	Yes in Safety Pulse Test mode
Module over-temperature detection	Yes
Output short to ground/overload protection	Yes
SA supply reverse voltage protection	Yes
SA supply overvoltage protection, max	60V DC

Table 167. Technical Specifications - 5034-OB8S, 5034-OB8SXT (continued)

Attribute	5034-OB8S, 5034-OB8SXT
(1) See the PointMax Digital I/O Modules User Manual, publication 5034-UM002 , for Safety Application Suitability Levels and Safety Data for safety modules.	

Table 168. General Specifications - 5034-OB8S, 5034-OB8SXT

Attribute	5034-OB8S, 5034-OB8SXT
Outputs per module	8
Output type	Sourcing
SA power nominal operating supply voltage	24V DC
SA power operating voltage range	18...30V DC
SA power current, nom	8.1 A @ 40 °C (104 °F) 4.1 A @ 60 °C (140 °F)
SA power current, max	8.1 A @ 40 °C (104 °F) 4.1 A @ 60 °C (140 °F)
SA power current at no load	20 mA @ 24V DC
Power dissipation, max	2.6 W @ 40 °C (104 °F) 1.4 W @ 60 °C (140 °F)
Thermal dissipation, max	8.87 BTU/hr @ 40 °C (104 °F) 4.78 BTU/hr @ 60 °C (140 °F)
Isolation voltage	250V (continuous), Basic Insulation Type, System to Field No isolation between SA power and output ports No isolation between individual output ports
RIUP support	Yes
CIP Sync	Yes, slave only ordinary clock
Electronic keying	Electronic keying via programming software
RTB key positions (slot)	1, 5, 14
RTB supported	5034-RTB18, 5034-RTB18S
Wiring category ⁽¹⁾	2 - Signal ports 2 - Power ports

Table 168. General Specifications – 5034-OB8S, 5034-OB8SXT (continued)

Attribute	5034-OB8S, 5034-OB8SXT
Wiring specification	See Wiring Specifications for Removable Terminal Blocks in the PointMax I/O System Specifications Technical Data, publication 5034-TD001
Indicators	1 green/red module status indicator 1 green/red SA power status indicator 8 yellow/red I/O status indicators
Dimensions (HxWxD), approx	123.6 x 15.0 x 66.4 mm (4.87 x 0.59 x 2.61 in.)
Weight, approx	46.0 g (1.62 oz.) – 5034-OB8S 49.0 g (1.73 oz.) – 5034-OB8SXT
Enclosure type	None (Open-style)
North American temp code	T4
UKEX/ATEX temp code	T4
IECEx temp code	T4

(1) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#). Use this Conductor Category information for planning conductor routing as described in the appropriate System Level Installation Manual.

Module Configuration

Before you start configuring your I/O module, you must create a Studio 5000 Logix Designer application project for the Logix 5000 controller that owns the I/O module. The project includes configuration data for the module.

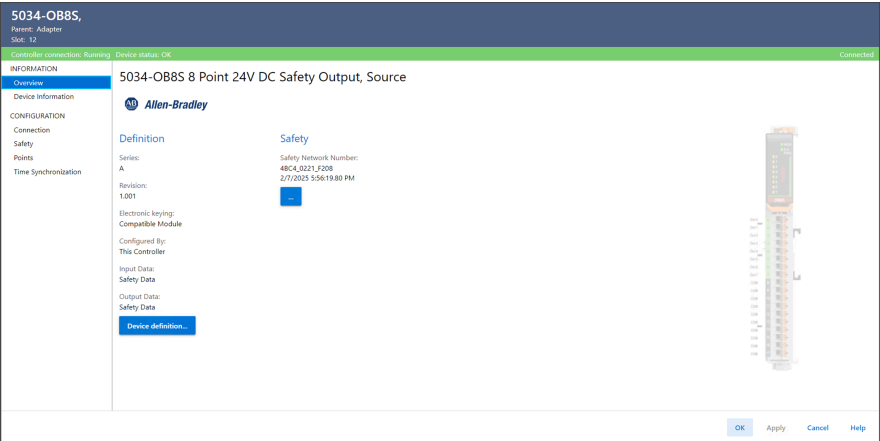
The Studio 5000 Logix Designer application transfers the project to the owner-controller during the program download. Data is then transferred to the I/O modules over the EtherNet/IP network.

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

Overview View

Use Overview to view the definition of a device, including the device type, revision, electronic keying, connection, and other device-specific values.

Figure 197. Overview View Example



Device Definition

To change the definition of a device, select Device definition in the Overview view.

Figure 198. Device Definition Example

Device definition

Device type:
5034-OB8S 8 Point 24V DC Safety Output, Source

Series:
A

Name:

Revision:
1, 001

Description:

Electronic keying:
Compatible Module

Slot:
12

Configured By:
This Controller

Input Data:
Safety Data

Output Data:
Safety Data

OK

Cancel

Help

Device Definition includes these parameters:

Table 169. Device Definition Parameters

Parameter	Definition	Available Choices
Device Type	Displays the device catalog number and type.	Device-specific
Name	Enter an IEC 61131 compliant device name. If an invalid character is entered in this field, or if the name exceeds 40 characters, the software ignores the character.	All valid values

Table 169. Device Definition Parameters (continued)

Parameter	Definition	Available Choices
Description	Enter the description of the device.	All valid values
Slot	Specify the slot number where the device resides. Only slots between 1 and the maximum number of I/O devices are valid depending on the platform. When the device is created, the slot number defaults to the first available slot position. When the controller is changed to one supporting a smaller maximum I/O count, the current slot value may no longer be valid.	1...32
Series	Specifies the series of the device.	Device-specific
Revision	Specifies the major and minor revisions of the device. The valid range for minor revision is from 1...255.	Device-specific
Electronic Keying	Defines the electronic keying used for the device. Electronic keying compares the device defined in the project to the installed device. If keying fails, a fault occurs. For detailed information on Electronic keying, see Electronic Keying in Logix 5000 Control Systems Application Technique, publication LOGIX-AT001 .	<ul style="list-style-type: none"> Exact Match Compatible Module
Configured By	Determines which tags are generated when configuration is complete. For the External Means choice, the controller and module establish communication without the controller sending any configuration or output data to the module.	<ul style="list-style-type: none"> External Means This Controller
Input Data	Select the input data type for the device.	<ul style="list-style-type: none"> Safety Data Safety Packed Data
Output Data	Select the output data type for the device.	<ul style="list-style-type: none"> None – If Configured By is set to External Means Safety Data – If Configured By is set to This Controller Safety Packed Data – If Input Data is set to Safety Packed Data

Safety Network Number

The Studio 5000 Logix Designer application automatically assigns a Safety Network Number (SNN) to safety modules as they are added to the project.

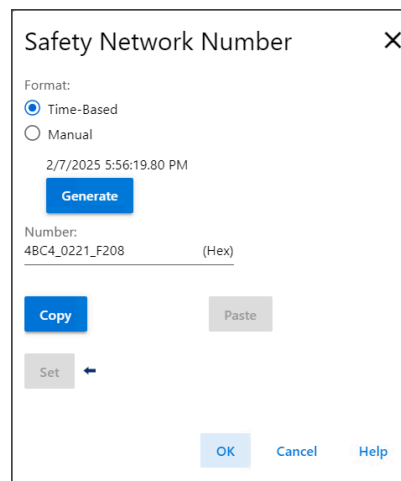
The SNN is a time-based number that uniquely identifies subnets across all networks in the safety system. All safety modules in a same system use the same SNN and are automatically assigned the same SNN by default.

The Studio 5000 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 Controllers Safety Reference Manual, publication [1756-RM012](#).

To change the SNN of a device, select the ellipses next to the SNN field in the General view.

Figure 199. Safety Network Number Example



The screenshot shows a dialog box titled "Safety Network Number" with a close button (X) in the top right corner. Inside the dialog, there is a "Format:" section with two radio buttons: "Time-Based" (which is selected) and "Manual". Below this, a timestamp "2/7/2025 5:56:19.80 PM" is displayed above a blue "Generate" button. Underneath, the "Number:" field shows "4BC4_0221_F208" followed by "(Hex)". There are "Copy" and "Paste" buttons below the number field. At the bottom left, there is a "Set" button with a left-pointing arrow. At the bottom right, there are "OK", "Cancel", and "Help" buttons.

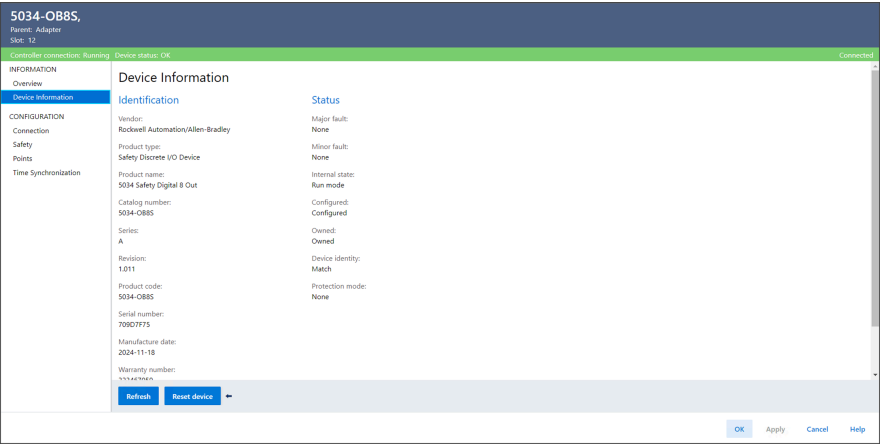
Device Information View

Use Device Information to view device and status information when the device is online.

Use Device Information to:

- Determine the identity of the device.
- View the device's current operational state.
- View whether the device was configured by the owner controller.
- View whether an owner controller is currently connected to the device.
- Retrieve the latest information from the device.
- Reset a device to its power-up state.
- If supported, view the Protection Mode of the device.

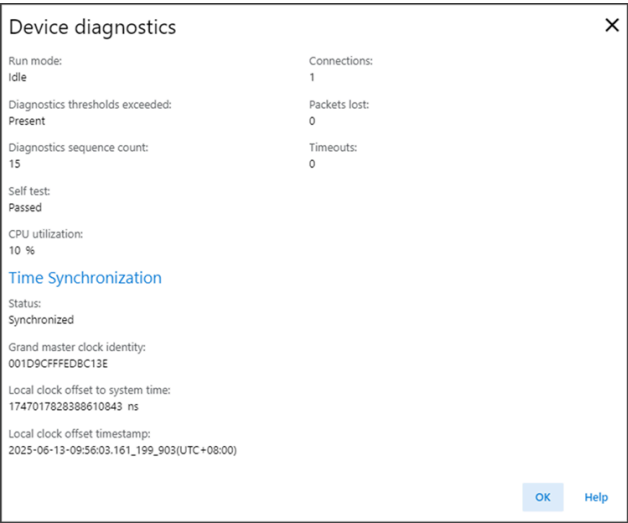
Figure 200. Device Information View Example



Device Diagnostics

To view the device diagnostics, select Diagnostics in the Device Information view.

Figure 201. Device Diagnostics Example



Connection View

Use Connection to define controller-to-device behavior.

IMPORTANT: For PointMax safety I/O modules, you set the RPI on the Safety view.

- Select Unicast or Multicast connection to use on the EtherNet/IP network. For more information, see [Unicast or Multicast Connection on page 27](#).
- View the reason of Connection Fault.



If there is a connection fault, the Module Fault area displays the error code with a description that helps you to troubleshoot the module. For more information, see [Troubleshoot Your Module on page 68](#).

- Inhibit the module. For more information, see [Module Inhibiting on page 25](#).

- Configure fault response for connection failure while the controller is in Run Mode.
- Enable or disable Automatic Diagnostics.



ATTENTION: If you do not enable Automatic Diagnostics, the device does not publish diagnostics to FactoryTalk Alarms and Events.

Figure 202. Connection View Example

Connection Type	Value	Range	Connection over EtherNet/IP
Safety Input	20.0	ms	Set on Safety View
Safety Output	20.0	ms	Set by Safety Task

Connection over EtherNet/IP

PointMax 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, the connection is set to Unicast and N/A is shown. You cannot change this parameter.

Safety View

Safety lets you set the RPI rate.

Figure 203. Safety View Example

Connection Type	Requested Packet Interval (RPI)	Connection Reaction Time Limit	Time	Action
Safety Input	20	ms	80	ms 3.7
Safety Output	20	ms	60	ms 3.6

Connection Reaction Time Limit

To change the Connection Reaction Time Limit configuration, select Advanced in the Safety view. For more information, see [Connection Reaction Time Limit With Safety Modules on page 38](#).

IMPORTANT: The Safety Task Period determines the RPI of the safety output.

Figure 204. Advanced Connection Reaction Time Limit Configuration Example

Advanced connection reaction time limit

Input

Requested Packet Interval (RPI):
20 ms
(2 - 500)

Timeout multiplier:
2
(1 - 4)

Network delay multiplier:
200 %
(10 - 600)

Connection reaction time limit:
80 ms

Output

Requested Packet Interval (RPI):
20 ms

Safety Task Period

Timeout multiplier:
2
(1 - 4)

Network delay multiplier:
200 %
(10 - 600)

Connection reaction time limit:
60 ms

OK

Cancel

Help

Points View

Points is only available if you choose This Controller for the Configured By parameter on the Device Definition dialog.

You must configure each point to use it in a safety application. The outputs are disabled by default.

Figure 205. Points View Example

5034-OB8S,
Parent: Adapter
Slot: 1/2

Controller connection: Running Device status: OK

Connected

INFORMATION
Overview
Device Information
CONFIGURATION
Connection
Safety
Points
Time Synchronization

Points

Point	Point Operation Type	Point Mode	☐ Enable No Load Diagnostics	Diagnostics
00	Dual	Safety	☐	↕
01		Safety	☐	↕
02		Safety Pulse Test	☐	↕
03	Dual	Safety Pulse Test	☐	↕
04		Safety	☐	↕
05		Safety Pulse Test	☐	↕
06	Dual	Not Used	☐	↕
07		Not Used	☐	↕

☐ Latch fault until reset via output tag

OK

Apply

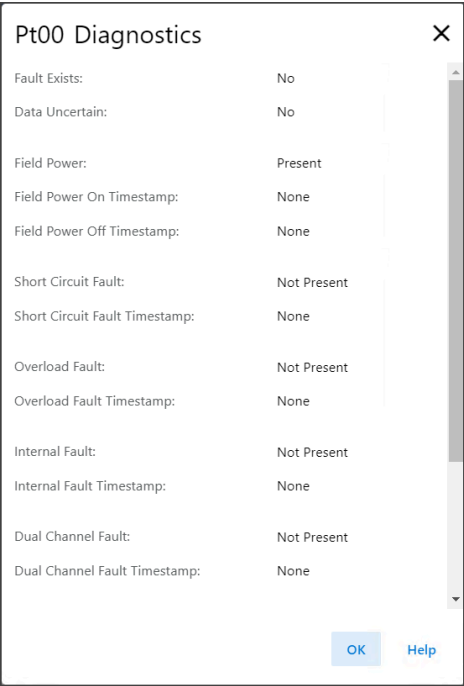
Cancel

Help

Pttx Diagnostics

To view the Pttx diagnostics, select Diagnostics in the Points view.

Figure 206. Ptxx Diagnostics Example

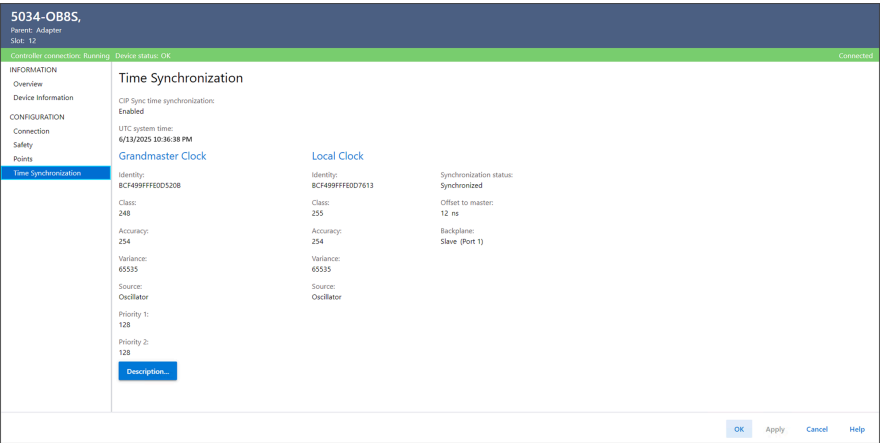


Time Synchronization View

The Time Synchronization view is read-only and displays the CIP Sync status information about the module when the project is online. Time Synchronization displays the following information:

- CIP Sync time synchronization status
- UTC system time
- Grandmaster Clock information
- Grandmaster Clock description
- Local Clock information

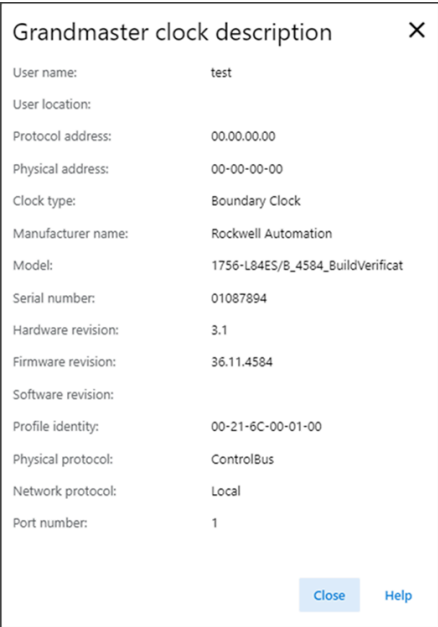
Figure 207. Time Synchronization View Example



Grandmaster Clock Description

The Grandmaster clock description dialog provides detailed information about the grandmaster clock. To view the Grandmaster clock description, select Description in the Time Synchronization view.

Figure 208. Grandmaster Clock Description Example



Use the Status Indicators for Troubleshooting

PointMax I/O modules use the following status indicators:

- SA Power Indicator – This indicator operates the same for all PointMax I/O modules.
- Module Status Indicator – This indicator operates the same for all PointMax I/O modules.
- Point Status Indicator – This indicator operates differently based on the module type you are using.

SA Power Status Indicator

Table 170. Interpret SA Power Indicator – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	The module is not powered. A safety connection cannot be made or maintained.	Complete the following actions: 1. Confirm that the system is powered. 2. Confirm that the module is installed properly.

Table 170. Interpret SA Power Indicator – Safety I/O Modules (continued)

Indicator State	Description	Recommended Action
Steady green	There is SA power to the module	None
Steady red	<ul style="list-style-type: none"> There is no SA power to the module. SA voltage is not within a valid range. A safety connection cannot be made or maintained.	Complete the following actions: <ol style="list-style-type: none"> Confirm that the SA Power wiring on the terminal block is installed properly. Check the following: <ul style="list-style-type: none"> Confirm that there is sufficient voltage supplied to the module. If an external power supply is used, confirm that the power supply is turned on. Confirm that the SA voltage is within the correct range (18...30V).

Module Status Indicators

Table 171. Interpret Module Status Indicator – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	The module is not powered.	Complete the following actions: <ol 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 a controller and is operating normally.	None
Flashing green	One of the following conditions exist: <ul style="list-style-type: none"> The module has powered up successfully. The module is OK, but it does not have a connection. No connection can result from missing, incomplete, or incorrect module configuration. <ul style="list-style-type: none"> A connection can be established with the controller, but initial time coordination exchange is not complete. Connection to an output module is in the idle state. 	Complete the following actions: <ul style="list-style-type: none"> Troubleshoot your Studio 5000 Logix Designer application to determine what is preventing a connection from the module to the controller and correct the issue. Confirm that the system conditions require the controller to be in Remote Run mode or Run mode, transition the controller to one of those modes.
Steady red	The module experienced a nonrecoverable fault.	Complete the following actions: <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	One of the following conditions exist: <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. 	Complete one of the following: <ul style="list-style-type: none"> Let the firmware update progress complete. Reattempt a firmware update after one fails. Use the Studio 5000 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.

Table 171. Interpret Module Status Indicator – Safety I/O Modules (continued)

Indicator State	Description	Recommended Action
		<p>To clear a recoverable fault, complete one of the following:</p> <ul style="list-style-type: none"> - Cycle module power. - Select Reset Module in the Studio 5000 Logix Designer project via the Module Info category of the Module Properties dialog. <p>If the fault does not clear after cycling power and module reset, contact Rockwell Automation Technical Support.</p> <ul style="list-style-type: none"> • Use the Studio 5000 Logix Designer application to determine if a connection has timed out. The Connection view in the Module Properties indicates whether a connection request has timed out. <p>If a connection has timed out, determine the cause and correct it. For example, a cable failure can cause a connection timeout.</p>
Flashing red/green	This pattern indicates that a UNID for the safety device needs to be configured.	None

Point Status Indicators – Safety Digital I/O Modules

Table 172. Point Status Indicators – Safety I/O Modules

Indicator State	Description	Recommended Action
Off	<p>One of the following:</p> <ul style="list-style-type: none"> • The point is Off. • There is no backplane power. • The point is not used. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Confirm that the point is configured properly. • Confirm that there is backplane power supplied through the EtherNet/IP adapter.
Steady yellow	The point is On.	None
Flashing red	The module experienced one or more recoverable faults.	Locate and correct the faults.
Steady red	<p>One of the following:</p> <ul style="list-style-type: none"> • A Field Power Loss condition exists. • An internal channel fault exists. 	<p>One of the following:</p> <ul style="list-style-type: none"> • Locate and correct the cause of field power loss condition. • Locate and correct the internal fault.

Module Tag Definitions

Module tags are created when you add a module to the Studio 5000 Logix Designer application project. The set of module tags associated with a module depends on the module type and Device Definition choices made during module configuration. The tables contained in this section list all of the 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.

Input Tag Definitions

Table 173. Input Tags

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
ConnectionFaulted	BOOL	Indicates if a connection to the target is running. The module always returns a zero in this member. The controller overwrites the zero with a one when the connection is not up.	<ul style="list-style-type: none"> 0 = Connection is running. 1 = Connection is 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 are active. 1 = One or more diagnostics are active or the prognostics threshold is reached.
Uncertain (Packed data)	BOOL	Indicates if the module is operating outside the designed operating range (such as temperature). If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	-128...+127 The value of 0 is skipped except during module powerup.
Pttx.Fault	BOOL	One of the following: <ul style="list-style-type: none"> Indicates that point data is inaccurate and cannot be trusted for use in the application. The point is set to Not Used. If the tag is set to 1, you must troubleshoot the module to correct the cause of the fault.	<ul style="list-style-type: none"> 0 = Good data 1 = Bad data (faulted), or set to Not Used
Pttx.Uncertain	BOOL	Indicates that the point data can be inaccurate but the degree of inaccuracy is not known. If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
Pttx.Readback PttxReadback (Packed data)	BOOL	Indicates the current readback from the screw.	<ul style="list-style-type: none"> 0 = Off 1 = On
Pttx.Status PttxStatus (Packed data)	BOOL	Indicates the status of the point.	<ul style="list-style-type: none"> 0 = Bad data (faulted), or set to Not Used 1 = Good

Output Tag Definitions

Table 174. Output Tags

Name	Data Type	Definition	Valid Values
Ptxx.Data PtxxData (Packed data)	BOOL	Indicates the current digital output value.	<ul style="list-style-type: none"> 0 = Off 1 = On
Ptxx.ResetFault PtxxResetFault (Packed data)	BOOL	<p>When Latch Fault until Reset via Output Tag is enabled, the I/O point holds safety output fault indications until it checks that the fault is removed.</p> <p>If the fault is removed, it clears only the fault status upon detecting that the ResetFault bit in its point sees a 0 to 1 transition.</p>	A 0 to 1 transition unlatches the fault.

Diagnostic Assembly

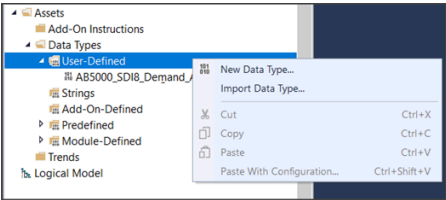
Diagnostic assembly helps you troubleshoot and diagnose the fault in your system.

Create User-defined Diagnostic Assembly Types

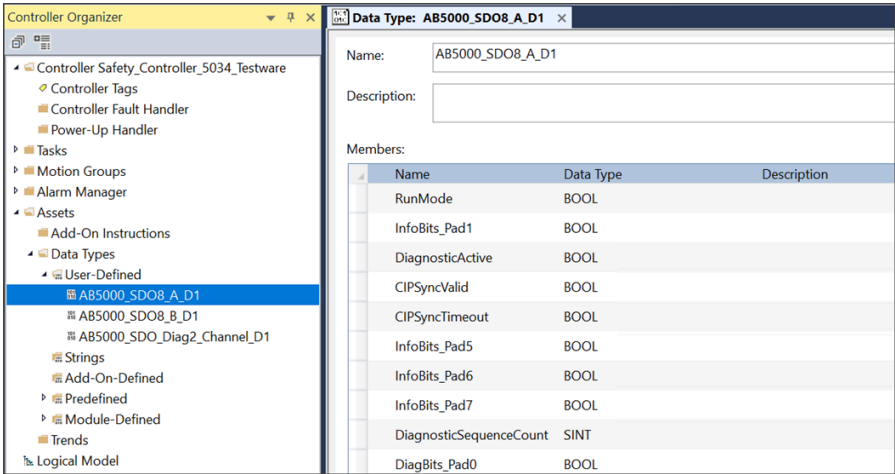
You can use the Studio 5000 Logix Designer application to create user-defined Diagnostic Assembly types.

Create user-defined diagnostic assembly by following the below steps:

- From the Controller Organizer pane, go to Assets → Data types → User-Defined.
- Right-click on the User-Defined folder and select New Data Type.



- 3. Add a Name and Description (optional) for your diagnostic assembly.
- 4. Under Members area, add the data members based on the diagnostic assembly detailed below.



IMPORTANT: The members indicated in the tables are arranged according to Data Alignment Rules of controllers. Strictly follow the data type and the sequence of the members that are indicated in the tables of this appendix. If the data type and the sequence are not followed, data misalignment may occur after executing Get Attribute Single Message (MSG) instruction.

Diagnostic Assembly Definition

- 1. Diagnostic Digital Safety 8 Output Point Assembly A
 - Instance ID = 0x8016 (32,790)
 - Size = 384 bytes

Table 175. Diagnostic Assembly Instance - 32,790

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
CIPSyncValid	BOOL	
CIPSyncTimeout	BOOL	
InfoBits_Pad5	BOOL	
FieldPowerOff	BOOL	
InfoBits_Pad7	BOOL	1
DiagnosticSequenceCount	SINT	

Name	Data Type	Size in Bytes
DiagBits_Pad0	BOOL	2
DiagBits_Pad1	BOOL	
DiagBits_Pad2	BOOL	
DiagBits_Pad3	BOOL	
DiagBits_Pad4	BOOL	
DiagBits_Pad5	BOOL	
DiagBits_Pad6	BOOL	
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
BaseUnsupportedFault This field is not used, but you must include it in the data structure.	BOOL	
BaseIDFault This field is not used, but you must include it in the data structure.	BOOL	
FlashUpdateRequired	BOOL	
SelfTestFault	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	DINT	4
LocalClockOffset	LINT	8
LocalClockOffsetTimestamp	LINT	8
GrandMasterClockID[8]	SINT	8
Points [0...3]	See Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)	352

2. Diagnostic Digital Safety 8 Output Point Assembly B
 - Instance ID = 0x8017 (32,791)
 - Size = 352 bytes

Table 176. Diagnostic Assembly Instance - 32,791

Name	Data Type	Size in Bytes
Points [4...7]	See Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)	288

Diagnostic Counters

Diagnostic Counters Assembly for I/O

- Instance ID = 0x301 (769)
- Size = 16 bytes

Table 177. Diagnostic Assembly Instance - 769

Name	Data Type	Size in Bytes
RunMode	BOOL	1
InfoBits_Pad1	BOOL	
DiagnosticActive	BOOL	
InfoBits_Pad3	BOOL	
InfoBits_Pad4	BOOL	
InfoBits_Pad5	BOOL	
InfoBits_Pad6	BOOL	
InfoBits_Pad7	BOOL	
DiagnosticSequenceCount	SINT	1
CIPConnections	INT	2
CIPLostPackets	DINT	4
CIPTimeouts	DINT	4
CPUUtilization	INT	2
Pad	INT	2

Diagnostic Channel Definition

This data type is retrieved as part of the diagnostic assembly instance.

Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)

- Size = 88 bytes

Table 178. Structure for Diagnostic Digital Safety Diagnostics 2 Input Channel (Output)

Name	Data Type	Size in Bytes
DataBits_Pad0	BOOL	2
Fault	BOOL	
Uncertain	BOOL	
NoLoad	BOOL	
ShortCircuit	BOOL	
DataBits_Pad5	BOOL	
FieldPowerOff	BOOL	
DataBits_Pad7	BOOL	
DualChannelFault	BOOL	
DataBits_Pad9	BOOL	
DataBits_Pad10	BOOL	
DataBits_Pad11	BOOL	
DataBits_Pad12	BOOL	
DataBits_Pad13	BOOL	
DataBits_Pad14	BOOL	
DataBits_Pad15	BOOL	2
InternalFault	BOOL	
Overload	BOOL	
ShortCircuitGround	BOOL	
This field is not used, but you must include it in the data structure.		
OverTemperature	BOOL	
CriticalTemperature	BOOL	
SafeStateNotChecked24Hours	BOOL	
SafeStateNotChecked6Months	BOOL	

Table 178. Structure for Diagnostic Digital Safety Diagnostics 2 Input Channel (Output) (continued)

Name	Data Type	Size in Bytes
DiagBits_Pad7	BOOL	
DiagBits_Pad8	BOOL	
DiagBits_Pad9	BOOL	
DiagBits_Pad10	BOOL	
DiagBits_Pad11	BOOL	
DiagBits_Pad12	BOOL	
DiagBits_Pad13	BOOL	
DiagBits_Pad14	BOOL	
DiagBits_Pad15	BOOL	
Pad	DINT	4
NoLoadTimestamp	LINT	8
ShortCircuitTimestamp	LINT	8
DualChannelFaultTimestamp	LINT	8
InternalFaultTimestamp	LINT	8
OverloadTimestamp	LINT	8
ShortCircuitGroundTimestamp This field is not used, but you must include it in the data structure.	LINT	8
FieldPowerOnTimestamp	LINT	8
FieldPowerOffTimestamp	LINT	8
OverTemperatureTimestamp	LINT	8
CriticalTemperatureTimestamp	LINT	8

Definitions for Diagnostic Assembly Parameters

Table 179. Definitions for Diagnostic Assembly Parameters

Name	Data Type	Definition	Valid Values
RunMode	BOOL	The module's operating state	<ul style="list-style-type: none"> 0 = Idle 1 = Run
DiagnosticActive	BOOL	Indicates if any diagnostics are active or if the prognostics threshold is reached.	<ul style="list-style-type: none"> 0 = No diagnostics are 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. A set bit alone cannot indicate that it is synced to the same master clock of the owner controller. You must compare the Grandmaster Clock ID of both the module and the owner controller.	<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 the module is not synced 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 master time.
DiagnosticSequenceCount	SINT	Increments for each time a distinct diagnostic condition is detected, and when a distinct diagnostic condition transitions from detected to not detected.	<p>-128...+127</p> <p>The value of 0 is skipped except during module powerup.</p>
LocalClockOffset	LINT	The offset from the local clock to the system time. This value helps to detect steps in time. This value updates when a PTP update is received.	All values
LocalClockOffsetTimestamp	LINT	Indicates the time of the local clock offset.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MMDD-HH:mm:ss_mmm_uuu_nnn(UTC-00:00).</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds uuu = microseconds nnn = nanoseconds UTC-00:00 = Time zone

Table 179. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
GrandMasterClockID	SINT[8]	The EUI-64 Identity of the CIP Sync Grandmaster clock the module is synced to	All values
Fault	BOOL	<p>Indicates that the data is inaccurate and cannot be trusted for use in the application.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good 1 = Bad, causing fault
Uncertain	BOOL	<p>Indicates that the data can be inaccurate but the degree of inaccuracy is not known.</p> <p>If the tag is set to 1, you must troubleshoot the module to correct the cause of the inaccuracy.</p> <hr/> <p>IMPORTANT: Once the condition that causes the tag to change to 1 is removed, the tag automatically resets to 0.</p> <hr/>	<ul style="list-style-type: none"> 0 = Good data 1 = Uncertain data
FieldPowerOff	BOOL	Indicates that a field power loss condition exists on the point.	<ul style="list-style-type: none"> 0 = Field power off condition does not exist 1 = Field power off condition exists
FieldPowerOnTimestamp	LINT	Indicates the time of the last field power turned on event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
FieldPowerOffTimestamp	LINT	Indicates the time of the last field power turned off event.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:ss.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
NoLoad	BOOL	Indicates whether a load fault is present.	<ul style="list-style-type: none"> 0 = No Load condition does not exist 1 = No Load condition exists
NoLoadTimestamp	LINT	Indicates the time of the last No Load fault.	A valid time or None if there is no recorded event time.

Table 179. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
			Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
ShortCircuit	BOOL	Indicates whether an output short circuit to high is present on the point.	<ul style="list-style-type: none"> • 0 = Short Circuit condition does not exist • 1 = Short Circuit condition exists
ShortCircuitTimestamp	LINT	Indicates the time of the last short circuit fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
DualChannelFault	BOOL	Indicates whether a dual channel fault is present.	<ul style="list-style-type: none"> • 0 = Good • 1 = Fault Present
DualChannelFaultTimestamp	LINT	Indicates the time of the last dual channel fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes • SS = seconds • mmm = milliseconds
InternalFault	BOOL	Indicates whether an internal fault is present. If there is an internal fault, cycle power to the module. If the problem persists, contact Technical Support.	<ul style="list-style-type: none"> • 0 = No internal issue found in the product • 1 = One or more of several internal diagnostics indicate an internal issue in the product
InternalFaultTimestamp	LINT	Indicates the time of the last internal fault.	A valid time or None if there is no recorded event time. Time format is YYYY-MM-DD-HH:mm:ss.mmm. <ul style="list-style-type: none"> • YYYY = year • MM = month • DD = day • HH = hour (24 hour) • mm = minutes

Table 179. Definitions for Diagnostic Assembly Parameters (continued)

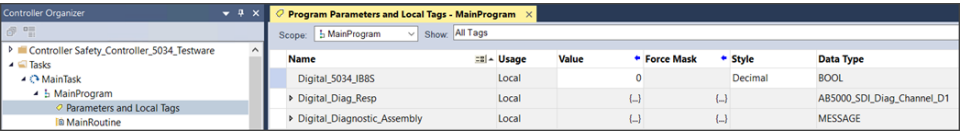
Name	Data Type	Definition	Valid Values
			<ul style="list-style-type: none"> SS = seconds mmm = milliseconds
Overload	BOOL	Indicates whether an overload fault is present on the point.	<ul style="list-style-type: none"> 0 = Overload condition does not exist 1 = Overload condition exists
OverloadTimestamp	LINT	Indicates the time of the last overload fault.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
OverTemperature	BOOL	<p>Indicates whether an over temperature condition is present on the module.</p> <p>Over temperature means that the device is at a higher temperature than its rated operating limits.</p>	<ul style="list-style-type: none"> 0 = Over temperature condition does not exist 1 = Module is at a higher temperature than its rated operating limits
OverTemperatureTimestamp	LINT	Indicates the time of the last over temperature condition.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds
CriticalTemperature	BOOL	<p>Indicates whether a critical temperature condition is present.</p> <p>Critical temperature means that the device is above the critical temperature limit for proper operation and may shut down without further warning.</p>	<ul style="list-style-type: none"> 0 = Critical temperature condition does not exist 1 = Module is above the critical temperature limit
CriticalTemperatureTimestamp	LINT	Indicates the time of the last critical temperature condition.	<p>A valid time or None if there is no recorded event time.</p> <p>Time format is YYYY-MM-DD-HH:mm:SS.mmm.</p> <ul style="list-style-type: none"> YYYY = year MM = month DD = day HH = hour (24 hour) mm = minutes SS = seconds mmm = milliseconds

Table 179. Definitions for Diagnostic Assembly Parameters (continued)

Name	Data Type	Definition	Valid Values
CIPConnections	INT	Indicates the number of CIP connections that are currently open.	0...24
CIPLostPackets	DINT	Indicates the running sum of the number of Sequenced Address Item Sequence Numbers that are skipped in Class 0 and Class 1 connections consumed by the adapter and its children.	0...2,147,483,647
CIPTimeouts	DINT	Indicates the running count of the number of connections that time out, both originated and targeted, to and through the adapter.	0...2,147,483,647
CPUUtilization	INT	Indicates the usage of the compute engine.	0...100%

Create Message Type User Tags

Create MESSAGE type user tags for requests and associated response user tags for each of the new user-defined diagnostic assembly types.



From the Controller Organizer pane, expand Tasks → MainTask → MainProgram:

1. Create MESSAGE type user tags for each request.
2. Create associated response user tags for each new user-defined diagnostic assembly type.
3. Add the user tags to your ladder program.



4. Expand the message tag to open the message configuration dialog.
5. On the Configuration tab, select:
 - Service type: Get Attribute Single
 - Class: 4
 - Attribute: 3
 - Instance:
 - 32,790 (8016h) Diagnostic Digital Safety 8 Output Point Assembly A
 - 32,791 (8017h) Diagnostic Digital Safety 8 Output Point Assembly B
 - Destination element: User-defined data type suitable for the instance entered.

- On the Communication tab, select the path to the module that you wish to send the messages to.
- Download the project and set to Run mode.
You can monitor the user-defined tag values from the Program Parameters and Local Tags window, under the MainProgram task in the Controller Organizer pane.

Safety Function for Safety Output Module

The safety output module transitions its output to safe state when commanded from the safety controller.

Safe State for Safety Output Module

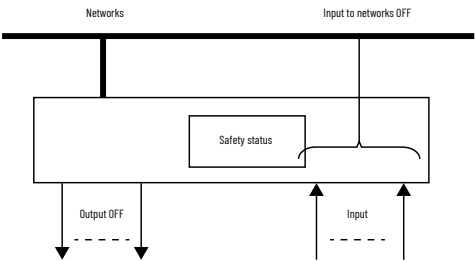


ATTENTION:

- The safe state of the outputs is defined as the off state.
- Use safety modules only in applications where the off state is the safe state.

The safe state of the safety output module is safety outputs = OFF.

Figure 209. Safety Status



Safety Application Suitability Levels

Table 180. Safety Application Suitability for PointMax Safety Output Modules

Suitability Level	Conditions	Notes
Applications that are rated up to, and including, SIL 2 as defined in IEC 61508, and PLc, Cat. 2 as defined in ISO 13849-1	The modules uses single-channel mode: <ul style="list-style-type: none"> Point mode is Safety Pulse Test Point mode is Safety – You must functionally test and verify that the output point can go to the safe state at least every 6 months. 	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 3 applications regardless of channel mode type. To achieve SIL 3 single-channel, the sensor that is used must be SIL 3 single-channel as well. The requirement that Point mode be Safety Pulse Test assumes that only the safety I/O module provides diagnostics to a specific Suitability Level.
Applications that are rated up to, and including, SIL 3 as defined in IEC 61508, and PLe, Cat. 4 as defined in ISO 13849-1	The modules use single-channel mode: <ul style="list-style-type: none"> Point mode is Safety Pulse Test Point mode is Safety – You must functionally test and verify that the output point can go to the safe state at least every 24 hours. Use IEC 60947 certified Safety Contactor External Wiring Fault exclusion – Faults by the external cabling out of the protective enclosure must be avoided 	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.

Table 180. Safety Application Suitability for PointMax Safety Output Modules (continued)

Suitability Level	Conditions	Notes
	<p>according to the requirements for fault exclusion by EN ISO 13849-2, Table D.4.</p> <p>This can be handled by at least one of these measures:</p> <ul style="list-style-type: none"> - Separate multicore cables - Individually shielded with earth connection <p>The modules use dual-channel mode:</p> <ul style="list-style-type: none"> • Point mode is Safety Pulse Test <p>The modules use dual-channel mode:</p> <ul style="list-style-type: none"> • Point mode is Safety – You must functionally test and verify that the output point can go to the safe state at least every 24 hours. • External Wiring Fault exclusion – Faults by the external cabling out of the protective enclosure must be avoided according to the requirements for fault exclusion by EN ISO 13849-2, Table D.4. <p>This can be handled by at least one of these measures:</p> <ul style="list-style-type: none"> - Separate multicore cables - Individually shielded with earth connection 	To achieve the specific Safety Integrity Level, see the wiring diagrams for the respective safety module.

Safety Data for Safety I/O Module

The Digital Safety Parameter Data tables list 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 IEC 61508, edition 2010.

PFD and PFH must be calculated for the devices within the system to comply with the SIL level that is required for application.

You must be responsible for following the requirements of ISO 13849-1:2023, to assess Performance Levels in their safety system.

You must validate the system functionality before starting operation. You are responsible for making sure that the system meets what is indicated in your Safety Requirement Specification. You can validate the system functionality as follows:

- You must functionally test every I/O module by individually toggling each input point and also verify that the controller detects it within the safety reaction time (SRT).
- You must individually toggle each output point by the controller and verify that the output point changes state.

For more information, see the safety controller manuals that are listed in [Additional Resources on page 12](#).

Safety Output Module Safety Data

Table 181. 5034-OB8S and 5034-OB8SXT Digital Safety Parameter Data

Attribute	Point Operation Type	
	Single Channel	Dual Channel
Total Failure Rate (λ (safety related))	4.00535E-06	4.09320E-06
Safe Failure Fraction (SFF)	99.997%	99.997%
Safe Failure Rate (λ_S)	2.00268E-06	2.04659E-06
Diagnostic Coverage (DC)	99.993%	99.994%
Safe Detected Failure Rate (λ_{SD})	2.00254E-06	2.04647E-06
Safe Undetected Failure Rate (λ_{SU})	1.31748E-10	1.21184E-10
Dangerous Failure Rate (λ_D)	2.00268E-06	2.04660E-06
Dangerous Detected Failure Rate (λ_{DD})	2.00254E-06	2.04648E-06
Dangerous Undetected Failure Rate (λ_{DU})	1.31748E-10	1.21184E-10
Diagnostic Test Interval (DTI) (hours)	8	8
Hardware Fault Tolerance (HFT)	0	1
Spurious Trip Rate (STR)	3.366E-06	3.874E-06
Mean Time to Failure, Spurious (MTTF-spurious), (hours)	297048	258134
PFH (1/hours)	1.317E-10	1.212E-10
PFD _{avg} , at Mission Time of 20 years	1.154E-05	1.062E-05
Safety Reaction Time (SRT), (millisecond)	6	6

Mean Time to Fail Dangerous (MTTF_D) = $1/\lambda_D$

Mean Time to Repair (MTTR) is 8 Hours = DTI

IMPORTANT: Faulty module is non-repairable and must be replaced with a new module within MTTR.

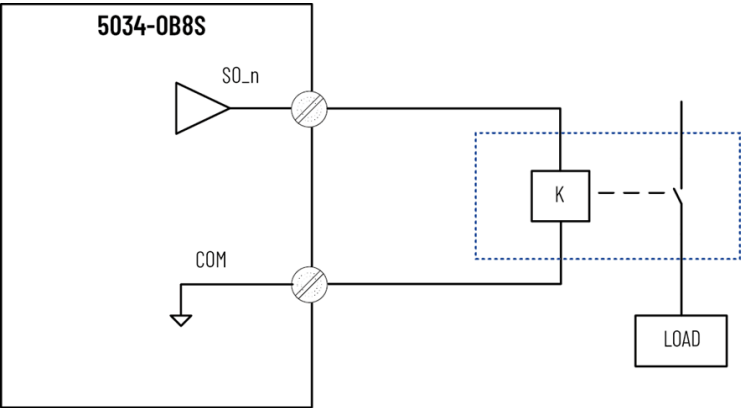
Wiring Diagrams for Safety Mode and Safety Pulse Mode

The following wiring diagrams show the output modules in Safety Mode and Safety Pulse Mode.

IMPORTANT: The Safety level that is shown in the diagrams is applicable to the module itself. Connected devices must have their own status monitoring to achieve application safety level.

IMPORTANT: You must use an SELV/PELV-listed power supply with the safety modules.

Figure 210. 5034-OB8S and 5034-OB8SXT - SIL 2, PLc, Cat. 2 in Single-channel Safety Mode or Safety Pulse Mode

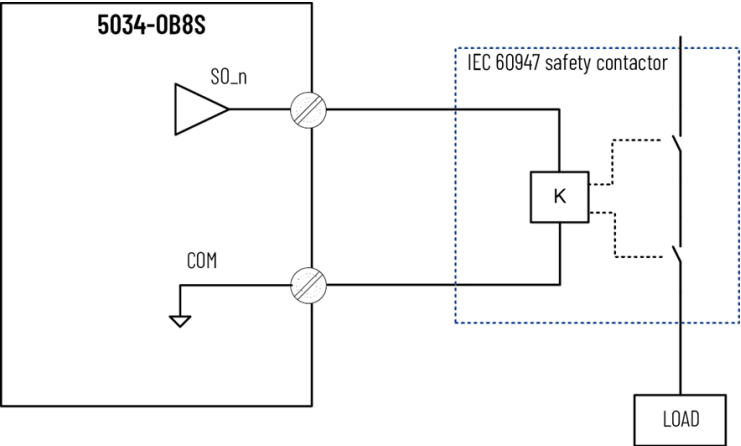


- n = 0...7

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 2, PLc, Cat. 2	None	External connected device must be SIL 2 rated	<ul style="list-style-type: none"> Safety Pulse Mode Safety Mode Condition: You must issue at least one safety demand every 6 months.

IMPORTANT: In the event that an external wire cross-circuit occurs between the positive potential (that is, SA +) and S0_n, the load is no longer able to shut down. The module detects the channel fault and sets the fault bit, which indicates that the channel cannot transition to Safe State until the fault is cleared.

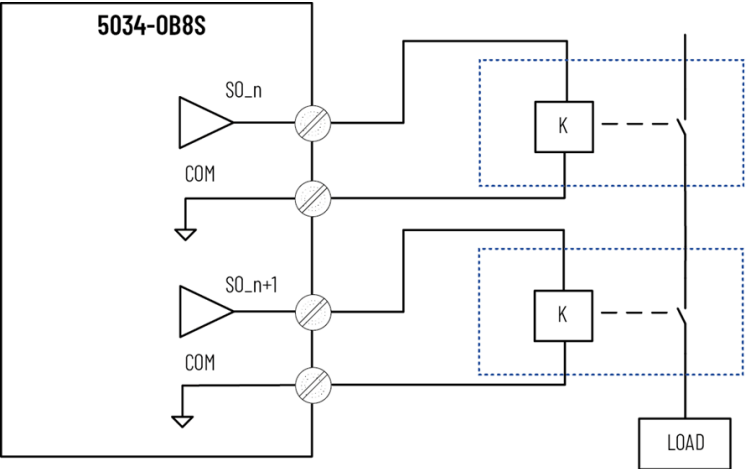
Figure 211. 5034-OB8S and 5034-OB8SXT - Up to and Including SIL 3, PLe, Cat. 4 in Single-channel Safety Mode or Safety Pulse Mode



- n = 0...7

SIL Level and Category	Fault Exclusion	Other	Point Mode
SIL 2, PLd, Cat. 3	External Wiring Fault	External connected device must be SIL 2 rated	<ul style="list-style-type: none">• Safety Mode Condition: You must issue at least one safety demand every 6 months.
SIL 3, PLe, Cat. 4		Use IEC 60947 safety contactor	<ul style="list-style-type: none">• Safety Pulse Mode• Safety Mode Condition: You must issue at least one safety demand every 24 hours.

Figure 212. 5034-OB8S and 5034-OB8SXT - SIL 3, PLe, Cat. 4 in Dual-channel Safety Pulse Mode or Safety Mode



- $n = 0, 2, 4, 6$
- The channel pairs that support dual-channel mode are:
 - Channel 0, 1 pair
 - Channel 2, 3 pair
 - Channel 4, 5 pair
 - Channel 6, 7 pair

SIL Level and Category	Fault Exclusion	Point Mode
SIL 3, PLe, Cat. 4	None	Safety Pulse Mode
	External Wiring Fault	Safety Mode Condition: You must issue at least one safety demand every 24 hours.

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Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
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Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
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Waste Electrical and Electronic Equipment (WEEE)



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

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

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