User Manual

Allen-Bradley

1732E ArmorBlock Dual-Port EtherNet/IP 4-Point Analog Input and Output Modules

Catalog Numbers 1732E-IF4M12R, 1732E-OF4M12R

Allen-Bradley • Rockwell Software

Rockwell Automation

Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://www.rockwellautomation.com/literature/) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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

Read this preface to familiarize yourself with the rest of the manual. It provides information concerning:

- who should use this manual
- the purpose of this manual
- related documentation
- conventions used in this manual

Who Should Use this Manual

Use this manual if you are responsible for designing, installing, programming, or troubleshooting control systems that use 1732E ArmorBlock Dual Port EtherNet/IP Dual-Port 4-Point Analog Input and Output Modules.

Purpose of this Manual

This manual is a reference guide for the 1732E-IF4M12R, 1732E-OF4M12R modules. It describes the procedures you use to install, wire, configure, troubleshoot, and use your module.

Related Documentation

The following documents contain additional information concerning Rockwell Automation products. To obtain a copy, contact your local Rockwell Automation office or distributor.

Resource	Description
1732E ArmorBlock™ Dual-Port EtherNet/IP 4-Point Analog Modules 1732E-WD003	Information on wiring the ArmorBlock Dual-Port EtherNet/IP 4-Point Analog Modules (1732E-IF4M12R, 1732E-OF4M12R, 1732E-IT4IM12R, 1732E-IR4IM12R).
1732E ArmorBlock Dual-Port EtherNet/IP 4-Point Analog Input and Output Installation Instructions, publication 1732E-IN006	Information on installing the ArmorBlock EtherNet/IP module.
EtherNet/IP Embedded Switch Technology Application Guide, publication ENET-AP005	A manual on how to install, configure and maintain linear and Device-level Ring (DLR) networks using Rockwell Automation EtherNet/IP devices with embedded switch technology.
EtherNet/IP Modules in Logix5000 Control Systems User Manual, publication ENET-UM001	A manual on how to use EtherNet/IP modules with Logix5000 controllers and communicate with various devices on the Ethernet network.
Getting Results with RSLogix 5000™, publication 9399-RLD300GR	Information on how to install and navigate RSLogix 5000. The guide includes troubleshooting information and tips on how to use RSLogix 5000 effectively.
Allen-Bradley Industrial Automation Glossary, AG-7.1	A glossary of industrial automation terms and abbreviations.

Common Techniques Used in this Manual

The following conventions are used throughout this manual:

- Bulleted lists such as this one provide information, not procedural steps.
- Numbered lists provide sequential steps or hierarchical information.
- *Italic* type is used for emphasis.

Notes:

Preface

Chapter 1

Overview of the 1732E ArmorBlock Analog Input and Output Modules

Chapter 2

Install Your ArmorBlock Module

Chapter 3

Configure Your Analog Input and Output Modules with RSLogix 5000 Software

Chapter 4

Configurable Features for the Analog Input and Output Modules

Chapter 5

Calibrate Your Modules

Chapter 6

Appendix A

Appendix B

Appendix C

Overview of the 1732E ArmorBlock Analog Input and Output Modules

Overview

This chapter provides an introduction to the features and functionalities of the 1732E ArmorBlock Analog Input and Output Modules, 1732E-IF4M12R and 1732E-OF4M12R. It includes the following sections:

Module Features

ArmorBlock analog I/O modules are interface modules that convert analog signals to digital values for inputs and convert digital values to analog signals for outputs. Controllers can then use these signals for control purposes.

By using the producer/consumer network model, ArmorBlock analog I/O modules produce information when needed.

Some of the module features are as follows:

- multiple preset ranges of voltage or current inputs/outputs
- process alarms and limits
- overrange and underrange detection
- digital filter for 1732E-IF4M12R

For more information about module features, see Configurable Features for the Analog Input and Output Modules on page 43.

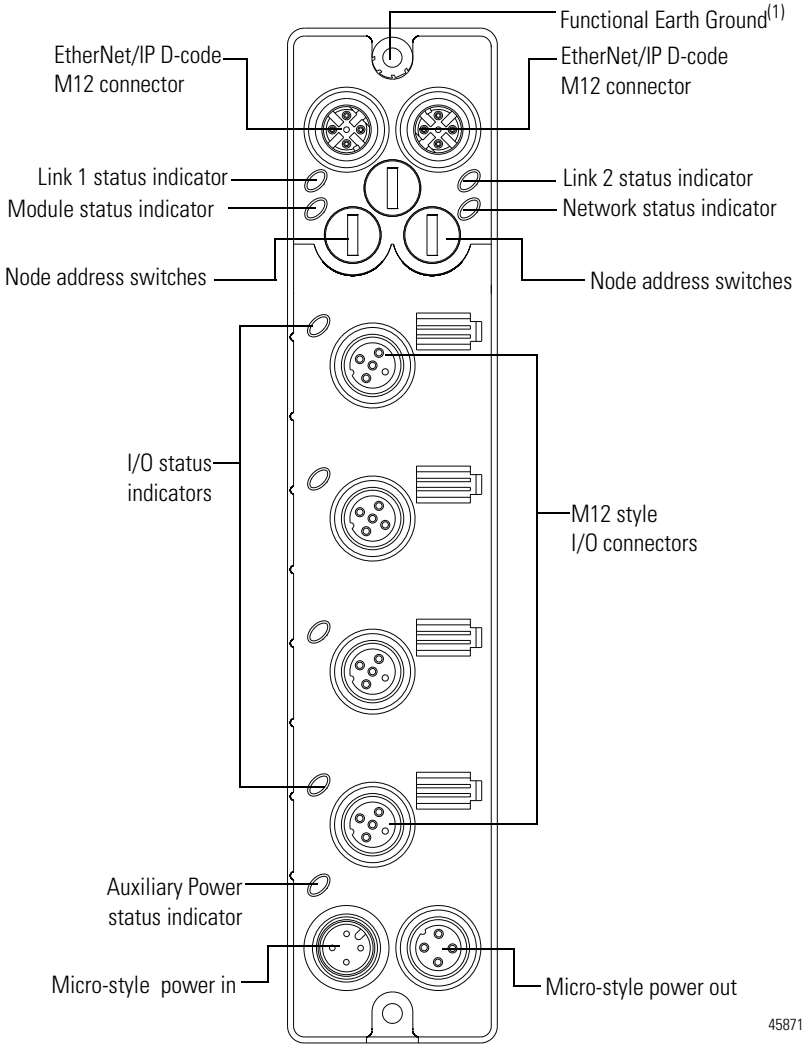
You must use RSLogix 5000 to configure these features. For a more detailed how-to-configure guide, read the chapter, Configure Your Analog Input and Output Modules with RSLogix 5000 Software on page 13.

Physical Features of Your Modules

The modules have the following components:

- Node address switches
- Connectors (two EtherNet/IP D-code M12 connectors, two micro-style Power in/out connectors, four I/O M12 connectors)
- Status indicators (Link, I/O, Module, Network, and Auxiliary power status indicators)
- Functional earth ground

Physical Features of 1732E-IF4M12R and 1732E-OF4M12R Modules



(1) Functional Earth grounds the I/O block's EtherNet/IP communication circuitry which is designed to mitigate the effect of noise on the network. The device requires a solid earth ground connection, either through a metal screw to a grounded metal panel or through a wire.

Types of Modules

The Analog Input and Output modules are as follows.

Catalog Number	Description	Network Connector	Power Connector
1732E-IF4M12R	24V DC power, 4-Point Analog Input, Dual-Port EtherNet/IP Module	Dual D-code M12	Dual 4-pin micro
1732E-OF4M12R	24V DC power, 4-Point Analog Output, Dual-Port EtherNet/IP Module		

Hardware/Software Compatibility

The module and the applications described in this manual are compatible with the following firmware versions and software releases.

Product	Firmware Version / Software Release
1732E-IF4M12R and 1732E-OF4M12R	Firmware rev. 1.1 or later
1756-EN2T, 1756-EN2TR, 1756-EN3TR	3.x version when using RSLogix 5000 v20 or later
RSLogix 5000 software	20 or later
RSLinx software	2.56 or later

Input and Output Types

The 1732E-IF4M12R module supports four input channels, while the 1732E-OF4M12R supports four output channels. Each of the four input/output channels can be configured as either current or voltage input/output, with current mode as default configuration.

You can select from a series of operational ranges for each channel. The range designates the minimum and maximum signals that are detectable by the module.

Input/Output Ranges for 1732E-IF4M12R and 1732E-OF4M12R

Module	Input/Output range
1732E-IF4M12R	0…20 mA 4…20 mA 0…10 V -10…10 V 0…5 V -5…5 V
1732E-OF4M12R	

To use an input or output as a current or voltage device, you must:

- wire the input/output connector for the correct input type (see page 10)
- configure the input/output as current or voltage via RSLogix 5000 (see page 25 and page 35)

Alarms/Limits

The modules are capable of generating the following alarms:

- process alarms (low, low-low, high, high-high) for 1732E-IF4M12R
- clamp/limits alarm for 1732E-OF4M12R

Process Alarms

The following level alarms are available for the for 1732E-IF4M12R module:

- Low
- Low-Low
- High
- High-High

When the channel input goes below a low alarm or above a high alarm, a bit is set in the data table. All Alarm Status bits can be read individually or by reading the Channel Status Byte (see page 48).

You can configure each channel alarm individually. See Alarm Configuration Tab on page 26 to learn how to configure the alarms.

Clamping

Clamping limits the output from the analog module to remain within a range configured by the controller, even when the controller commands an output outside that range. This safety feature sets a high clamp and a low clamp.

Once clamps are determined for a module, any data received from the controller that exceeds those clamps sets an appropriate limit alarm and transitions the output to that limit but not beyond the requested value.

Clamping alarms can be disabled or latched on a per channel basis.

To learn how to set clamp limits, see Limits Configuration Tab on page 36.

Overrange and Underrange Detection

This feature detects when the input module is operating beyond limits set by the input range. For example, if you are using the 1732E-IF4M12R module in the 0V...10V input range and the module voltage increases to 11V, the overrange detects this condition.

The table shows the input ranges of the input module and the lowest/highest signal available in each range before the module detects an underrange/overrange condition.

Lowest and Highest Signal for Overrange and Underrange Detection

Available Range	Lowest Signal in Range	Highest Signal in Range
0…20 mA	0 mA	20 mA
4…20 mA	4 mA	20 mA
0…10 V	0 V	10 V

Lowest and Highest Signal for Overrange and Underrange Detection

Available Range	Lowest Signal in Range	Highest Signal in Range
-10…10 V	-10 V	10 V
0…5 V	0 V	5 V
-5…5 V	-5 V	5 V

Digital Filters

The 1732E-IF4M12R module also supports a digital filter to smooth input data noise transients on each input channel. This value specifies the time constant for a digital first order lowpass filter on the input. It is specified in units of milliseconds. A value of 0 disables the filter.

To learn more about digital filter, see page 44.

Chapter Summary

In this chapter, you were introduced to the features of the ArmorBlock Analog Input and Output modules.

Notes:

Install Your ArmorBlock Module

Overview

This chapter shows you how to install and wire the 1732E ArmorBlock Dual Port 4-Point EtherNet/IP Analog Input and Output modules. The only tools you require are a flat or Phillips head screwdriver and drill. This chapter includes the following topics:

Install the Module

To install the module:

- Set the network address
- Mount the module
- Connect the I/O, Network, and Auxiliary cables to the module.

Set the Network Address

The I/O block ships with the rotary switches set to 999 and DHCP enabled. To change the network address, you can do one of the following:

- adjust the node address switches on the front of the module.
- use a Dynamic Host Configuration Protocol (DHCP) server, such as Rockwell Automation BootP/DHCP.
- retrieve the IP address from nonvolatile memory.

The I/O block reads the switches first to determine if the switches are set to a valid number. To set the network address:

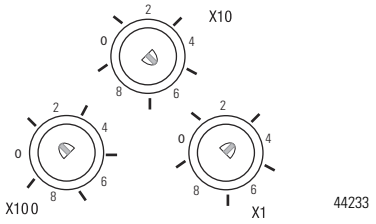
1. Remove power.
2. Remove the switch dust caps.
3. Rotate the three (3) switches on the front of the module using a small blade screwdriver.
4. Line up the small notch on the switch with the number setting you wish to use.
   Valid settings range from 001...254.

5. Replace switch dust caps. Make sure not to over tighten.
6. Reapply power.
7. Record IP address on product label found on the side of enclosure.

Set Network Address

Example shows network switches set at 163, which sets the module IP address to 192.168.1.**163**.

Note: You need to remove the protective switch dust caps before you can adjust the address settings.



When the switches are set to a valid number, the I/O block's IP address is 192.168.1.xxx, where xxx represents the number set on the switches. The I/O block's subnet mask is 255.255.255.0 and default gateway address is set to 192.168.1.1.

When the I/O block uses the network address set on the switches, the I/O block does not have a host name assigned to it or use any Domain Name Server.

If the switches are set to an invalid number (for example, 000 or a value greater than 254 excluding 888), the I/O block checks to see if DHCP is enabled. If DHCP is enabled, the I/O block asks for an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters. (The modules are shipped with the network switches set to 999.)

If DHCP is not enabled, the I/O block uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory.

Network Address Switch value 001

The module IP address cannot be the same as the gateway address. If the address switches are set to 001, the module IP address becomes 192.168.1.1, which is the same as the default gateway address. In this case, the module gateway address will be set to 0.0.0.0.

Default Factory Configuration

The switch value 888 resets the module to default factory configuration on power up. The module will not operate properly when powered up with this setting. The switches must be set to a different (and valid) value and then power cycled after a reset.

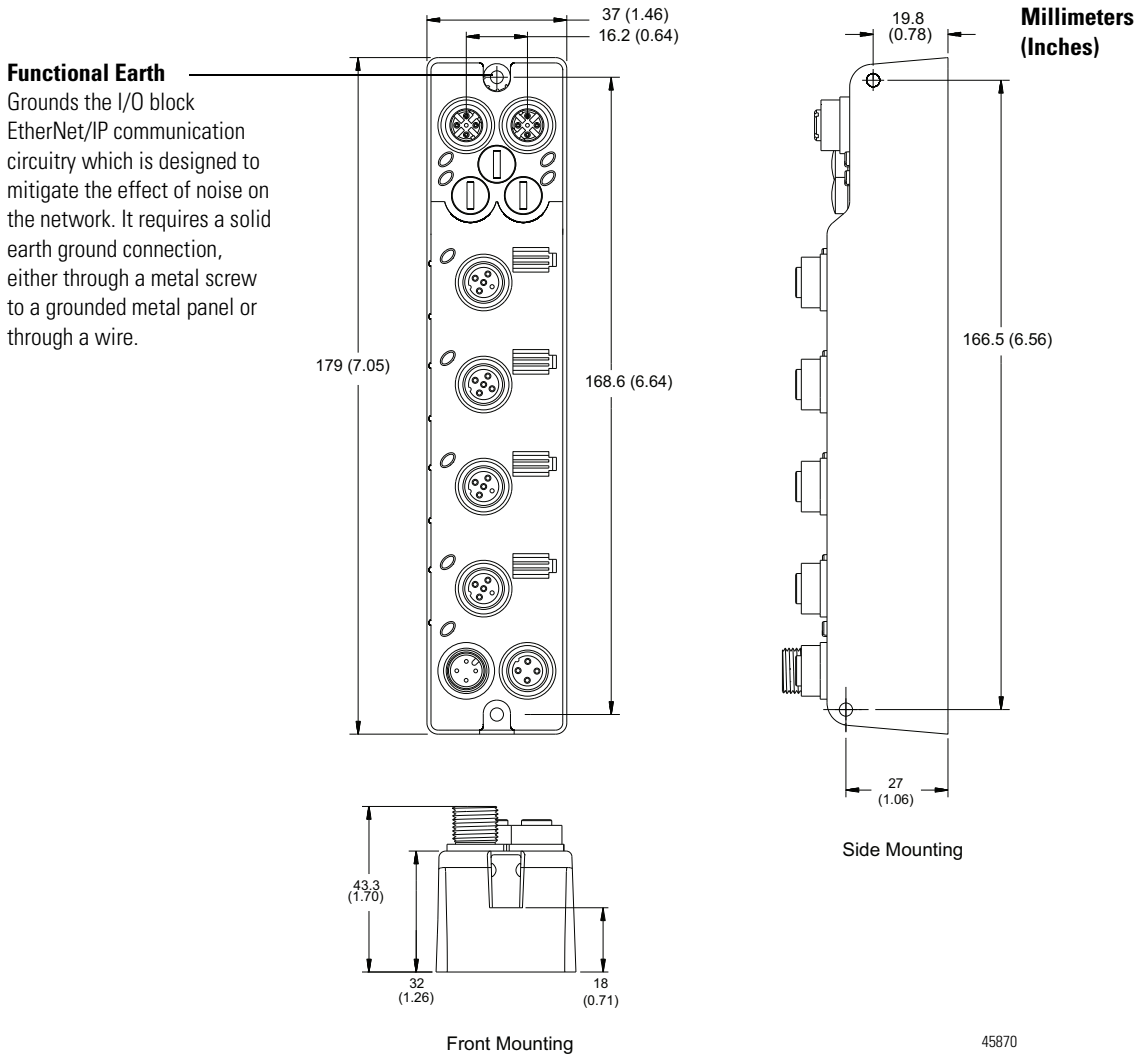
While in reset state, the module LED flashes red and the network LED goes off.

Mount the Module

Two sets of mounting holes are used to mount the module directly to a panel or machine. Mounting holes accommodate #6 (M3) pan head screws. The torque specification is 0.68 Nm (6 lb-in.).

To mount the module on a wall or panel, use the screw holes provided in the module. Refer to the drilling dimensions illustration to guide you in mounting the module.

Mounting Dimensions



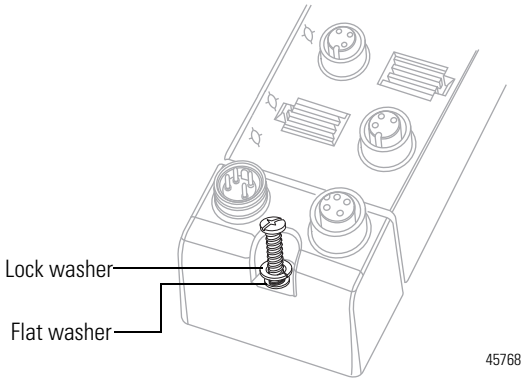
Install the mounting base as follows:

1. Lay out the required points as shown above in the drilling dimension drawing.
2. Drill the necessary holes for #6 (M3) pan head screws.
3. Mount the module using #6 (M3) screws.

Mount the Module in High Vibration Areas

If you mount the module in an area that is subject to shock or vibration, we recommend you use a flat and a lock washer to mount the module. Mount the flat and the lock washer as shown in the mounting illustration. Torque the mounting screws to 0.68 Nm (6 lb-in.).

High Vibration Area Mounting

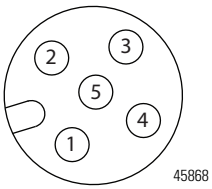


Wire the Module

The 1732E-IF4M12R, 1732E-OF4M12R ArmorBlock EtherNet/IP modules have 5-pin micro-style M12 I/O connectors. We provide caps to cover the unused connectors on your module. Connect the quick-disconnect cord sets you selected for your module to the appropriate ports.

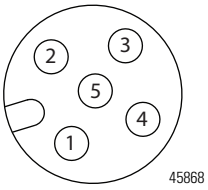
I/O Connectors(1)

Micro-style M12 5-Pin Input Female Connector – 1732E-IF4M12R



(View into connector)
Pin 1 Current Input +
Pin 2 Current Common
Pin 3 Voltage Input +
Pin 4 Voltage Common
Pin 5 No Connect

Micro-style M12 5-Pin Input Female Connector – 1732E-OF4M12R

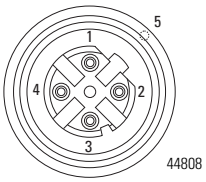


(View into connector)
Pin 1Current Output +
Pin 2Current Common
Pin 3Voltage Output +
Pin 4Voltage Common
Pin 5No Connect

(1) Only 4 of the 5 pins are active. The center pin (5) is internally tied to signal ground to minimize external noise pickup.

Ethernet Connector

D-Code Micro Network Female Connector



(View into connector 1)
Pin 1M12_Tx+
Pin 2 M12_Rx+
Pin 3 M12_Tx-
Pin 4 M12_Rx-
Pin 5 Connector shell shield GND

IMPORTANT Use the 1585D–M4DC–H: Polyamide small body unshielded mating connectors for the D-Code M12 female network connector.

Note that the distance between the center of each Ethernet connector is 16.2 mm (see Mounting Dimensions on page 9).
Rockwell Automation recommends the use of suitable cable based on this measurement. Some of the recommended cables are 1585D-M4TBJM-x and 1585D-M4TBDM-x for daisychains.

IMPORTANT Use two twisted pair CAT5E UTP or STP cables.

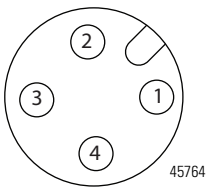
D-Code M12 Pin	Wire Color	Signal	8-way Modular RJ45 Pin
1	White-orange	TX+	1
2	White-green	RX+	3
3	Orange	TX-	2
4	Green	RX-	6

Power Connectors

Attach the mini-style 4-pin connector to the mini-style 4-pin receptacle as shown below.

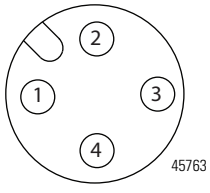
Micro-style 4-Pin Input Male Receptacle

Male Input



(View into receptacle)
Pin 1 Auxiliary power+
Pin 2 Module power+
Pin 3 Module power-
Pin 4 Auxiliary power-

Female Output



The power required by the module is based on a 4-pin micro-style connector system. Power can be daisy chained through the module either left to right or right to left. The standard configuration is with Module/Auxiliary power entering the module on the left connector.

Both modules require two 24V DC (nominal) supplies. These supplies are called the Module Power and the Auxiliary Power. The Module power supplies the microprocessor and Ethernet portions of the module. The Auxiliary Power provides power for the voltage or current outputs on the 1732E-OF4M12R analog output module.

Internally, the Module Power and Auxiliary Power are electrically isolated.

IMPORTANT The maximum current that any pin on the power connectors can carry is 4 A.

ATTENTION: To comply with the CE Low Voltage Directive (LVD), this equipment and all connected I/O must be powered from a source compliant with the following:
Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

ATTENTION: To comply with UL restrictions, this equipment must be powered from a source compliant with the following: Limited Voltage/ Limited Current.

ATTENTION: The device meets UL Type 1 Enclosure rating.

Chapter Summary

In this chapter, you learned how to install and wire your module. The following chapter describes how to configure your module to communicate on the EtherNet/IP network by providing an IP address, gateway address, and Subnet mask.

Configure Your Analog Input and Output Modules with RSLogix 5000 Software

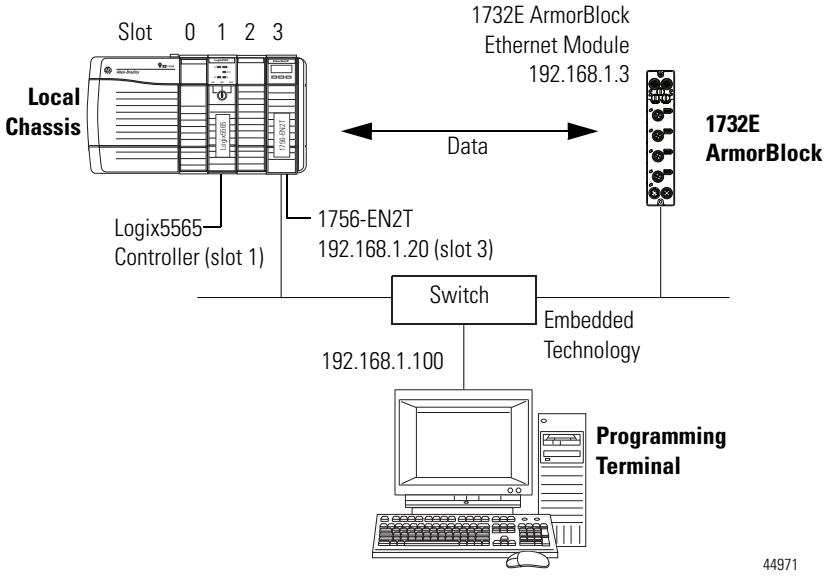
Introduction

This chapter guides you through the steps required to configure your modules using the RSLogix 5000 software. Note that the modules presented in this chapter can be configured using RSLogix 5000 software, version 20, or later.

Adding the two modules through RSLogix 5000 involve the same general procedure. Note, however, that the two modules do not have exactly similar Module Definition properties or configuration parameters. The customization of both modules are distinctly covered in the next sections.

Set Up the Hardware

In this example, a ControlLogix chassis contains the Logix5565 processor in slot 1 and a 1756-EN2T bridge module in slot 3. The 1732E ArmorBlock module is mounted remotely.



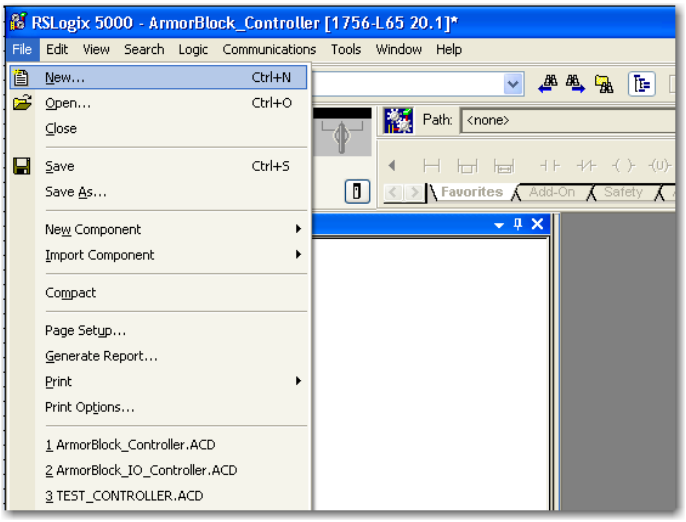
To work along with this example set up your system as shown.

- Note that in the example application, the Logix5565 controller and 1756-EN2T module (firmware version 2.3 or higher) are assumed to be in the slots shown.
- Verify the IP addresses for your programming terminal, 1756-EN2T module and 1732E ArmorBlock Ethernet module.
- Verify that you connected all wiring and cabling properly.
- Be sure you configured your communication driver (for example, AB_ETH-1 or AB-ETHIP-1) in RSLinx™ software.

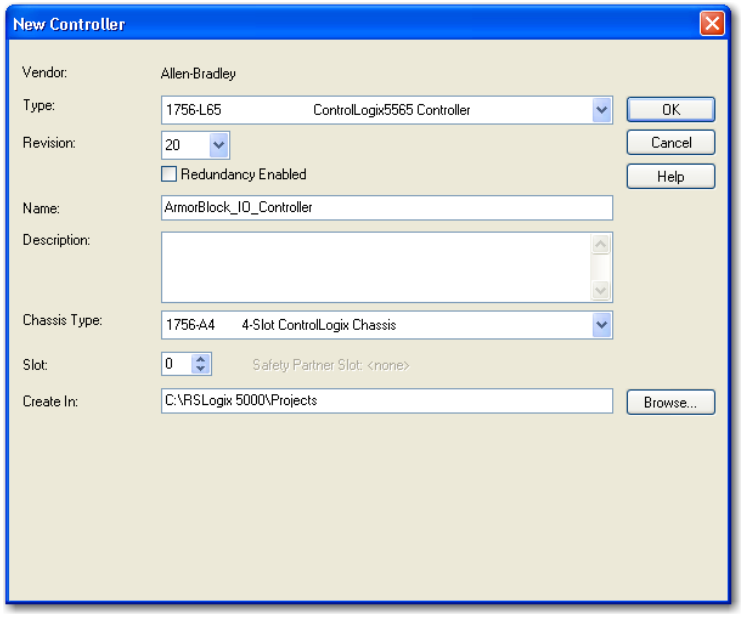
Create the Example Application

Perform the following steps to create the example application:

1. From the File menu, select New.



   The New Controller dialog opens.



2. Enter an appropriate name for the Controller, for example, ArmorBlock_IO_Controller.
3. Select the correct version, chassis type, and slot number of the controller, and the folder where you want to save the RSLogix 5000 software file (Create In). The Description is optional.

   To use redundancy in your system, select the Redundancy Enabled checkbox.
4. Click OK.

Configure Your I/O Module

You must configure your module upon installation. The module will not work until it has been configured with at least the default configuration.

RSLogix 5000 Configuration Software

You must use **RSLogix 5000**, **version 20 or later**, to configure your module. You have the option of accepting default configuration for your module or writing point-level configuration specific to your application.

Both options are explained in detail, including views of software screens, in this chapter.

Overview of the Configuration Process through RSLogix 5000

When you use the RSLogix 5000 software to configure a module, you must perform the following steps:

1. Add the Local EtherNet/IP Bridge (1756-EN2T, 1756-EN2TR, or 1756-EN3TR) to your project's I/O Configuration.
2. Add the 1732E-IF4M12R or 1732E-OF4M12R module as a child of the 1756-EN2T module.
3. Accept the default configuration or change it to specific configuration for the module.
4. Edit configuration for a module when changes are needed.

Add a New Bridge and Module to Your RSLogix 5000 Project

After you have started RSLogix 5000 software and created a controller, you must add a new bridge and a new module to your project. The bridge allows your module to communicate with the controller.

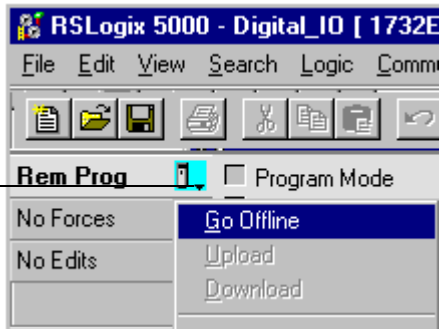
The wizard allows you to create a new module and write configuration. You can use default configuration or write specific configuration for your application.

IMPORTANT	Click Help on the configuration dialogs shown in this section if you need assistance in selecting and setting the parameters.

Add the Local EtherNet/IP Bridge to the I/O Configuration

1. If necessary, go offline.

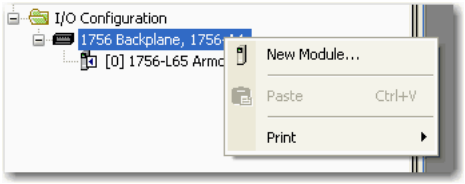
If you are not offline, use this pull-down menu to go offline.



2. Add the EtherNet/IP Bridge to your RSLogix 5000 project.

A. Right-click 1756 Backplane.

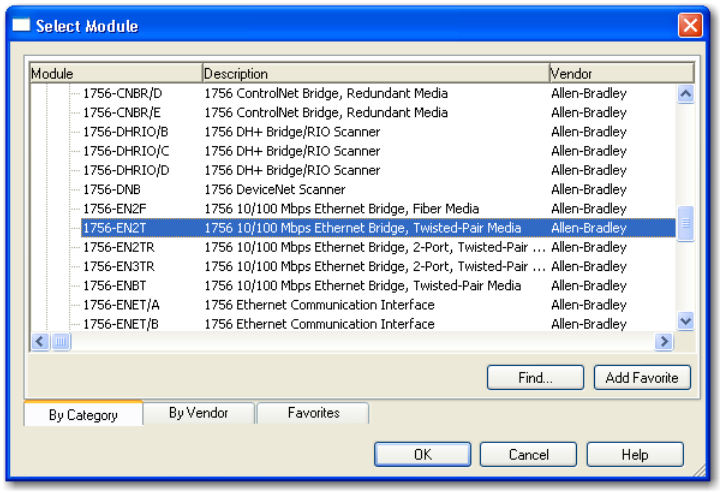
B. Select New Module.



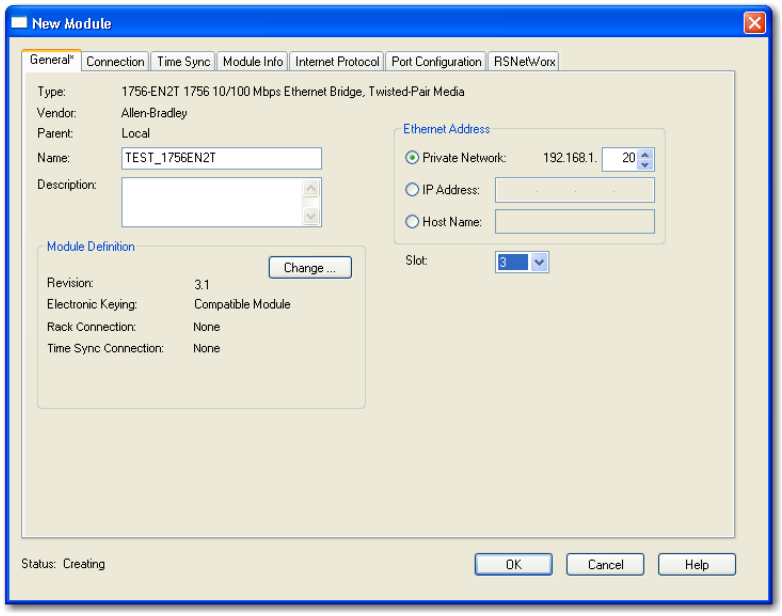
3. Expand Communications and select the new module in the Select Module dialog that appears. Select the 1756-EN2T EtherNet/IP Bridge.

A. Select the 1756-EN2T EtherNet/IP Bridge.

B. Click OK.



4. The New Module dialog opens.
   Configure the bridge module as illustrated below.



A. Name the bridge.

B. Enter the IP address.

C. Select slot 3 for the EtherNet/IP bridge.

D. Make sure the Minor Revision number matches your module revision number.

E. Choose an Electronic Keying method.
For more information, see page 23.

F. Click OK.

Note that we have entered the following properties in this example:

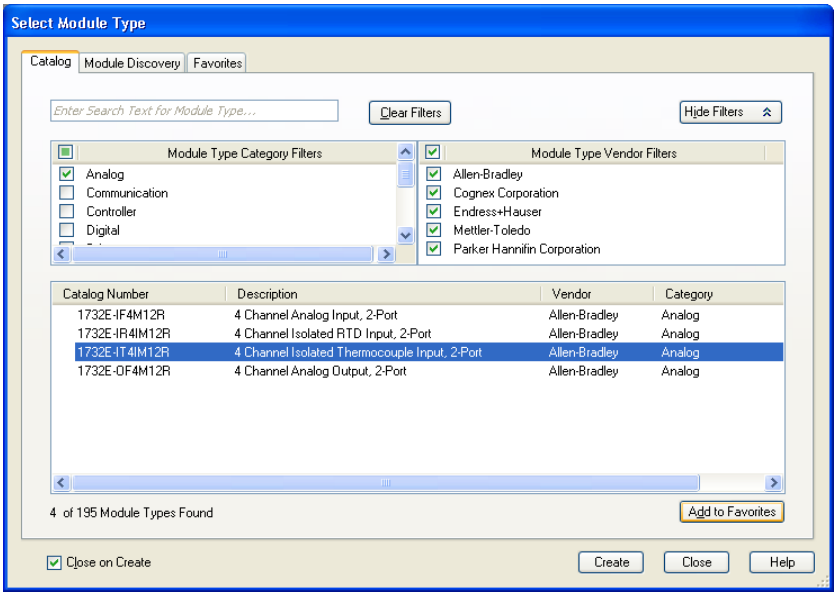
Name	TEST_1756EN2T
IP address	192.168.1.20
Slot	3
Revision	3.1
Electronic Keying	Compatible Module

The local 1756-EN2T communication module will communicate with the 1732E ArmorBlock module on Ethernet. Before you can communicate with your module, you need to add it as a *child* of the 1756-EN2T communication module. For more information about using 1756 controller and EtherNet/IP products, see publication ENET-UM001.

Add the I/O module as a child of the 1756-EN2T module

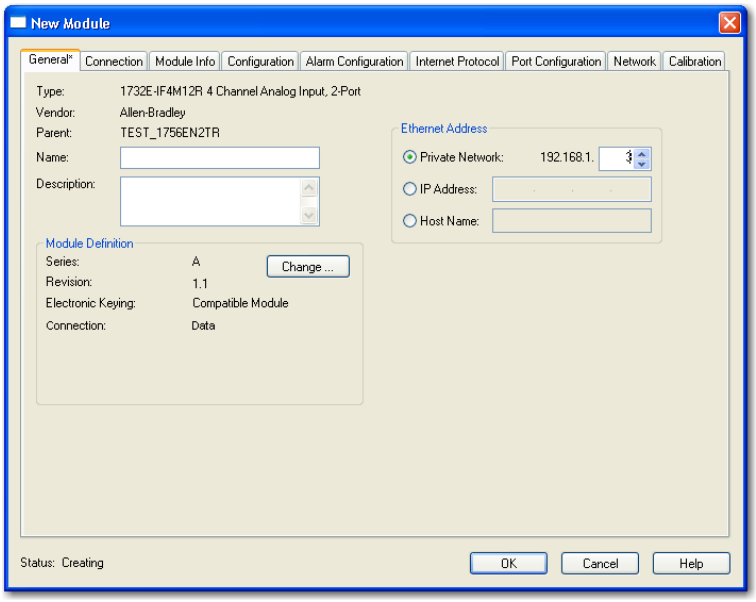
1. Right-click the Ethernet folder that appears below the 1756-EN2T bridge you added to the I/O Configuration tree and select New Module.

2. On the Select Module Type dialog that appears, select the 1732E-IF4M12R module. Click Create.
   To look for the 1732E-IF4M12R module in the list, you can type the catalog number in the search box or use the filters. To do so, click Clear Filters and check Analog in the Module Type Category Filters.



TIP If the 1732E-IF4M12R, 1732E-OF4M12R modules are not listed under the analog category of the Select Module Type dialog, you may need to download the Add-On Profile (AOP) for the 1732E ArmorBlock 2-Port and install it as an add-on to RSLogix 5000. The AOP file can be downloaded from: support.rockwellautomation.com/controlflash/LogixProfiler.asp

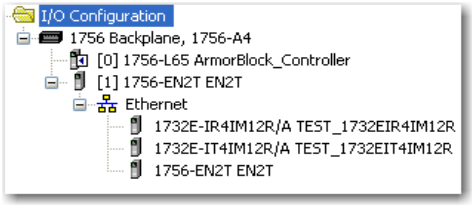
3. The New Module dialog appears.
Fill in the Module Properties information as shown, and then click OK.



Note that we have used the following properties in this example:

Field Name	Value
Name	TEST_1732EIF4M12R
IP address	192.168.1.3
Electronic keying	Compatible Module
Revision	1.1
Connection	Input Only (This parameter is Exclusive Owner for 1732E-OF4M12R)

To add the 1732E-OF4M12R Analog output module, follow the same steps. After adding the modules to your project, the I/O Configuration tree should appear as follows:



This example uses default Module Definition and configuration properties. To customize your module configuration, go to:

- Edit Your 1732E-IF4M12R Configuration on page 21
- Edit Your 1732E-OF4M12R Configuration on page 30

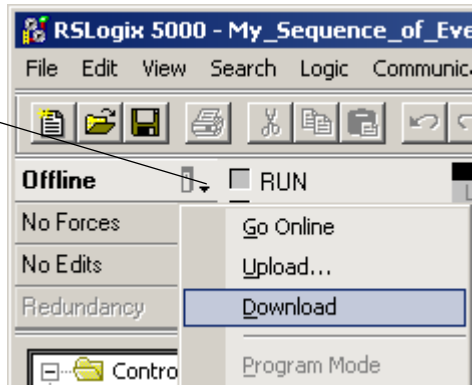
Download the Program to Your Controller

After you write configuration for your module, the module does not use this configuration until you download it to the owner-controller. The download transfers the entire program to the controller, overwriting any existing program.

Download module configuration as shown below:

A. Click here to see the pull-down menu.

B. Click download.



Depending on your application, a variety of RSLogix 5000 software screens may appear to choose a path to your ControlLogix controller and to verify the download. Navigate those screens as best fits your application.

This completes the download process.

Edit Your 1732E-IF4M12R Configuration

RSLogix 5000 programming software automatically creates module-defined data types and tags when a module is created. This section describes how to modify the default configuration for input modules.

Data types symbolically name module configuration, input and output data. Tags let you provide each a unique name, such as where the user-defined data type and slot reside on the controller. This information is used to communicate data between the controller and module.

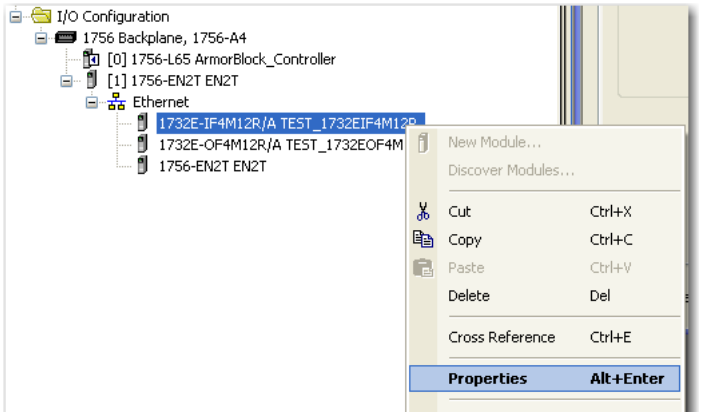
After you have set configuration for a module, you can review and change your choices. You can change configuration data and download it to the controller while online. This is called **dynamic reconfiguration**.

Your freedom to change some configurable features, though, depends on whether the controller is in Remote Run Mode or Program Mode.

IMPORTANT	Although you can change configuration while online, you must go offline to add or delete modules from the project.

The editing process begins on the main page of RSLogix 5000 software.

1. On the I/O Configuration tree for your project in RSLogix 5000, right-click the name of your module.



2. Select Properties. The Module Properties dialog appears and has the following tabs available for configuration.

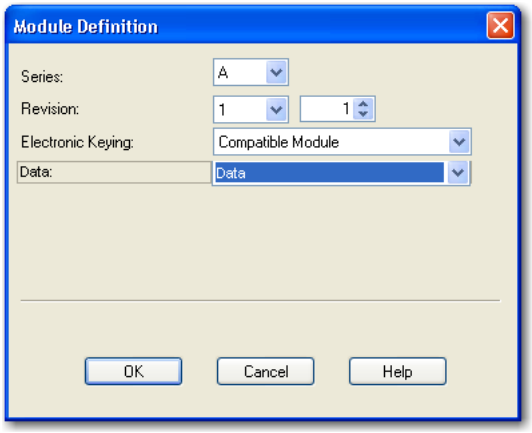
3. Click any of the tabs to edit the parameters for your module.
   The next sections show you how to edit the different tabs in the Module Properties dialog.

TIP Tabs can be selected in any order. The following examples are for instructional purposes.

General Tab

The General tab allows you to edit general properties such as Name, IP Address, and Description for your module.

You also can edit Module Definition properties such as revision, electronic keying, and data. To do so, click Change.



Module Definition Fields

Field Name	Description
Series	Specifies the module series.
Revision	Specifies the module's major and minor revision.
Electronic Keying	The electronic keying feature automatically compares the expected module, as shown in the RSLogix 5000 I/O Configuration tree, to the physical module before I/O communication begins. You can use electronic keying to help prevent communication to a module that does not match the type and revision expected. For each module in the I/O Configuration tree, the user-selected keying option determines if, and how, an electronic keying check is performed. Typically, three keying options are available: • Exact Match • Compatible Module (default value) • Disable Keying **Exact Match** is an electronic keying protection mode that requires the physical module and the module configured in the software to match according to vendor, catalog number, major revision and minor revision. **Compatible Module** indicates that the module determines whether to accept or reject communication. Compatible Keying is the default setting. It allows the physical module to accept the key of the module configured in the software, provided that the configured module is one the physical module is capable of emulating. The exact level of emulation required is product and revision specific. **Disable Keying** indicates the keying attributes are not considered when attempting to communicate with a module. Other attributes, such as data size and format, are considered and must be acceptable before I/O communication is established. With Disabled Keying, I/O communication may occur with a module other than the type specified in the I/O configuration tree with unpredictable results. We generally do not recommend using Disabled Keying.
Connection	Available options are Data, Input Only, Exclusive Owner, and Listen Only. Calibration and Configuration options are not available for Listen Only option. **Input Only** specifies an independent connection where a device receives inputs from the target device and sends configuration data to the target device. An Input Only connection does not send outputs; it only receives inputs. You can specify multiple Input Only connections to the target device from different originators. **Exclusive Owner** specifies an independent connection where a single device controls the output states in the target device. If you have an existing Exclusive Owner connection to a target device, you cannot specify another Exclusive Owner or Redundant connection to that same target device. **Listen Only** specifies a dependent connection where a device receives inputs from the target device, but does not send configuration data with the target device. A Listen Only connection only functions properly when another non-Listen Only connection exists to the same target device. A Listen Only connection does not send outputs; it only receives inputs. You can specify multiple Listen Only connections to the target device from different originators.

Connection Tab

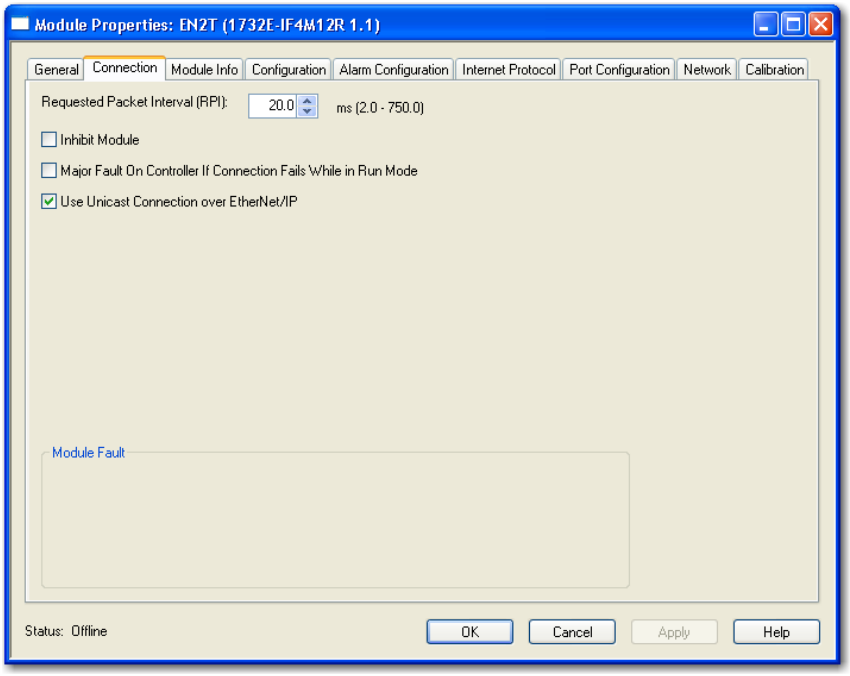
The Connection tab on the Module Properties dialog box lets you enter a requested packet interval (RPI), inhibit a module, and set a connection fault

when the controller is in Run mode. The RPI provides a defined, maximum period of time when data is transferred to the owner-controller.

1. Choose from the options on the Connection tab.

Connection Tab Fields

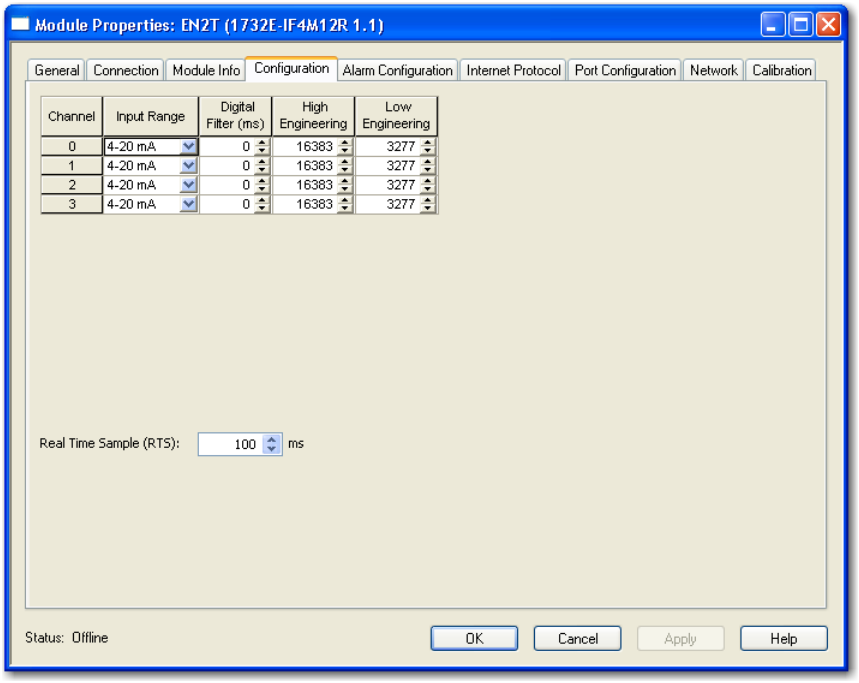
Field	Description
Requested Packet Interval (RPI) (ms)	A user-defined rate at which the module updates the information sent to its owner-controller. This interval defines the slowest rate at which a module sends its data to the owner-controller. The time ranges from 2.0…750 ms and is sent to the module with all other configuration parameters.
Inhibit Module	Check the box to prevent communication between the ownercontroller and the module. This option allows for maintenance of the module without faults being reported to the controller.
Major fault On Controller If Connection Fails While in Run Mode	Check the box to create a major fault if there is a connection failure with the controller while in Run mode.
Use Unicast Connection over EtherNet/IP	This option is enabled by default. **Unicast** connections are point to point transmissions between a source node and destination node on the network. A Frame is sent to a single destination.
Module Fault	The fault box is empty if you are offline. The type of connection fault appears in the text box if a fault occurs when the module is online.



2. Do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK if you are finished making changes.

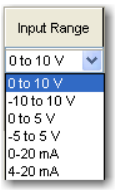
Configuration Tab

The Configuration tab on the Module Properties dialog box lets you program information on each of the four channels on the 1732E-IF4M12R module.



1. Choose from the options on the Configuration tab.

Configuration tab

Field	Description
Channel	Indicates the four input channels 0…3.
Input range	Input can be voltage or current, with current mode as default. It has the following input range options: 
Digital filter	Serves to reject higher frequency noise and harmonics. Choose a value in milliseconds that specifies the time constant for a digital first order lowpass filter on the input. A value of 0 disables the filter.

Configuration tab

Field	Description
High Engineering	High engineering value helps determine the engineering units the signal values scale into. The high engineering term corresponds to the high signal value. The scaling equation used is shown below. $\text{Data} = \frac{(\text{Signal}-\text{LowSignal})(\text{HighEngineering}-\text{LowEngineering})}{\text{High Signal} - \text{Low Signal}} + \text{Low Engineering}$
Low Engineering	One of four points used in scaling. The low engineering helps determine the engineering units the signal values scale into. The low engineering term corresponds to the low signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal}-\text{LowSignal})(\text{HighEngineering}-\text{LowEngineering})}{\text{High Signal} - \text{Low Signal}} + \text{Low Engineering}$
Real Time Sample (RTS)	This parameter instructs the module how often to scan its input channels and obtain all available data. This feature is applied on a module-wide basis.

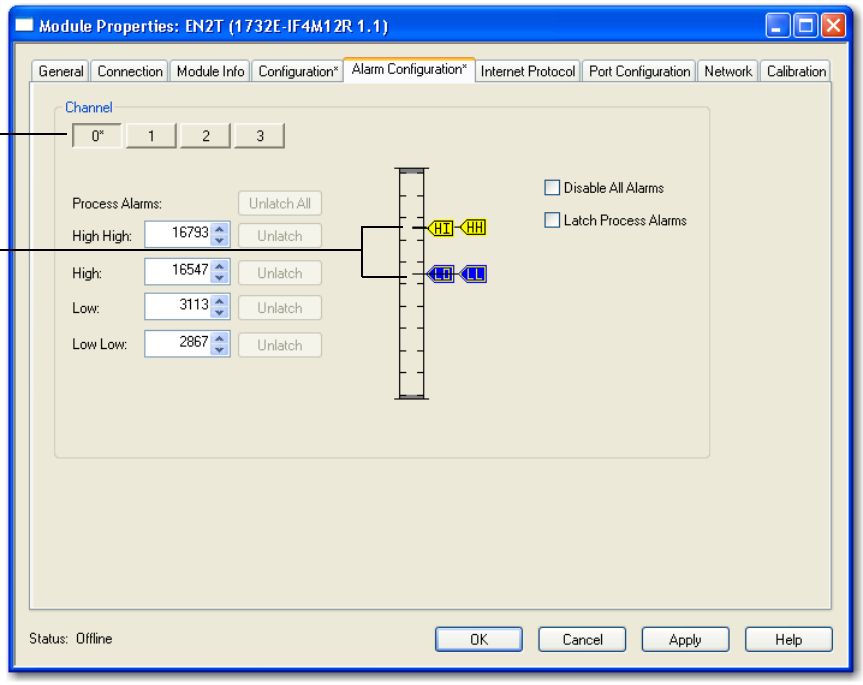
2. Do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK if you are finished making changes.

Alarm Configuration Tab

The Alarm Configuration tab on the Module Properties dialog box lets you program high and low limits, and disable and latch alarms per channel.

Click Channel button to set limits and alarm configuration for each of the 4 channels.

Use the sliders to set limits. HH slider sets High High limits; HI sets High limits; LL for Low Low; and LO for Low.



1. Choose from the options on the Alarm Configuration tab.

Alarm Configuration tab

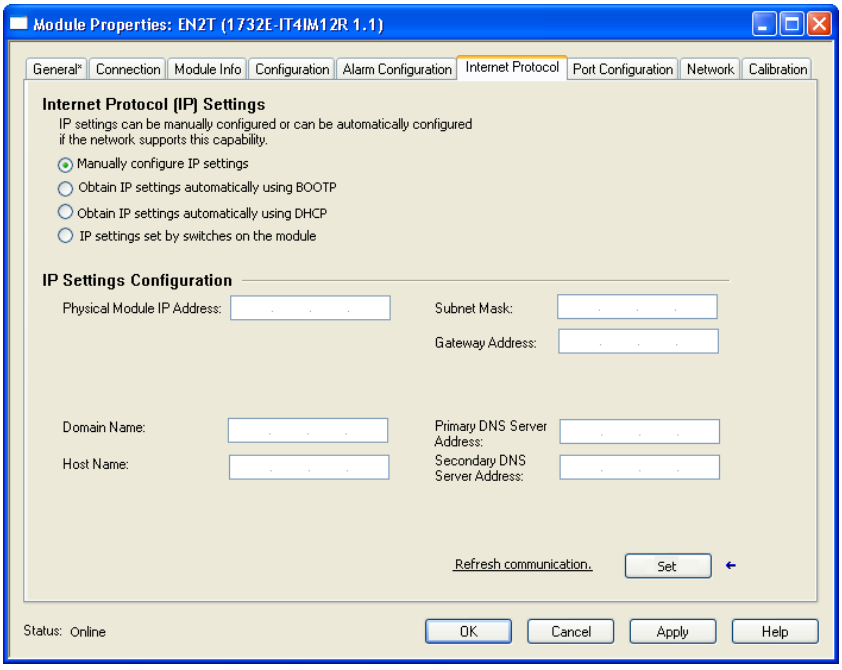
Field	What to do	Description
Channel	Select a push button to correspond to a channel (0…3)	Click the channel that is being configured.
Process Alarms		Type a value for each of the four alarm trigger points that alert you when the module has exceeded these limitations. You also can use the respective slider icon to set a trigger value. The Unlatch buttons are enabled only when the module is online. See Process Alarms on page 46 for more information.
High High	Choose from -32,768...32,767	Select a value so that any value out of range in this field causes a profile validation error. This value also appears in the HH slider on this dialog.
High	Choose from -32,768...32,767	Select a value so that any value out of range in this field causes a profile validation error. This value also appears in the HI slider on this dialog.
Low	Choose from -32,768...32,767	Select a value so that any value out of range in this field causes a profile validation error. This value also appears in the LO slider on this dialog.

Alarm Configuration tab

Field	What to do	Description
Low Low	Choose from -32,768...32,767	Select a value so that any value out of range in this field causes a profile validation error. This value also appears in the LL slider on this dialog.
Disable All Alarms	Click to check the checkbox	Check the box to disable all alarms. **Important**: When you disable all alarms, you disable process, and channel diagnostic alarms (for example, underrange and overrange). We recommend that you disable only unused channels so extraneous alarm bits are not set.
Latch Process Alarms	Click to check the checkbox	Check the box to latch an alarm in the set position even if the condition that causes the alarm disappears. Click to unlatch all alarms together. This feature is disabled when offline

2. After the channels are configured, do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK to apply the change and close the dialog box.
   - Click Cancel to close the dialog box without applying changes.

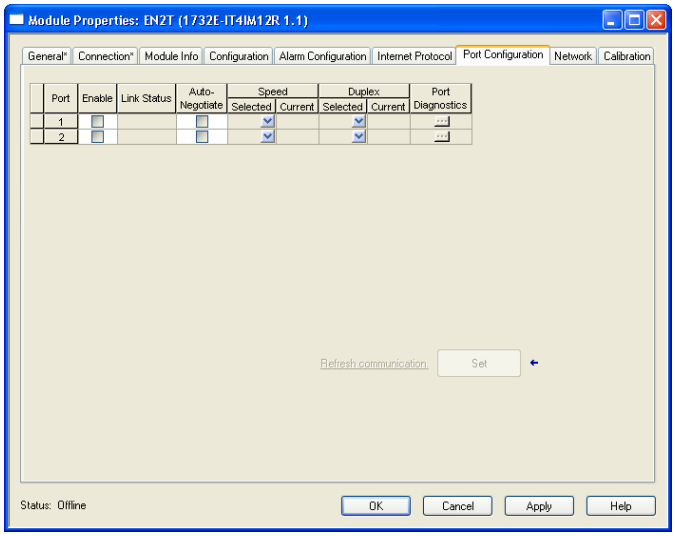
Internet Protocol Tab



1. To configure your IP settings, click the Internet Protocol tab. This tab is only available for editing when the device is online. To manually configure your IP settings, specify the IP address in the Physical Module IP Address field.

2. On other fields (Domain Name, Host Name, Primary DNS Server Address, Secondary DNS Server Address), specify the corresponding parameter. Click Set and then click OK.

Port Configuration Tab



To configure the Ethernet ports, click the Port Configuration tab. This tab is only available for editing when the device is online.

To configure the ports:

To	Then
Use the default port speed and duplex settings	Leave Auto-negotiate port speed and duplex checked. This setting determines the actual speed and duplex setting.
Manually configure your port's speed and duplex settings	Follow these steps. 1. Clear the Auto-negotiate port speed and duplex checkbox. 2. From the Current Port Speed pull-down menu, choose a port speed. 3. From the Current Duplex pull-down menu, choose the appropriate Duplex value, that is, Half Duplex or Full Duplex.

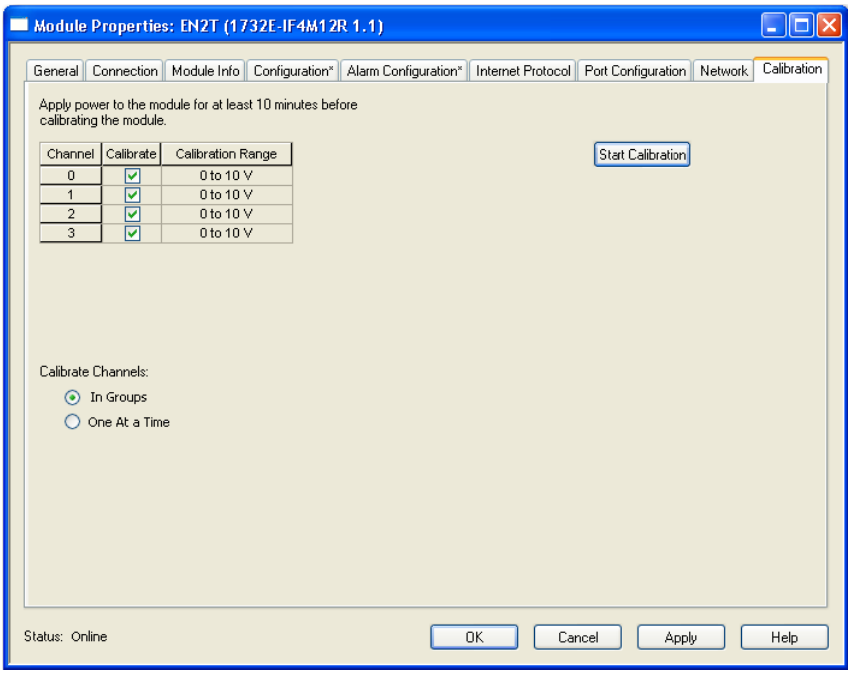
IMPORTANT Consider the following when you configure the module's port settings:

- If the module is connected to an unmanaged switch, leave Auto-negotiate port speed and duplex checked or the module will fail.
- If you are forcing the port speed and duplex with a managed switch, the corresponding port of the managed switch must be forced to the same settings or the module will fail.

Calibration Tab

The Calibration tab on the Module Properties dialog box lets you recalibrate the module, if necessary. Calibration corrects any hardware inaccuracies on a particular channel.

For detailed information about calibration, see Calibrate Your Modules on page 45.



Edit Your 1732E-OF4M12R Configuration

RSLogix 5000 programming software automatically creates module-defined data types and tags when a module is created. This section describes how to modify the default configuration for input modules.

Data types symbolically name module configuration, input and output data. Tags let you provide each a unique name, such as where the user-defined data type and slot reside on the controller. This information is used to communicate data between the controller and module.

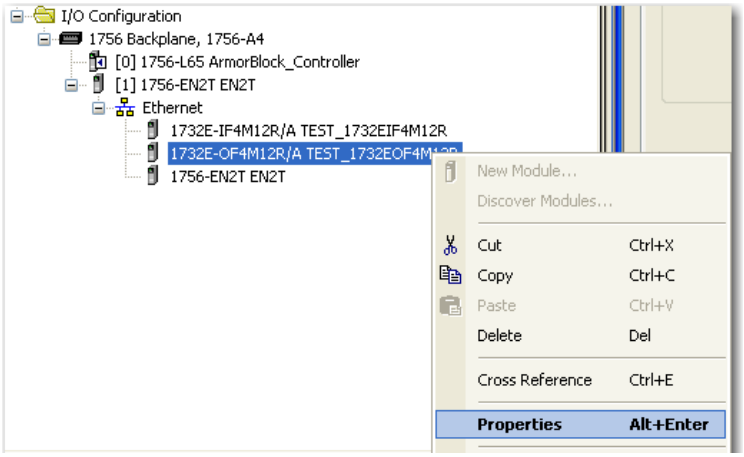
After you have set configuration for a module, you can review and change your choices. You can change configuration data and download it to the controller while online. This is called **dynamic reconfiguration**.

Your freedom to change some configurable features, though, depends on whether the controller is in Remote Run Mode or Program Mode.

IMPORTANT	Although you can change configuration while online, you must go offline to add or delete modules from the project.

The editing process begins on the main page of RSLogix 5000 software.

1. On the I/O Configuration tree for your project in RSLogix 5000, right-click the name of your module.



2. Select Properties. The Module Properties dialog appears and has the following tabs available for configuration.

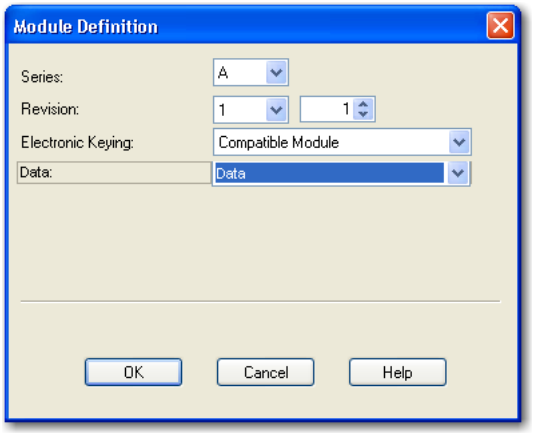
3. Click any of the tabs to edit the parameters for your module.
   The next sections show you how to edit the different tabs in the Module Properties dialog.

TIP Tabs can be selected in any order. The following examples are for instructional purposes.

General Tab

The General tab allows you to edit general properties such as Name, IP Address, and Description for your module.

You also can edit Module Definition properties such as revision, electronic keying, and data. To do so, click Change.



General Tab Field Description

Field Name	Description
Series	Specifies the module series.
Revision	Specifies the module's major and minor revision.
Electronic Keying	The electronic keying feature automatically compares the expected module, as shown in the RSLogix 5000 I/O Configuration tree, to the physical module before I/O communication begins. You can use electronic keying to help prevent communication to a module that does not match the type and revision expected. For each module in the I/O Configuration tree, the user-selected keying option determines if, and how, an electronic keying check is performed. Typically, three keying options are available: • Exact Match • Compatible Module (default value) • Disable Keying **Exact Match** is an electronic keying protection mode that requires the physical module and the module configured in the software to match according to vendor, catalog number, major revision and minor revision. **Compatible Module** indicates that the module determines whether to accept or reject communication. Compatible Keying is the default setting. It allows the physical module to accept the key of the module configured in the software, provided that the configured module is one the physical module is capable of emulating. The exact level of emulation required is product and revision specific. **Disable Keying** indicates the keying attributes are not considered when attempting to communicate with a module. Other attributes, such as data size and format, are considered and must be acceptable before I/O communication is established. With Disabled Keying, I/O communication may occur with a module other than the type specified in the I/O configuration tree with unpredictable results. We generally do not recommend using Disabled Keying.

General Tab Field Description

Field Name	Description
Connection	Available options are Data and Listen Only, with Data as default. Calibration and Configuration options are not available for Listen Only option. **Listen Only** specifies a dependent connection where a device receives inputs from the target device, but does not send configuration data with the target device. A Listen Only connection only functions properly when another non-Listen Only connection exists to the same target device. A Listen Only connection does not send outputs; it only receives inputs. You can specify multiple Listen Only connections to the target device from different originators.

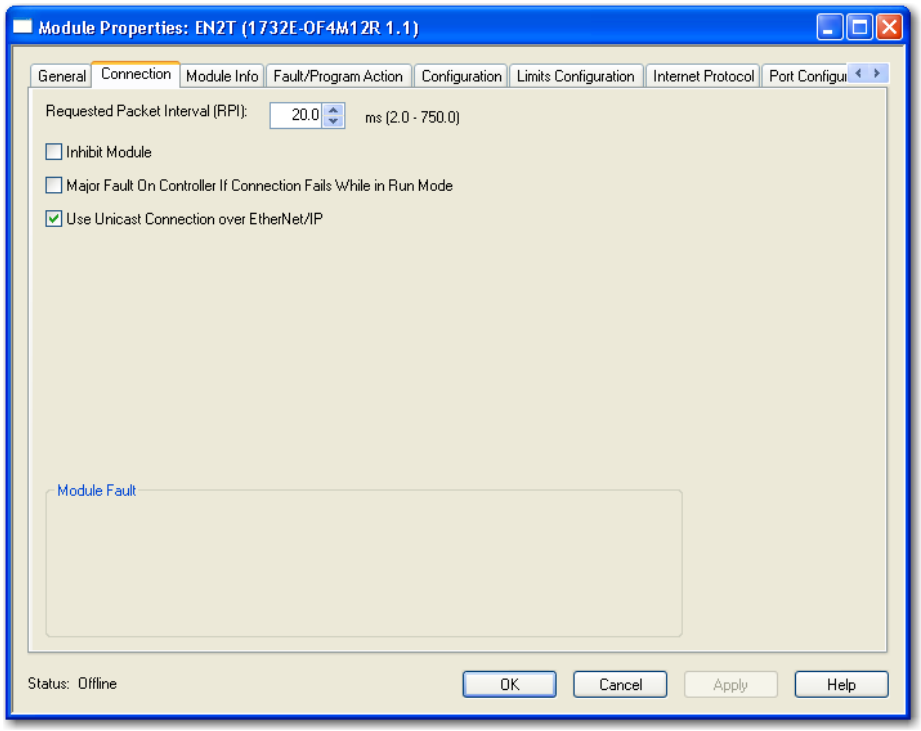
Connection Tab

The Connection tab on the Module Properties dialog box lets you enter a requested packet interval (RPI), inhibit a module, and set a connection fault when the controller is in Run mode. The RPI provides a defined, maximum period of time when data is transferred to the owner-controller.

1. Choose from the options on the Connection tab.

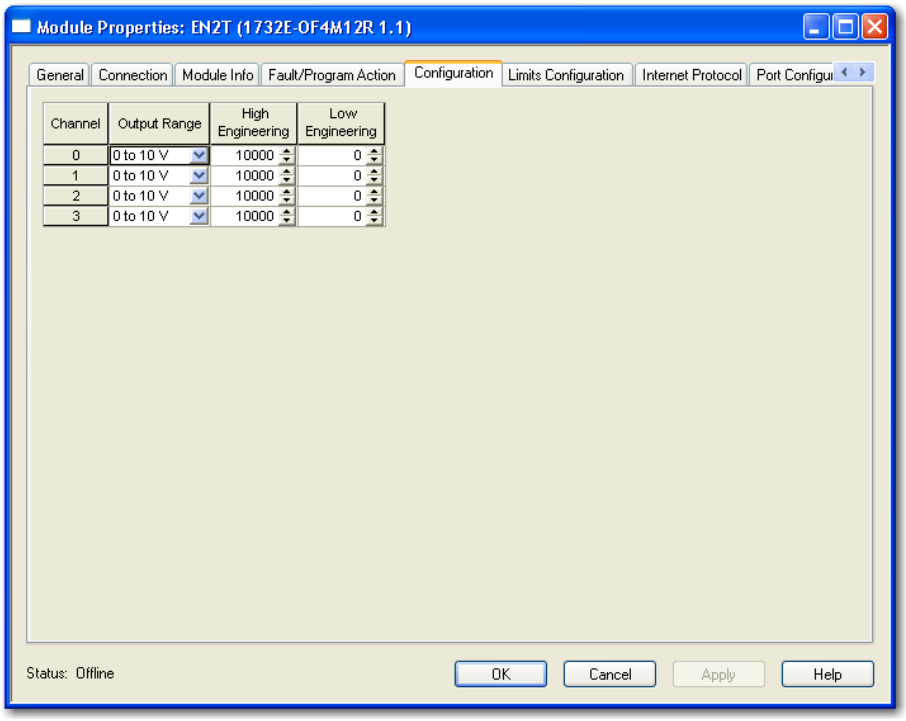
Connection Tab Fields

Field	Description
Requested Packet Interval (RPI) (ms)	A user-defined rate at which the module updates the information sent to its owner-controller. This interval defines the slowest rate at which a module sends its data to the owner-controller. The time ranges from 2.0…750 ms and is sent to the module with all other configuration parameters.
Inhibit Module	Check the box to prevent communication between the ownercontroller and the module. This option allows for maintenance of the module without faults being reported to the controller.
Major fault On Controller If Connection Fails While in Run Mode	Check the box to create a major fault if there is a connection failure with the controller while in Run mode.
Use Unicast Connection over EtherNet/IP	This option is enabled by default. **Unicast** connections are point to point transmissions between a source node and destination node on the network. A Frame is sent to a single destination.
Module Fault	The fault box is empty if you are offline. The type of connection fault appears in the text box if a fault occurs when the module is online.



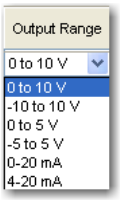
2. Do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK if you are finished making changes.

Configuration Tab



1. Choose from the options on the Configuration tab.

Configuration tab

Field	Description
Channel	Indicates the four input channels 0…3.
Output range	Sets the output as current or voltage output, with the following output range options: 

Configuration tab

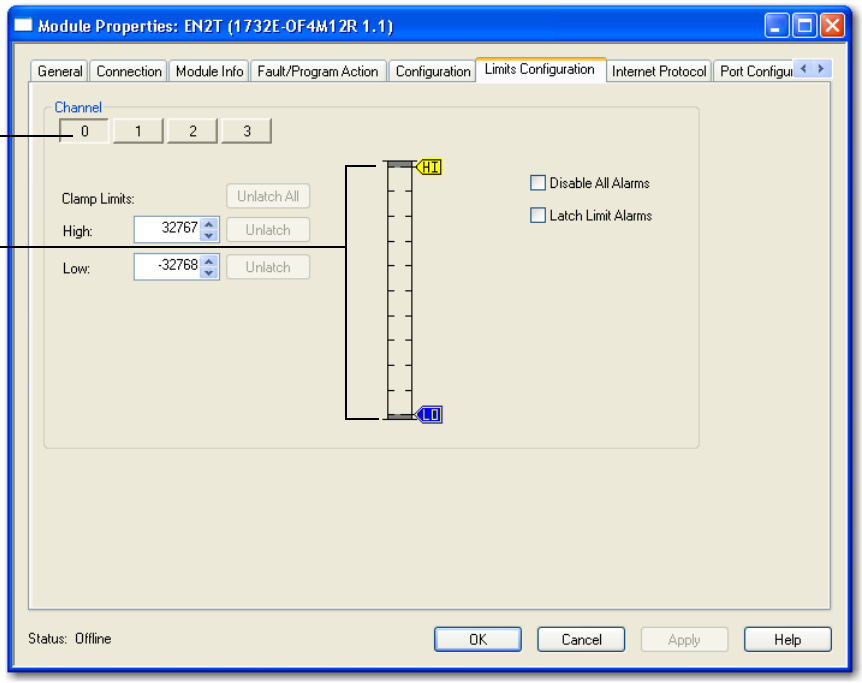
Field	Description
High Engineering	High engineering value helps determine the engineering units the signal values scale into. The high engineering term corresponds to the high signal value. The scaling equation used is shown below. $\text{Data} = \frac{(\text{Signal-LowSignal})(\text{HighEngineering-LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$
Low Engineering	Low engineering helps determine the engineering units the signal values scale into. The low engineering term corresponds to the low signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal-LowSignal})(\text{HighEngineering-LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$

Limits Configuration Tab

The Limits Configuration tab on the Module Properties dialog box lets you program high and low limits, and disable and latch alarms per channel.

Click Channel button to set limits and alarm configuration for each of the 4 channels.

Use the sliders to set limits. HI sets High limits; and LO for Low.



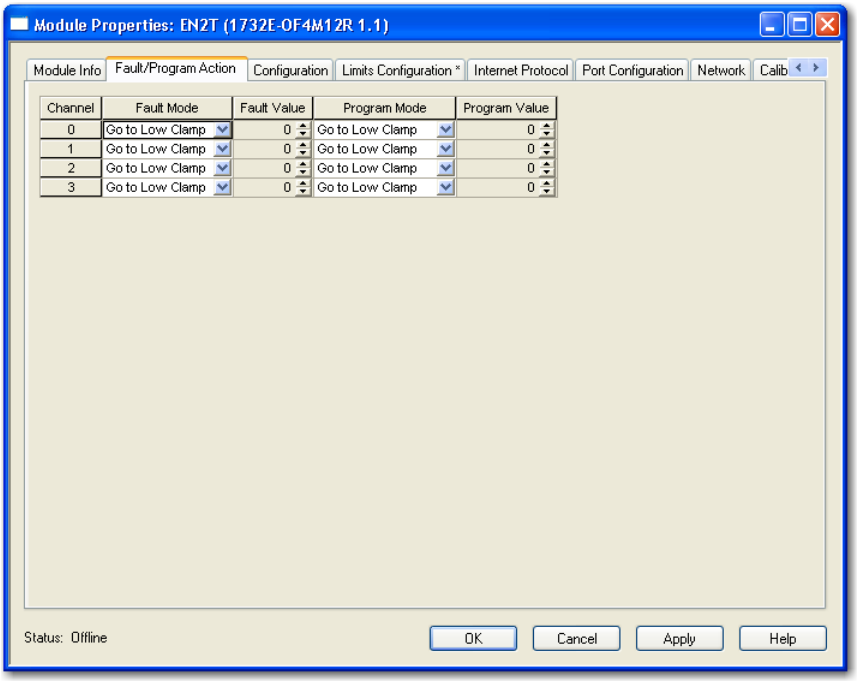
1. Choose from the options on the Limit Configuration tab.

Limit Configuration tab

Field	What to do	Description
Channel	Select apush button to correspond to a channel (0…3).	Refers to the channel being configured. Click to configure.
Clamp Limits High Clamp Low Clamp	Type a high and low clamp value that limits the output from the analog module within this range.	See Clamping/Limiting on page 47 for more information.
Disable All Alarms	Click to check the checkbox	Check the box to disable all alarms. **Important**: When you disable all alarms, you disable process, and channel diagnostic alarms (for example, underrange and overrange). We recommend that you disable only unused channels so extraneous alarm bits are not set.
Latch Limit Alarms	Click to check the checkbox	Check the box to latch an alarm if the controller data value exceeds the clamping limit.

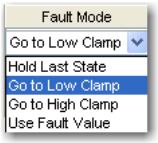
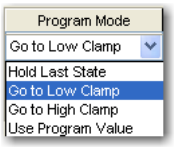
2. After the channels are configured, do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK to apply the change and close the dialog box.
   - Click Cancel to close the dialog box without applying changes.

Fault/Program Action Tab



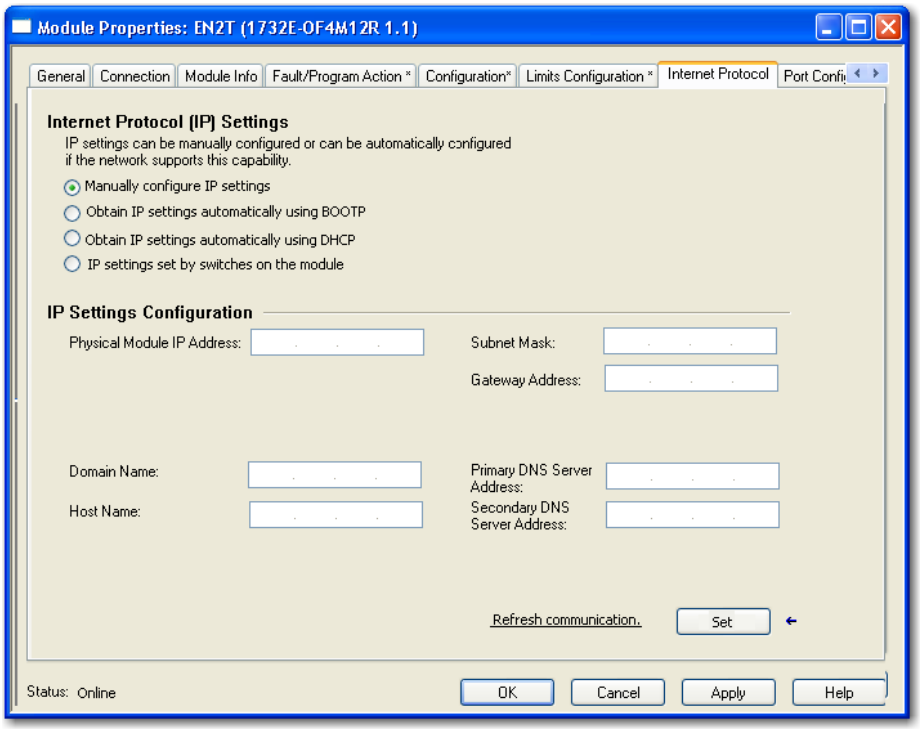
1. To configure the Fault/Program Action tab, set the following parameters:

Fault/Program Action tab

Field	What to do	Description
Channel	Select a push button to correspond to a channel (0…3).	Refers to the channel being configured.
Fault Mode	Select from a dropdown list: 	Allows the user to select any of the following output behavior for each channel when in Fault mode: • Go to Low Clamp (default) • Hold Last State • Go to High Clamp • Use Fault Value
Fault Value	Specify a value.	Activates when Use Fault Value is selected as Fault Mode. The user needs to enter a value for the output to transition to when there is a communication fault.
Program Mode	Select from a dropdown list: 	Allows the user to select any of the following output behavior for each channel when in Program mode: • Go to Low Clamp (default) • Hold Last State • Go to High Clamp • Use Program Value
Program Value	Specify a value.	Activates when Use Program Value is selected as Program Mode. The user needs to enter a value for the output to transition to when in Program mode.

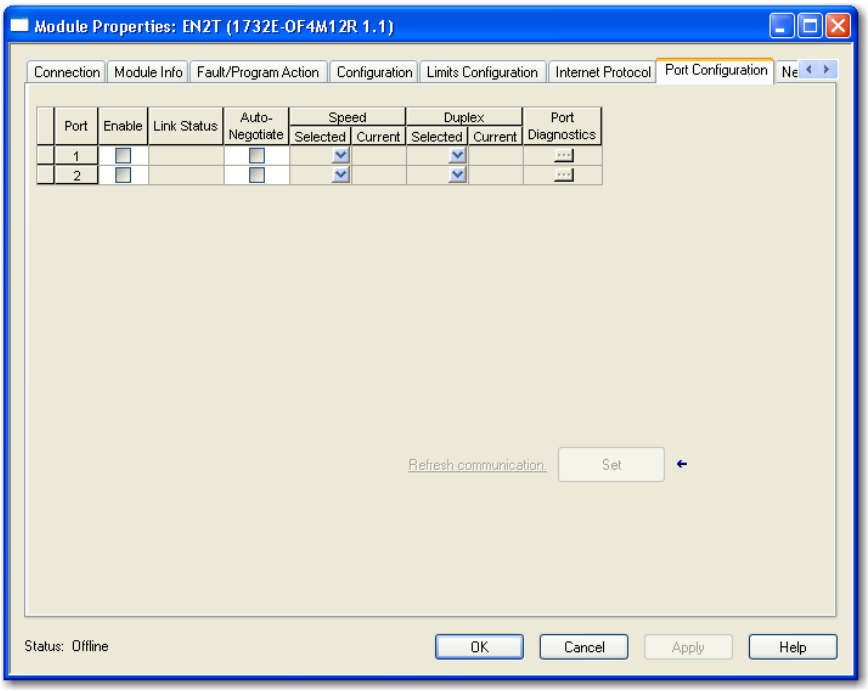
2. Do one of the following:
   - Click Apply to store a change but stay on the dialog box to choose another tab.
   - Click OK if you are finished making changes.

Internet Protocol Tab



1. To configure your IP settings, click the Internet Protocol tab. This tab is only available for editing when the device is online. To manually configure your IP settings, specify the IP address in the Physical Module IP Address field.
2. On the other fields (Domain Name, Host Name, Primary DNS Server Address, Secondary DNS Server Address), specify the corresponding parameter. Click Set and then click OK.

Port Configuration Tab



To configure the Ethernet ports, click the Port Configuration tab. This tab is only available for editing when the device is online.

To configure the ports:

To	Then
Use the default port speed and duplex settings	Leave Auto-negotiate port speed and duplex checked. This setting determines the actual speed and duplex setting.
Manually configure your port's speed and duplex settings	Follow these steps. 1. Clear the Auto-negotiate port speed and duplex checkbox. 2. From the Current Port Speed pull-down menu, choose a port speed. 3. From the Current Duplex pull-down menu, choose the appropriate Duplex value, that is, Half Duplex or Full Duplex.

IMPORTANT Consider the following when you configure the module's port settings:

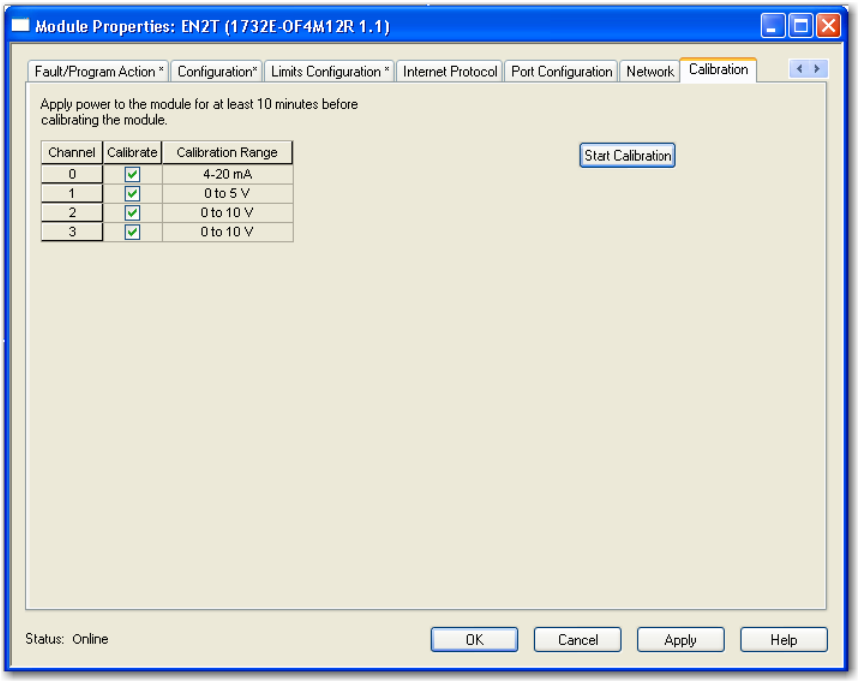
- If the module is connected to an unmanaged switch, leave Auto-negotiate port speed and duplex checked or the module will fail.
- If you are forcing the port speed and duplex with a managed switch, the corresponding port of the managed switch must be forced to the same settings or the module will fail.

Calibration Tab

The Calibration tab on the Module Properties dialog box lets you recalibrate the module, if necessary. Calibration corrects any hardware inaccuracies on a

particular channel. The Calibration Range that appears on the Calibration tab is dependent on the output range configured for the channel.

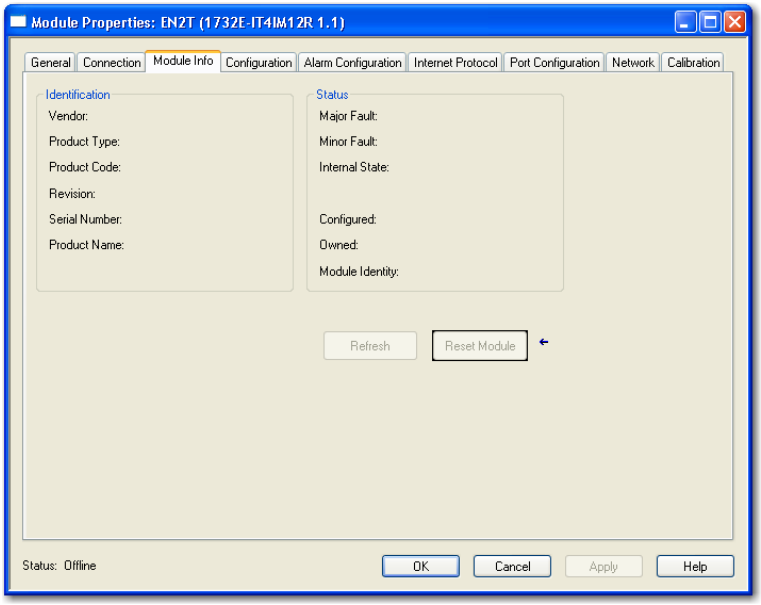
For detailed information about calibration, see Calibrate Your Modules on page 45.

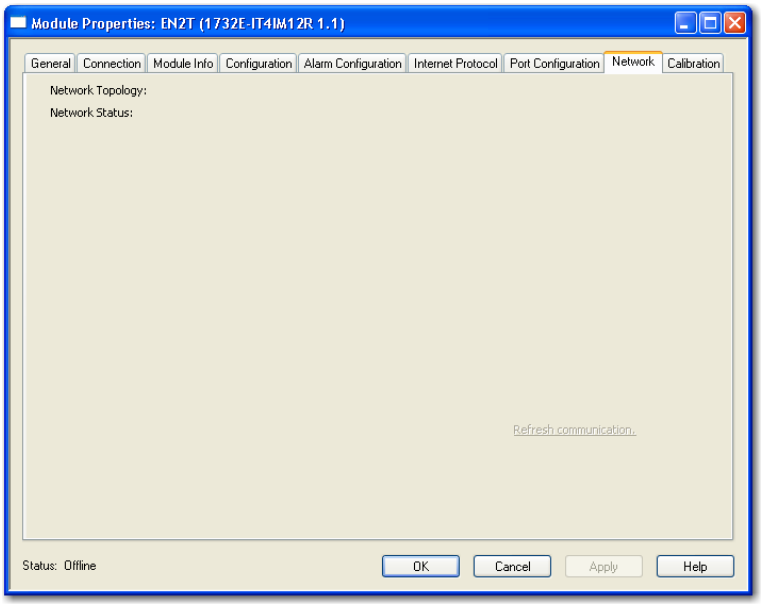


Status and Monitoring Tabs

Although each dialog box maintains importance during online monitoring, some of the tabs, such as the Module Info and Network, are blank during the initial module configuration.

Check the status of your module using these tabs.





Chapter Summary

This chapter provided instructions on how to configure the 1732E ArmorBlock Analog Input and Output modules through the RSLogix 5000 software.

Configurable Features for the Analog Input and Output Modules

Overview

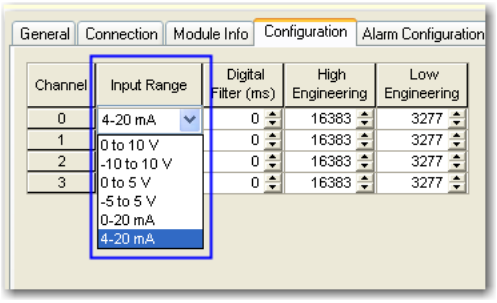
This chapter describes how the different configuration parameters affect the analog input and output channels. It also includes the data structure for both modules.

The parameters discussed in this chapter can be configured through the RSLogix 5000 software. See the previous chapter, Configure Your Analog Input and Output Modules with RSLogix 5000 Software, to learn more about the step-by-step I/O configuration and setup process using RSLogix 5000.

Configurable Features for the 1732E-IF4M12R Input Module

The following features can be configured on each of the four channels for the 1732E-IF4M12R module, unless otherwise specified.

Input Types and Ranges



Each of the four 1732E-IF4M12R input points can be configured as either current input or voltage input, with current mode as default configuration.

The user must do two things to use the input as a current or voltage device:

- Wire for the correct input type (see page 10)
- Configure accordingly through RSLogix 5000 (see page 25)

Current Mode

In current mode, the module supports either 0...20 mA or 4...20 mA input currents independently for each channel, with the latter as default input range.

Voltage Mode

In voltage mode, the module supports both unipolar ranges of 0...10V and 0...5V, and bipolar ranges of ±5V and ±10V. The nominal common mode input impedance per channel in voltage mode is 125 kΩ

Digital Filters

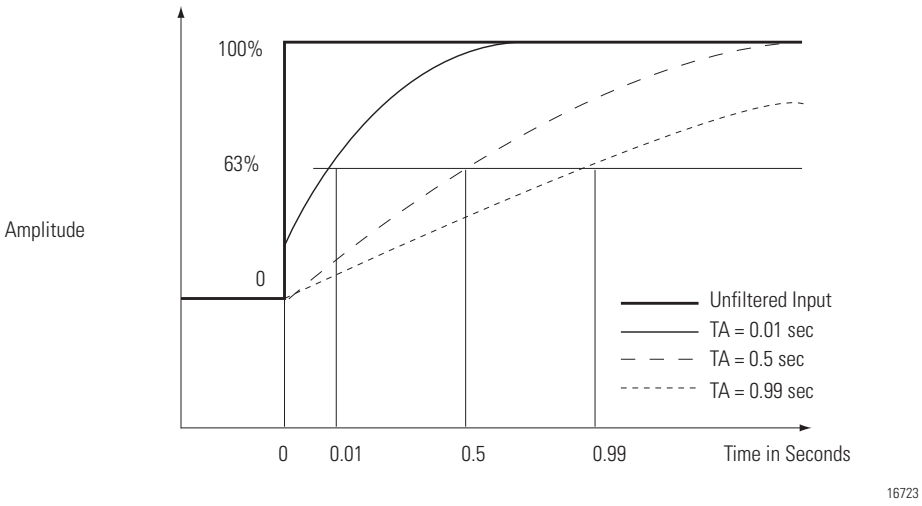
The digital filter smooths input data noise transients for all channels on the module. This feature is applied on a per channel basis. The digital filter value specifies the time constant for a digital first order lowpass filter on the input. It is specified in units of milliseconds. A value of 0 disables the filter.

The digital filter equation is a classic first order lag equation.

$$Yn = Yn\text{-}1 + \frac{[\Delta t]}{\Delta t + TA}(X_n - Y_n - 1)$$

Yn = Present output, filtered peak voltage (PV)
Yn-1 =Previous output, filtered PV
Δt = Module channel update time (seconds)
TA = Digital filter time constant (seconds)
Xn = Present input, unfiltered PV

Using a step input change to illustrate the filter response, as shown in the illustration, you can see that when the digital filter time constant elapses, 63.2% of the total response is reached. Each additional time constant achieves 63.2% of the remaining response.



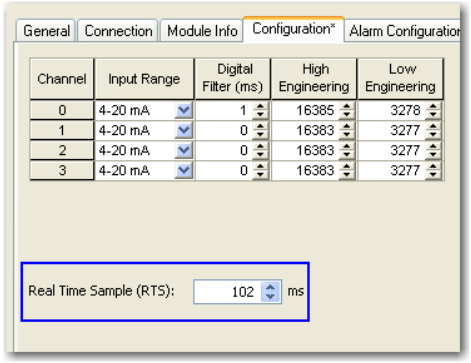
To set digital filters in RSLogix 5000, go to page 25.

High Engineering/Low Engineering

High engineering and low engineering values help determine the engineering units the signal values scale into. The high engineering term corresponds to the high signal value, while the low engineering term corresponds to the low signal value. The scaling equation used is shown below.

$$\text{Data} = \frac{(\text{Signal}-\text{LowSignal})(\text{HighEngineering}-\text{LowEngineering})}{\text{High Signal} - \text{Low Signal}} + \text{Low Engineering}$$

Real-time Sampling



This parameter instructs the module how often to scan its input channels and obtain all available data. The data is produced at the rate configured by the RPI parameter on the connection tab. This feature is applied on a module-wide basis.

Process Alarms

Process alarms alert you when the module has exceeded configured high or low limits for each channel. You can latch process alarms. These are set at four user configurable alarm trigger points.

- High high
- High
- Low
- Low low

To set process alarms via RSLogix 5000, go to page 26.

Configurable Features for the 1732E-OF4M12R Output Module

The following features can be configured on each of the four channels for the 1732E-OF4M12R module, unless otherwise specified.

Feature	Page
Output Types and Ranges	46
High Engineering/Low Engineering	47
Fault Mode and Program Mode	47
Clamping/Limiting	47

Output Types and Ranges

Each of the four 1732E-OF4M12R output points can be configured as either current output or voltage output, with current mode as default configuration.

The user must do two things to use the output as a current or voltage device:

- Wire for the correct output type (see page 10)
- Configure accordingly through RSLogix 5000 (see page 35)

Current Mode

In current mode, the module supports either 0...20 mA or 4...20 mA output currents independently for each channel, with the latter as default output range.

Voltage Mode

In voltage mode, the module supports ranges of 0...5V, -5...+5V, 0...10V, or -10...+10V, independently for each channel.

In voltage mode, the outputs are short circuit protected to 20 mA per channel.

High Engineering/Low Engineering

See High Engineering/Low Engineering on page 45.

Fault Mode and Program Mode

The module allows the user to set output states or behavior when in program mode or fault mode, for each of the four channels. When in program mode the user can define the following go-to transition behavior for each of the four channels:

- Hold Last State – instructs the module to maintain last valid state
- Go to Low Clamp – defined in the Limits Configuration tab
- Go to High Clamp – defined in the Limits Configuration tab
- Use Program Value – user defined value in RSLogix 5000

The user can define the following go-to transition behavior for each channel when the module has a communication fault:

- Hold Last State
- Go to Low Clamp
- Go to High Clamp
- Use Fault Value – user defined fault value

Clamping/Limiting

Clamping limits the output from the analog module to remain within a range configured by the controller, even when the controller commands an output

outside that range. This safety feature sets a high clamp and a low clamp. Once clamps are determined for a module, any data received from the controller that exceeds those clamps sets an appropriate limit alarm and transitions the output to that limit but not beyond the requested value.

For example, an application may set the high clamp on a module for 8V and the low clamp for -8V. If a controller sends a value corresponding to 9V to the module, the module will only apply 8V to its screw terminals.

Clamping alarms can be disabled or latched on a per channel basis.

To set clamping limits via RSLogix 5000, go to page 36.

Clamp/Limit Alarms

This function works directly with clamping. When a module receives a data value from the controller that exceeds clamping limits, it applies signal values to the clamping limit but also sends a status bit to the controller notifying it that the value sent exceeds the clamping limits.

Using the example above, if a module has clamping limits of 8V and -8V but then receives data to apply 9V, only 8V is applied to the screw terminals and the module sends a status bit back to the controller informing it that the 9V value exceeds the module's clamping limits.

To set clamping alarms via RSLogix 5000, go to page 36.

Data Tables

The data structure of each Assembly instance used by the Analog Input and Output modules is defined in the tables below.

1732E-IF4M12R – Configuration Assembly Instance 100 Data Structure

Configuration Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
4…5	Channel 0 Low Engineering							
6…7	Channel 0 High Engineering							
8…9	Channel 0 Digital Filter							
10…11	Channel 0 Low Alarm							
12…13	Channel 0 High Alarm							
14…15	Channel 0 Low Low Alarm							
16…17	Channel 0 High High Alarm							
18	Channel 0 Input Range							
19	Channel 0 Enable Alarm Latch							
20	Channel 0 Disable Alarms							
21…23	Reserved (Ignore)							
24…25	Channel 1 Low Engineering							

1732E-IF4M12R – Configuration Assembly Instance 100 Data Structure

Configuration Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
26…27	Channel 1 High Engineering							
28…29	Channel 1 Digital Filter							
30…31	Channel 1 Low Alarm							
32…33	Channel 1 High Alarm							
34…35	Channel 1 Low Low Alarm							
36…37	Channel 1 High High Alarm							
38	Channel 1 Input Range							
39	Channel 1 Enable Alarm Latch							
40	Channel 1 Disable Alarms							
41…43	Reserved (Ignore)							
44…45	Channel 2 Low Engineering							
46…47	Channel 2 High Engineering							
48…49	Channel 2 Digital Filter							
50…51	Channel 2 Low Alarm							
52…53	Channel 2 High Alarm							
54…55	Channel 2 Low Low Alarm							
56…57	Channel 2 High High Alarm							
58	Channel 2 Input Range							
59	Channel 2 Enable Alarm Latch							
60	Channel 2 Disable Alarms							
61…63	Reserved (Ignore)							
64…65	Channel 3 Low Engineering							
66…67	Channel 3 High Engineering							
68…69	Channel 3 Digital Filter							
70…71	Channel 3 Low Alarm							
72…73	Channel 3 High Alarm							
74…75	Channel 3 Low Low Alarm							
76…77	Channel 3 High High Alarm							
78	Channel 3 Input Range							
79	Channel 3 Enable Alarm Latch							
80	Channel 3 Disable Alarms							
81…83	Reserved (Ignore)							
84…85	Update Rate							

1732E-OF4M12R – Configuration Assembly Instance 101 Data Structure

Configuration Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
4…5	Channel 0 Fault Value							
6…7	Channel 0 Idle Value							
8…9	Channel 0 Low Engineering							
10…11	Channel 0 High Engineering							
12…13	Channel 0 Low Clamp							
14…15	Channel 0 High Clamp							
16	Channel 0 Output Range							
17	Channel 0 Fault Action							
18	Channel 0 Idle Action							
19	Channel 0 Enable Alarm Latch							
20	Channel 0 Disable Alarms							
21…23	Reserved (Ignore)							
24…25	Channel 1 Fault Value							
26…27	Channel 1 Idle Value							
28…29	Channel 1 Low Engineering							
30…31	Channel 1 High Engineering							
32…33	Channel 1 Low Clamp							
34…35	Channel 1 High Clamp							
36	Channel 1 Output Range							
37	Channel 1 Fault State							
38	Channel 1 Idle State							
39	Channel 1 Enable Alarm Latch							
40	Channel 1 Disable Alarms							
41…43	Reserved (Ignore)							
44…45	Channel 2 Fault Value							
46…47	Channel 2 Idle Value							
48…49	Channel 2 Low Engineering							
50…51	Channel 2 High Engineering							
52…53	Channel 2Low Clamp							
54…55	Channel 2 High Clamp							
56	Channel 2 Output Range							
57	Channel 2 Fault State							
58	Channel 2 Idle State							
59	Channel 2 Enable Alarm Latch							
60	Channel 2 Disable Alarms							
61…63	Reserved (Ignore)							

1732E-OF4M12R – Configuration Assembly Instance 101 Data Structure

Configuration Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
64…65	Channel 3 Fault Value							
66…67	Channel 3 Idle Value							
68…69	Channel 3 Low Engineering							
70…71	Channel 3 High Engineering							
72…73	Channel 3 Low Clamp							
74…75	Channel 3 High Clamp							
76	Channel 3 Output Range							
77	Channel 3 Fault State							
78	Channel 3 Idle State							
79	Channel 3 Enable Alarm Latch							
80	Channel 3 Disable Alarms							
81	Reserved (Ignore)							

1732E-OF4M12R – Consumed Assembly Instance 106 Data Structure

Consumed Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0…1	Channel 0 Data							
2…3	Channel 1 Data							
4…5	Channel 2 Data							
6…7	Channel 3 Data							

1732E-IF4M12R – Produced Assembly Instance 105 Data Structure

Produced Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0…3	Reserved (must be zero)							
4…5	Channel 0 Data							
6…7	Channel 1 Data							
8…9	Channel 2 Data							
10…11	Channel 3 Data							
12	Channel 0 Status(1)							
13	Channel 1 Status(1)							
14	Channel 2 Status(1)							
15	Channel 3 Status(1)							

(1) This parameter is in Byte and has the following structure:
Bit 0 = Fault; Bit 1 = Calibration; Bit 2 = Low Alarm; Bit 3 = High Alarm; Bit 4 = Low Low Alarm; Bit 5 = High High Alarm; Bit 6 = Underrange; Bit 7 = Overrange

1732E-OF4M12R – Produced Assembly Instance 107 Data Structure

Produced Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0…3	Reserved (must be zero)							
4	Channel 0 Status(1)							
5	Channel 0 Status(1)							
6	Channel 0 Status(1)							
7	Channel 0 Status(1)							

(1) This parameter is in Byte and has the following structure:
Bit 0 = Fault; Bit 1 = Calibration; Bit 2 = Low Alarm; Bit 3 = High Alarm

Chapter Summary

This chapter discussed the different configurable features for the analog input and output modules. It also provides the configuration and produced data structure tables for the modules.

Calibrate Your Modules

Overview

The Analog Input and Output modules are shipped to you calibrated but calibration is also made available through the RSLogix 5000 software should you choose to recalibrate to increase module accuracy for your specific application.

This chapter shows you how to calibrate your modules.
It includes the following topics.

IMPORTANT The analog input module can be calibrated on a channel-by-channel basis or with the channels grouped together, while the output module only allows for channels to be calibrated one at a time. Regardless of which option you choose, we recommend you calibrate all channels on your module each time you calibrate. This will help you maintain consistent calibration readings and improve module accuracy.

Calibration is meant to correct any hardware inaccuracies that may be present on a particular channel. The calibration procedure compares a known standard, either input signal or recorded output, with the channel's performance and then calculating a linear correction factor between the measured and the ideal.

The linear calibration correction factor is applied on every input or output same to obtain maximum accuracy.

Difference of Calibrating an Input Module and an Output Module

Although the purpose of calibrating analog modules is the same for input and output modules, to improve the module's accuracy and repeatability, the procedures involved differs for each.

- When you calibrate input modules, you use current or voltage calibrators to send a signal to the module to calibrate it.
- When you calibrate output modules, you use a digital multimeter (DMM) to measure the signal the module is sending out.

To maintain your module's accuracy specifications, we recommend you use calibration instruments with specific ranges. The table lists the recommended instruments for each module.

Module	Recommended Instrument Range
1732E-IF4M12R	-10V…+10V source ±500 μV accuracy 0…20 mA source ±2 μA accuracy
1732E-OF4M12R	DMM accurate to within ±500 μV or ±2 μA

IMPORTANT Do not calibrate your module with an instrument that is less accurate than those recommended to avoid anomalies.

- Calibration appears to occur normally but the module gives inaccurate data during operation.
- A calibration fault occurs, forcing you to abort calibration.
- The calibration fault bits are set for the channel you attempted to calibrate. The bits remain set until a valid calibration is completed.
- In this case, you must recalibrate the module with an instrument as accurate as recommended.

Calibrate in Program or Run Mode

You must be online to calibrate your analog I/O modules by using RSLogix 5000 software. When you are online, choose Program mode as the state of your program during calibration.

IMPORTANT The module freezes the state of each channel and does not update the controller with new data until after the calibration ends. This could be hazardous if active control were attempted during calibration.

Calibrate the Input Module (1732E-IF4M12R)

Input calibration is a multi-step process that involves multiple services being sent to the module.

The 1732E-IF4M12R module is used in applications requiring voltage or current. The module offers the following input ranges:

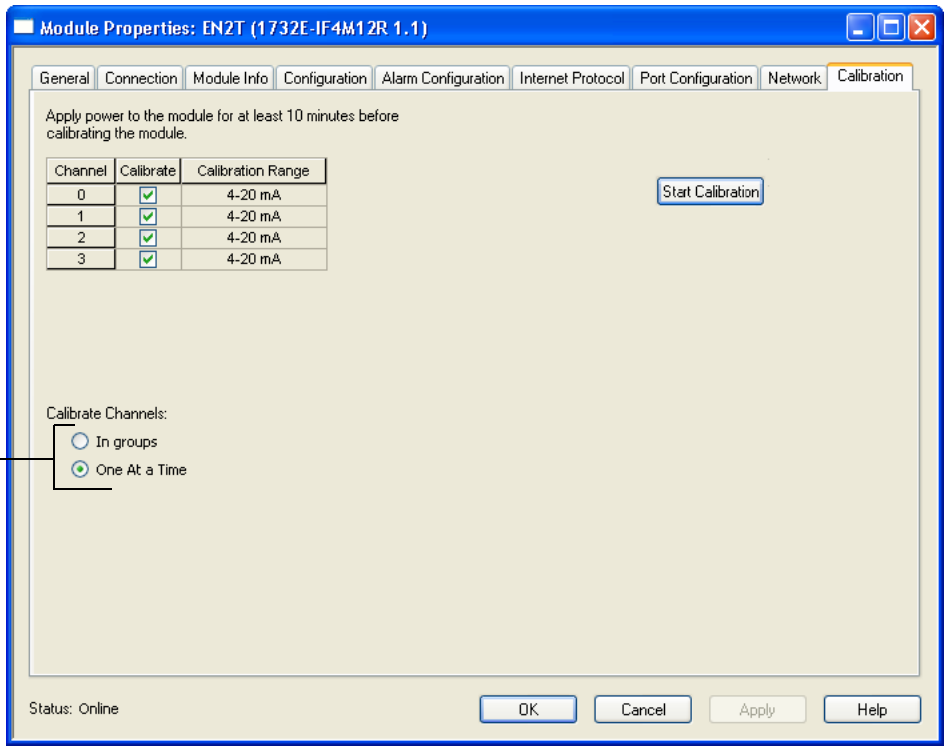
- -10...10V
- 0...10V
- 0...5V
- -5...5V
- 0...20 mA
- 4...20 mA

IMPORTANT Apply power to the power supply and module for at least 10 minutes before calibrating the module.

While you are online, you must access the Calibration tab on the Module Properties dialog box through RSLogix 5000.

Follow these steps to calibrate your module.

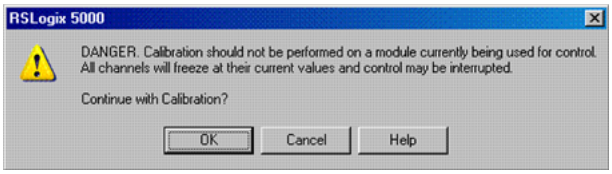
1. Click Calibration Tab on the Module Properties dialog box.



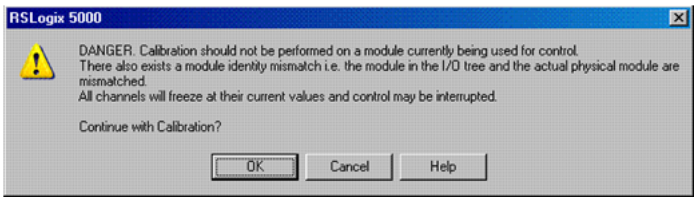
Choose whether to calibrate each channel one at a time or in groups all at once

2. Check the Calibrate checkbox to specify which channel to calibrate. In this example, check Channels 0...3.
3. Under Calibrate Channels select One At a Time.
4. Click Start Calibration. This button is active when:
   - the system is online, and
   - you selected at least one of the channels.

   Note that you can press the F1 button on your keyboard or click Help from the wizard and warning message that appear to get detailed information about the procedures for calibration.
5. After clicking Start Calibration, a warning dialog appears notifying you of the risk involved in calibrating an active system and gives you the option to quit.

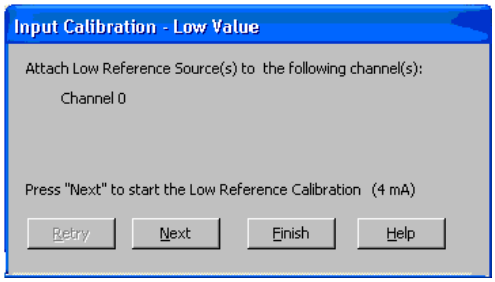


If at least one channel has been selected and there is a mismatch between the device in the RSLogix 5000 I/O Configuration and the actual physical device, another warning dialog comes up. It informs you that this is dangerous with an active system and there is a mismatch. This message box gives you an option to quit. Help is provided to you more information.



From the Danger dialog, for a module not currently used for control, click OK to continue.

6. The Low Value dialog appears.
Set the calibrator for the low reference and apply it to the module.

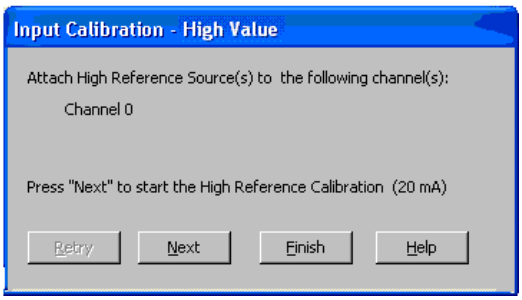


Click Next to start low reference calibration.

TIP If several channels have been selected for calibration with One At a Time option enabled, only one channel will appear in the list at the first round of calibration (that is, after low reference and high reference calibration).

TIP If calibration is configured to be done In Groups, the Low Value dialog box shows all the channels enabled for calibration.

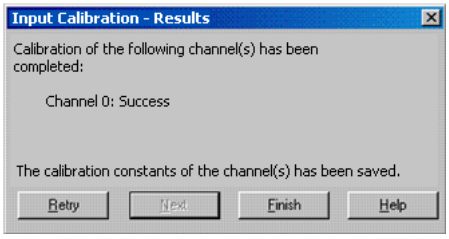
7. Set the calibrator for the high reference voltage and apply it to the module
The High Value dialog appears.



TIP If several channels have been selected for calibration with One At a Time option enabled, only one channel will appear in the list at the first round of calibration (that is, after low reference and high reference calibration).

TIP If calibration is configured to be done In Groups, the High Value dialog box shows all the channels enabled for calibration.

8. From the High Value dialog, click Next to start calibration.
The Input Calibration - Results dialog appears. It shows you the results of calibration.



- For failed calibration, go to step 9.
- For successful calibration, go to step 10 .

9. If the calibration failed, click Retry to recalibrate the same channel.
This takes you back to steps 6...8 until you get successful calibration on the channel.

10. If the calibration is successful, click Next to start calibration on the next channel (in this example, channel 1).
This takes you back to steps 6...8. You will have to go through the same cycle of steps for each of the next channels lined up for calibration.

11. After successful calibration on the channel(s), click Finish to close the Calibration Wizard.

Calibrate the Output Module (1732E-OF4M12R)

Output calibration is a multi-step process that involves measuring a signal from the module. This section has two parts, as shown in the table.

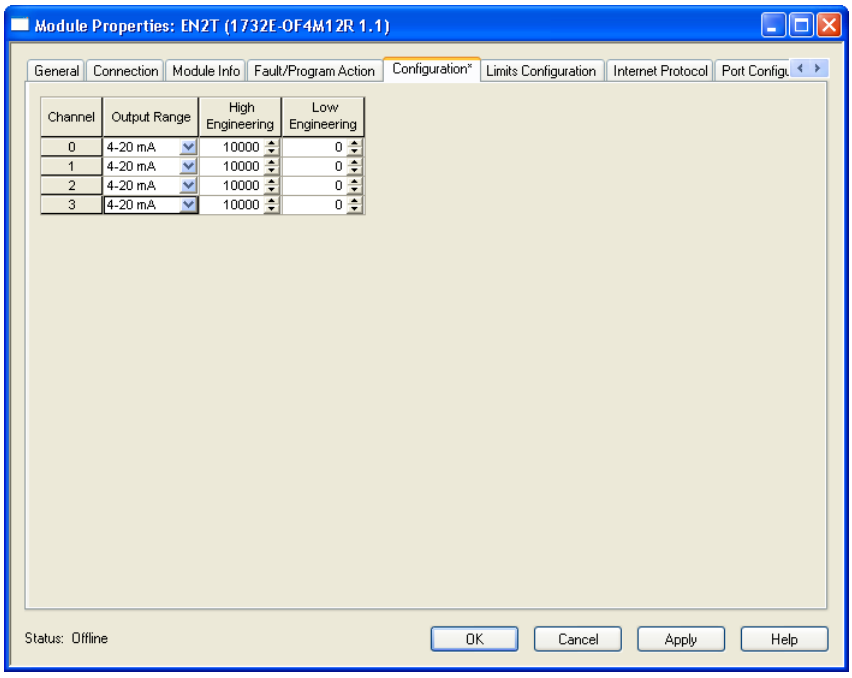
Current Meter Calibrations

RSLogix 5000 software commands the module to output specific levels of current. You must measure the actual level and record the results. This measurement allows the module to account for any inaccuracies.

While you are online, you must access the Module Properties dialog box. See Edit Your 1732E-OF4M12R Configuration on page 30.

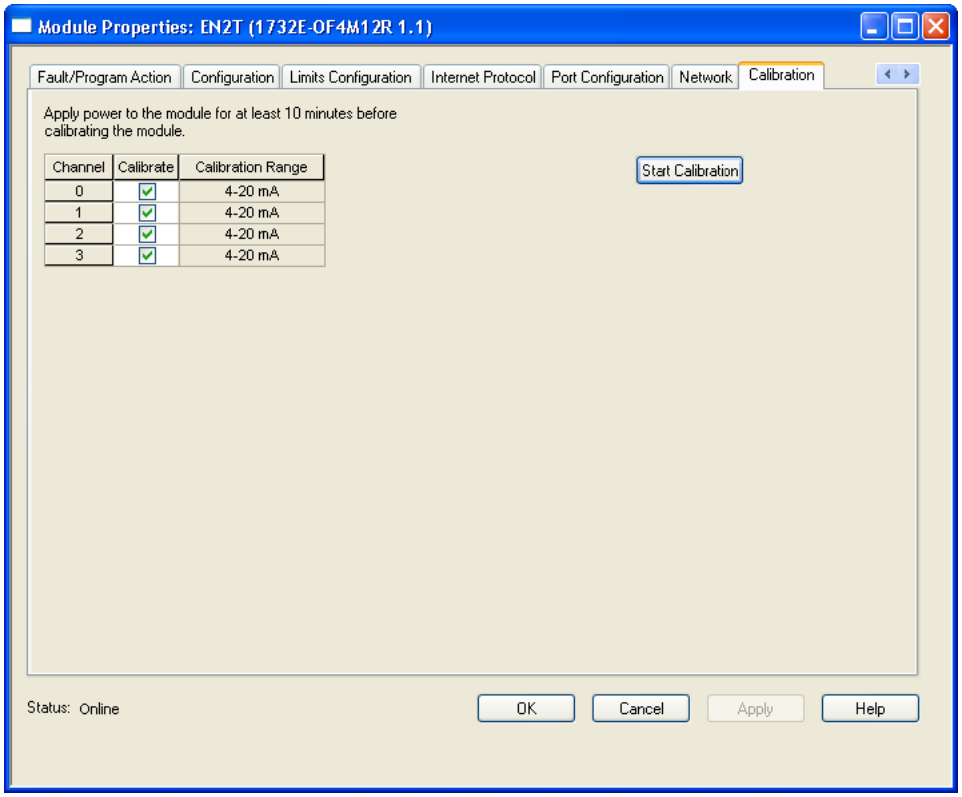
Follow these steps to calibrate your module.

1. Connect your current meter to the module.
2. Go to the Configuration tab on the Module Properties dialog box.



3. At the Output Range, choose the range from the pull-down menu to calibrate the channels. Click Apply.

4. Click the Calibration Tab on the Module Properties dialog box.



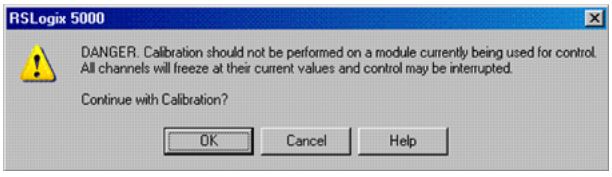
5. Set the channels to be calibrated. In this example, all channels are enabled for calibration.

TIP For the output module, calibration is done one channel at a time.

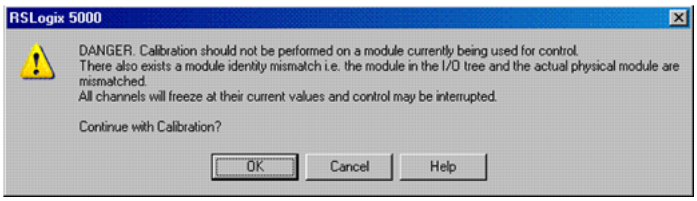
6. Click Start Calibration to access the Calibration Wizard. This button is active when:
   - the system is online, and
   - you selected at least one of the channels.

   Note that you can press the F1 button on your keyboard or click Help from the wizard and warning message that appear to get detailed information about the procedures for calibration.

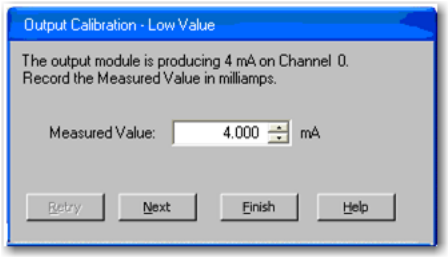
7. After clicking Start Calibration, a warning dialog appears notifying you of the risk involved in calibrating an active system and gives you the option to quit.



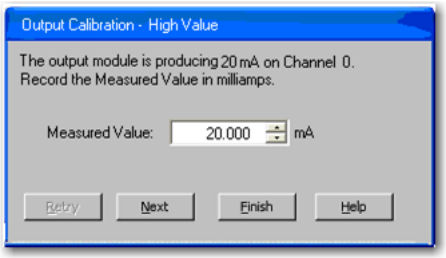
If at least one channel has been selected and there is a mismatch between the device in the RSLogix 5000 I/O Configuration and the actual physical device, another warning dialog comes up. It informs you that this is dangerous with an active system and there is a mismatch. This message box gives you an option to quit. Help is provided to you more information.



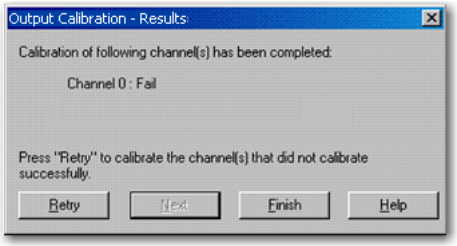
8. From the Danger dialog, for a module not currently used for control, click OK to continue.
   The Output Calibration - Low Value dialog appears.



9. Record the results of your measurement.
10. Click Next. The Output Calibration - High Value dialog appears.



11. Record the results of your measurement.
12. Click Next to calibrate the module.
    The Output Calibration Results page appears.



- For failed calibration, go to step 13.
- For successful calibration, go to step 14 .

13. If the calibration failed, click Retry to recalibrate the same channel.
    This takes you back to steps 8...12 until you get successful calibration on the channel.
14. If the calibration is successful, click Next to start calibration on the next channel (in this example, channel 1).
    This takes you back to steps 8...12. You will have to go through the same steps for each of the next channels lined up for calibration.
15. After successful calibration on the channel(s), click Finish to close the Calibration Wizard.

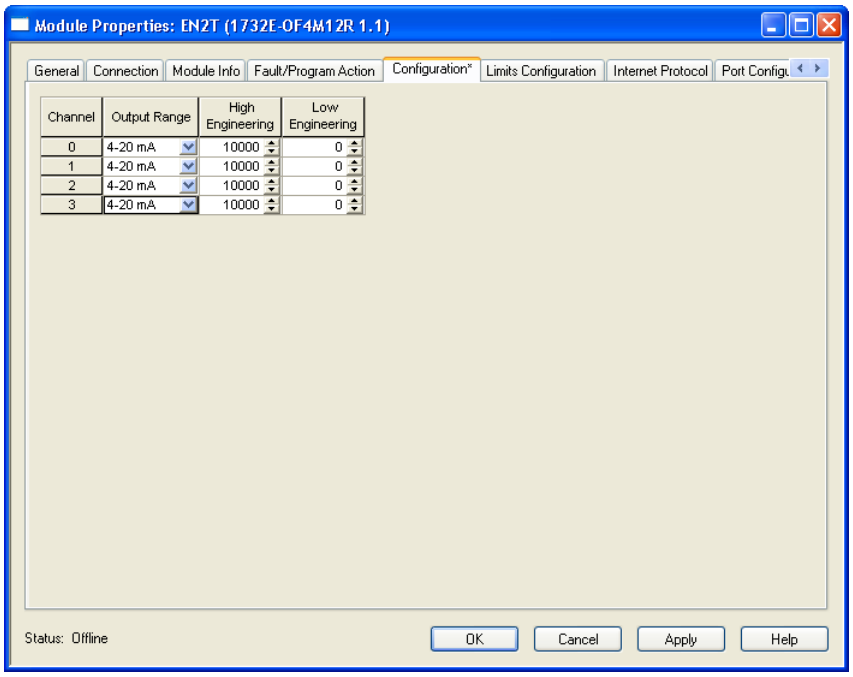
Voltage Meter Calibrations

RSLogix 5000 software commands the module to output specific levels of voltage. You must measure the actual level and record the results. This measurement allows the module to account for any inaccuracies.

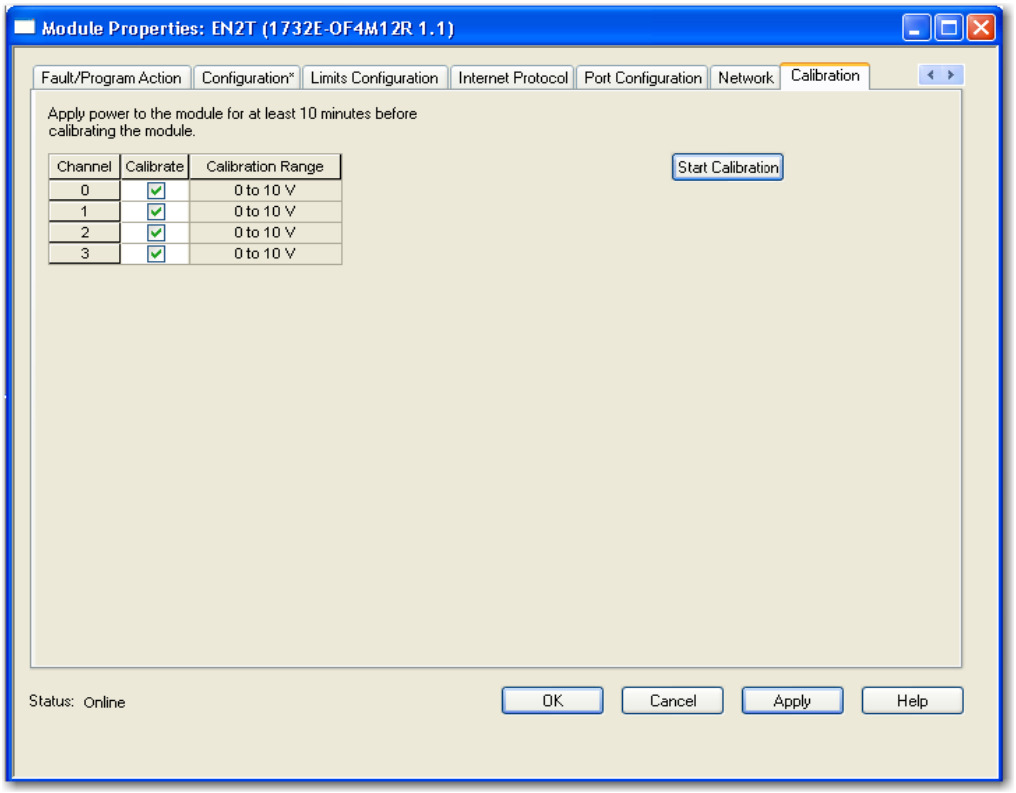
While you are online, you must access the Module Properties dialog box. See Edit Your 1732E-OF4M12R Configuration on page 30.

Follow these steps to calibrate your module.

1. Connect your voltage meter to the module.
2. Go to the Configuration tab on the Module Properties dialog box.



3. At the Output Range, choose the range from the pull-down menu to calibrate the channels. Click Apply.
4. Click the Calibration Tab on the Module Properties dialog box.



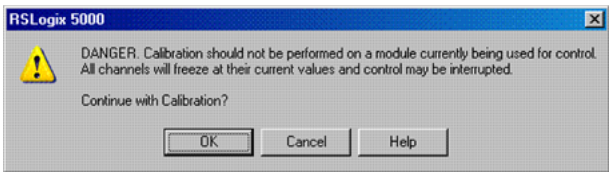
5. Set the channels to be calibrated. In this example, all channels are enabled for calibration.

   TIP For the output module, calibration is done one channel at a time.

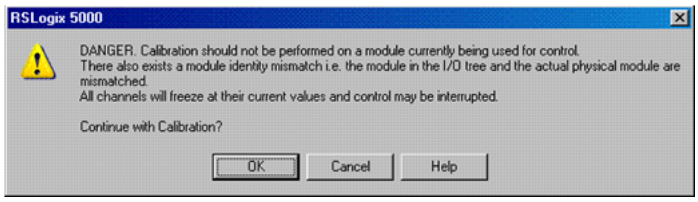
6. Click Start Calibration to access the Calibration Wizard. This button is active when:
   - the system is online, and
   - you selected at least one of the channels.

   Note that you can press the F1 button on your keyboard or click Help from the wizard and warning message that appear to get detailed information about the procedures for calibration.

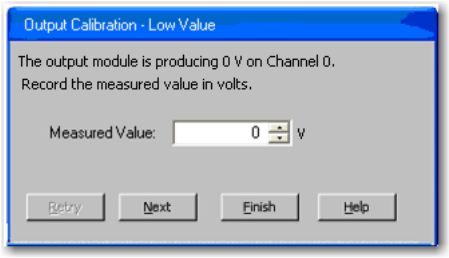
7. After clicking Start Calibration, a warning dialog appears notifying you of the risk involved in calibrating an active system and gives you the option to quit.



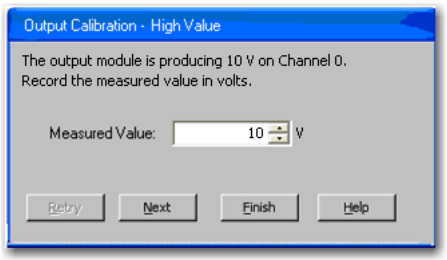
If at least one channel has been selected and there is a mismatch between the device in the RSLogix 5000 I/O Configuration and the actual physical device, another warning dialog comes up. It informs you that this is dangerous with an active system and there is a mismatch. This message box gives you an option to quit. Help is provided to you more information.



8. From the Danger dialog, for a module not currently used for control, click OK to continue.
The Output Calibration - Low Value dialog appears.

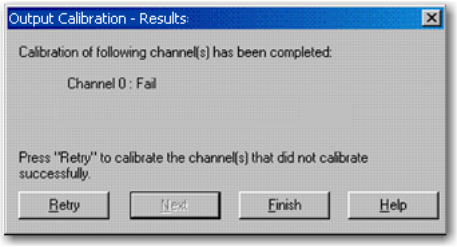


9. Record the results of your measurement.
10. Click Next. The Output Calibration - High Value dialog appears.



11. Record the results of your measurement.

12. Click Next to calibrate the module.
    The Output Calibration Results page appears.



- For failed calibration, go to step 13.
- For successful calibration, go to step 14 .

13. If the calibration failed, click Retry to recalibrate the same channel.
    This takes you back to steps 8...12 until you get successful calibration on the channel.
14. If the calibration is successful, click Next to start calibration on the next channel (in this example, channel 1).
    This takes you back to steps 8...12. You will have to go through the same steps for each of the next channels lined up for calibration.
15. After successful calibration on the channel(s), click Finish to close the Calibration Wizard.

Chapter Summary

This chapter provided a step-by-step guide on how to calibrate your ArmorBlock analog input and output modules.

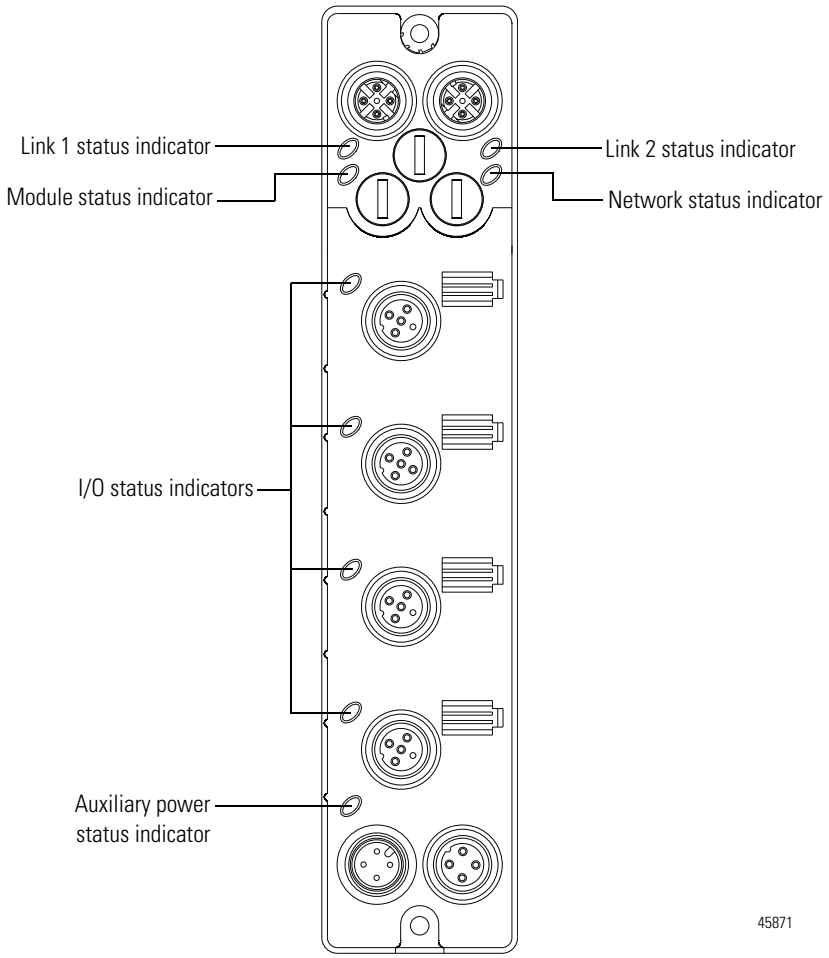
Troubleshoot the Modules

This chapter describes the different status indicators available in the analog input and output modules, 1732E-IF4M12R and 1732E-OF4M12R, and how to interpret these indicators to help troubleshoot the modules. It also includes a section on how to check your module for faults through the RSLogix 5000 software.

Interpret Status Indicators

The 1732E-IF4M12R and 1732E-OF4M12R modules have the following status indicators:

- Network, Module, and Link status indicators for EtherNet/IP
- Auxiliary power status indicator
- Individual I/O status indicators for inputs



Indicator Status for Modules

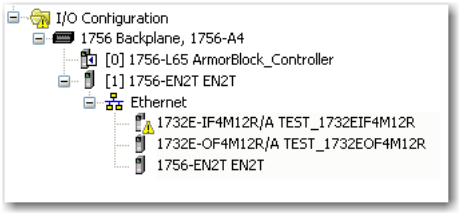
Indicator	Status	Description
Module status	Off	No power applied to the device.
	Flashing red/ green	The module is performing POST (Power-On Self Test), which completes within 30 s.
	Green	Device operating normally.
	Flashing red	Module has experienced a recoverable fault.
	Red	Unrecoverable fault – may require device replacement.
Network status	Off	The device is not initialized or the module does not have an IP address.
	Flashing green	The device has no CIP connections. The device has an IP address, but no CIP connections are established.
	Green	Device is online, has an IP address. CIP connections are established.
	Flashing red	One or more connections have timed out.
	Red	The module has detected that its IP address is already in use.
	Flashing red/ green	The module is performing a power-on self test (POST).
Network link status (Link 1/Link 2)	Off	No link established.
	Green	Link established on indicated port at 100 Mbps.
	Flashing green	Link activity present on indicated port at 100 Mbps.
	Yellow	Link established on indicated port at 10 Mbps.
	Flashing yellow	Link activity present on indicated port at 10 Mbps.
Auxiliary Power status	Off	Auxiliary power off or not connected.
	Green	Auxiliary power applied to device.
I/O status	Off	The input or output channel is inactive, can be calibrated.
	Flashing Green	Channel is calibrating.
	Green	**1732E-IF4M12R** – Normal operation, inputs being scanned. **1732E-OF4M12R** – The output is active and under control.
	Flashing Red	**1732E-IF4M12R** – Fault. Channel is at end of range. **1732E-OF4M12R** – Output fault. The output is open (current mode only), or a low/high clamp alarm is present.
	Red	**1732E-OF4M12R** – Auxiliary power disconnected or off.

Check for Faults

In addition to the status indicators on the module, RSLogix 5000 software alerts you to fault and other conditions in one of three ways:

- Warning signal on the main screen next to the module – This occurs when the connection to the module is broken.

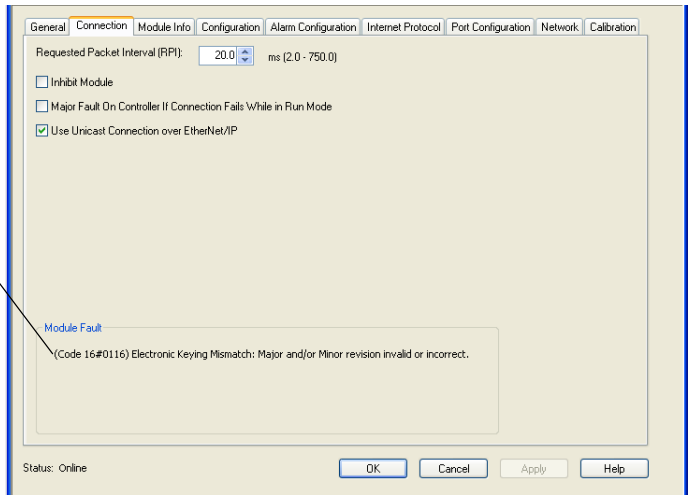
Warning icon appears when a communications fault occurs or if the module is inhibited



Warning signal – The module has a communications fault

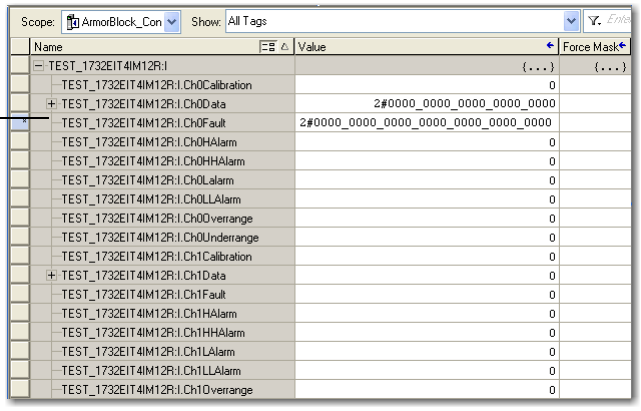
- Message in a screen's status line.

Status line provides information on the module fault and on the connection to the module



- Notification in the Tag Monitor – General module faults are also reported in the Tag Monitor. Communication faults are reported in the input tags.

RSLogix 5000 software generates 1 s in response to a module communication fault. In this example, a communication fault occurred between the controller and the module, so the controller automatically writes 1 s for all bits in the word.



Notes:

Specifications

General Specifications

The analog input and output modules, 1732E-IF4M12R and 1732E-OF4M12R, have the following general specifications.

General Specifications

Attributes	Value
Voltage, power, max	30V DC
Voltage, power, min	12V DC
Module power	12…30V DC @ @ 150mA – 1732E-IF4M12R 12…30V DC @ @ 250mA – 1732E-OF4M12R
Power consumption	3 W @ 24V DC, typical 3.5 W, max (module unloaded)
Isolation voltage	50V (continuous), Basic Insulation Type Type tested @ 707V DC for 60 s
Communication rate	EtherNet/IP 10/100 Mbps Full or half-duplex 100 meter per segment
Status indicators	Module status – red/green Network status – red/green Link status – green/yellow Auxiliary power status – green I/O LED – red/green
Dimensions, approx., HxWxD	179 x 37 x 27 mm (7.05 x 1.46 x 1.06 in.)
Weight, approx.	0.34 kg (0.75 lb)
Wiring category(1)	1 – on signal ports 1 – on power ports 1 – on communication ports

(1) Use this Conductor Category information for planning conductor routing. Refer to publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

Input Specifications

The 1732E-IF4M12R module has the following input specifications.

Input Specifications – 1732E-IF4M12R

Attributes	Value
Number of inputs	4
Resolution, min	16 bits
Data format	16-bit sign magnitude
Conversion rate	1.005 kHz per channel
Input type	Configurable as voltage or current inputs
Notch Filter	1 kHz per channel

Input Specifications – 1732E-IF4M12R

Attributes	Value
Input range Current input Voltage input	 32 mA, 275 mW ±30V, 20 mA, 25 mW
Input impedance	125 kΩ per channel
Accuracy	0.1% Full Scale @ 25 °C (77 °F)
Accuracy drift with temperature, max	40 ppm % Full Scale /°C @ 25 °C (77 °F)
Calibration	Factory calibrated. Calibration is also supported through RSLogix 5000.
Overload support Current input Voltage input	 32 mA 30V continuous

Output Specifications

The 1732E-OF4M12R module has the following input specifications.

Output Specifications – 1732E-OF4M12R

Attributes	Value
Number of outputs	4
Resolution, min	16 bits
Data format	16-bit sign magnitude
Conversion rate	≤ 2 ms
Output type	Configurable as voltage or current per channel
Output range Current output Voltage output	 0…20 mA, 4…20 mA +/-10V, 10 mW
Short circuit protection, max Current output Voltage output	 20 mA (0…20 mA mode) 20 mA per channel
Accuracy	0.1% Full Scale @ 25 °C (77 °F)
Accuracy drift with temperature, max	40 ppm % Full Scale /°C @ 25 °C (77 °F)
Calibration	Factory calibrated. Calibration is also supported through RSLogix 5000.

Environmental Specifications

The analog input and output modules, 1732E-IF4M12R and 1732E-OF4M12R, have the following environmental specifications.

Environmental Specifications

Attribute	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20…60 °C (-4…140 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40…85 °C (-40…185 °F)
Temperature, ambient, max	60 °C (140 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% noncondensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 5 g @ 10…500 Hz
Shock, operating	IEC60068-2-27 (Test Ea, Unpackaged Shock): 30 g
Shock, nonoperating	IEC60068-2-27 (Test Ea, Unpackaged Shock): 50 g
Emissions	CISPR 11: Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±3 kV @ 5 kHz on power ports ±3 kV @ 5 kHz on signal ports ±3 kV @ 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: ±2 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±500V line-line (DM) and ±1 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	Meets IP65/66/67/69K (when marked)

Certifications

The analog input and output modules, 1732E-IF4M12R and 1732E-OF4M12R, have the following certifications.

Certifications

Certification (when product is marked)[1]	Value
c-UR-us	UL Recognized Component Industrial Control Equipment, certified for US and Canada. See UL File E322657.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications.

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

1732E ArmorBlock Embedded Web Server

Introduction

Rockwell Automation offers enhanced 1732E ArmorBlock for your EtherNet/IP control systems so you can monitor data remotely via web pages.

This chapter shows how you can use the module's web server.

Typical Applications

The module provides access to internal and network diagnostics. This access opens up different, remote access applications to control systems. Use the ArmorBlock I/O web browser to remotely access module data. Use a web browser to monitor live module data and access diagnostic information.

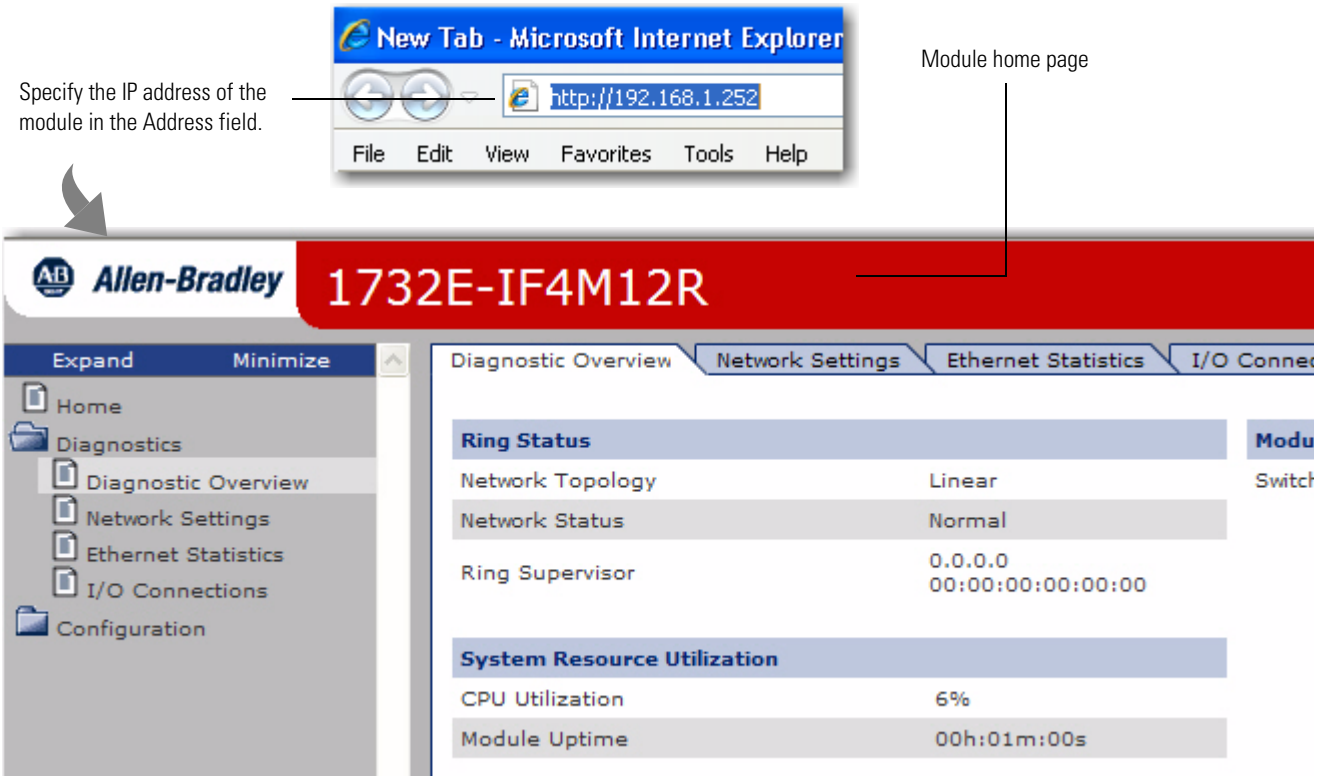
Browser Requirements

You can access the 1732E ArmorBlock I/O web pages only with Internet Explorer 6.0 or higher. To access data view pages, the browser requires Javascript support.

The supported display size is 640 x 480 or greater. Smaller display sizes work but might require extensive scrolling to view the information.

Access the Home Page of the Web Server

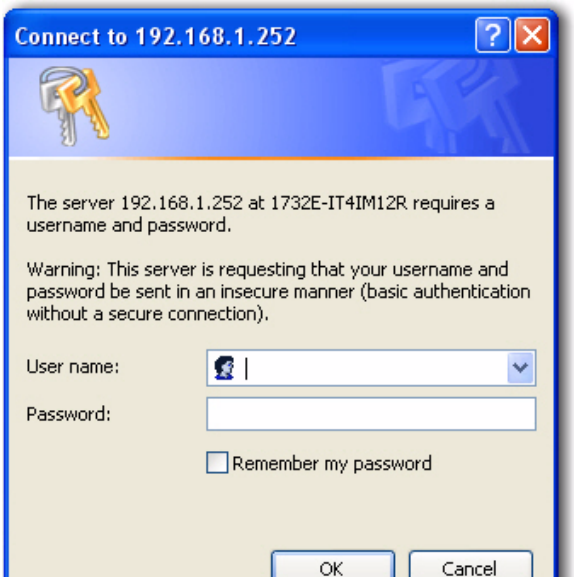
From your web browser, enter the IP address of the 1732E ArmorBlock module. The module displays its home page.



Log On to the Web Server

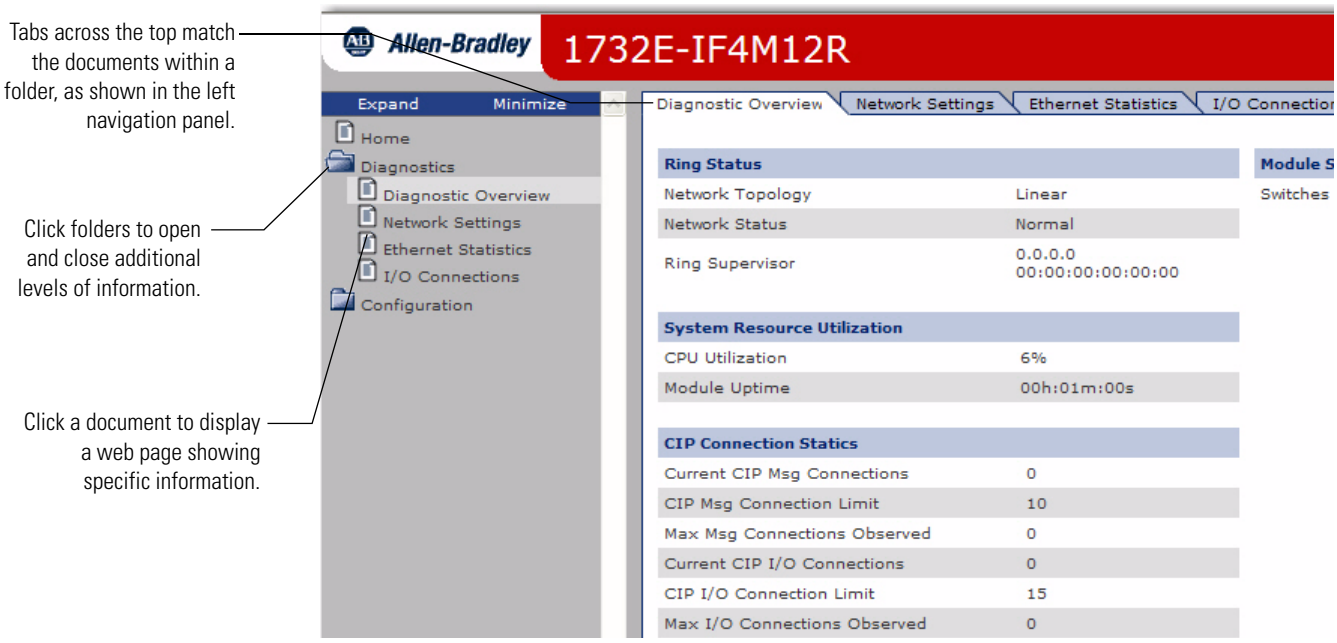
Many of the features of the 1732E ArmorBlock I/O require you to log on with appropriate access. If you select a feature, such as Configuration, the 1732E ArmorBlock I/O prompts you to enter your user name and password. The user name is Administrator. The default password is blank. Both are case sensitive.

Default Access
User Name: administrator
Password: <blank>



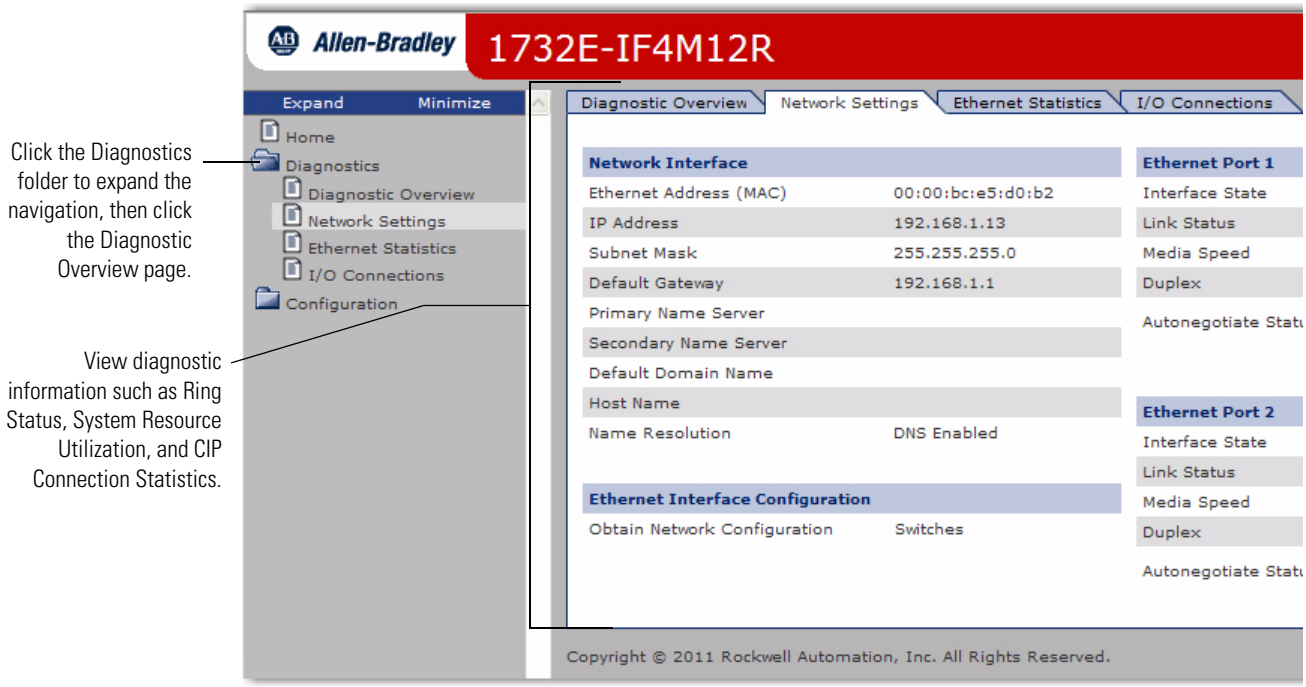
Navigate the 1732E ArmorBlock I/O

You navigate the web server pages by using the navigation panel on the left of the screen. There are also tabs across the top you can use to navigate the sections within folders



Access Diagnostic Information

You can view specific diagnostic information by clicking Diagnostic Overview on the navigational panel on the left.

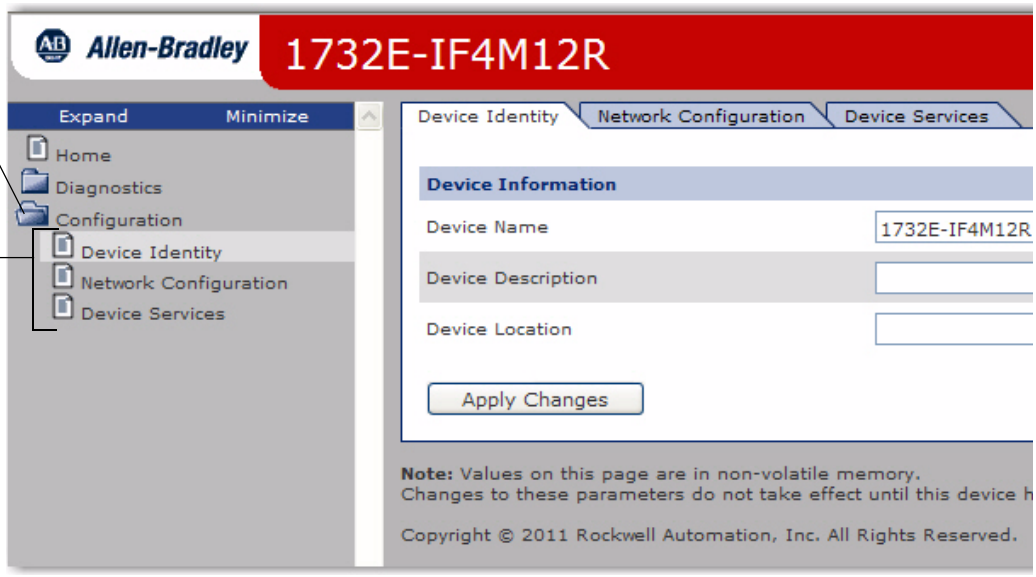


Access Configuration Information

You can also view configuration information through the Web Server pages. Click Configuration folder.

Click the Configuration folder to expand the navigation.

You can view and edit Device Identity, Network Configuration and Device Services information.



Module Tag Definitions

The 1732E-IF4M12R and 1732E-OF4M12R modules have the following sets of tags:

- Configuration
- Input
- Output (for 1732E-OF4M12R only)

Module Tags for 1732E-IF4M12R

Input Tags (1732E-IF4M12R)

Tag Name	Data Type	Definition
I.Fault	DINT	Collection of all module level fault bits.
I.Ch0Data I.Ch1Data I.Ch2Data I.Ch3Data	INT	The channel input signal represented in counts where -32,768 counts is the minimum detectable input signal and 32,767 counts is the maximum detectable.
I.Ch0Fault I.Ch1Fault I.Ch2Fault I.Ch3Fault	BOOL	Individual channel fault status bit. Indicates a 'hard' fault has occurred on the channel that means: calibration is ongoing; or if an input, an overrange or underrange condition is present These bits also are set by the controller if communication is lost with the I/O module.
I.Ch0Calibration I.Ch1Calibration I.Ch2Calibration I.Ch3Calibration	BOOL	Indicates if calibration is currently in progress on a channel.
I.Ch0Lalarm I.Ch1Lalarm I.Ch2Lalarm I.Ch3Lalarm	BOOL	Low alarm bits that set when the input signal moves beneath the configured low alarm trigger point, C.Ch<0...3>LAlarmLimit. Remains set until the input signal moves above the trigger point, unless latched via C.Ch<0...3>LimitAlarmLatch.
I.Ch0HAlarm I.Ch1HAlarm I.Ch2HAlarm I.Ch3HAlarm	BOOL	High alarm bit that sets when the input signal moves above the configured high alarm trigger point, Ch<0…3>HAlarmLimit. emains set until the input signal moves below the trigger point, unless latched via Ch<0…3>LimitAlarmLatch of the high alarm trigger point.
I.Ch0LLAlarm I.Ch1LLAlarm I.Ch2LLAlarm I.Ch3LLAlarm	BOOL	Low low alarm bit that sets when the input signal moves beneath the configured low low alarm trigger point, Ch<0…3>LLAlarmLimit. Remains set until the input signal moves above the trigger point, unless latched via Ch<0…3>LimitAlarmLatch.
I.Ch0HHAlarm I.Ch0HHAlarm I.Ch0HHAlarm I.Ch0HHAlarm	BOOL	High high alarm bit that sets when the input signal moves above the configured high high alarm trigger point, Ch<0…3>LimitAlarmLatch.
I.Ch0Underrange I.Ch1Underrange I.Ch1Underrange I.Ch1Underrange	BOOL	Alarm bits indicating the channel's input is less than the minimum detectable input signal.

Input Tags (1732E-IF4M12R)

Tag Name	Data Type	Definition
I.Ch0Overrange I.Ch1Overrange I.Ch2Overrange I.Ch3Overrange	BOOL	Alarms bit indicating the channel's input is greater than the maximum detectable input signal.

Configuration Tags (1732E-IF4M12R)

Tag Name	Data Type	Definition
C.Ch0LEngineering C.Ch1LEngineering C.Ch2LEngineering C.Ch3LEngineering	INT	The low engineering value helps determine the engineering units the signal values scale into. The low engineering term corresponds to the low signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal-LowSignal})(\text{HighEngineering-LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$
C.Ch0HEngineering C.Ch1HEngineering C.Ch2HEngineering C.Ch3HEngineering	INT	The high engineering helps determine the engineering units the signal values scale into. The high engineering term corresponds to the high signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal-LowSignal})(\text{HighEngineering-LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$
C.Ch0Filter C.Ch1Filter C.Ch2Filter C.Ch3Filter	INT	Configures the channel's filter settings. A non-zero value enables the filter. The value serves as a time constant in milliseconds that can be used in a first order lowpass filter to smooth the input signal. See Digital Filters on page 44 for more information.
C.Ch0LAlarmLimit C.Ch1LAlarmLimit C.Ch2LAlarmLimit C.Ch3LAlarmLimit	INT	The low alarm trigger point. This value causes the Ch<0...3>LAlarm bit to trigger when the input signal moves beneath the configured trigger point, in engineering units. See Alarm Configuration Tab on page 26 and Process Alarms on page 46 for more information.
C.Ch0HAlarmLimit C.Ch1HAlarmLimit C.Ch2HAlarmLimit C.Ch3HAlarmLimit	INT	The high alarm trigger point. This value causes the Ch<0...3>HAlarm bit to trigger when the input signal moves above the configured trigger point, in engineering units. See Alarm Configuration Tab on page 26 and Process Alarms on page 46 for more information.
C.Ch0LLAlarmLimit C.Ch1LLAlarmLimit C.Ch2LLAlarmLimit C.Ch3LLAlarmLimit	INT	The low low alarm trigger point. This value causes the Ch<0...3>LLAlarm bit to trigger when the input signal moves beneath the configured trigger point, in engineering units. See Alarm Configuration Tab on page 26 and Process Alarms on page 46 for more information.
C.Ch0HHAlarmLimit C.Ch0HHAlarmLimit C.Ch0HHAlarmLimit C.Ch0HHAlarmLimit	INT	The high high alarm trigger point. This value causes the Ch<0...3>HHAlarm bit to trigger when the input signal moves above the configured trigger point, in engineering units. See Alarm Configuration Tab on page 26 and Process Alarms on page 46 for more information.
C.Ch0Range C.Ch1Range C.Ch2Range C.Ch3Range	SINT	Configures the input range for the channel. See Input Types and Ranges on page 44 for more information.

Configuration Tags (1732E-IF4M12R)

Tag Name	Data Type	Definition
C.Ch0LimitAlarmLatch C.Ch1LimitAlarmLatch C.Ch2LimitAlarmLatch C.Ch3LimitAlarmLatch	SINT	Enables latching for the process alarms. Latching causes the process alarms to remain set until an unlatch service is explicitly sent to the channel or alarm.
C.Ch0AlarmDisable C.Ch1AlarmDisable C.Ch2AlarmDisable C.Ch3AlarmDisable	SINT	Disables all alarms for the channel: 0 – Alarms are not disabled 1 – Alarms are disabled
C.RealTimeSample	INT	Configures real-time sampling on a module-wide basis. See Real-time Sampling on page 46 for more information.

Module Tags for 1732E-OF4M12R

Input Tags (1732E-OF4M12R)

Tag Name	Data Type	Definition
I.Fault	DINT	Collection of all module level fault bits.
I.Ch0Fault I.Ch1Fault I.Ch2Fault I.Ch3Fault	BOOL	Individual channel fault status bit. Indicates a 'hard' fault has occurred on the channel that means: calibration is ongoing; or if an input, an overrange or underrange condition is present; or if an output, a low or high clamp condition is occurring. These bits also are set by the controller if communication is lost with the I/O module.
I.Ch0Calibration I.Ch1Calibration I.Ch2Calibration I.Ch3Calibration	BOOL	Indicates if calibration is currently in progress on a channel.
I.Ch0LAlarm I.Ch1LAlarm I.Ch2LAlarm I.Ch3LAlarm	BOOL	Low alarm bits that set when the input signal moves beneath the configured low alarm trigger point, Ch<0...3>LAlarmLimit. Remains set until the input signal moves above the trigger point, unless latched via Ch<0...3>LimitAlarmLatch, of the low alarm trigger point.
I.Ch0HAlarm I.Ch1HAlarm I.Ch2HAlarm I.Ch3HAlarm	BOOL	High alarm bit that sets when the input signal moves above the configured high alarm trigger point, Ch<0...3>HAlarmLimit. Remains set until the input signal moves below the trigger point, unless latched via Ch<0...3>LimitAlarmLatch.

Configuration Tags (1732E-OF4M12R)

Tag Name	Data Type	Definition
C.Ch0FaultValue C.Ch1FaultValue C.Ch2FaultValue C.Ch3FaultValue	INT	Defines the value, in counts, the output should take if a communication fault occurs when the Ch*x*FaultMode bit is set. Where: *x* = output channel.
C.Ch0ProgramValue C.Ch1ProgramValue C.Ch2ProgramValue C.Ch3ProgramValue	INT	Defines the value, in counts, the output should take when the connection transitions to Program mode if the Ch*x*ProgMode bit is set. Where: *x* = output channel.
C.Ch0LEngineering C.Ch1LEngineering C.Ch2LEngineering C.Ch3LEngineering	INT	The low engineering value helps determine the engineering units the signal values scale into. The low engineering term corresponds to the low signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal}-\text{LowSignal})(\text{HighEngineering}-\text{LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$

Configuration Tags (1732E-OF4M12R)

Tag Name	Data Type	Definition
C.Ch0HEngineering C.Ch1HEngineering C.Ch2HEngineering C.Ch3HEngineering	INT	The high engineering value helps determine the engineering units the signal values scale into. The high engineering term corresponds to the high signal value. The scaling equation used is as follows: $\text{Data} = \frac{(\text{Signal-LowSignal})(\text{HighEngineering-LowEngineering})}{\text{High Signal - Low Signal}} + \text{Low Engineering}$
C.Ch0LClamp C.Ch1LClamp C.Ch2LClamp C.Ch3LClamp	INT	Sets the low clamp limit value for the channel. See Clamping/Limiting on page 47 for more information.
C.Ch0HClamp C.Ch1HClamp C.Ch2HClamp C.Ch3HClamp	INT	Sets the high clamp limit value for the channel. See Clamping/Limiting on page 47 for more information.
C.Ch0Range C.Ch1Range C.Ch2Range C.Ch3Range	SINT	Configures the channel's output range and determines the signal range the output channel can detect. See Output Types and Ranges on page 46 for more information.
C.Ch0FaultMode C.Ch1FaultMode C.Ch2FaultMode C.Ch3FaultMode	SINT	Selects the behavior the output channel should take if a communication fault occurs. Either hold last state, go to a user-defined value, go to low clamp, or go to high clamp. Ch<0...3>FaultValue defines the value to go to on fault if the bit is set.
C.Ch0ProgMode C.Ch1ProgMode C.Ch2ProgMode C.Ch3ProgMode	SINT	Selects the behavior the output channel should take if a communication fault occurs. Either hold last state, go to a user-defined value, go to low clamp, or go to high clamp. Ch<0…3>FaultValue defines the value to go to on fault if the bit is set.
C.Ch0LimitAlarmLatch C.Ch1LimitAlarmLatch C.Ch2LimitAlarmLatch C.Ch3LimitAlarmLatch	SINT	Enables latching for the clamp limit alarms. Latching causes the limit alarms to remain set until an unlatch service is explicitly sent to the channel or alarm.
C.Ch0AlarmDisable C.Ch1AlarmDisable C.Ch2AlarmDisable C.Ch3AlarmDisable	SINT	Disables all alarms for the channel: 0 – Alarms are not disabled 1 – Alarms are disabled

Output Tags (1732E-OF4M12R)

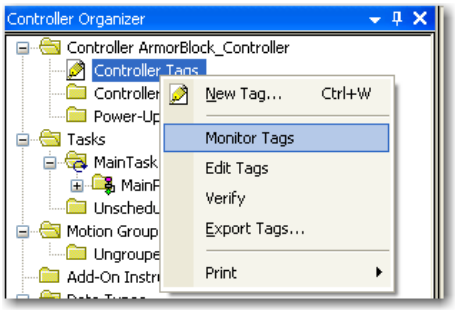
Tag Name	Data Type	Definition
O.Ch0Data O.Ch1Data O.Ch2Data O.Ch3Data	INT	The channel output signal represented in counts where -32,768 counts is the minimum detectable output signal and 32,767 counts is the maximum detectable.

Access the Module Tags

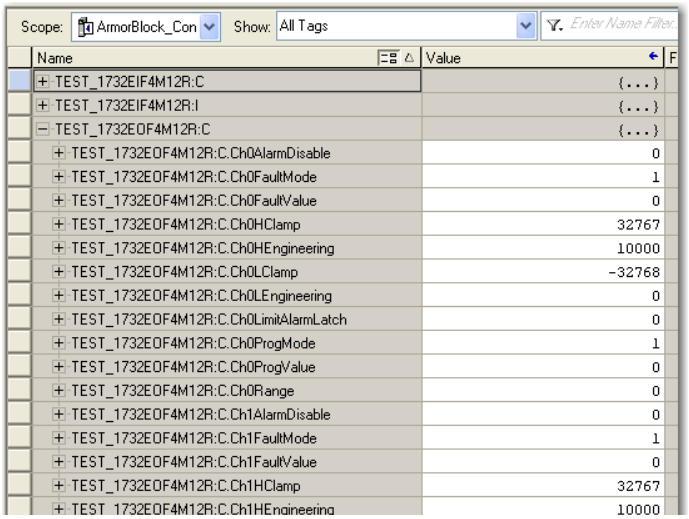
When you access tags, you have two options. You can:

- monitor tags – this option allows you to view tags and change their values

- edit tags – this option allows you to add or delete tags but not to change their values



When you click Edit Tags or Monitor Tags, you can view and/or edit the tags through the following screen that shows all the tags for your modules:



Notes:

Numerics

A

B

C

D

T

U

V

W

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.
At http://www.rockwellautomation.com/support/, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/support/.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

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