



Multifunctional Access Box with CIP Safety over EtherNet/IP

Catalog Numbers 442G-MABH-x, 442G-MABxB-Ux-x,
442G-MABE1



Allen-Bradley

by ROCKWELL AUTOMATION

Guardmaster®

User Manual

Original Instructions

Important User Information

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

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

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

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

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

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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



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



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

IMPORTANT

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

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



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



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



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

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About This Publication

Use this manual if you are responsible for the design, installation, programming, or troubleshooting of systems that use the Guardmaster® 442G Multifunctional Access Box with CIP Safety™ over EtherNet/IP™ protocol.

You must have a basic understanding of electrical circuitry and familiarity with safety-related systems. If you do not, obtain the proper training before using this product.

This manual is a reference guide for the 442G access box. It describes the procedures to use to install, wire, and troubleshoot the access box. This manual does the following:

- Explains how to install and wire your access box
- Provides an overview of the access box

Read and understand this manual before using the described products. Consult your Allen-Bradley distributor or Rockwell Automation sales office if you have any questions or comments.

Download Firmware, AOP, EDS, and Other Files

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

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Updated Additional Resources table.	6
Updated Figure 5 .	10
Updated Catalog Number Explanation section.	11
Added Reset Access Box to Factory Settings section.	33

Additional Resources

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

Resource	Description
Multifunctional Access Box with CIP Safety over EtherNet/IP Installation Instructions, publication 442G-IN004	Provides information on how to install the access box such as mounting information, wiring, and specifications.
GuardLogix 5570 and Compact GuardLogix 5370 Controller Systems Safety Reference Manual, publication 1756-RM099	Provides the safety requirements that are required to reach SIL 3 in a safety system.
GuardLogix 5570 Controllers User Manual, publication 1756-UM022	Provides information on how to install, configure, program, and use GuardLogix® 5570 controllers in Studio 5000 Logix Designer® projects.
ControlFLASH Firmware Upgrade Kit User Manual, publication 1756-UM105	Provides information on how to upgrade your module firmware by using ControlFLASH™ software. ⁽¹⁾
Compact GuardLogix 5370 Controllers User Manual, publication 1769-UM022	Provides information on how to install, configure, program, and use Compact GuardLogix 5370 controllers.
EtherNet/IP Network Devices User Manual, ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies with solid-state components.
Allen-Bradley™ Industrial Automation Glossary, publication AG-7.1	Glossary of industrial automation terms and abbreviations
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications .	Provides declarations of conformity, certificates, and other certification details.

(1) Devices manufactured with firmware revision 1.002 (check unit label) cannot be upgraded using ControlFLASH. Devices that are manufactured with firmware revision 1.005 and higher can be upgraded using ControlFlash.

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

Product Overview

Multifunctional Access Box with CIP Safety over EtherNet/IP Overview

The multifunctional access box with CIP Safety™ over EtherNet/IP™ is a combined interlocking module with guard locking and integrated control elements. The intended use of the access box is at entry points for full-body access into automation cells or areas that require restricted or controlled access.

This access box can be used in an integrated safety system with a GuardLogix® safety controller. Safety data is exchanged by using CIP Safety via an EtherNet/IP network.

In combination with a movable safety guard and the control system, this safety module can help prevent opening of the safety guard while a dangerous machine function is performed. The position of the guard locking is monitored during this process.

- Starting commands that cause a dangerous machine function must become active only when the safety guard is closed and locked.
- The guard locking module must not be unlocked until the dangerous machine function has ended.
- Closing and locking a safety guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued.

The locking module detects the position of the safety guard and the position of the bolt actuator. The position of the locking arm is also monitored. The bolt actuator is moved into and out of the locking module by actuating the door handle. When the bolt is fully inserted into the locking module, the locking arm can lock the bolt actuator in this position.

The GuardLocked input signal is turned on only when the locking bolt is sensed in its extended position in the lock module and the locking arm is in position (for example, the guard is closed and the bolt is both extended and locked).

Power to Release

For Power to Release versions, spring force keeps the locking arm in the locked position and unlocks by solenoid force when power is applied to the solenoid.

Guard locking is activated when the guard is in the closed position and power is removed from the solenoid.

IMPORTANT Safety output signal Unlock is turned off.

Guard locking is deactivated when voltage is applied to the solenoid.

IMPORTANT Safety output signal Unlock is turned on.



ATTENTION: If the safety guard is open when power is removed from the solenoid and the guard is then closed, guard locking is activated. This activation can lead to persons being locked in unintentionally.

Power to Lock

For Power to Lock versions, solenoid force keeps the locking arm in the locked position when power is applied to the solenoid and unlocked by spring force when power is removed from the solenoid.

Guard locking is activated when the guard is in the closed position and power is applied to the solenoid.

IMPORTANT Safety output signal Unlock is turned off.

Guard locking is deactivated when voltage is removed from the solenoid.

IMPORTANT Safety output signal Unlock is turned on.



ATTENTION: An unintended loss of power causes guard locking to be deactivated. Power to Lock versions should only be used for personal protection if minimum safe distance is provided in accordance with EN ISO 13855.

Assembly Overview

Figure 1 - Components at a Glance

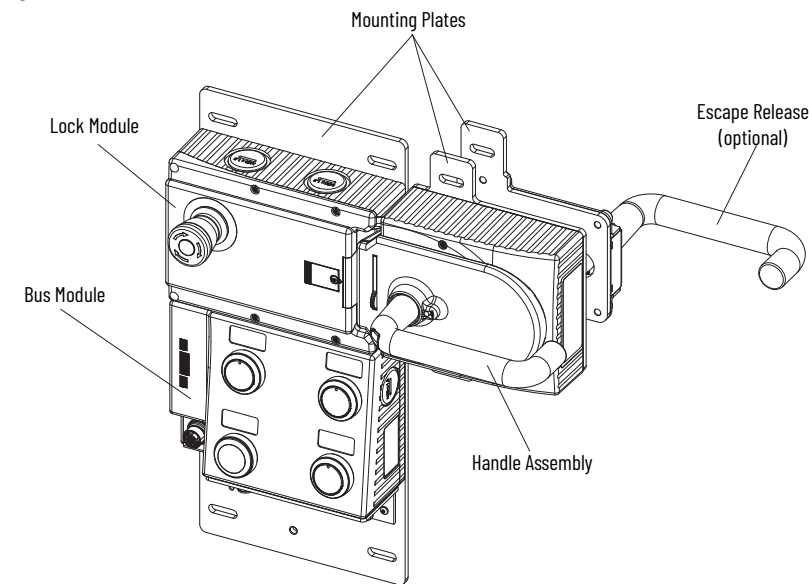


Figure 2 - Bus Module

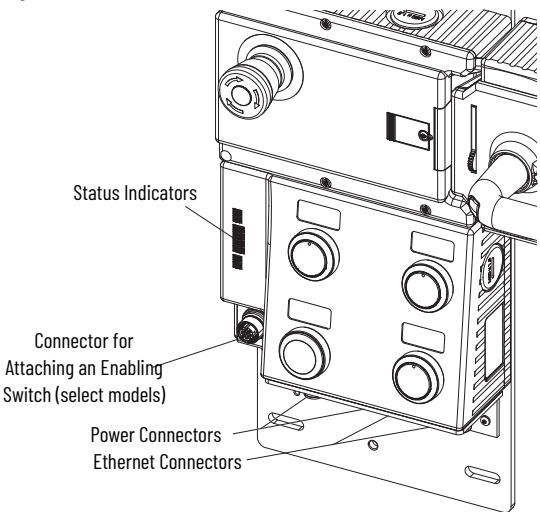


Figure 3 - Locking Module with Control Cover

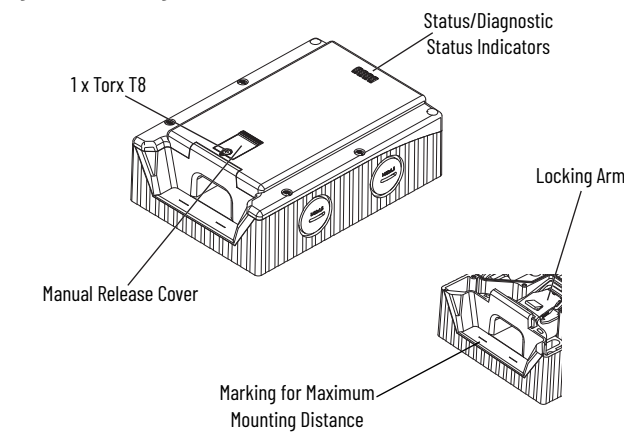
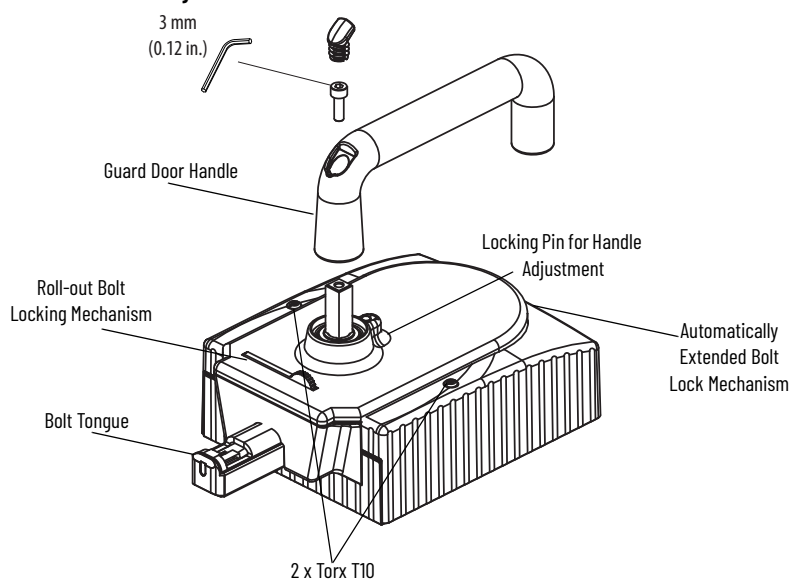
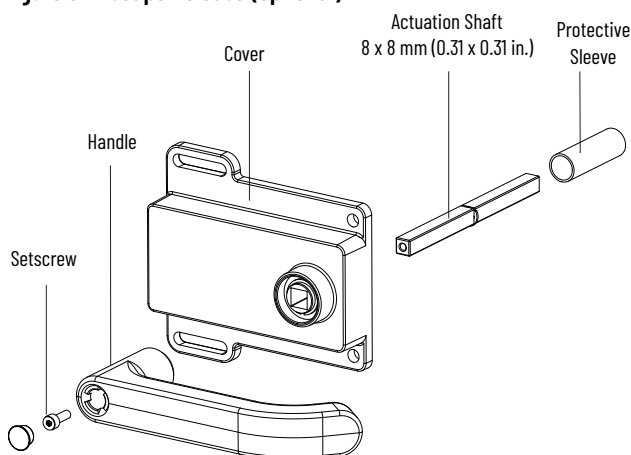


Figure 4 - Handle Assembly**Figure 5 - Escape Release (optional)****IMPORTANT**

The length of the actuation shaft (115 mm [4.53 in.]) is optimized for mounting on a 45 mm (1.77 in.) profile. An extended shaft is available (Cat. No. 442G-MABASHFT). See publication [442G-IN004](#) for instructions regarding mounting on smaller or larger profiles.

Catalog Number Explanation

IMPORTANT The following information is for reference purposes only. Not all combinations produce a valid catalog number.

442G-MAB

R**B-U****R****E0****J****P4679****N4**

a

b

c

d

e

f

a	
Lock Type	
Code	Description
R	Power to Release
L	Power to Lock

b	
Hinge Side	
Code	Description
R	Guard door hinged on the right
L	Guard door hinged on the left

c	
E-stop	
Code	Description
E0	Illuminated E-stop in position S0
Blank	No E-stop

d	
Enabling Switch Connector	
Code	Description
J	Enabling switch connector
Blank	No connector for enabling switch

e	
Push Button Position	
Code	Description
P49	Push buttons in positions 4 and 9
P4679	Push buttons in positions 4, 6, 7, 9

f	
Connector	
Code	Description
Blank	M12 micro
N4	7/8 in. mini

See [Figure 21 on page 45](#) and [Figure 22 on page 45](#).

Auxiliary/Manual Release

The manual release lets you unlock the guard door when unforeseen or uncommon circumstances occur.

IMPORTANT The manual release is not a safety function. The machine manufacturer must select and use a suitable release according to the risk assessment. The correct function must be checked at regular intervals.

The system enters into a latching fault (fault code 2744) when the manual release is actuated.

IMPORTANT The system might not enter into a latching fault if the manual release is actuated slowly.

To clear the fault, open the guard and cycle the LockSequenceFaultUnlatch input signal (see [Clear Faults on page 39](#)).

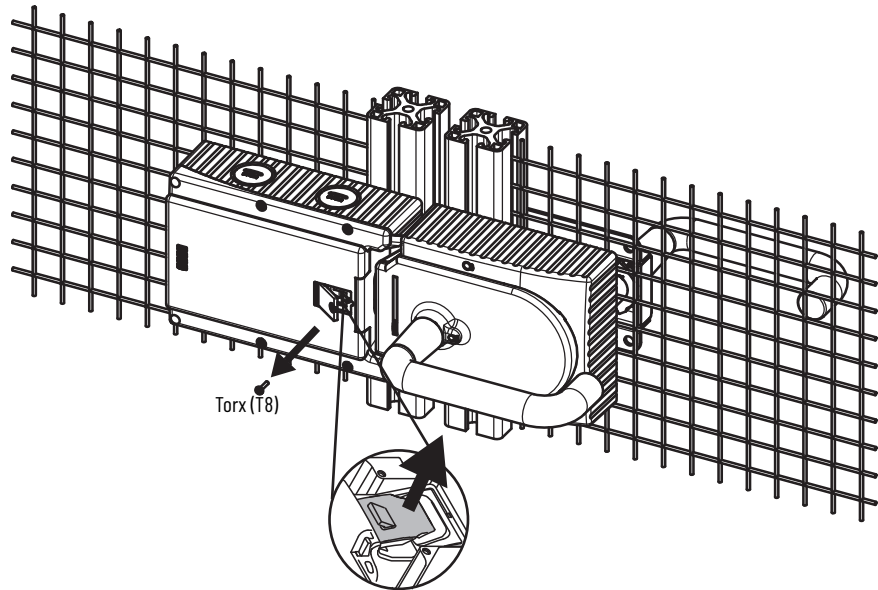


ATTENTION: The locking screw must be screwed back in and sealed after assembly and after use of the manual release. Tightening torque is 0.5 N•m (4.42 lb•in).

To unlock the guard door with the manual release:

1. Undo locking screw.
2. Use a screwdriver to lift the locking arm actuate the guard door handle.

Figure 6 - Auxiliary/Manual Release



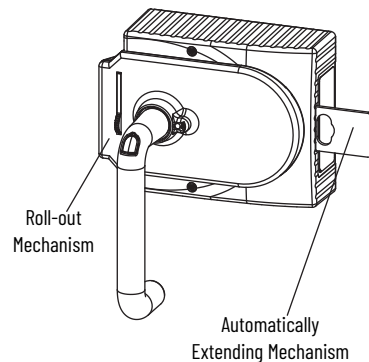
Bolt Locking Mechanism

The access box has two mechanisms for locking the bolt actuator to help prevent locking the guard and restarting the machine while an operator is inside the safeguarded area.

One of the bolt locking mechanisms extends automatically when the handle is in the OPEN position. The other mechanism is manually extended (see [Figure 6](#)). To pivot out, press the grooved part (only possible with the handle in the OPEN position and the bolt retracted).

IMPORTANT With the manual bolt locking mechanism rolled out, the bolt cannot be extended.

Figure 7 - Bolt Locking Mechanism



The minimum padlock diameter is 2 mm (0.08 in.) and the maximum diameter is 10 mm (0.39 in.) You can fit a maximum of three locks in an 8 mm (0.31 in.) diameter.

Mounting Plates

IMPORTANT The use of the handle assembly mounting plate is required with the Ethernet version of the access box. The use of the escape release mounting plate is optional.

Figure 8 - Handle Assembly Mounting Plate [mm (in.)]

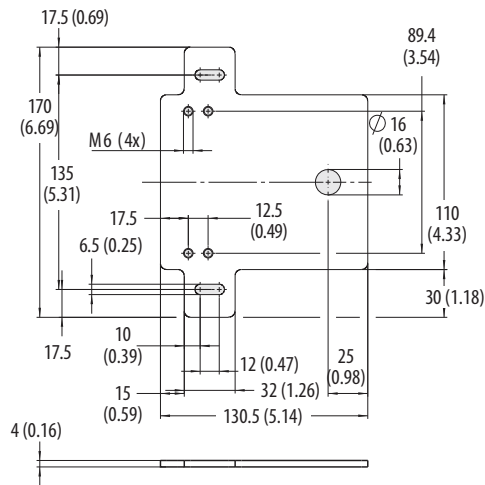
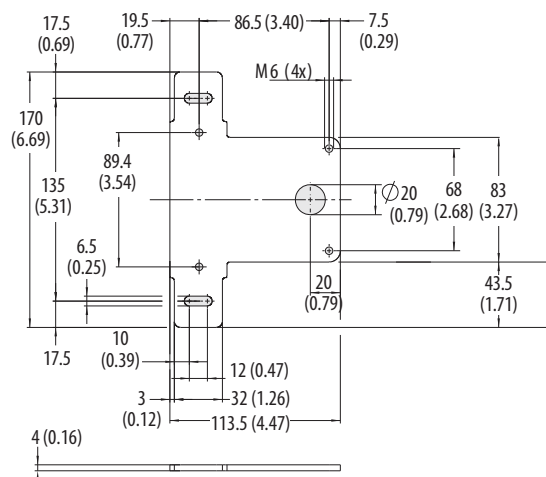


Figure 9 - Escape Release Mounting Plate [mm (in.)]



Mounting Hardware Reference

Handle Assembly Mounting Plate is supplied with the following hardware:

- 4X DIN 7984-M6X12 ZN (screw)
- 4X DIN 433-6 NI (washer)
- 4X DIN 6797-JZ-D6,4 (lock washer)

Escape Release Mounting Plate is supplied with the following hardware:

- 4X DIN 7984-M6X8 (screw)
- 4X DIN 433-6 NI (washer)
- 4X DIN 6797-JZ-D6,4 (lock washer)

Typical Ethernet Configurations

The Multifunctional Access Box with CIP Safety can be connected in any of the following three network topologies: star, linear, or Device Level Ring (DLR).

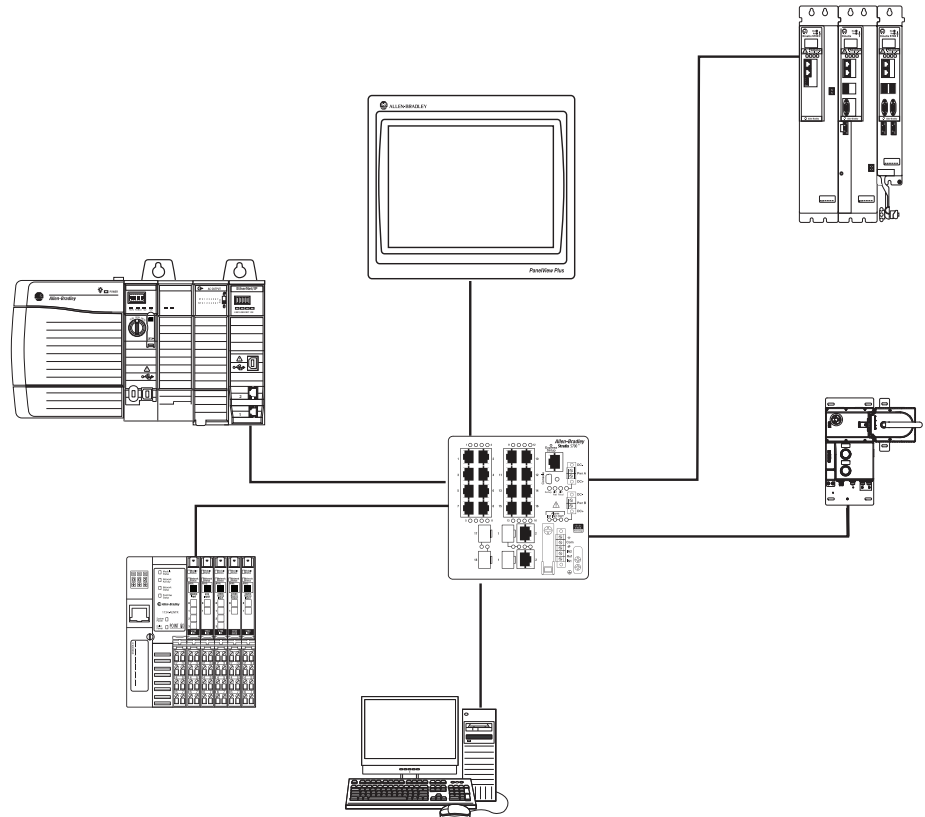


ATTENTION: The access box does not currently support time-sensitive applications that are based on CIP Sync™, including CIP Motion™ applications. Do not use the access box in DLR topologies where other nodes are using CIP Sync or CIP Motion. To be used in linear topologies, where other nodes are using CIP Sync or CIP Motion, the access box must be connected at the end of the line.

Star Topology

The star structure consists of a number of modules that are connected to a central switch. Modules can be added or removed without affecting the rest of the network.

Figure 10 - Example of Star Topology



Linear Topology

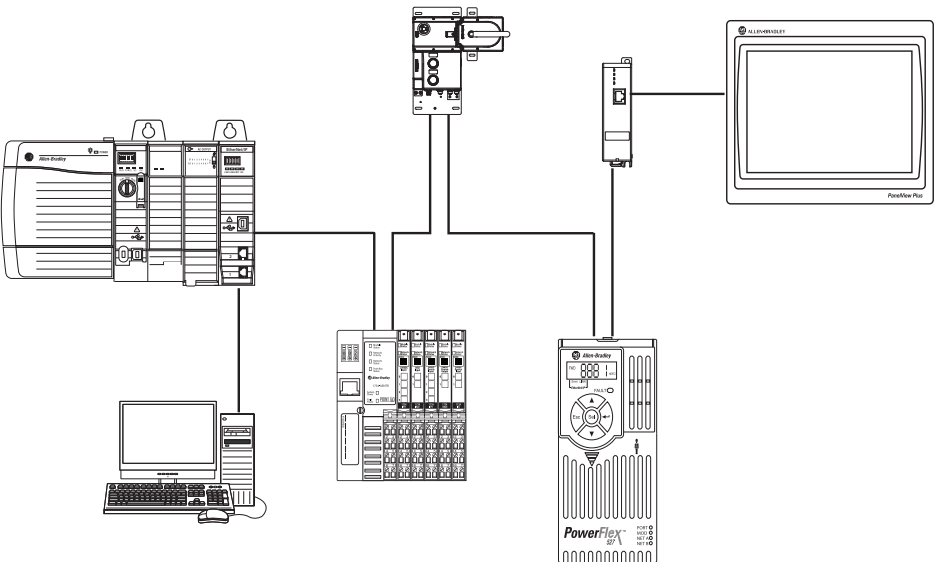
The linear topology uses the embedded switching capability to form a daisy-chain style network that has a beginning and an end. Linear topology simplifies installation and reduces wiring and installation costs, but a break in the network disconnects all modules downstream from the break. When this topology is used, both Ethernet connections on the access box may be used. For the network connection, use Link 1, Link 2, or both.

IMPORTANT Modules without dual ports must include the 1783-ETAP module or be connected at the end of the line.



ATTENTION: The access box does not currently support time-sensitive applications that are based on CIP Sync, including CIP Motion applications. Do not use the access box in DLR topologies where other nodes are using CIP Sync or CIP Motion. To be used in linear topologies, where other nodes are using CIP Sync or CIP Motion, the access box must be connected at the end of the line.

Figure 11 - Example of Linear Topology



Device Level Ring (DLR) Topology

A DLR network is a single-fault-tolerant ring network that is intended for the interconnection of automation modules without the need for more switches.

The ring topology offers these advantages:

- Media redundancy
- Fast-network fault detection and reconfiguration
- Resiliency of a single-fault-tolerant network
- Easy implementation without more hardware requirements

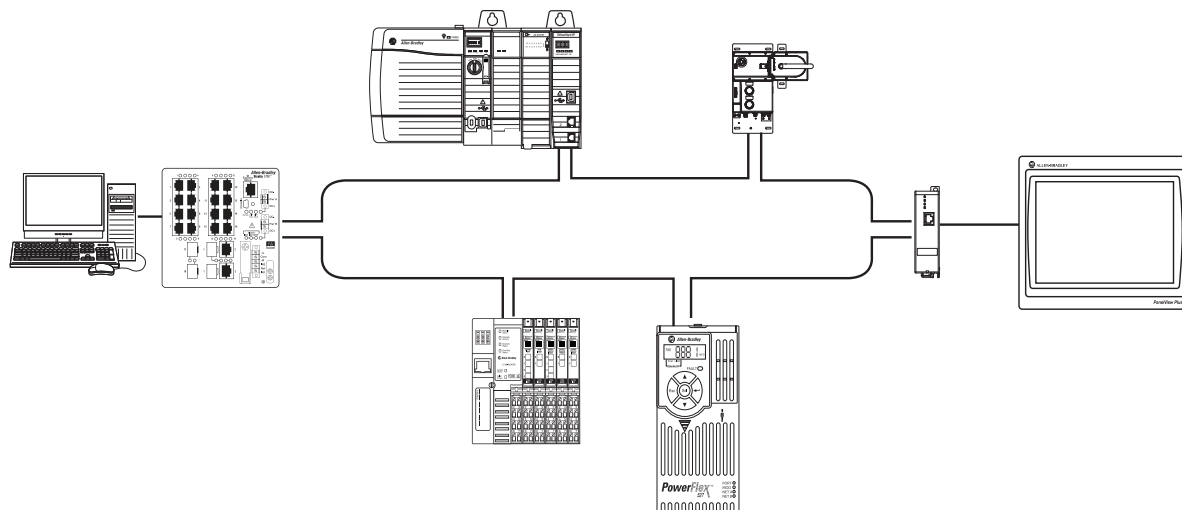
IMPORTANT This section summarizes a DLR network. To plan, configure, and monitor DLR networks, see publication [ENET-AP005](#).

One DLR network can support as many as 50 nodes. A DLR network supports copper connections (maximum of 100 m [328 ft]), fiber-optic connections (maximum of 2 km), or a mix of copper and fiber.



ATTENTION: The access box does not currently support time-sensitive applications that are based on CIP Sync, including CIP Motion applications. Do not use the access box in DLR topologies where other nodes are using CIP Sync or CIP Motion. To be used in linear topologies, where other nodes are using CIP Sync or CIP Motion, the access box must be connected at the end of the line.

Figure 12 - Example Device Level Ring Topology



Safety Concept

Standards

The access box satisfies applicable requirements in the following standards that are related to functional and machinery assembly:

- IEC 60947-5-3: 1999/A: 2005
- EN/ISO 13849-1:2008/AC: 2009 (Performance Level e [PL_e], Category 4)
- IEC 61508: 2010 (SIL 3)
- IEC 62061: 2005 (SIL CL 3)
- EN/ISO 14119:2013
- UL 508 17th Edition dated 3/19/2013

Safety Certification

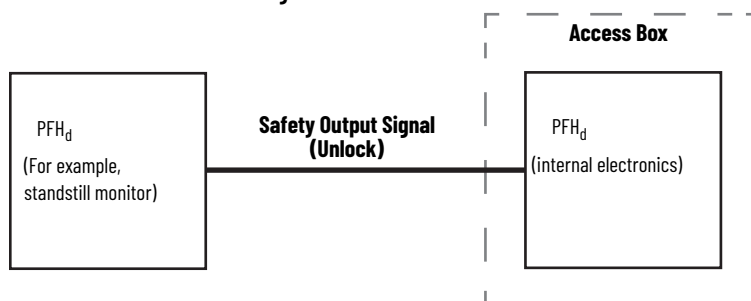
The Guardmaster® access box is a Type 4 interlocking module with guard locking and high-coded RFID actuators according to EN ISO 14119.

The access box is certified for use in safety applications up to and including Performance Level PL_e and Category 4 in compliance with EN ISO 13849-1 and SIL 3 according to IEC 61508 and IEC 62061, for guard position monitoring, guard lock monitoring, and guard locking control.

Control of Guard Locking

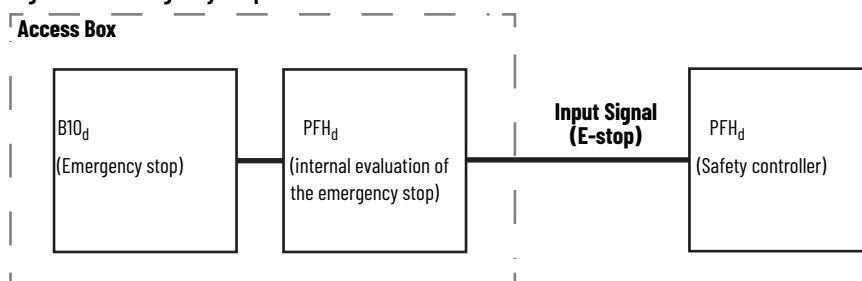
The access box PFH_d and the external control (for example, PFH_d of the standstill monitor) determine the safety level of guard locking control. Guard locking is controlled with the Unlock output signal.

Figure 13 - Control of Guard Locking



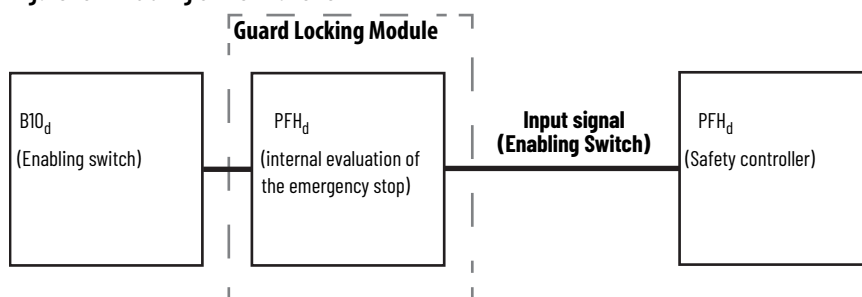
[Figure 14](#) applies to access boxes with emergency stop.

Figure 14 - Emergency Stop Function



[Figure 15](#) applies to access boxes with a connection for an enabling switch.

Figure 15 - Enabling Switch Function



The access box must be installed in accordance with the applicable regulation and standards.

While the access box can be used for PLe and Category 4 applications, the installer must comply with guard requirements (for example, EN/ISO 13854 and EN/ISO 13857) and in some cases also minimum (safe) distance requirements (for example, EN/ISO 13855).

The installed system, including the safety control system and the means by which the machine stops, must achieve the needed safety performance. The access box is one element in the safety system.

Before safety components are used, a risk assessment must be performed on the machine in accordance with:

- EN ISO 12100, Safety of machinery — Basic concepts - General principles for design - Risk assessment and risk reduction.
- EN ISO 13849-1, Safety of machinery. Safety-related parts of control systems. General principles for design, Annex B
- IEC 62061, Safety of Machinery — Functional safety of safety-related electrical, electronic, and programmable electronic control systems.

Correct use includes compliance with the relevant requirements for installation and operation, in particular:

- EN ISO 13849-1, Safety of machinery. Safety-related parts of control systems. General principles for design
- EN ISO 14119, Safety of machinery. Interlocking modules that are associated with guards. Principles for design and selection
- EN 60204-1, Safety of machinery. Electrical equipment of machines. General requirements.

Additional guidance on guards, guard locking, and guard interlocking is found in:

- EN/ISO 12100 Safety of machinery — General principles for design — Risk assessment and risk reduction
- EN/ISO 13855 Safety of machinery — Positioning of safeguards concerning the approach speeds of parts of the human body
- EN/ISO 13857 Safety of machinery — Safety distances to prevent hazard zones from being reached by upper and lower limbs
- EN/ISO 14120 General requirements for the design and construction of guards

Safety Requirements for Integrated Safety Applications

Safety application requirements include evaluating the probability of failure rates (PFD and PFH), system reaction time settings, and functional verification tests.

For safety system requirements, including information on the safety network number (SNN), functional verification test intervals, system reaction time, and PFD/PFH calculations, see the GuardLogix® safety reference manual for your controller. You must read, understand, and fulfill the requirements that are detailed in the safety reference manual before operating a safety system that uses this access box.

Notes:

Use the Multifunctional Access Box in an Integrated Safety Controller-based System

Set the Network IP Address

The access box ships with the DIP switches set to 0 and DHCP enabled.



ATTENTION: Set a suitable network IP address before connecting the access box to a network.

Perform one of these steps to set the network IP address:

- Adjust the DIP switches inside the access box (see [Figure 19 on page 35](#)).
- Use a Dynamic Host Configuration Protocol (DHCP) server, such as Rockwell Automation BootP/DHCP Server Utility.
- Retrieve the IP address from nonvolatile memory.

The access box reads the switches first to determine if the switches are set to a valid number. Set the network address by adjusting the eight DIP switches inside the access box. Valid settings range from 001...254.

When the switches are set to a valid number, the IP address of the access box is 192.168.1.xxx (where xxx is the decimal representation of the binary number set on the switches). The subnet mask of the access box is 255.255.255.0 and the gateway address is set to 0.0.0.0. When the access box is reading the network address set on the switches, the access box does not have a host name assigned to it or use any Domain Name System.

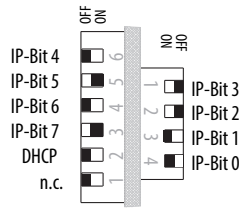
If the switches are set to an invalid number (such as 000 or a value greater than 254), the access box checks to see if DHCP is enabled. If DHCP is enabled, the access box requests an address from a DHCP server. The DHCP server also assigns other Transport Control Protocol (TCP) parameters.

If DHCP is not enabled, the access box uses the IP address (along with other TCP configurable parameters) stored in nonvolatile memory.

See [Figure 16 on page 22](#) for an example of the network address DIP switches.

Figure 16 shows the switches set at 10100011 (163) with a network address of 192.168.1.163.

Figure 16 - Example Network Address DIP Switches



Set the IP Address with a BOOTP/DHCP Server

The BOOTP/DHCP server is a standalone server that you can access from either of these locations:

- Programs > Rockwell Software > BOOTP-DHCP Server

If you have not installed the server, you can download and install it from rok.auto/pcdc.

- Tools directory on the Studio 5000® installation CD

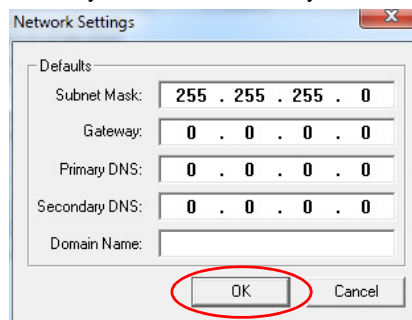
IMPORTANT Before you start the BOOTP/DHCP server, make sure that you have the Ethernet address (MAC ID) of the access box. The MAC ID is on a label on the side of the access box and uses an address in a format similar to the following: 00-0b-db-14-55-35

The BOOTP/DHCP server also limits the possibility of assigning duplicate IP addresses.

If you use the BOOTP/DHCP server in an uplinked subnet where an enterprise DHCP server exists, an access box can get an address from the enterprise server before the Rockwell Automation utility sees the access box. If necessary, disconnect from the uplink to set the address and configure the access box to retain the static address before reconnecting to the uplink. This issue does not occur if you have configured the node names in the access box and leave DHCP enabled.

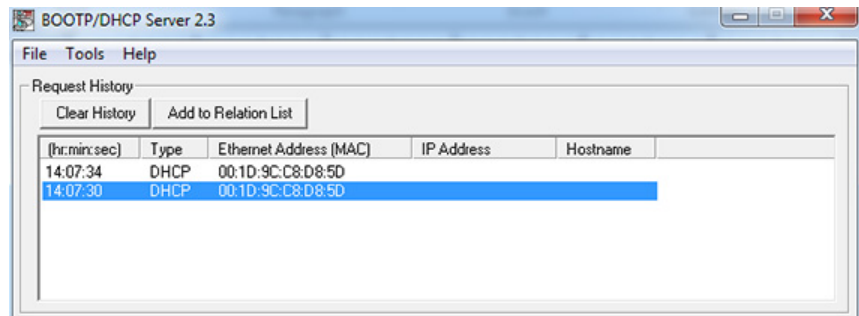
To set the IP address with a BOOTP/DHCP server, follow these steps.

1. Start the BOOTP/DHCP software.
2. From the Tools menu, choose Network Settings.
3. If appropriate for the network, type the Subnet Mask, Gateway address, Primary and/or Secondary DNS address, and Domain Name. Click OK.

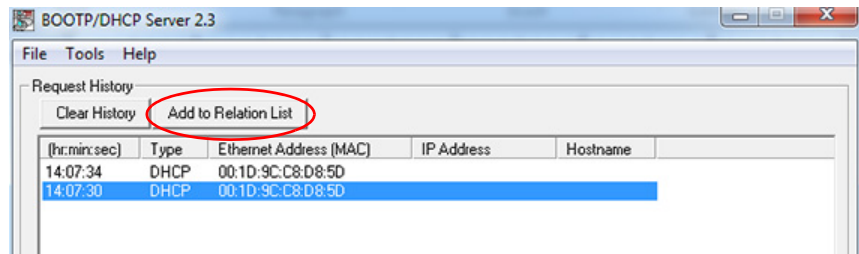


- The Request History panel displays the MAC IDs of access boxes that issue DHCP requests.

Select the appropriate access box.



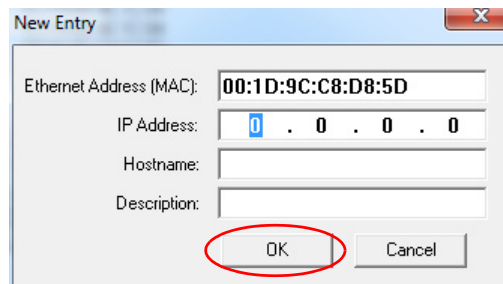
- Click Add to Relation List.



The New Entry dialog box appears.

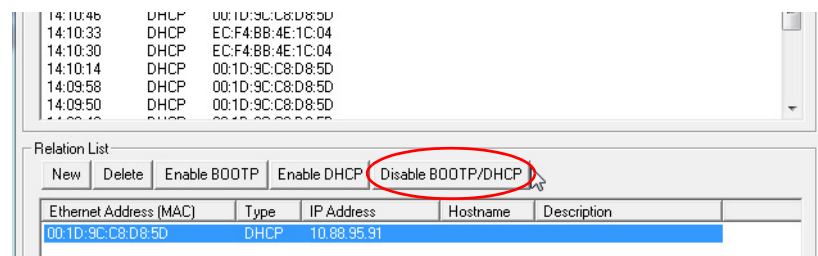
- Type an IP Address, Hostname, and Description for the access box.

Click OK.



- To assign this configuration to the access box, wait for the access box to appear in the Relation List panel and select it.

Click Disable BOOTP/DHCP.



The access box now uses the assigned configuration and no longer issues DHCP requests.

IMPORTANT If you do not select Disable BOOTP/DHCP, then on a power cycle the access box clears the current IP configuration and begins sending DHCP requests again.

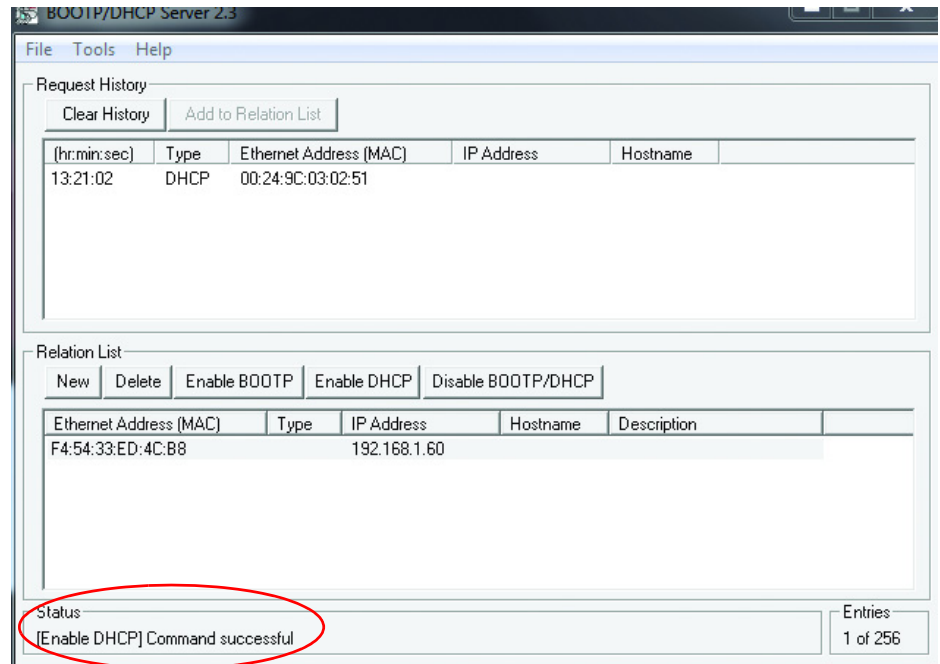
Restore the Access Box to DHCP Mode

When the IP Address of the Access Box Is Known

Use a BootP/DHCP utility to Enable DHCP.

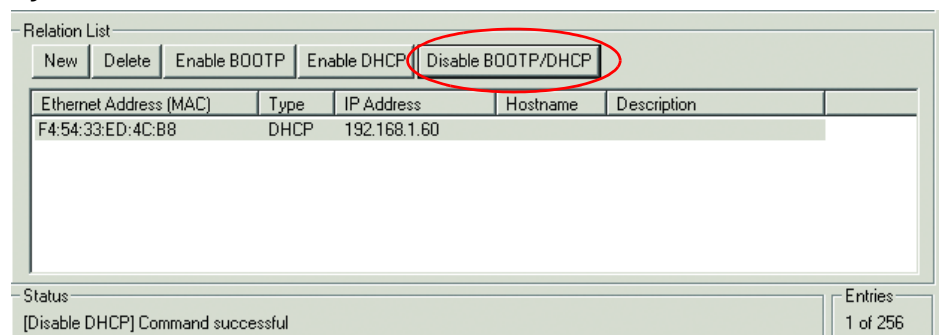
1. Start the BootP/DHCP Software.
2. Under relation list, add an entry for the access box. Enter the MAC ID of the access box and the known IP address.
3. Select Enable DHCP.
4. A message appears in the lower left corner that indicates the command was successful.

Figure 17 - Enable DHCP



5. After power cycling the access box, it resumes sending DHCP requests.
6. Use a DHCP server to set the IP address as described in section [Set the Network IP Address on page 21](#).
7. Click Disable BOOTP/DHCP.

Figure 18 - Disable DHCP



IMPORTANT If you do not select Disable BOOTP/DHCP, then on a power cycle the access box clears the current IP configuration and begins sending DHCP requests again.

When the IP Address of the Access Box Is Unknown

1. Set DHCP DIP switch (see [Figure 19 on page 35](#)) to the ON position.
2. Power cycle the access box.
3. Use a DHCP server to set the IP address as described in [Set the Network IP Address on page 21](#).
4. Click Disable BOOTP/DHCP.

IMPORTANT If you do not select Disable BOOTP/DHCP, then on a power cycle the access box clears the current IP configuration and begins sending DHCP requests again.

5. Return the DHCP DIP switch to the OFF position.

Duplicate IP Address Detection and Resolution

The access box verifies that its IP address does not match any other access box IP address on the network when you perform either of these tasks:

- Connect the access box to a EtherNet/IP™ network.
- Change the IP address on the access box.

If the IP address matches that of another module on the network, the EtherNet/IP port on the access box transitions to conflict mode. In conflict mode, these conditions exist:

- Module (MOD) status indicator flashes red.
- Network (NET) status indicator is steady red.

[Table 1](#) describes how to resolve duplicate IP addresses.

Table 1 - Duplicate IP Address Resolution

Duplicate IP Address Detection Conditions	Resolution Process
<ul style="list-style-type: none"> • Both modules support duplicate IP address detection. • Second module is added to the network after the first module is operating on the network. 	<ol style="list-style-type: none"> 1. The module that began operation first uses the IP address and continues to operate without interruption. 2. The module that begins operation second detects the duplication and enters Conflict mode. 3. Assign a new IP address to the module that is in Conflict mode.
<ul style="list-style-type: none"> • Both modules support duplicate IP address detection • Both modules were powered up at approximately the same time. 	<p>Both EtherNet/IP modules enter Conflict mode. To resolve this conflict, follow these steps:</p> <ol style="list-style-type: none"> 1. Assign a new IP address to one of the modules. 2. Cycle power to the other module.
One module supports duplicate IP address detection and a second module does not.	<ol style="list-style-type: none"> 1. Regardless of which module obtained the IP address first, the module that does not support IP address detection uses the IP address and continues to operate without interruption. 2. The module that supports duplicate IP address detection detects the duplication and enters Conflict mode. 3. Assign a new IP address to the module that is in conflict mode.

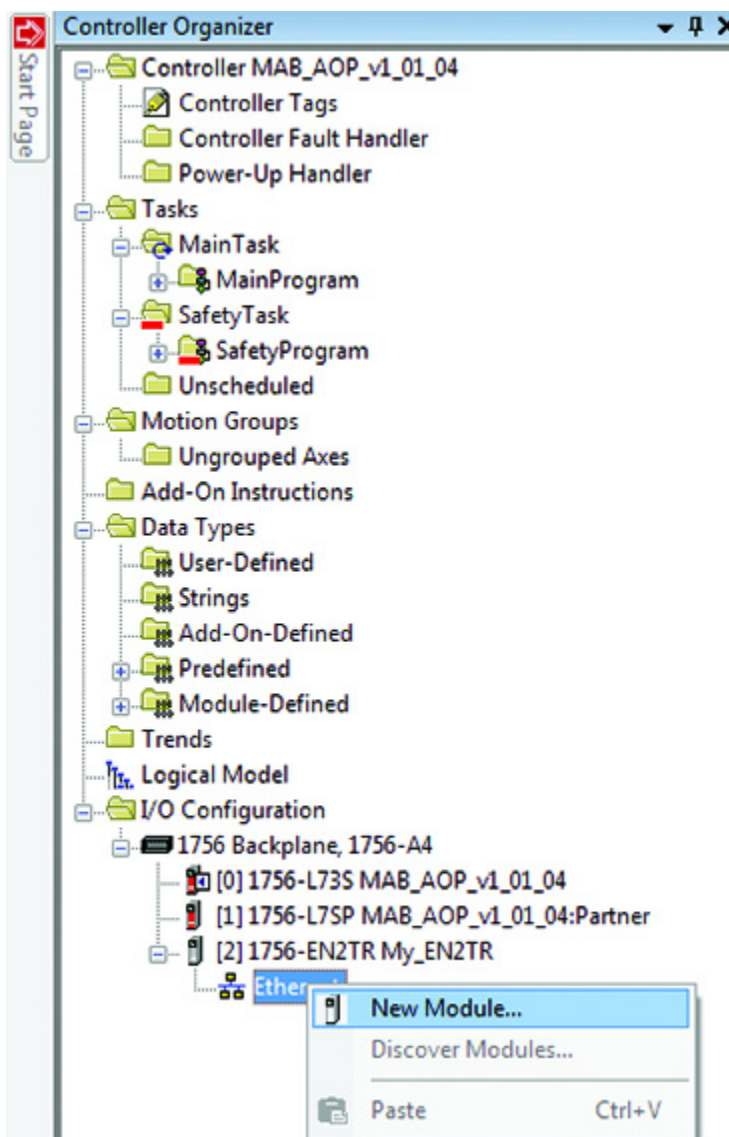
Add and Configure Access Box in the Logix Designer Application

An Add-on Profile (AOP) is available for the access box and can be used with RSLogix 5000® version 20 and higher. The profile can be downloaded from rok.auto/pcdc.

Add Access Box to the I/O Configuration Tree

To add an access box to the I/O configuration tree, follow these guidelines.

1. From the I/O Configuration tree, right-click the Ethernet bridge and choose New Module.



2. In the Select Module dialog box, enter “MAB” to see a list of available models.
3. Choose the appropriate module, and select Create at the bottom of the dialog box.

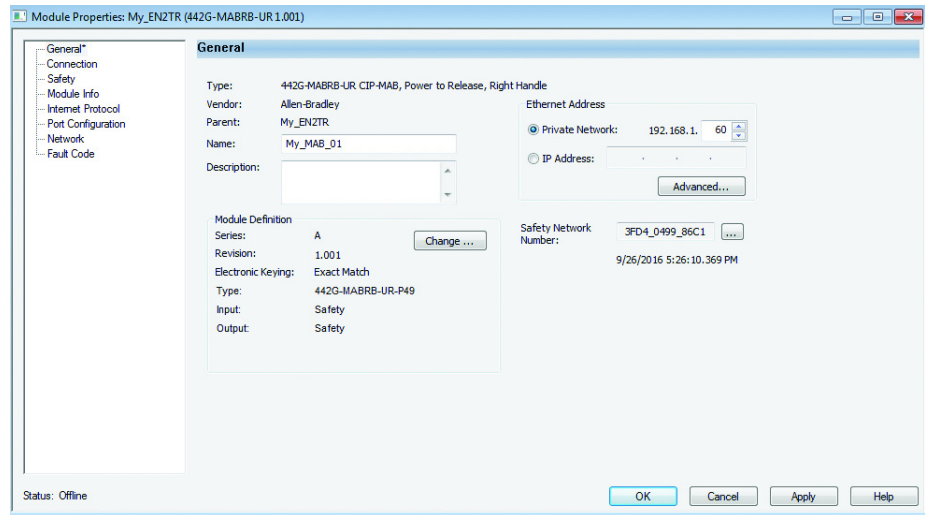
Configure the Access Box

Follow these steps to configure the general properties of the access box.



At the bottom of a dialog box, choose Help for information about how to complete entries in the dialog box. At the bottom of a warning dialog box, choose Help to get information about that specific error.

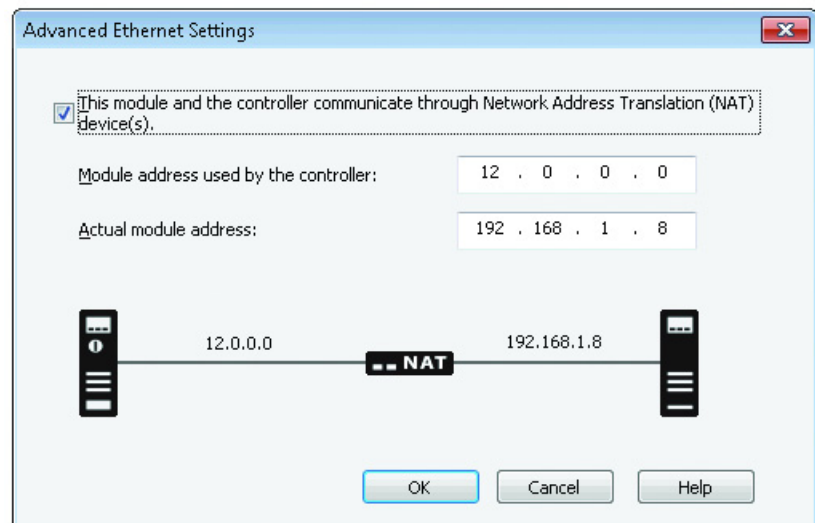
1. From the I/O configuration tree, double-click the access box to see the Module Properties dialog box.



2. Type a unique name for the access box.
3. If desired, type a description.
4. If you are not using Network Address Translation (NAT), type the IP address of the access box in the IP Address field.

If you are using NAT, follow these steps:

1. In the IP Address field, type the controller IP address.
2. Click Advanced to open the Advanced Ethernet Settings dialog box.



3. Check the checkbox to indicate that this access box and the controller communicate through NAT modules.
4. Type the actual access box address.

If you configured the IP address with BOOTP/DHCP, this is the address that you set on the access box.

5. Click OK.

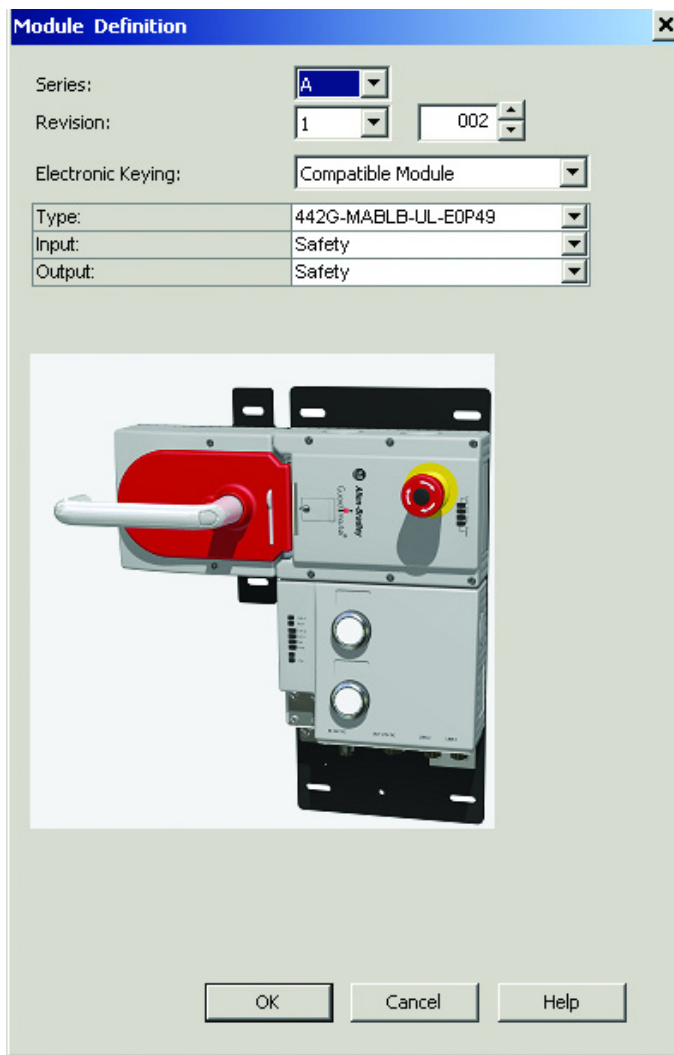
IMPORTANT When NAT is used in a safety application with a GuardLogix® controller, the access box does not accept a safety connection unless the actual access box address is provided.

Change the Access Box Definition

On the General tab, click Change to open the Module Definition dialog box, and enter the following.

- Series
- Major and minor revisions
- Electronic keying

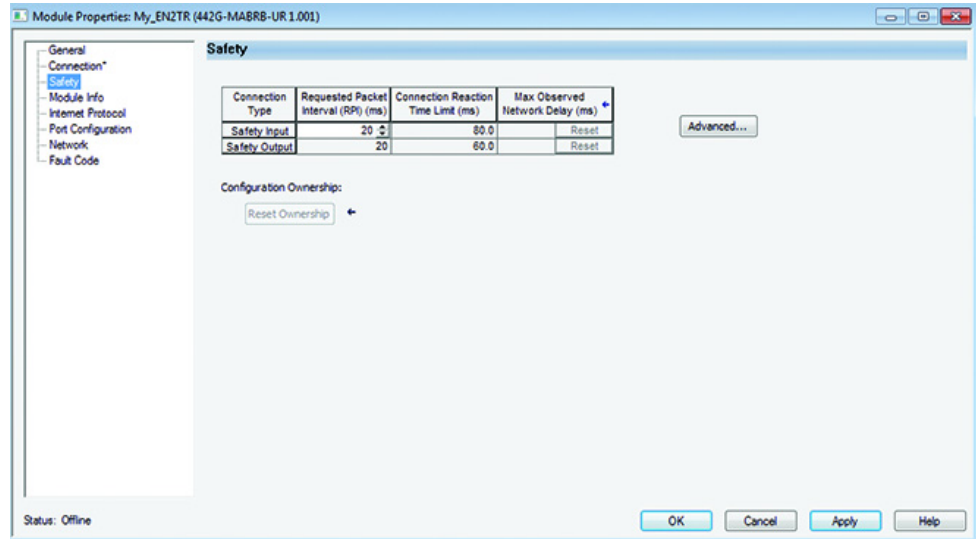
The catalog number in the Type field represents the catalog number of the access box being used. A picture of the device is displayed and can be used to confirm the module selection.



Configure the Safety Connection

Follow these steps to complete entries when you choose the Safety tab.

1. From the Module Properties dialog box, choose the Safety tab to see the Safety dialog box.

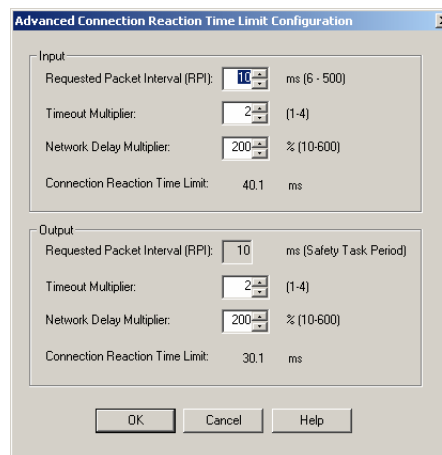


IMPORTANT

Both standard and safety rated signals are included in the CIP Safety™ connection (see [Appendix B on page 43](#)).

Safety rated signals can be used in safety functions. Standard rated signals can be used in the safety task, but must not be relied on for safety functions.

2. Click Advanced to configure Requested Packet Interval (RPI) and Configure Connection Reaction Time Limit (CRTL).



We suggest that you keep the Timeout Multiplier and Network Delay Multiplier at their default values of 2 and 200.

See the GuardLogix Controllers User Manual that is listed in [Additional Resources on page 6](#), for more information about the CRTL.

Make sure that input RPI is set to match the need. The smallest input RPI supported by the access box is 10 ms. A smaller RPI consumes more network bandwidth. This can cause spurious trips because other access boxes cannot get access to the network.

The selection of an appropriate RPI results in a system with maximum (best) performance.

IMPORTANT Analyze each safety channel to determine what is appropriate. The default timeout multiplier of 2 and network delay multiplier of 200 creates an input connection reaction time limit of four times the RPI and an output connection reaction limit of three times the RPI. A safety administrator must approve changes to these parameters.

A connection status bit (ConnectionFaulted) exists for every connection.

Scope: **MyMAB_AOP_v1_1** Show: All Tags Y. Enter A

Name	Value	Force Mask	Style	Data Type	Class
My_MAB_01:1	{...}	{...}		AB:442G_MABB_E0JP4679:1:0	Safety
My_MAB_01:1.RunMode	1		Decimal	BOOL	Safety
My_MAB_01:1.ConnectionFaulted	0		Decimal	BOOL	Safety
My_MAB_01:1.DiagnosticActive	0		Decimal	BOOL	Safety
My_MAB_01:1.EStop	1		Decimal	BOOL	Safety
My_MAB_01:1.EnablingSwitch	0		Decimal	BOOL	Safety
My_MAB_01:1.GuardClosed	1		Decimal	BOOL	Safety

If the RPI and CRTL for the network are set appropriately, then this status tag must always have a value of 0. Monitor all connection status bits to verify that they are not changing to 1 intermittently due to timeouts.

Configuration Signature

The multifunctional access box does not have any configuration data. A safety signature is not generated for this device.

Save and Download the Access Box Configuration

After the access box is configured, download the project to the controller. We recommend that you save the project before downloading.

Configuration Ownership – Reset Ownership

Configuration ownership must be established when a new safety I/O module is added to a project and anytime there is a change in one of the following items.

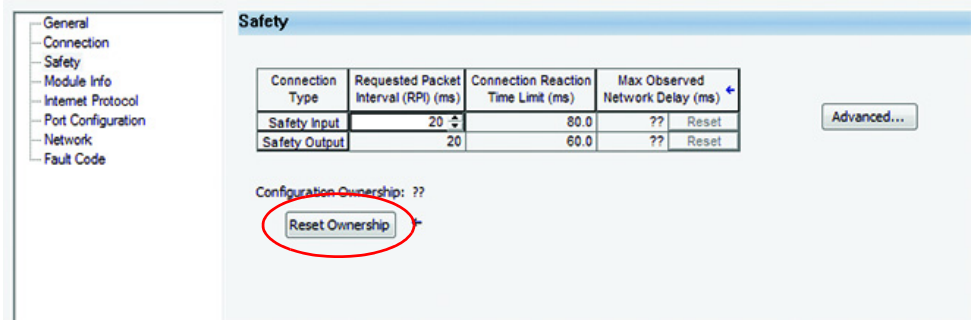
- EtherNet/IP address
- Safety Network Number
- GuardLogix slot number
- GuardLogix Safety Network Number
- Communication path from GuardLogix controller to module

IMPORTANT When replacing an access box, if the controller does not re-establish the safety connection automatically, it may be necessary to reset the ownership and the SNN.

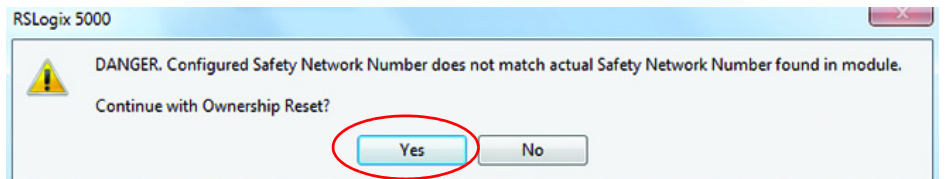
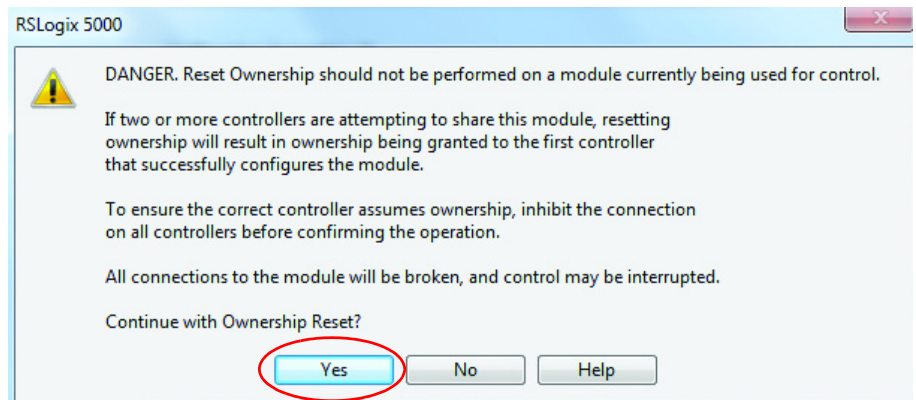
If any of these items change, the connection between the GuardLogix controller and the access box is lost, and the yellow yield in the project tree appears. Reset ownership to re-establish the connection by using this procedure.

IMPORTANT When replacing a device, if the replacement device was used previously and if the connection is local (as shown on the safety tab in RSLogix 5000), the device must first be reset to out-of-box condition. See publication [1756-UM020](#).

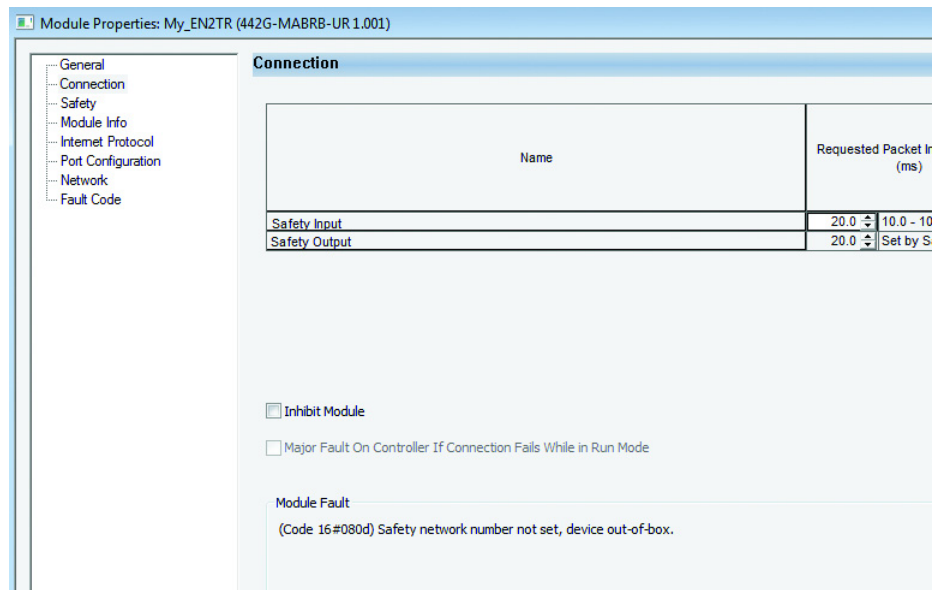
1. From the Module Properties dialog box, choose the Safety tab. You see the Safety dialog box.
2. Click Reset Ownership to re-establish the connection.



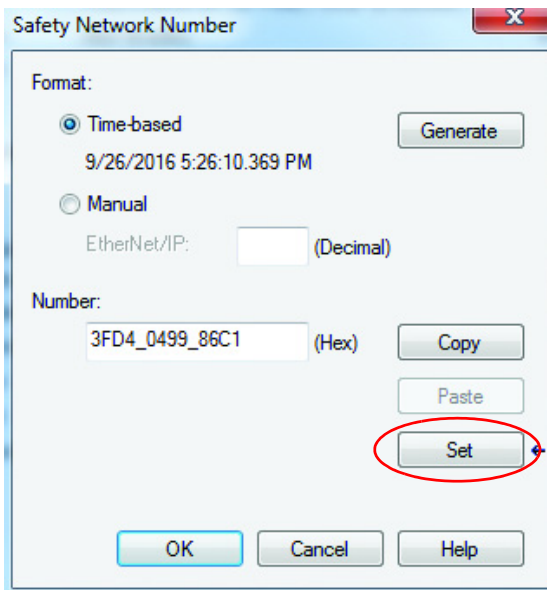
3. Click Yes to continue with ownership reset.



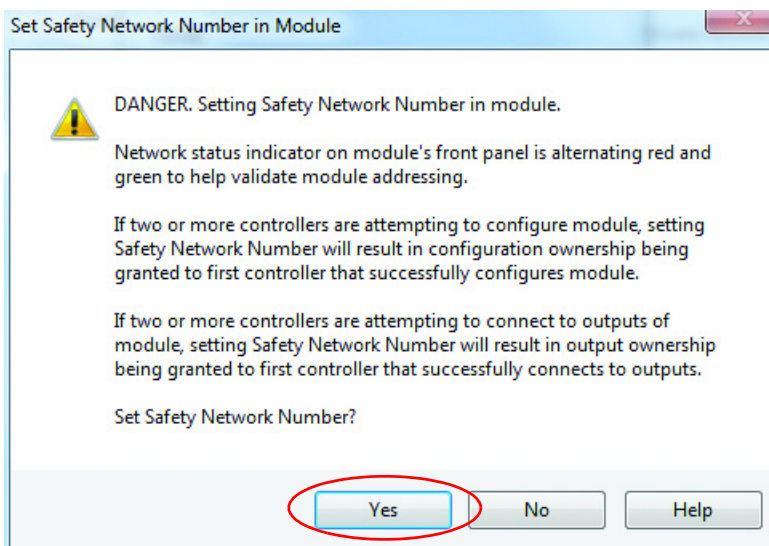
4. On the connection page, notice that the module is faulted (safety network number (SNN) not set, module-out-of-box).



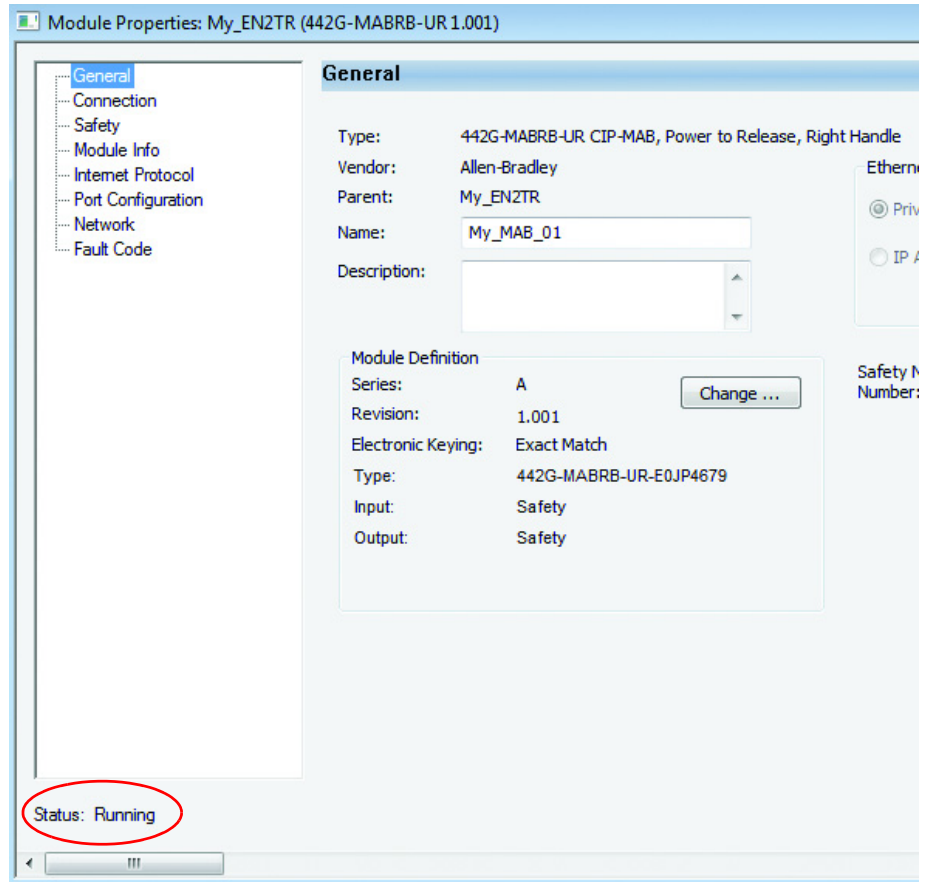
- From the General tab, click Safety Network Number. The SNN dialog box appears. Enter the Number, Click Set, then click OK.



- Select Yes to continue when the following warning appears.



- The module status changes from Faulted to Running, as shown in the lower left corner of the General tab.



Reset Access Box to Factory Settings

Follow these steps to clear a previously assigned IP address or Safety Network Number (SNN) in the access box and return it to the factory settings:

- Set all DIP switches to the ON position (see [Figure 19 on page 35](#)).
- Power cycle the device.
- Set all DIP switches to the OFF position.
- Power cycle the device a second time.

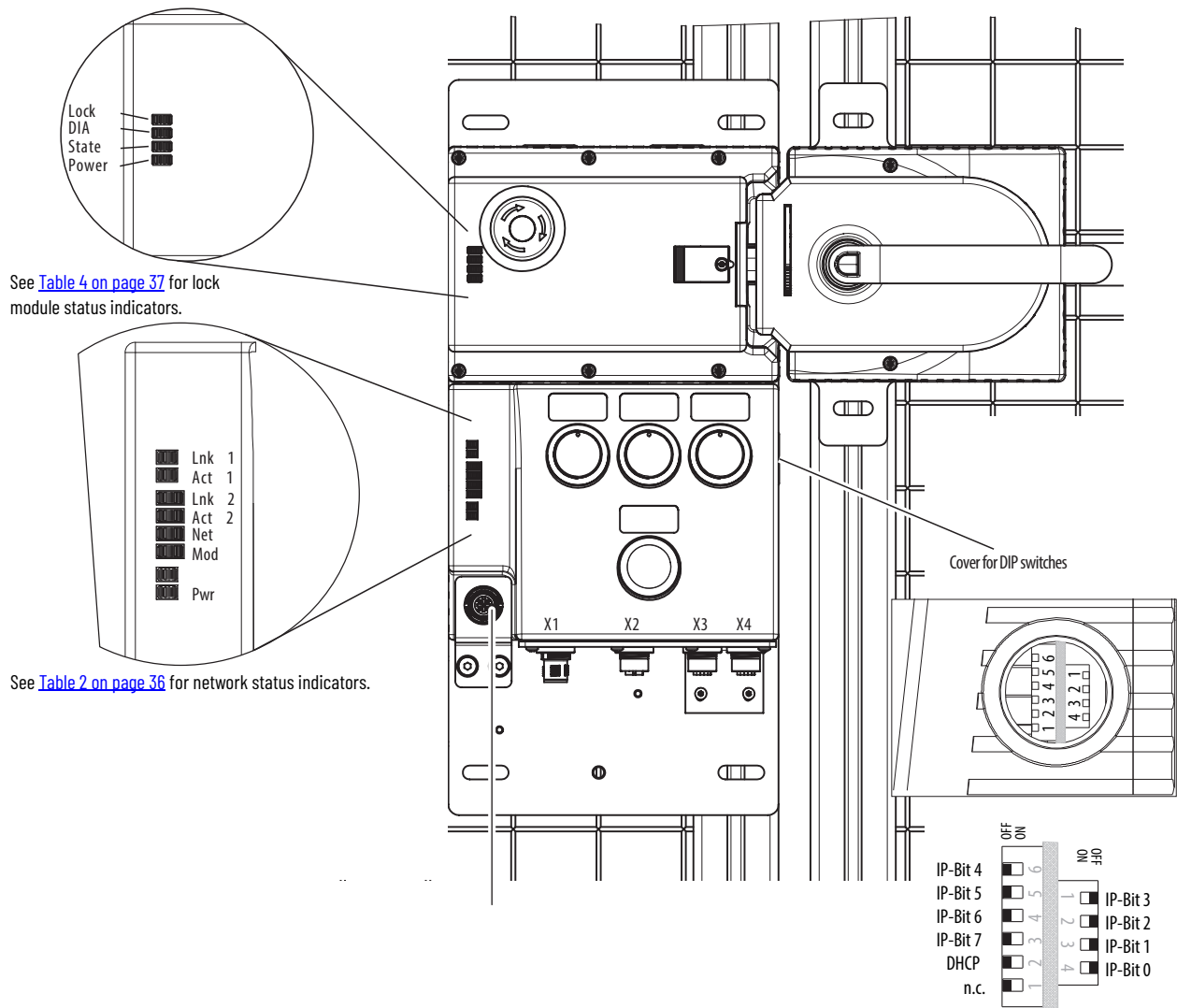
ControlFLASH Application Compatibility

Devices that are manufactured with firmware revision 1.002 (check unit label) cannot be upgraded with the ControlFLASH™ application. Devices that are manufactured with firmware revision 1.005 and higher are compatible with the ControlFLASH application and can be upgraded with future firmware releases.

Notes:

Status and Troubleshooting

Figure 19 - Status Indicators and DIP Switches




See [Table 3 on page 36](#) for DIP switch assignment.

Table 2 - Network Status Indicators






























Status Indicator	Color	Significance
ACT 1 ACT 2	OFF Green flashing Yellow flashing	No activity Port activity Collision
LNK1 LNK2	OFF Green Yellow Red	No connection Connection Port disabled Major NIC fault
MOD	Green flashing Green Red flashing Red Red/green flashing	Idle or standby Normal operation Recoverable fault Unrecoverable fault Self-test/startup
NET	Green flashing Green Red flashing Red Red/green flashing	No network connection Network connection Time out Communication failed Network error

Table 3 - DIP Switch Assignment

Switch	Designation	Function
Block 2	1	N.C. Reserved
	2	DHCP <ul style="list-style-type: none"> • OFF position = IP address via DIP switch • ON position = IP address via DHCP (all other DIP switches in position = OFF)  To identify the module in the control system, set the DIP switch to ON position. This setting allows the DHCP server to recognize the module. Use this setting if you do not know the IP address (See Restore the Access Box to DHCP Mode on page 24.)
	3	IP bit 7
	4	IP bit 6
	5	IP bit 5
	6	IP bit 4
Block 1	4	IP bit 3
	3	IP bit 2
	2	IP bit 1
	1	IP bit 0

Factory setting: all switches in OFF position.

Table 4 - Lock Module Status Indicators

Operating Mode	Guard Position	Bolt Position	Guard Locking	Input Signal Guard Closed	Input Signal Guard Interlock	Input Signal Guard Locking	Module Diagnostics Input Signal Lock Sequence Fault	Power (green)	State (green)	Lock (yellow)	DIA (red)	State
Normal operation	Open	Not inserted	OFF	OFF	OFF	OFF	OFF		 Long OFF, Short ON			Normal operation, guard is open
	Closed	Not inserted	OFF	ON	OFF	OFF	OFF		 Long ON, short OFF			Normal operation, guard is closed
	Closed	Inserted	OFF	ON	ON	OFF	OFF			 Long ON, Short OFF		Normal operation, guard is closed, bolt tongue is inserted
	Closed	Inserted	ON	ON	ON	ON	OFF					Normal operation, guard is closed and locked
Handle Config. Standby	Open	Not inserted	OFF	OFF	OFF	OFF	OFF		 3x			Guard is open; module is ready to configure another handle assembly (standby is active for only 3 minutes after power-up).
Setup	Closed	Inserted	ON	OFF	ON	ON	OFF		 1 Hz			Handle configuration
	X	X	X	OFF	OFF	OFF	OFF					Positive acknowledgment after completion of handle configuration. Set output bit Locking Fault Reset to resume normal operation.
Fault Display	X	X	X	OFF	OFF	OFF	ON		 3x			Handle assembly read error (for example, error in code or code cannot be read) ⁽¹⁾
	X	X	X	OFF	OFF	OFF	ON					Internal fault (for example, component faulty, data fault) ⁽²⁾
	X	X	X	OFF	OFF	OFF	ON			 1x		Signal sequence incorrect (for example, broken bolt) ⁽³⁾ or after actuation of the escape release ⁽¹⁾

(1) Non-latching fault; open safety guard and close it again to reset.

(2) Latching fault; use corresponding output bit to reset. See [Clear Faults on page 39](#).(3) Latching fault; use corresponding output bit to reset; guard must be open. See [Clear Faults on page 39](#).

Table 5 - Key to Symbols




	Status indicator not illuminated		Status indicator flashes
	Status indicator illuminated	X	Any state

Table 6 - Fault Codes and Corrective Actions

Fault Code	Fault Type	Fault Description	Corrective Action	Fault Reset Bit ⁽¹⁾
2721	Emergency stop discrepancy time error	The time between E-stop Channel A and Channel B changing state exceeded the maximum allowable time.	Press the E-stop. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2722	Enabling switch discrepancy time error.	The time between Enabling Switch Channel A and Channel B changing state exceeded the maximum allowable time.	Remove the enabling switch. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2723	Door position discrepancy time error	Discrepancy between both microprocessor channels of module	Open the guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2724	Bolt position discrepancy time error	Discrepancy between both microprocessor channels of module	Open the guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2725	Guard Locking discrepancy time error	Discrepancy between both microprocessor channels of module	Open the guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2731	Emergency stop test pulse error	The E-stop monitoring circuit does not detect test pulses.	This problem can be the result of a short circuit on one or both of the emergency stop contacts. Press and release the E-stop. Check for signs of abuse or tampering. Inspect the switch casing for damage. The lock module cover (with E-stop) may need to be replaced. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2732	Enabling switch test pulse error	The Enabling Switch monitoring circuit does not detect test pulses.	Check enabling switch connection for a possible short circuit on one or both of the enabling switch contacts. Replace the enabling switch if there are any signs of abuse or tampering. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2733	Door position test pulse error	The Guard Door Position monitoring circuit does not detect test pulses.	Open and close guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2734	Bolt position test pulse error	The Bolt Position monitoring circuit does not detect test pulses.	Open and close guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2735	Guard locking test pulse error	The Guard Lock monitoring circuit does not detect test pulses.	Close and lock the guard door. Unlatch the fault by cycling output GeneralFaultUnlatch.	GeneralFaultUnlatch
2741	Max service life of 1,000,000 operations has been reached	The module has reached the maximum mechanical lifetime of 1,000,000 operations.	No action required. For information only.	—
2742	Internal module error	Indicates an unrecoverable fault. The module may need to be replaced.	Power cycle the access box. If the error persists, the bus/lock module may need to be replaced.	None
2743	Signal sequence error	The module detected an unacceptable sequence of events (for example, guard locking is active while the guard door is in the open position).	Check the mechanical function of the handle assembly and bolt actuator. Open the guard door. While the guard door is open, unlatch the fault by cycling output LockSequenceFaultUnlatch.	LockSequenceFaultUnlatch
2744	Lock module error	The module detected activation of the escape release handle or the manual release.	Open and close the guard door. Unlatch the fault by cycling output LockSequenceFaultUnlatch.	LockSequenceFaultUnlatch
2745	Transponder read error	Indicates an unrecoverable fault. The module may need to be replaced.	Power cycle the access box. If the error persists, the bus/lock module may need to be replaced.	None
2750	Power supply or CIP Safety parameter assignment error	This error indicates a problem with the power supply or a CIP Safety parameter assignment error.	Disconnect and reconnect the power supply.	None

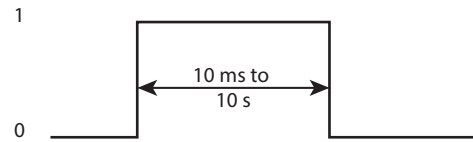
(1) See [Clear Faults on page 39](#).

Clear Faults

To clear faults in the access box, you must cycle one of the fault reset signals (GeneralFaultUnlatch or LockSequenceFault Unlatch) as specified in [Table 6 on page 38](#).

The reset requires a leading and trailing edge of the reset signal within a specific time frame. The pulse width must be between 10 ms...10 s. If the pulse width is too short or too long, the reset function is not executed.

Figure 20 - Fault Reset Timing



Multiple Faults

It is highly unlikely that more than one fault will occur at the same time. If a new fault does occur before a previous fault has been cleared, a new value is written to FaultCode, which deletes the previous one. The DiagnosticActive bit is set with each fault, but does not change state if the second fault occurs before the first fault is cleared.

Notes:

Specifications

Safety Ratings

Attribute	Value		
Standards	IEC 60947-5-3, EN ISO 13849-1, ISO 14119, UL 508 (evaluated for risks of electrical shock and fire; only suitable for NFPA 79 applications)		
Safety Classification	Type 4 interlocking module with guard locking and high-coded RFID actuators according to ISO 14119		
Functional Safety Data	PL _e , Cat. 4 (according to ISO 13849-1, SIL CL 3 according to IEC 62061 and IEC 61508)		
	MTTF _d	Monitoring of guard locking	746 years
		Control of guard locking	475 years
		Evaluation of emergency stop	787 years
		Evaluation of enabling switch	753 years
	PFH _d	Monitoring of guard locking	3.37 x 10 ⁻⁹
		Control of guard locking	4.91 x 10 ⁻⁹
		Evaluation of emergency stop	3.05 x 10 ⁻⁹
		Evaluation of enabling switch	3.05 x 10 ⁻⁹
	B10 _d	Emergency stop	1.0 x 10 ⁵
		Enabling switch	According to manufacturer specifications
Mission time	20 years		
Certifications	c-UL-us (UL 508) and CE Marked for all applicable EU Directives		
Safety Outputs	CIP Safety		

Operating Characteristics

Attribute	Value
Torque settings, max	<ul style="list-style-type: none"> 1 N•m (8.85 lb in.) lock module cover screws (6x) 0.5 N•m (4.42 lb in.) manual release locking screw 2 N•m (17.70 lb in.) handle set screw (handle and escape release)
Holding force F _{zh} (ISO 14119)	2000 N
Locking bolt alignment tolerance	Horizontal: ± 4 mm (0.16 in.); Vertical: ± 5 mm (0.2 in.)
Operating voltage	Class 2 PELV 24V DC +10/-15% required ⁽¹⁾
EMC protection requirements	In accordance with EN 61000-4 and DIN EN 61326-3-1
Current consumption, max	500 mA
Operating current, max	4 A
External fuse	1 A (min), slow-blow
Risk time ⁽²⁾ (per IEC 60947-5-3)2	<ul style="list-style-type: none"> E-stop: 100 ms Enabling switch: 100 ms Guard position: 250 ms Bolt position: 250 ms Guard locking: 250 ms
Switching frequency, max	1 Hz
Insulation voltage U _i (IEC 60947-1)	75V
Impulse withstand voltage U _{imp}	0.5 kV
Pollution degree (IEC 60947-1)	3
Manual release	Built in (ISO 14119)
Mechanical life	1,000,000 operations

(1) Refer to Electrical Connection—Power Supply Requirements in Installation Instructions, publication [442G-IN004](#).

(2) The risk time is the maximum difference between the time the input status changes and the time the corresponding bit in the input assembly is turned on.

Environmental

Attribute	Value
Ambient temperature at UB = DC 24V	-20...+55 °C (-4...+131 °F)
Storage temperature	-20...+65 °C (-4...+149 °F)
Enclosure rating	IP54
Operating humidity	5...80% relative
Vibration/shock	IEC 60068-2-27 30 g (1.06 oz), 11 ms/IEC 60068-2-6 10...55 Hz

Physical Characteristics

Attribute	Value
Weight	<ul style="list-style-type: none"> • Lock/bus assembly on mounting plate: 3.6 kg (7.9 lb) • Handle assembly on mounting plate: 1.2 kg (2.6 lb) • Escape release: 500 g (17.6 oz)
Materials	<ul style="list-style-type: none"> • Glass fiber reinforced plastic • Nickel-plated die-cast zinc • Anodized aluminum handle • Stainless steel • Powder-coated sheet steel

EtherNet/IP I/O Assemblies

Input Assemblies

Instance Decimal (hex)	Signal Rating	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1025 (401)	Standard	0	Reserved					Diagnostic Active		
	Standard	1	Reserved							
	Standard	2	Reserved							
		3	Reserved							
	Safety	4	—	—	—	—	—	—	Enabling Switch	E-stop
	Safety	5	Guard Locked	Guard Interlocked	—	—	—	Reserved	Reserved	Guard Closed
	Standard	6	—	—	—	Switch 6 ⁽¹⁾	—	—	—	Switch 4 ⁽¹⁾
	Standard	7	—	—	—	Switch 9 ⁽¹⁾	—	—	—	Switch 7 ⁽¹⁾
	Standard	8	—	—	—	—	—	—	—	—
	Standard	9	Cycle Threshold Exceeded	—	Unlock Command Fault	Reserved	Enabling Switch Fault	E-stop Fault	Lock Sequence Fault	—
	Standard	10, 11	Fault Code							

(1) Switch (x) refers to the switch in position SX (see [Figure 21 on page 45](#) and [Figure 22 on page 45](#)).

Output Assemblies

Instance Decimal (hex)	Data Type	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1279 (4FF)	Safety	0	—	—	—	—	—	—	—	Unlock
	Standard	1	—	—	Light 9 ⁽¹⁾	—	Light 7 ⁽¹⁾	Light 6 ⁽¹⁾	—	Light 4 ⁽¹⁾
	Standard	2	—	—	—	—	—	—	—	E-stop Light
	Standard	3	Lock Sequence Fault Unlatch	General Fault Unlatch	Reserved					

(1) Light (x) refers to illumination of the switch in position Sx (see [Figure 21 on page 45](#) and [Figure 22 on page 45](#)).

IMPORTANT Safety rated signals can be used in safety functions. Standard rated signals can be used in the safety task, but must not be relied on for safety functions.

Tag Definitions

Name	Signal Rating	Data Type	Tag Definition
ConnectionFaulted	Standard	BOOL	Connection Faulted — Indicates the state of the communication connection between the access box and the controller. 0 = Connection to the tag is up and working 1 = Not connected
CycleThresholdExceeded		BOOL	Cycle Threshold Exceeded— indicates when the module has reached 1,000,000 switching cycles 0 = < 1,000,000 switching cycles of the solenoid 1 = > 1,000,000 switching cycles of the solenoid Note: Prognostic information only. This tag is not a fault condition.
DiagnosticActive		BOOL	Diagnostic Active — Indicates whether the access box is faulted. 1 = One or more diagnostics active 0 = No diagnostics active
EnablingSwitch	Safety	BOOL	Enabling Switch (GripSwitch) Status 1 = Enabling is in the active (enabled) state 0 = Switch is released (safe state)
EnablingSwitchFault	Standard	BOOL	Enabling Switch (GripSwitch) Fault — indicates an Enabling Switch specific fault 1 = Fault 0 = OK, no fault Note: This tag rolls up into DiagnosticActive.
EStop	Safety	BOOL	E-stop Status 1 = E-stop is in the active state (E-stop not pressed) 0 = E-stop pressed (safe state)
EStopFault	Standard	BOOL	E-stop Fault — indicates an E-stop-specific fault 1 = Fault 0 = OK, no fault Note: This tag rolls up into Diagnostic Active.
EStopLight		BOOL	E-stop Light — controls illumination for the E-stop. 1 = Illumination is turned ON 0 = Illumination is turned OFF
FaultCode		INT	Fault Code — indicates the specific diagnostic message of the access box
GeneralFaultUnlatch		BOOL	General Fault Acknowledgment — unlatches faults that are related to the bus interface 1 = Reset of bus module 0 = Normal operation
GuardClosed	Safety	BOOL	Guard Position Monitoring — indicates the position of the guard 1 = Guard is closed 0 = Guard is open
GuardInterlocked		BOOL	Interlock Status 1 = Guard is interlocked (guard closed with bolt actuator engaged) 0 = Bolt is retracted (disengaged) and/or guard is open
GuardLocked		BOOL	Guard Locking Status 1 = Guard locking is active (guard is closed, actuator (bolt) is engaged AND locked) 0 = Guard locking is not active (actuator (bolt) is NOT engaged and NOT locked)
Light<X>		BOOL	Light X — controls illumination of the push button in location <x> 1 = Illumination is turned ON 0 = Illumination is turned OFF X = 4, 6, 7, 9 switch element designator
LockSequenceFaultUnlatch	Standard	BOOL	Lock Sequence Fault Acknowledgment — unlatches faults that are related to the locking sequence 1 = Reset of locking assembly 0 = Normal operation
LockSequenceFault		BOOL	Lock Sequence Fault — indicates a signal sequence error 1 = Fault 0 = OK, no fault Note: This tag rolls up into Diagnostic Active.
RunMode		BOOL	Run Mode — Indicates the operating mode of the access box 1 = Run Mode 0 = Not Run Mode
Switch<X>	Standard	BOOL	Switch X for momentary push button: 1 = Push Button Pressed 0 = Push Button Released X = 4, 6, 7, 9 switch element designator
Unlock	Safety	BOOL	Unlock Command — control for switching the guard locking on and off. 1 = Turn guard locking OFF (disable locking) 0 = Turn guard locking ON (enable locking) Note: Logic is the same for both Power to Lock (PTL) and Power to Release (PTR) versions
UnlockCommandFault	Standard	BOOL	Unlock Command Fault — indicates a fault in the Unlock Command 1 = Fault 0 = OK, no fault Note: This tag rolls up into Diagnostic Active.

Figure 21 - Right-hand System

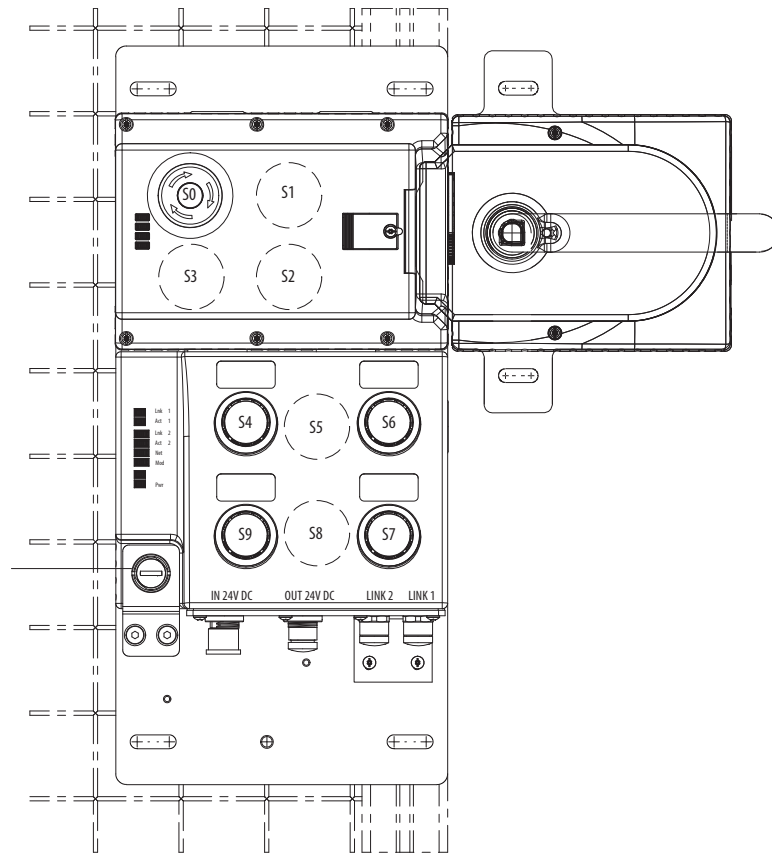
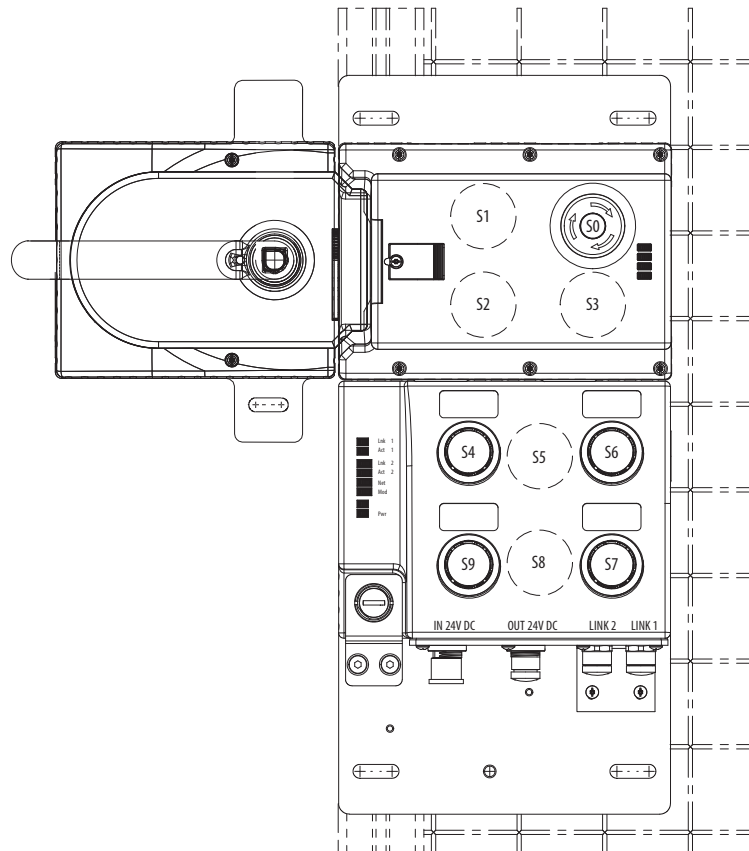


Figure 22 - Left-hand System



Notes:

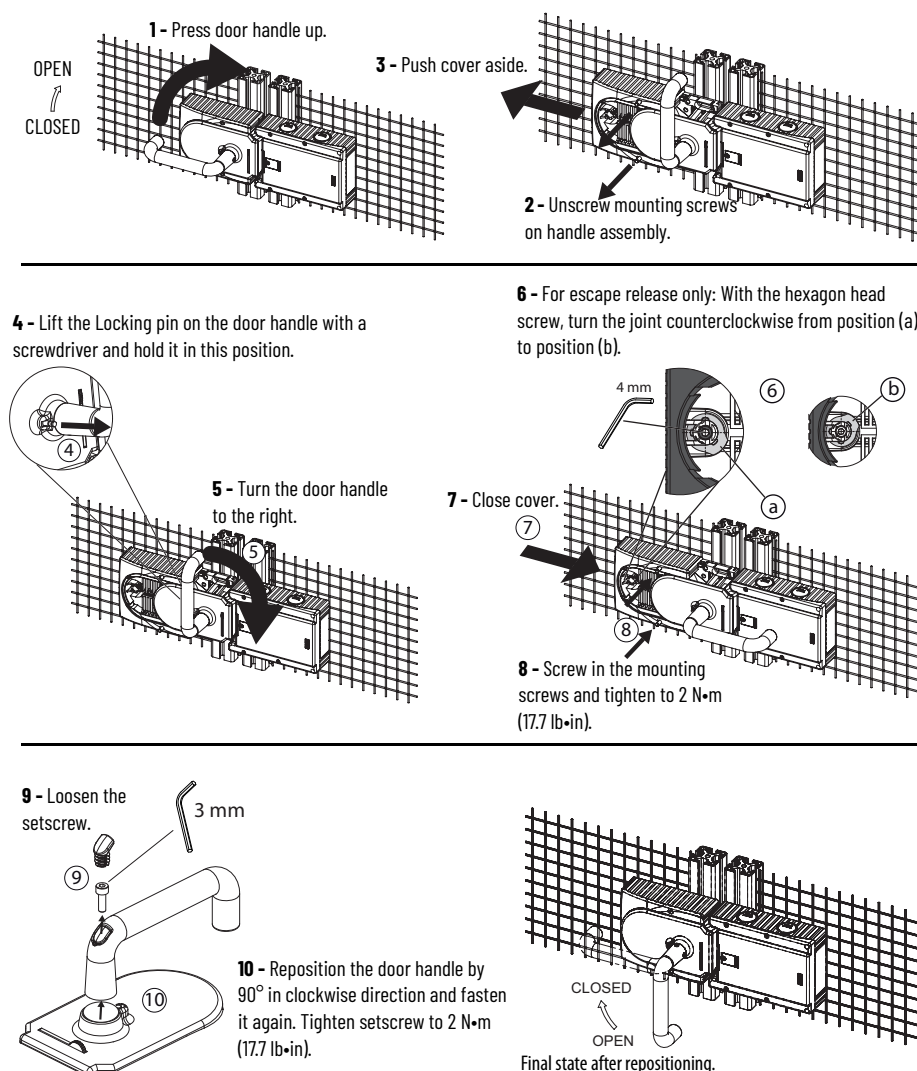
Change Actuation Direction of Handle Assembly

IMPORTANT It is only possible to perform this change when the bolt is not extended and an escape release is not yet mounted.

Procedure

If a right-hand assembly must be mounted on a left-hinged guard door or a left-hand assembly must be mounted on a right-hinged guard door, the actuating direction of the door handle must be changed. [Figure 23](#) shows the process to change from right- to left-hand operation.

Figure 23 - Change Actuation Direction



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Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
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