



# *pro*Net - EtherNet/IP -CIP Safety Communication Module Configuration Instructions





## **CIP Safety communication module Configuration Instructions**

This document includes instructions for the configuration of an amGard*pro pro*Net EtherNet/IP device with a Rockwell Automation PLC using Studio 5000 Logix Designer. The device uses both safety and standard communication in parallel. The PLC must support this feature for the full functionality of the device. Standard-only communication can only be used in a non-safety application.

#### Important:

The *pro*Net systems are designed for use according to the installation and operating instructions enclosed. It must be installed by competent and qualified personnel who have read and understood the whole of this document prior to commencing installation. If the device or guarded machinery equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. The device is not to be used as a Mains Isolator. The device is a component to be added to a permanent electrical installation meeting the requirements of the applicable IEC/EN standards. All the voltages used within the connected circuits must be derived from a Safety Extra Low Voltage or Protected Extra Low Voltage power supply (SELV or PELV). Fortress Interlocks Ltd accepts no liability whatsoever for any situation arising from misuse or misapplication of the Device.

BEWARE OF INTENTIONAL MISUSE CAUSED BY OPERATORS WANTING TO BYPASS SAFETY SYSTEMS. THE INSTALLER SHOULD ASSESS THE RISKS AND MITIGATE AGAINST THEM.

In order to maintain device safety rating, overall system must be validated to ISO 13849-2 and/or evaluated in accordance with IEC 62061.

IF YOU HAVE ANY QUESTIONS OR QUERIES OF ANY NATURE WHATSOEVER PLEASE CONTACT THE SUPPLIER WHO WILL BE PLEASED TO ADVISE AND ASSIST.

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- Ensure the provided EDS file has been installed on the computer (Refer to section EDS Installation).
   Create and configure module in Studio 5000 (Refer to section Integration with Studio 5000).
   Connect power to unit (MS:Green flash ☆, NS:Off ○, CS:Green flash ☆). (Refer to Installation Instructions).
   Connect data to unit (MS:Green flash ☆, NS: Off ○, CS:Green flash ☆, Link:Amber ●). (Refer to Installation Instructions).
   Set IP address of unit (MS:Green+Red flash ☆, NS:Green flash ☆, CS:Green flash ☆, Link:Amber flash ☆). (Refer to section Setting or Changing the IP Address).
   Reset ownership of the unit if it was previously connected to a different PLC or if the IP address has been changed after a Safety Network Number (SNN) has been set. (MS, NS, CS flashing Green ☆). (Refer to section Resetting Safety Ownership).
   Set the SNN (Safety Network Number) and disable Configuration Signature once the unit has connected (MS, NS, CS solid Green ●). (Refer to section Configuring the Safety Functions and Configuration Signature).
- **8.** Set PLC to run mode and check that the unit is now running.

### **Initial Setup**

# EDS Installation

Rockwell Automation - Hardware Installation Tool This tool allows you to change the hardware description information currently installed on your computer.
Add       Launch the EDS Wizard and add selected hardware description files only.         Remove       Rockwell Automation's EDS Wizard         Registration       Electronic Data Sheet file(s) will be added to your system for use in Rockwell Automation applications.         Image: Complexity of Register a single file       Register a directory of EDS files         Image: Complexity of Register a directory of EDS files       Look in subfolders         Named:       C:\Users\MKaramanos\Desktop\EIP\Fortress_setup\EDS\005A002800
• If there is an icon file (ico) with the same name as the file(s) you are registering then this image will be associated with the device. To perform an installation test on the file(s), click Next



The following are basic instructions to configure the device within Studio 5000 Logic Designer. The user is responsible for ensuring that the settings used meet the requirements of the safety system.

Support for a device with parallel safety and standard communications is a feature of Studio 5000 version 28 and later only.

Support for EDS files with parallel safety and standard communications is a feature of version 32 and later only. Fortress recommends using the instructions for Version 28 and Later for all users, as this allows the project to include a range of Fortress units with different memory map sizes in the same project. However, if the user is only using Fortress units with the same memory map sizes, an EDS file is available.

#### Studio 5000 Version 32 and Later

1. Within a Studio 5000 project with an EtherNet/IP-enabled PLC, right-click the EtherNet/IP driver under 'I/O Configuration' and select 'New Module...'.



- 2. Search for the "Fortress Interlocks" module and select 'Create'.
- 3. Give the new module a name and set its EtherNet address to match the IP address of the unit.
- 4. Set the Safety Network Number as described in 'Safety Network Number'.
- 5. Set the Configuration Signature as described in 'Configuration Signature'.
- **6.** After confirming and downloading these settings to the PLC, the module status should switch to 'Running'. Should a fault occur, the module's 'Connection' tab will display a description of the fault.
- 7. Refer to the supplied memory map when writing your main and safety programs.

#### Studio 5000 Version 28 and Later

**1.** Within a Studio 5000 project with an EtherNet/IP-enabled PLC, right-click the EtherNet/IP driver under 'I/O Configuration' and select 'New Module...'.



- 2. Search for the "Generic EtherNet/IP Safety and Standard Module" module and select 'Create'.
- 3. Give the new module a name and set its EtherNet address to match the IP address of the unit.
- 4. Change the 'Module Definition' to the following device-specific parameters:

General	
Vendor	1425
Product Type	35
Product Code	5
Major Revision	1
Minor Revision	1

Electronic Keying	Exact Match
Connection:	Safety and Standard
Input Data:	Safety and Standard
Output Data:	Safety and Standard
Data Format:	SINT (8-Bit)

Note that the values marked '\*' may differ from those shown here for some devices. Please refer to the supplied memory map document for the values for your specific device.

Connections							
Connection			Output		Configuration		
Connection	Assembly Instance Size (bytes)		Assembly Instance Size (bytes		Assembly Instance Size (byte		
Safety Input	612	3	199	-	832	-	
Safety Output	199 -		768	3	-	-	
Standard	100	17*	150	7*	5	0	

5. Set the safety network number as described in 'Safety Network Number'.

6. Set the Configuration Signature as described in 'Configuration Signature'.

7. After confirming and downloading these settings to the PLC, the module status should switch to 'Running'. Should a fault occur, the module's 'Connection' tab will display a description of the fault.

8. Refer to the supplied memory map when writing your main and safety programs.

To set an IP address on a device Fortress recommends using the DIP switches or the proNet Support Tool.

The device also hosts a web page that can be used to change the IP address and disable the DHCP functionality. It is also possible to change the IP address using alternative DHCP services.

Note that changing the IP address of the device will invalidate its Safety Network Number and require its safety ownership be reset – this is also done through the *pro*Net Support Tool. See 'Resetting Safety Ownership' for details.

#### **DIP Switches**

Set the switches to your desired IP address. When using the DIP switches the IP address of the unit will always have the format "192.168.1.xxx". The DIP-Switches are used to identify the last byte of the address which must be between 1 and 254. 'Figure 1 – DIP switches for 192.168.1.200' shows an example configuration.



Figure 1 – DIP switches for 192.168.1.200

#### proNet Support Tool

The *pro*Net support tool contains useful features including setting device IP address and resetting Ownership. The *pro*Net Support Tool can be downloaded from the Fortress website.

#### **Discover Units**

1. Run the Pronect.exe application.

Pronect -	- [1.0.0.3]					-		×
Discovery								
Scan	vEthernet (Default Switc	h) [172.25.52.113]	✓ Refresh A	dapter List				
Daviana								
Turce	IP address	Submat	Default external	MAC	DUCP	Status		
Type	II duiess	Jubrier	Default gateway	MAC	Drici	Status		
IP Address	_							
Set IP	Use DHCP	IP address:	Subne	: mask:	. Default gatew	ay:		
Ownership								
Reset	Preserve IP	address						
Control								
Wink	Show Web Page							
Log								
Log								~
								~
	n that is some							
work adapte	er that is conne	ected to the	amGard pro	vet unit.				
Discover	Ŋ							_
Discover	ny Lanton F	themet [192]	168 1 551		V Dat	Frank Ada	antor Lie	-
Discover	n Laptop E	themet [192.	168.1.55]	1101	✓ Ref	fresh Ada	apter Lis	st
Discover	n Laptop E vEtheme	themet [192. t (Default Swit	168.1.55] ch) [172.25.52.	113]	✓ Re	fresh Ada	apter Lis	st
Discover Sca Devices	n Laptop B vEtheme Laptop B WiFL [17	themet [192. t (Default Swit themet [192. 2 20 10 21	168.1.55] ch) [172.25.52. 168.1.55]	113]	✓ Ret	fresh Ada	apter Lis	st

Pronect -	[1.0.0.3]					-		×
Discovery								
Scan	Laptop Ethernet [192.1	68.1.55]	✓ Refresh Ada	apter List				
Devices				Tibles				
Type Ethernet/IP	IP address 0.0.0.0	Subnet 0.0.0.0	0.0.0.0	MAC 00-30-11-25-1A-08	DHCP	Status		
IP Address								4
Set IP	Use DHCP	IP address:	0.0.0.0 Subnet r	nask: 0.0.0.0	Default gateway	0.0	0.0	
Ownership								
Reset	Preserve IP	address						
Control								
Wink	Show Web Page							
Log	100 100							_
Scan started or Scan complete	192.168.1.55 1 device(s) found.							^
Scan started or Scan complete	192.168.1.55 1 device(s) found.							
								~
ch you w CP'. P addre:	vould like to a	issign an IP it mask and i	address to. then press 'S	et IP'.				
ch you w CP'. P addres <sup>P</sup> Address Set IP	vould like to a ss and subne	IP address: 15	address to. then press 'S <sup>92,168, 0,50</sup> Subnet	et IP'.	Default gatev	way: D.	0.0.	0
ch you w CP'. P addres P Address Set IP	vould like to a ss and subne Use DHCP	ISSIGN AN IP	address to. then press 'S 92.168. 0 . 50 Subnet	et IP'.	Default gatew	way: D.	0.0.	0
Ch you w CP'. P address P Address Set IP Pronect - Discovery	Use DHCP	IP address: 15	address to. then press 'S 32.168. 0 . 50 Subnet	et IP'.	Default gatev	way: D.	0.0.	0
ch you w CP'. P address P address Set IP Discovery Scan	Use DHCP	IP address: 15	address to. then press 'So 92.168. 0 . 50 Subnet	et IP'. mask: 255.255.255.0	Default gatev	way: D.	0.0.	0
ch you w CP'. P address Set IP Set IP Discovery Scan Devices	Vould like to a ss and subne Use DHCP	IP address: 19 68.1.55]	address to. then press 'So 92.168. 0 . 50 Subnet	et IP'.	Default gatew	vay: D.	0.0.	0
ch you w CP'. P address Set IP P Address Set IP Discovery Scan Devices Type Ethemet/IP	Vould like to a ss and subne Use DHCP (1.0.0.3) Laptop Ethemet (192.1) IP address 192.168.0.50	assign an IP         it mask and f         IP address:         IP address:         68.1.55]         Subnet         255.255.255.0	address to. then press 'S 32.168. 0 . 50 Subnet V Refresh Ada Default gateway 0.0.0	et IP'. mask: 255.255.255.0 pter List MAC 00-30-11-25-1A-08	Default gatew DHCP False	vay: D .	0.0.	0
ch you w CP'. P address P address Set IP Discovery Scan Devices Type Ethemet/IP IP Address Set IP Ownership Reset Control Wink	Vould like to a ss and subne Use DHCP Use DHCP Laptop Ethemet [192.1 IP address 192.168.0.50	IP address: 1 P address: 1 P address: 1 P address: 1	address to. then press 'Si 32.168. 0 . 50 Subnet V Refresh Ada Default gateway 0.0.0.0	et IP'. mask: 255.255.255.0 pter List MAC 00-30-11-25-1A-08 mask: 255.255.255.0	Default gatew DHCP False	vay: D.	0.0.	
ch you w CP'. P address Set IP Discovery Scan Devices Type Ethemet/IP IP Address Set IP Ownership Reset Control Wink Log	Vould like to a ss and subne Use DHCP Use DHCP Use DHCP II.0.0.3] I Laptop Ethemet [192.1] IP address 192.168.0.50	IP address: 1 Subnet 255.255.255.0	address to. then press 'S 32.168. 0 . 50 Subnet	et IP'. mask: 255.255.255.0 pter List MAC 00-30-11-25-1A-08	Default gateway	way: D.	0.0.	
ch you w CP'. P address Set IP	Vould like to a ss and subne Use DHCP (1.0.0.3) Laptop Ethemet [192.1] IP address 192.168.0.50 Use DHCP V Preserve IP Show Web Page 1 device(s) found. 192.168.1.55 1 device(s) found.	IP address: 1 Subnet 255.255.255.0	address to. then press 'S 32.168. 0 . 50 Subnet Refresh Ada Default gateway 0.0.0	et IP'. mask: 255.255.255.0 pter List MAC 00-30-11-25-1A-08 mask: 255.255.255.0	Default gateway	way: D.	0.0.	

# Setting or Changing the IP Address

Othor	Mothodo		
By def	ault DHCP IP allocation is enable	ed on the device. The use of the DIP switches to set an IP address disable	s DHCP
<i>y</i> ao:			5 81101 .
Chang previo	jing the DIP switches from a non- usly disabled.	zero value to zero while the device is operating will re-enable DHCP if it wa	as
The de	evice webpage can be used to dis	sable the DHCP functionality.	
the [	DHCP functionality is not disabled	I, the device will require a DHCP service every time it is power cycled.	
ortres ware	ss recommends using dip switche that DHCP lease expiry may inte	es or the <i>pro</i> Net Support Tool to assign IP addresses. If using a DHCP serverupt communications.	/er, be
)evic	e Web Page		
3hould he use 1ighlig	d the device have an IP address s er to set any static IP address of hted selection box.	set, a web page will be hosted at that address. The 'IP Configuration' tab a their choice. The DHCP functionality can also be disabled from this page u	llows sing the
	Safety Diagnostics	I/O Diagnostics Network Diagnostics IP Configuration	
		Interlocks	
	IP Configuration (Back)		
	Using this page	can prevent interlocks from reconnecting to the network	
	Parameter	Value	
	DHCP	Disabled <b>T</b>	
	IP Address	192.168.1.8	
	Subnet Mask	255.255.255.0	
	Gateway Address	0.0.0.0	
	Host Name		
	Domain name		
	DNS Server #1	0.0.0.0	
	DNS Server #2	0.0.0.0	
		Save settings	
	Parameter	Value	
	Port 1	Auto 🔻	
	Port 2	Auto 🔹	
		Save settings	
L			

#### Safety Network Number

Should the connection tab of the module properties show the fault "(Code 16#080d) Safety network number not set, device out-of-box", a new Safety Network Number must be sent to the device, using the instructions below.

The Safety Network number will need to be reset should the IP address of the device change, as described in 'Resetting	
Safety Ownership'.	

	General Connection	Connection
	- Module Info - Internet Protocol - Port Configuration	Name Requested Packet Interval (RPI) Connection over EtherNet/IP
		Safety Input         10.0 ♀         1.0 - 500.0         Unicast           Safety Output         20.0 ♀         Set by Safety Task         Unicast           Standard         10.0 ♠         0.2 . 3200.0         Unicast
		□ Inhibit Module
		☐ Major Fault On Controller If Connection Fails While in Run Mode Module Fault (Code 16≠080d) Safety network number not set, device out-of-box.
	Status: Faulted	OK Cancel Apply Help
1. Under the general tab	and open the Sa	afety Network Number dialogue:
	General Connection Safety Module Info Internet Protocol Port Configuration	General         Type:       ETHERNET-SAFETY-STANDARD-MODULE Generi         Parent:       Local         Name:       FIL_6         Description:       Private Network:         192.168.1.       6 Implement
		Advanced Safety Network Number: EtherNet/IP: 9999
		Module Definition     Connection Parameters       Vendor:     1425       Product Type:     43       Connection Assembly     Size       Assembly     Size       Instance     (Bytes)       Revision:     1.030       Electronic Keying:     Exact Match       Safety Output:     199       0     768       3     Connection:       5     100
		Input Data: Safety and Standard Output Data: Safety and Standard Data Format: SINT (8-Bit) Sixe Safety: 832 Standard: 5 0 Change
	Status: Faulted	OK Cancel Apply Help

# **Configuring the Safety Functions and Configuration Signature**

<ol> <li>Ensure that the 'Number' matches t</li> <li>Press the 'Set' button to send this v.</li> </ol>	hat of the safety PLC. alue to the device. This action will need to be	confirmed.
	Safety Network Number	×
	Format: O Time-based Generate	
	Manual     EtherNet/IP: 9999     (Decimal)	
	Number: 0004_0000_270F (Hex) Copy	
	Paste Set	÷
	OK Cancel Help	
Set Safety M	Network Number in Module	×

DANGER. Setting Safety Network Number in module. Network status indicator on module's front panel is alternating red and green to help validate module addressing. If two or more controllers are attempting to configure module, setting Safety Network Number will result in configuration ownership being granted to first controller that successfully configures module. If two or more controllers are attempting to connect to outputs of module, setting Safety Network Number will result in output ownership being granted to first controller that successfully connects to outputs.
Set Safety Network Number?
Yes No Help

After a few seconds the unit should change to the status "Running".

## **Configuring the Safety Functions and Configuration Signature**

The device does not have any user-configurable safety functionality and therefore does not support the safety configuration signature. Un-check this box in order to create the module.

General Connection Safety Module Info Internet Protocol Port Configuration	Safety	Safety					
	Connection Type Safety Input Safety Output	Requested Packet Interval (RPI) (ms) 10 <u>1</u> 20	Connection R Time Limit	eaction (ms) Netw 40.1 60.0	x Observed ork Delay (ms) Reset Reset	Advanced	
	Configuration Ownership: Reset Ownership * Configuration Signature:				Disabling the Configuration Signature disables the configuration validation		
	ID: Date: [		(He	<) C	opy iste	check performed when connections are established.	
	Time:	\$	🗘 ms				

# **Resetting Device Ownership**

#### **Ownership Reset**

It will be necessary to reset device ownership if a device has previously had a SNN set and the IP address is changed. There are two methods to reset ownership on amGard *pro*Net EIP devices.

Note that the device cannot be reset while it is connected to a PLC. Inhibit the relevant module on the PLC first if necessary. This process will be necessary if the IP address of a unit is changed, as it allows a new Safety Network Number to be set.

#### Resetting ownership using Fortress proNet Support Tool

Fortress recommends using the proNet Support Tool available from the Fortress website. See earlier section for use of general use of the *pro*Net Support Tool. The Fortress *pro*Net support Tool is available from the Fortress website.

- 1. Select the unit which you would like to reset the ownership for.
- 2. Ensure that the unit is on the same subnet as the machine running the proNet Support Tool.
- **3.** Ensure that the unit is not connected to a running PLC, as safety ownership cannot be reset during safety operation. This can also be achieved by inhibiting the connection as shown later.
- 4. Press 'Reset' under 'Ownership'. This process will remove the unit's IP address and cause the unit to power-cycle. If 'Preserve IP address' is checked, the *pro*Net Support Tool will re-assign the unit its Id IP address settings once this process is complete.

	Lasta Dhanat (102.100	1 551					
Scan Laptop Ethemet [192.168.1.55] V Refresh Adapter List							
Devices							
Туре	IP address	Subnet	Default gateway	MAC	DHCP	Status	
Ethemet/IP	192.168.0.50	255.255.255.0	0.0.0.0	00-30-11-25-1A-08	False		
15.4.1.							
IP Address Set IP	Use DHCP	IP address: 192	2.168. 0 . 50 Subnet m	ask: 255.255.255.0	Default gateway	r: 0.0	. 0 .
IP Address Set IP Ownership Reset	Use DHCP	IP address: 19	2.168. 0 . 50 Subnet m	aek: 255.255.255.0	Default gateway	r: 0.0	. 0 .
IP Address Set IP Ownership Reset Control Wink	Use DHCP Preserve IP a Show Web Page	IP address: 19	2.168. 0 . 50 Subnet m	aek: 255.255.255.0	Default gateway	r: 0.0	. 0 . (
IP Address Set IP Ownership Reset Control Wink Log	Use DHCP Preserve IP a Show Web Page	IP address: 19	2.168. 0 . 50 Subnet m	ask: 255.255.255.0	Default gateway	r: 0.0	. 0 . (

#### **Ownership Reset in Studio 5000**

FORTRESS

proNet device must be inhibited in the PLC program before ownership reset.

Open the properties page of the desired module and inhibit the *pro*Net device by checking the 'Inhibit Module' under the 'Connection' tab, then select 'apply'.

The Status will be updated from 'Running' to 'Inhibited'.

Run Mode     Controller OK     Path: A8_ETHIP-1\192.168.1.2*	۰ ۴ 📩	
Energy Storage OK Rem Run R. No Forces	No Edits 🔒 Safety Unlocked	4.2 Favorites Add-On Safety Alarms Bit Timer/Counter Inpub/Output Compare Compute/Math Move/Logica
	Module Properties: Local (ETH	RRNET SAFETY STANDARD-MODULE 1.001) ×
<ul> <li>Controller test_test</li> <li>Controller Tags</li> <li>Controller Fault Handler</li> <li>Power-Up Handler</li> <li>Tasks</li> <li>MainTask</li> <li>MainTask</li> <li>SafetyTask</li> <li>J. SafetyTogram</li> <li>Uncheduled</li> <li>Motion Groups</li> <li>Ungrouped Axes</li> <li>Motion Groups</li> <li>1769 Bus</li> <li>1769 Fus</li> <li>1769 L30ERMS test_test</li> <li>Ethernet</li> <li>1769 L30ERMS test_test</li> </ul>	General Ornection* Safety Module Info Internet Protocol Post Configuration	Connection       Name     Requested Packet Interval (RPI) (ms)     Connection Development Entrice/P       Safety hout     10 € Set on Safety Page     Unicast       Safety Output     20 € Set by Safety Task     N/A       Standard     10.0 € 0.2 - \$200.0     Unicost
	Status: Running	Major Fault On Controller If Connection Fails While in Run Mode  Module Fault  OK Cancel Apply Help
Under the 'Safety' tab, select 'Reset Own	ership', and press	Yes.
Controller Organizer 🗸 🔫	Module Properties: Local (ETHER	NET-SAFETY-STANDARD-MODULE 1.001) ×
Controller test_test Controller Tags Controller Fault Handler Controll	General Connection Safety Module hfo Internet Protocol Port Configuration	Safety         Connection       Requested Packet       Connection Reaction       Max Observed         Safety Junctual (RPI) (ms)       Time Linit (ms)       Max Observed       Advanced         Safety Junctual (RPI) (ms)       Time Linit (ms)       Max Observed       Advanced         Safety Junctual (RPI) (ms)       Time Linit (ms)       Max Observed       Advanced         Safety Junctual (ms)       20       60.0       77       Reset         Configuration Ownemble:       Reset Ownership       Reset Ownership should not be performed on a module currently being used for control.         If two or more controllers are attempting to share this module, resetting ownership will result in ownership being granted to the first controller?       That successfully configures the module.         To ensure the correct controller assumes ownership, inhibit the connection on all controllers before confirming the operation.       All connections to the module will be broken, and control may be interrupted.         Continue with Ownership Reset?       Yes       No       Help
	Status: Inhibited	OK Cancel Apply Help
Studio 5000 will request a password to res	set ownership. On	amGard <i>pro</i> Net E/IP device the password is: <b>IXXAT_SafeT100CS</b>
boot up.	Reset Safety Module (	
P address will presenve upon reset	neset sarety module c	Aureanh V

Help

Reset Ownership

Enter Password:

to continue with ownership reset:

Module is password protected. Enter configuration password for this module

Cancel

.....

Un-inhibit the proNet device by deselecting 'Inhibit Module' under the 'connection' tab. Press 'apply'

*pro*Net device will be activated and Studio 5000 will present Module Fault Code: 16#080d Safety network number not set, device out-of-box.

This confirms the *pro*Net device ownership has been reset successfully





# *pro*Net - EtherNet/IP -CIP Safety Communication Module Configuration Instructions

