

How to connect Omron NX-CSG320 + NX-SL5500 With Omron GI-SMDxxxx CIP Safety IO block



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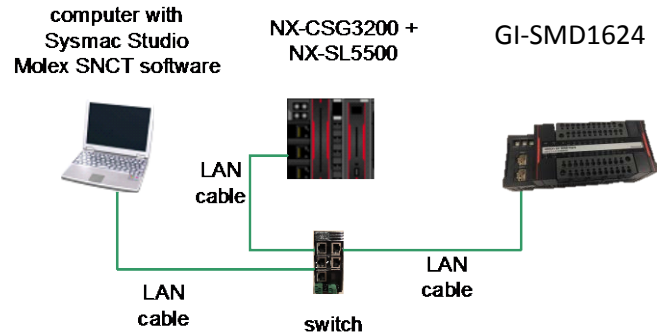
1. Application Devices and Device Configuration

1.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	Ethernet switch	W4S1-0xx
OMRON	NX-series Safety CPU unit	NX-SL5xxx
OMRON	NX-series Communication Control unit	NX-CSGxxxx
OMRON	Omron Safety I/O block	GI-SMD1624

1.2. Device Configuration



Manufacturer	Name	Model	Version
OMRON	Ethernet switch	W4S1-05B	
OMRON	NX-series Safety CPU unit	NX-SL5500	Ver. 1.3
OMRON	NX-series Communication Control unit	NX-CSG3200	Ver. 1.01
OMRON	Sysmac Studio	SYSMAC-SE2xxx	Ver.1.25.1
OMRON	Compress CIP device file	CIP_Safety_XXXXX.zip * XXXXX is a unique name for each target device to be added	
OMRON	Safety I/O block	GI-SMD1624	1.0
-	Personal computer (OS: Win 10)	-	
-	LAN cable (STP (shielded, twisted-pair) cable of Ethernet category 5 or higher)	-	

2. EtherNet/IP Safety Connection Procedure

This section describes the procedures for connecting the Omron safety I/O block and the safety controller via EtherNet/IP safety.

2.1. Safety Controller Setup

Set up the Safety Controller.

The Sysmac Studio is used for the Safety Controller setup, please install before proceeding.

2.1.1. Hardware configuration and IP address Settings

Configure the hardware of the Safety Controller and set the IP address using the hardware switches.



Precautions for Correct Use



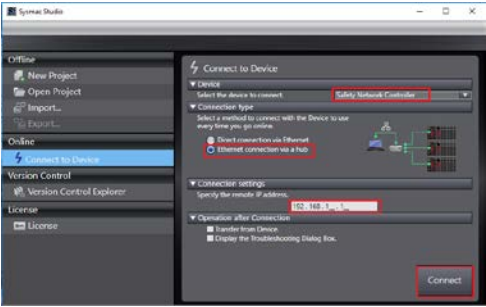
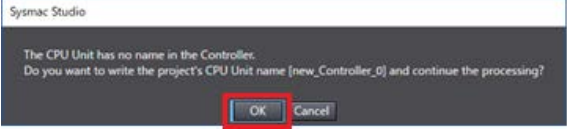
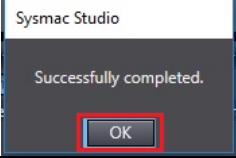
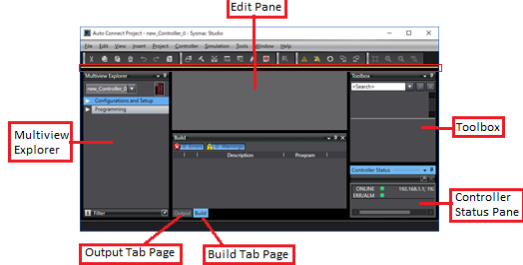
Before setting up turn the power supply is OFF.

If it is ON, the settings described in the following steps and subsequent procedures may not be applicable.

1	Make sure Safety Controller is powered OFF.	
2	Connect Safety CPU Unit to Communication Control Unit.	<p>Communication Control Unit</p> <p>Rotary switches</p> <p>PORT1</p> <p>PORT2A</p> <p>PORT2B</p> <p>Built-in EtherNet/IP ports</p> <p>Safety CPU Unit</p> <p>End Cover</p>
3	<p>Setting the IP address:</p> <p>1 is for port 1.</p> <p>2 is for port 2A and 2B.</p> <p>If the rotary switches are set to 00 then the IP address for port 1 and 2 are set using Sysmac Studio.</p> <p>If the rotary switches are between 01 to FF (001 to 255 in decimal) then:</p> <p>Port 1 default IP address = 192.168.1.xxx</p> <p>Port 2A and 2B default IP address = 192.168.250.xxx</p>	<p>Set the rotary switch for port 1 and 2 to 00</p> <p>IP ADDRESS</p> <p>1</p> <p>2</p> <p>x16</p> <p>x1</p>

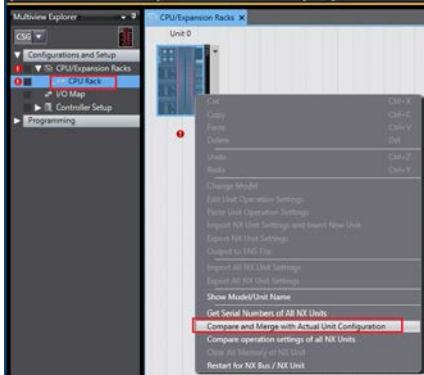
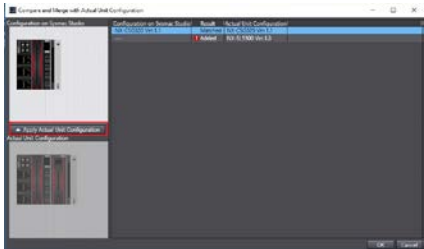
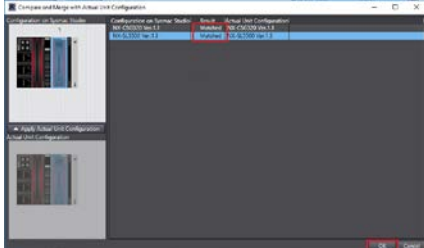
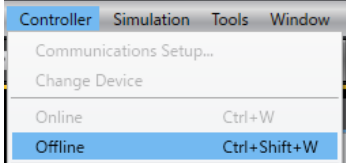
2.1.2. Starting Sysmac Studio and Going Online

Start Sysmac Studio and go online with the Safety Controller.

1	Power up the Safety Controller and the I/O block	
2	Launch Sysmac Studio	
3	From Sysmac Studio start page select Connect to Device	
4	<p>From the connect to device page:</p> <ul style="list-style-type: none"> • Select the device to connect = Safety Network Controller • Connection type = Ethernet connection via a Hub • Connection settings = 192.168.1.1 (this is the Safety network controller port 1 IP address) • Select Connect 	
5	<p>If the dialog box on the right is displayed, select OK.</p> <p>*The contents of the dialog box vary depending on the status of Controller. Check the contents and click on an appropriate button to proceed with the processing.</p>	
6	When the connection is successful select OK to finish.	
7	<p>The Auto Connect Project dialog box is displayed.</p> <p>When an online connection is established, ONLINE with a green dot is displayed in the Controller Status pane.</p>	

2.1.3. Creating a Safety Controller Unit Configuration

Create and setup a unit configuration for the Safety Controller.

<p>1</p>	<p>Hardware configuration.</p> <ul style="list-style-type: none"> From the Multiviewer Explorer select Configurations and Setup -> CPU/Expansion Racks Double click CPU Rack From the CPU/Expansion Racks tab right click on Unit 0 (NX-CSG320). Select Compare and Merge with Actual Unit Configuration. <p>This is how Sysmac Studio check to see what is mounted to the communication control unit</p>	
<p>2</p>	<p>The comparison results are displayed. Select Apply Actual Unit Configuration.</p>	
<p>3</p>	<p>Check that the configuration on Sysmac Studio and actual unit configuration match each other. Select OK to finish.</p>	
<p>4</p>	<p>Go offline with the Safety Controller. Select from the top menu Controller -> Offline</p>	

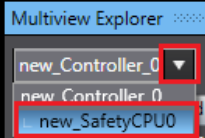
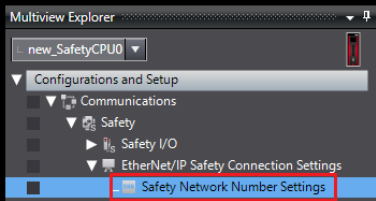
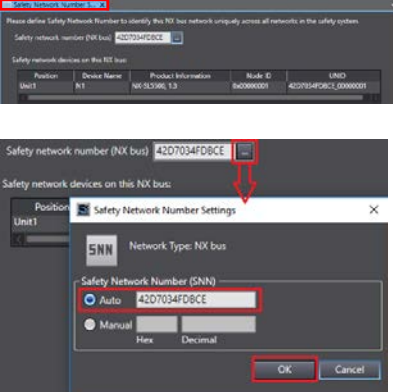
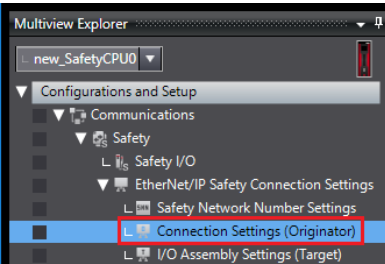
2.2. Network Setting with Sysmac Studio


Set the EtherNet/IP safety connection.

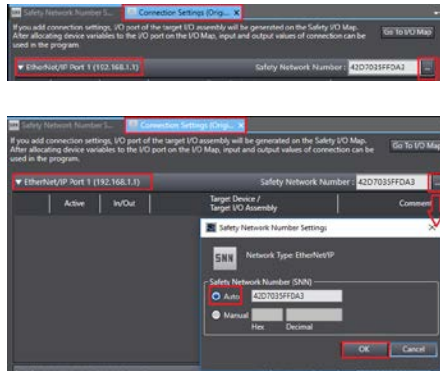
2.2.1. Setting the Connections

Set connection between the Safety Controller and the Omron Safety I/O Block.

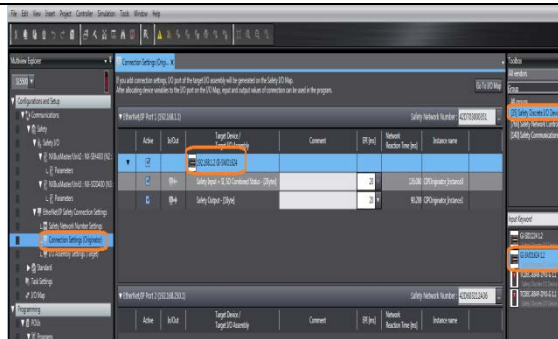
In the connection setting via the built-in EtherNet/IP port 2 of the Safety Controller, configure the I/O block to use as a target device.

1	From the Multiview Explorer select new_SafetyCPU0	
2	Select Configurations and Setup -> Communications -> Safety -> EtherNet/IP Safety Connection Settings. Double click on Safety Network Number Settings	
3	The Safety Network Number Settings tab page is displayed. Click on [edit icon] to the right of Safety Network Number (NX bus) to edit. The Safety Network Number Setting dialog box is display. The safety network number (SNN) default setting is Auto, if not, select Auto to generate the SNN for the NX bus. Select OK to finish.	
4	From the Multiviewer Explorer double click on Connection Settings (Originator).	

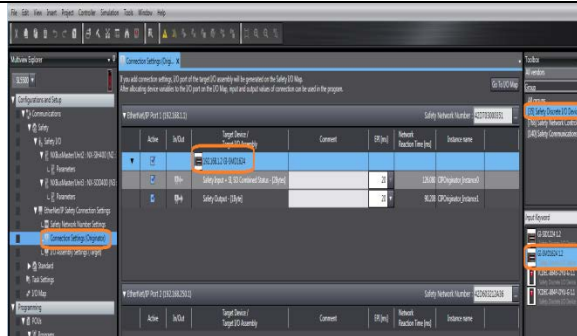
5 The Connection Settings (Originator) tab page is displayed.
 Click on  to the right of Safety Network Number for EtherNet/IP Port 1 to edit.
 The Safety Network Number Settings dialog box is display.
 The safety network number (SNN) default setting is Auto, if not, select Auto to generate the SNN for the EtherNet/IP Port 1.
 Select OK to finish.



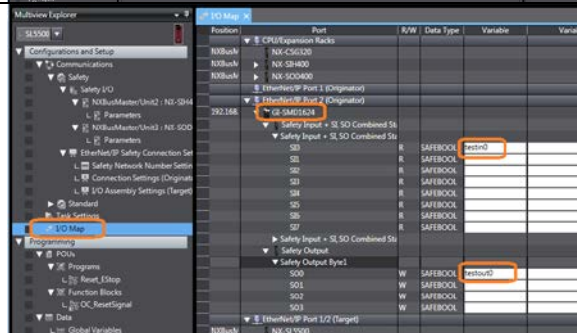
6 Select the GI module and insert under the correct Ethernet port.



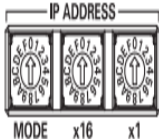
7 Select the GI module and insert under Ethernet port 1.




8 Give at least one input and output a name



9 Set the GI nodes IP address
 Note: Use clear memory function if below does not seem to work. Changing IP address is sometimes not allowed if TUNID is set. Z400 section 6-4-3
 Mode 0: 192.168.250.x x set by x16 and x1
 Mode 4: DHCP see manual Z400

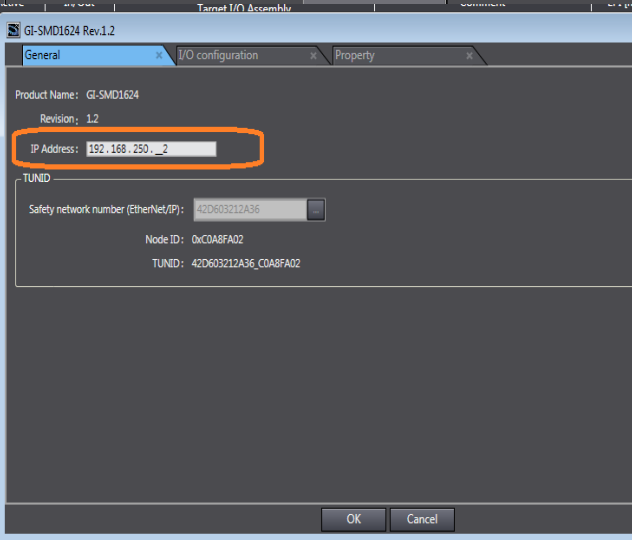
Hardware switch setting	[IP ADDRESS] switch x3 (MODE, x16, x1)
	
Factory setting	
GI-SMD1624:	192.168.250.2 [IP ADDRESS] switch = [002]
GI-SID1224:	192.168.250.3 [IP ADDRESS] switch = [003]

10 To program the GI



Active	In/Out	Target Device / Target I/O Assembly	Comment
<input checked="" type="checkbox"/>		192.168.250.2 GI-SMD1624	Right Click
<input checked="" type="checkbox"/>		Safety Input + [es]	
<input checked="" type="checkbox"/>		Safety Output	

11 Set target node IP address – to match the I/O block rotary set IP address



GI-SMD1624 Rev.1.2

Product Name: GI-SMD1624
 Revision: 1.2

IP Address: 192.168.250._2

TUNID

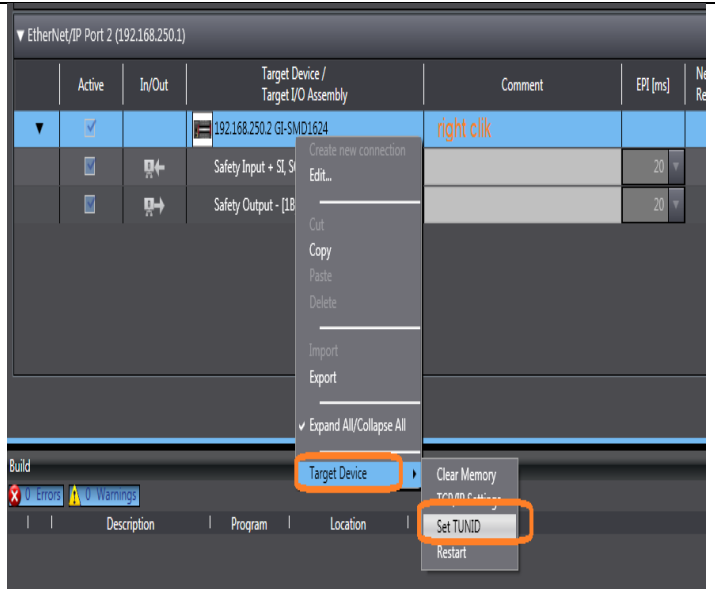
Safety network number (EtherNet/IP): 42D603212A36

Node ID: 0xC0A8FA02
 TUNID: 42D603212A36_C0A8FA02

OK Cancel

<p>12 To program each input select I/O Configuration tab -> Input.</p>	
<p>13 To program each output select I/O Configuration tab -> Output.</p>	
<p>13 Transfer program to Safety PLC (see section 2.4) Transfer setting to NX-CSG320 or NX102</p>	

14 Set GI TUNID Z400 section 6-4-2


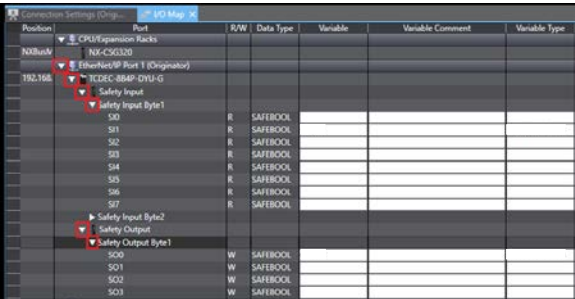
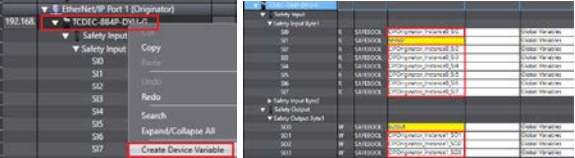


2.3. Transferring Program with Sysmac Studio

Transfer the Safety Network Controller and the Safety CPU program.

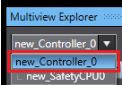
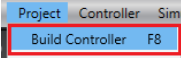

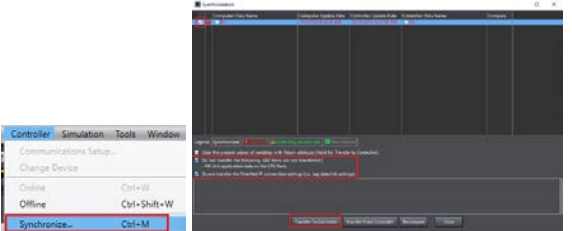
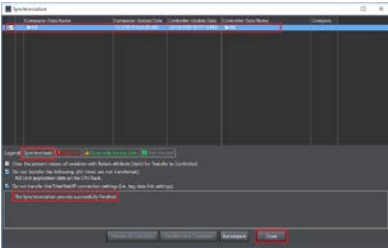
2.3.1. Setting Global Variables

Set global variables for the Safety Controller

<p>1</p>	<p>Click Go To I/O Map in the Connection Settings (Originator) Tab page.</p>	
<p>2</p>	<p>In the I/O Map click ▾ to expand. Expand EtherNet/IP Port 1 (Originator)</p>	
<p>3</p>	<p>To auto generate the variable names right click on GI-SMD1624 and select Create Device Variable.</p> <p>*the auto generate variable name is the instance name + the port description (CIPOriginator_Instance_SIO)</p>	 <p>To use user define variable names just enter the variable name in the Variable column. (Example: sensor and output are user define variable names)</p>

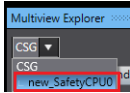


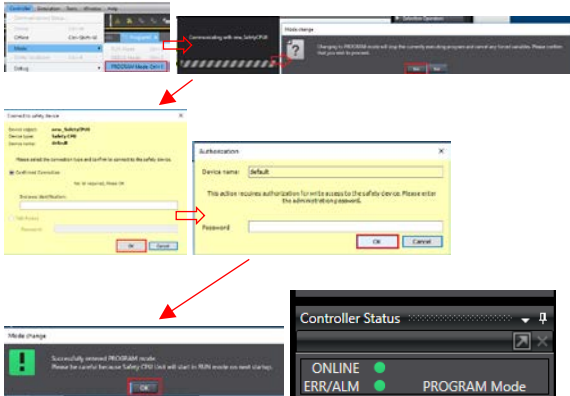
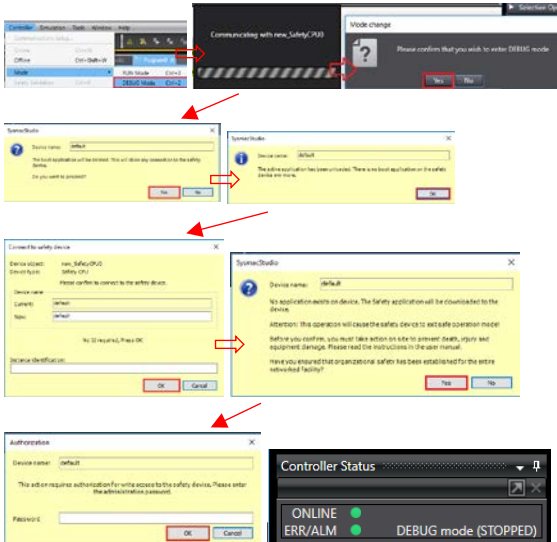
2.3.2. Transferring the Safety Application Data

Transfer the safety application data to the Safety Network Controller (NX-CSGxxx)

1	From the Multiview Explorer, select new_Controller_0	
2	From Project -> Build Controller to check for errors and compile the project	
3	From Controller -> Online to go online to the safety network controller	
4	From Controller -> Synchronize. The Synchronization Dialog Box is displayed. Check that the data to transfer (select NX). Select Transfer To Controller to download the application.	
5	During synchronization confirmation and warning dialog boxes will be displayed. Read and choose the option accordingly. Check the message "The Synchronization process successfully finished." which indicate the synchronization is completed. Select Close.	

2.3.3. Transferring the Safety Program

Transfer the safety program to the safety CPU unit.

<p>1</p>	<p>From the Multiview Explorer, select new_SafetyCPU0.</p>	
<p>2</p>	<p>In the Offline mode create the safety program. Select from the top menu Project -> Build Controller to check for errors and compile the project.</p>	
<p>3</p>	<p>Select from the top menu Controller -> Online to go online to the safety network controller. The Monitoring warning dialog box is displayed. Select OK.</p>	
<p>4</p>	<p>Select from the top menu Controller -> Mode -> PROGRAM Mode. The Mode change dialog box is displayed. Select Yes. Various dialog boxes will be displayed. Read and choose the option accordingly. Check the message in Controller Status pane to show PROGRAM Mode.</p>	
<p>5</p>	<p>Select from the top menu Controller -> Mode -> DEBUG Mode to begin downloading the safety program. The Mode change dialog box is displayed. Select Yes. Various dialog boxes will be displayed. Read and choose the option accordingly. Check the message in Controller Status pane to show DEBUG mode (STOPPED).</p>	

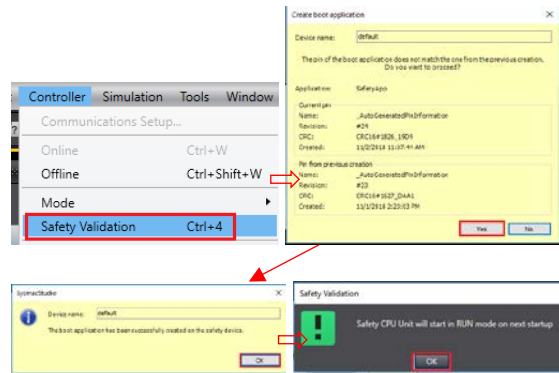
6

Select from the top menu Controller -> Mode -> Safety Validation to validate the safety program.

The Create boot application dialog box is displayed. Select Yes.

The information dialog box is displayed. Select OK.

The Safety Validation dialog box is displayed. Select OK.

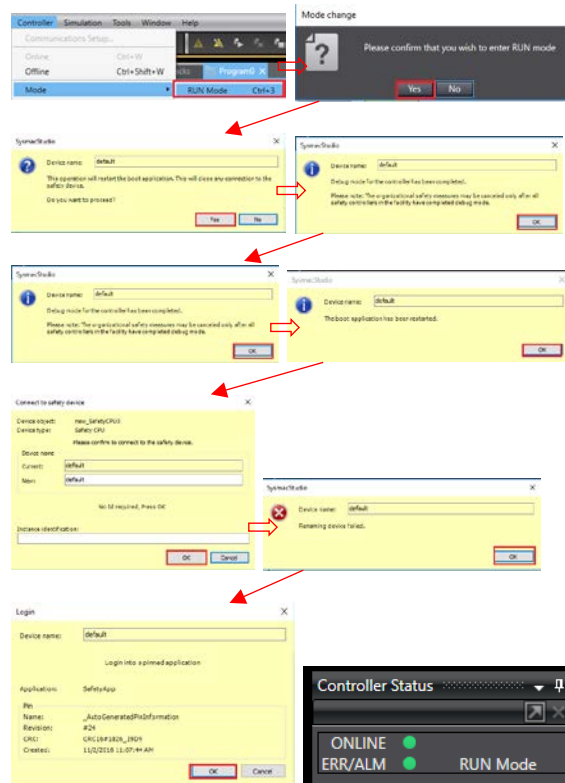


7

Select from the top menu Controller -> Mode -> RUN Mode.

The Mode change dialog box is displayed. Select Yes.

Various dialog boxes will be displayed. Read and choose the option accordingly. Check the message in Controller Status pane to show RUN Mode.



3. Acknowledgement

- EtherNet/IP is a trademark of ODVA, INC.