

Machine Automation Controller NJ/NX-series

EtherNet/IP™ Connection Guide

Balluff GmbH

Network Module
(BNI EIP-50[]-105-Z015)

Network
Connection
Guide

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1. Related Manuals

To ensure system safety, make sure to always read and follow the information provided in all Safety Precautions and Precautions for Safe Use in the manuals for each device which is used in the system.

The table below lists the manuals provided by Balluff GmbH (hereinafter referred to as "Balluff") and OMRON Corporation (hereinafter referred to as "OMRON"), which pertain to this guide.

Manufacturer	Cat. No.	Model	Manual name
OMRON	W500	NJ501-□5□□ NJ501-□4□□ NJ501-□3□□ NJ301-12□□ NJ301-11□□ NJ101-10□□ NJ101-90□□	NJ-series CPU Unit Hardware User's Manual
OMRON	W535	NX701-17□□ NX701-16□□	NX-series CPU Unit Hardware User's Manual
OMRON	W578	NX1P2-11□□□□ NX1P2-10□□□□ NX1P2-90□□□□	NX-series NX1P2 CPU Unit Hardware User's Manual
OMRON	W501	NX701-17□□ NX701-16□□ NX1P2-11□□□□ NX1P2-10□□□□	NJ/NX-series CPU Unit Software User's Manual
OMRON	W506	NX1P2-90□□□□ NJ501-□5□□ NJ501-□4□□ NJ501-□3□□ NJ301-12□□ NJ301-11□□ NJ101-10□□ NJ101-90□□	NJ/NX-series CPU Unit Built-in EtherNet/IP™ Port User's Manual
OMRON	W504	SYSMAC-SE2□□□	Sysmac Studio Version 1 Operation Manual
OMRON	0969584-7	W4S1-05□ W4S1-03B	Switching Hub W4S1-series Users Manual
OMRON	9540393-4	E2E(Q)-□-IL□	PROXIMITY SENSOR INSTRUCTION SHEET
OMRON	9540292-0	E2E(Q)-□-IL□	PROXIMITY SENSOR INDEX LIST

Manufacturer	Cat. No.	Model	Manual name
Balluff	933690-726	BNI EIP-50[]-105-Z015	BNI EIP-502-105-Z015 BNI EIP-508-105-Z015 EtherNet/IP™ IP67 Modules User's Guide
Balluff	893539	BNI EIP-50[]-105-Z015	BNI EIP-508-105-Z015 IP67 Modules 8IO-Link/In-/Outputs, 8 In-/Outputs User's Guide

2. Terms and Definitions



The terms and definitions used in this guide are given below.

Term	Explanation and Definition
node	A node refers to a relay point, a junction point or an end point on an EtherNet/IP network made up of devices having an EtherNet/IP port. A device with one EtherNet/IP port is recognized as one node and two EtherNet/IP ports as two nodes on an EtherNet/IP network.
tag	A tag is a unit that is used to exchange data with tag data links. Data is exchanged between the local network variables and remote network variables specified in the tags or between specified I/O memory areas.
tag set	When a connection is established, from 1 to 8 tags (including Controller status) is configured as a tag set. Each tag set represents the data that is linked for a tag data link connection. Tag data links are therefore created through a connection between one tag set and another tag set. A tag set name must be set for each tag set.
tag data links	The standard EtherNet/IP implicit communications are called tag data links. Tag data links enable cyclic tag data exchanges on an EtherNet/IP network between Controllers or between Controllers and other devices.
connection	A connection is used to exchange data as a unit within which data concurrency is maintained.
connection type	There are two kinds of connection types for tag data links. One is a multi-cast connection, and the other is a unicast (point-to-point) connection. The multi-cast connection sends an output tag set in one packet to more than one node. The unicast connection separately sends one output tag set to each node. Therefore, the multi-cast connection can reduce the communications load if one output tag set is sent to more than one node.
originator and target	To perform tag data links, it is necessary to open connections between nodes that perform tag data links. The node that requests the connection is called the originator, and the node that receives the request is called the target.
tag data link parameters	The information that is set to perform tag data links, including tags, tag sets and connections, is called tag data link parameters.
EDS file	A file that describes information unique to a device such as the number of I/O points for an EtherNet/IP device. The connections that define the tag data links can be set by installing this file in Network Configurator.

3. Precautions

- (1) Understand the specifications of devices which are used in the system. Allow some margin for ratings and performance. Provide safety measures, such as installing a safety circuit, in order to ensure safety and minimize the risk of abnormal occurrence.
- (2) To ensure system safety, make sure to always read and follow the information provided in all Safety Precautions and Precautions for Safe Use in the manuals for each device which is used in the system.
- (3) The user is encouraged to confirm the standards and regulations that the system must conform to.
- (4) It is prohibited to copy, to reproduce, and to distribute a part or the whole of this guide without the permission of OMRON Corporation.
- (5) The information contained in this guide is current as of February 2018. It is subject to change for improvement without notice.

The following notations are used in this guide.

 WARNING	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
 Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.



Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.



Additional Information

Additional information to read as required.

This information is provided to increase understanding or make operation easier.

Symbol



The filled circle symbol indicates operations that you must do.
The specific operation is shown in the circle and explained in the text.
This example shows a general precaution for something that you must do.

4. Overview

This guide describes procedures for connecting a Balluff Network Module (BNI EIP-50[]-105-Z015) (hereinafter referred to as the "Network Module") to an OMRON NJ/NX-series Machine Automation Controller (hereinafter referred to as the "Controller") via EtherNet/IP and for checking their communication status.

Refer to *Section 6. EtherNet/IP Settings* and *Section 7. EtherNet/IP Connection Procedure* to understand setting methods and key points to operate EtherNet/IP tag data links.

The OMRON E2E-series IO-Link Proximity Sensor (hereinafter referred to as the "Proximity Sensor") is used in this guide in order to check data that is sent and received between the Controller and the Network Module.

5. Applicable Devices and Device Configuration

5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	NJ/NX-series CPU Unit	NX701-17□□
		NX701-16□□
		NX1P2-11□□□□
		NX1P2-10□□□□
		NX1P2-90□□□□
		NJ501-□5□□
		NJ501-□4□□
		NJ501-□3□□
		NJ301-12□□
		NJ301-11□□
		NJ101-10□□
		NJ101-90□□
Balluff	Network Module	BNI EIP-502-105-Z015
		BNI EIP-508-105-Z015



Precautions for Correct Use

In this guide, the devices with models and versions listed in 5.2. *Device Configuration* are used as examples of applicable devices to describe the procedures for connecting the devices and checking their connection.

You cannot use devices with versions lower than the versions listed in 5.2.

To use the above devices with models not listed in 5.2. or versions higher than those listed in 5.2., check the differences in the specifications by referring to the manuals before operating the devices.



Additional Information

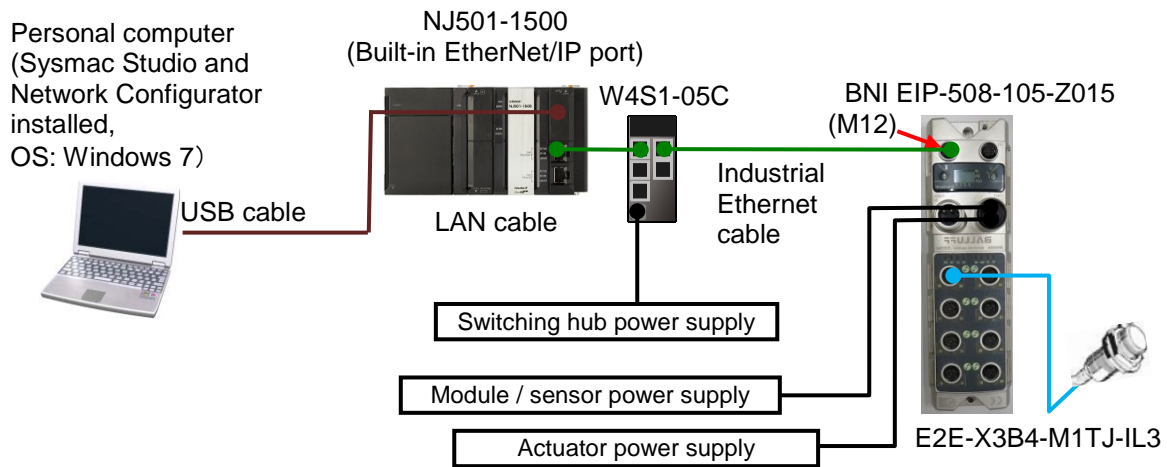
This guide describes the procedures for establishing the network connection.

It does not provide information on operation, installation, wiring method, device functionality, or device operation, which is not related to the connection procedures.

Refer to the manuals or contact the device manufacturer.

5.2. Device Configuration

The hardware components to reproduce the connection procedures in this guide are as follows:



Manufacturer	Name	Model	Version
OMRON	NJ-series CPU Unit (Built-in EtherNet/IP port)	NJ501-1500	Ver.1.14
OMRON	Power Supply Unit	NJ-PA3001	
OMRON	Switching hub	W4S1-05C	Ver.1.0
-	Switching hub power supply (24 VDC)	-	
OMRON	Sysmac Studio	SYSMAC-SE2	Ver.1.18
OMRON	Network Configurator	(Included in Sysmac Studio)	Ver.3.61
OMRON	IO-Link Proximity Sensor	E2E-X3B4-M1TJ-IL3	Ver.1.00
-	Personal computer (OS: Windows 7)	-	
-	USB cable (USB 2.0 type B connector)	-	
-	LAN cable (STP (shielded, twisted-pair) cable of Ethernet category 5 or higher)	-	
Balluff	Industrial Ethernet cable (M12 straight male to RJ45, double-ended)	BCC M414-E894-8G-672-ES64N9-006	
Balluff	Network Module	BNI EIP-508-105-Z015	H6_S4.2
Balluff	EDS file	BNI EIP-508-105-Z015.eds	1.1(Major Revision: 4)
Balluff	Icon file	BNI EIP-508-105-Z015.ico	
-	Module / sensor power supply (24 VDC)	-	
-	Actuator power supply (24 VDC)	-	



Precautions for Correct Use

Prepare the EDS file listed above.

To obtain the EDS file, contact Balluff GmbH.



Precautions for Correct Use

Note that the EDS file specified in this *Clause 5.2.* is not compatible with versions of the Network Module earlier than "H5_S[].[]". You need the EDS file with a different version that is compatible with earlier versions of the Network Module.



Precautions for Correct Use

When there is an icon file specific to the device, the icon file and the EDS file must be stored in the same folder.



Precautions for Correct Use

Update Sysmac Studio and Network Configurator to the versions specified in this *Clause 5.2.* or to higher versions. If you use a version higher than the one specified, the procedures and related screenshots described in *Section 7.* and the subsequent sections may not be applicable. In that case, use the equivalent procedures described in this guide by referring to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) and *Network Configurator Online Help*.



Additional Information

For specifications of the switching hub power supply, refer to the *Switching Hub W4S1-series Users Manual* (Cat. No. 0969584-7).



Additional Information

For specifications of the Module / sensor and Actuator power supplies, refer to the *BNI EIP-508-105-Z015 IP67 Modules 8 IO-Link/In-/Outputs, 8 In-/Outputs User's Guide* (893539).



Additional Information

The system configuration in this guide uses USB for the connection between the personal computer and the Controller. For information on how to install the USB driver, refer to *A-1 Driver Installation for Direct USB Cable Connection* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

For NX1P2 Controllers, there is no need to install the USB driver because they do not have a USB port.



Additional Information

The NX1P2 Controller, if used, should be connected to your personal computer with an Ethernet cable. For information on how to connect the cable, refer to *6-2 Going Online with a Controller* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

6. EtherNet/IP Settings

This section describes the parameters, global variables and tag sets that are all defined in this guide.

Hereinafter, the Network Module is referred to as the "Destination Device" in some descriptions.

6.1. Parameters

The parameters set in this guide are shown below.

6.1.1. EtherNet/IP Communications Settings

The parameters required to connect the Controller and the Network Module via EtherNet/IP are shown below.

Item	Controller (Node 1)	Network Module (Node 2)
IP address	192.168.250.1	192.168.250.2
Subnet mask	255.255.255.0	255.255.255.0

6.1.2. Destination Device Settings

The parameter of the Network Module is shown below.

Item	Set value	Remarks
0015 Port function	1	Port 0: IO-Link mode Ports 1-7: Standard I/O mode

The following figure shows the data configuration of 0015 Port function and the relationship between each port and set value of 0015 Port function. The IO-Link mode is set when the set value for port is 01, whereas the standard I/O mode is set when the set value for port is 00. With Network Configurator, the set value of 0015 Port function is "1" in decimal that represents a binary value of "00 00 00 00 00 00 00 01".

0015 Port function																
Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Set value	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	└──┬──┘		└──┬──┘		└──┬──┘		└──┬──┘		└──┬──┘		└──┬──┘		└──┬──┘		└──┬──┘	
	Port 7		Port 6		Port 5		Port 4		Port 3		Port 2		Port 1		Port 0	
	set value		set value		set value		set value		set value		set value		set value		set value	

For example, if setting Ports 0-2 to IO-Link mode and Ports 3-7 to standard I/O mode, the set value of 0015 Port function will be "21" in decimal that represents a binary value of "00 00 00 00 00 01 01 01".

6.2. Global Variables

The Controller treats the data in tag data links as global variables.

The following tables show the global variables and their related settings.

■Output area (Controller to Network Module)

Name	Data type	Network publish	Data size (byte)
EIP002_Standard_IO_ports_OUT	BYTE[6]	Output	6
EIP002_IOLink_port0_1_OUT	BYTE[64]	Output	64
EIP002_IOLink_port2_3_OUT	BYTE[64]	Output	64
EIP002_IOLink_port4_5_OUT	BYTE[64]	Output	64
EIP002_IOLink_port6_7_OUT	BYTE[64]	Output	64

*Relationship between the global variables and the Network Module data

Global variable	Network Module								
	Data allocation	Bit							
		7	6	5	4	3	2	1	0
EIP002_Standard_IO_ports_OUT[0]	Standard I/O ports	O32	O34	O22	O24	O12	O14	O02	O04
EIP002_Standard_IO_ports_OUT[1]		O72	O74	O62	O64	O52	O54	O42	O44
EIP002_Standard_IO_ports_OUT[2]		R32	R34	R22	R24	R12	R14	R02	R04
EIP002_Standard_IO_ports_OUT[3]		R72	R74	R62	R64	R52	R54	R42	R44
EIP002_Standard_IO_ports_OUT[4]		0	0	0	0	0	0	0	0
EIP002_Standard_IO_ports_OUT[5]		0	0	0	0	0	DL	GO	RO
EIP002_IOLink_port0_1_OUT[0] to [31]	IO-Link port 0	IO-Link port 0 output process data							
EIP002_IOLink_port0_1_OUT[32] to [63]	IO-Link port 1	IO-Link port 1 output process data							
EIP002_IOLink_port2_3_OUT[0] to [31]	IO-Link port 2	IO-Link port 2 output process data							
EIP002_IOLink_port2_3_OUT[32] to [63]	IO-Link port 3	IO-Link port 3 output process data							
EIP002_IOLink_port4_5_OUT[0] to [31]	IO-Link port 4	IO-Link port 4 output process data							
EIP002_IOLink_port4_5_OUT[32] to [63]	IO-Link port 5	IO-Link port 5 output process data							
EIP002_IOLink_port6_7_OUT[0] to [31]	IO-Link port 6	IO-Link port 6 output process data							
EIP002_IOLink_port6_7_OUT[32] to [63]	IO-Link port 7	IO-Link port 7 output process data							

■ Input area (Network Module to Controller)

Name	Data type	Network publish	Data size (byte)
EIP002_Standard_IO_ports_IN	BYTE[8]	Input	8
EIP002_IOLink_port0_1_IN	BYTE[96]	Input	96
EIP002_IOLink_port2_3_IN	BYTE[96]	Input	96
EIP002_IOLink_port4_5_IN	BYTE[96]	Input	96
EIP002_IOLink_port6_7_IN	BYTE[96]	Input	96

*Relationship between the global variables and the Network Module data

Global variable	Network Module								
	Data allocation	Bit							
		7	6	5	4	3	2	1	0
EIP002_Standard_IO_ports_IN[0]	Standard I/O ports	I32	I34	I22	I24	I12	I14	I02	I04
EIP002_Standard_IO_ports_IN[1]		I72	I74	I62	I64	I52	I54	I42	I44
EIP002_Standard_IO_ports_IN[2]		S3		S2		S1		S0	
EIP002_Standard_IO_ports_IN[3]		S7		S6		S5		S4	
EIP002_Standard_IO_ports_IN[4]		O32	O34	O22	O24	O12	O14	O02	O04
EIP002_Standard_IO_ports_IN[5]		O72	O74	O62	O64	O52	O54	O42	O44
EIP002_Standard_IO_ports_IN[6]		0	0	0	0	0	NA	PS	PA
EIP002_Standard_IO_ports_IN[7]		0	0	0	0	0	0	0	0
EIP002_IOLink_port0_1_IN[0]	IO-Link port 0	IO-Link port 0 input process data Stores the process data "Byte0 (PD0)" of the Proximity Sensor.							
EIP002_IOLink_port0_1_IN[1]		IO-Link port 0 input process data Stores the process data "Byte1 (PD1)" of the Proximity Sensor.							
EIP002_IOLink_port0_1_IN[2] to [31]		IO-Link port 0 input data							
EIP002_IOLink_port0_1_IN[32]		0	0	0	0	0	0	DC	IOL
EIP002_IOLink_port0_1_IN[33]		SC	0	0	0	0	PDI	DF	VF
EIP002_IOLink_port0_1_IN[34] to [35]		Vendor ID							
EIP002_IOLink_port0_1_IN[36] to [38]		Device ID							
EIP002_IOLink_port0_1_IN[39] to [41]		Event 1							
EIP002_IOLink_port0_1_IN[42] to [44]		Event 2							
EIP002_IOLink_port0_1_IN[45] to [47]		Event 3							
EIP002_IOLink_port0_1_IN[48] to [79]		IO-Link port 1 input data							
EIP002_IOLink_port0_1_IN[80]		0	0	0	0	0	0	DC	IOL
EIP002_IOLink_port0_1_IN[81]		SC	0	0	0	0	PDI	DF	VF
EIP002_IOLink_port0_1_IN[82] to [83]		Vendor ID							
EIP002_IOLink_port0_1_IN[84] to [86]		Device ID							
EIP002_IOLink_port0_1_IN[87] to [89]		Event 1							
EIP002_IOLink_port0_1_IN[90] to [92]		Event 2							
EIP002_IOLink_port0_1_IN[93] to [95]		Event 3							

Global variable	Network Module								
	Data allocation	Bit							
		7	6	5	4	3	2	1	0
EIP002_IOLink_port2_3_IN[0] to [47]	IO-Link port 2	Same as for the data allocation "IO-Link port 0"							
EIP002_IOLink_port2_3_IN[48] to [95]	IO-Link port 3	Same as for the data allocation "IO-Link port 1"							
EIP002_IOLink_port4_5_IN[0] to [47]	IO-Link port 4	Same as for the data allocation "IO-Link port 0"							
EIP002_IOLink_port4_5_IN[48] to [95]	IO-Link port 5	Same as for the data allocation "IO-Link port 1"							
EIP002_IOLink_port6_7_IN[0] to [47]	IO-Link port 6	Same as for the data allocation "IO-Link port 0"							
EIP002_IOLink_port6_7_IN[48] to [95]	IO-Link port 7	Same as for the data allocation "IO-Link port 1"							

■Process Data of Proximity Sensor

(Data to be stored in the global variable *EIP002_IOLink_port0_1_IN[0]* listed in the table for the input area)

Byte0 (PD0)	割り当て Assignment	詳細 Details
	モニタ出力 Monitor Output	センシングの検出量を8bit (0-255) で出力する 詳細は6項を参照。 The sensing data are output as eight bits(0-255). For details, refer to Section 6

(Data to be stored in the global variable *EIP002_IOLink_port0_1_IN[1]* listed in the table for the input area)

Byte1 (PD1)	割り当て Assignment	詳細 Details
	制御出力 Control Output	0: OFF 1: ON
	— Reserved	0
	— Reserved	0
	— Reserved	0
	不安定検出アラーム Instability Detection Alarm	0: 安定状態 Stable 1: 不安定状態 Unstable
	過接近検出アラーム Target too Close Alarm	0: 安定状態 Not close 1: 過接近状態 Too close
	— Reserved	0
	異常 Error	検出コイル断線等センサ内部に異常が発生しており、 交換が必要な場合の診断出力 This is the diagnostic output issued when an error such as disconnection of the detection coil has occurred inside the sensor and the sensor must be replaced. 0:正常 Normal (OFF) 1: 異常 Error (ON)

**Additional Information**

For details on setting the data in tag data links for the Network Module, refer to 5. *Integration* and 6. *Process Data* of the *BNI EIP-508-105-Z015 IP67 Modules 8 IO-Link/In-/Outputs, 8 In-/Outputs User's Guide* (893539).

**Additional Information**

With Sysmac Studio, two methods can be used to specify an array for a data type. After specifying, (1) is converted to (2), and the data type is always displayed as (2).

(1) BOOL[16] / (2) ARRAY[0..15] OF BOOL

In this guide, the data type is simplified by displaying BOOL[16].

(The example above means a BOOL data type with sixteen array elements.)

6.3. Tag Sets

The tag sets to perform tag data links are shown below.

The data in the tag sets are assigned in ascending order of the following OUT No. and IN No.

■ Output area (Controller to Network Module)

Tag set name (Originator variable)		Data size (byte)
EIP002_OUT		262
OUT No.	Tag name (Global variable)	Data size (byte)
1	EIP002_Standard_IO_ports_OUT	6
2	EIP002_IOLink_port0_1_OUT	64
3	EIP002_IOLink_port2_3_OUT	64
4	EIP002_IOLink_port4_5_OUT	64
5	EIP002_IOLink_port6_7_OUT	64

■ Input area (Network Module to Controller)

Tag set name (Originator variable)		Data size (byte)
EIP002_IN		392
IN No.	Tag name (Global variable)	Data size (byte)
1	EIP002_Standard_IO_ports_IN	8
2	EIP002_IOLink_port0_1_IN	96
3	EIP002_IOLink_port2_3_IN	96
4	EIP002_IOLink_port4_5_IN	96
5	EIP002_IOLink_port6_7_IN	96

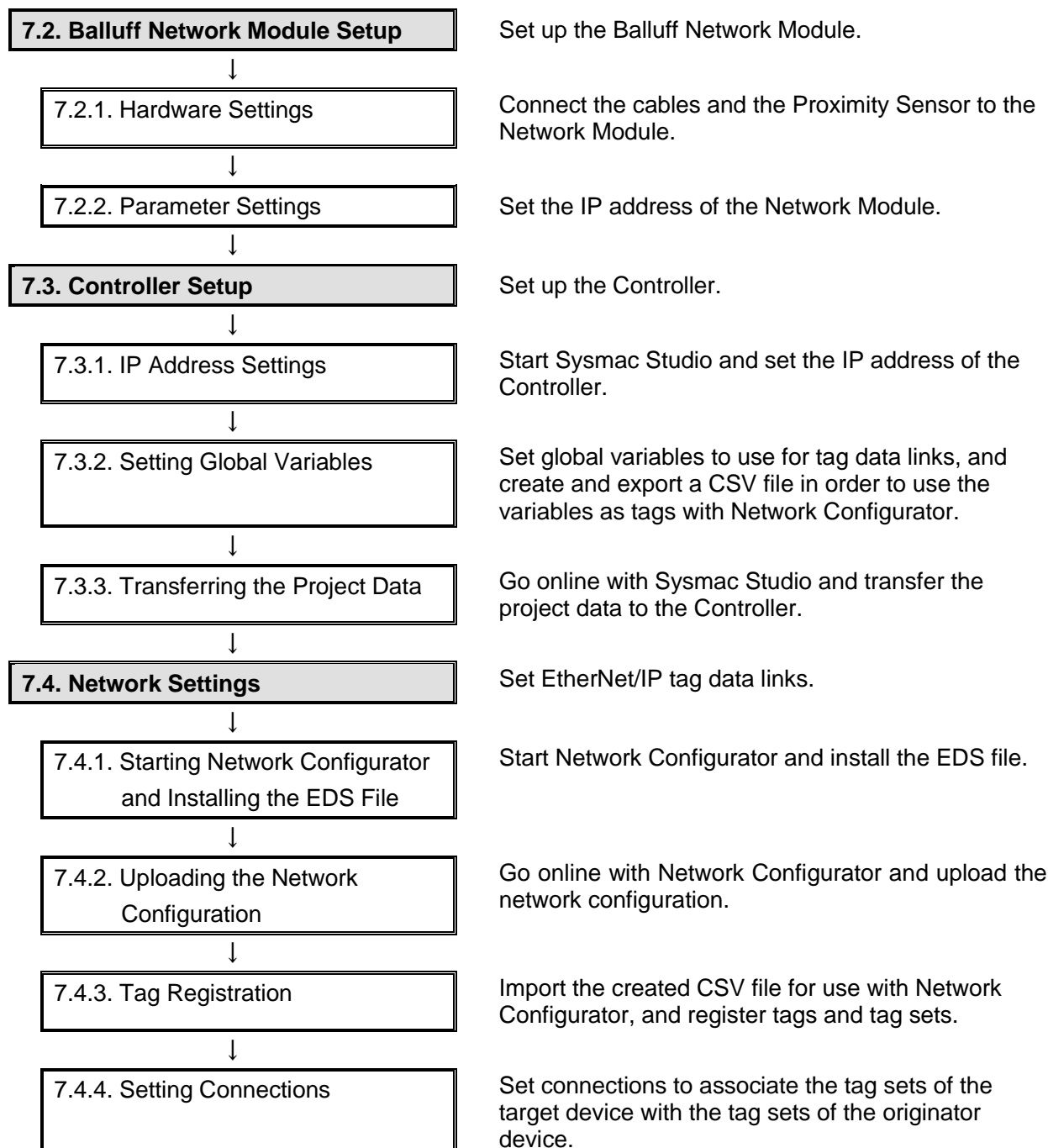
7. EtherNet/IP Connection Procedure

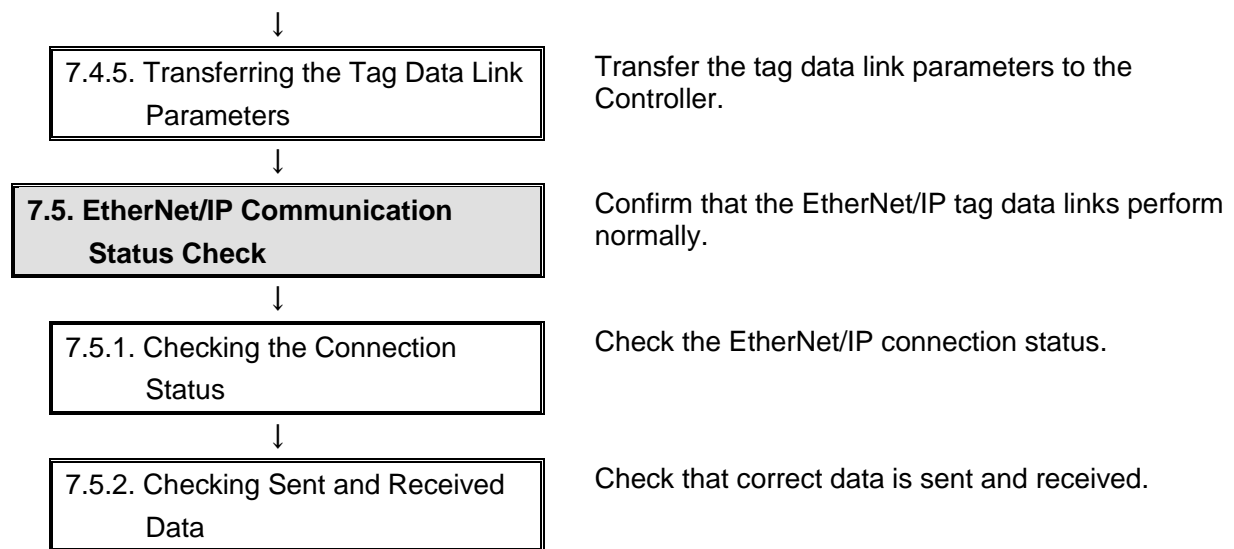
This section describes the procedures for connecting the Network Module and the Controller via EtherNet/IP. The explanation of the procedure for setting up the Controller given in this guide is based on the factory default settings.

For the initialization, refer to *Section 8. Initialization Method*.

7.1. Work Flow

Take the following steps to connect the Network Module and the Controller via EtherNet/IP and to perform tag data links.





7.2. Balluff Network Module Setup

Set up the Balluff Network Module.

7.2.1. Hardware Settings

Connect the cables and the Proximity Sensor to the Network Module.



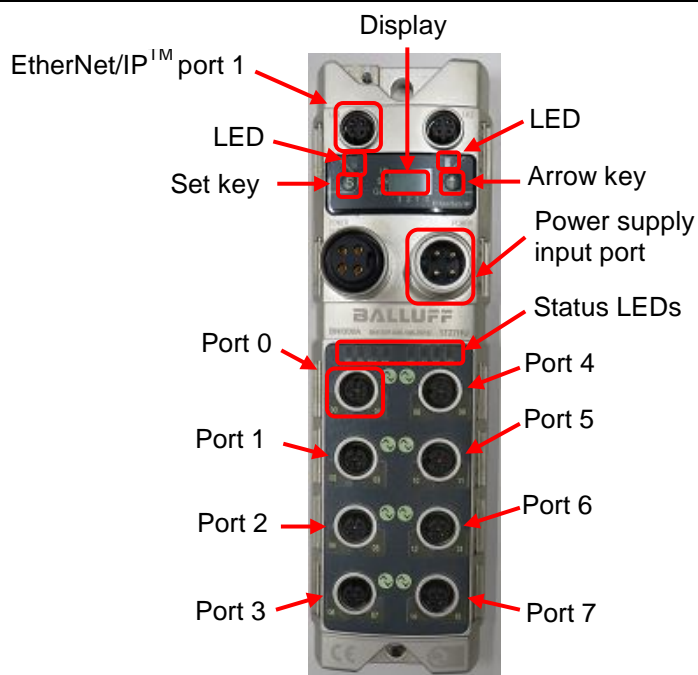
Precautions for Correct Use

Make sure that the power supplies are OFF when you set up.

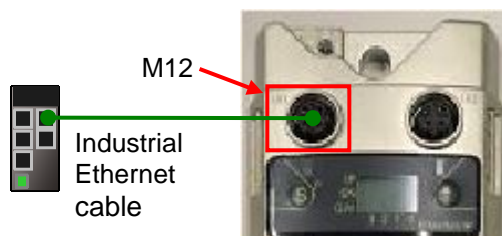
If any of them are ON, the settings described in the following steps and subsequent procedures may not be applicable.

- 1 Make sure that Module / sensor, Actuator and Switching hub power supplies are all OFF.

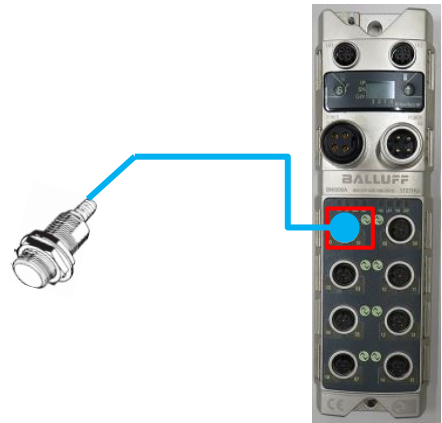
- 2 Check the positions of the ports, keys and LED on Network Module by referring to the figure on the right.



- 3 Connect Switching hub and EtherNet/IP™ port 1 on Network Module with an Industrial Ethernet cable.



- 4 Connect Proximity Sensor to Port 0 on Network Module.



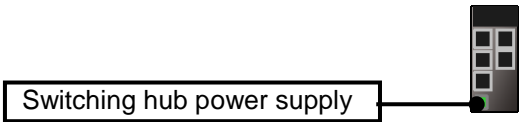
- 5 Connect Module / sensor power supply and Actuator power supply to Power supply input port on Network Module.

*For connecting the power supplies to Network Module, refer to 3.3. *Electrical connection of the BNI EIP-508-105-Z015 IP67 Modules 8 IO-Link/In-/Outputs, 8 In-/Outputs User's Guide* (893539).





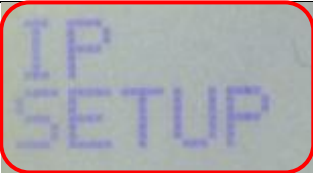

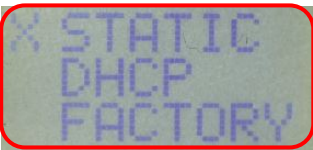

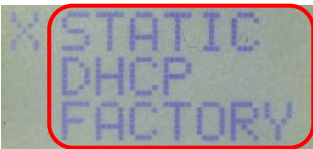
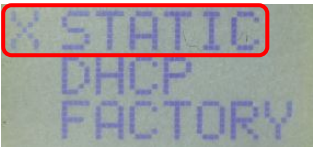


Power supply input port pin assignment		
Pin	Function	Description
1	+24V	Actuator power supply
2	+24V	Module / sensor power supply
3	0V	GND module / sensor power supply
4	0V	GND actuator power supply

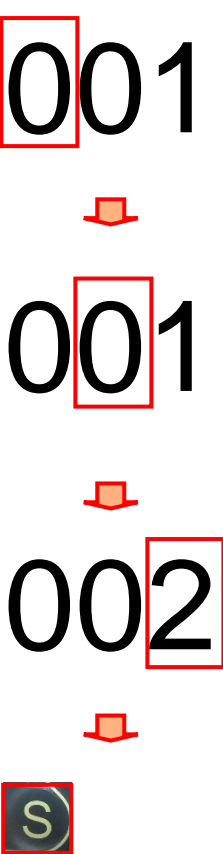



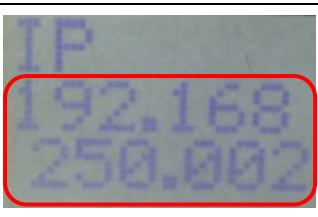

- 6 Connect Switching hub power supply to Switching hub.



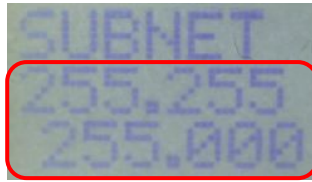
7.2.2. Parameter Settings

Set the IP address of the Network Module.

1	Turn ON Module / sensor and Actuator power supplies.	
2	The display on Network Module shows the 4th octet of the Network Module IP address.	
	Briefly press the Set key twice.	
3	Check that the IP SETUP Menu is displayed as shown on the right.	
	Briefly press the Arrow key.	
4	Check that menu items of the IP SETUP Menu are displayed as shown on the right.	
	Press and hold the Set key (at least 3 seconds).	
5	The display of the menu items starts flashing. *The display flashes in editing mode, allowing you to select the menu items from the IP SETUP Menu.	 点滅
6	Select STATIC by briefly pressing the Arrow key.	
	Briefly press the Set key.	
7	The display shows the 4th octet of the Network Module IP address.	

8	<p>Set the 1st digit of the 4th octet to 0 by briefly pressing the Arrow key.</p> <p>Briefly pressing the Set key saves the entered value of the 1st digit.</p> <p>Set the 2nd digit of the 4th octet to 0 by briefly pressing the Arrow key.</p> <p>Briefly pressing the Set key saves the entered value of the 2nd digit.</p> <p>Set the last digit of the 4th octet to 2 by briefly pressing the Arrow key.</p> <p>Briefly pressing the Set key saves the entered value of the last digit.</p> <p>*The 4th octet of the IP address is set to 002.</p>	
9	In the same way as step 8, set the 3rd octet of the IP address to 250.	
10	In the same way as step 8, set the 2nd octet of the IP address to 168.	
11	In the same way as step 8, set the 1st octet of the IP address to 192.	
12	<p>The IP address of Network Module is displayed.</p> <p>Check that 192.168.250.2 is set as shown on the right.</p>	
13	Briefly press the Arrow key.	

- 14 The subnet mask of Network Module is displayed.
Check that the address is set to 255.255.255.0 as shown on the right.



*If not, press and hold the **Set** key (at least 3 seconds) to call up the editing mode, and then set the address to 255.255.255.0 in the same way as steps 8 to 12.

- 15 Turn OFF Module / sensor and Actuator power supplies, then turn them back ON.

*The changed parameter will be reflected by power cycling.

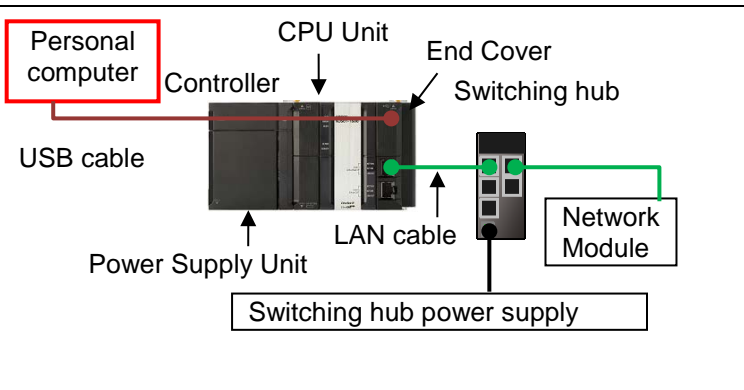
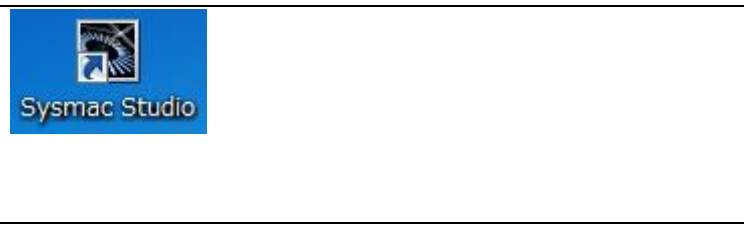

7.3. Controller Setup

Set up the Controller.

7.3.1. IP Address Settings

Start Sysmac Studio and set the IP address of the Controller.

Install Sysmac Studio and the USB driver on your personal computer beforehand.

<p>1 Connect a LAN cable to the built-in EtherNet/IP port (PORT1) on Controller, and connect a USB cable to the peripheral (USB) port. As shown in 5.2. <i>Device Configuration</i>, connect Personal computer and Switching hub to Controller.</p>	 <p>Diagram illustrating the connection setup for the Controller. The components shown are: Personal computer, CPU Unit, Controller, End Cover, Switching hub, USB cable, Power Supply Unit, LAN cable, Network Module, and Switching hub power supply. The connections are: Personal computer to Controller (USB cable), Controller to Switching hub (LAN cable), Switching hub to Network Module (LAN cable), Network Module to Switching hub power supply (LAN cable), and Switching hub power supply to Switching hub (power supply).</p>
<p>2 Start Sysmac Studio.</p> <p>*If the User Account Control Dialog Box is displayed at start, make a selection to start Sysmac Studio.</p>	 <p>Sysmac Studio</p>
<p>3 Sysmac Studio starts. Click New Project.</p>	 <p>Screenshot of the Sysmac Studio interface. The 'New Project' option is highlighted in the 'Offline' menu. The main window displays the Sysmac Studio logo and the text 'Automation Software Version 1.18' and 'OMRON'.</p>

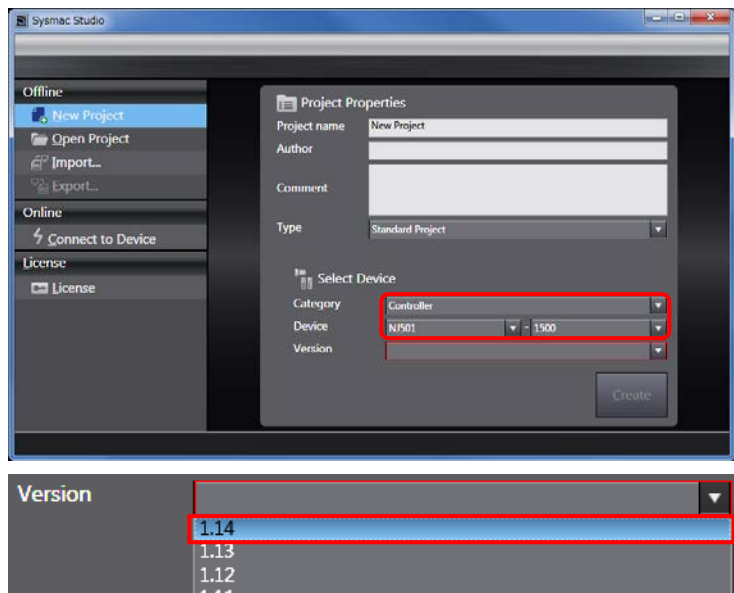
4 The Project Properties Dialog Box is displayed.

*In this guide, "New Project" is used as the project name.

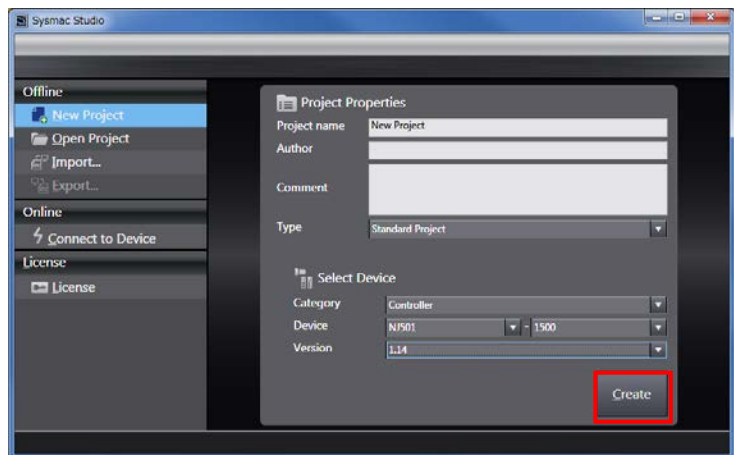
Check that the device used is shown in the *Category* and *Device* Fields of Select Device.

Select an applicable version from the pull-down list of Version.

*Although 1.14 is selected as an example in this guide, select the version you actually use.



5 Click **Create**.



6 The New Project is displayed.

The following panes are displayed in this window.

Left: Multiview Explorer

Top right: Toolbox

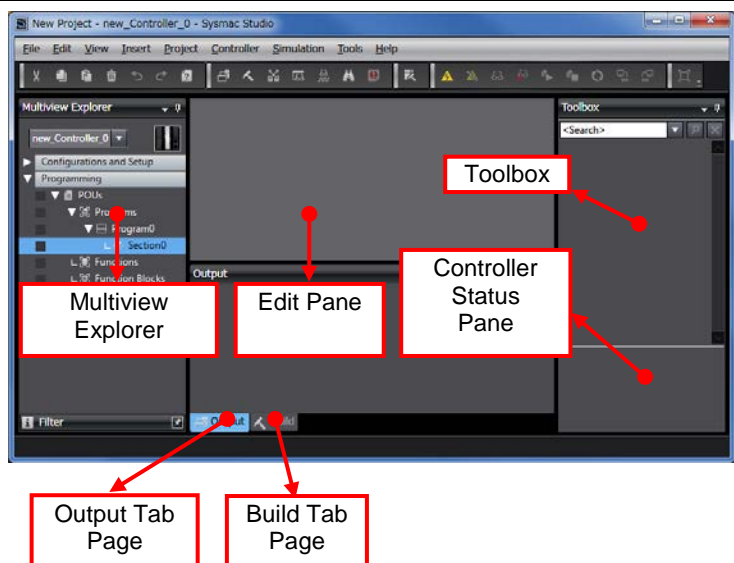
Bottom right: Controller Status
Pane

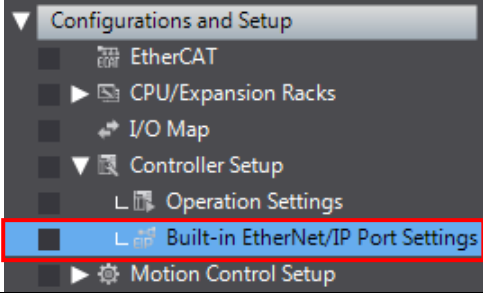
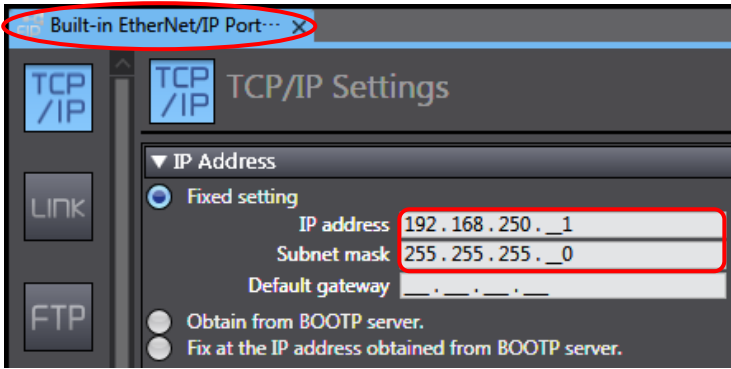
Top middle: Edit Pane

The following tabs are displayed in the bottom middle of this window.

Output Tab Page

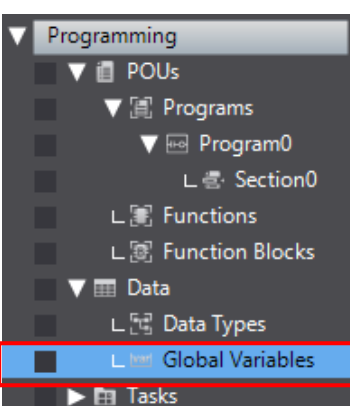
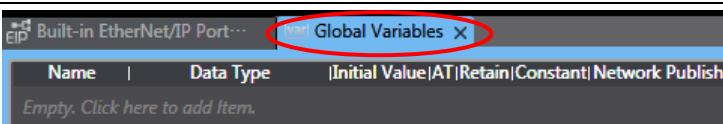
Build Tab Page



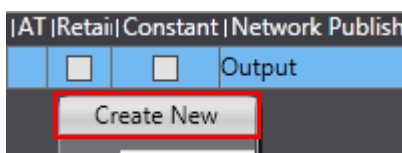
7	<p>Double-click Built-in EtherNet/IP Port Settings under Configurations and Setup - Controller Setup in the Multiview Explorer.</p>	
8	<p>The Built-in EtherNet/IP Port Settings Tab Page is displayed in the Edit Pane.</p> <p>Check that the following settings are made in the <i>IP Address</i> Field.</p> <p>IP address: 192.168.250.1 Subnet mask: 255.255.255.0</p>	

7.3.2. Setting Global Variables

Set global variables to use for tag data links, and create and export a CSV file in order to use the variables as tags with Network Configurator.

1	<p>Double-click Global Variables under Programming - Data in the Multiview Explorer.</p>																																																																							
2	<p>The Global Variables Tab Page is displayed in the Edit Pane.</p> <p>Click on a space to enter a variable in the <i>Name</i> Column.</p> <p>Enter <i>EIP002_Standard_IO_ports_OUT</i> in the <i>Name</i> Column.</p> <p>Enter <i>BYTE[6]</i> in the <i>Data Type</i> Column.</p> <p>After entering, check that the data type changes to <i>ARRAY[0..5] OF BYTE</i>.</p> <p>Select Output from the pull-down list of Network Publish.</p>	 <p style="text-align: center;">↓</p> <table border="1" data-bbox="694 929 1420 996"> <thead> <tr> <th>Name</th> <th>Data Type</th> <th>Initial Value</th> <th>AT</th> <th>Retain</th> <th>Constant</th> <th>Network Publish</th> </tr> </thead> <tbody> <tr> <td></td> <td>BOOL</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Do not publish</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="694 1064 1420 1131"> <thead> <tr> <th>Name</th> <th>Data Type</th> <th>Initial Value</th> <th>AT</th> <th>Retain</th> <th>Constant</th> <th>Network Publish</th> </tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT</td> <td>BOOL</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Do not publish</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="694 1198 1420 1265"> <thead> <tr> <th>Name</th> <th>Data Type</th> <th>Initial Value</th> <th>AT</th> <th>Retain</th> <th>Constant</th> <th>Network Publish</th> </tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT</td> <td>BYTE[6]</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Do not publish</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="694 1310 1420 1444"> <thead> <tr> <th>Name</th> <th>Data Type</th> <th>Initial Value</th> <th>AT</th> <th>Retain</th> <th>Constant</th> <th>Network Publish</th> </tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT</td> <td>ARRAY[0..5] OF BYTE</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Do not publish</td> </tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1" data-bbox="694 1489 1420 1556"> <thead> <tr> <th>Name</th> <th>Data Type</th> <th>Initial Value</th> <th>AT</th> <th>Retain</th> <th>Constant</th> <th>Network Publish</th> </tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT</td> <td>ARRAY[0..5] OF BYTE</td> <td></td> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td>Output</td> </tr> </tbody> </table>	Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish		BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish	Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish	EIP002_Standard_IO_ports_OUT	BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish	Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish	EIP002_Standard_IO_ports_OUT	BYTE[6]			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish	Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish	EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish	Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish	EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish																																																																		
	BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish																																																																		
Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish																																																																		
EIP002_Standard_IO_ports_OUT	BOOL			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish																																																																		
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Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish																																																																		
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish																																																																		
Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish																																																																		
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output																																																																		

- 3 After entering, right-click under the entered variable, and select **Create New** from the menu.



A new variable can be entered.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish

Enter *EIP002_IOLink_port0_1_OUT* in the *Name* Column.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish

Enter *BYTE[64]* in the *Data Type* Column.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	BYTE[64]			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish

After entering, check that the data type changes to *ARRAY[0..63] OF BYTE*.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Do not publish
						Do not publish Publish Only Input
						Output

Select **Output** from the pull-down list of Network Publish.

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output

- 4 In the same way as step 3, enter the following data in the newly added rows.

- Name:

EIP002_IOLink_port2_3_OUT

Data Type: *BYTE[64]*

Network Publish: **Output**

- Name:

EIP002_IOLink_port4_5_OUT

Data Type: *BYTE[64]*

Network Publish: **Output**

- Name:

EIP002_IOLink_port6_7_OUT

Data Type: *BYTE[64]*

Network Publish: **Output**

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port2_3_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port4_5_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port6_7_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output

- 5 In the same way as step 3, enter the following data in the newly added rows.

- Name:

EIP002_Standard_IO_ports_IN

Data Type: *BYTE[8]*

Network Publish: **Input**

- Name:

EIP002_IOLink_port0_1_IN

Data Type: *BYTE[96]*

Network Publish: **Input**

- Name:

EIP002_IOLink_port2_3_IN

Data Type: *BYTE[96]*

Network Publish: **Input**

- Name:

EIP002_IOLink_port4_5_IN

Data Type: *BYTE[96]*

Network Publish: **Input**

- Name:

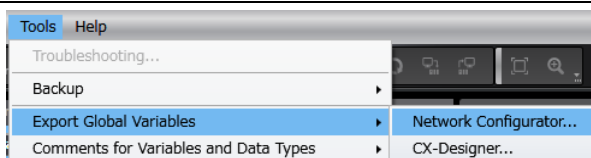
EIP002_IOLink_port6_7_IN

Data Type: *BYTE[96]*

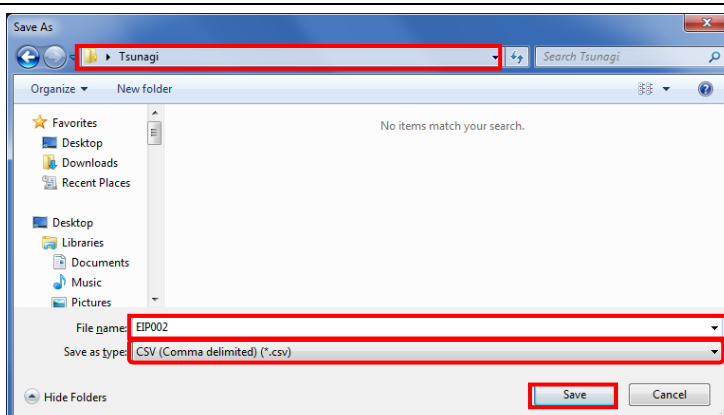
Network Publish: **Input**

Name	Data Type	Initial Value	AT	Retain	Constant	Network Publish
EIP002_Standard_IO_ports_OUT	ARRAY[0..5] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port0_1_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port2_3_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port4_5_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_IOLink_port6_7_OUT	ARRAY[0..63] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Output
EIP002_Standard_IO_ports_IN	ARRAY[0..7] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Input
EIP002_IOLink_port0_1_IN	ARRAY[0..95] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Input
EIP002_IOLink_port2_3_IN	ARRAY[0..95] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Input
EIP002_IOLink_port4_5_IN	ARRAY[0..95] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Input
EIP002_IOLink_port6_7_IN	ARRAY[0..95] OF BYTE			<input type="checkbox"/>	<input type="checkbox"/>	Input

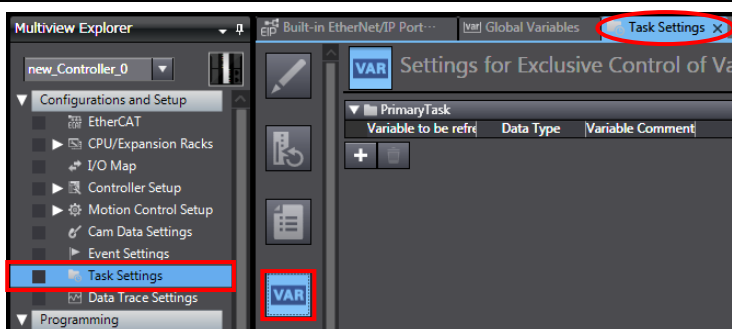
- 6 Select **Export Global Variables - Network Configurator** from the Tools Menu.



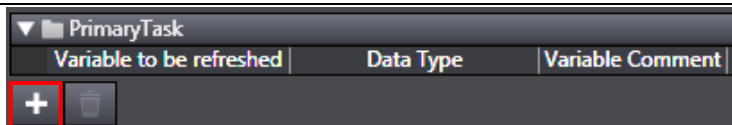
- 7 The Save As Dialog Box is displayed. Select a location to save the file, and enter a file name. ("EIP002" is used in this guide.).
Check that the file type is CSV (Comma delimited) (*.csv).
Click **Save**.



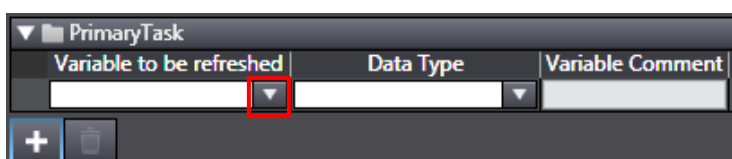
- 8 Double-click **Task Settings** under **Configurations and Setup** in the Multiview Explorer. The Task Settings Tab Page is displayed in the Edit Pane. Click **VAR**.



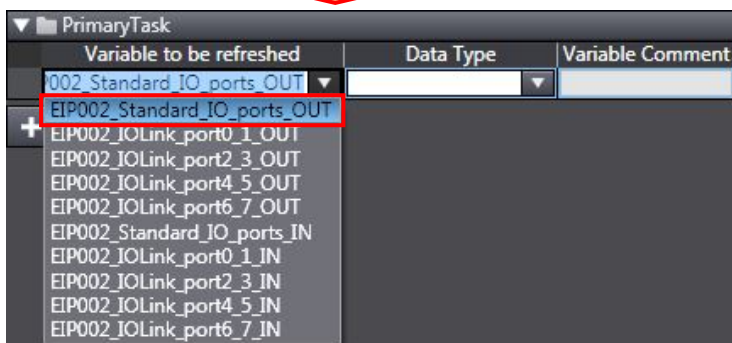
- 9 Click the **+** Button.



An entry is displayed allowing you to specify the variables. Click ▾ in the entry cell of the *Variable to be refreshed* Column.



The variables set in the previous steps are listed. Select *EIP002_Standard_IO_ports_OUT*.



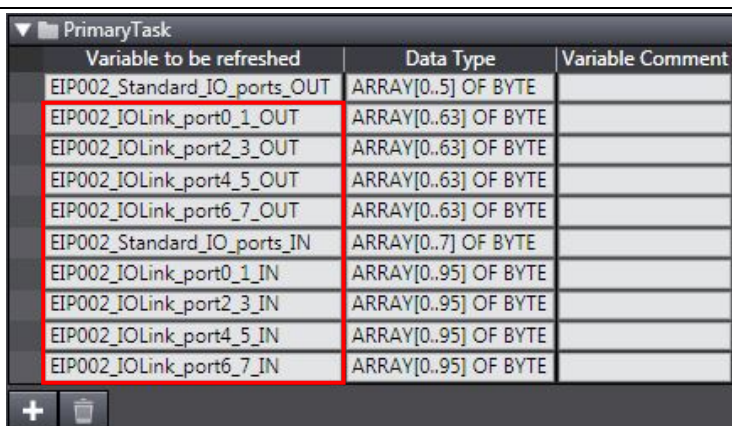
EIP002_Standard_IO_ports_OUT is added.



*Since the data types are displayed automatically, you do not need to set them.

- 10 In the same way as step 9, add all the variables set in the previous steps to the *Variable to be refreshed* Column.

*Since the data types are displayed automatically, you do not need to set them.



7.3.3. Transferring the Project Data

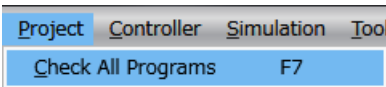
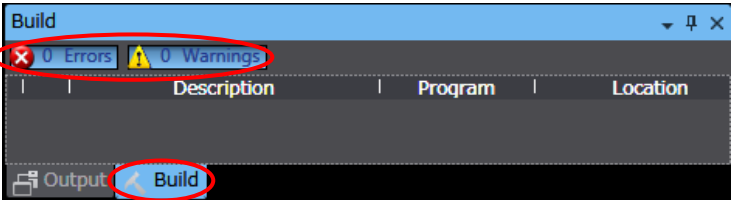
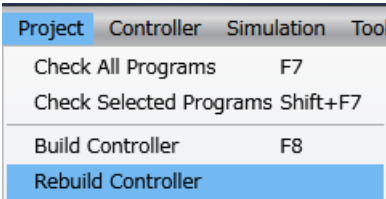
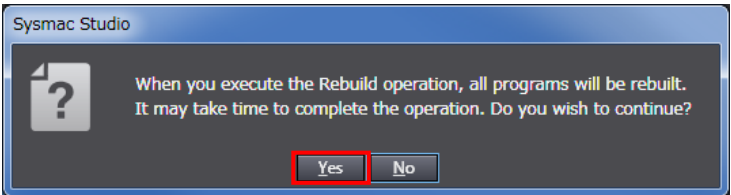
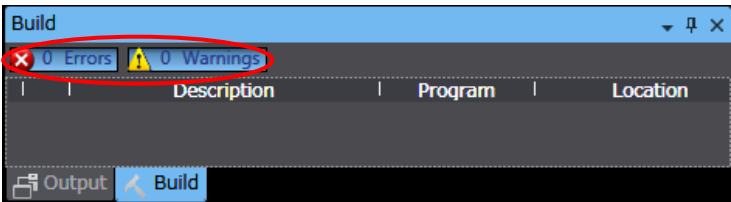
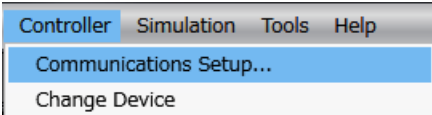
Go online with Sysmac Studio and transfer the project data to the Controller.

WARNING

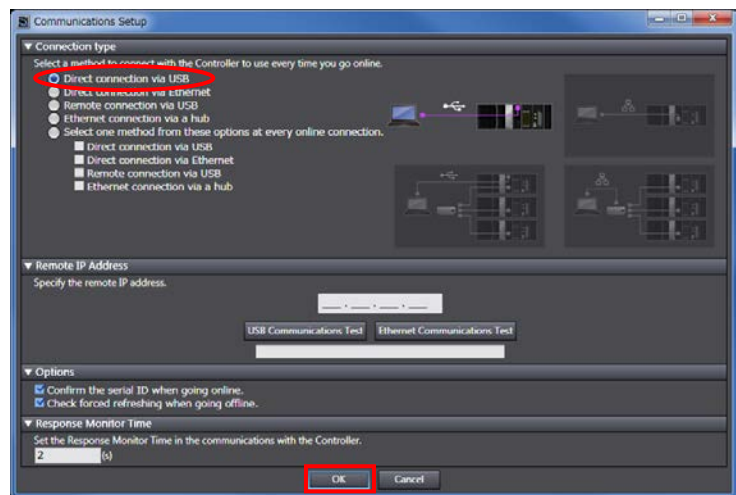
Regardless of the operating mode of the CPU Unit, devices or machines may perform unexpected operation when you transfer any of the following data from Sysmac Studio: a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units.

Always confirm safety at the destination node before you transfer the project data.

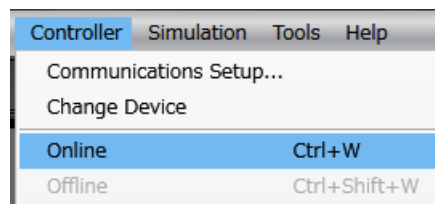


1	Turn ON Controller.	
2	Select Check All Programs from the Project Menu.	
3	The Build Tab Page is displayed. Check that "0 Errors" and "0 Warnings" are displayed.	
4	Select Rebuild Controller from the Project Menu.	
5	The dialog box on the right is displayed. Check the contents and click Yes .	
6	Check that "0 Errors" and "0 Warnings" are displayed on the Build Tab Page.	
7	Select Communications Setup from the Controller Menu.	

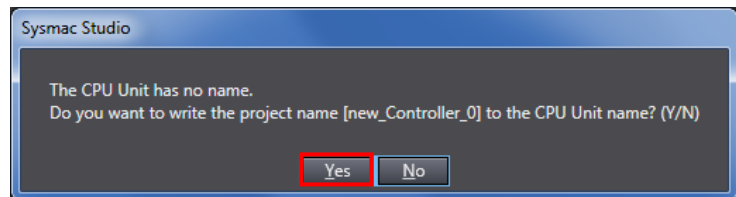
- 8 The Communications Setup Dialog Box is displayed. Check that the *Direct connection via USB* Option is selected in the *Connection type* Field. Click **OK**.



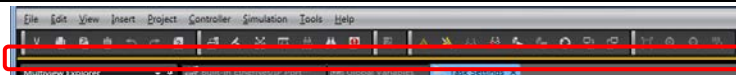
- 9 Select **Online** from the Controller Menu. If a confirmation dialog box is displayed, check the contents and click **Yes**.



*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.



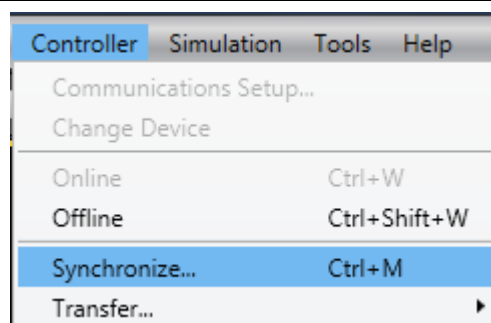
- 10 When an online connection is established, a yellow line is displayed under the toolbar.



Additional Information

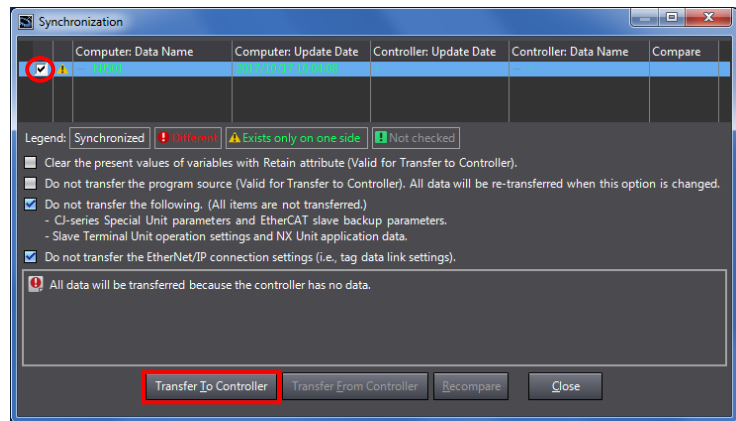
For details on the online connections to the Controller, refer to *Section 6. Online Connections to a Controller* of the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

- 11 Select **Synchronize** from the Controller Menu.



- 12 The Synchronization Dialog Box is displayed.
Check that the data to transfer (NJ501 shown on the right) is selected.
Click **Transfer To Controller**.

*After executing "Transfer To Controller", the Sysmac Studio data is transferred to Controller, and the data is synchronized.

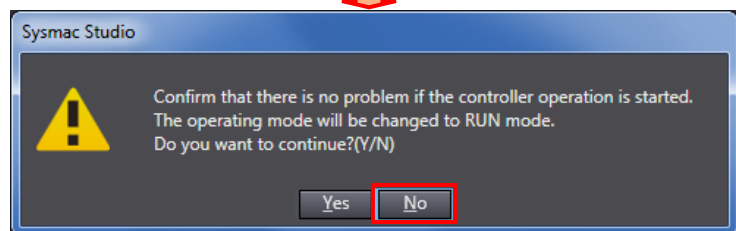
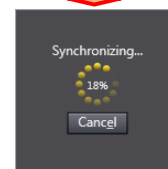
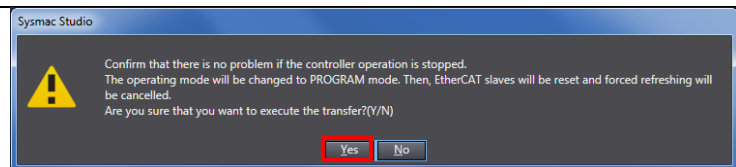


- 13 The dialog box on the right is displayed. Confirm that there is no problem, and click **Yes**.

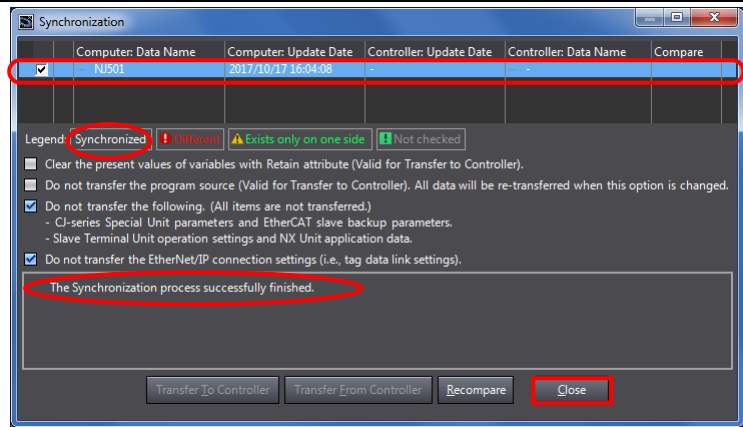
A screen is displayed stating "Synchronizing".

The dialog box on the right is displayed. Confirm that there is no problem, and click **No**

*Do not return to RUN mode.



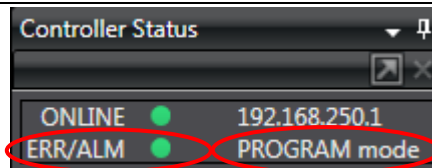
- 14 As shown in the figure on the right, the font color that is used to display the synchronized data changes to the same color as the one used to specify "Synchronized". Check that a message is displayed stating "The Synchronization process successfully finished". Confirm that there is no problem, and click **Close**.



*When the Sysmac Studio project data coincides with the Controller data, a message is displayed stating "The synchronization process successfully finished".

*If the synchronization fails, check the wiring and repeat from step 1.

- 15 Check that the ERR/ALM indicator in the Controller Status Pane changes to a green color and that PROGRAM mode is displayed.



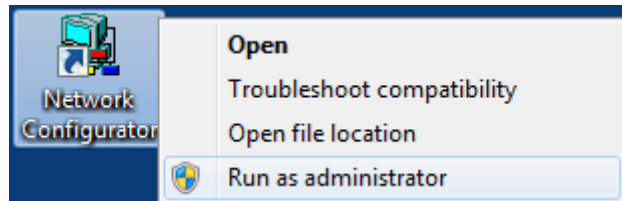
7.4. Network Settings

Set EtherNet/IP tag data links.

7.4.1. Starting Network Configurator and Installing the EDS File

Start Network Configurator and install the EDS file.

- 1 Right-click the Network Configurator shortcut icon and select **Run as administrator** from the menu.



Precautions for Correct Use

To manipulate the EDS file, you must select "Run as administrator" as described in step 1 above to start Network Configurator.

Otherwise, if you login with other user accounts, the following operations listed in the EDS File Menu are not applied due to user management for Windows security functions.

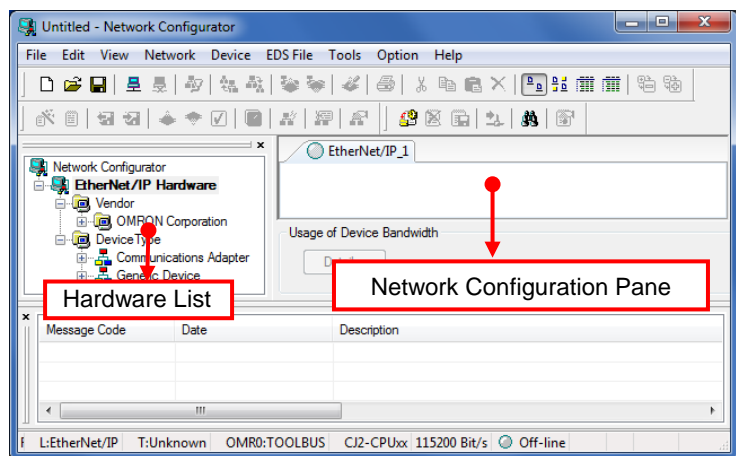
- EDS File Menu:

Install, Create, Delete and Creating EDS Index Files

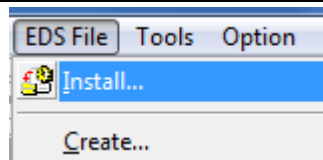
- 2 Network Configurator starts.
The following panes are displayed in this window.

Left: Hardware list

Right: Network Configuration
Pane

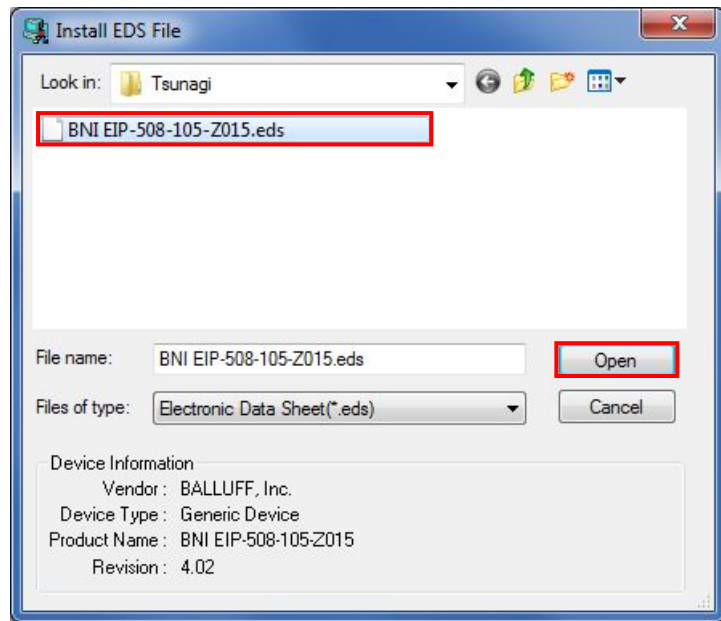


- 3 Select **Install** from the EDS File Menu.



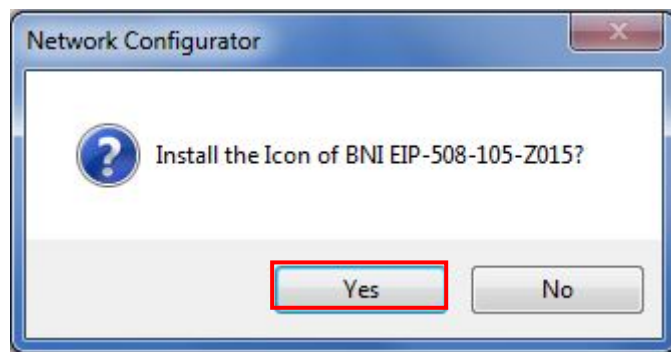
- 4 The Install EDS File Dialog Box is displayed. Select *BNI EIP-508-105-Z015.eds* (EDS file) to install. Click **Open**.

*For information on how to obtain the EDS file, refer to *Precautions for Correct Use* in 5.2. *Device Configuration*.

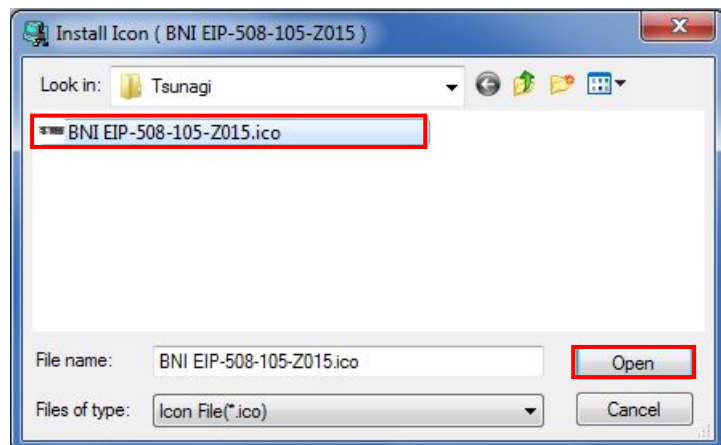


- 5 If the dialog box on the right is displayed, check the contents and click **Yes**.
If not, go to step 7.

*If the icon file and the EDS file are stored in the same folder, the icon file is automatically installed, and the dialog box on the right is not displayed. There is no need to proceed with step 6.

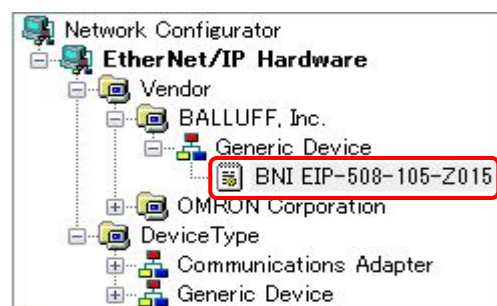


- 6 The dialog box on the right is displayed.
Select *BNI EIP-508-105-Z015.ico* (icon file) to install.
Click **Open**.



- 7 Check that Destination Device is added to the Hardware List.

*It indicates that the EDS file is properly installed.



7.4.2. Uploading the Network Configuration

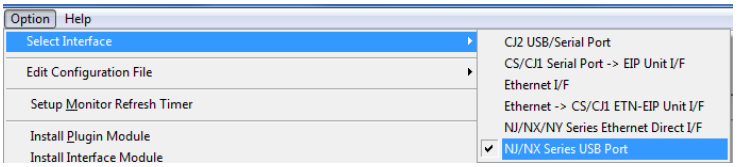
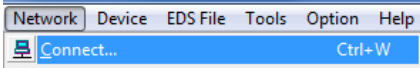
Go online with Network Configurator and upload the network configuration.

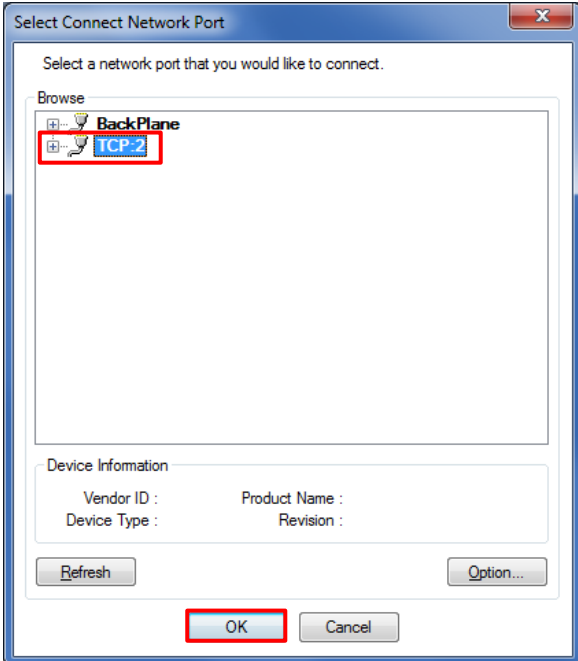
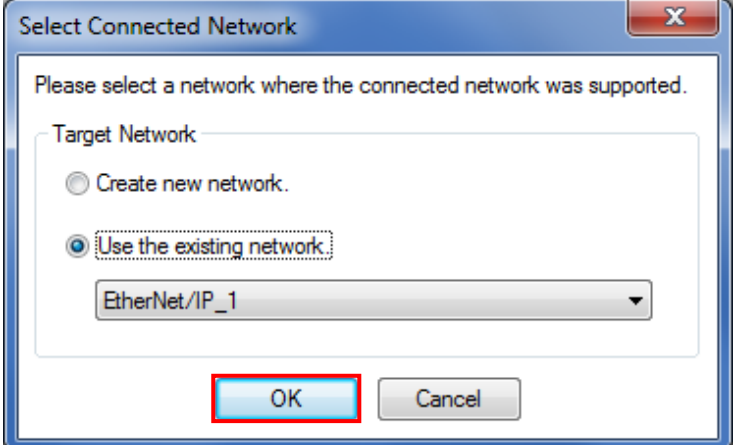


Precautions for Correct Use

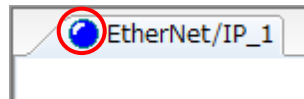
Check that the LAN cable is connected before performing the following steps.

If not, turn OFF both devices, and then connect the LAN cable.

- 1 Turn ON Switching hub.
- 2 Select **Select Interface - NJ/NX Series USB Port** from the Option Menu.
 
- 3 Select **Connect** from the Network Menu.
 
- 4 The Select Connect Network Port Dialog Box is displayed. Select **TCP:2**.

Click **OK**.
 
- 5 The Select Connected Network Dialog Box is displayed. Check the contents and click **OK**.
 

- 6 Check that the color of the network connection icon changes to blue on the **EtherNet/IP_1** Tab of the Network Configuration Pane.



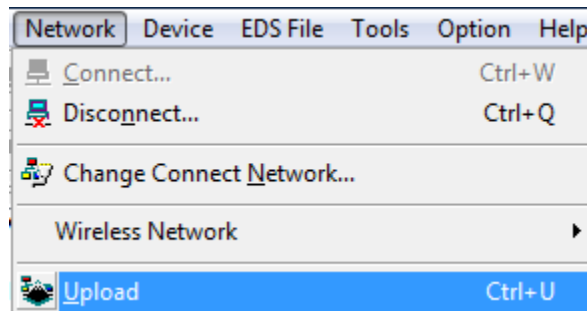
*It indicates that Network Configurator and Controller are online.



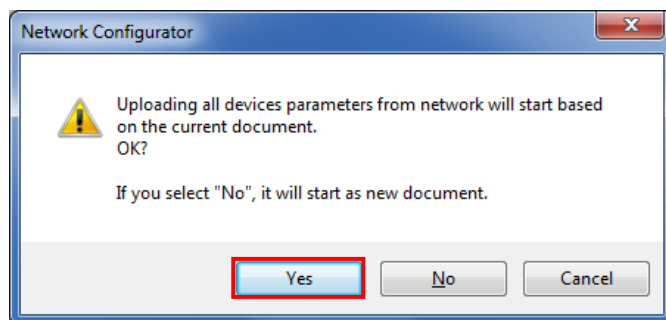
Additional Information

If the online connection to the Controller cannot be established, check the cable connection. Or, return to step 1, check the settings and repeat each step. For details, refer to *7-2-8 Connecting the Network Configurator to the Network of the NJ/NX-series CPU Unit Built-in EtherNet/IP™ Port User's Manual* (Cat. No. W506).

- 7 Select **Upload** from the Network Menu to upload device parameters from the network.



- 8 The dialog box on the right is displayed. Confirm that there is no problem, and click **Yes**.



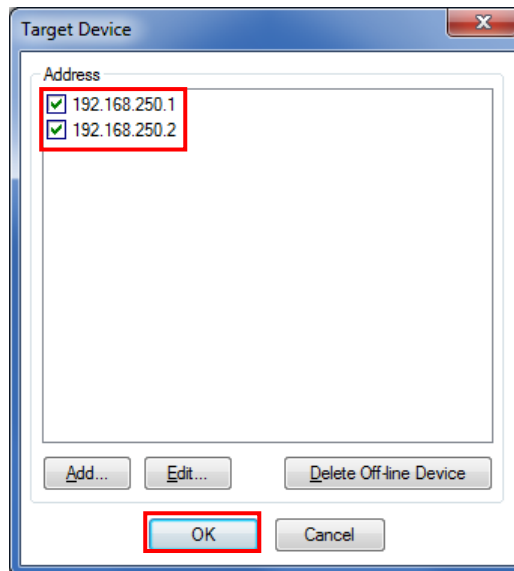
- 9 The Target Device Dialog Box is displayed.

Select 192.168.250.1 and 192.168.250.2.

Click **OK**.

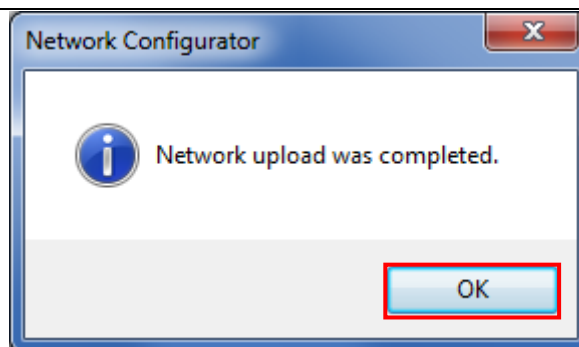
*If 192.168.250.1 and 192.168.250.2 are not displayed in the dialog box, click **Add** to add the addresses.

*The displayed address varies with the status of Network Configurator.



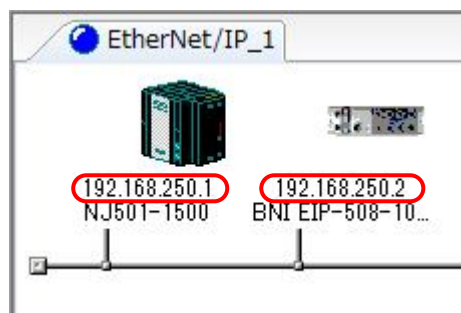
- 10 The parameters of Destination Device are uploaded.

After completing the upload, the dialog box on the right is displayed. Check the contents and click **OK**.



- 11 Check that the nodes with the following IP addresses are configured in the Network Configuration Pane.

- Controller (Node 1)
IP address: 192.168.250.1
- Network Module (Node 2)
IP address: 192.168.250.2



- 12 Right-click the device icon of Network Module (Node 2) and select **Parameter - Edit** from the menu.



- 13 The Edit Device Parameters Dialog Box is displayed. Enter the following value and click **OK**.

0015 Port function: 1

*The device parameters set in the dialog box are included in the connection information set in 7.4.4. *Setting Connections* and are transferred to Controller in 7.4.5. *Transferring the Tag Data Link Parameters*. There is no need to transfer the device parameters to Network Module.

*If the device parameters are changed, it is necessary to delete the already set connections and set them as new ones again. For details, refer to *Precautions for Correct Use* in 7.5.2. *Checking Sent and Received Data*.

Parameter Name	Value
0015 Port function	1
0016 IOL Port 1 Cycle Time	0
0017 IOL Port 1 Validation type	0
0018 IOL Port 1 Vendor ID 1	0
0019 IOL Port 1 Vendor ID 2	0
0020 IOL Port 1 Device ID 1	0
0021 IOL Port 1 Device ID 2	0
0022 IOL Port 1 Device ID 3	0
0023 IOL Port 1 Serial number 1	0
0024 IOL Port 1 Serial number 2	0
0025 IOL Port 1 Serial number 3	0
0026 IOL Port 1 Serial number 4	0
0027 IOL Port 1 Serial number 5	0

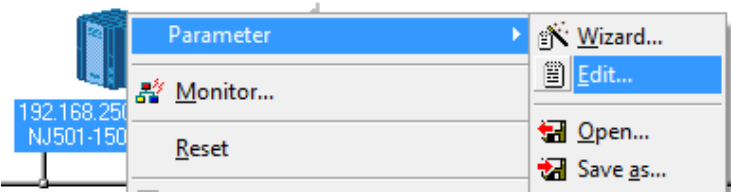
0015 Port function
Default : 21845 Min : 0 Max : 21845

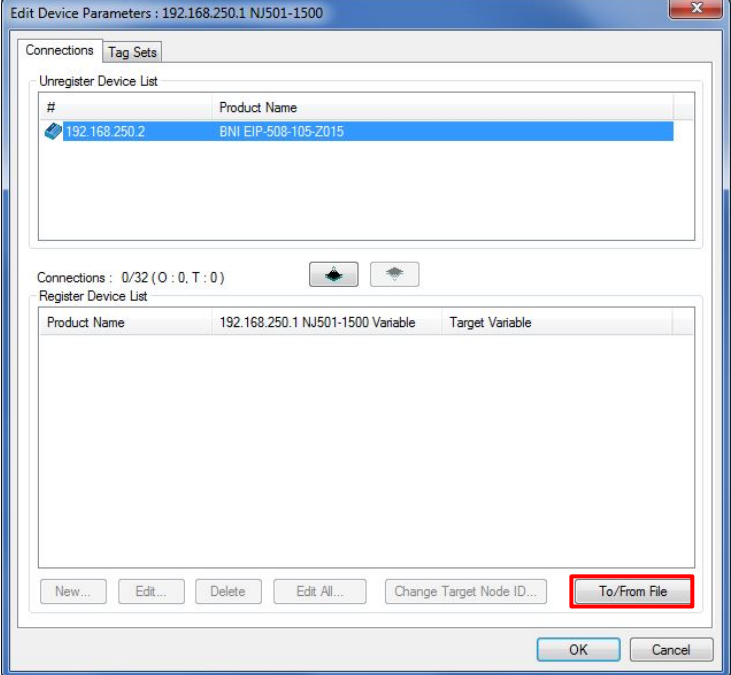
Buttons: Default Setup, Expand All, Collapse All, Reset, **OK**, Cancel

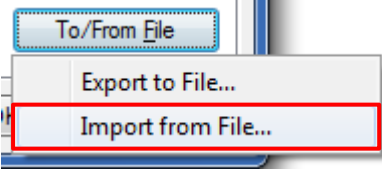
7.4.3. Tag Registration

Import the created CSV file for use with Network Configurator, and register tags and tag sets.

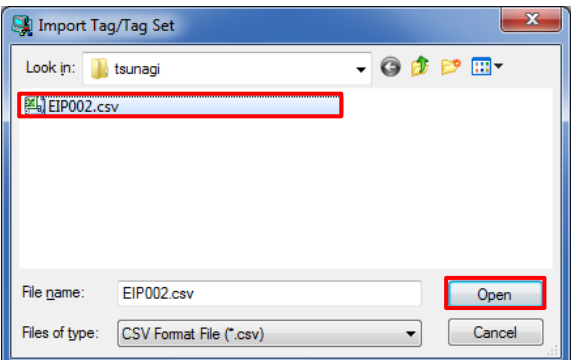
- 1 Right-click the device icon of Controller (Node 1) in the Network Configuration Pane and select **Parameter - Edit** from the menu.


- 2 The Edit Device Parameters Dialog Box is displayed. Click **To/From File**.

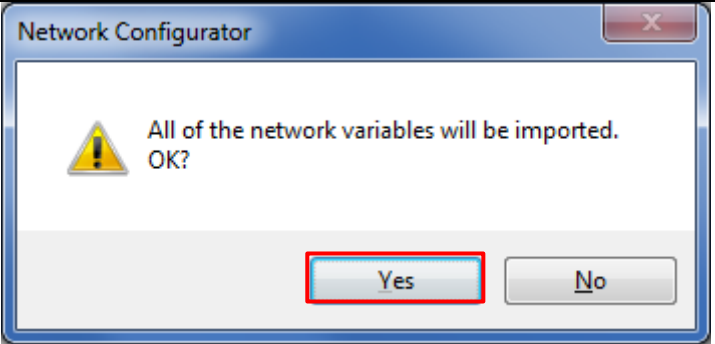

- 3 Select **Import from File**.


- 4 The Import Tag/Tag Set Dialog Box is displayed. Select **EIP002.csv** and click **Open**.

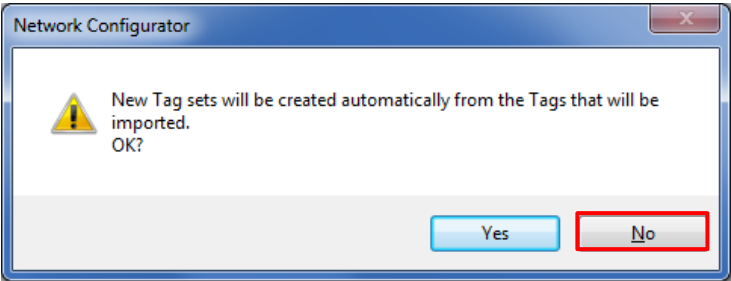
*"EIP002.csv" is the file created in step 7 of 7.3.2. *Setting Global Variables*.



- 5 The dialog box on the right is displayed. Confirm that there is no problem, and click **Yes**.

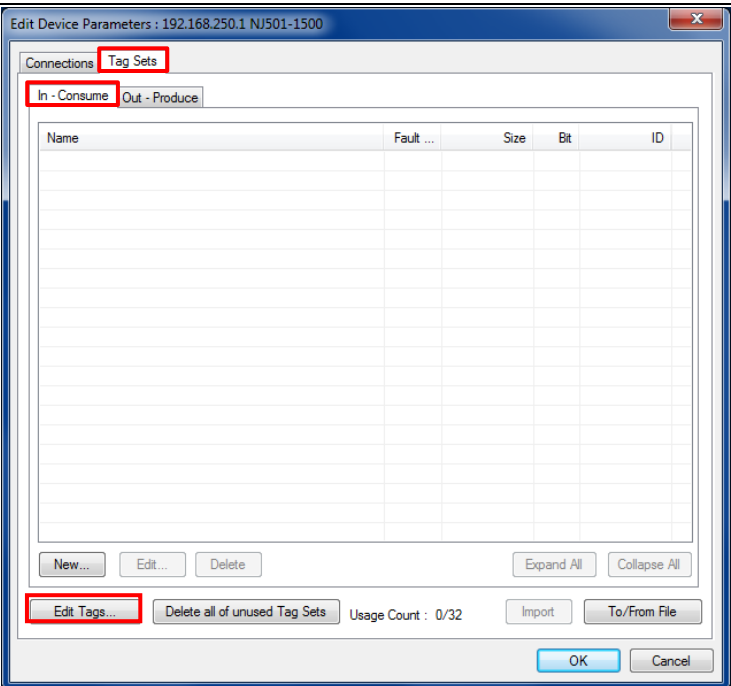

- 6 The dialog box on the right is displayed. Confirm that there is no problem, and click **No**.

*Do not automatically create a tag set from the tags you import.


- 7 Click the **Tag Sets** Tab in the Edit Device Parameters Dialog Box.

Click the **In - Consume** Tab, and then click **Edit Tags**.

*Follow steps 7 to 14 to register the input tag set of Controller (Node 1).

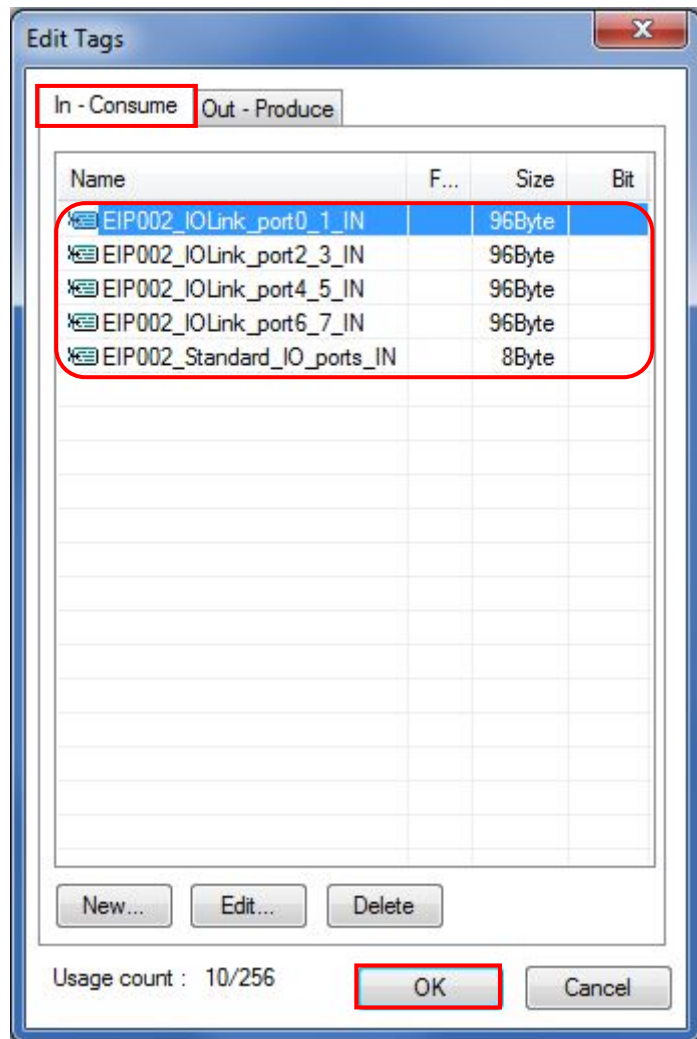


8 The Edit Tags Dialog Box is displayed.

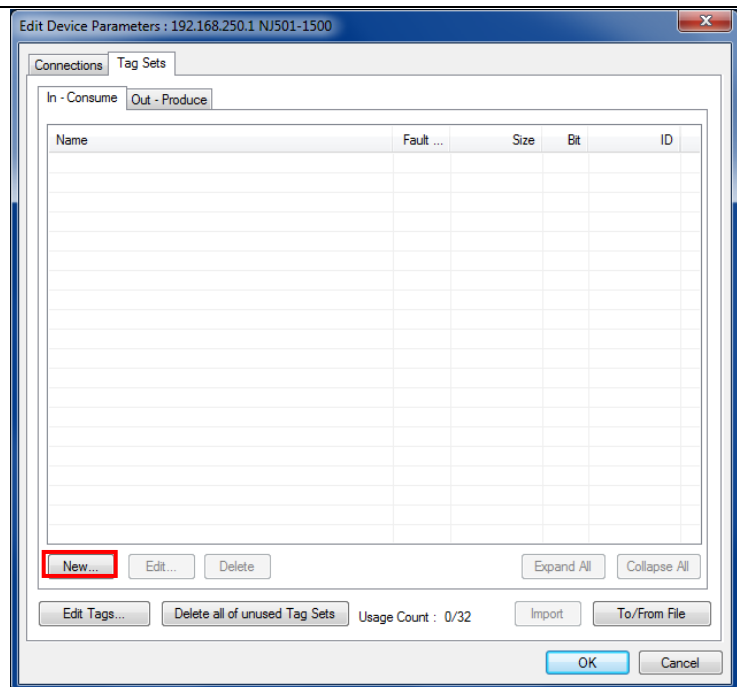
Click the **In - Consume** Tab.

Check that the tab page shows the variable names that are described in 6.3. *Tag Sets* and have been set in 7.3.2. *Setting Global Variables*.

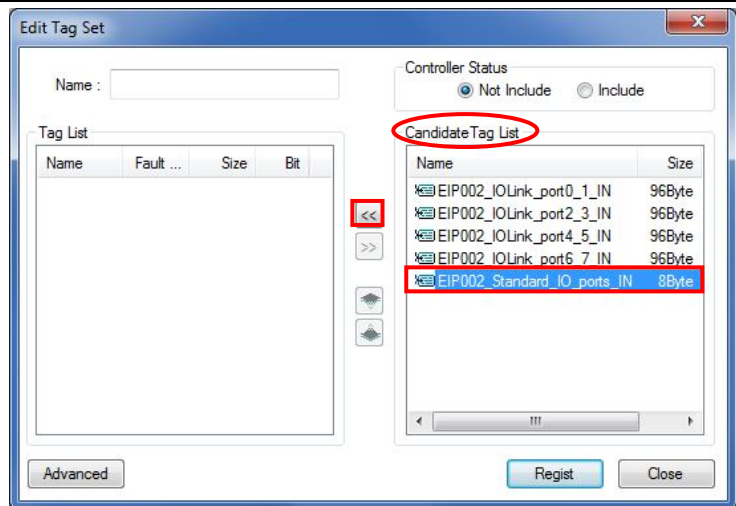
Click **OK**.



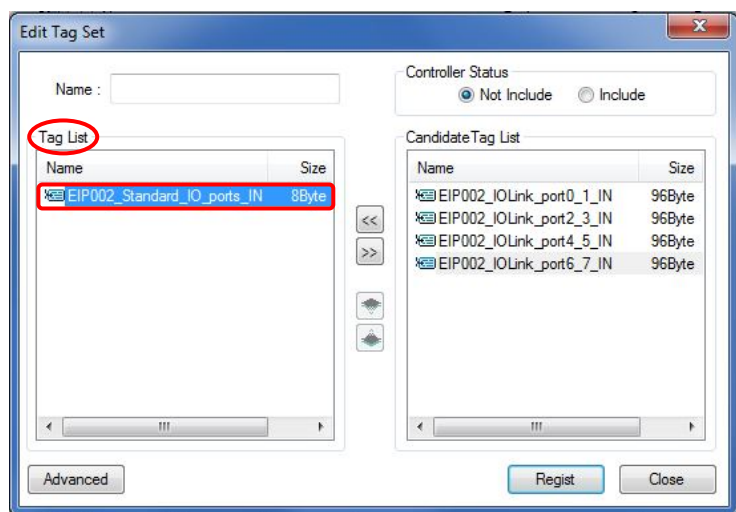
- Click **New** in the Edit Device Parameters Dialog Box.



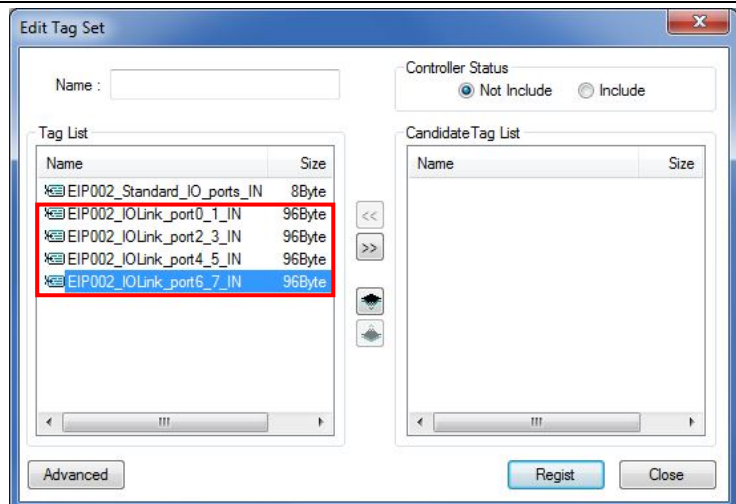
- 10 The Edit Tag Set Dialog Box is displayed.
Select *EIP002_Standard_IO_ports_IN* from the Candidate Tag List.
Click the << Button.



Check that *EIP002_Standard_IO_ports_IN* is registered in the Tag List.

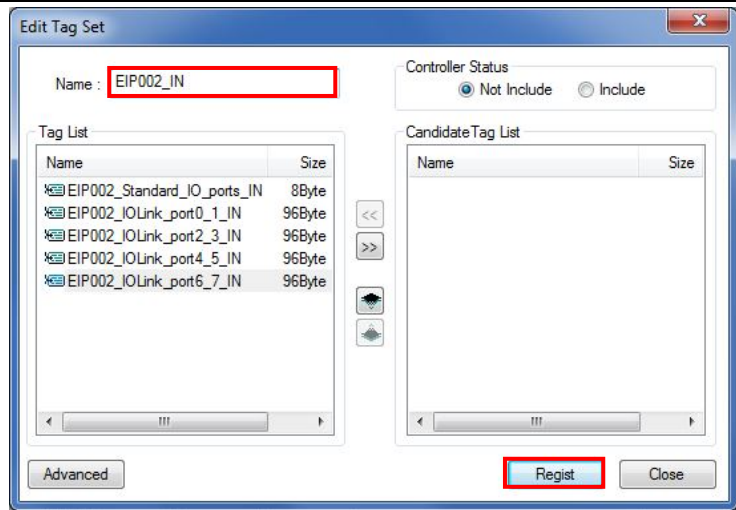


- 11 In the same way as step 10, individually select all the other variables displayed in the Candidate Tag List and register them in the Tag List in ascending order of IN No. listed in 6.3. *Tag Sets*.



12 Enter *EIP002_IN* in the *Name* Field.

Click **Register**.



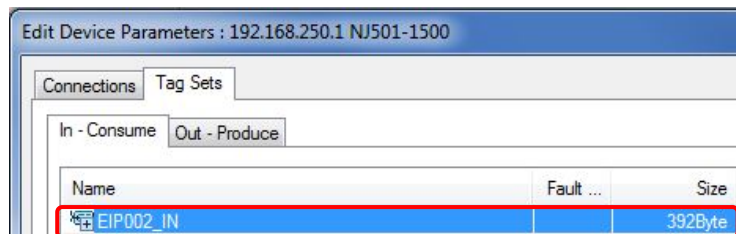
13 The Edit Tag Set Dialog Box is displayed again. Click **Close**.



14 Check that the following tag set information is displayed on the In - Consume Tab Page of the Edit Device Parameters Dialog Box.

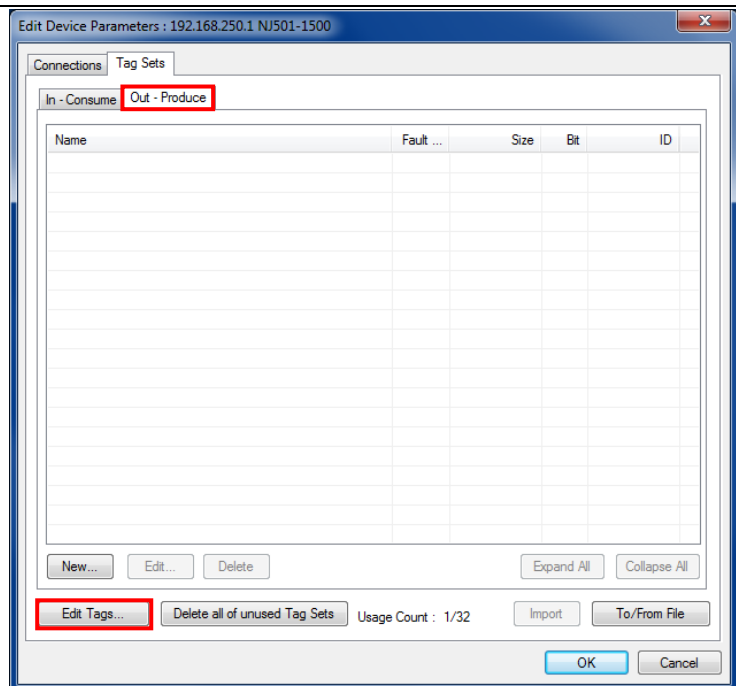
Name: *EIP002_IN*

Size: 392 Byte



15 Click the **Out - Produce** Tab in the Edit Device Parameters Dialog Box.
Click **Edit Tags**.

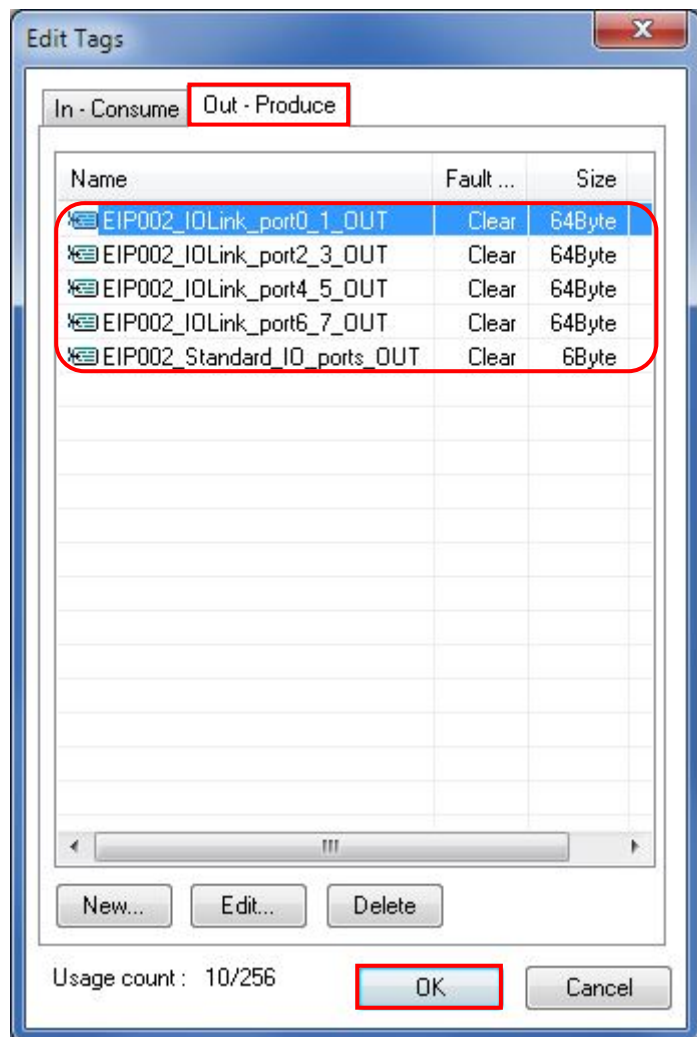
*Follow steps 15 to 21 to register the output tag set of Controller (Node 1).



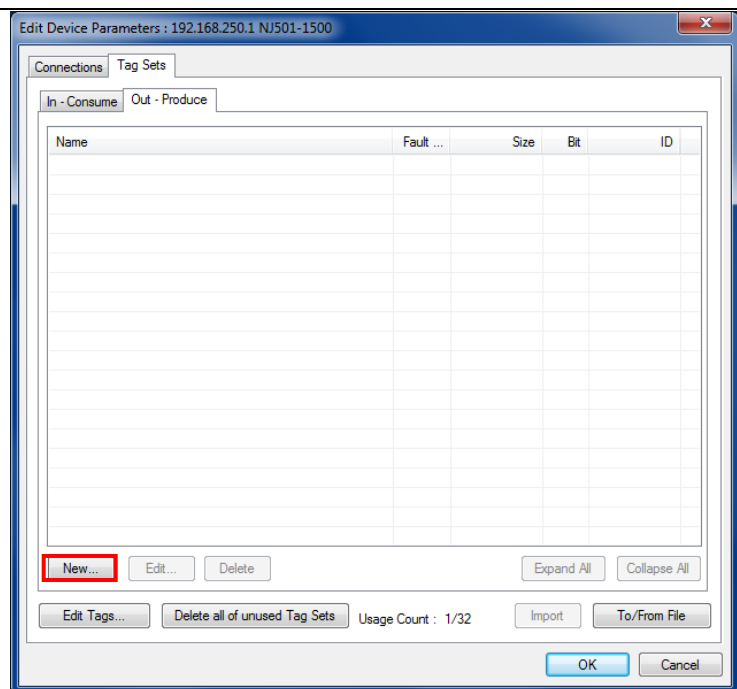
- 16 The Edit Tags Dialog Box is displayed.
Click the **Out - Produce** Tab.

Check that the tab page shows the variable names that are described in 6.3. *Tag Sets* and have been set in 7.3.2. *Setting Global Variables*.

Click **OK**.

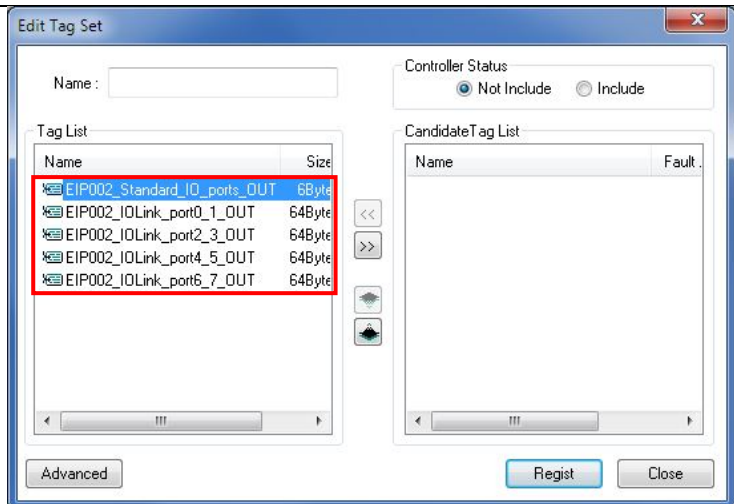


- 17 Click **New** in the Edit Device Parameters Dialog Box.



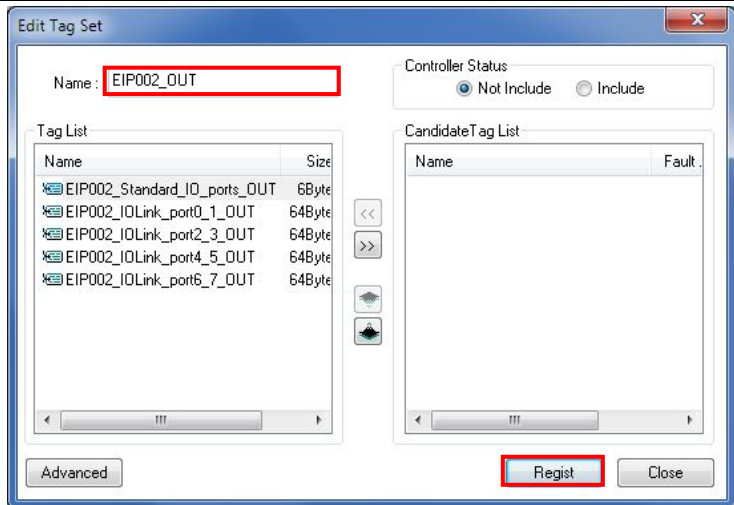
18 The Edit Tag Set Dialog Box is displayed.

In the same way as steps 10 and 11, individually select all the variables displayed in the Candidate Tag List and register them in the Tag List in ascending order of OUT No. listed in 6.3. *Tag Sets*.



19 Enter *EIP002_OUT* in the *Name* Field.

Click **Register**.



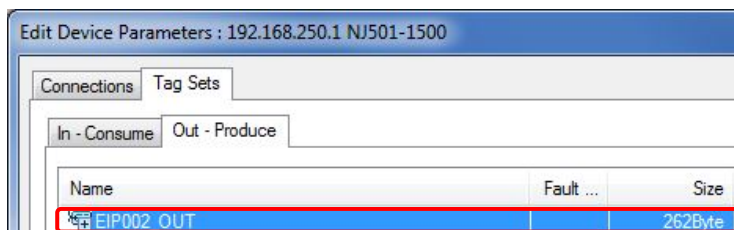
20 The Edit Tag Set Dialog Box is displayed again. Click **Close**.



21 Check that the following tag set information is displayed on the Out - Produce Tab Page of the Edit Device Parameters Dialog Box.

Name: *EIP002_OUT*

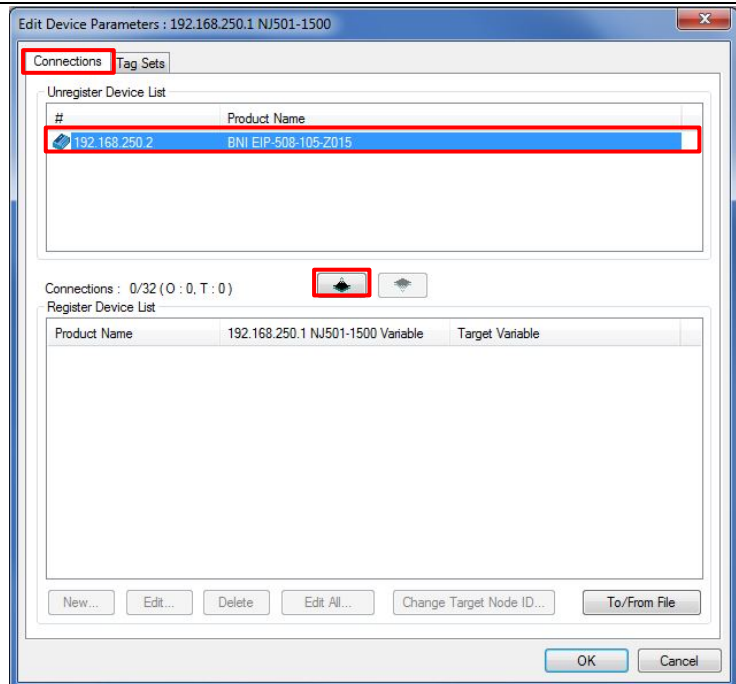
Size: 262 Byte



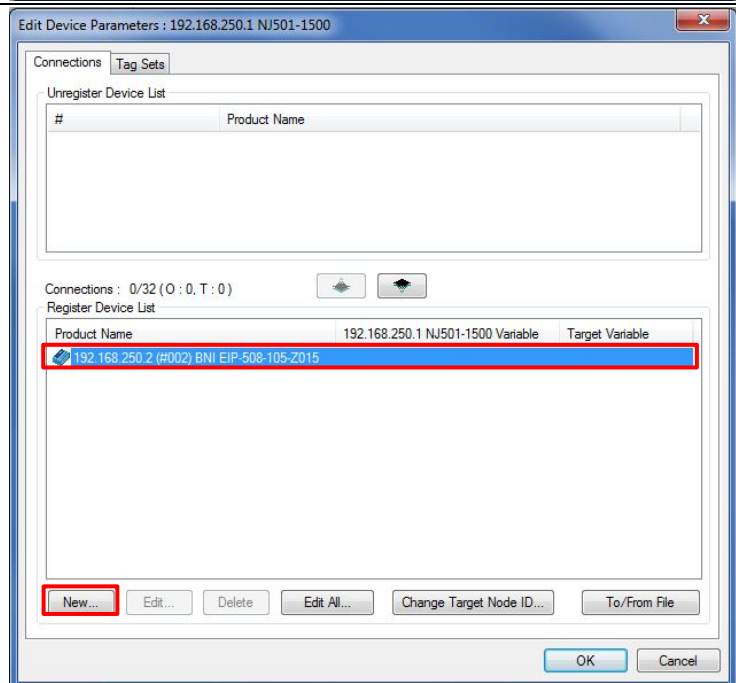
7.4.4. Setting Connections

Set connections to associate the tag sets of the target device with the tag sets of the originator device.

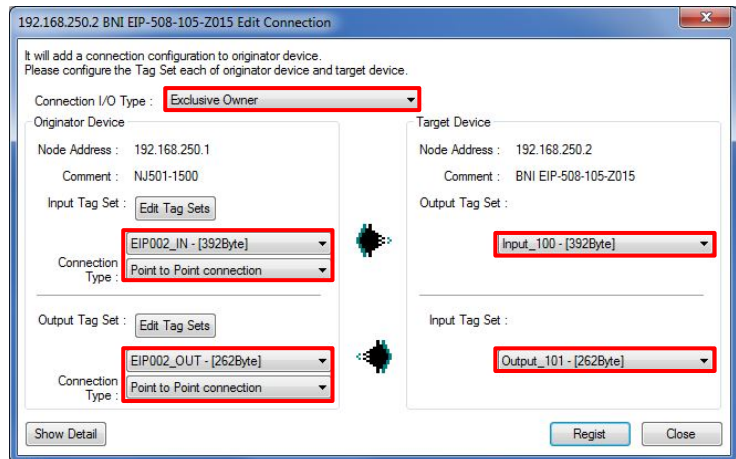
- 1 Click the **Connections** Tab in the Edit Device Parameters Dialog Box.
Select *192.168.250.2* from the Unregister Device List and click .



- 2 192.168.250.2 is registered in the Register Device List.
Select *192.168.250.2* and click **New**.



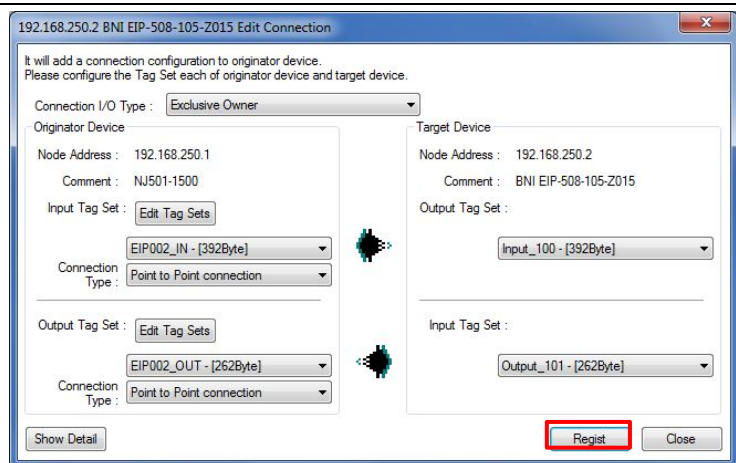
- 3 The Edit Connection Dialog Box is displayed. Set the values listed in the following table in the *Connection I/O Type*, *Originator Device* and *Target Device* Fields.



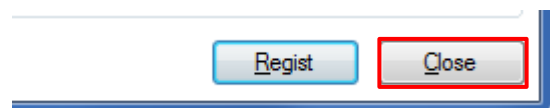
■Editing settings for connections

Setting item		Set value
Connection I/O Type		Exclusive Owner
Originator Device	Input Tag Set	EIP002_IN-[392 Byte]
	Connection Type	Point to Point connection
	Output Tag Set	EIP002_OUT-[262 Byte]
	Connection Type	Point to Point connection
Target Device	Output Tag Set	Input_100-[392 Byte]
	Input Tag Set	Output_101-[262 Byte]

- 4 Click **Regist**.

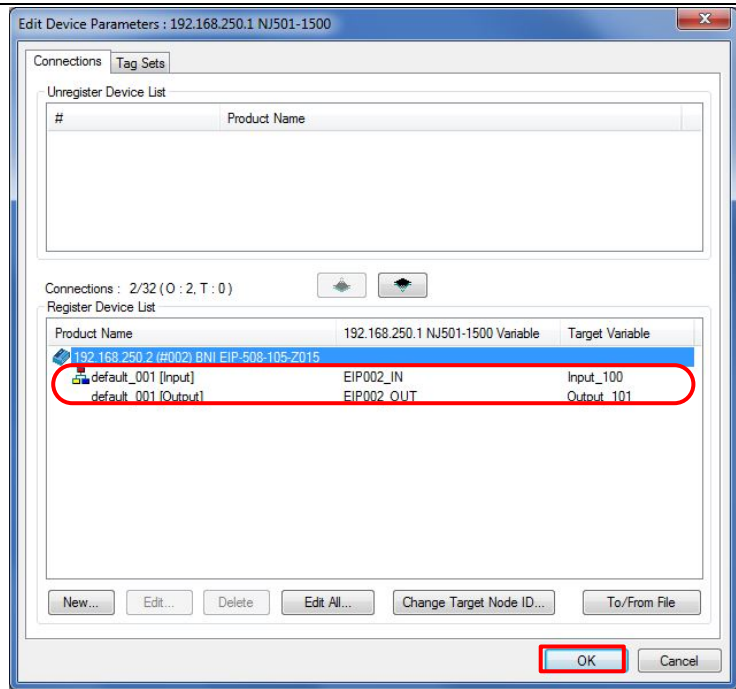


- 5 The Edit Connection Dialog Box is displayed again. Click **Close**.



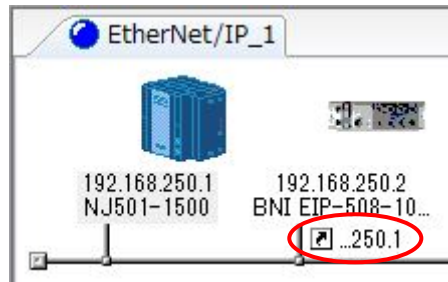
- 6 The Edit Device Parameters Dialog Box is displayed again. Check that the connections set for 192.168.250.2 are registered.

Click **OK**.



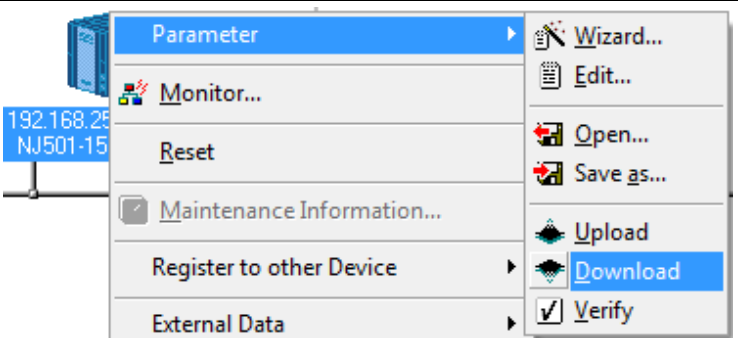
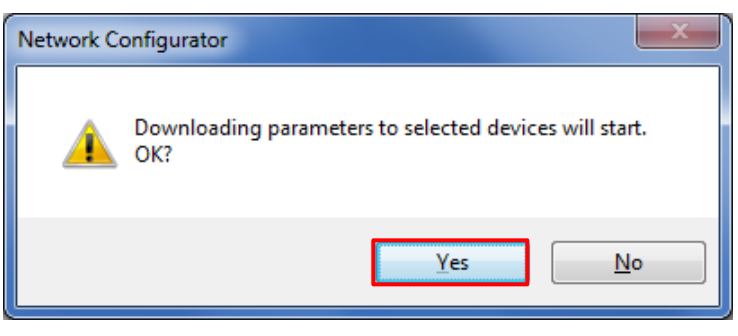
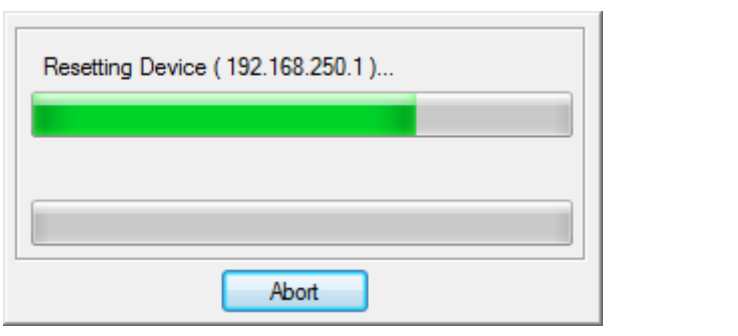
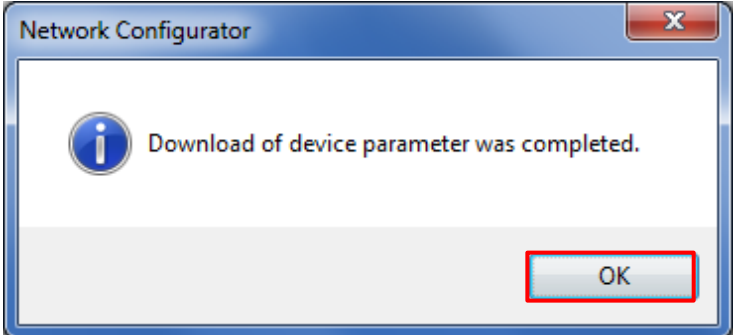
- 7 The IP address of Controller (Node 1) is displayed under the device icon of Network Module (Node 2) in the Network Configuration Pane.

*It indicates that the connection settings are completed.



7.4.5. Transferring the Tag Data Link Parameters

Transfer the tag data link parameters to the Controller.

1	Right-click the device icon of Controller (Node 1) in the Network Configuration Pane and select Parameter - Download from the menu.	
2	The dialog box on the right is displayed. Confirm that there is no problem, and click Yes .	
3	The tag data link parameters are downloaded from Network Configurator to Controller.	
4	The dialog box on the right is displayed. Check the contents and click OK .	

7.5. EtherNet/IP Communication Status Check

Confirm that the EtherNet/IP tag data links perform normally.

7.5.1. Checking the Connection Status

Check the EtherNet/IP connection status.

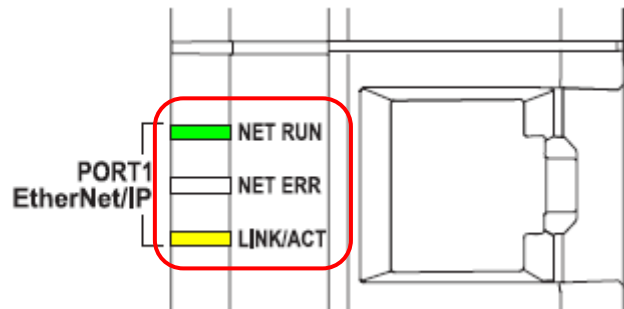
- 1 Check with LED indicators on Controller that the tag data links perform normally.

The LED indicators in normal status are as follows:

NET RUN: Green lit

NET ERR: Not lit

LINK/ACT: Yellow flashing
(Flashing while packets are being sent and received.)



*The NX-series Controllers also have the same LED indicator status.

- 2 Check Status LEDs on Network Module.

The LED indicators in normal status are as follows:

US: Green lit

UA: Green lit

Mod: Green lit

Net: Green lit

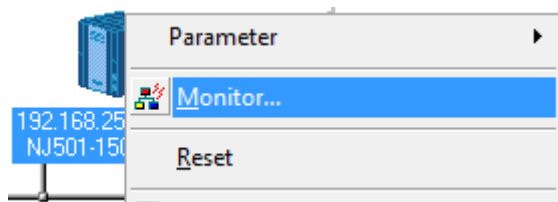
100: Yellow lit

LK1: Green flashing



- 3 The normal performance of tag data links can be confirmed through the status information in the Monitor Device Dialog Box of Network Configurator.

Right-click the device icon of Controller (Node 1) in the Network Configuration Pane and select **Monitor**.

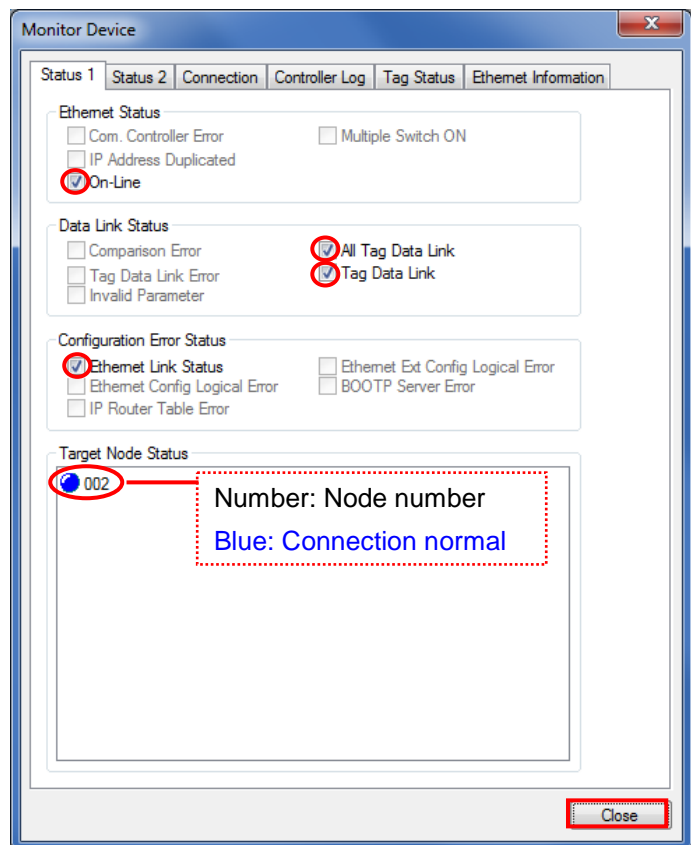


- 4 The Monitor Device Dialog Box is displayed.
Check that the following check boxes are selected in the Status 1 Tab Page.

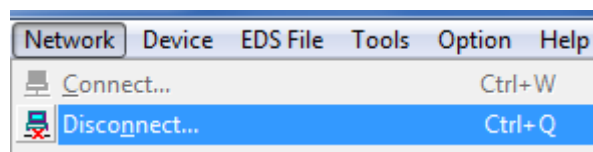
- On-Line
- All Tag Data Link
- Tag Data Link
- Ethernet Link Status

Check that the target node status is displayed as shown on the right.

Click **Close**.

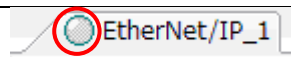


- 5 Select **Disconnect** from the Network Menu.

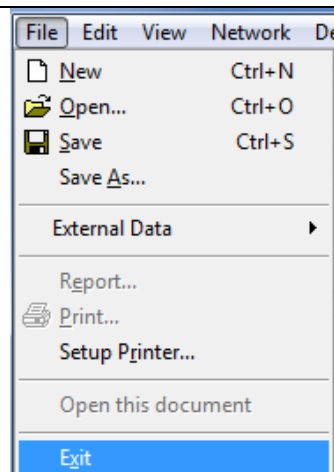


- 6 Check that the color of the network connection icon changes to gray on the **EtherNet/IP_1** Tab of the Network Configuration Pane.

*It indicates that Network Configurator and Controller are offline.



- 7 Select **Exit** from the File Menu to close Network Configurator.



7.5.2. Checking Sent and Received Data

Check that correct data is sent and received.

Caution

In this procedure, the output of the Network Module is performed, which may have a risk of unexpected operation of the devices connected to the Network Module.

Ensure safety before you proceed with this operation check described here.

If you cannot ensure safety, do not proceed. When you perform this operation check, make sure to complete all the steps and make the output of the Network Module safe.



Caution

If you wire the I/O in the state where the devices are powered ON, this may cause damage to the devices.

Always read and follow the information provided in all safety precautions in the manuals for each device to be wired.



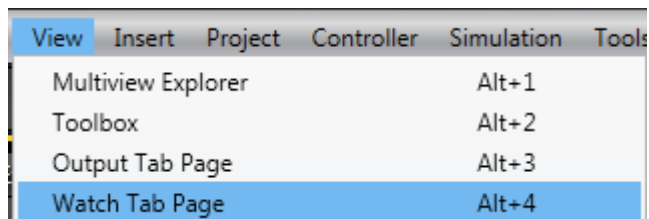
Caution

If you change the variable values on a Watch Tab Page when Sysmac Studio is online with the CPU Unit, the devices connected to the Controller may operate regardless of the operating mode of the CPU Unit.

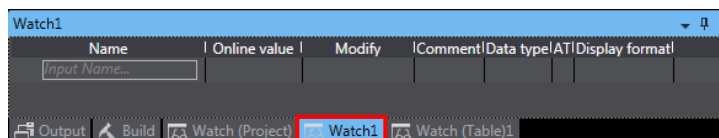
Always ensure safety before you change the variable values on a Watch Tab Page when Sysmac Studio is online with the CPU Unit.



- 1 Select **Watch Tab Page** from the View Menu in Sysmac Studio.



- 2 Select the **Watch1** Tab.



- 3 Click *Input Name* in the *Name* Column and enter the following variables.

EIP002_Standard_IO_ports_OUT[5]
EIP002_IOLink_port0_1_IN[32]
EIP002_IOLink_port0_1_IN[80]
EIP002_IOLink_port2_3_IN[32]
EIP002_IOLink_port2_3_IN[80]
EIP002_IOLink_port4_5_IN[32]
EIP002_IOLink_port4_5_IN[80]
EIP002_IOLink_port6_7_IN[32]
EIP002_IOLink_port6_7_IN[80]
EIP002_IOLink_port0_1_IN[0]
EIP002_IOLink_port0_1_IN[1]

Name
Input Name...



Name
EIP002_Standard_IO_ports_OUT[5]
EIP002_IOLink_port0_1_IN[32]
EIP002_IOLink_port0_1_IN[80]
EIP002_IOLink_port2_3_IN[32]
EIP002_IOLink_port2_3_IN[80]
EIP002_IOLink_port4_5_IN[32]
EIP002_IOLink_port4_5_IN[80]
EIP002_IOLink_port6_7_IN[32]
EIP002_IOLink_port6_7_IN[80]
EIP002_IOLink_port0_1_IN[0]
EIP002_IOLink_port0_1_IN[1]
Input Name...

- 4 Set the following display formats for the variables set in step 3.

EIP002_Standard_IO_ports_OUT[5]:

Binary

EIP002_IOLink_port0_1_IN[32]: **Binary**

EIP002_IOLink_port0_1_IN[80]: **Binary**

EIP002_IOLink_port2_3_IN[32]: **Binary**

EIP002_IOLink_port2_3_IN[80]: **Binary**

EIP002_IOLink_port4_5_IN[32]: **Binary**

EIP002_IOLink_port4_5_IN[80]: **Binary**

EIP002_IOLink_port6_7_IN[32]: **Binary**

EIP002_IOLink_port6_7_IN[80]: **Binary**

EIP002_IOLink_port0_1_IN[0]: **Decimal**

EIP002_IOLink_port0_1_IN[1]: **Binary**

Name	Online value	Modify	Data type	Display format
EIP002_Standard_IO_ports_OUT[5]	0000 0000		BYTE	Binary
EIP002_IOLink_port0_1_IN[32]	0000 0011		BYTE	Binary
EIP002_IOLink_port0_1_IN[80]	0000 0000		BYTE	Binary
EIP002_IOLink_port2_3_IN[32]	0000 0000		BYTE	Binary
EIP002_IOLink_port2_3_IN[80]	0000 0000		BYTE	Binary
EIP002_IOLink_port4_5_IN[32]	0000 0000		BYTE	Binary
EIP002_IOLink_port4_5_IN[80]	0000 0000		BYTE	Binary
EIP002_IOLink_port6_7_IN[32]	0000 0000		BYTE	Binary
EIP002_IOLink_port6_7_IN[80]	0000 0000		BYTE	Binary
EIP002_IOLink_port0_1_IN[0]	61		BYTE	Decimal
EIP002_IOLink_port0_1_IN[1]	0000 0000		BYTE	Binary



- 5 Enter 0000 0010 in the *Modify* Column for *EIP002_Standard_IO_ports_OUT[5]*.

The online value changes to 0000 0010.

Name	Online value	Modify
EIP002_Standard_IO_ports_OUT[5]	0000 0000	0000 0010
EIP002_IOLink_port0_1_IN[32]	0000 0011	
EIP002_IOLink_port0_1_IN[80]	0000 0000	



Name	Online value	Modify
EIP002_Standard_IO_ports_OUT[5]	0000 0010	0000 0010
EIP002_IOLink_port0_1_IN[32]	0000 0011	
EIP002_IOLink_port0_1_IN[80]	0000 0000	

6	Check that the LEDs on Network Module are lit green.																									
7	Enter 0000 0000 in the <i>Modify</i> Column for <i>EIP002_Standard_IO_ports_OUT[5]</i> .	<table border="1"> <thead> <tr> <th>Name</th><th>Online value</th><th>Modify</th></tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT[5]</td><td>0000 0010</td><td>0000 0000</td></tr> <tr> <td>EIP002_IOLink_port0_1_IN[32]</td><td>0000 0011</td><td></td></tr> <tr> <td>EIP002_IOLink_port0_1_IN[80]</td><td>0000 0000</td><td></td></tr> </tbody> </table> <p style="text-align: center;">↓</p> <table border="1"> <thead> <tr> <th>Name</th><th>Online value</th><th>Modify</th></tr> </thead> <tbody> <tr> <td>EIP002_Standard_IO_ports_OUT[5]</td><td>0000 0000</td><td>0000 0000</td></tr> <tr> <td>EIP002_IOLink_port0_1_IN[32]</td><td>0000 0011</td><td></td></tr> <tr> <td>EIP002_IOLink_port0_1_IN[80]</td><td>0000 0000</td><td></td></tr> </tbody> </table>	Name	Online value	Modify	EIP002_Standard_IO_ports_OUT[5]	0000 0010	0000 0000	EIP002_IOLink_port0_1_IN[32]	0000 0011		EIP002_IOLink_port0_1_IN[80]	0000 0000		Name	Online value	Modify	EIP002_Standard_IO_ports_OUT[5]	0000 0000	0000 0000	EIP002_IOLink_port0_1_IN[32]	0000 0011		EIP002_IOLink_port0_1_IN[80]	0000 0000	
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EIP002_Standard_IO_ports_OUT[5]	0000 0000	0000 0000																								
EIP002_IOLink_port0_1_IN[32]	0000 0011																									
EIP002_IOLink_port0_1_IN[80]	0000 0000																									
	The online value changes to 0000 0000.																									
8	Check that the LEDs on Network Module turn OFF.																									

9 Check the Ports 0-7 statuses of Network Module.

Check that the following online values of the variables are displayed.

EIP002_IOLink_port0_1_IN[32]:

0000 0011 (Port 0 in IO-Link mode)

EIP002_IOLink_port0_1_IN[80]:

0000 0000 (Port 1 in Standard I/O mode)

EIP002_IOLink_port2_3_IN[32]:

0000 0000 (Port 2 in Standard I/O mode)

EIP002_IOLink_port2_3_IN[80]:

0000 0000 (Port 3 in Standard I/O mode)

EIP002_IOLink_port4_5_IN[32]:

0000 0000 (Port 4 in Standard I/O mode)

EIP002_IOLink_port4_5_IN[80]:

0000 0000 (Port 5 in Standard I/O mode)

EIP002_IOLink_port6_7_IN[32]:

0000 0000 (Port 6 in Standard I/O mode)

EIP002_IOLink_port6_7_IN[80]:

0000 0000 (Port 7 in Standard I/O mode)

Name	Online value
EIP002_IOLink_port0_1_IN[32]	0000 0011
EIP002_IOLink_port0_1_IN[80]	0000 0000
EIP002_IOLink_port2_3_IN[32]	0000 0000
EIP002_IOLink_port2_3_IN[80]	0000 0000
EIP002_IOLink_port4_5_IN[32]	0000 0000
EIP002_IOLink_port4_5_IN[80]	0000 0000
EIP002_IOLink_port6_7_IN[32]	0000 0000
EIP002_IOLink_port6_7_IN[80]	0000 0000



Precautions for Correct Use

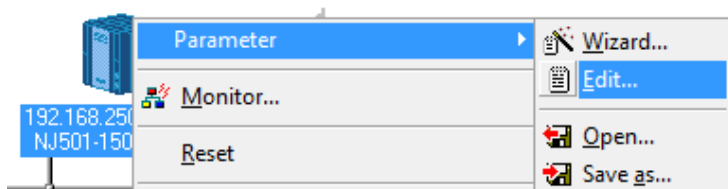
If the Ports 0-7 statuses of the Network Module are different from the ones described in step 9, go back to step 13 of 7.4.2. *Uploading the Network Configuration*. Check and change the device parameters for the Ports 0-7 functions of the Network Module.

After changing the device parameters, delete the already set connections by following the steps below, and then follow each step of 7.4.4. *Setting Connections* and the subsequent procedures again.

Note that changed device parameters of the Network Module are not reflected unless you retransfer the tag data link parameters to the Controller after deleting the already set connections and setting them as new ones again.

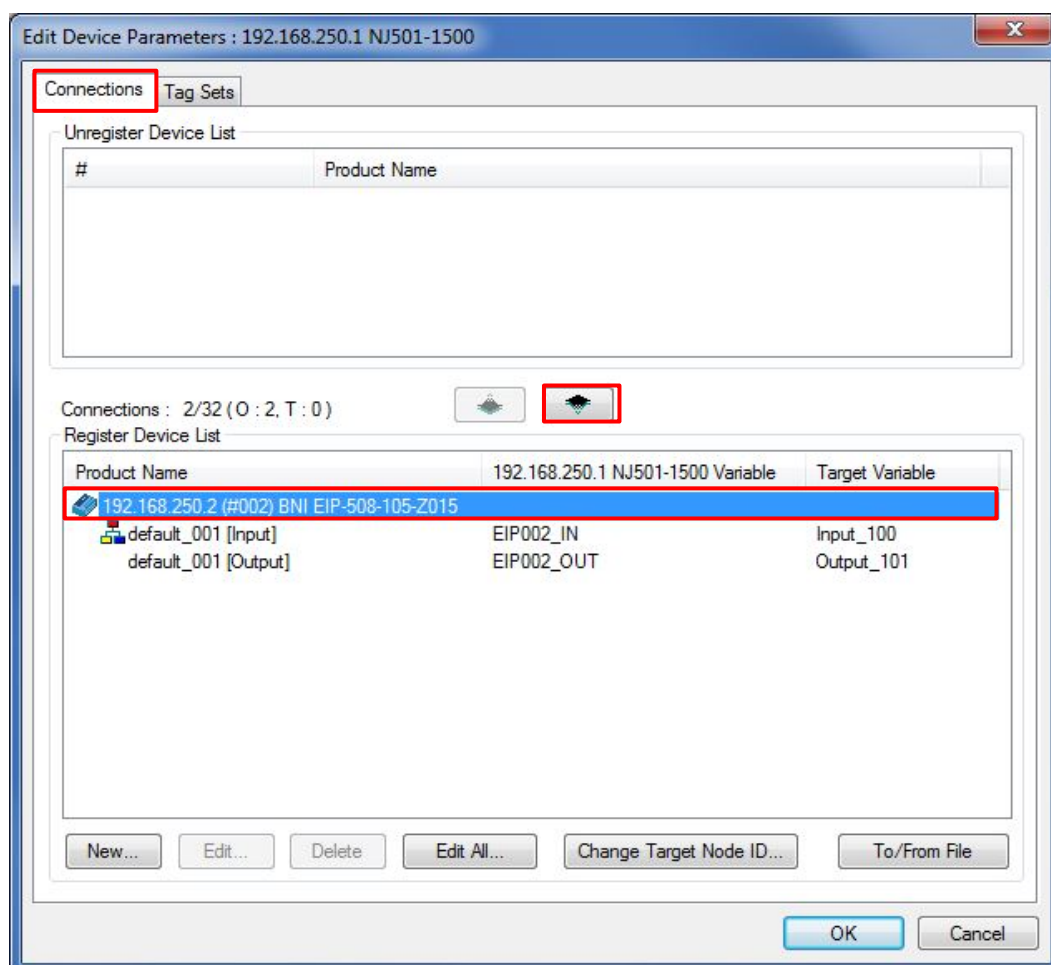
■How to delete the connections

(1) Right-click the device icon of Controller (Node 1) in the Network Configuration Pane and select **Parameter - Edit** from the menu.

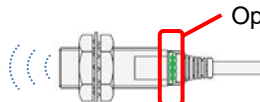


(2) Click the **Connections** Tab in the Edit Device Parameters Dialog Box.

(3) Select 192.168.250.2 from the Register Device List and click .



- 10 Make sure that there is no sensing object in front of Proximity Sensor and that Operation indicator is not lit (control output OFF).



Operation indicator (Orange) is not lit.

- 11 Check that the following online values of the variables are displayed.

EIP002_IOLink_port0_1_IN[0]: 61

EIP002_IOLink_port0_1_IN[1]:

0000 0000 (Bit 0 is "0".)

Name	Online value
EIP002_IOLink_port0_1_IN[0]	61
EIP002_IOLink_port0_1_IN[1]	0000 0000

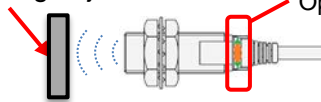
*The monitor output value varies depending on the surrounding environment of the location where Proximity Sensor is mounted.

*For details on each of the variables, refer to 6.2. *Global Variables*.

*You can check that the process data of Proximity Sensor (control output) is OFF. It shows the same status as in step 10.

- 12 Place Sensing object in front of Proximity Sensor and check that Operation indicator is lit orange (control output ON).

Sensing object



Operation indicator (Orange) is lit.

- 13 Check that the following online values of the variables are displayed.

EIP002_IOLink_port0_1_IN[0]: 176

EIP002_IOLink_port0_1_IN[1]:

0000 0001 (Bit 0 is "1".)

Name	Online value
EIP002_IOLink_port0_1_IN[0]	176
EIP002_IOLink_port0_1_IN[1]	0000 0001

*The monitor output value varies depending on the surrounding environment of the location where Proximity Sensor is mounted.

*For details on each of the variables, refer to 6.2. *Global Variables*.

*You can check that the process data of Proximity Sensor (control output) is ON. It shows the same status as in step 12.

8. Initialization Method

The setting procedures in this guide are based on the factory default settings.

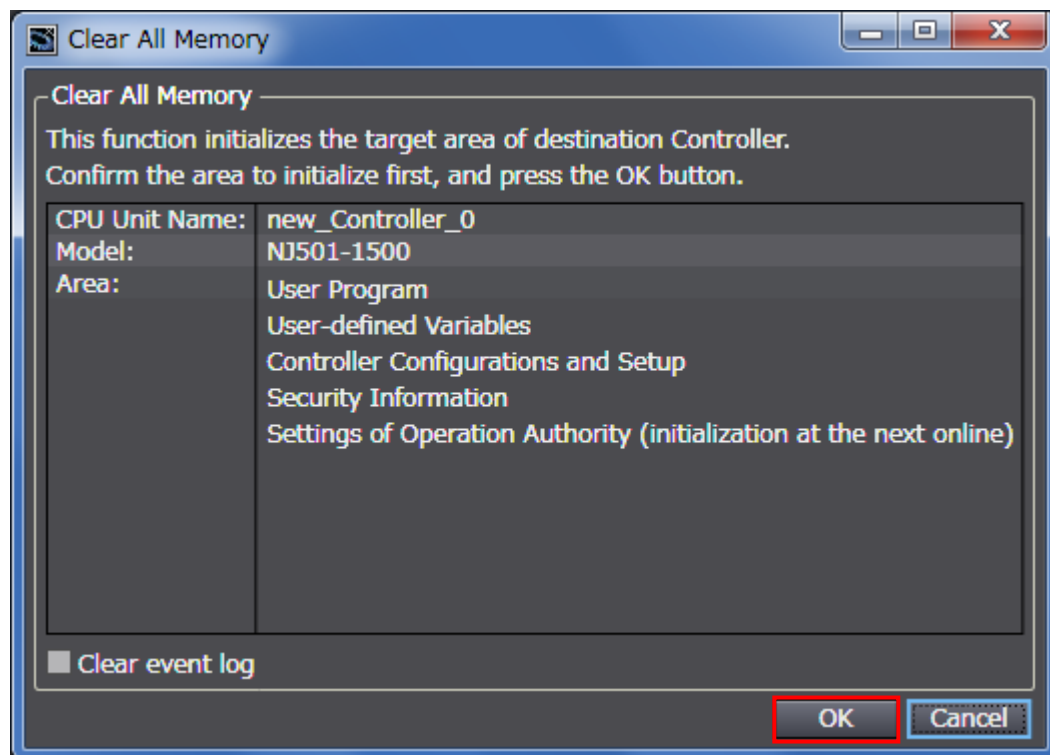
Some settings may not be applicable unless you use the devices with the factory default settings.

8.1. Initializing a Controller

To initialize the settings of a Controller, it is necessary to initialize a CPU Unit.

Change the operating mode of Controller to PROGRAM mode and select **Clear All Memory** from the Controller Menu in Sysmac Studio. The Clear All Memory Dialog Box is displayed.

Check the contents and click **OK**.



9. Revision History

Revision code	Date of revision	Description of revision
01	March 23, 2018	First edition

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