

Machine Automation Controller NJ-series

EtherNet/IP™ Connection Guide

OMRON Corporation

Displacement Sensor
(ZW-7000 series)

Network
Connection
Guide

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Table of Contents

1. Related Manuals	1
2. Terms and Definitions	2
3. Precautions	4
4. Overview	5
5. Applicable Devices and Device Configuration	6
5.1. Applicable Devices	6
5.2. Device Configuration	7
6. EtherNet/IP Settings	9
6.1. Parameters	9
6.2. Data Types to Use for Tag Data Links	10
6.3. Global variables	11
6.4. Tag Sets	14
6.5. Tag Data Link Table	14
7. EtherNet/IP Connection Procedure	15
7.1. Work Flow	15
7.2. Sensor Controller Setup	16
7.3. Controller Setup	26
7.4. EtherNet/IP Communication Status Check	43
8. Initialization method	48
8.1. Initializing Controller	48
8.2. Initializing Sensor Controller	48
9. Appendix: Procedure Using the Project File	49
9.1. Work Flow	49
9.2. Controller Setup	50
10. Revision History	52

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.

Cat. No.	Model	Manual name
W500	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ-series CPU Unit Hardware User's Manual
W501	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series CPU Unit Software User's Manual
W506	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series CPU Unit Built-in EtherNet/IP™ Port User's Manual
W504	SYSMAC-SE2□□□□	Sysmac Studio Version 1 Operation Manual
0969584-7	W4S1-05□ W4S1-03B	Switching Hub W4S1-series Users Manual
Z362	ZW-7000□	Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual
Z363	ZW-7000□	Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual for Communications Settings

2. Terms and Definitions

Term	Explanation and Definition
Node	<p>A controller and a device are connected to an EtherNet/IP network via EtherNet/IP ports. EtherNet/IP recognizes each EtherNet/IP port connected to the network as one node.</p> <p>When a device with two EtherNet/IP ports is connected to the EtherNet/IP network, EtherNet/IP recognizes this device as two nodes. EtherNet/IP achieves the communications between controllers or the communications between a controller and a device by exchanging data between these nodes connected to the network.</p>
Tag	<p>A minimum unit of the data that is exchanged on the EtherNet/IP network is called a tag. The tag is defined as a network variable or as a physical address, and it is assigned to the memory area of each device.</p>
Tag set	<p>In the EtherNet/IP network, a data unit that consists of two or more tags can be exchanged. The data unit consisting of two or more tags for the data exchange is called a tag set. Up to eight tags can be configured per tag set for OMRON controllers.</p>
Tag data link	<p>In EtherNet/IP, the tag and tag set can be exchanged cyclically between nodes without using a user program.</p> <p>This standard feature on EtherNet/IP is called a tag data link.</p>
Connection	<p>A connection is used to exchange data as a unit within which data concurrency is maintained. The connection consists of tags or tag sets. Creating the concurrent tag data link between the specified nodes is called a "connection establishment". When the connection is established, the tags or tag sets that configure the connection are exchanged between the specified nodes concurrently.</p> <p>There are two ways to specify the connection: one is to specify a tag set name (tag name), and the other is to specify an instance number of Assembly Object. In Sysmac Studio, the connection is set by specifying the instance number.</p>
Connection type	<p>There are two kinds of connection types for the tag data link connection. 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, multi-cast connections can decrease the communications load if one output tag set is sent to more than one node.</p>

Term	Explanation and Definition
Originator and Target	<p>To operate tag data links, one node requests the opening of a communications line called a "connection".</p> <p>The node that requests to open the connection is called an "originator", and the node that receives the request is called a "target".</p> <p>Each communication data is called an "originator variable" and a "target variable".</p> <p>In Sysmac Studio, the instance number is specified in the target variable.</p>
Tag data link parameter	<p>A tag data link parameter is the setting data to operate tag data links. It includes the data to set tags, tag sets, and connections.</p>
EDS file	<p>A file that describes the number of I/O points for the EtherNet/IP device and the parameters that can be set via EtherNet/IP.</p>
RPI	<p>This is an abbreviation for Requested Packet Interval.</p> <p>RPI indicates the data I/O refresh cycle that is set for each connection between the originator and the target.</p>

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 document without the permission of OMRON Corporation.
- (5) The information contained in this document is current as of June 2016. It is subject to change for improvement without notice.

The following notations are used in this document.



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 document describes the procedures for connecting Displacement Sensor (hereinafter referred to as Sensor Controller) to NJ Series Machine Automation Controller (hereinafter referred to as Controller) via EtherNet/IP, both produced by OMRON Corporation (hereinafter referred to as OMRON), and for checking their connections.

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.



Additional Information

Settings described in 7.3. *Controller Setup* are made in advance in the Sysmac Studio project file (hereinafter referred to as project file) listed below. Refer to *Section 9. Appendix: Procedure Using the Project File* for information on how to use the project file.

Obtain the project file with a latest version from OMRON Corporation.

Name	File name	Version
Sysmac Studio project file (extension: csm2)	P653_NJ_EIP_OMRON_ZW-70 00_EV100.csm2	Ver.1.00

5. Applicable Devices and Device Configuration

5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	NJ-series CPU Unit	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□
OMRON	Confocal Fiber Type Displacement Sensor	
	Sensor Controller	ZW-7000□
	Sensor Head	ZW-S70□□



Precautions for Correct Use

In this document, 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 connections.

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

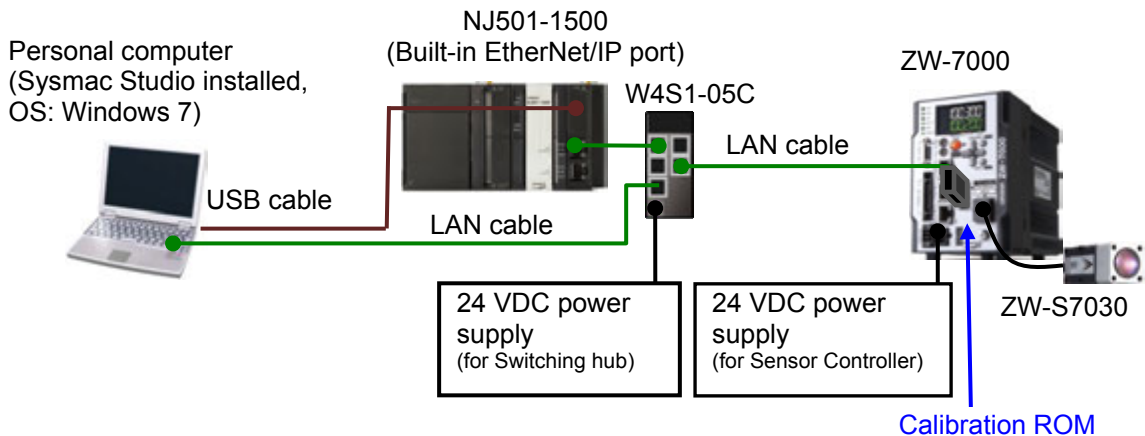
This document describes the procedures for establishing the network connections.

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 your OMRON representative.

5.2. Device Configuration

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



Manufacturer	Name	Model	Version
OMRON	NJ-series CPU Unit (Built-in EtherNet/IP port)	NJ501-1500	Ver. 1.10
OMRON	Power Supply Unit	NJ-PA3001	
OMRON	Switching hub	W4S1-05C	Ver. 1.0
-	24 VDC power supply (for Switching hub)	-	
OMRON	Sysmac Studio	SYSMAC-SE2□□□□	Ver. 1.15
-	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)	-	
OMRON	Sensor Controller	ZW-7000	Ver. 2.020
OMRON	Sensor Head	ZW-S7030	
OMRON	Calibration ROM	(Supplied with Sensor Head)	
OMRON	24 VDC power supply (for Sensor Controller) (24 VDC, 2.5A, 60W)	S8VS-06024	



Precautions for Correct Use

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



Additional Information

For specifications of 24 VDC power supply available for Switching hub, refer to the *Switching Hub W4S1-series Users Manual* (Cat. No. 0969584-7).



Additional Information

For specifications of 24 VDC power supply available for Sensor Controller, refer to the *Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual* (Cat. No. Z362).



Additional Information

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

6. EtherNet/IP Settings

This section describes the setting contents of parameters, global variables, tag sets, and tag data link table that are all defined in this document.

6.1. Parameters

The parameters that are set in this document are shown below.

6.1.1. Communication Settings of Personal Computer

The parameters for Sensor Controller are set using Ethernet communications with Personal Computer for settings.

The parameters required for connecting Personal computer for setting and Sensor Controller using Ethernet communications are shown below.

Item	Personal computer for setting	Sensor Controller
IP address	192.168.250.100	192.168.250.50 (Default)
Subnet mask	255.255.255.0	255.255.255.0

6.1.2. EtherNet/IP Communications Settings

The parameters required for connecting Controller to Sensor Controller via EtherNet/IP are shown below.

Item	Controller	Sensor Controller	Remarks
IP address	192.168.250.1	192.168.250.50 (Default)	Using Sysmac Studio.
Subnet mask	255.255.255.0	255.255.255.0	Using Sysmac Studio.
Fieldbus	-	EtherNet/IP	Using Sysmac Studio.

6.2. Data Types to Use for Tag Data Links

The following data types are used for tag data links to communicate with Sensor Controller.

■ Defining a data type for signal access (Union)

Data type to access control signals and status signals

Data type name	Data type
U_EIPFlag	UNION
F	BOOL[32]
W	DWORD

■ Defining a data type for command area access (Structure)

Data type to access the command area

Data type name	Data type	Sensor Controller data
S_EIPOutput	STRUCT	-
SensorHeadControlFlag1	U_EIPFlag	Sensor head control signal1 (32 bit)
SensorHeadControlFlag2	U_EIPFlag	Sensor head control signal2 (32 bit)
SensorHeadControlReserve	U_EIPFlag	Extended area (32 bit)
CommandCode	DWORD	Command code (32 bit)
CommandParam1	UINT	Command parameter 1 (16 bit)
CommandParam2	UINT	Command parameter 2 (16 bit)
CommandParam3	DINT	Command parameter 3 (32 bit)

■ Defining a data type for response and output area access (Structure)

Data type to access the response and output areas

Data type name	Data type	Sensor Controller data
S_EIPInput	STRUCT	-
SensorHeadStatusFlag1	U_EIPFlag	Sensor head status signal1 (32 bit)
SensorHeadStatusFlag2	U_EIPFlag	Sensor head status signal2 (32 bit)
SensorHeadStatusReserve	U_EIPFlag	Extended area (32 bit)
CommandCodeEcho	DWORD	Command code Echo (32 bit)
ResponseCode	UDINT	Response code (32 bit)
ResponseData	DINT	Response data (32 bit)
OutputData	DINT[8]	Output Data0 to 7 (32 bit)



Additional Information

For details on the union and structure types, refer to *Memory Assignments and Commands in 4-1 EtherNet/IP Connection of the Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual for Communications Settings* (Cat. No. Z363).



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 document, the data type is simplified by displaying BOOL[16].

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

6.3. Global variables

The Controller treats the data in tag data links as global variables.
The content of global variable settings is shown below.

■ Output area (Controller to Sensor Controller)

Variable	Data type	Data size
EIPOutput	S_EIPOutput	24 bytes

Sensor Controller data	Variable name	Base type
Sensor head control signal1 (Data type: U_EIPFlag)	EIPOutput.SensorHeadControlFlag1.F *1	BOOL[32]
	EIPOutput.SensorHeadControlFlag1.W	DWORD
Sensor head control signal2 (Data type: U_EIPFlag)	EIPOutput.SensorHeadControlFlag2.F *2	BOOL[32]
	EIPOutput.SensorHeadControlFlag2.W	DWORD
Extended area (Data type: U_EIPFlag)	EIPOutput.SensorHeadControlReserve.F	BOOL[32]
	EIPOutput.SensorHeadControlReserve.W	DWORD
Command code	EIPOutput.CommandCode	DWORD
Command parameter 1	EIPOutput.CommandParam1	UINT
Command parameter 2	EIPOutput.CommandParam2	UINT
Command parameter 3	EIPOutput.CommandParam3	DINT

*1: Assignment of Sensor Head control signal1

Variable: EIPOutput.SensorHeadControlFlag1.F

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
															EXE

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
															ERRCLR

EXE : Control command execution
ERRCLR : Error clear

*2: Assignment of Sensor Head control signal2

Variable: EIPOutput.SensorHeadControlFlag2.F

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
													LIGHT OFF	RESET	TIMING

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
								ZERO CLR_T4	ZERO CLR_T3	ZERO CLR_T2	ZERO CLR_T1	ZERO_ T4	ZERO_ T3	ZERO_ T2	ZERO_ T1

TIMING : Timing
RESET : Reset
LIGHTOFF : Light metering OFF
ZERO_Tn : TASK n Zero reset execution (n: 1 to 4)
ZEROCLR_Tn : TASK n Zero reset cancel (n: 1 to 4)

■ Input area (Sensor Controller to Controller)

Variable	Data type	Data size
EIPInput	S_EIPInput	56 bytes

Sensor Controller data	Variable name	Base type
Sensor Head status signal 1 (Data type: U_EIPFlag)	EIPInput.SensorHeadStatusFlag1.F *1	BOOL[32]
	EIPInput.SensorHeadStatusFlag1.W	DWORD
Sensor Head status signal 2 (Data type: U_EIPFlag)	EIPInput.SensorHeadStatusFlag2.F *2	BOOL[32]
	EIPInput.SensorHeadStatusFlag2.W	DWORD
Extended area (Data type: U_EIPFlag)	EIPInput.SensorHeadStatusReserve.F	BOOL[32]
	EIPInput.SensorHeadStatusReserve.W	DWORD
Command code Echo	EIPInput.CommandCodeEcho	DWORD
Response code	EIPInput.ResponseCode	UDINT
Response data	EIPInput.ResponseData	DINT
Output Data 0	EIPInput.OutputData	DINT[8]
Output Data 1		
Output Data 2		
Output Data 3		
Reserved		
Reserved		
Reserved		
Reserved		

*1: Assignment of Sensor Head status signal1

Variable: EIPInput.SensorHeadStatusFlag1.F

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
BANK1_E	BANK1_D	BANK1_C	BANK1_B	BANK1_A							RUN		READY		FLG

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
															ERR

FLG : Control command completion
 READY : Ready
 RUN : Run screen
 BANK1_A : Current bank number bit0
 |
 BANK1_E : Current bank number bit4
 ERR : Error

*2: Assignment of Sensor Head status signal2

Variable: EIPIInput.SensorHeadStatusFlag2.F

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				TASK STAT _T4	TASK STAT _T3	TASK STAT _T2	TASK STAT _T1		OR	GATE	ENABLE	STABIL ITY1	LIGHT	RESET STAT	HOLD STAT

31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
LOW _T4	PASS _T4	HIGH _T4	LOW _T3	PASS _T3	HIGH _T3	LOW _T2	PASS _T2	HIGH _T2	LOW _T1	PASS _T1	HIGH _T1	ZERO STAT_ T4	ZERO STAT_ T3	ZERO STAT_ T2	ZERO STAT_ T1

HOSDSTAT : Hold execution status

RESETSTAT : Reset execution state

LIGHT : Logical beam lighting state

STABILITY1 : Measurement position

ENABLE : Measurement state

GATE : Data output completed

OR : Overall judgment result

TASKSTAT_Tn : TASK n TASK status (n: 1 to 4)

ZEROSTAT_Tn : TASK n Zero reset state (n: 1 to 4)

HIGH_Tn : TASK n HIGH output (n: 1 to 4)

PASS_Tn : TASK n PASS output (n: 1 to 4)

LOW_Tn : TASK n LOW output (n: 1 to 4)



Additional Information

For details on command and response codes, refer to *Memory Assignments and Commands* in *4-1 EtherNet/IP Connection of the Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual for Communications Settings* (Cat. No. Z363).

6.4. Tag Sets

The content of tag set settings to operate tag data links is shown below.
The data in the tag sets are assigned with the following OUT No. and IN No.

■ Output area (Controller to Sensor Controller)

Originator variable (tag set name)		Data size (byte)
EIP050_OUT		24
OUT No.	Global variable name (tag name)	Data size (byte)
1	EIPOutput	24

■ Input area (Sensor Controller to Controller)

Originator variable (tag set name)		Data size (byte)
EIP050_IN		56
IN No.	Global variable name (tag name)	Data size (byte)
1	EIPInput	56

6.5. Tag Data Link Table

The content of tag data link table settings (connection settings) is shown below.
The values marked with red squares are taken from the values defined in the EDS file for Sensor Controller.

Connection Name	Connection I/O Type	RPI (ms)	Timeout Value
default_001	Consume Data From/Produce Data To	50.0	RPI x 4

Connection I/O Type	Input / Output	Target Variable (Sensor Controller set value: instance number)	Size (Byte)	Originator Variable (Tag set name)	Size (Byte)	Connection Type
Consume Data From/Produce Data To	Input	101	56	EIP050_IN	56	Multi-cast connection
	Output	100	24	EIP050_OUT	24	Point to Point connection



Precautions for Correct Use

The RPI and the timeout value are left as default values in this document.
When you set connections, change them according to your usage environment.

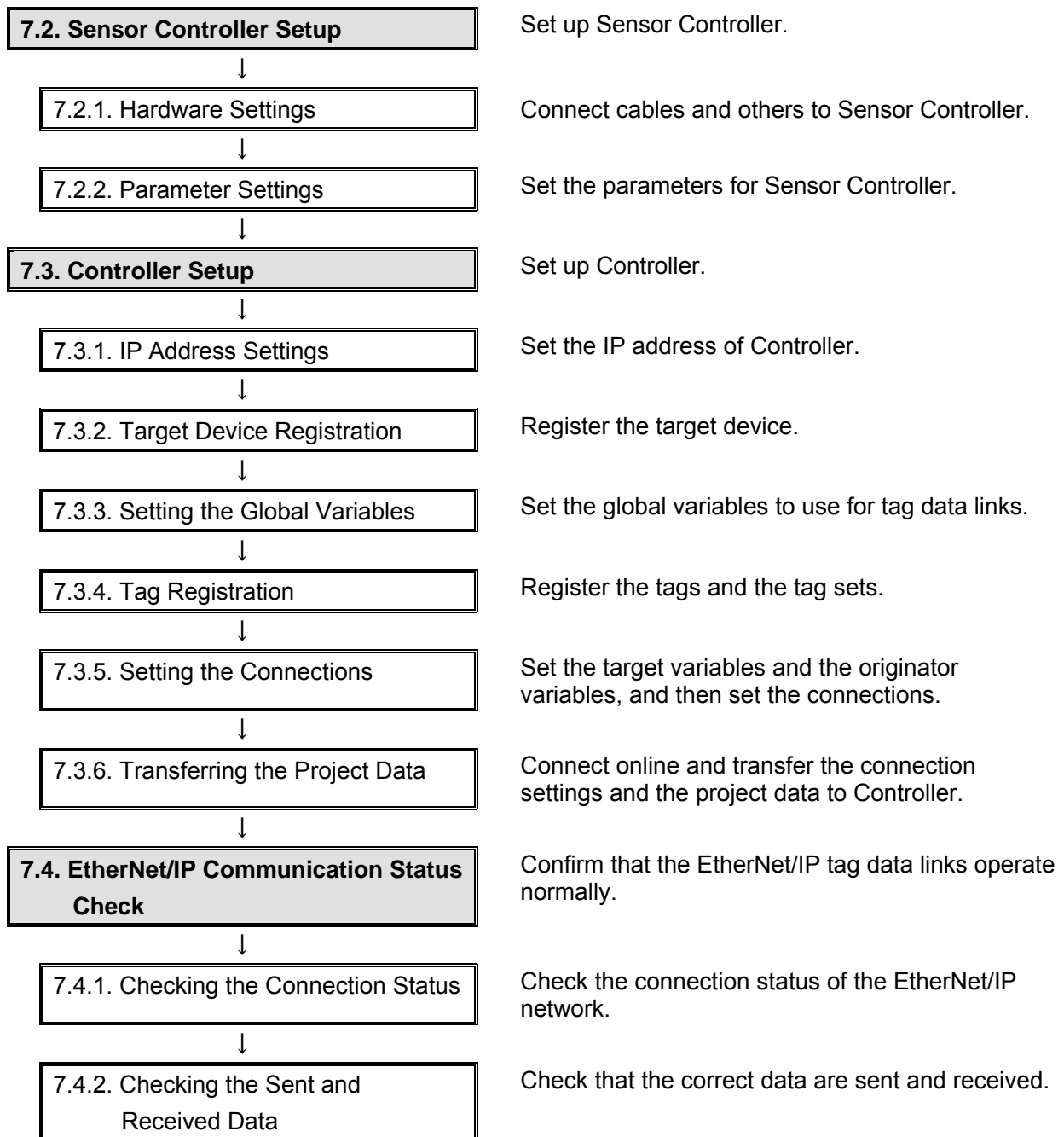
7. EtherNet/IP Connection Procedure

This section describes the procedures for connecting Sensor Controller and Controller on the EtherNet/IP network. The explanations of procedures for setting up Controller and Sensor Controller given in this document are based on the factory default settings.

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

7.1. Work Flow

Take the following steps to operate tag data links by connecting Sensor Controller and Controller via EtherNet/IP.



7.2. Sensor Controller Setup

Set up Sensor Controller.

7.2.1. Hardware Settings

Connect cables and others to Sensor Controller.



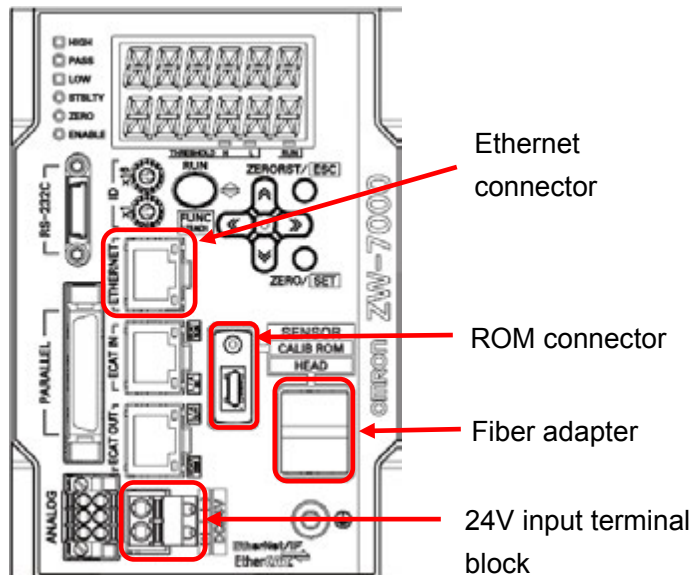
Precautions for Correct Use

Make sure that the power supply is OFF when you set up.

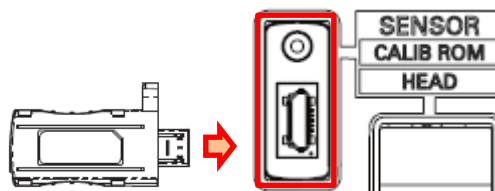
- 1 Make sure that Sensor Controller is powered OFF.

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

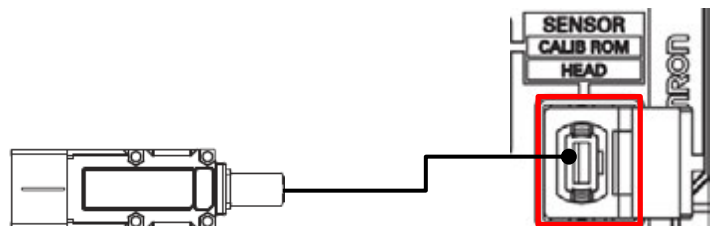
- 2 Check the position of connectors on Sensor Controller by referring to the figure on the right.

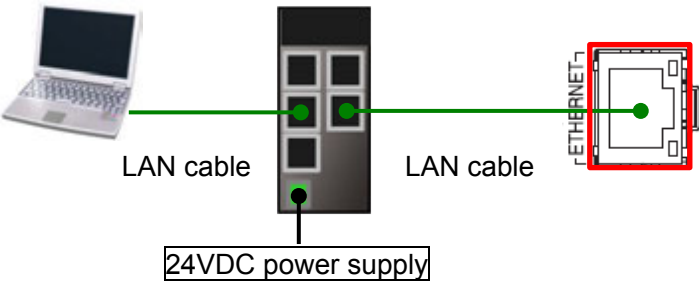
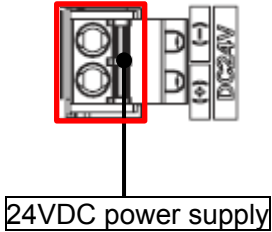


- 3 Connect Calibration ROM to ROM connector.



- 4 Connect Fiber connector on Sensor Head to Fiber adapter.



<p>5</p>	<p>Connect Switching hub to Personal computer and to Ethernet connector on Sensor Controller with LAN cables. Connect 24 VDC power supply (for Switching hub) to Switching hub.</p>	 <p>The diagram illustrates the connection for step 5. On the left, a laptop is connected to a switching hub (a rack-mounted device with four ports) via a green LAN cable. The switching hub is also connected to an Ethernet connector on a sensor controller (a rectangular board with various ports) via another green LAN cable. A 24VDC power supply is connected to the bottom of the switching hub. The Ethernet connector on the sensor controller is highlighted with a red box.</p>
<p>6</p>	<p>Connect 24 VDC power supply to 24 V input terminal block.</p> <p>*For details on specifications of 24 VDC power supply available for Sensor Controller, refer to the <i>Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual</i> (Cat. No. Z362).</p>	 <p>The diagram illustrates the connection for step 6. A 24VDC power supply is connected to a terminal block. The terminal block has two terminals labeled 'D' and 'C', and a label 'DC24V' next to it. The power supply connection point is highlighted with a red box.</p>

7.2.2. Parameter Settings

Set the parameters for Sensor Controller.

The parameters are set using Sysmac Studio.

Install Sysmac Studio on Personal computer beforehand.

Since Personal computer and Sensor Controller are connected with LAN cables, set the IP address of Personal computer to *192.168.250.100*.



Precautions for Correct Use

The Parameters for Sensor Controller are checked using Ethernet communications with Personal computer.

Note that there may be some changes required for the Personal computer settings depending on the state of Personal computer.

-
- 1 Turn ON Sensor Controller and Switching hub.
-

- 2 Set The IP address of Personal computer to *192.168.250.100*.

*The IP address can be changed in the following way.

- (1) Start Personal computer and log in using an administrator account. From the Windows Start menu, select **Control Panel - Network and Internet - Network and Sharing Center**, and click **Change Adapter Settings**. Double-click **Local Area Connection**.

*The procedure steps may be different depending on the environment settings of Personal computer.

- (2) The Local Area Connection Status Dialog Box is displayed. Click **Properties**.

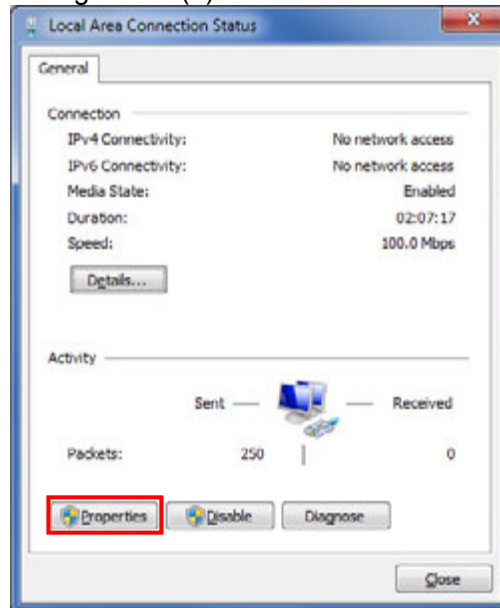
- (3) The Local Area Connection Properties Dialog Box is displayed. Select **Internet Protocol Version 4 (TCP/IPv4)**, and click **Properties**.

*The display differs depending on the configuration of Personal computer.

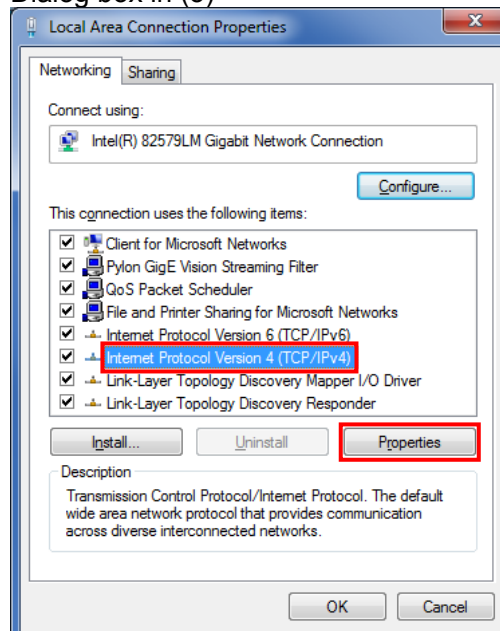
- (4) The Internet Protocol Version 4 (TCP/IPv4) Properties Dialog Box is displayed. Select **Use the following IP address**, and set the IP address to *192.168.250.100* and the subnet mask to *255.255.255.0*. Click **OK**.

- (5) Click **Close** or **OK** to close all the displayed dialog boxes.

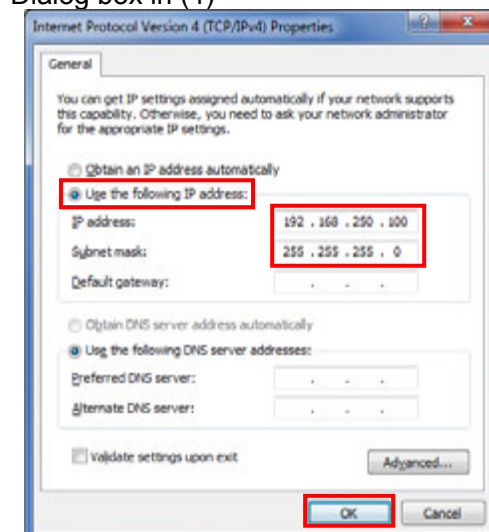
Dialog box in (2)


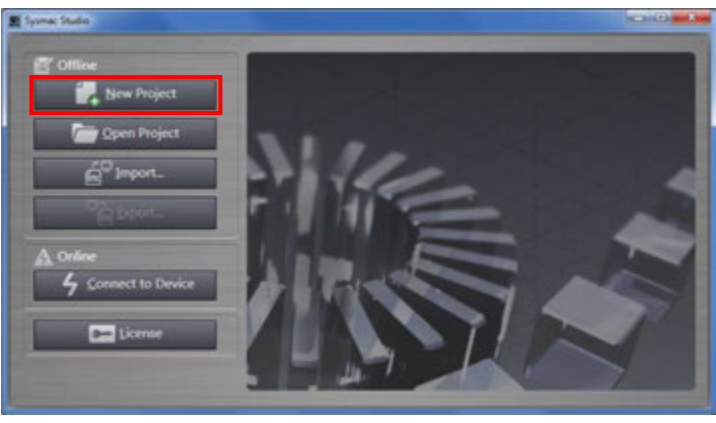
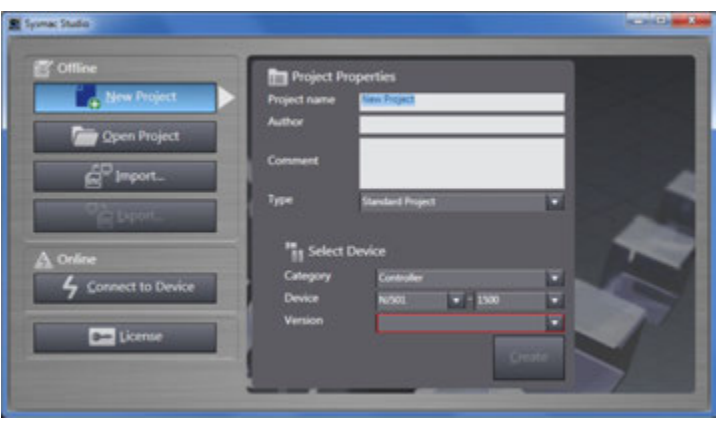
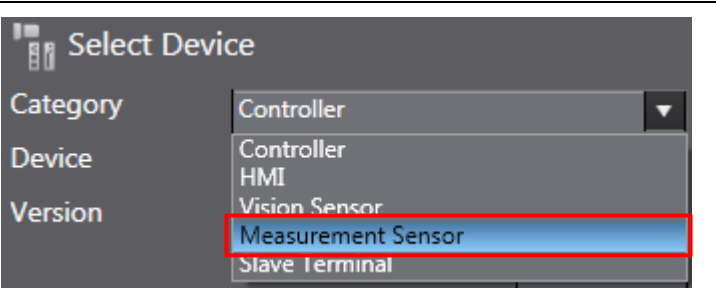
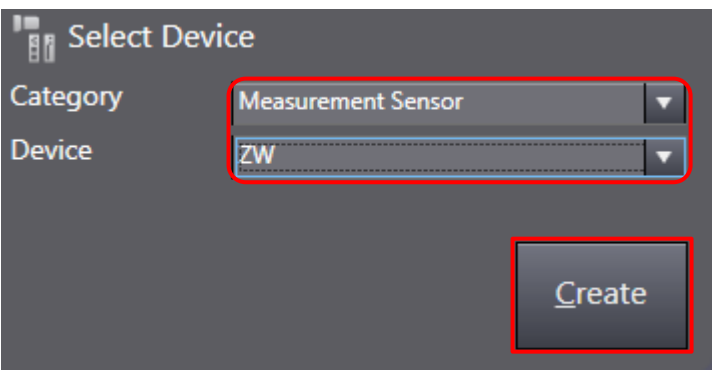


Dialog box in (3)



Dialog box in (4)



<p>3 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>4 Sysmac Studio starts. Click New Project.</p>	
<p>5 The Project Properties Dialog Box is displayed.</p>	
<p>6 Select Measurement Sensor from the pull-down list of Category in the Select Device Area.</p>	
<p>7 Check that the category and the device in the Select Device Area are set as shown below. Category: Measurement Sensor Device: ZW Click Create.</p>	

8 The Select Sensor Dialog Box is displayed.

Select *Specify a sensor* and set the IP address to

192.168.250.50.

Click **Confirm**.

Select Sensor

Specify a sensor

IP address 192.168.250.50

Confirm

Name	ZW
Sensor controller type	ZW
Version	1.2**
Sensor head type	ZW
Sensor serial No.	SAMH115

Enter the type

Model ZW-CE10

Version 1.2**

OK Cancel

9 The information of Sensor Controller and Sensor Head is displayed. Check that the information displayed there indicates the connected devices. Click **OK**.

*If Sensor Controller is not specified, the IP address and other settings may not be in the factory default state. Refer to the *Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual* (Cat. No. Z362) to check the values of IP address and others.

Select Sensor

Specify a sensor

IP address 192.168.250.50

Confirm

Name	ZW-7
Sensor controller type	ZW-7000
Version	2.020
Sensor head type	ZW-S7030
Sensor serial No.	SAMH115

Enter the type

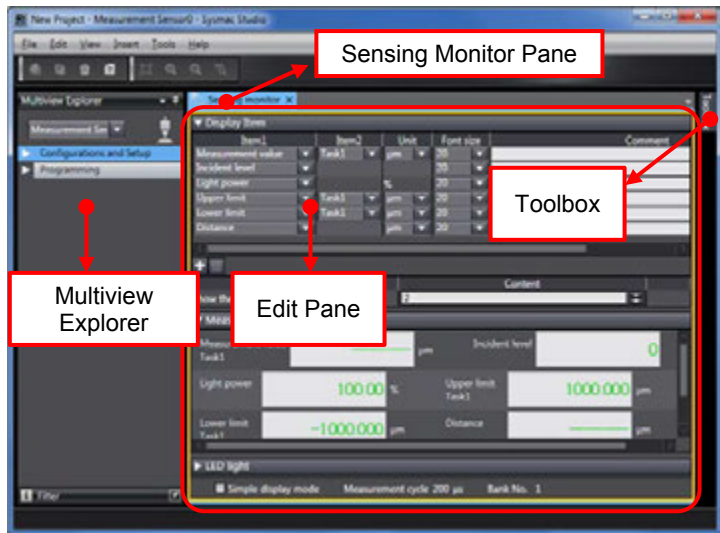
Model ZW-CE10

Version 1.2**

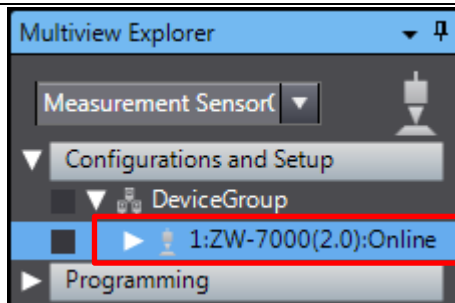
OK Cancel

10 The Sensor Controller project is displayed online.
When an online connection is established, the Edit Pane is surrounded with a yellow frame.

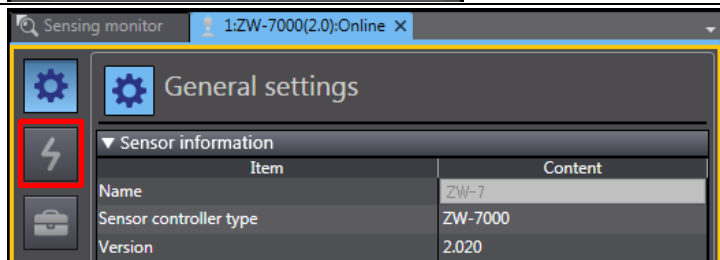
The following panes are displayed in this window.
Left: Multiview Explorer
Center: Edit Pane
The following tabs are displayed in the Edit Pane.
Center: Sensing Monitor Pane
Right: Toolbox



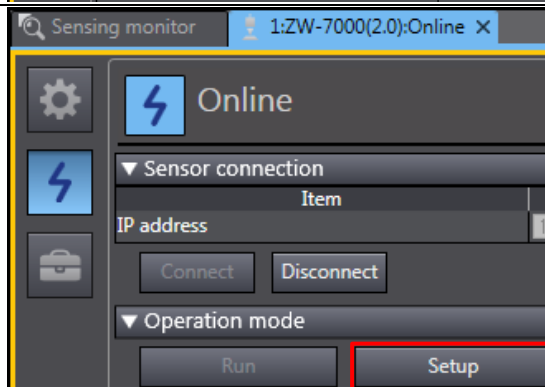
11 Double-click **1:ZW-7000(2.0):Online** under **Configurations and Setup - DeviceGroup** in the Multiview Explorer.



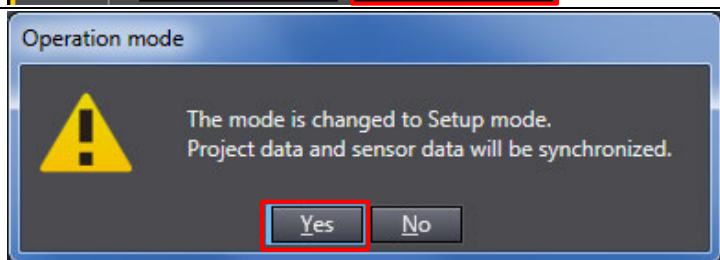
12 The 1:ZW-7000(2.0):Online Tab Page is displayed.
Click the **Online** Button.



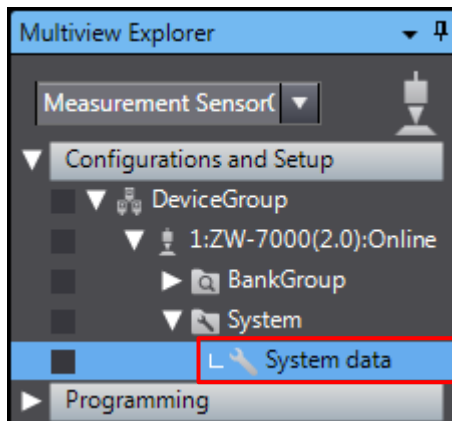
13 The Online is displayed.
Click **Setup** in the *Operation mode* Field.



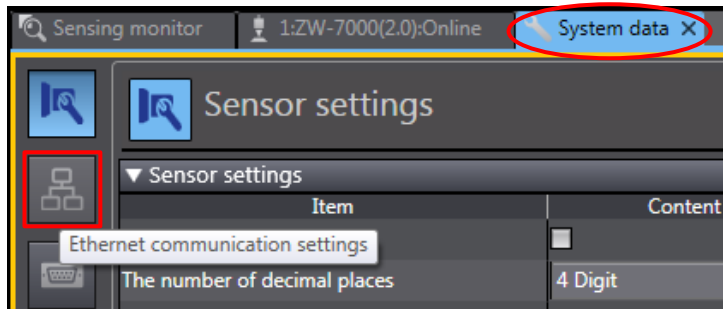
14 The Operation mode Dialog Box is displayed. Confirm that there is no problem, and click **Yes**.



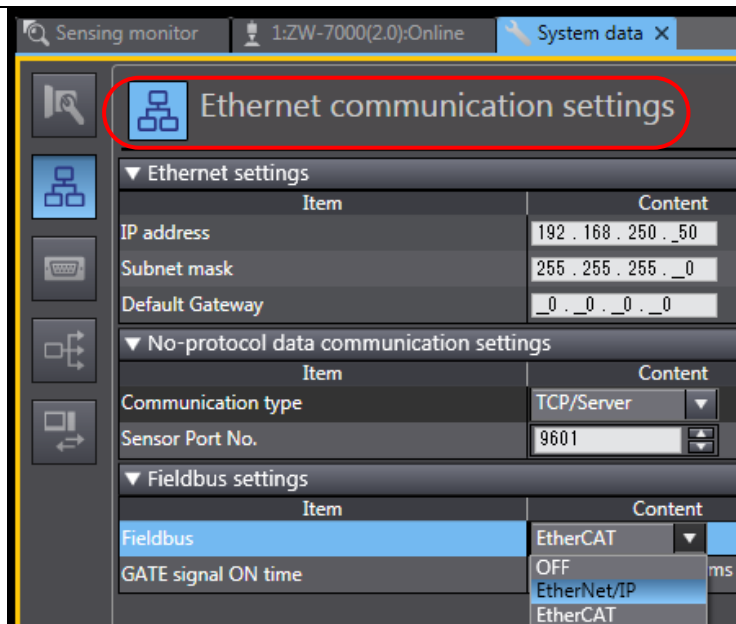
15 Double-click **System data** under **Configurations and Setup - DeviceGroup - 1:ZW-7000(2.0) :Online - System** in the Multiview Explorer.



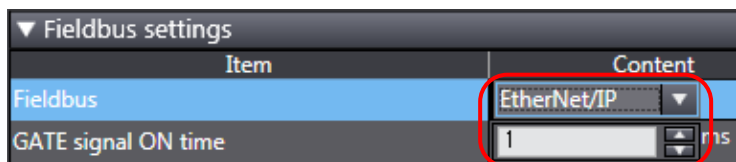
16 The System data Tab Page is displayed. Click the **Ethernet communication settings** Button.



17 The Ethernet communication settings view is displayed. Select **EtherNet/IP** from the pull-down list of Fieldbus.



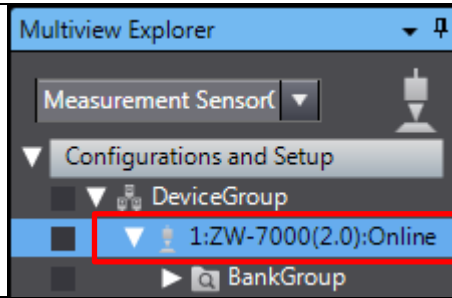
Check that the following fieldbus settings are made.
 Fieldbus: EtherNet/IP
 GATE signal ON time: 1 ms (Default)



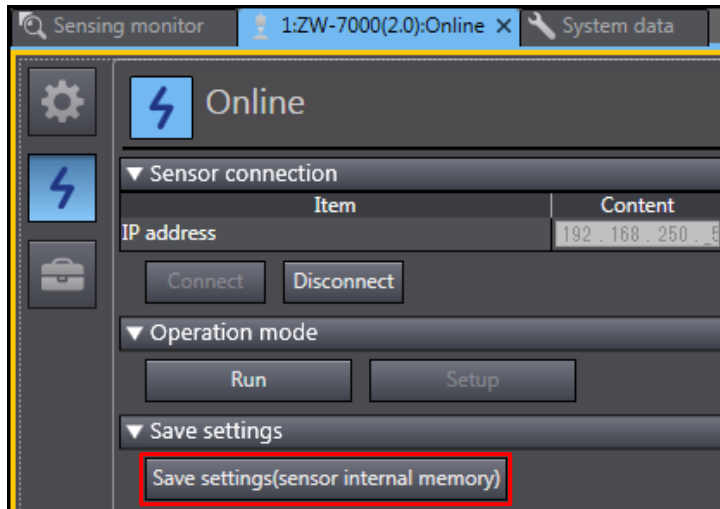
Precautions for Correct Use

If you use the hold function on Sensor Controller, set the value of GATE signal ON time greater than RPI.

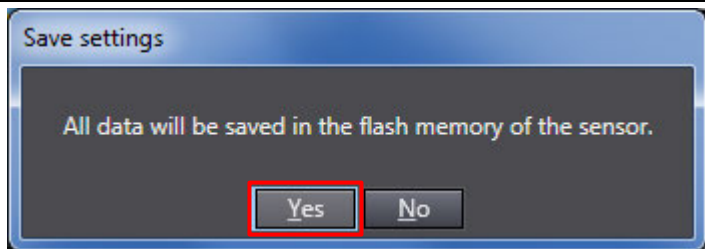
18 Double-click **1:ZW-7000(2.0):Online** under **Configurations and Setup - DeviceGroup** in the Multiview Explorer.



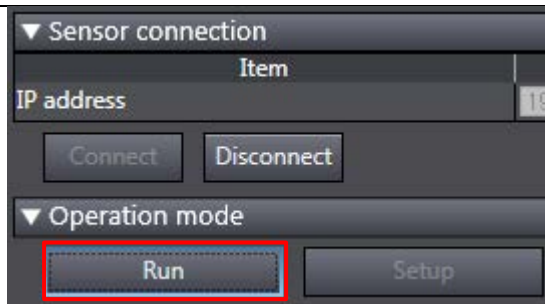
19 The Online view is displayed on the 1:ZW-7000(2.0):Online Tab Page. Click **Save settings (sensor internal memory)** in the *Save settings* Field.



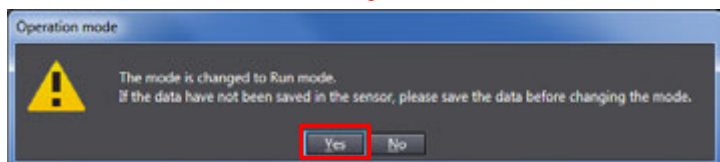
20 The Save settings Dialog Box is displayed. Check the contents and click **Yes**.



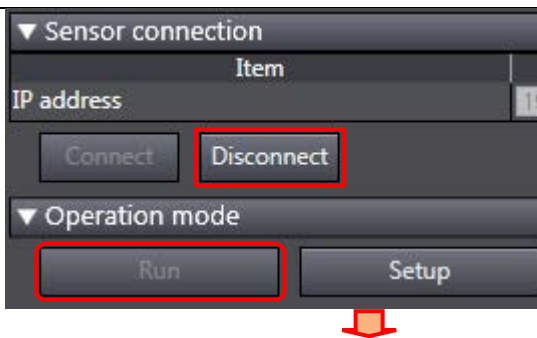
21 Click **Run** in the *Operation mode* Field.



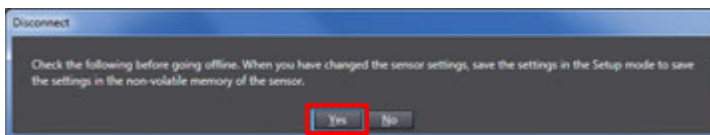
The Operation mode Dialog Box is displayed. Confirm that there is no problem, and click **Yes**.



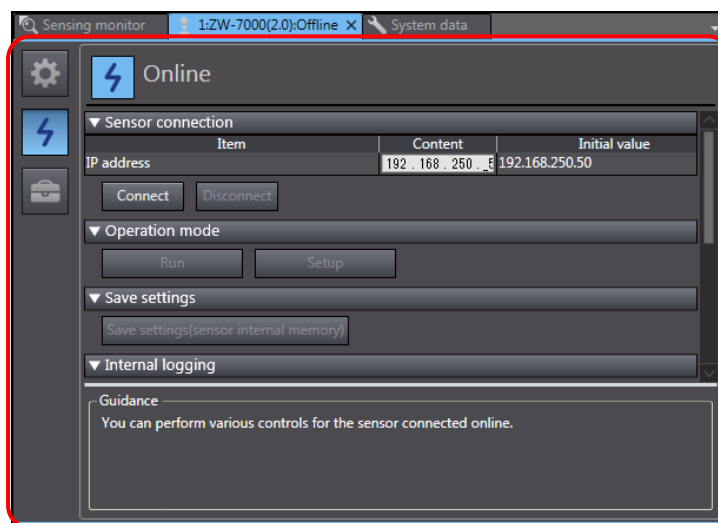
22 Check that the **Run** Button in the *Operation mode* Field becomes dim. Click **Disconnect** in the *Sensor connection* Field.



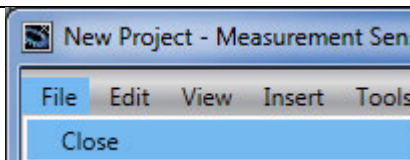
The Disconnect Dialog Box is displayed. Check the contents and click **Yes**.



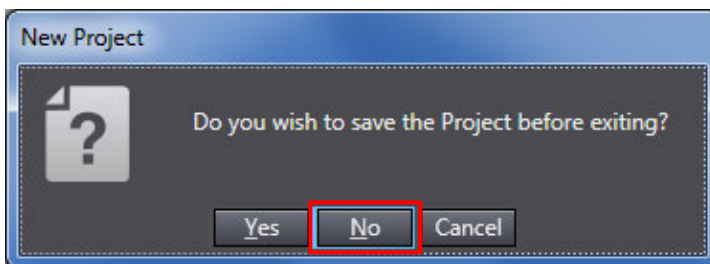
23 The connection goes offline, and the yellow frame surrounding the Edit Pane disappears.



24 Select **Close** from the File Menu.



The New Project Dialog Box is displayed. Click **No** if you do not need to save the project.



25 Turn OFF Sensor Controller and Switching hub.

26 Remove the LAN cable from Ethernet connector.

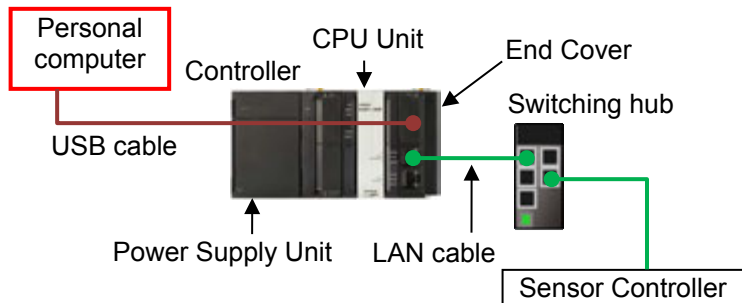
7.3. Controller Setup

Set up Controller.

7.3.1. IP Address Settings

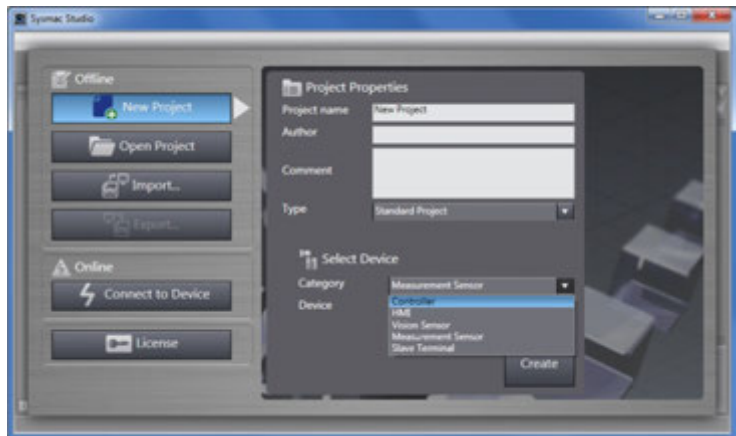
Set the IP address of Controller.

- 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. *Device Configuration*, connect Personal computer and Switching hub to Controller.



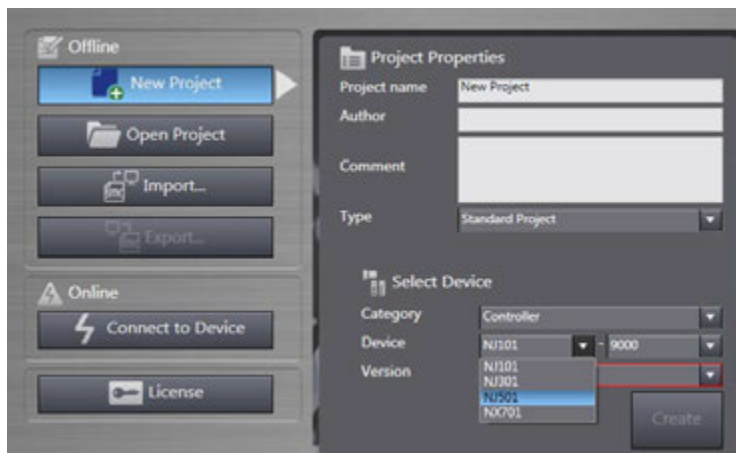
- 2 The Project Properties Dialog Box is displayed in Sysmac Studio. Select **Controller** from the pull-down list of Category in the Select Device Area.

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



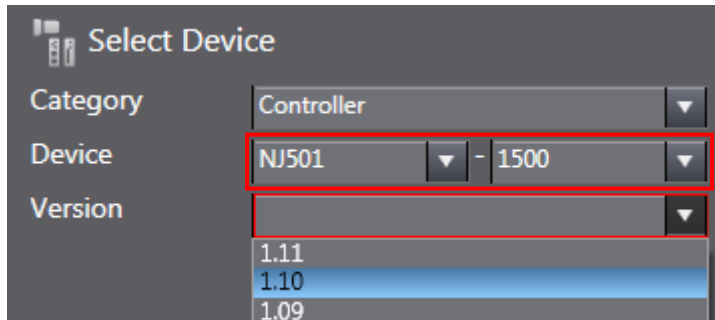
- 3 Select the device to use from the pull-down list of Device.

*NJ501-1500 is selected as an example of device in this document.

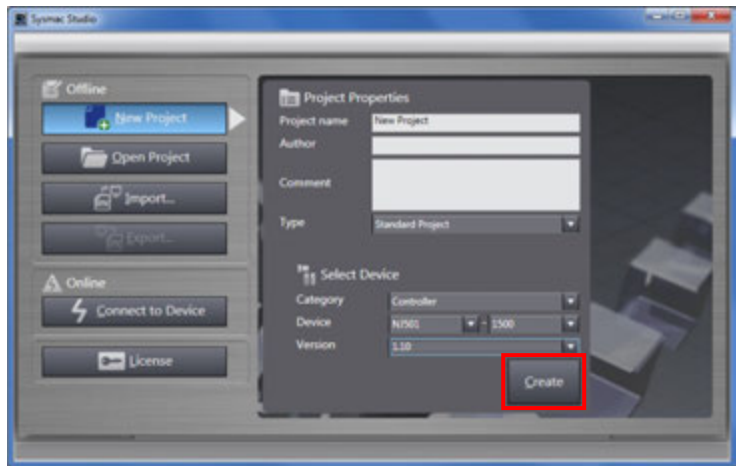


Select an applicable version from the pull-down list of Version.

*Although 1.10 is selected as an example in this document, select the version you actually use.

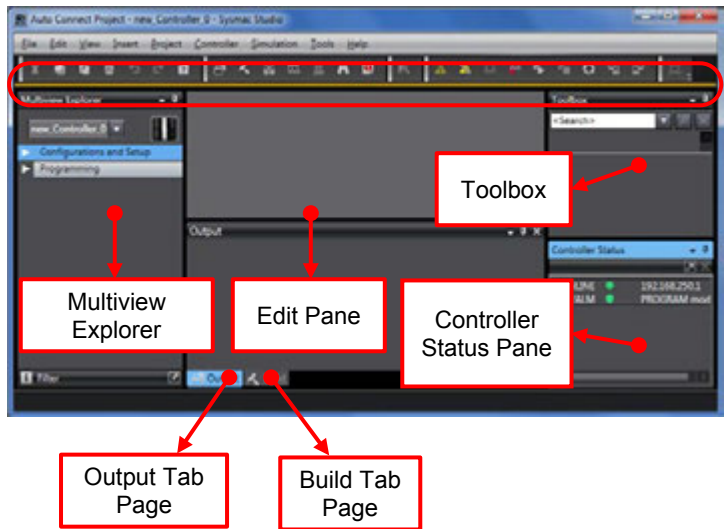


4 Click **Create**.

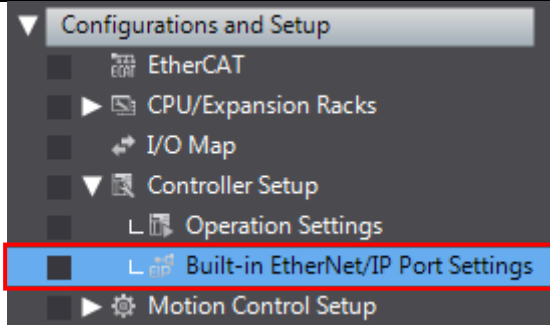


5 The New Project is displayed.

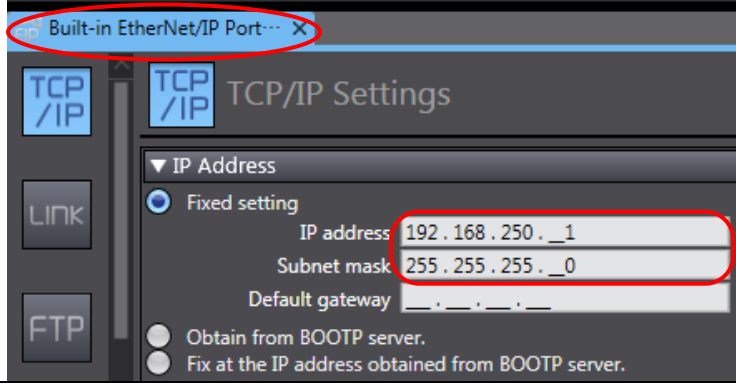
The following panes are displayed in this window.
 Left: Multiview Explorer
 Top right: Toolbox
 Bottom right: Controller Status Pane
 Middle top: Edit Pane
 The following tabs are displayed in the bottom middle of this window.
 Output Tab Page
 Build Tab Page



6 Double-click **Built-in EtherNet/IP Port Settings** under **Configurations and Setup - Controller Setup** in the Multiview Explorer.

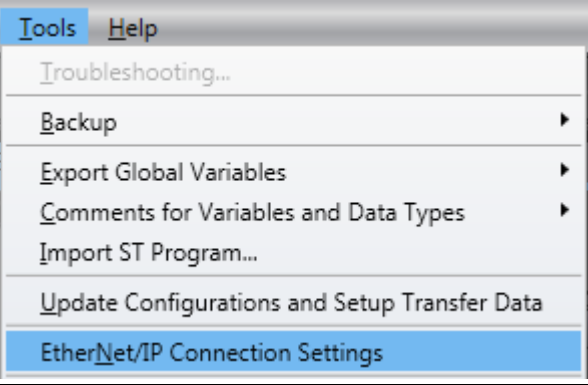
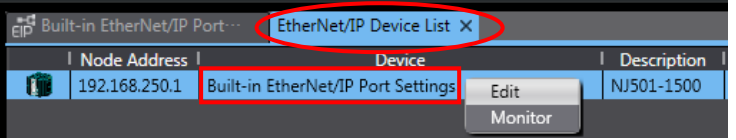
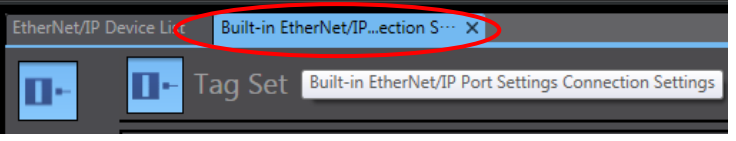
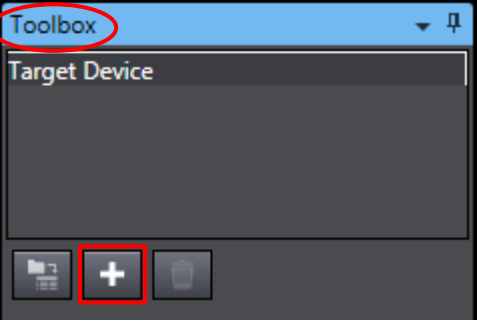
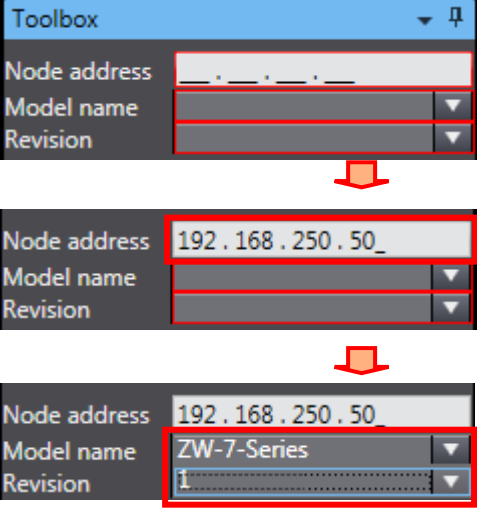


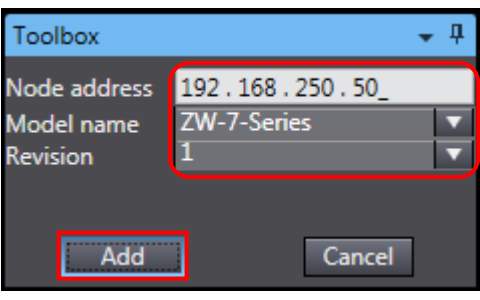
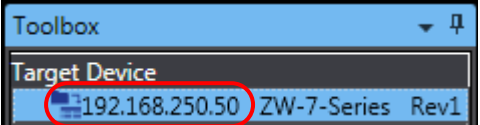
7 The Built-in EtherNet/IP Port Settings Tab Page is displayed in the Edit Pane.
 Check that the following settings are made in the *IP Address* Field.
 IP address: 192.168.250.1
 Subnet mask: 255.255.255.0



7.3.2. Target Device Registration

Register the target device.

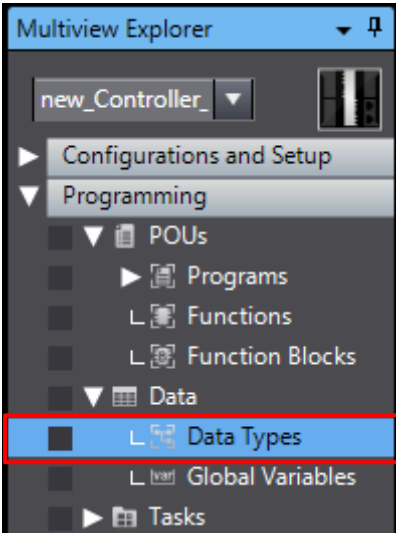
<p>1</p>	<p>Select EtherNet/IP Connection Settings from the Tools Menu.</p>	
<p>2</p>	<p>The EtherNet/IP Device List Tab Page is displayed in the Edit Pane. Right-click and select Edit from the menu while Built-in EtherNet/IP Port Settings is selected.</p>	
<p>3</p>	<p>The Built-in EtherNet/IP Port Settings Connection Settings Tab Page is displayed in the Edit Pane.</p>	
<p>4</p>	<p>Click the + Button in the Toolbox.</p>	
<p>5</p>	<p>Data fields of the target device registration are displayed.</p> <p>Enter <i>192.168.250.50</i> in the <i>Node address</i> Field.</p> <p>Select the following values from the pull-down lists of Model name and Revision.</p> <p>Model name: ZW-7-Series</p> <p>Revision: 1</p>	

6	Check the settings and click Add .	
7	192.168.250.50 is registered in Target Device of the Toolbox.	

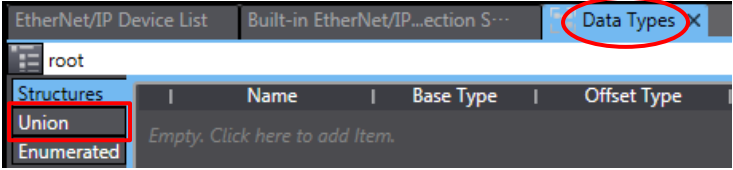
7.3.3. Setting the Global Variables

Set the global variables to use for tag data links.

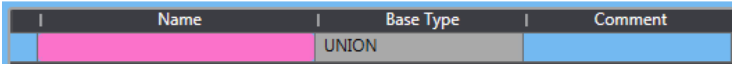
1 Double-click **Data Types** under **Programming - Data** in the Multiview Explorer.



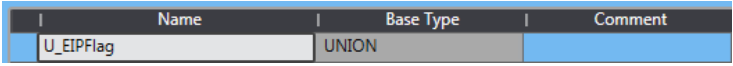
2 Click the **Union** Side Tab.



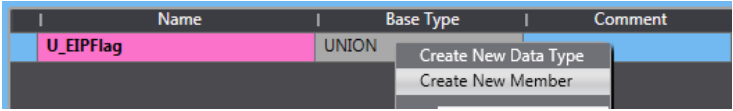
Click on a space in the *Name* Column to enter a new data type.



Enter *U_EIPFlag* in the *Name* Column.



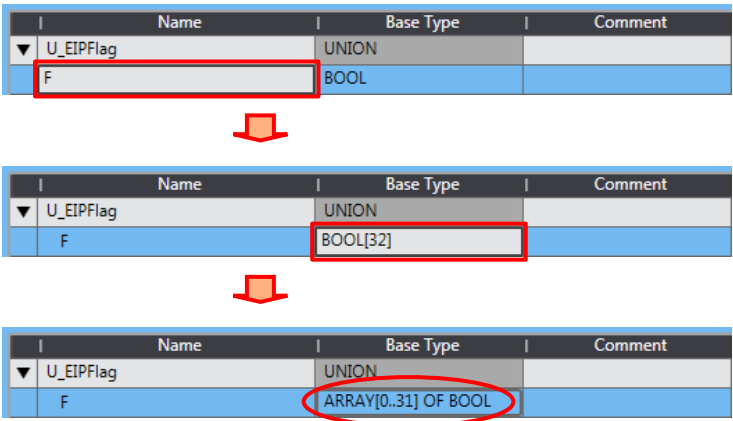
3 After entering, right-click and select **Create New Member** from the menu.



4 Enter the following data in the newly added row.

- Name: *F*
- Data type: *BOOL[32]*

*After entering, the base type changes to **ARRAY[0..31] OF BOOL** as shown on the right.



5	<p>In the same way as steps 3 and 4, enter the following data in the newly added row.</p> <ul style="list-style-type: none"> • Name: <i>W</i> Data type: <i>DWORD</i> 	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Comment</th> </tr> </thead> <tbody> <tr> <td>▼</td> <td>U_EIPFlag</td> <td>UNION</td> <td></td> </tr> <tr> <td></td> <td>F</td> <td>ARRAY[0..31] OF BOOL</td> <td></td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>W</td> <td>WORD</td> <td></td> </tr> </tbody> </table>		Name	Base Type	Comment	▼	U_EIPFlag	UNION			F	ARRAY[0..31] OF BOOL			W	WORD																					
	Name	Base Type	Comment																																			
▼	U_EIPFlag	UNION																																				
	F	ARRAY[0..31] OF BOOL																																				
	W	WORD																																				
6	<p>Click the Structures Side Tab.</p> <p>Click on a space in the <i>Name</i> Column to enter a new data type.</p> <p>Enter <i>S_EIPOutput</i> in the <i>Name</i> Column.</p>	<div style="border: 1px solid gray; padding: 2px; margin-bottom: 5px;"> EtherNet/IP Device List Built-in EtherNet/IP...ection S... Data Types X </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Offset Type</th> </tr> </thead> <tbody> <tr> <td>▼</td> <td>root</td> <td></td> <td></td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>Structures</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Union</td> <td colspan="2" style="text-align: center;"><i>Empty. Click here to add Item.</i></td> </tr> <tr> <td></td> <td>Enumerated</td> <td colspan="2"></td> </tr> </tbody> </table> <p style="text-align: center; color: red; font-weight: bold;">↓</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Offset Type</th> </tr> </thead> <tbody> <tr style="border: 2px solid red;"> <td></td> <td></td> <td>STRUCT</td> <td>NJ</td> </tr> </tbody> </table> <p style="text-align: center; color: red; font-weight: bold;">↓</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Offset Type</th> </tr> </thead> <tbody> <tr style="border: 2px solid red;"> <td></td> <td>S_EIPOutput</td> <td>STRUCT</td> <td>NJ</td> </tr> </tbody> </table>		Name	Base Type	Offset Type	▼	root				Structures				Union	<i>Empty. Click here to add Item.</i>			Enumerated				Name	Base Type	Offset Type			STRUCT	NJ		Name	Base Type	Offset Type		S_EIPOutput	STRUCT	NJ
	Name	Base Type	Offset Type																																			
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	Name	Base Type	Offset Type																																			
	S_EIPOutput	STRUCT	NJ																																			
8	<p>Enter <i>SensorHeadControlFlag1</i> in the <i>Name</i> Column.</p> <p>Enter <i>U_EIPFlag</i> in the <i>Base Type</i> Column.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Offset Type</th> </tr> </thead> <tbody> <tr> <td>▼</td> <td>S_EIPOutput</td> <td>STRUCT</td> <td>NJ</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>SensorHeadControlFlag1</td> <td>BOOL</td> <td></td> </tr> </tbody> </table> <p style="text-align: center; color: red; font-weight: bold;">↓</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> <th style="width: 15%;">Offset Type</th> </tr> </thead> <tbody> <tr> <td>▼</td> <td>S_EIPOutput</td> <td>STRUCT</td> <td>NJ</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>SensorHeadControlFlag1</td> <td>U_EIPFlag</td> <td></td> </tr> </tbody> </table>		Name	Base Type	Offset Type	▼	S_EIPOutput	STRUCT	NJ		SensorHeadControlFlag1	BOOL			Name	Base Type	Offset Type	▼	S_EIPOutput	STRUCT	NJ		SensorHeadControlFlag1	U_EIPFlag													
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▼	S_EIPOutput	STRUCT	NJ																																			
	SensorHeadControlFlag1	U_EIPFlag																																				
9	<p>In the same way as steps 7 and 8, enter the following data in the newly added rows.</p> <ul style="list-style-type: none"> • Name: <i>SensorHeadControlFlag2</i> Base type: <i>U_EIPFlag</i> • Name: <i>SensorHeadControlReserve</i> Base type: <i>U_EIPFlag</i> • Name: <i>CommandCode</i> Base type: <i>DWORD</i> • Name: <i>CommandParam1</i> Base type: <i>UINT</i> • Name: <i>CommandParam2</i> Base type: <i>UINT</i> • Name: <i>CommandParam3</i> Base type: <i>DINT</i> <p>*Enter each member of the data type in order from the top of the list described in 6.2. <i>Data Types to Use for Tag Data Links</i>.</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 60%;">Name</th> <th style="width: 20%;">Base Type</th> </tr> </thead> <tbody> <tr> <td>▼</td> <td>S_EIPOutput</td> <td>STRUCT</td> </tr> <tr> <td></td> <td>SensorHeadControlFlag1</td> <td>U_EIPFlag</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>SensorHeadControlFlag2</td> <td>U_EIPFlag</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>SensorHeadControlReserve</td> <td>U_EIPFlag</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>CommandCode</td> <td>DWORD</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>CommandParam1</td> <td>UINT</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>CommandParam2</td> <td>UINT</td> </tr> <tr style="border: 2px solid red;"> <td></td> <td>CommandParam3</td> <td>DINT</td> </tr> </tbody> </table>		Name	Base Type	▼	S_EIPOutput	STRUCT		SensorHeadControlFlag1	U_EIPFlag		SensorHeadControlFlag2	U_EIPFlag		SensorHeadControlReserve	U_EIPFlag		CommandCode	DWORD		CommandParam1	UINT		CommandParam2	UINT		CommandParam3	DINT									
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	CommandCode	DWORD																																				
	CommandParam1	UINT																																				
	CommandParam2	UINT																																				
	CommandParam3	DINT																																				

10 After entering, right-click and select **Create New Data Type** from the menu.

Name	Base Type	Offset Type
▼ S_EIPOutput	STRUCT	NJ
SensorHeadControlFlag1	U_EIPFlag	
SensorHeadControlFlag2	U_EIPFlag	
SensorHeadControlReserve	U_EIPFlag	
CommandCode	DWORD	
CommandParam1	UINT	
CommandParam2	UINT	
CommandParam3	DINT	



Enter *S_EIPInput* in the Name Column.

Name	Base Type	Offset Type
▼ S_EIPOutput	STRUCT	NJ
SensorHeadControlFlag1	U_EIPFlag	
SensorHeadControlFlag2	U_EIPFlag	
SensorHeadControlReserve	U_EIPFlag	
CommandCode	DWORD	
CommandParam1	UINT	
CommandParam2	UINT	
CommandParam3	DINT	
S_EIPInput	STRUCT	NJ

11 In the same way as steps 7 and 8, enter the following data in the newly added rows.

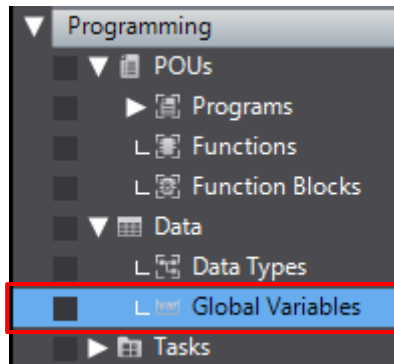
- Name: *SensorHeadStatusFlag1*
Base type: *U_EIPFlag*
- Name: *SensorHeadStatusFlag2*
Base type: *U_EIPFlag*
- Name: *SensorHeadStatusReserve*
Base type: *U_EIPFlag*
- Name: *CommandCodeEcho*
Base type: *DWORD*
- Name: *ResponseCode*
Base type: *DINT*
- Name: *ResponseData*
Base type: *DINT*
- Name: *OutputData*
Base type: *DINT[8]*

Name	Base Type
▼ S_EIPOutput	STRUCT
SensorHeadControlFlag1	U_EIPFlag
SensorHeadControlFlag2	U_EIPFlag
SensorHeadControlReserve	U_EIPFlag
CommandCode	DWORD
CommandParam1	UINT
CommandParam2	UINT
CommandParam3	DINT
▼ S_EIPInput	STRUCT
SensorHeadStatusFlag1	U_EIPFlag
SensorHeadStatusFlag2	U_EIPFlag
SensorHeadStatusReserve	U_EIPFlag
CommandCodeEcho	DWORD
ResponseCode	DINT
ResponseData	DINT
OutputData	ARRAY[0..7] OF DINT

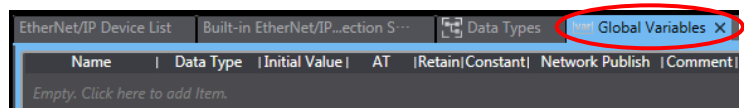
*After entering, the base type changes to ARRAY[0..7] OF DINT.

*Enter each member of the data type in order from the top of the list described in 6.2. *Data Types to Use for Tag Data Links*.

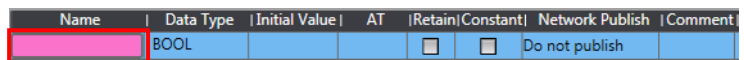
12 Double-click **Global Variables** under **Programming - Data** in the Multiview Explorer.



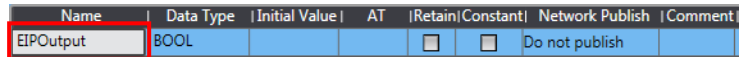
13 The Global Variables Tab Page is displayed in the Edit Pane.



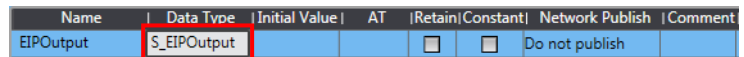
Click on a space in the *Name* Column to enter a new variable.



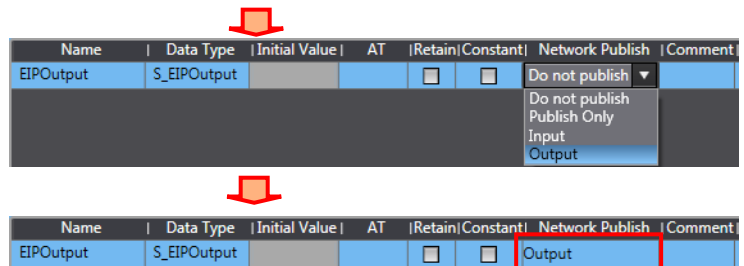
Enter *EIPOutput* in the *Name* Column.



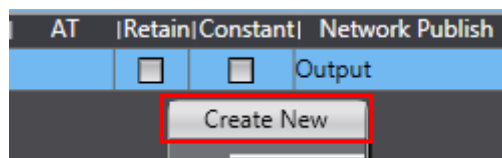
Enter *S_EIPOutput* in the *Data Type* Column.



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

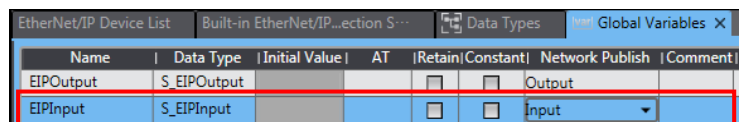


14 After entering, right-click and select **Create New** from the menu.

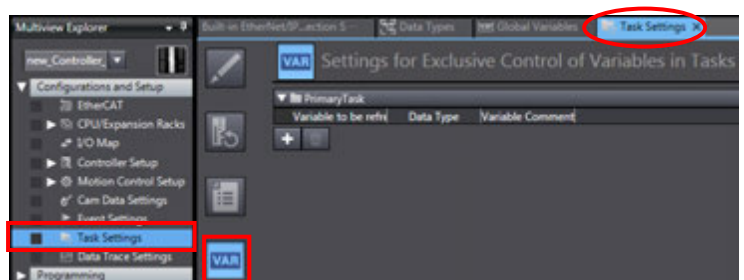


15 In the same way as step 13, enter the following data in the newly added row.

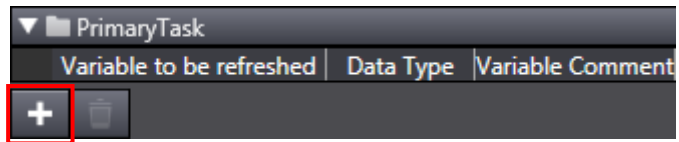
- Name: *EIPInput*
- Data type: *S_EIPInput*
- Network Publish: **Input**



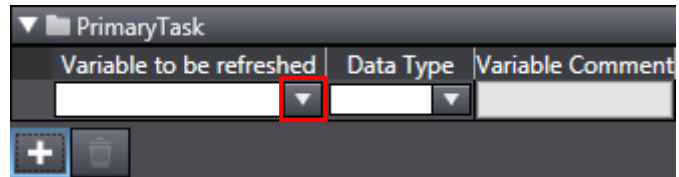
16 Double-click **Task Settings** under **Configurations and Setup** in the Multiview Explorer. The Task Settings Tab Page is displayed in the Edit Pane. Click **VAR**.



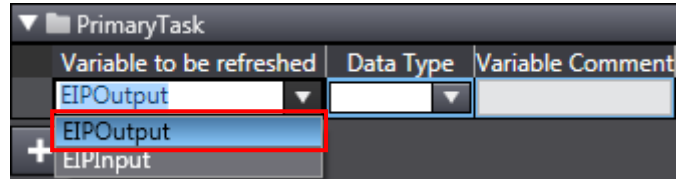
17 Click the + Button.



A row for new entry is added. Click the **Down Arrow** Button of the entry cell in the *Variable to be refreshed* Column (the left side of the figure).

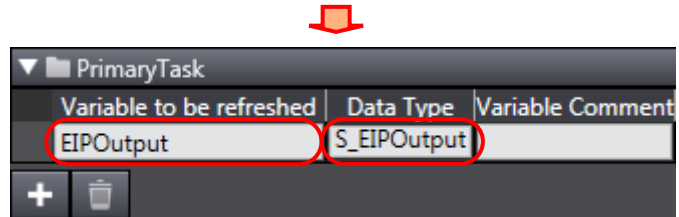


The variables set in the previous steps are displayed. Select *EIPOutput*.

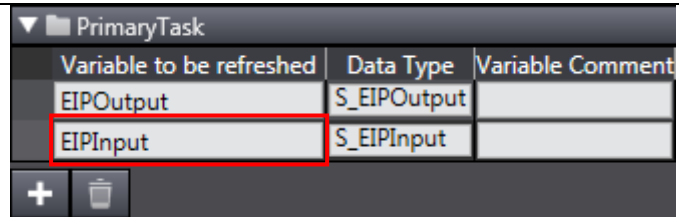


EIPOutput is added.

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



18 In the same way as step 17, add all the variables set in the previous steps to the *Variable to be refreshed* Column (the left side of the figure).



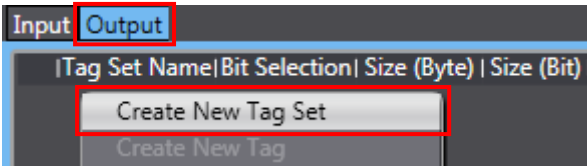
*Since the data types are displayed automatically, you do not need to set them.

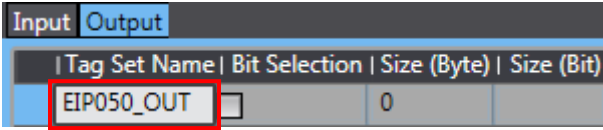
7.3.4. Tag Registration

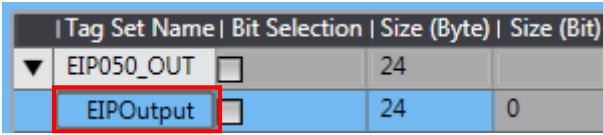
Register the tags and the tag sets.

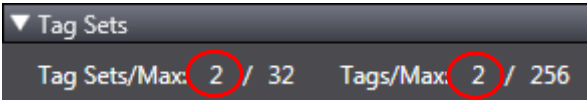
<p>1 Click the Tag Set Button on the Built-in EtherNet/IP Port Settings Connection Settings Tab Page. Select the Input Tab in Tag Sets.</p>	
<p>2 Right-click any open space on the Input Tab Page and select Create New Tag Set from the menu.</p>	
<p>3 A new tag name can be entered. Select the newly added entry cell. Enter <i>EIP050_IN</i>.</p>	
<p>4 Right-click and select Create New Tag from the menu while EIP050_IN is selected. A new tag name can be entered under EIP050_IN. Select the newly added entry cell. Set the global variable of IN No.1 as a tag, which is listed in 6.4. Tag Sets. *When the first character of the set variable name is typed, an appropriate name beginning with the character appears as shown on the right.</p>	

- 5 Select **Output** Tab.
Right-click any open space on the Output Tab Page and select **Create New Tag Set** from the menu.


- 6 A new name can be entered in the *Tag Set Name* Column.
In the same way as step 3, enter *EIP050_OUT*.


- 7 In the same way as step 4, set the global variable of OUT No. 1 as a tag, which is listed in 6.4. *Tag Sets*.






- 8 Check that Tag Sets shows 2 and that the number of Tags shows the same as the number of the global variables you set.



7.3.5. Setting the Connections

Set the target variables (that receive the open request) and the originator variables (that request for opening), and then set the connections (tag data link table).

<p>1 Click the Connection Button on the Built-in EtherNet/IP Port Settings Connection Settings Tab Page.</p>	
<p>2 Right-click any open space in Connection and select Add from the menu.</p>	
<p>3 A new connection can be entered. Select the newly added entry cell.</p> <p>Select 192.168.250.50 from the pull-down list of Target Device.</p>	
<p>4 The default_001 connection is created.</p> <p>Check that Consume Data From/Produce Data To is selected in the <i>Connection I/O Type</i> Column.</p>	
<p>5 The target variable and the originator variable can be set.</p>	
<p>6 Click the entry cell for Input in the <i>Target Variable</i> Column.</p> <p>When you press Ctrl + Space on the keyboard, an appropriate instance number appears.</p> <p>*The instance number also appears even when the first character of the instance number "1" is entered.</p> <p>Select the instance number.</p> <p>Likewise, set the target variable for Output.</p>	

<p>7</p> <p>Click the entry cell for Input in the <i>Originator Variable</i> Column. The pull-down list is displayed. Select the tag set name to use.</p> <p>Likewise, set the originator variable for Output.</p>	<p>Click the entry cell for Input in the <i>Originator Variable</i> Column. The pull-down list is displayed. Select the tag set name to use.</p> <p>Likewise, set the originator variable for Output.</p>	<table border="1"> <thead> <tr> <th>Input/Out</th> <th>Target Variable</th> <th>Size [Byte]</th> <th>Originator Variable</th> <th>Size [Byte]</th> </tr> </thead> <tbody> <tr> <td>Input</td> <td>101</td> <td>56</td> <td></td> <td>---</td> </tr> <tr> <td>Output</td> <td>100</td> <td>24</td> <td>EIP050_IN</td> <td>---</td> </tr> </tbody> </table> <p style="text-align: center;"></p> <table border="1"> <thead> <tr> <th>Input/Out</th> <th>Target Variable</th> <th>Size [Byte]</th> <th>Originator Variable</th> <th>Size [Byte]</th> </tr> </thead> <tbody> <tr> <td>Input</td> <td>101</td> <td>56</td> <td>EIP050_IN</td> <td>56</td> </tr> <tr> <td>Output</td> <td>100</td> <td>24</td> <td>EIP050_OUT</td> <td>24</td> </tr> </tbody> </table>	Input/Out	Target Variable	Size [Byte]	Originator Variable	Size [Byte]	Input	101	56		---	Output	100	24	EIP050_IN	---	Input/Out	Target Variable	Size [Byte]	Originator Variable	Size [Byte]	Input	101	56	EIP050_IN	56	Output	100	24	EIP050_OUT	24
Input/Out	Target Variable	Size [Byte]	Originator Variable	Size [Byte]																												
Input	101	56		---																												
Output	100	24	EIP050_IN	---																												
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Input	101	56	EIP050_IN	56																												
Output	100	24	EIP050_OUT	24																												
<p>8</p> <p>Set the connection type, RPI [ms], and timeout value as required.</p> <p>*In this document, the default values are used for these settings.</p>	<p>Set the connection type, RPI [ms], and timeout value as required.</p> <p>*In this document, the default values are used for these settings.</p>	<table border="1"> <thead> <tr> <th>Originator Variable</th> <th>Size [Byte]</th> <th>Connection Type</th> <th>RPI [ms]</th> <th>Timeout Value</th> </tr> </thead> <tbody> <tr> <td>EIP050_IN</td> <td>56</td> <td>Multi-cast connection</td> <td>50.0</td> <td>RPI x 4</td> </tr> <tr> <td>EIP050_OUT</td> <td>24</td> <td>Point to Point connection</td> <td></td> <td></td> </tr> </tbody> </table>	Originator Variable	Size [Byte]	Connection Type	RPI [ms]	Timeout Value	EIP050_IN	56	Multi-cast connection	50.0	RPI x 4	EIP050_OUT	24	Point to Point connection																	
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<p>9</p> <p>Check that Connections shows 2.</p>	<p>Check that Connections shows 2.</p>	<table border="1"> <tr> <td colspan="2">▼ Connection</td> </tr> <tr> <td>Connections/Max:</td> <td>2 32</td> </tr> <tr> <td>Target Device</td> <td> Connection Name</td> </tr> </table>	▼ Connection		Connections/Max:	2 32	Target Device	Connection Name																								
▼ Connection																																
Connections/Max:	2 32																															
Target Device	Connection Name																															


7.3.6. Transferring the Project Data

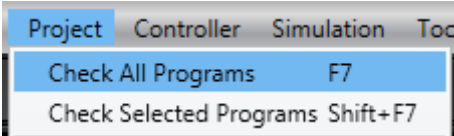
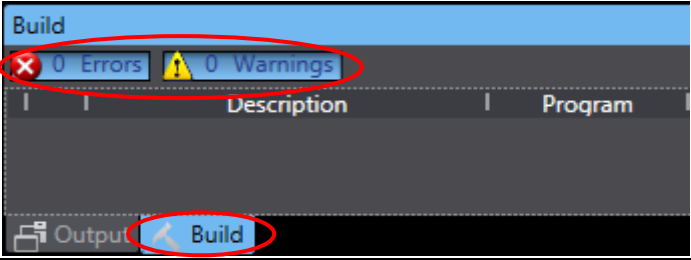
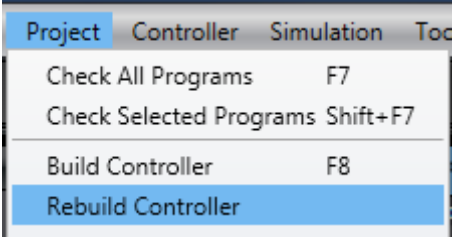
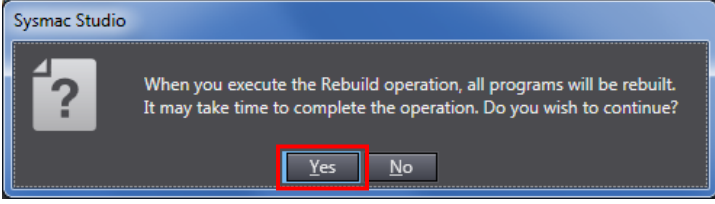
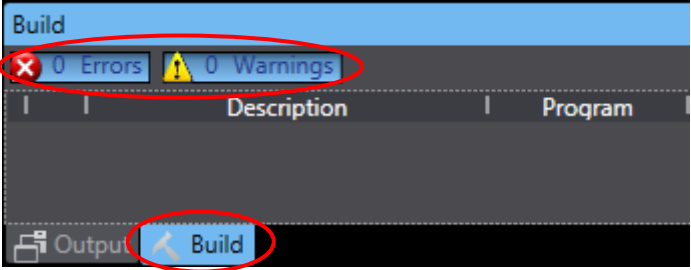
Connect online and transfer the connection settings and the project data to Controller.

⚠ **WARNING**

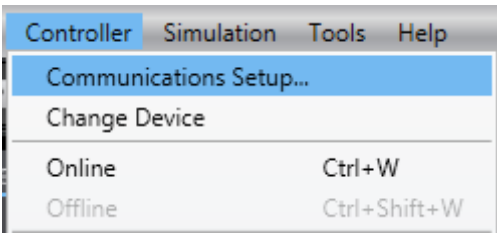
When you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from Sysmac Studio, the devices or machines may perform unexpected operation regardless of the operating mode of CPU Unit.

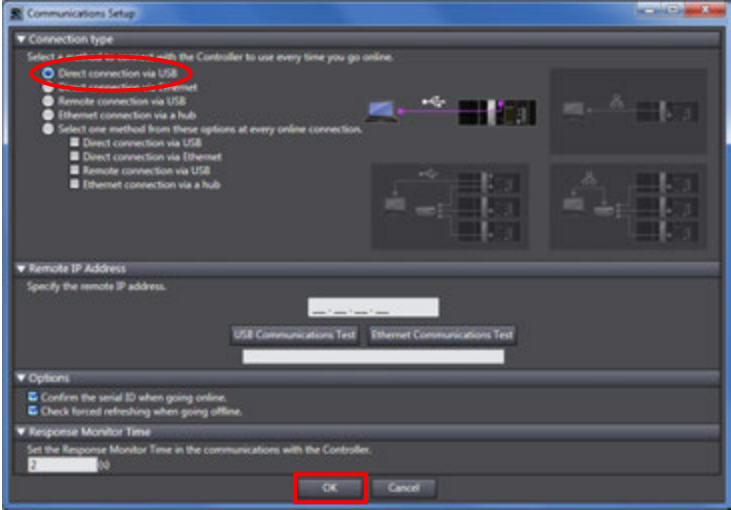
Always confirm safety at the destination node before you transfer the project data.



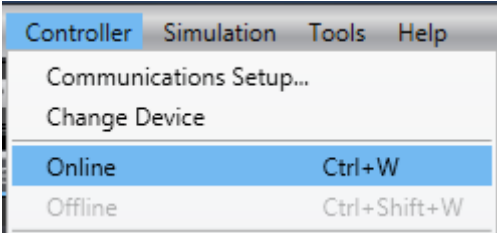
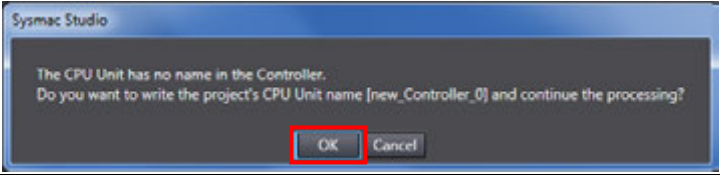
- | | | |
|---|---|--|
| 1 | Turn ON Controller, Switching hub, and Sensor Controller. | |
| 2 | Select Check All Programs from the Project Menu. |  |
| 3 | The Build Tab Page is displayed.
Check that "0 Errors" and "0 Warnings" are displayed. |  |
| 4 | Select Rebuild Controller from the Project Menu. |  |
| 5 | A confirmation dialog box is displayed. Check the contents and click Yes . |  |
| 6 | Check that "0 Errors" and "0 Warnings" are displayed on the Build Tab Page. |  |

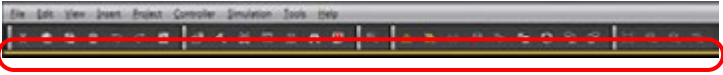
- 7 Select **Communications Setup** from the Controller Menu.


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


- 9 Select **Online** from the Controller Menu. A confirmation dialog box is displayed. Check the contents and click OK.

*The displayed dialog depends 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 bar is displayed under the toolbar.

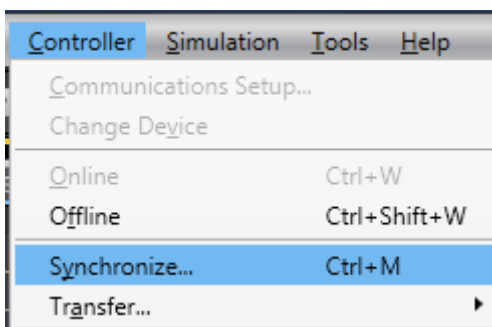




Additional Information

For details on the online connections to 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.



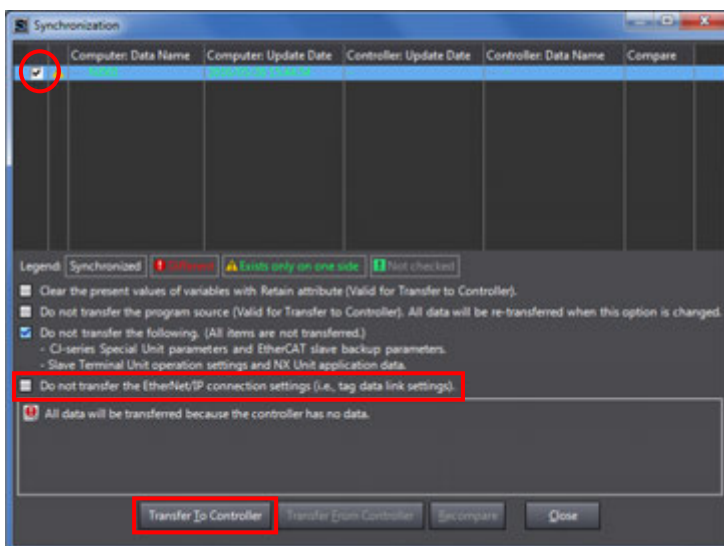
12 The Synchronization Dialog Box is displayed.

Check that the data to transfer (NJ501 in the right dialog box) is selected.

Uncheck *Do not transfer the EtherNet/IP connection settings (i.e., tag data link settings)*.

Click **Transfer To Controller**.

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



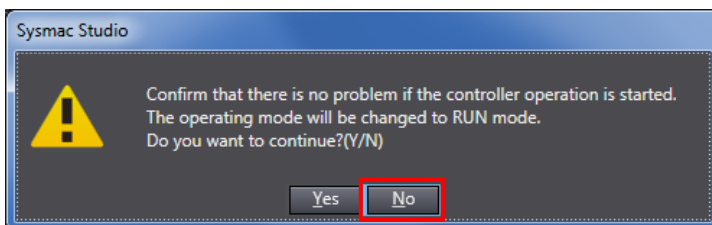
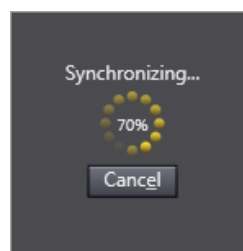
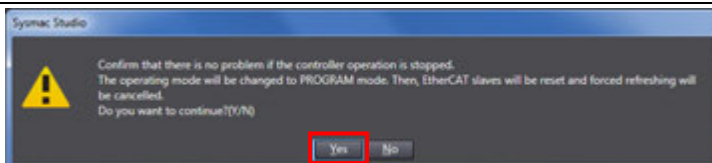
13 A confirmation dialog box is displayed.

Confirm that there is no problem, and click **Yes**.

A screen stating "Synchronizing" is displayed.

A confirmation dialog box is displayed. Confirm that there is no problem, and click **No**.

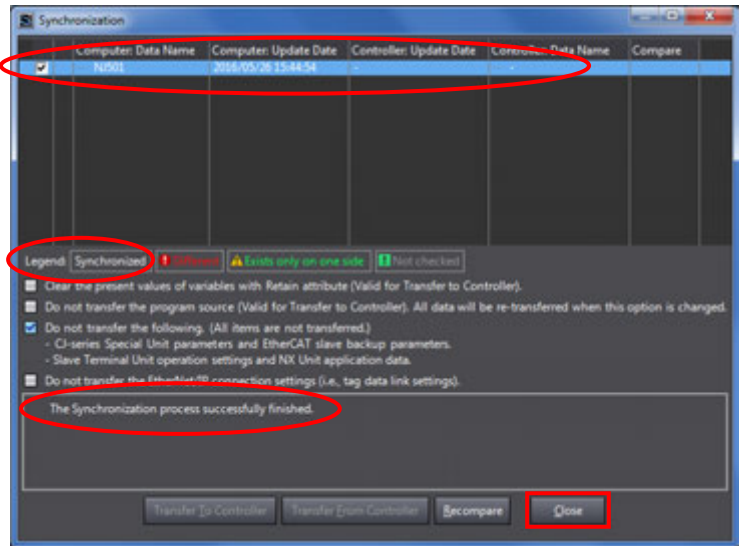
*Do not return to RUN mode.



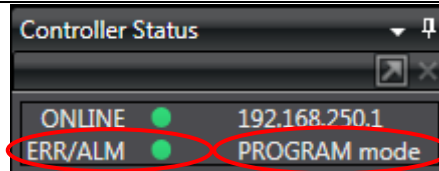
14 Check that the synchronized data is displayed with the color specified by "Synchronized" and that a message is displayed stating "The synchronization process successfully finished". Confirm that there is no problem, and click **Close**.

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

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



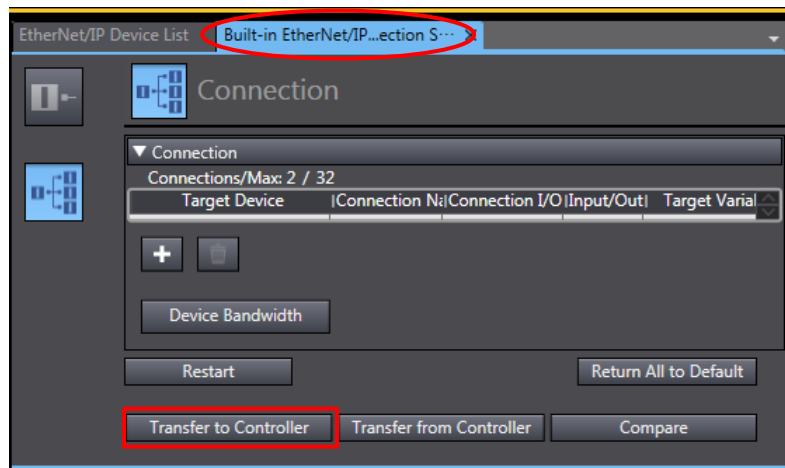
15 Check that ERR/ALM indicator in the Controller Status Pane changes to green color and that PROGRAM mode is displayed.



Precautions for Correct Use

If you change the connection settings (tag data link table) after performing the synchronization, the changed connection settings (tag data link table) are not transferred even when performing the synchronization again.

When you transfer the changed connection settings, click **Transfer to Controller** on the Built-in EtherNet/IP Port Settings Connection Settings Tab Page.

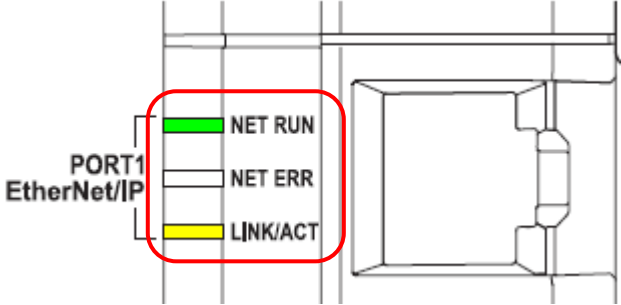
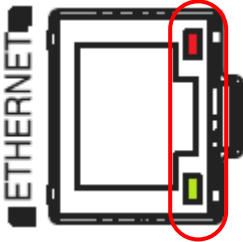
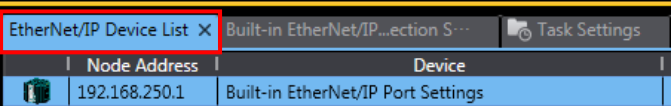
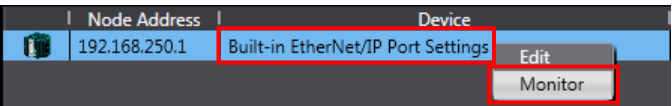
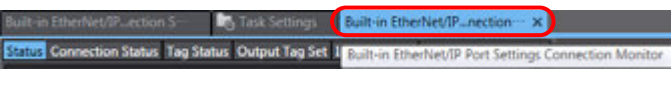
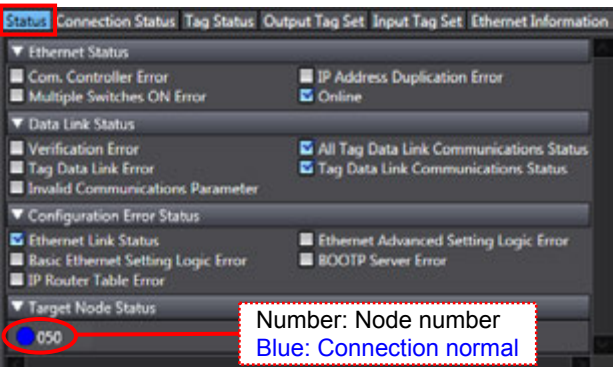


7.4. EtherNet/IP Communication Status Check

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

7.4.1. Checking the Connection Status

Check the connection status of the EtherNet/IP network.

<p>1</p>	<p>Check with LED indicators on Controller that the tag data links operate normally.</p> <p>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.)</p>	
<p>2</p>	<p>Check the LED indicators on Sensor Controller.</p> <p>The LED indicators in normal status are as follows: Red LED: Lighting Green LED: Lighting</p>	
<p>3</p>	<p>Select the EtherNet/IP Device List Tab.</p>	
<p>4</p>	<p>Right-click and select Monitor from the menu while Built-in EtherNet/IP Port Settings is selected.</p>	
<p>5</p>	<p>The Built-in EtherNet/IP Port Settings Connection Monitor Tab Page is displayed.</p>	
<p>6</p>	<p>Select the Status Tab. When the same check boxes are selected as shown on the right, the tag data links are normally in operation.</p>	

- 7 Select the **Connection Status** Tab.
 Check that a blue circle is displayed next to the applicable connection listed in the *Connection Name* Column.
 Check that the Status is 00:0000.

Status	Connection Name	Type	Status
●	192.168.250.50 default_001	Out/In	00:0000

- 8 Select the **Tag Status** Tab.
 Check that all the tags in the *Tag Name* Column are displayed and that blue circles are displayed next to them. Check that the status of all tags is normally resolved.

Tag Name	Input/Output	Status
● EIPInput	Input	Normally resolved
● EIPOutput	Output	Normally resolved

7.4.2. Checking the Sent and Received Data

Check that the correct data are sent and received.

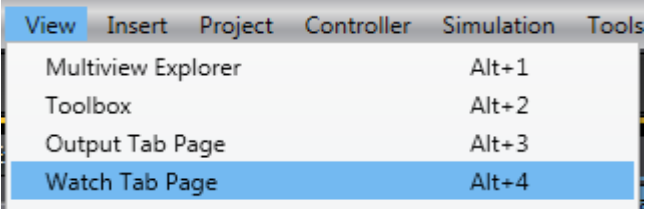
In this document, the system data acquisition command and the number of digits displayed past decimal point for command parameters are set to global variables in the output area where Controller is output to Sensor Controller, and response data (the number of digits displayed past decimal point) from Sensor Controller are checked, which are stored in global variables in the input area.

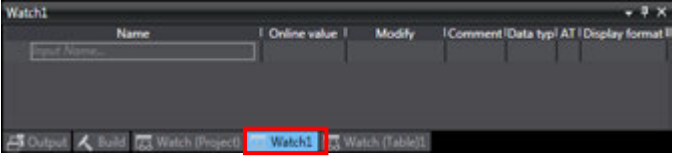
Caution

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

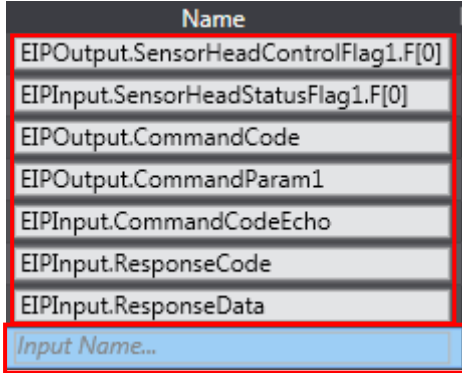
Always ensure safety before you change the variable values on a Watch Tab Page when Sysmac Studio is online with CPU Unit

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

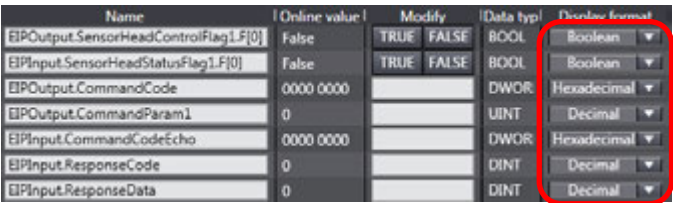

- 2 Select the **Watch1** Tab.


- 3 Enter the following variable names for monitoring. To enter a new name, click *Input Name*.

EIPOutput.SensorHeadControlFlag1.F[0]
EIPIInput.SensorHeadStatusFlag1.F[0]
EIPOutput.CommandCode
EIPOutput.CommandParam1
EIPIInput.CommandCodeEcho
EIPIInput.ResponseCode
EIPIInput.ResponseData


- 4 Check that the display formats of the variables you set in step 3 are as follows:

EIPOutput.SensorHeadControlFlag1.F[0] : Boolean
EIPIInput.SensorHeadStatusFlag1.F[0] : Boolean
EIPOutput.CommandCode: Hexadecimal
EIPOutput.CommandParam1: Decimal
EIPIInput.CommandCodeEcho : Hexadecimal
EIPIInput.ResponseCode: Decimal
EIPIInput.ResponseData: Decimal



<p>5 Enter 0040 4000 for <i>EIPOutput.CommandCode</i> in the <i>Modify</i> Column.</p> <p>0040 4000 is displayed for <i>EIPOutput.CommandCode</i> in the <i>Online value</i> Column.</p> <p>*The command code 0040 4000 (system data acquisition) is set.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>Online value</th> <th>Modify</th> </tr> </thead> <tbody> <tr> <td>EIPOutput.SensorHeadControlFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPInput.SensorHeadStatusFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPOutput.CommandCode</td> <td>0000 0000</td> <td>0040 4000</td> </tr> <tr> <td>EIPOutput.CommandParam1</td> <td>0</td> <td></td> </tr> </tbody> </table>	Name	Online value	Modify	EIPOutput.SensorHeadControlFlag1.F[0]	False	TRUE FALSE	EIPInput.SensorHeadStatusFlag1.F[0]	False	TRUE FALSE	EIPOutput.CommandCode	0000 0000	0040 4000	EIPOutput.CommandParam1	0										
Name	Online value	Modify																							
EIPOutput.SensorHeadControlFlag1.F[0]	False	TRUE FALSE																							
EIPInput.SensorHeadStatusFlag1.F[0]	False	TRUE FALSE																							
EIPOutput.CommandCode	0000 0000	0040 4000																							
EIPOutput.CommandParam1	0																								
<p>6 In the same way as step 5, set 900 for <i>EIPOutput.CommandParam1</i> in the <i>Online value</i> Column.</p> <p>*The system data number 900 (Number of digits displayed past decimal point) is set.</p>	<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>EIPOutput.SensorHeadControlFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPInput.SensorHeadStatusFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPOutput.CommandCode</td> <td>0040 4000</td> <td>0040 4000</td> </tr> <tr> <td>EIPOutput.CommandParam1</td> <td>0</td> <td></td> </tr> </tbody> </table>	Name	Online value	Modify	EIPOutput.SensorHeadControlFlag1.F[0]	False	TRUE FALSE	EIPInput.SensorHeadStatusFlag1.F[0]	False	TRUE FALSE	EIPOutput.CommandCode	0040 4000	0040 4000	EIPOutput.CommandParam1	0										
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EIPInput.SensorHeadStatusFlag1.F[0]	False	TRUE FALSE																							
EIPOutput.CommandCode	0040 4000	0040 4000																							
EIPOutput.CommandParam1	0																								
<p>7 Check that the online value of <i>EIPInput.SensorHeadStatusFlag1.F[0]</i> is False. Click TRUE for <i>EIPOutput.SensorHeadControlFlag1.F[0]</i> in the <i>Modify</i> Column.</p> <p>True is displayed for <i>EIPOutput.SensorHeadControlFlag1.F[0]</i> in the <i>Online value</i> Column, and the command is executed. When the command execution is complete, True is displayed for <i>EIPInput.SensorHeadStatusFlag1.F[0]</i> in the <i>Online value</i> Column.</p>	<table border="1"> <thead> <tr> <th>Name</th> <th>Online value</th> <th>Modify</th> </tr> </thead> <tbody> <tr> <td>EIPOutput.SensorHeadControlFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPInput.SensorHeadStatusFlag1.F[0]</td> <td>False</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPOutput.CommandCode</td> <td>0040 4000</td> <td>0040 4000</td> </tr> <tr> <td>EIPOutput.CommandParam1</td> <td>900</td> <td>900</td> </tr> </tbody> </table>	Name	Online value	Modify	EIPOutput.SensorHeadControlFlag1.F[0]	False	TRUE FALSE	EIPInput.SensorHeadStatusFlag1.F[0]	False	TRUE FALSE	EIPOutput.CommandCode	0040 4000	0040 4000	EIPOutput.CommandParam1	900	900									
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EIPOutput.SensorHeadControlFlag1.F[0]	False	TRUE FALSE																							
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EIPOutput.CommandCode	0040 4000	0040 4000																							
EIPOutput.CommandParam1	900	900																							
<p>8 When the process ends normally, the online values of the response variables are shown below.</p> <p><i>EIPInput.CommandCodeEcho</i>: 0040 4000 (Execution command code)</p> <p><i>EIPInput.ResponseCode</i>: 0 (Command execution result (0: OK, -1(FFFFFFFF): NG) is reflected.)</p> <p><i>EIPInput.ResponseData</i>: 1 (The number of digits displayed past decimal point is 1. (Default))</p>	<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>EIPOutput.SensorHeadControlFlag1.F[0]</td> <td>True</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPInput.SensorHeadStatusFlag1.F[0]</td> <td>True</td> <td>TRUE FALSE</td> </tr> <tr> <td>EIPOutput.CommandCode</td> <td>0040 4000</td> <td>0040 4000</td> </tr> <tr> <td>EIPOutput.CommandParam1</td> <td>900</td> <td>900</td> </tr> <tr> <td>EIPInput.CommandCodeEcho</td> <td>0040 4000</td> <td></td> </tr> <tr> <td>EIPInput.ResponseCode</td> <td>0</td> <td></td> </tr> <tr> <td>EIPInput.ResponseData</td> <td>1</td> <td></td> </tr> </tbody> </table>	Name	Online value	Modify	EIPOutput.SensorHeadControlFlag1.F[0]	True	TRUE FALSE	EIPInput.SensorHeadStatusFlag1.F[0]	True	TRUE FALSE	EIPOutput.CommandCode	0040 4000	0040 4000	EIPOutput.CommandParam1	900	900	EIPInput.CommandCodeEcho	0040 4000		EIPInput.ResponseCode	0		EIPInput.ResponseData	1	
Name	Online value	Modify																							
EIPOutput.SensorHeadControlFlag1.F[0]	True	TRUE FALSE																							
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EIPInput.CommandCodeEcho	0040 4000																								
EIPInput.ResponseCode	0																								
EIPInput.ResponseData	1																								



Additional Information

For details on commands, refer to *4-1 EtherNet/IP Connection* of the *Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual for Communications Settings* (Cat. No. Z363).



Additional Information

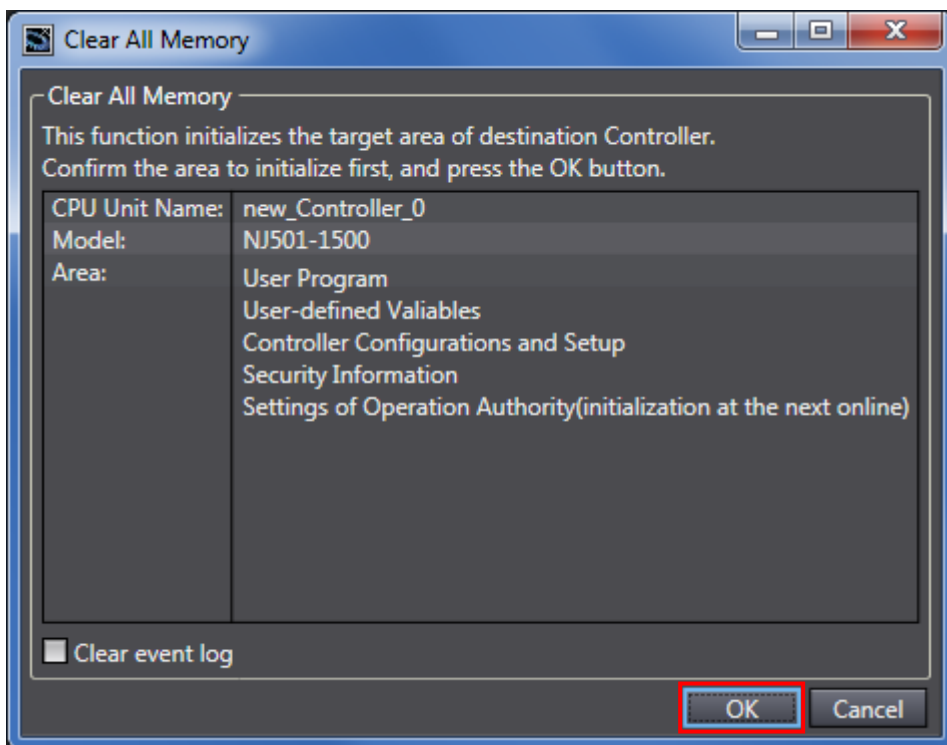
For details on system data, refer to *8-2 System data list* of the *Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual for Communications Settings* (Cat. No. Z363).

8. Initialization method

The setting procedures in this document 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 Controller

To initialize the Controller settings, it is necessary to initialize 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**.



8.2. Initializing Sensor Controller

For information on how to initialize Sensor Controller, refer to *Initializing Settings* in *4-6 Setting Measurement Mode of the Sensor* in *4.Settings for Function of the Displacement Sensor ZW-7000 series Confocal Fiber Type Displacement Sensor User's Manual* (Cat. No. Z362).

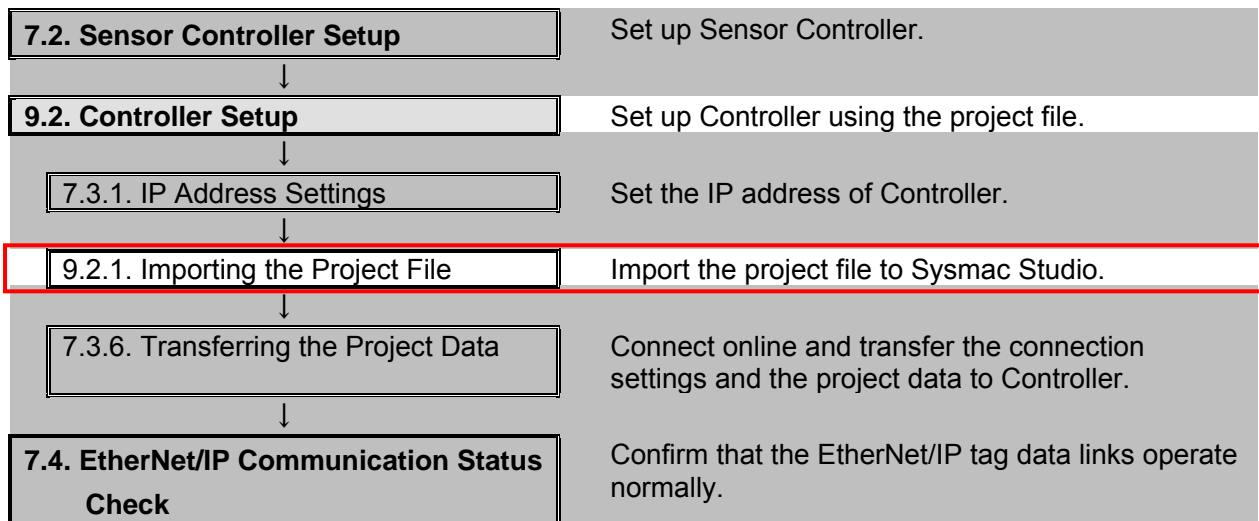
9. Appendix: Procedure Using the Project File

This section describes the procedure in which you use the following project file. The project file includes the setting contents described in 7.3. *Controller Setup*. Obtain the project file with a latest version from OMRON Corporation.

Name	File name	Version
Sysmac Studio project file (extension: csm2)	P653_NJ_EIP_OMRON_ZW-7000_EV 100.csm2	Ver.1.00

9.1. Work Flow

Take the following steps to make the EtherNet/IP tag data link settings using the project file. Refer back to each of the following procedures for details except for 9.2.1. *Importing the Project File* marked with a red square.

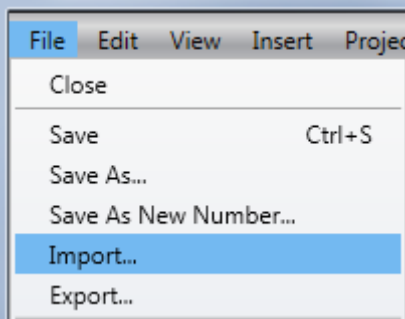
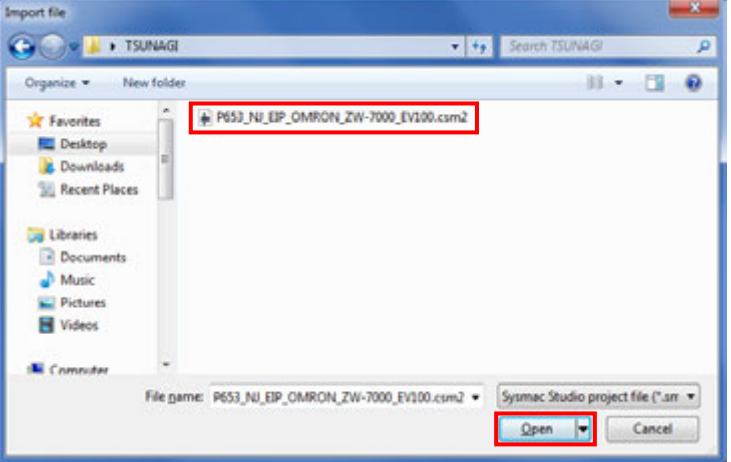
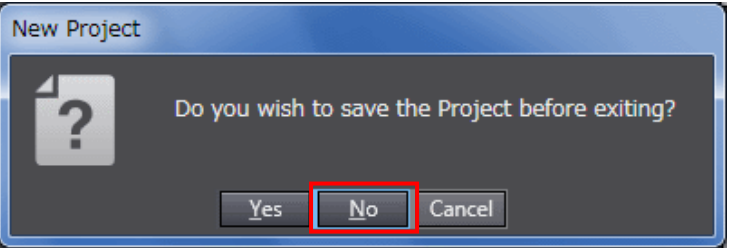
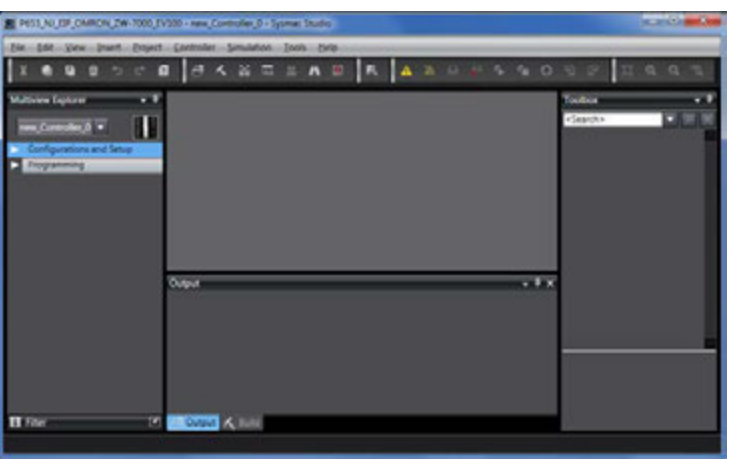


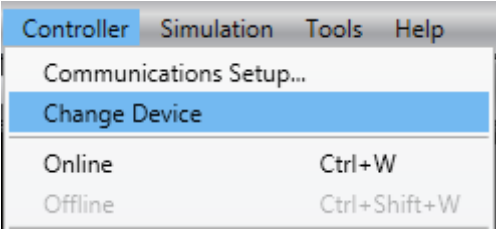
9.2. Controller Setup

Set up Controller using the project file.

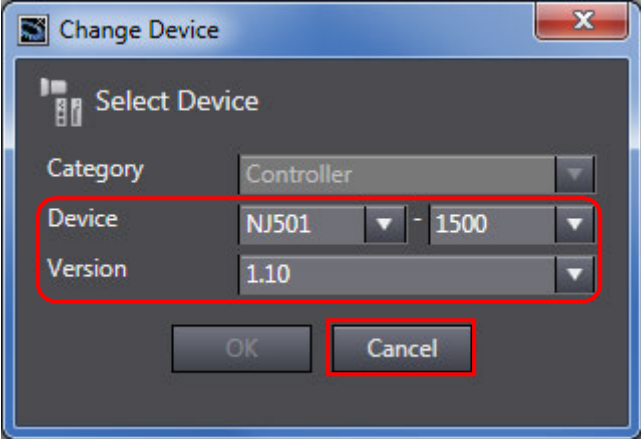
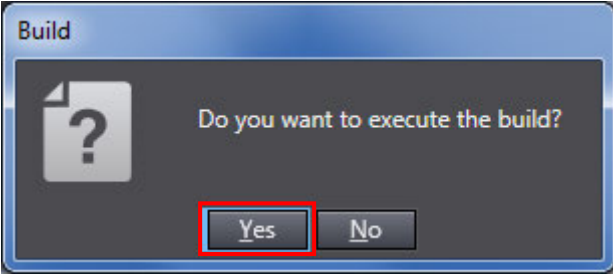
9.2.1. Importing the Project File

Import the project file to Sysmac Studio.

<p>1 Select Import from the File Menu.</p>	
<p>2 The Import file Dialog Box is displayed, Select <i>P653_NJ_EIP_OMRON_ZW-7000_EV100.csm2</i> (project file) and click Open.</p> <p>*Obtain the project file from OMRON.</p>	
<p>3 The dialog box on the right is displayed. Check the contents and click No.</p>	
<p>4 The <i>P653_NJ_EIP_OMRON_ZW-7000_EV100</i> project is displayed.</p> <p>*If an error message is displayed stating "Failed to Load Descendants", change the version of Sysmac Studio to the version specified in 5.2. <i>Device Configuration</i> or to a higher version.</p>	

- | | | |
|----------|---|--|
| <p>5</p> | <p>Select Change Device from the Controller Menu.</p> |  <p>A screenshot of the software's menu bar. The 'Controller' menu is open, showing options: 'Communications Setup...', 'Change Device' (highlighted in blue), 'Online' (with keyboard shortcut Ctrl+W), and 'Offline' (with keyboard shortcut Ctrl+Shift+W).</p> |
| <p>6</p> | <p>The Change Device Dialog Box is displayed.
Check that the <i>Device</i> and the <i>Version</i> Fields are set as shown on the right.

Click Cancel.

*If the settings are different, select the setting items from the pull-down list, and click OK.</p> |  <p>A screenshot of the 'Change Device' dialog box. It has a title bar with a close button. The main area is titled 'Select Device' and contains three fields: 'Category' (set to 'Controller'), 'Device' (set to 'NJ501 - 1500'), and 'Version' (set to '1.10'). The 'Device' and 'Version' fields are enclosed in a red rectangular box. At the bottom, there are 'OK' and 'Cancel' buttons, with the 'Cancel' button also highlighted with a red box.</p> |
| <p>7</p> | <p>If you changed the settings in step 6, the Build Dialog Box is displayed. Check the contents and click Yes.</p> |  <p>A screenshot of the 'Build' dialog box. It has a title bar and a question mark icon on the left. The text in the center asks 'Do you want to execute the build?'. At the bottom, there are 'Yes' and 'No' buttons, with the 'Yes' button highlighted by a red box.</p> |

10. Revision History

Revision code	Date of revision	Description of revision
01	June 24, 2016	First edition

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Cat. No. P653-E1-01

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