OMRON

Machine Automation Controller NJ-series

EtherCAT®
Connection Guide

OMRON Corporation

Displacement Sensor(Confocal Fiber Type)

(ZW-CE1)

Network Connection Guide

SYSMAC always in control

P538-E1-01

About Intellectual Property Right and Trademarks

Table of Contents

1. Related Manuals

The table below lists the manuals related to this document.
To ensure system safety, make sure to always read and heed the information provided in all Safety Precautions, Precautions for Safe Use, and Precaution for Correct Use of manuals for each device which is used in the system.

Cat. No.	Model	Manual name
W500	NJ501-[][][][] NJ301-[][][][]	NJ-series CPU Unit Hardware User's Manual
W501	NJ501-[][][][] NJ301-[][][][]	NJ-series CPU Unit Software User's Manual
W505	NJ501-[][][][] NJ301-[][][][]	NJ-series CPU Unit Built-in EtherCAT Port User's Manual
W504	SYSMAC-SE2[][][]	Sysmac Studio Version 1 Operation Manual
Z332	ZW-CE1[]	ZW Series Displacement Sensor (Confocal Fiber Type) User's Manual

2. Terms and Definitions

Term	Explanation and Definition
PDO Communications (Communications using Process Data Objects)	This method is used for cyclic data exchange between the master unit and the slave units. PDO data (i.e., I/O data that is mapped to PDOs) that is allocated in advance is input and output periodically each EtherCAT process data communications cycle (i.e., the period of primary periodic task). The NJ-series Machine Automation Controller uses the PDO communications for commands to refresh I/O data in a fixed control period, including I/O data for EtherCAT Slave Units, and the position control data for the Servomotors. It is accessed from the NJ-series Machine Automation Controller in the following ways. •With device variables for EtherCAT slave I/O •With Axis Variables for Servo Drive and encoder input slaves to which assigned as an axis
SDO Communications (Communications using Service Data Objects)	This method is used to read and write specified slave unit data from the master unit when required. The NJ-series Machine Automation Controller uses SDO communications for commands to read and write data, such as for parameter transfers, at specified times. The NJ-series Machine Automation Controller can read/write the specified slave data (parameters and error information, etc.) with the EC_CoESDORead (Read CoE SDO) instruction or the EC_CoESDOWrite (Write CoE SDO) instruction.
Slave Unit	There are various types of slaves such as Servo Drives that handle position data and I/O terminals that control the bit signals. The slave receives output data sent from the master, and transmits input data to the master.
Node address	An address to identify the unit connected to the EtherCAT.
ESI file (EtherCAT Slave Information file)	The ESI files contain information unique to the EtherCAT slaves in XML format. Install an ESI file into the Sysmac Studio, to allocate slave process data and make other settings.

3. Remarks

(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 safety circuit in order to ensure safety and minimize risks of abnormal occurrence.

(2) To ensure system safety, always read and heed the information provided in all Safety Precautions, Precautions for Safe Use, and Precaution for Correct Use of manuals for each device used in the system.

(3) The users are 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 of or whole of this document without the permission of OMRON Corporation.

(5) This document provides the latest information as of April 2013. The information on this document is subject to change without notice for improvement.

The following notation is used in this document.

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

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

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.

Symbols

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

4. Overview

This document describes the procedure for connecting the Displacement Sensor (ZW series) of OMRON Corporation to NJ-series Machine Automation Controller (hereinafter referred to as Controller) via EtherCAT and provides the procedure for checking their connection.
Refer to *Section 7 Connection Procedure* to understand the setting method and key points to connect the devices via EtherCAT.

5. Applicable Devices and Support Software

5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	NJ-series CPU Unit	NJ501-[][][][] NJ301-[][][][]
OMRON	Confocal Fiber Type Displacement Sensor Controller	ZW-CE1[] ZW-CE1[]T
OMRON	Sensor Head	ZW-S[][]

Additional Information

As applicable devices above, the devices with the models and versions listed in Section 5.2. are actually used in this document to describe the procedure for connecting devices and checking the connection.

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

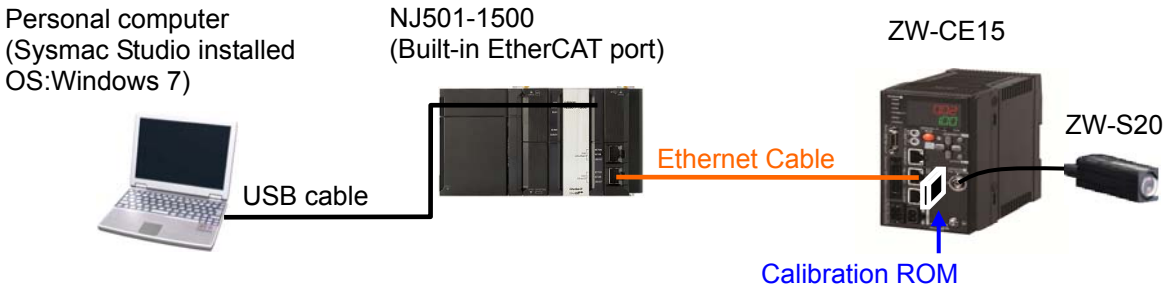
To use the above devices with versions not listed in Section 5.2 or versions higher than those listed in Section 5.2, check the differences in the specifications by referring to the manuals before operating the devices.

Additional Information

This document describes the procedure to establish the network connection. Except for the connection procedure, it does not provide information on operation, installation or wiring method. It also does not describe the functionality or operation of the devices. Refer to the manuals or contact your OMRON representative.

5.2. Device Configuration

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



Manufacturer	Product Name	Model	Version
OMRON	CPU Unit (Built-in EtherCAT port)	NJ501-1500	Ver.1.03
OMRON	Power Supply Unit	NJ1-PA3001	
OMRON	Sysmac Studio	SYSMAC-SE2[][][]	Ver.1.05
-	Personal computer (OS: Windows 7)	-	
-	USB cable (USB 2.0 type B connector)	-	
OMRON	Ethernet cable (with industrial Ethernet connector)	XS5W-T421-[]M[]-K	
OMRON	Displacement Sensor Controller	ZW-CE15	Ver.1.110
OMRON	Displacement Sensor Sensor Head	ZW-S20	
OMRON	Calibration ROM	(Included with Sensor Head)	
OMRON	Recommended power supply: 24 VDC 2.5A 60W		

Precautions for Correct Use

The connection line of EtherCAT communication cannot be shared with other network, such as Ethernet.

The switching hub for Ethernet cannot be used for EtherCAT.

Please use the cable (double shielding with aluminum tape and braiding) of Category 5 or higher, and use the shielded connector of Category 5 or higher.

Connect the cable shield to the connector hood at both ends of the cable.

Additional Information

Update the Sysmac Studio to the version specified in this section or higher version using the auto update function.

If a version not specified in this section is used, the procedures described in Section 7 and subsequent sections may not be applicable. In that case, use the equivalent procedures described in the Sysmac Studio Version 1 Operation Manual (Cat.No. W504).

Additional Information

For information on the specifications of the Ethernet cable and network wring, refer to *Section 4 EtherCAT Network Wiring* in the *NJ-series CPU Unit Built-in EtherCAT Port User's Manual* (Cat. No. W505).

Additional Information

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

6. EtherCAT Settings

This section provides the specifications such as communication parameters and variable names that are set in this document.
Hereinafter, the Displacement Sensor is referred to as the "destination device" or “Slave Unit” in some descriptions.

6.1. EtherCAT Communications Settings

The setting required for EtherCAT communications is as follows:

	Displacement Sensor
Node address	01

6.2. Allocation of EtherCAT Communications

The device variables of the destination device are allocated to the Controller's global variables.
The relationship between the device data and the global variables is shown below.

■Output area (Controller → Destination device)

Destination device data		Device variable name	Data type
Common Control Flag		E001_Common_Control_Flag	DWORD
	Control command execution	E001_EXE	BOOL
	Measurement synchronous start	E001_SYNC	BOOL
	Error clear	E001_ERCLR	BOOL
Sensor Head1 Control Flag		E001_Sensor_Head1_Control_Flag	DWORD
	Timing	E001_TIMING1	BOOL
	Reset	E001_RESET1	BOOL
	Light metering OFF	E001_LIGHTOFF1	BOOL
	Zero reset execution of task 1	E001_ZERO1_T1	BOOL
	Zero reset execution of task 2	E001_ZERO1_T2	BOOL
	Zero reset execution of task 3	E001_ZERO1_T3	BOOL
	Zero reset execution of task 4	E001_ZERO1_T4	BOOL
	Zero reset cancel of task 1	E001_ZEROCLR1_T1	BOOL
	Zero reset cancel of task 2	E001_ZEROCLR1_T2	BOOL
	Zero reset cancel of task 3	E001_ZEROCLR1_T3	BOOL
	Zero reset cancel of task 4	E001_ZEROCLR1_T4	BOOL
Sensor Head2 Control Flag		E001_Sensor_Head2_Control_Flag	DWORD
Command code		E001_Command	DWORD

Destination device data	Device variable name	Data type
Command parameter1	E001_Command_Parameter1	UINT
Command parameter2	E001_Command_Parameter2	UINT
Command parameter3	E001_Command_Parameter3	DINT

■Input area (Controller ← Destination device)

Destination device data		Device variable name	Data type
Common Status Flag		E001_Common_Status_Flag	DWORD
	Control command completion	E001_FLG	BOOL
	Measurement synchronization completion	E001_SYNCFLG	BOOL
	Ready	E001_READY	BOOL
	Run screen	E001_RUN	BOOL
	Current bank bit0	E001_BANKOUT1_A	BOOL
	Current bank bit1	E001_BANKOUT1_B	BOOL
	Current bank bit2	E001_BANKOUT1_C	BOOL
	Current bank bit3	E001_BANKOUT1_D	BOOL
	Current bank bit4	E001_BANKOUT1_E	BOOL
	Error	E001_ERR	BOOL
Sensor Head1 Status Flag		E001_Sensor_Head1_Status_Flag	DWORD
	Hold execution status	E001_HOLDSTAT1	BOOL
	Reset execution state	E001_RESETSTAT1	BOOL
	Logical beam lighting state	E001_LIGHT1	BOOL
	Measurement position	E001_STABILITY1	BOOL
	Measurement state	E001_ENABLE1	BOOL
	Data output completed	E001_GATE1	BOOL
	Overall judgment output	E001_OR1	BOOL
	Zero reset execution of task 1	E001_ZEROSTAT1_T1	BOOL
	Zero reset execution of task 2	E001_ZEROSTAT1_T2	BOOL
	Zero reset execution of task 3	E001_ZEROSTAT1_T3	BOOL
	Zero reset execution of task 4	E001_ZEROSTAT1_T4	BOOL
	HIGH output of task 1	E001_HIGH1_T1	BOOL
	PASS output of task 1	E001_PASS1_T1	BOOL
	LOW output of task 1	E001_LOW1_T1	BOOL
	HIGH output of task 2	E001_HIGH1_T2	BOOL
	PASS output of task 2	E001_PASS1_T2	BOOL
	LOW output of task 2	E001_LOW1_T2	BOOL
	HIGH output of task 3	E001_HIGH1_T3	BOOL
	PASS output of task 3	E001_PASS1_T3	BOOL

Destination device data		Device variable name	Data type
	LOW output of task 3	E001_LOW1_T3	BOOL
	HIGH output of task 4	E001_HIGH1_T4	BOOL
	PASS output of task 4	E001_PASS1_T4	BOOL
	LOW output of task 4	E001_LOW1_T4	BOOL
Sensor Head2 Status Flag		E001_Sensor_Head2_Status_Flag	DWORD
Echo back of command code		E001_Response	DWORD
Response code		E001_Response_Code	DWORD
Response data		E001_Response_Data1	DINT
Measurement value of task 1		E001_Measurement_Value_of_Task_1	DINT
Measurement value of task 2		E001_Measurement_Value_of_Task_2	DINT
Measurement value of task 3		E001_Measurement_Value_of_Task_3	DINT
Measurement value of task 4		E001_Measurement_Value_of_Task_4	DINT
reserve		E001_Measurement_Value_Reserve_01	DINT
reserve		E001_Measurement_Value_Reserve_02	DINT
reserve		E001_Measurement_Value_Reserve_03	DINT
reserve		E001_Measurement_Value_Reserve_04	DINT

■Details of the status allocation (Controller ← Destination device)

Destination device data		Global variable name	Data type
Sysmac error status		E001_Sysmac_Error_Status	BYTE
	Observation levels of information	E001_Observation	BOOL
	Minor Fault levels of information	E001_Minor_Fault	BOOL

7. Connection Procedure

This section describes the procedure for connecting the Controller via EtherCAT.
This document explains the procedure for setting up the Controller and Displacement Sensor from the factory default setting. For the initialization, refer to *Section 8 Initialization Method*.

7.1. Work Flow

Take the following steps to connect to EtherCAT.

7.2. Setting Up the Displacement Sensor	Set up the Displacement Sensor.
↓	
7.2.1 Hardware Settings	Set the hardware switches on the Displacement Sensor.
↓	
7.3. Setting Up the Controller	Set up the Controller.
↓	
7.3.1. Starting the Sysmac Studio and Setting the EtherCAT network configuration	Start the Sysmac Studio and set the EtherCAT network configuration.
↓	
7.3.2 Setting the Device Variables	Set the device variables used for the EtherCAT Slave Unit.
↓	
7.3.3. Transferring the Project Data	Transfer the project data from the Sysmac Studio to the Controller.
↓	
7.4. Checking the EtherCAT Communications	Confirm that the EtherCAT communications are performed normally.
↓	
7.4.1 Checking the Connection Status	Check the connection status of the EtherCAT network.
↓	
7.4.2 Checking Data that are Sent and Received	Confirm that correct data are sent and received.

7.2. Setting Up the Displacement Sensor

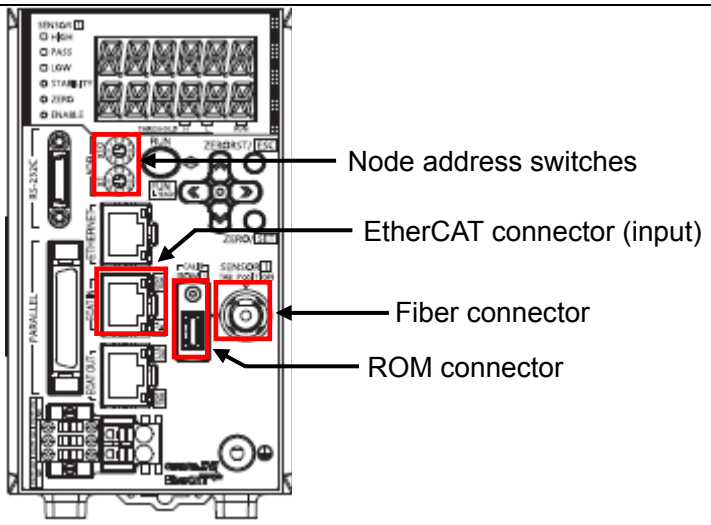
Set up the Displacement Sensor.

7.2.1. Hardware Settings

Set the hardware switches on the Displacement Sensor.

Precautions for Correct Use

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

1	Confirm that the power supply to the Displacement Sensor is OFF. *If the power supply is turned ON, settings may not be applicable as described in the following procedure.	
2	Refer to the figure on the right and check the hardware switches of the Displacement Sensor. Connect the Ethernet cable to the EtherCAT connector (input). Connect the calibration ROM to the ROM connector. Connect the Sensor Head to the Fiber Connector. Set the node address switches as follows: x10: 0, x1: 1 *Set the node address to 01.	
3	Turn ON the power supply to the Displacement Sensor.	

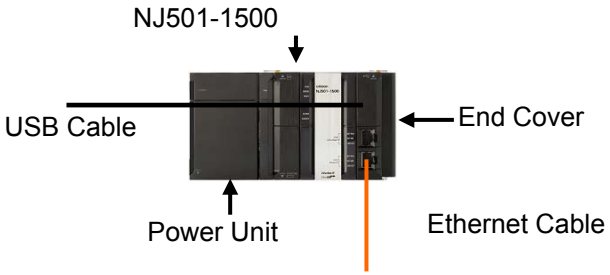
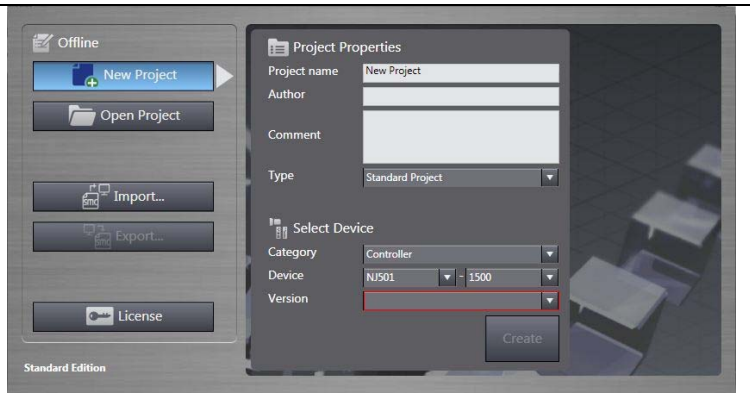
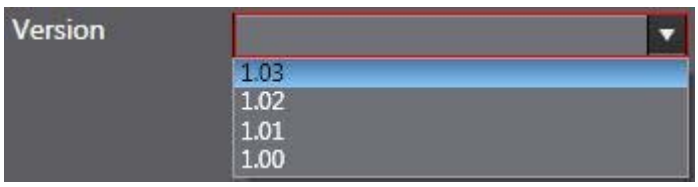
7.3. Setting Up the Controller

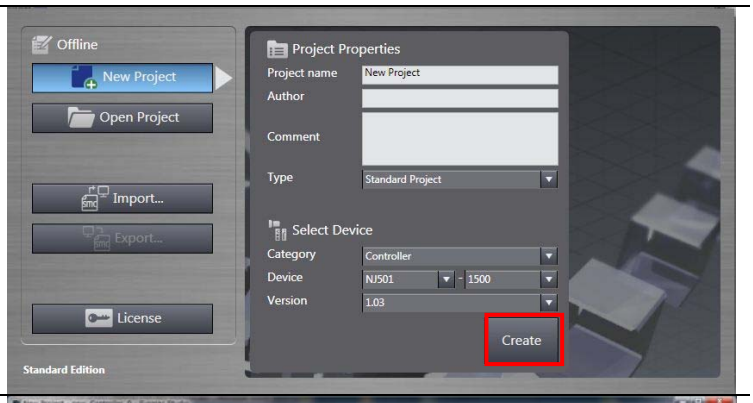
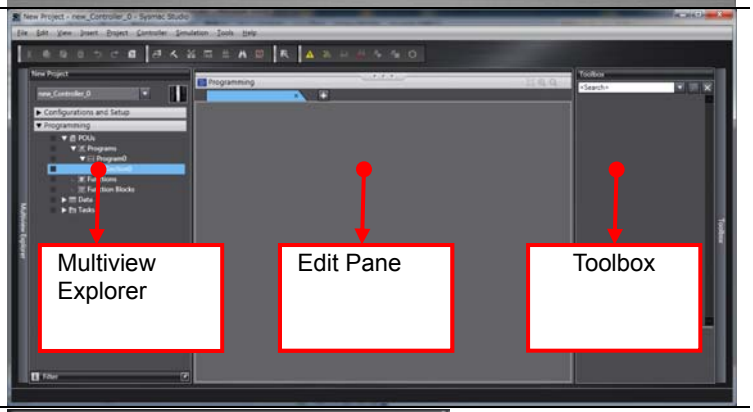
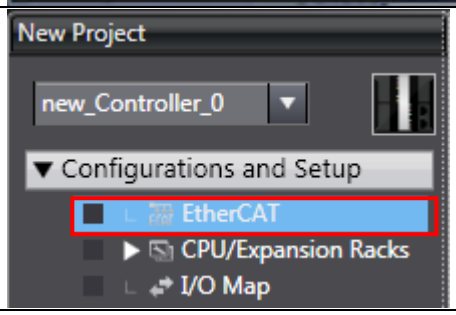
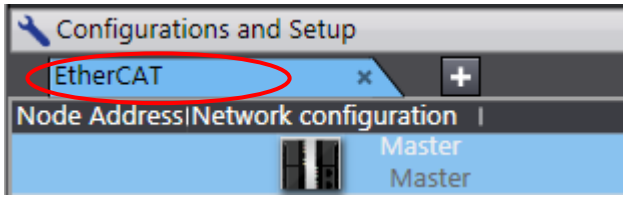
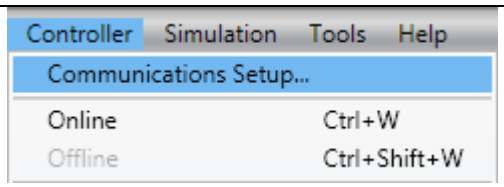
Set up the Controller.

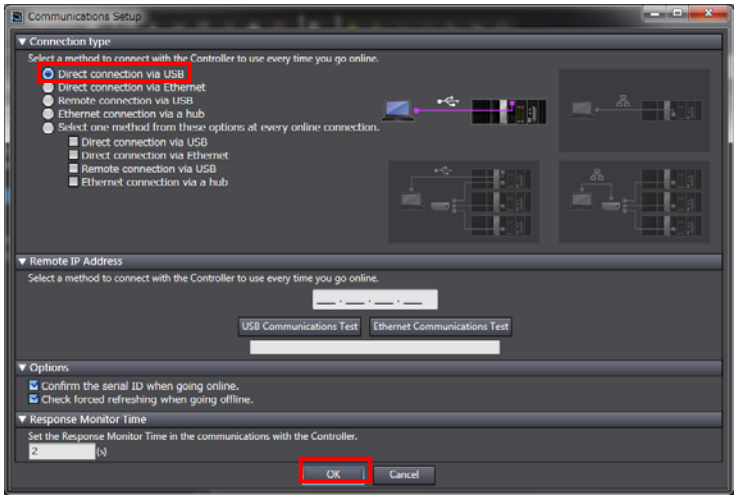
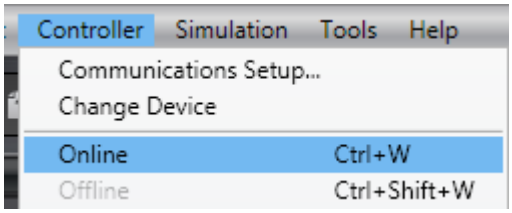
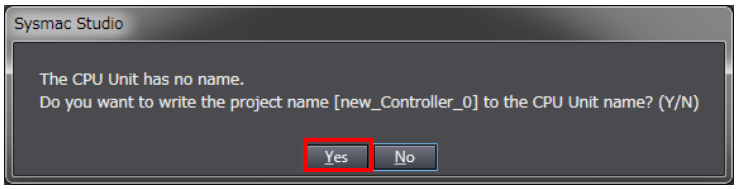
7.3.1. Starting the Sysmac Studio and Setting the EtherCAT Network Configuration

Start the Sysmac Studio and set the EtherCAT network configuration.

Install the Sysmac Studio and USB driver in the personal computer beforehand.

1	Connect the Ethernet cable to the built-in EtherCAT port (PORT2) of the Controller and the USB cable to the peripheral (USB) port. As shown in 5.2. Device Configuration, connect the personal computer, Displacement Sensor and Controller. Turn ON the power supply to the Controller.	
2	Start the Sysmac Studio. Click the **New Project** Button. *If a confirmation dialog for an access right is displayed at start, select to start.	
3	The Project Properties Dialog Box is displayed. *In this document, New Project is set as the project name. Confirm that Category and Device to use are set in the Select Device Field. Select version 1.03 from the pull-down list of Version. *Although 1.03 is selected in this document, select a version you actually use.	 

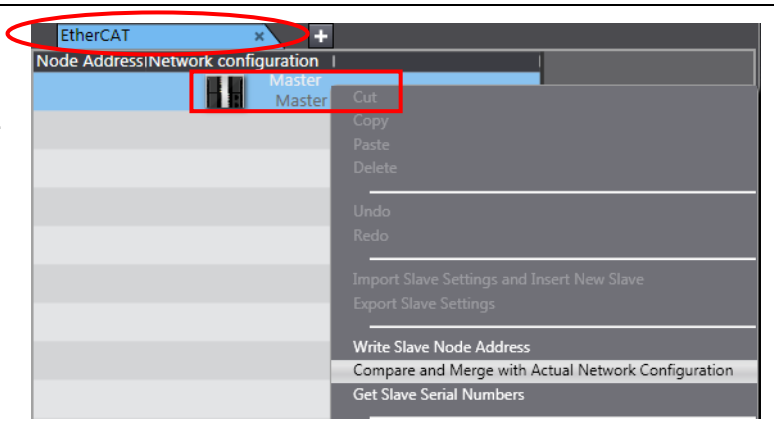
4	Click the **Create** Button.	
5	The New Project is displayed. The left pane is called Multiview Explorer, the right pane is called Toolbox and the middle pane is called Edit Pane.	
6	Double-click **EtherCAT** under **Configurations and Setup** in the Multiview Explorer.	
7	The EtherCAT Tab is displayed on the Edit Pane.	
8	Select ***Communications Setup*** from the Controller Menu.	

9	The Communications Setup Dialog Box is displayed. Select the *Direct connection via USB* Option for Connection Type. Click the **OK** Button.	
10	Select ***Online*** from the Controller Menu. If a confirmation dialog is displayed, click the **Yes** Button. *The displayed dialog depends on the status of the Controller used. Click the **Yes** Button to proceed with the processing.	 
11	When an online connection is established, a yellow bar is displayed on the top of the Edit Pane.	

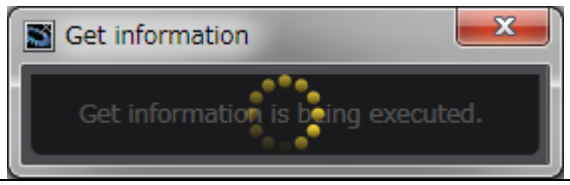
Additional Information

Refer to *Section 5 Online Connections to a Controller* in the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504) for details on online connections to a Controller.

12 Right-click **Master** on the EtherCAT Tab Page, and select ***Compare and Merge with Actual Network Configuration***.

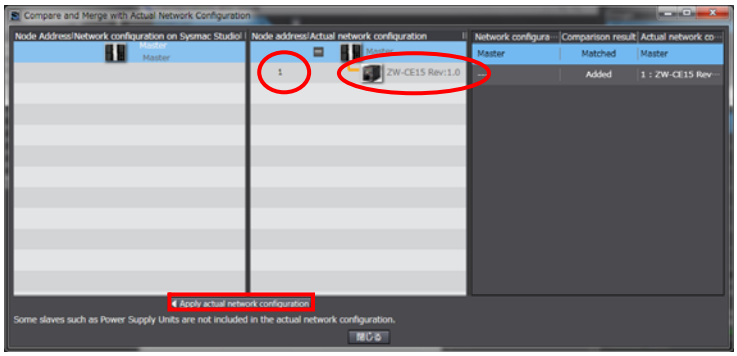


A screen is displayed stating "Get information is being executed"

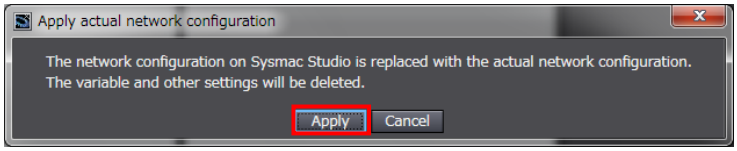


13 The Compare and Merge with Actual Network Configuration Pane is displayed.
Node address 1 and ZW-CE15 Rev.1.0 are added to the Actual network configuration after the comparison.

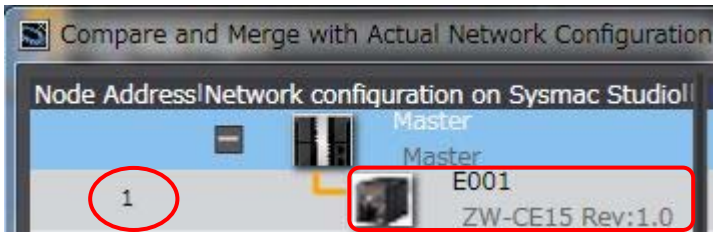
Click the **Apply actual network configuration** Button.



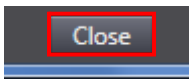
14 A confirmation dialog box is displayed. Click the **Apply** Button.



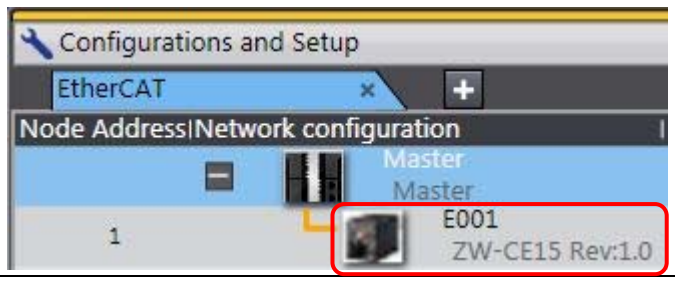
Confirm that node address 1 and E001 ZW-CE15 Rev.1.0 are added to the Network configuration on Sysmac Studio.



Click the **Close** Button.

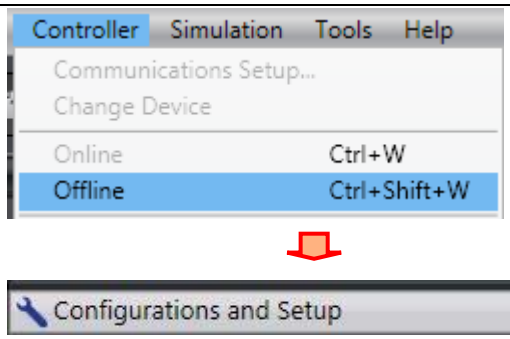
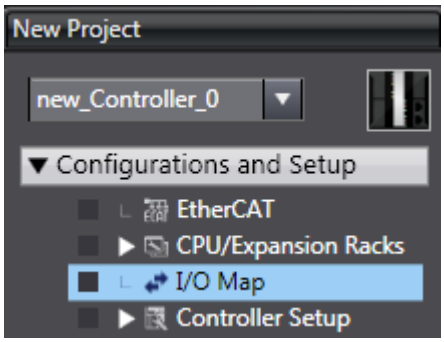
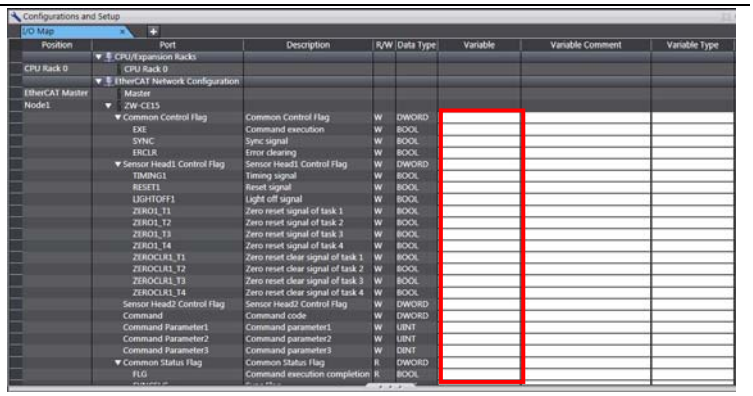


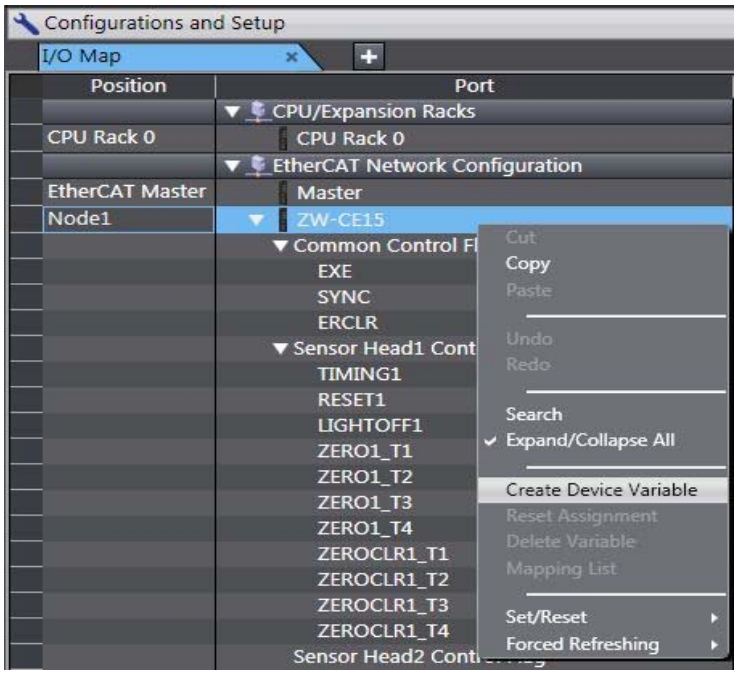
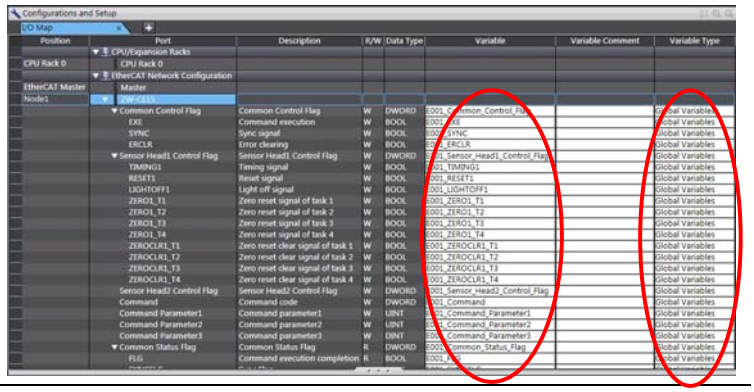
15 Node address 1 and E001 ZW-CE15 Rev:1.0 are added to the EtherCAT Tab Page in the Edit Pane.



7.3.2. Setting the Device Variables

Set the device variables used for the EtherCAT Slave Unit.

1	Select ***Offline*** from the Controller Menu. The yellow bar on the top of the Edit Pane disappears.	
2	Double-click **I/O Map** under **Configurations and Setup** on the Multiview Explorer.	
3	The I/O Map Tab is displayed on the Edit Pane. Confirm that Node1 is displayed in the Position Column and the Slave Unit is displayed. *To manually set a variable name for the Slave Unit, click a column under Variable Column and enter a name.	

4	Right-click **Node1** and select ***Create Device Variable***.	
5	The variable names and variable types are automatically set.	

Additional Information

The device variables are named automatically from a combination of the device names and the I/O port names.

For slave units, the default device names start with an "E" followed by a sequential number starting from "001"

Additional Information

In the example above, all device variables of the slave are automatically created. However, a device variable of each I/O port can also be automatically created.

Also, you can set any device variables manually.

7.3.3. Transferring the Project Data

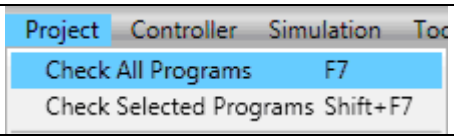
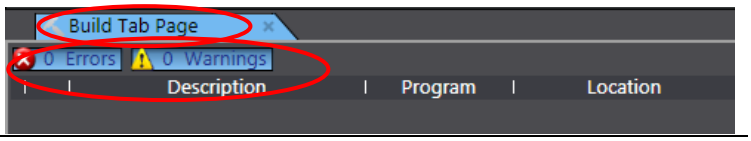
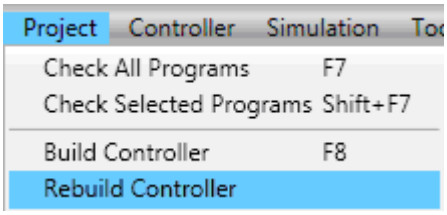
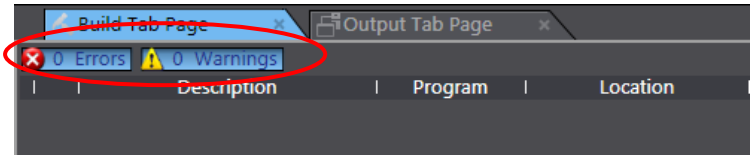
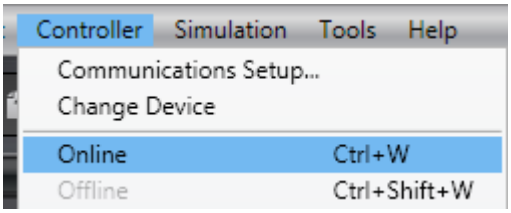
Transfer the project data from the Sysmac Studio to the Controller.

⚠ WARNING

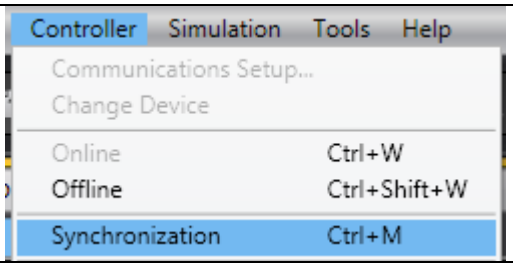
Always confirm safety at the destination node before you transfer a user program, configuration data, setup data, device variables, or values in memory used for CJ-series Units from the Sysmac Studio.
The devices or machines may perform unexpected operation regardless of the operating mode of the CPU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

Precautions for Safe Use

After you transfer the user program, the CPU Unit restarts and communications with the EtherCAT slaves are cut off. During that period, the slave outputs behave according to the slave settings.
The time that communications are cut off depends on the EtherCAT network configuration.
Before you transfer the user program, confirm that the system will not be adversely affected.

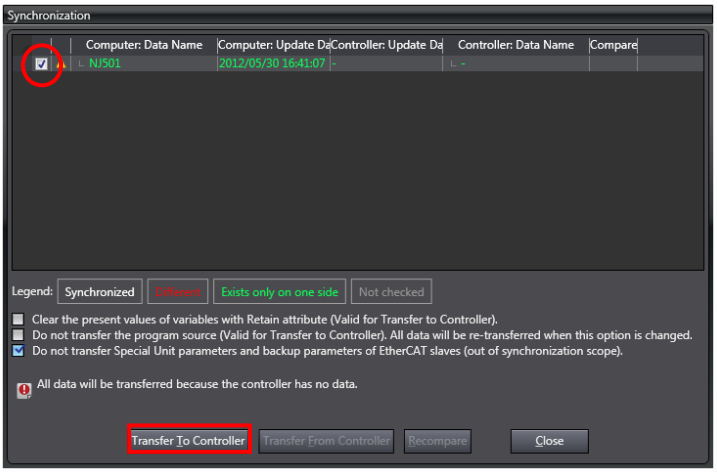
1	Select ***Check All Programs*** from the Project Menu.	
2	The Build Tab Page is displayed in the Edit Pane. Confirm that “0 Errors” and “0 Warnings” are displayed.	
3	Select ***Rebuild Controller*** from the Project Menu.	
4	Confirm that “0 Errors” and “0 Warnings” are displayed in the Build Tab Page.	
5	Select ***Online*** from the Controller Menu.	

6 Select ***Synchronization*** from the Controller Menu.

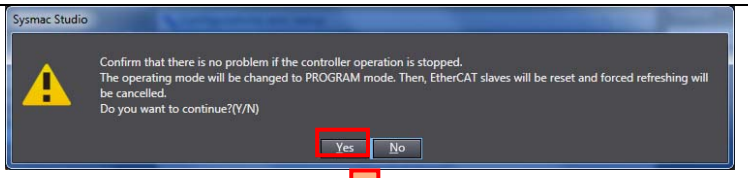


7 The Synchronization Dialog Box is displayed.
Confirm that the data to transfer (NJ501 in the right dialog) is selected. Then, click the **Transfer to Controller** Button.

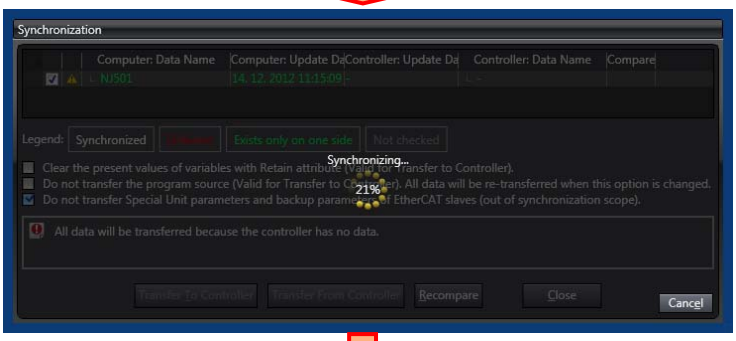
*After executing the **Transfer to Controller**, the Sysmac Studio data is transferred to the Controller and the data are compared.



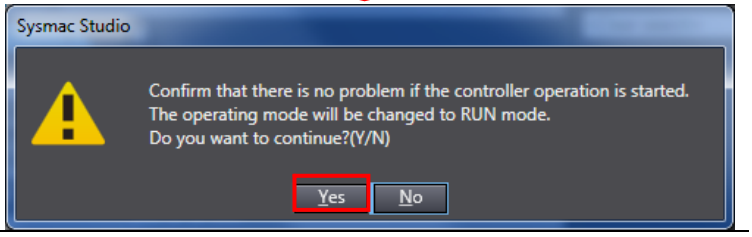
8 A confirmation dialog is displayed. Click the **Yes** Button.

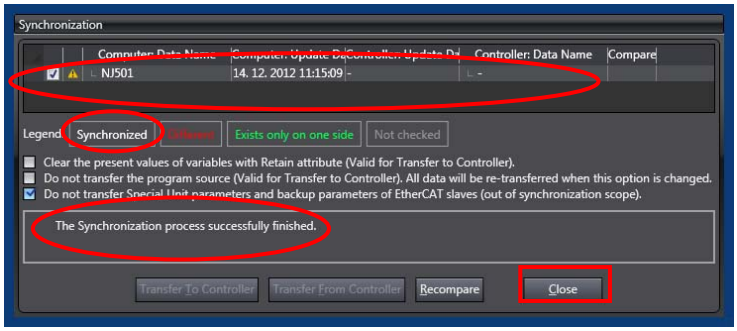


A screen stating "Synchronizing" is displayed.



A confirmation dialog is displayed. Click the **Yes** Button.



9	Confirm that the synchronized data is displayed with the color specified by “Synchronized”, and that a message is displayed stating "The synchronization process successfully finished". If there is no problem, click the **Close** Button. *A message stating “The synchronization process successfully finished" is displayed if the Sysmac Studio project data and the data in the Controller match. *If the synchronization fails, check the wiring and repeat from step 1.	

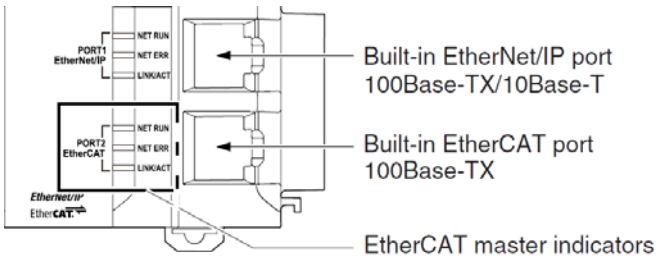
7.4. Checking the EtherCAT Communications

Confirm that the EtherCAT communications are performed normally.

7.4.1. Checking the Connection Status

Check the connection status of the EtherCAT network.

1 Check the LED indicators on the Controller and confirm that the EtherCAT communications are performed normally.



LED indicators in normal status

[NET RUN]: Lit green

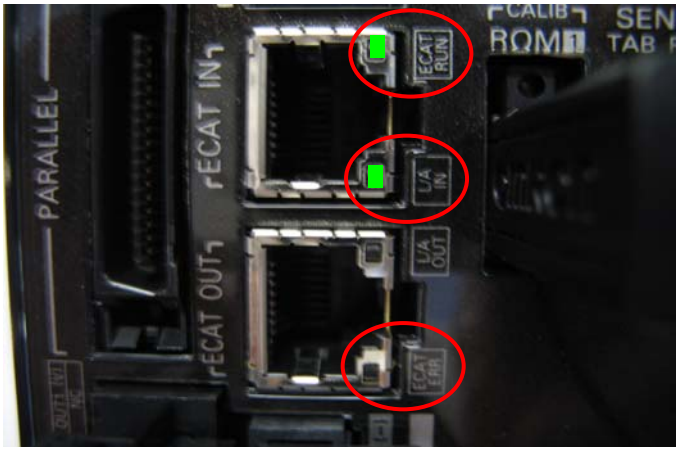
[NET ERR]: Not lit

[LINK/ACT]: Flashing yellow

Label	Name	Color	Status	Meaning
EtherCAT NET RUN	RUN	Green	Lit	EtherCAT communications are in progress. • I/O data is being input and output.
			Flashing	EtherCAT communications are established. Communications is in one of the following states. • Only message communications is function-ing. • Only message communications and I/O data input operations are functioning.
			Not lit	EtherCAT communications are stopped. • Power is OFF or the Unit is being reset. • There is a MAC address error, communica-tions controller error, or other error.
EtherCAT NET ERR	ERROR	Red	Lit	There is an unrecoverable error, such as a hardware error or an exception.
			Flashing	There is a recoverable error.
			Not lit	There is no error.
EtherCAT LINK/ACT	Link/Activity	Yellow	Lit	The link is established.
			Flashing	A link is established and data is being sent and received. The indicator flashes whenever data is sent or received.
			Not lit	The link is not established.

2 Check the LED indicators on the Displacement Sensor.

LED indicators in normal status
[ECAT RUN]: Lit green
[L/A IN]: Flashing green
[ECAT ERROR]: Not lit



LED name	Color	Status	Contents
ECAT RUN indicator	Green	OFF	Initialization status
		Blinking	Pre-Operational status
		Single flash	Safe-Operational status
		ON	Operational status
ECAT ERROR indicator	Red	OFF	No error
		Blinking	Communication setting error or PDO mapping error
		Single flash	Synchronization error or communications data error
		Double flash	Application WDT timeout
		ON	PDI WDT timeout
L/A IN indicator	Green	OFF	Link not established in physical layer
		Flickering	In operation after establishing link
		ON	Link established in physical layer
L/A OUT indicator	Green	OFF	Link not established in physical layer
		Flickering	In operation after establishing link
		ON	Link established in physical layer

7.4.2. Checking Data that are Sent and Received

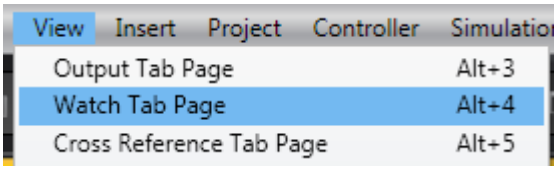
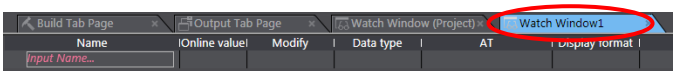
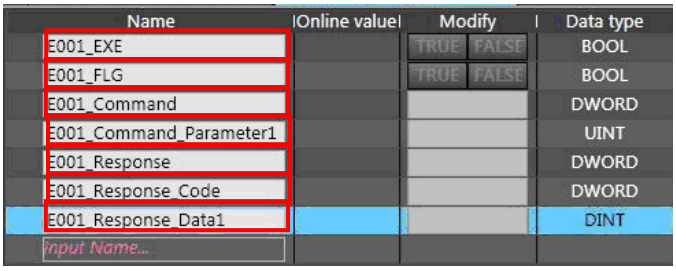
Confirm that correct data are sent and received.

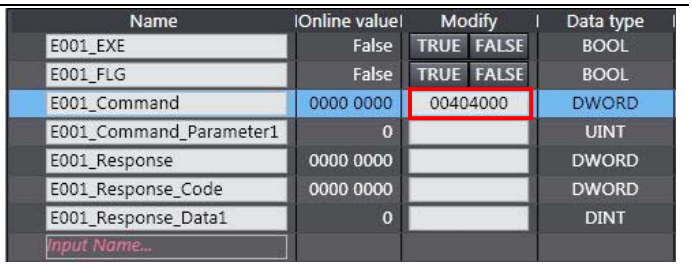
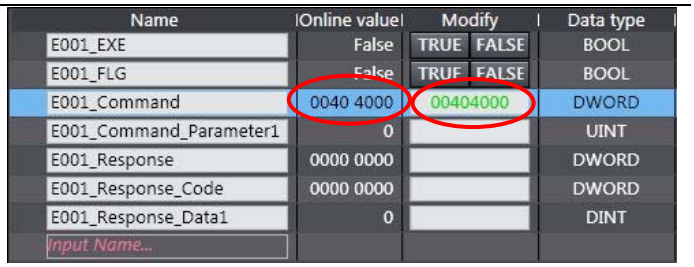
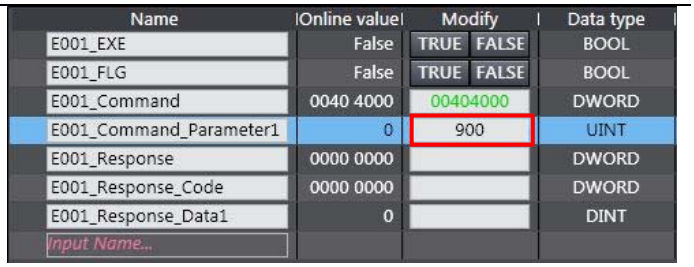
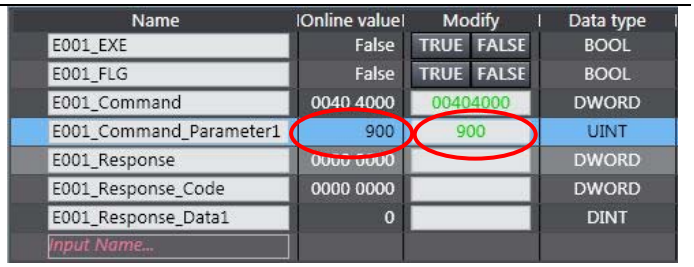
⚠ WARNING

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

⚠ Caution

Always turn OFF the power supply to the devices and confirm safety before I/O wiring.
Make sure to wire in an appropriate state by confirming the safety related descriptions in manuals for the devices.

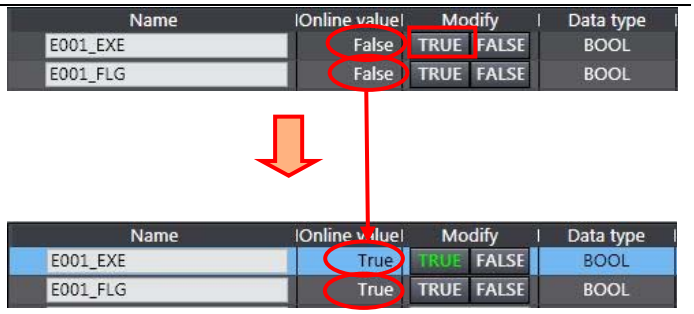
1	Select ***Watch Tab Page*** from the View Menu.	
2	The Watch Tab Page 1 is displayed in the lower section of the Edit Pane.	
3	Enter the following names in the Watch Tab Page1 for monitoring. To enter a new name, click a column stating Input Name… E001_EXE E001_FLG E001_Command E001_Command_Parameter1 E001_Response E001_Response_Code E001_Response_Data1	

4	Enter 00404000 in the Modify Column of *E001_Command*. *By setting the value of E001_Command to 00404000, the system data acquisition command is executed.	
5	Press the **Enter** Key. The value in the Modify Column is displayed in green. Then, the online value of *E001_Command* changes to 0040 4000.	
6	Enter 900 in the Modify Column of *E001_Command_Parameter1*. *By setting the value of *E001_Command_Parameter1* to 900, the system data to be acquired is set to Number of digits displayed past decimal point.	
7	Press the **Enter** Key. The value in the Modify Column is displayed in green. Then, the online value of *E001_Command_Parameter1* changes to 900.	

8 If the online values of *E001_EXE* and *E001_FLG* are False, click **TRUE** in the Modify Column of *E001_EXE*.

Confirm that the online values of *E001_EXE* and *E001_FLG* change to True.

*The online value of *E001_FLG* changes to True when the execution of the system data acquisition command is completed in the Displacement Sensor.



Name	Online value	Modify	Data type
E001_EXE	False	TRUE FALSE	BOOL
E001_FLG	False	TRUE FALSE	BOOL

Name	Online value	Modify	Data type
E001_EXE	True	TRUE FALSE	BOOL
E001_FLG	True	TRUE FALSE	BOOL

9 Confirm that the online value of *E001_Response* is 0040 4000.

**E001_Response* stores the command code executed by the Displacement Sensor.

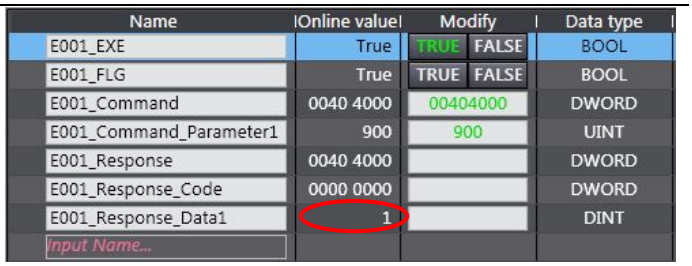
Name	Online value	Modify	Data type
E001_EXE	True	TRUE FALSE	BOOL
E001_FLG	True	TRUE FALSE	BOOL
E001_Command	0040 4000	00404000	DWORD
E001_Command_Parameter1	900	900	UINT
E001_Response	0040 4000		DWORD
E001_Response_Code	0000 0000		DWORD
E001_Response_Data1	1		DINT
Input Name...			

10 Confirm that the online value of *E001_Response_Code* is 0000 0000.

**E001_Response_Code* stores the response code of the command executed by the Displacement Sensor.

*If the online value of *E001_Response_Code* is 0000 0000, the execution result of the command is OK.

Name	Online value	Modify	Data type
E001_EXE	True	TRUE FALSE	BOOL
E001_FLG	True	TRUE FALSE	BOOL
E001_Command	0040 4000	00404000	DWORD
E001_Command_Parameter1	900	900	UINT
E001_Response	0040 4000		DWORD
E001_Response_Code	0000 0000		DWORD
E001_Response_Data1	1		DINT
Input Name...			

11	Confirm that the online value of *E001_Response_Data1* is 1. **E001_Response_Data1* stores the response data of the command executed by the Displacement Sensor. *If the online value of *E001_Response_Data1* is 1, the number of decimal places setting is set to 1 (default value).	

Name	Online value	Modify	Data type
E001_EXE	True	TRUE FALSE	BOOL
E001_FLG	True	TRUE FALSE	BOOL
E001_Command	0040 4000	00404000	DWORD
E001_Command_Parameter1	900	900	UINT
E001_Response	0040 4000		DWORD
E001_Response_Code	0000 0000		DWORD
E001_Response_Data1	1		DINT
Input Name...			

Additional Information

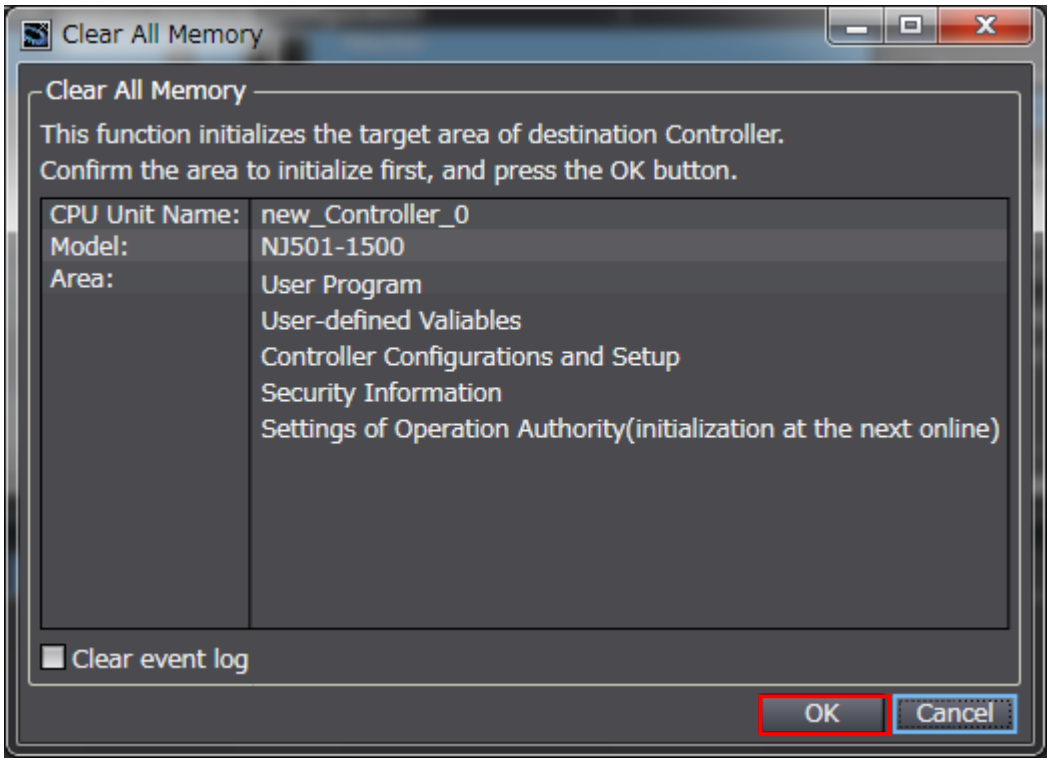
For details on the command, refer to *6-2 EtherCAT connection* in the *ZW Series Displacement Sensor (Confocal Fiber Type) User's Manual* (Cat. No. Z332).

8. Initialization Method

This document explains the setting procedure from the factory default setting.
Some settings may not be applicable as described in this document unless you use the devices with the factory default setting.

8.1. Initializing the Controller

To initialize the settings of the Controller, select ***Clear All Memory*** from the Controller Menu of the Sysmac Studio. The Clear All Memory Dialog Box is displayed. Click the **OK** Button.



8.2. Initializing the Displacement Sensor

For information on how to initialize the Displacement Sensor, refer to *Initializing Settings* in 4-5 *Setting the System* of the *ZW Series Displacement Sensor (Confocal Fiber Type) User's Manual* (Cat. No. Z332).

9. Revision History

Revision code	Date of revision	Revision reason and revision page
01	April 26, 2013	First edition

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17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. Miscellaneous. (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

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