CJ Series
EtherNet/IP™ Connection Guide

Yamaha Motor Co., Ltd.
TS Series
SINGLE-AXIS ROBOT CONTROLLER

P591-E1-01

About Intellectual Property Rights and Trademarks

Microsoft product screen shots reprinted with permission from Microsoft Corporation.
Windows is a registered trademark of Microsoft Corporation in the USA and other countries.
ODVA and EtherNet/IP™ are trademarks of ODVA.
Company names and product names in this document are the trademarks or registered trademarks of their respective companies.

Table of Contents

1. Related Manuals 1
2. Terms and Definitions 2
3. Precautions 3
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. EtherNet/IP Communications Parameters 9
6.2. Allocating the Tag Data Links 10
7. EtherNet/IP Connection Procedure 11
7.1. Work Flow 11
7.2. Setting Up the YAMAHA MOTOR Robot Controller 12
7.3. Setting Up the PLC 20
7.4. Setting Up the Network 30
7.5. Checking the EtherNet/IP Communications 45
8. Initialization Method 52
8.1. Initializing the PLC 52
9. Revision History 54

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
W472	CJ2M-CPU[][] CJ2H-CPU6[] CJ2H-CPU6[]-EIP	CJ-series CJ2 CPU Unit Hardware User's Manual
W473	CJ2M-CPU[][] CJ2H-CPU6[] CJ2H-CPU6[]-EIP	CJ-series CJ2 CPU Unit Software User's Manual
W465	CJ1W-EIP21 CJ2H-CPU6[]-EIP CJ2M-CPU3[]	EtherNet/IP™ Unit Operation Manual
W446	-	CX-Programmer Operation Manual
E119	TS-S2 TS-X TS-P	YAMAHA SINGLE-AXIS ROBOT CONTROLLER TS Series User’s Manual
E114	TS-Manager	YAMAHA SUPPORT SOFTWARE TS-Manager User’s Manual

2. Terms and Definitions

Term	Explanation and Definition
Node	Controllers and devices are connected to the EtherNet/IP network via the EtherNet/IP ports. The EtherNet/IP recognizes each EtherNet/IP port connected to the network as one node. When a device with two EtherNet/IP ports is connected to the EtherNet/IP network, the EtherNet/IP recognizes this device as two nodes. The EtherNet/IP achieves the communications between controllers or the communications between controllers and devices by exchanging data between these nodes connected to the network.
Tag	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 allocated to the memory area of each device.
Tag set	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.
Tag data link	In the EtherNet/IP, the tag and tag set can be exchanged cyclically between nodes without using the user program. This standard feature on the EtherNet/IP is called a tag data link.
Connection	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.
Originator and Target	To perform tag data links, one node requests the opening of a communications line called a "connection". The node that requests opening the connection is called an "originator", and the node that receives the request is called a "target".
Tag data link parameter	The tag data link parameter is the setting data to perform the tag data link. It includes the data to set tags, tag sets, and connections.
EDS file	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.

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 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 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 March 2014. It is subject to change without notice for improvement.

The following notation is used in this document.

⚠ 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 triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text This example indicates a general precaution.
	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 must do.

4. Overview

This document describes the procedure for connecting Single-axis Robot Controller (TS series) (hereinafter referred to as Robot Controller) of Yamaha Motor Co., Ltd. (hereinafter referred to as YAMAHA MOTOR) to CJ-series Programmable Controller + EtherNet/IP Unit (hereinafter referred to as the PLC) of OMRON Corporation (hereinafter referred to as OMRON), and the procedure to check their connection.
Refer to *Section 6 EtherNet/IP Settings* and *Section 7 EtherNet/IP Connection Procedure* to understand the setting method and key points to operate the tag data link for EtherNet/IP.
In this document, CJ-series EtherNet/IP Unit and the built-in EtherNet/IP port of CJ-series CJ2 CPU Unit are collectively called as the "EtherNet/IP Unit".

5. Applicable Devices and Device Configuration

5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	CJ2 CPU Unit	CJ2[]-CPU[][]
OMRON	EtherNet/IP Unit	CJ1W-EIP21 CJ2H-CPU6[]-EIP CJ2M-CPU3[]
YAMAHA MOTOR	Single-axis Robot Controller	TS-S2 TS-X TS-P
YAMAHA MOTOR	Single-axis Robot	TRANSERVO series FLIP-X series PHASER series

Precautions for Correct Use

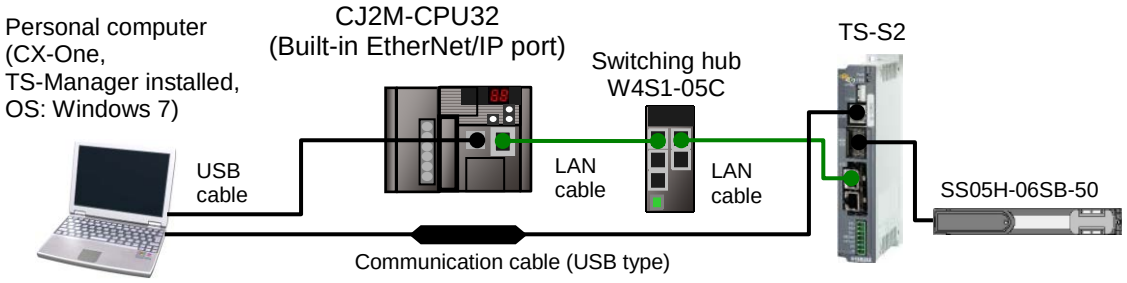
As applicable devices above, the devices with the models and versions listed in *Section 5.2.* are actually used in this document to describe the procedure for connecting devices and checking the connection.
You cannot use devices with versions lower than the versions listed in *Section 5.2.*
To use 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 the device manufacturer.
(Yamaha Motor Co., Ltd. http://global.yamaha-motor.com/business/robot/)
This URL is the latest address at the time of this document creation. Contact each device manufacturer for the latest information.

5.2. Device Configuration

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



Manufacturer	Name	Model	Version
OMRON	CPU Unit (Built-in EtherNet/IP port)	CJ2M-CPU32	Ver.2.0 (Ver.2.12)
OMRON	Power Supply Unit	CJ1W-PA202	
OMRON	Switching hub	W4S1-05C	Ver.1.00
OMRON	CX-One	CXONE-AL[][]C-V4 /AL[][]D-V4	Ver.4.[][]
OMRON	CX-Programmer	(Included in CX-One)	Ver.9.50
OMRON	Network-Configurator	(Included in CX-One)	Ver.3.56
-	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)	-	
YAMAHA MOTOR	Single-axis Robot Controller	TS-S2	Ver.1.10.121
YAMAHA MOTOR	Single-axis Robot	SS05H-06SB-50	
YAMAHA MOTOR	EDS file	Yamaha_TS1(EIP2).eds	Ver.1.1
YAMAHA MOTOR	Support software for TS series Robot Controllers	TS-Manager	Ver.1.3.3
YAMAHA MOTOR	Communication cable (USB type)	KCA-M538F-A0	

Precautions for Correct Use

Prepare the corresponding EDS file beforehand. The latest EDS file can be downloaded from the YAMAHA MOTOR website.

http://global.yamaha-motor.com/business/robot/0002.html

Contact YAMAHA MOTOR if the file is not available.

Precautions for Correct Use

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

Precautions for Correct Use

Update the CX-Programmer and Network Configurator to the versions specified in this section or higher versions 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 *CX-Programmer Operation Manual* (Cat. No. W446) and Network Configurator Online Help.

Additional Information

The system configuration in this document uses USB for the connection between the Personal computer and PLC. For information on how to install the USB driver, refer to *A-5 Installing the USB Driver* of the *CJ-series CJ2 CPU Unit Hardware User's Manual* (Cat. No. W472).

Additional Information

The system configuration in this document uses USB for the connection to the Robot Controller. For information on how to install the USB driver, refer to *8.2. Driver Software Setup* of the *YAMAHA SUPPORT SOFTWARE TS-Manager User's Manual* (Cat. No. E114).

6. EtherNet/IP Settings

This section describes the specifications such as communication parameters and tag data link that are set in this document.

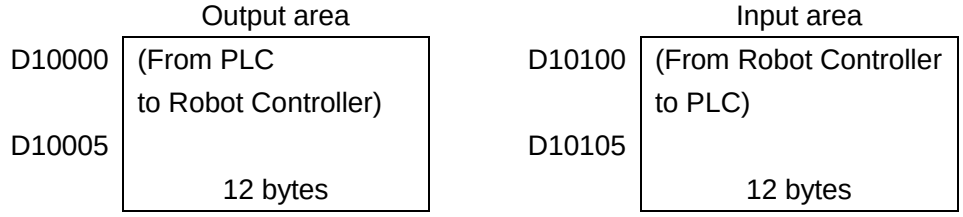
6.1. EtherNet/IP Communications Parameters

The communications parameter required connecting the PLC and the Robot Controller via EtherNet/IP is given below.

Setting item	PLC (EtherNet/IP Unit) (node 1)	Robot Controller (node 2)
Unit number	0	-
Node address	1	2
IP address	192.168.250.1	192.168.250.2
Subnet mask	255.255.255.0	255.255.255.0

6.2. Allocating the Tag Data Links

The tag data links are allocated for the Robot Controller as shown below.



■ Output area (from PLC to Robot Controller)

Address	Bit	Destination device data	
D10000	0	PIN0	Point No. selection
	1	PIN1	
	2	PIN2	
	3	PIN3	
	4	PIN4	
	5	PIN5	
	6	PIN6	
	7	PIN7	
	8	JOG+	JOG movement (+ direction)
	9	JOG-	JOG movement (- direction)
	10	MANUAL	Manual mode
	11	ORG	Return-to-origin
	12	/LOCK	Interlock
	13	START	Start
	14	RESET	Reset
	15	SERVO	Servo ON
D10001	0 to 15	-	-
D10002	0 to 15	WIN0	Execution command
D10003	0 to 15	WIN1	Command option
D10004	0 to 15	WIN2	
D10005	0 to 15	WIN3	

■ Input area (from Robot Controller to PLC)

Address	Bit	Destination device data	
D10100	0	POUT0	Point No. output
	1	POUT1	
	2	POUT2	
	3	POUT3	
	4	POUT4	
	5	POUT5	
	6	POUT6	
	7	POUT7	
	8	OUT0	Control output
	9	OUT1	
	10	OUT2	
	11	OUT3	
	12	BUSY	Operation is being executed
	13	END	Operation completion
	14	/ALM	Alarm
	15	SRV-S	Servo status
D10101	0 to 15	-	-
D10102	0 to 15	WOUT0	Status
D10103	0 to 15	WOUT1	Command response
D10104	0 to 15	WOUT2	
D10105	0 to 15	WOUT3	

7. EtherNet/IP Connection Procedure

This section describes the procedure for connecting the Robot Controller to the PLC via EtherNet/IP.
This document explains the procedures for setting up the PLC from the factory default setting. For the initialization, refer to *Section 8 Initialization Method*.
Since the Robot Controller requires an initial data that matches the robot being used, the procedure to create the initial data is described in this section.

7.1. Work Flow

Take the following steps to operate the tag data link for EtherNet/IP.

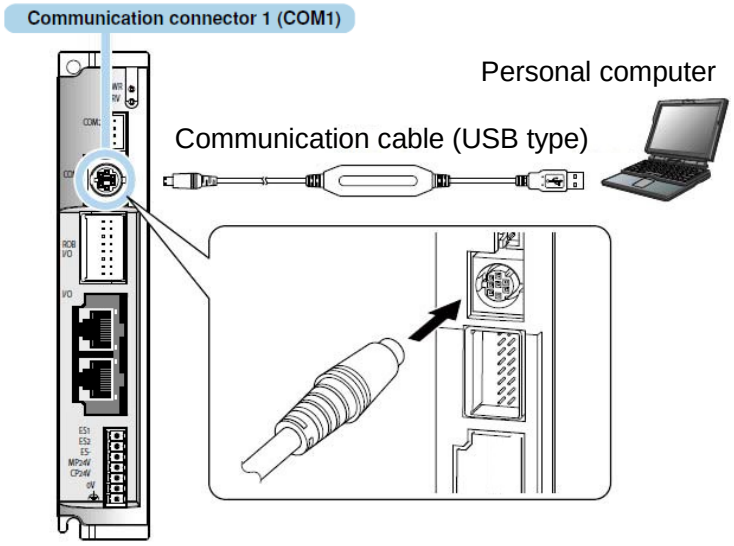
7.2. Setting Up the YAMAHA MOTOR Robot Controller	Set up the YAMAHA MOTOR Robot Controller.
↓	
7.2.1. Parameter Settings	Set the parameters for the Robot Controller.
↓	
7.3. Setting Up the PLC	Set up the PLC.
↓	
7.3.1. Hardware Settings	Set the hardware switches on the EtherNet/IP Unit and wire the network.
↓	
7.3.2. Starting the CX-Programmer and Connecting Online with the PLC	Start the CX-Programmer and connect online with the PLC.
↓	
7.3.3. Creating the I/O Table and setting IP Addresses	Create the I/O table and set the IP address of the PLC.
↓	
7.4. Setting Up the Network	Set the tag data links for the EtherNet/IP.
↓	
7.4.1. Starting the Network Configurator and Installing the EDS File	Start the Network Configurator and install the EDS file.
↓	
7.4.2. Connecting Online with the PLC and Uploading the Configuration	Connect online with the PLC and upload the network configuration.
↓	
7.4.3. Setting Tags	Register the tags of the send area and receive area.
↓	
7.4.4. Setting the Connection	Associate the target device with the tags of the originator.
↓	
7.4.5. Transferring the Tag Data Link Parameters	Transfer the set tag data link parameters to the PLC.
↓	
7.5. Checking the EtherNet/IP Communications	Confirm that the EtherNet/IP tag data links are operated normally.
↓	
7.5.1. Checking the Connection Status	Check the connection status of EtherNet/IP.
↓	
7.5.2. Checking the Data that are Sent and Received	Confirm that the correct data are sent and received.

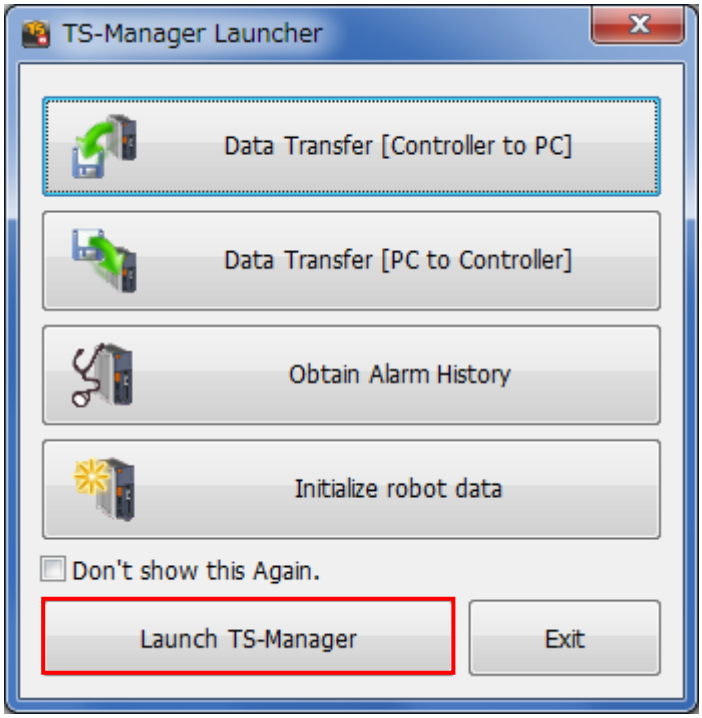
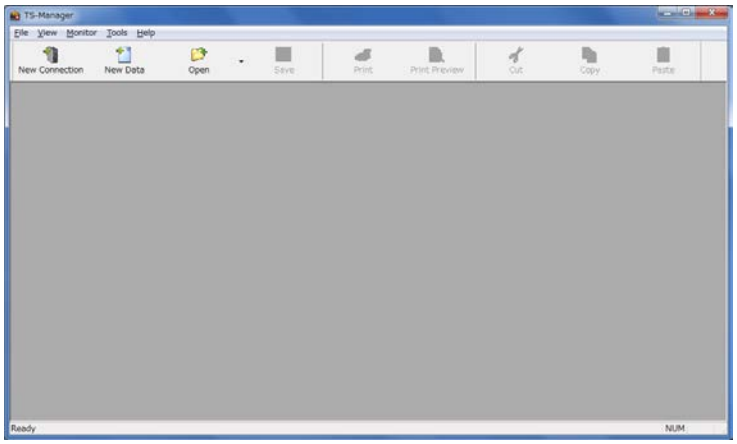
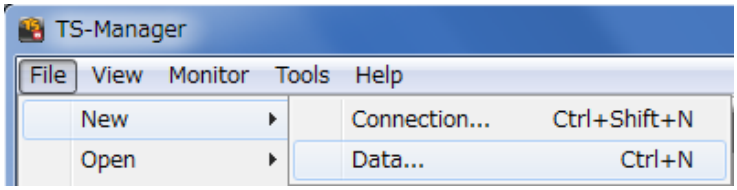
7.2. Setting Up the YAMAHA MOTOR Robot Controller

Set up the YAMAHA MOTOR Robot Controller.

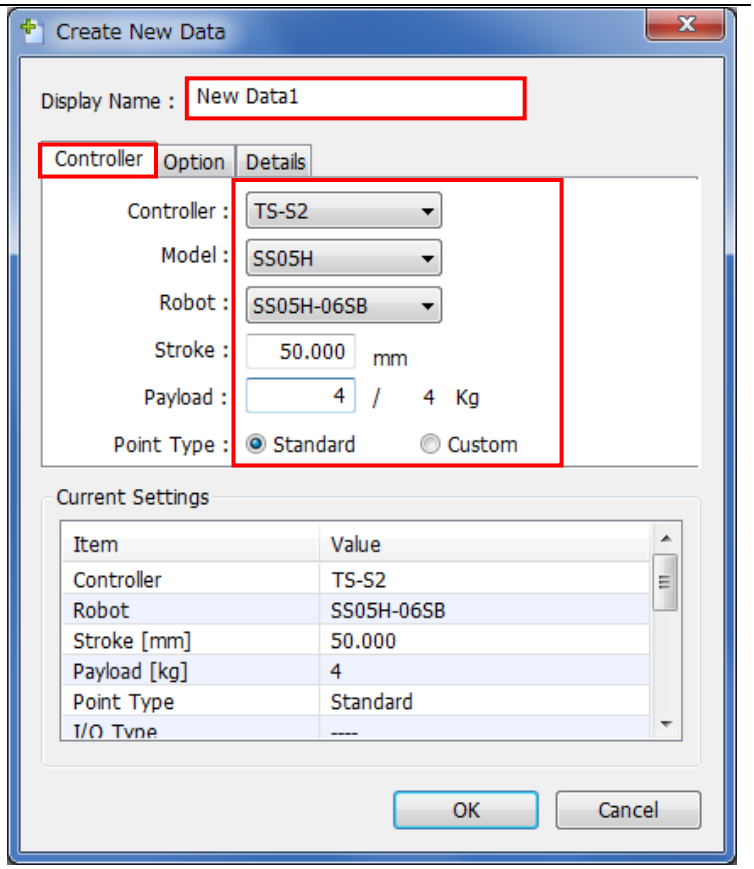
7.2.1. Parameter Settings

Set the parameters for the Robot Controller.
Install the TS-Manager to the Personal computer beforehand to set parameters.
Use USB to connect the Robot Controller to the Personal computer.
For information on how to install the USB driver, refer to *8.2. Driver Software Setup* of the *YAMAHA SUPPORT SOFTWARE TS-Manager User's Manual* (Cat. No. E114).

1	Make sure that the power supply to the Robot Controller is OFF, and then connect the Robot Controller to the Personal computer with a Communication cable (USB type). * Connect the Communication cable (USB type) to COM1 on the Robot Controller.	 Robot Controller
2	Turn ON the power supply to the Robot Controller.	
3	Start the TS-Manager from the Personal computer.	 TS-Manager

4	The TS-Manager Launcher Dialog Box is displayed at startup. Click the **Launch TS-Manager** Button.	
5	The TS-Manager starts.	
6	Create the initial data that matches the Robot Controller and robot being used. Select ***New*** - ***Data*** from the File Menu.	

7 The Create New Data Dialog Box is displayed. Enter a display name.



* The name specified here is used only for identifying the data on the TS-Manager. Although New Data1 (default value) is set in this document, change the name as required.

Click the **Controller** Tab, and then select or enter the following values.

・Controller: *TS-S2*
・Model: *SS05H*
・Robot: *SS05H-06SB*
* Select appropriate values for each item according to the Robot Controller and robot being used.

・Stroke: *50.000*
* Set the "Stroke" according to the robot's specifications.

・Payload: *4*
* Although the default value is set for "Payload" in this document, change the value according to the usage.

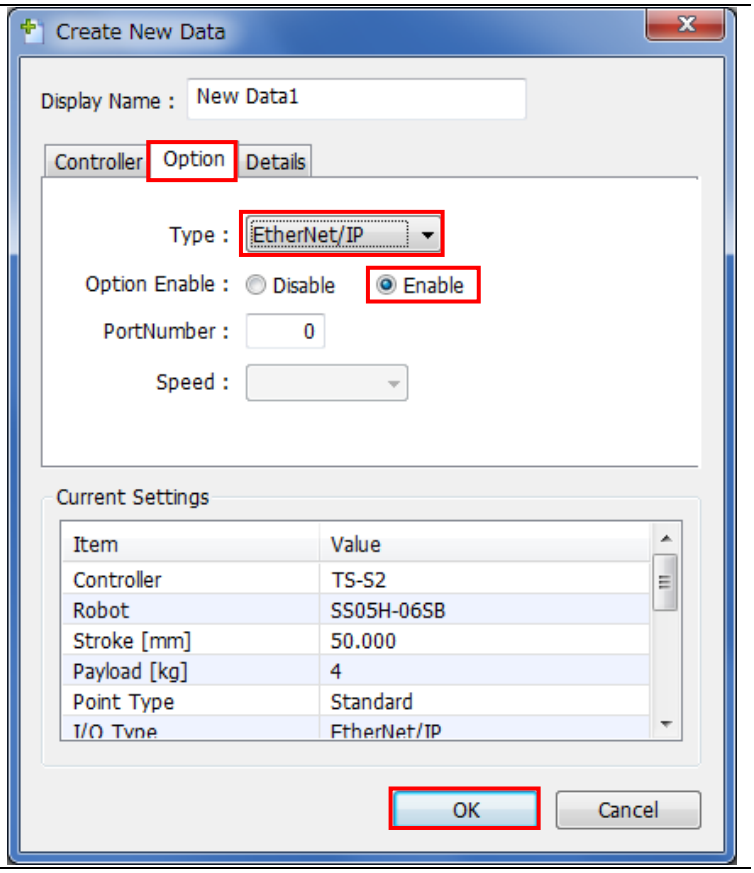
・Point Type: *Standard*
* Although the default value is set for "Point Type" in this document, select the appropriate type according to the usage.

8 Click the **Option** Tab, and then select the following value.

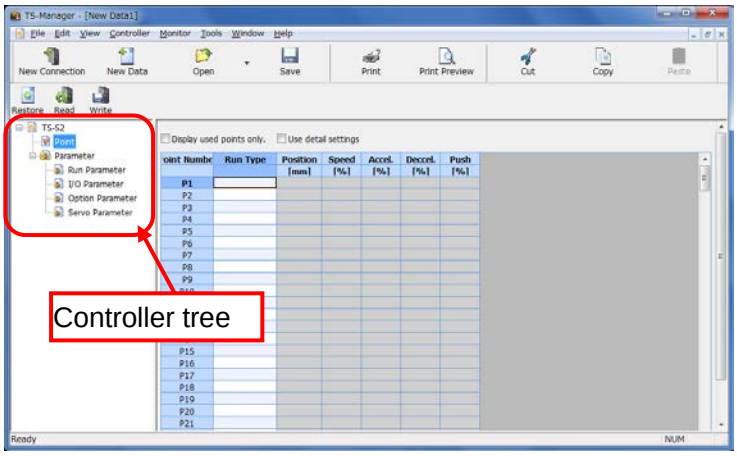
・Type: *EtherNet/IP*
・Option Enable: *Enable*

Use the default settings for other parameters and the settings on the Details Tab.

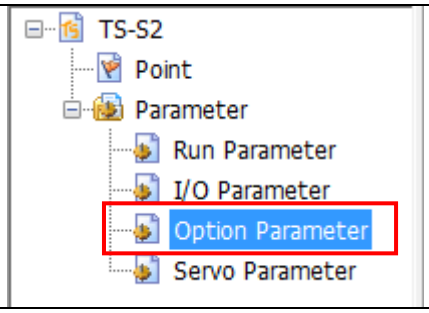
Click the **OK** Button.



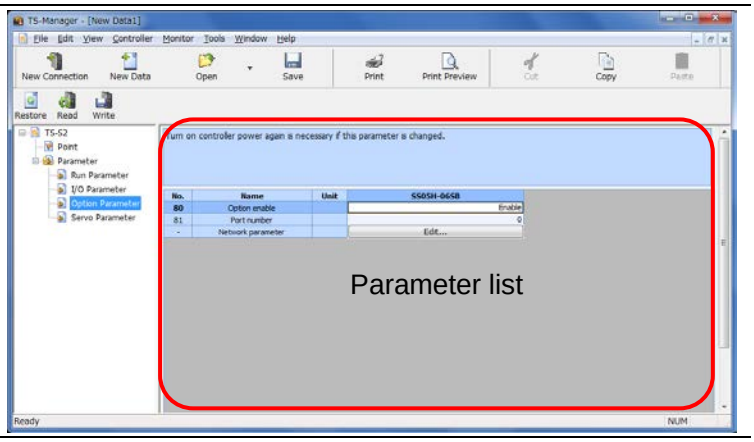
9 After the initial data is created, settings of New Data1 are displayed on the TS-Manager Main Window.



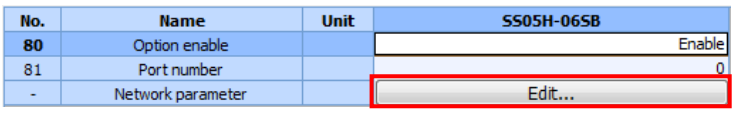
10 Double-click **Option Parameter** in the Controller tree.



11 A parameter list is displayed.



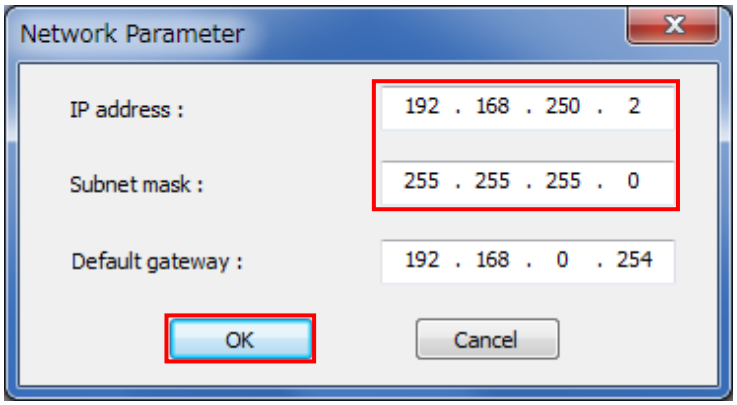
12 Click the **Edit** Button of Network parameter.



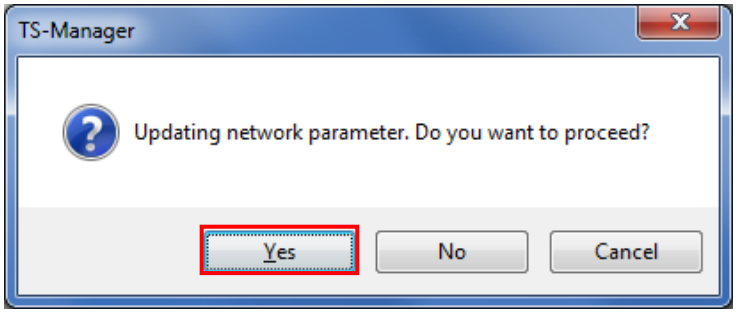
13 The Network Parameter Dialog Box is displayed. Set the following values and click the **OK** Button.

・IP address: *192.168.250.2*
・Subnet mask: *255.255.255.0*

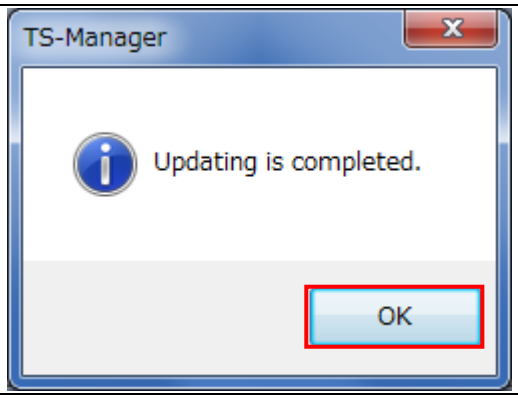
* Use the default value for Default gateway since it is not used in this document.



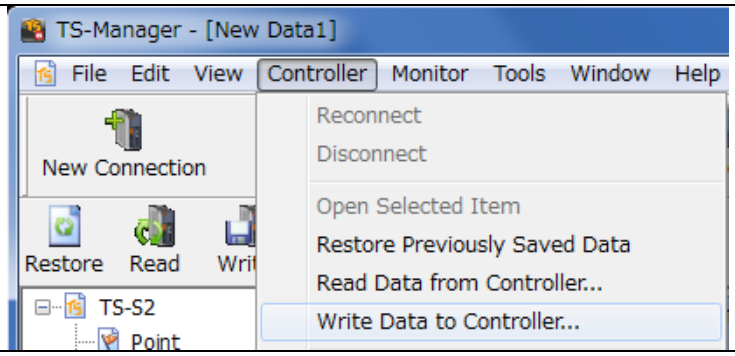
14 A confirmation dialog box is displayed asking whether to update network parameter. Check the contents and click the **Yes** Button.



15 A dialog box is displayed stating "Updating is completed". Check the contents and click the **OK** Button.

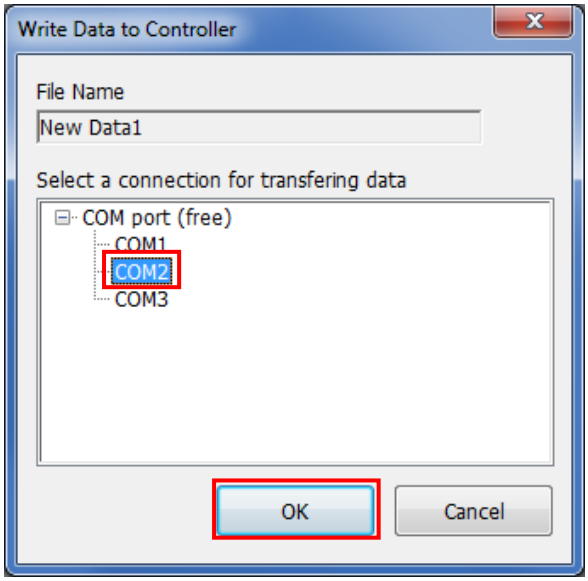


16 Select ***Write Data to Controller*** from the Controller Menu.



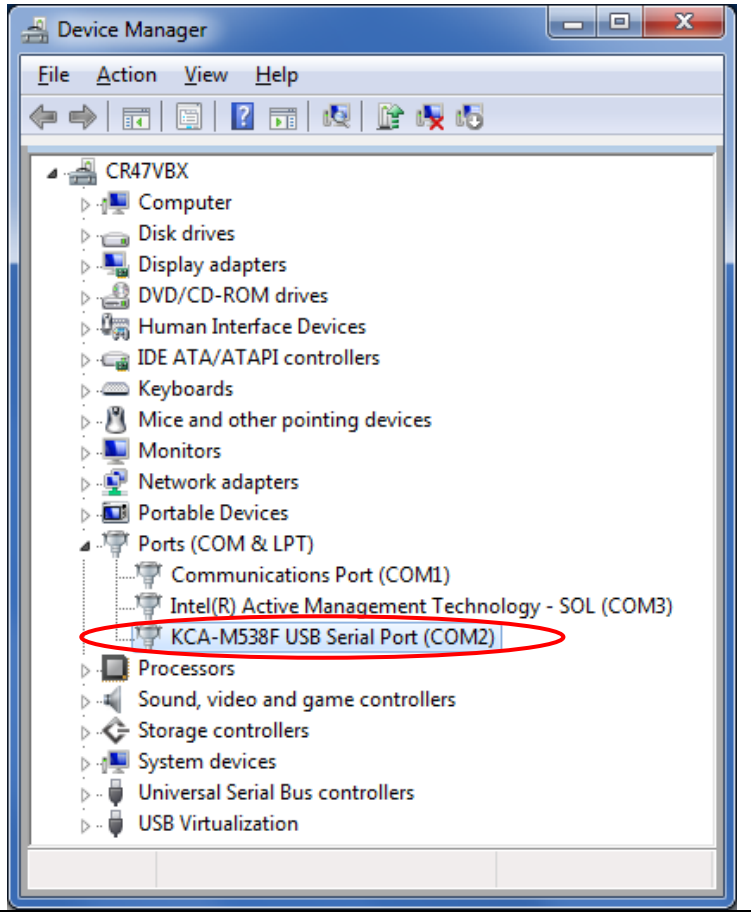
17 On the Write Data to Controller Dialog Box, select a COM port number in COM port (free), and then click the **OK** Button.

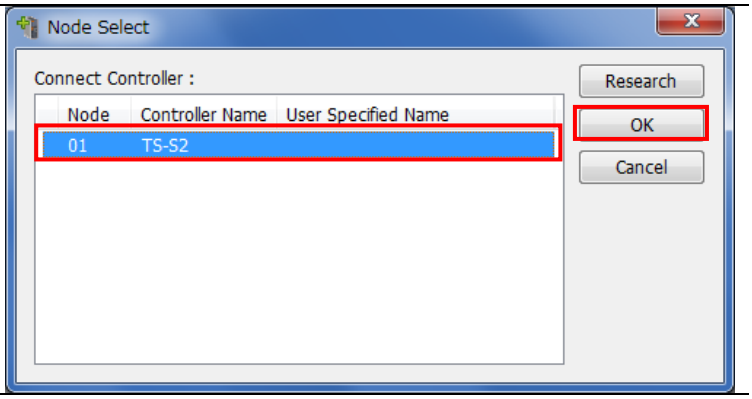
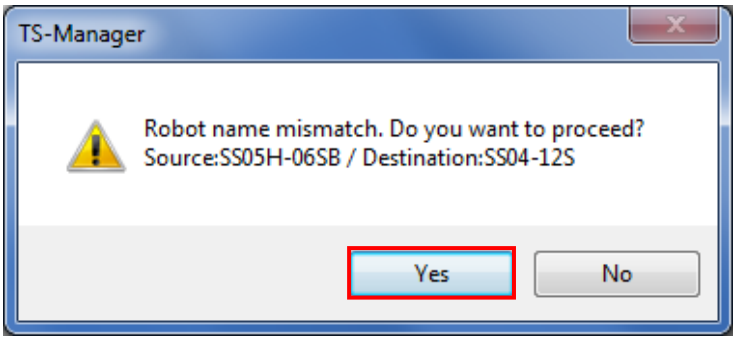
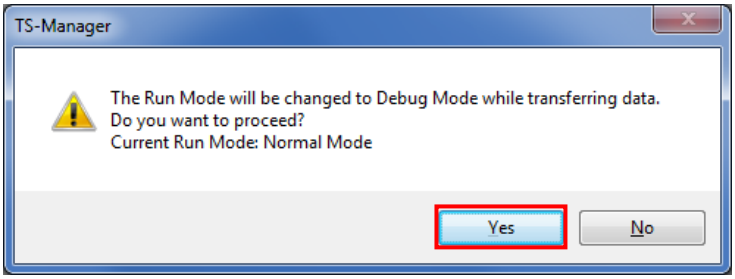
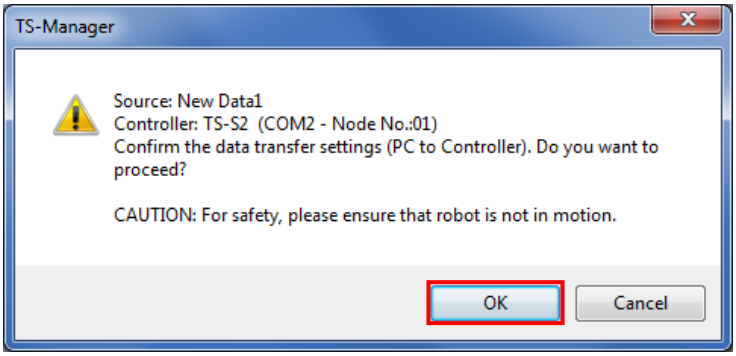
* COM2 is selected in the right figure as an example.

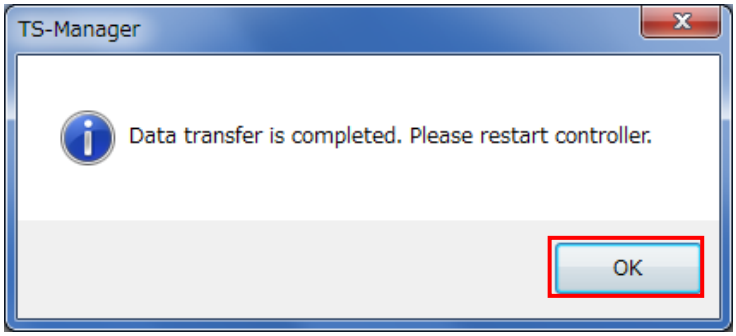
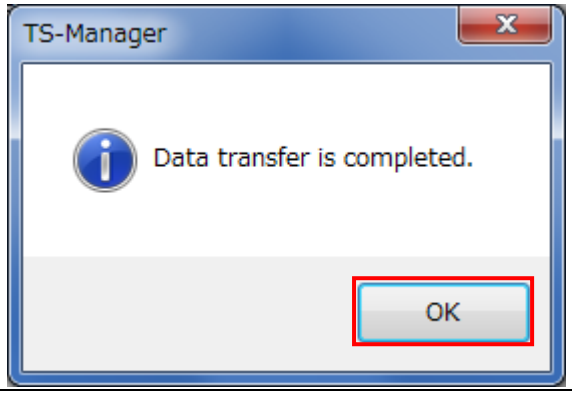


* If there are multiple COM port numbers in COM port (free), display the Windows Device Manager to check the COM port number under Ports (COM & LPT).
As an example, the right figure displays COM2 which is assigned to KCA-M538F.

* To display Device Manager, right-click **Computer**, ***select System Properties***, and click ***Device Manager*** on the Personal computer.



18	A search for the Controller starts, and then the Node Select Dialog Box is displayed. Select the node *01* and click the **OK** Button.	
19	If a robot name different from the one you want to use is already registered to the Robot Controller, the dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.	
20	A confirmation dialog box is displayed asking whether to change the operating mode. Confirm that there is no problem and click the **Yes** Button.	
21	A confirmation dialog box is displayed asking whether to execute data transfer to the Robot Controller. Confirm that there is no problem and click the **OK** Button.	

22	When the dialog box is displayed stating that data transfer is completed. Check the contents and click the **OK** Button. * A different complete message appears as shown on the right depending on whether changes are made to the robot name. In either case, click the **OK** Button.	Complete message when the robot name is changed.  Complete message when the robot name is not changed. 
23	Turn OFF the power supply to the Robot Controller. * To reflect parameters, the power supply to the Robot Controller must be cycled. For the procedure, go to the next section.	

7.3. Setting Up the PLC

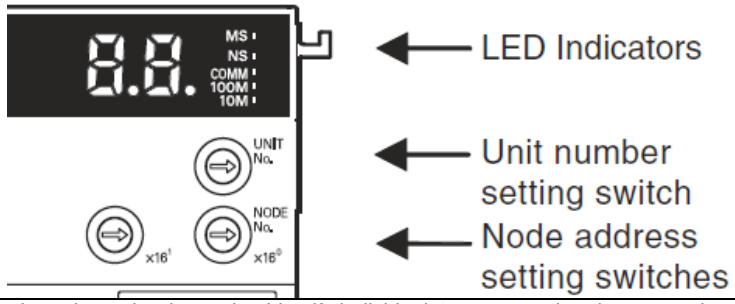
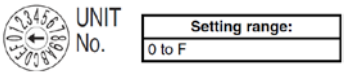
Set up the PLC.

7.3.1. Hardware Settings

Set the hardware switches on the EtherNet/IP Unit and wire the network.

Precautions for Correct Use

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

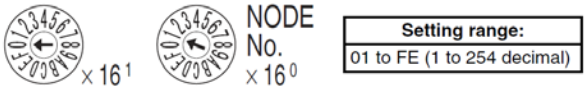
1	Make sure that the power supply to the PLC is OFF. * If the power supply is turned ON, settings may not be applicable as described in the following procedure.	
2	Check the position of the hardware switches on the front panel of the EtherNet/IP Unit by referring to the right figure.	
3	Set the Unit number setting switch to *0*.	The unit number is used to identify individual CPU Bus Units when more than one CPU Bus Unit is mounted to the same PLC. Use a small screwdriver to make the setting, taking care not to damage the rotary switch.The unit number is factory-set to 0. 

4 Set the Node address setting switches to the following default settings.
[NODE No.x16^1]: *0*
[NODE No.x16^0]: *1*

* Set the IP address to *192.168.250.1*.

* By default, the first to third octets of the local IP address are fixed to 192.168.250. The fourth octet is the values that were set with the Node address setting switches.

With the FINS communications service, when there are multiple EtherNet/IP Units connected to the Ethernet network, the EtherNet/IP Units are identified by node addresses. Use the node address switches to set the node address between 01 and FE hexadecimal (1 to 254 decimal).Do not set a number that has already been set for another node on the same network.



The left switch sets the sixteens digit (most significant digit) and the right switch sets the ones digit (least significant digit).The node address is factory-set to 01.
Default IP address = 192.168.250.node address

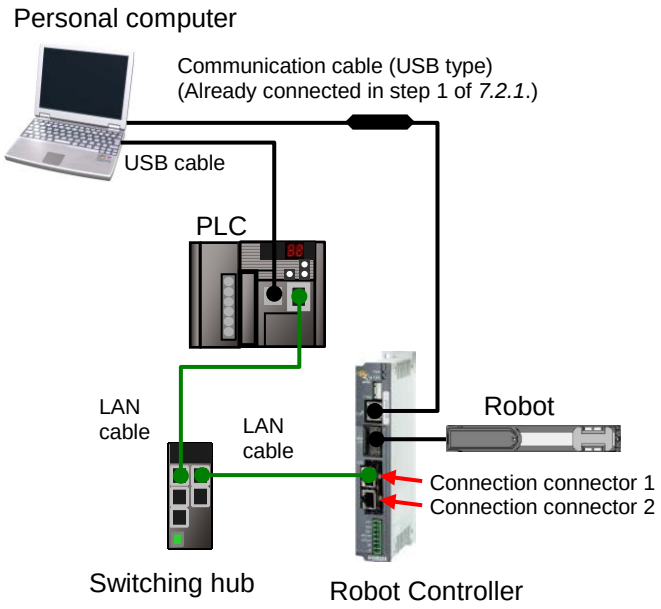
With the factory-default node address setting of 01, the default IP address is 192.168.250.1.

5 Make sure that the power supply to the PLC and the Robot Controller is OFF.

Connect the EtherNet/IP port on the PLC and the EtherNet/IP port (Connection connector 1) on the Robot Controller with LAN cables via the Switching hub.

Connect the peripheral USB port on the PLC to the Personal computer with a USB cable.

Connect the Robot to the Robot Controller.



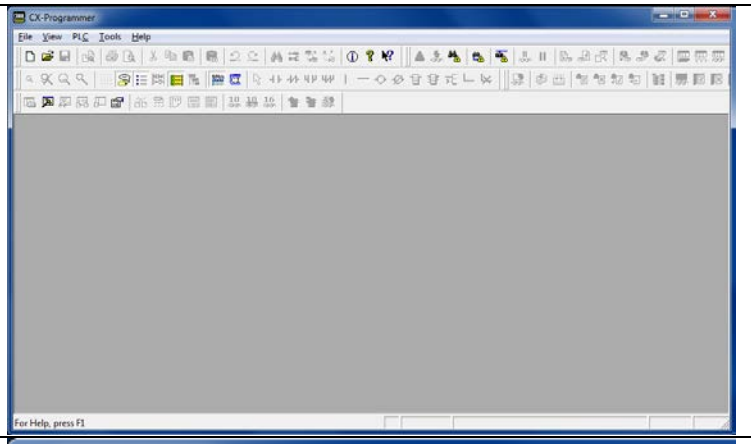
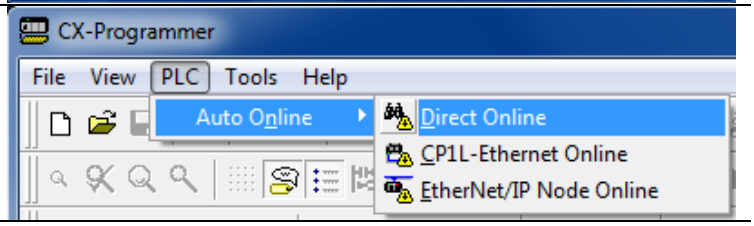
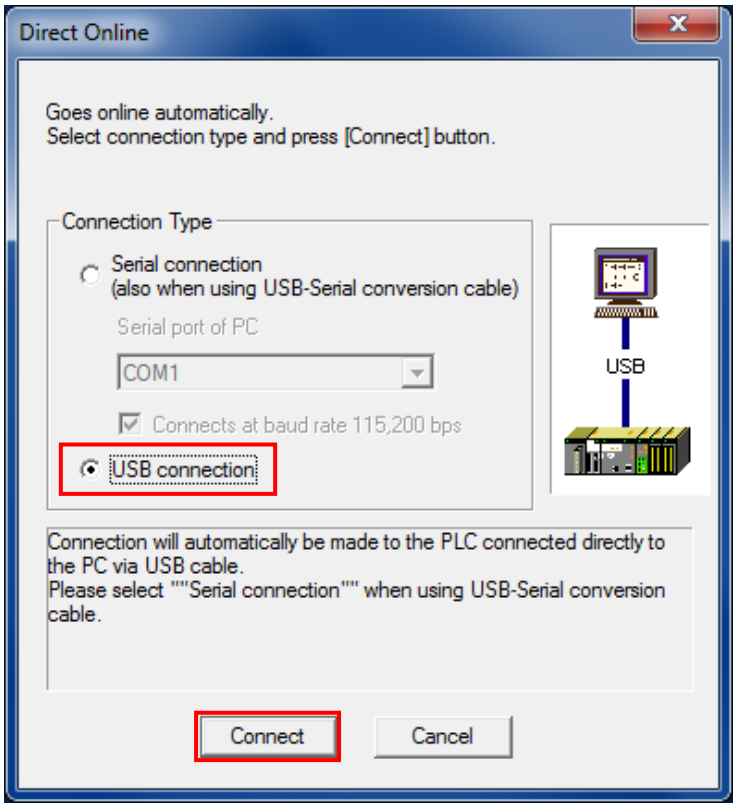
6 Turn ON the power supply to the PLC and Robot Controller.

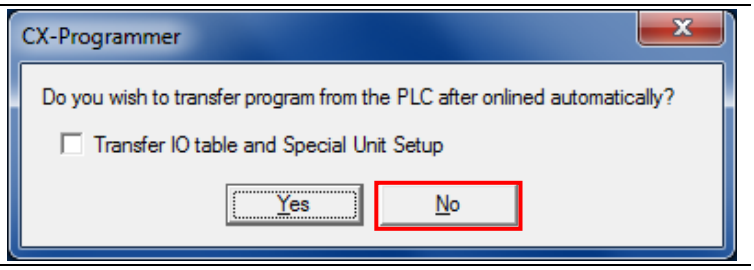
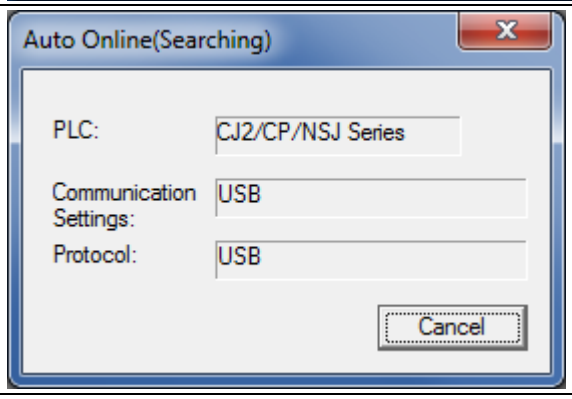
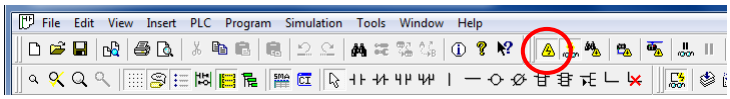
* The set IP address of PLC is displayed on the seven-segment LED indicators from right to left. Afterwards, the rightmost 8 bits of the IP address are displayed in hexadecimal during normal operation.

7.3.2. Starting the CX-Programmer and Connecting Online with the PLC

Start the CX-Programmer and connect online with the PLC.

Install the CX-One and USB driver in the Personal computer beforehand.

1	Start the CX-Programmer.	
2	Select ***Auto Online*** - ***Direct Online*** from the PLC Menu.	
3	The Direct Online Dialog Box is displayed. Select the *USB connection* Option for Connection Type and click the **Connect** Button.	

4	The dialog box on the right is displayed. Check the contents and click the **No** Button.	
5	The dialog box on the right is displayed, and the CX-Programmer and the PLC are automatically connected.	
6	Confirm that the CX-Programmer and the PLC are normally connected online. *The icon is pressed down during online connection.	

Additional Information

If an online connection cannot be made to the PLC, check the cable connection.
Or, return to step 2, check the settings and repeat each step.
Refer to *Connecting Directly to a CJ2 CPU Unit Using a USB Cable* in *Chapter 3 Communications* in *PART 3: CX-Server Runtime of the CX-Programmer Operation Manual* (Cat. No. W446) for details.

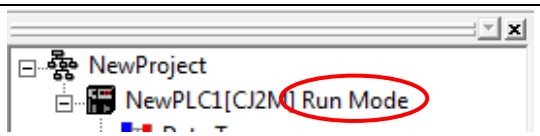
Additional Information

The dialog boxes explained in the following procedures may not be displayed depending on the environmental setting of CX-Programmer.
For details on the environmental setting, refer to *Options and Preferences* in *Chapter 3 Project Reference* in *PART 1: CX-Programmer* of the *CX-Programmer Operation Manual* (Cat. No. W446). This document explains the setting procedure when the *Confirm all operations affecting the PLC* Check Box is selected.

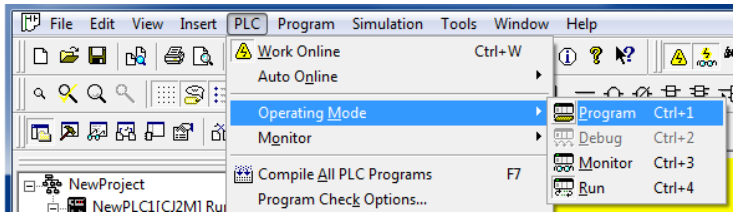
7.3.3. Creating the I/O Table and setting IP Addresses

Create the I/O table and set the IP address of the PLC.

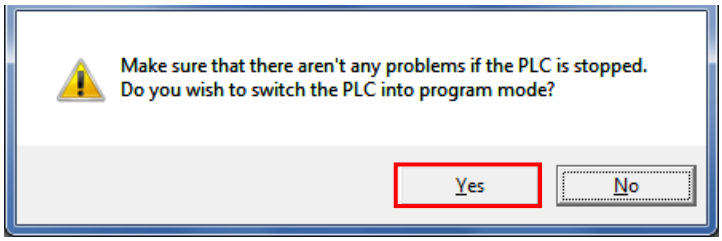
1 If the operating mode of the PLC is RUN Mode or Monitor Mode, change it to Program Mode by following the steps below.



(1) Select ***Operating Mode*** - ***Program*** from the PLC Menu of the CX-Programmer.

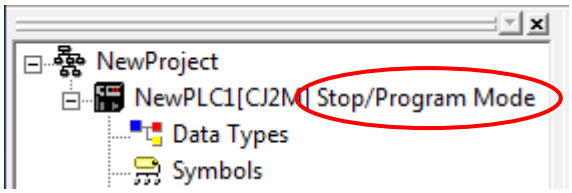


(2) The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.

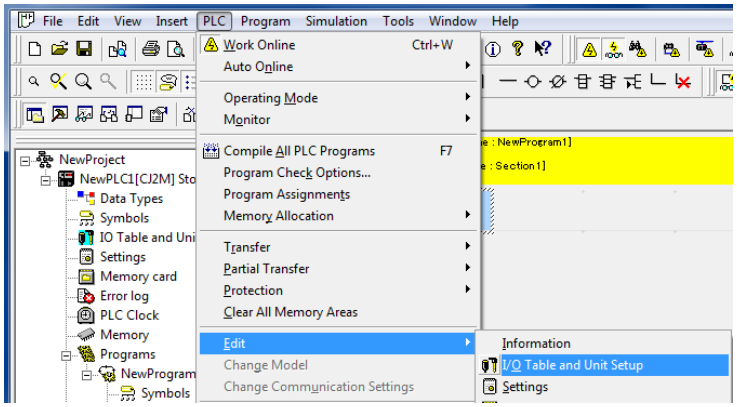


* Refer to *Additional Information* on the previous page for the settings concerning the dialog display.

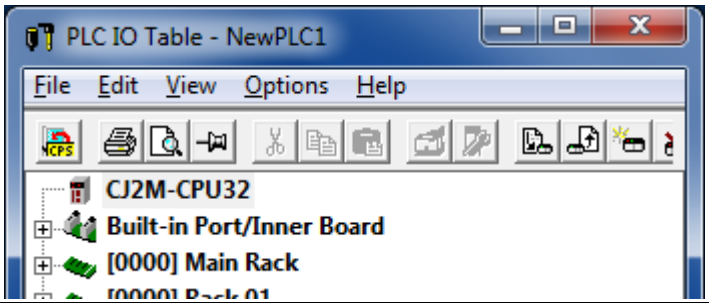
(3) Confirm that Stop/Program Mode is displayed on the right of the PLC model in the project workspace of the CX-Programmer.

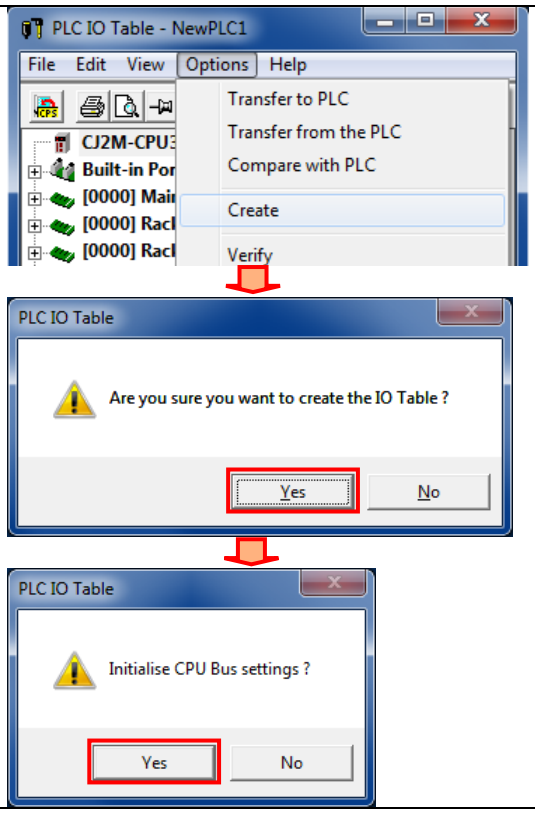


2 Select ***Edit*** - ***I/O Table and Unit Setup*** from the PLC Menu of the CX-Programmer.

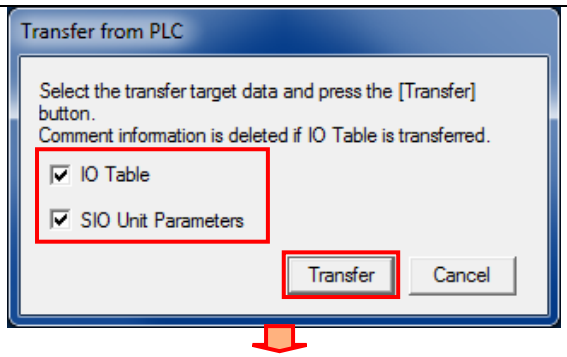


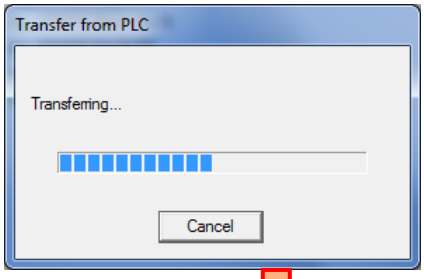
The PLC IO Table Window is displayed.



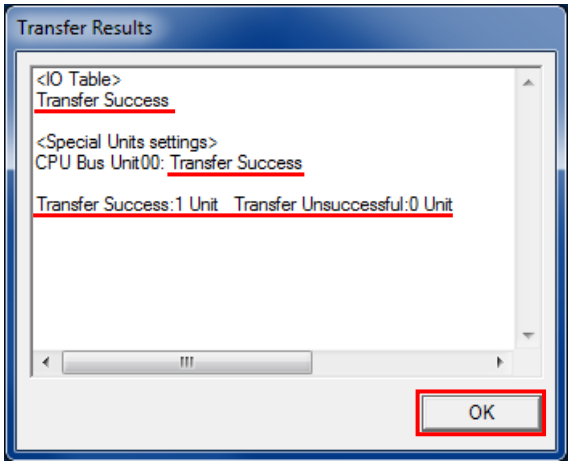
3	Select ***Create*** from the Options Menu of the PLC IO Table Window. The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button. The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.	

4 The Transfer from PLC Dialog Box is displayed. Select the *I/O Table* Check Box and the *SIO Unit Parameters* Check Box, and click the **Transfer** Button.





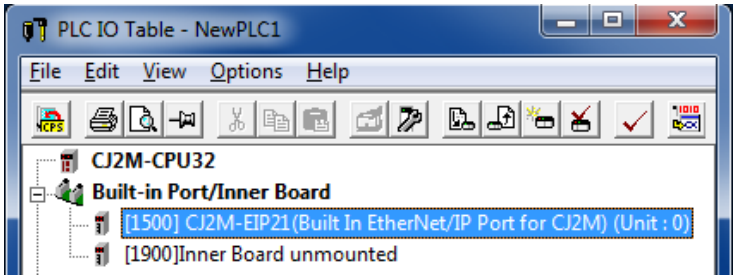
When the transfer is completed, the Transfer Results Dialog Box is displayed.
Confirm that the transfer was normally executed by referring to the message in the dialog box.



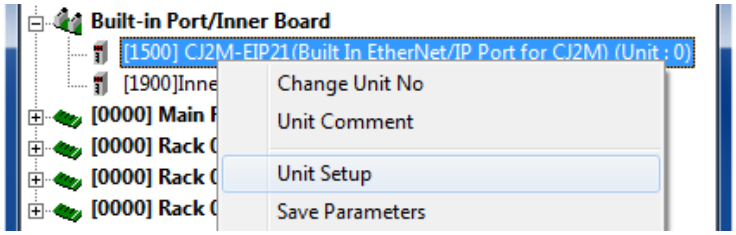
When the I/O table is created normally, the dialog box displays as follows:
Transfer Success: 1 Unit
Transfer Unsuccessful: 0 Unit

Click the **OK** Button.

5 On the PLC IO Table Window, click **+** to the left of Built-in Port/Inner Board to display CJ2M-EIP21.
* The right figure displays the CPU Unit (built-in EtherNet/IP port) specified in *5.2. Device Configuration*. When you use an applicable EtherNet/IP Unit not specified in *5.2. Device Configuration*, the display position and name are different from this figure.



Right-click **CJ2M-EIP21** and select ***Unit Setup***.

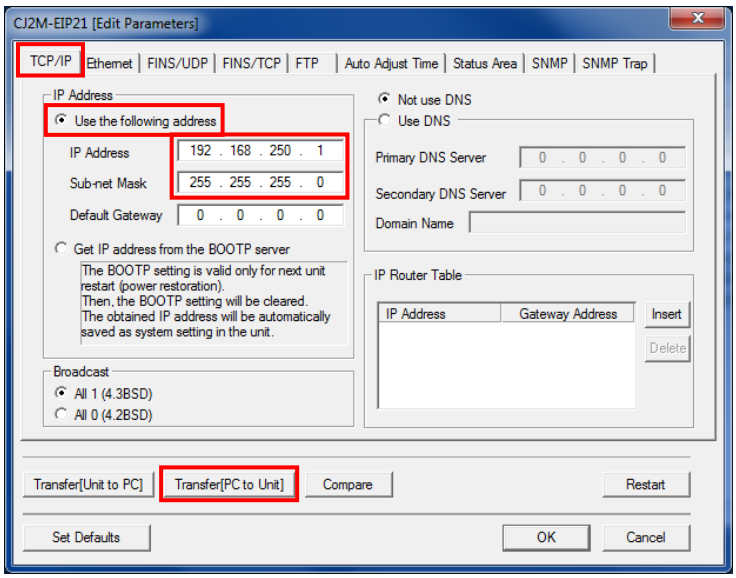


6 The Edit Parameters Dialog Box is displayed. Select the **TCP/IP** Tab.

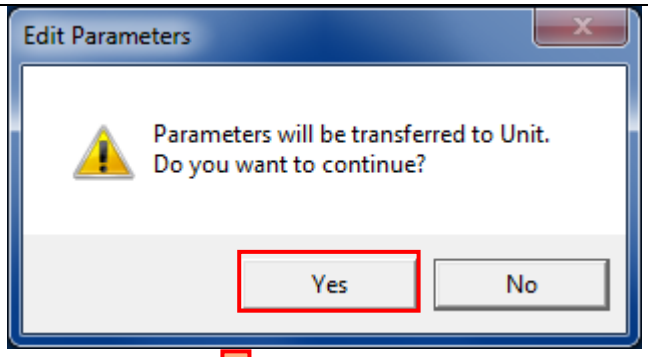
Make the following settings in the *IP Address* Field.

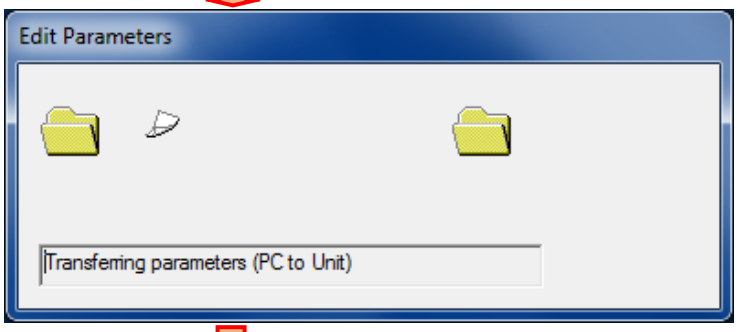
- Select the *Use the following address* Check Box
- IP Address: *192.168.250.1*
- Subnet Mask: *255.255.255.0*

Click the **Transfer [PC to Unit]** Button.

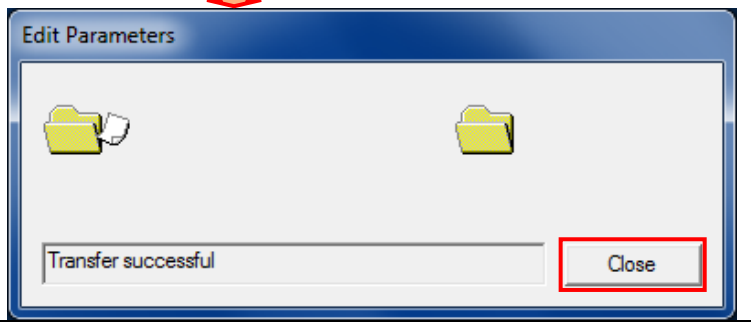


7 The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.

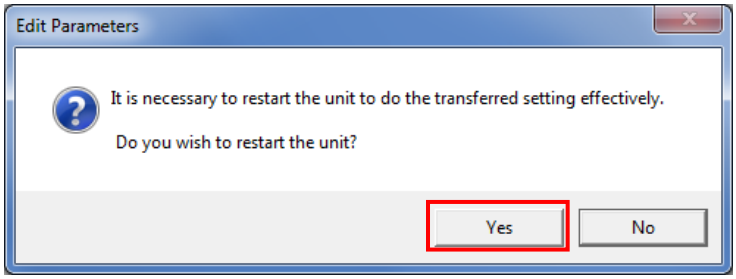




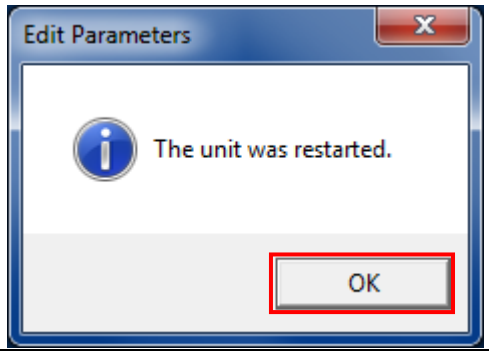
Confirm that parameters were normally transferred to the Unit, and click the **Close** Button.



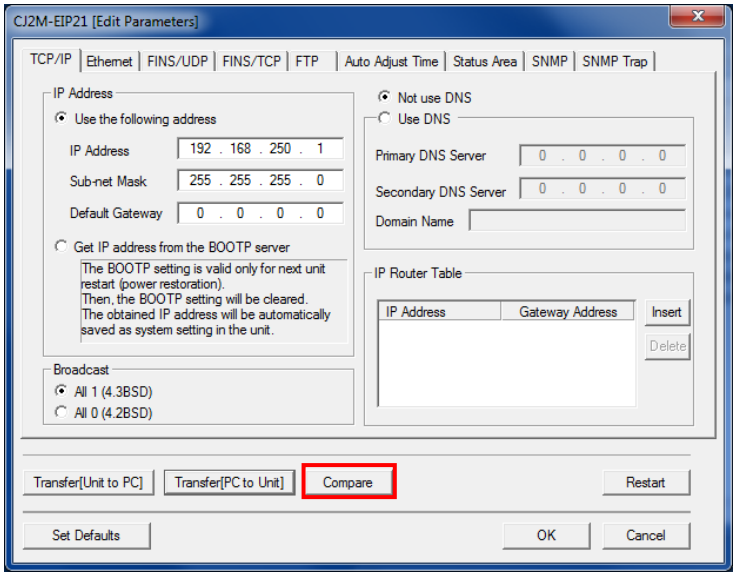
8 A dialog box on the right is displayed. Check the contents and click the **Yes** Button.



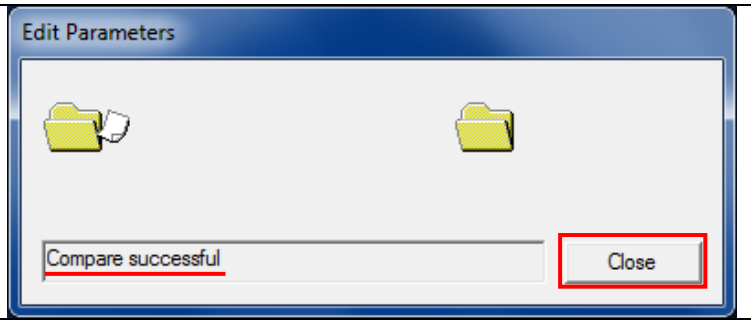
When the Unit is restarted, the dialog box on the right is displayed. Check the contents and click the **OK** Button.



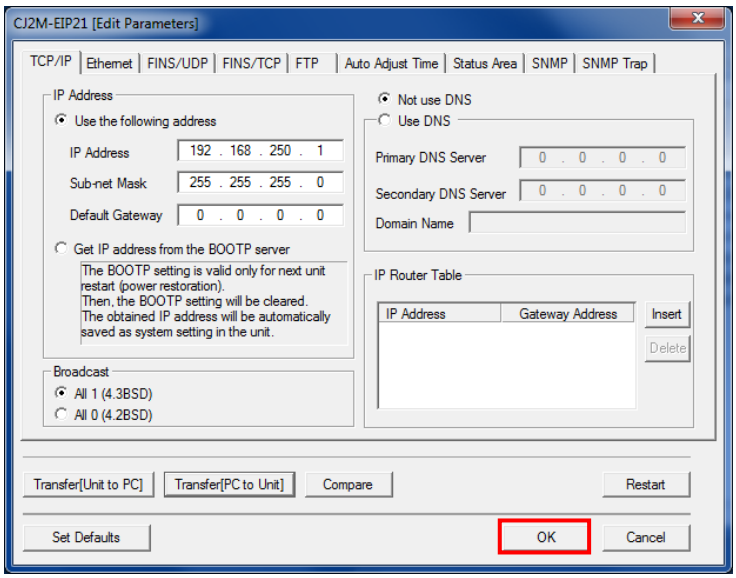
9 To confirm that the IP address is correctly changed, click the **Compare** Button.



10 After confirming that parameters match, click the **Close** Button.



11 Click the **OK** Button on the Edit Parameters Dialog Box.



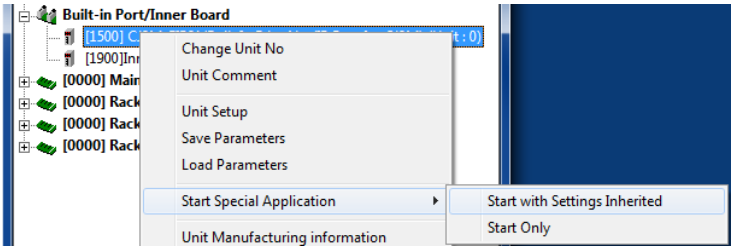
7.4. Setting Up the Network

Set the tag data links for the EtherNet/IP.

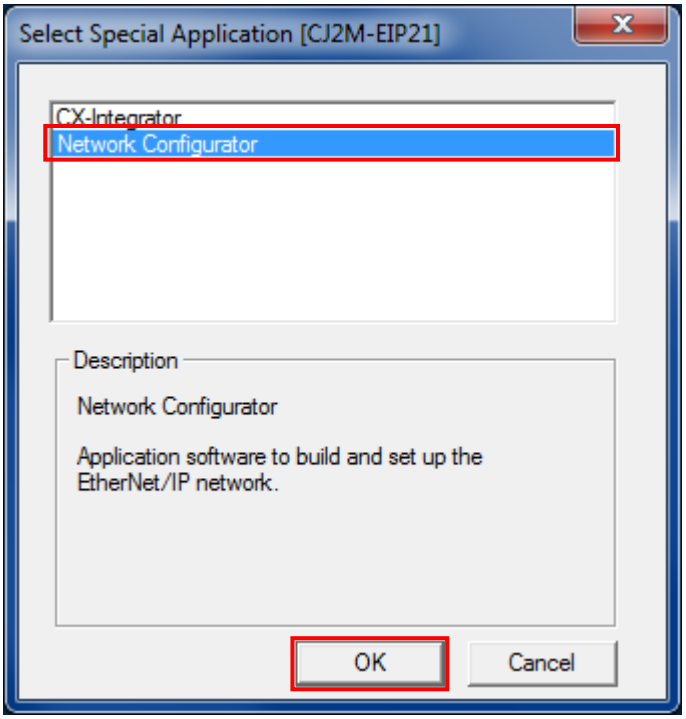
7.4.1. Starting the Network Configurator and Installing the EDS File

Start the Network Configurator and install the EDS file.

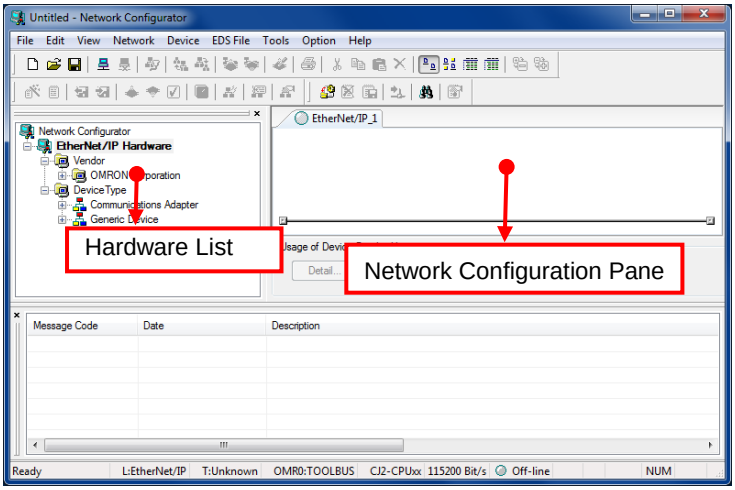
1 Right-click **CJ2M-EIP21** on the PLC IO Table Window, and select ***Start Special Application*** - ***Start with Settings Inherited***.

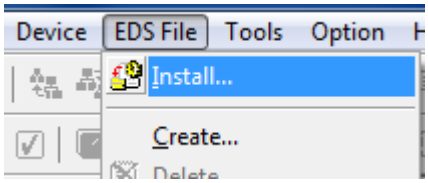
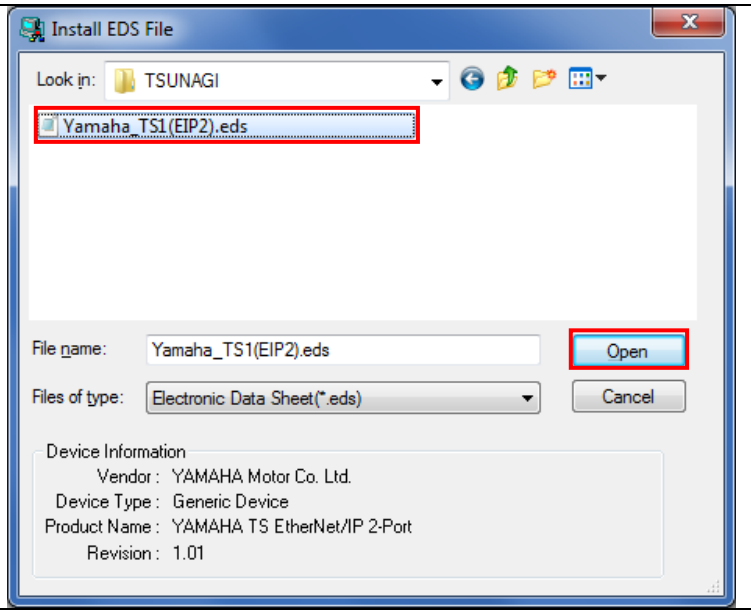
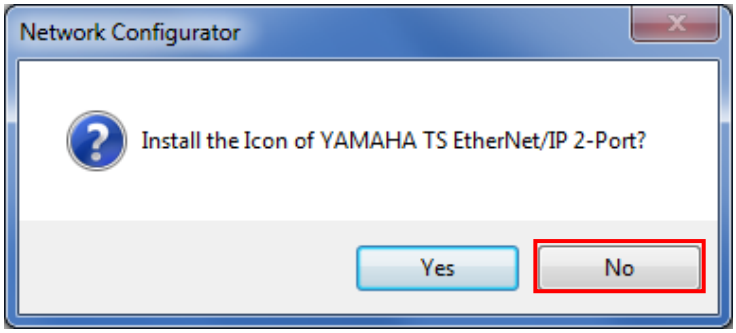
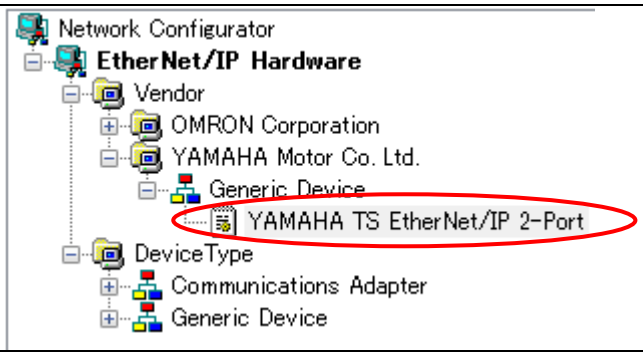


The Select Special Application Dialog Box is displayed. Select *Network Configurator* and click the **OK** Button.



2 Network Configurator is started.



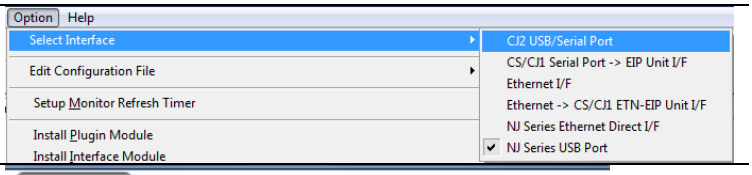
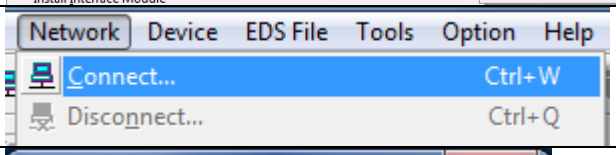
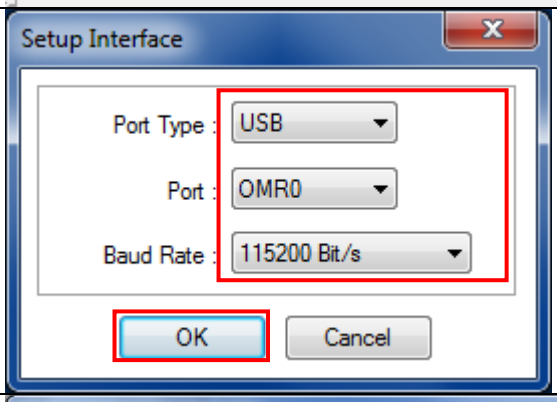
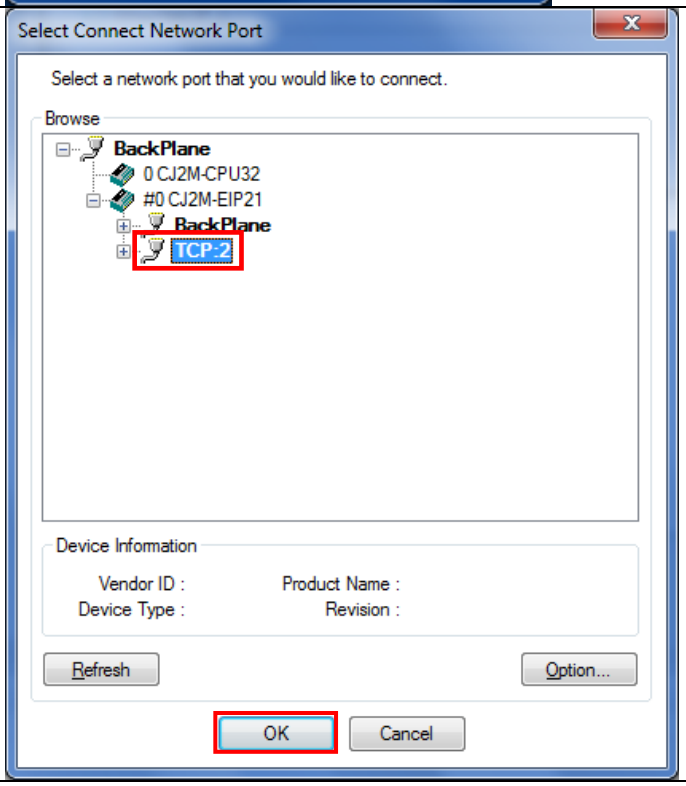
3	Select ***Install*** from the EDS File Menu.	
4	Select the *Yamaha_TS1(EIP2).eds* to install and click the **Open** Button. * For how to obtain the EDS file, refer to *Precautions for Correct Use* in *5.2. Device Configuration*.	
5	The dialog box on the right is displayed. Check the contents and click the **No** Button	
6	When the EDS file is normally installed, the device is added as shown on the right. Confirm that the device was added to the EtherNet/IP Hardware List.	

Precautions for Correct Use

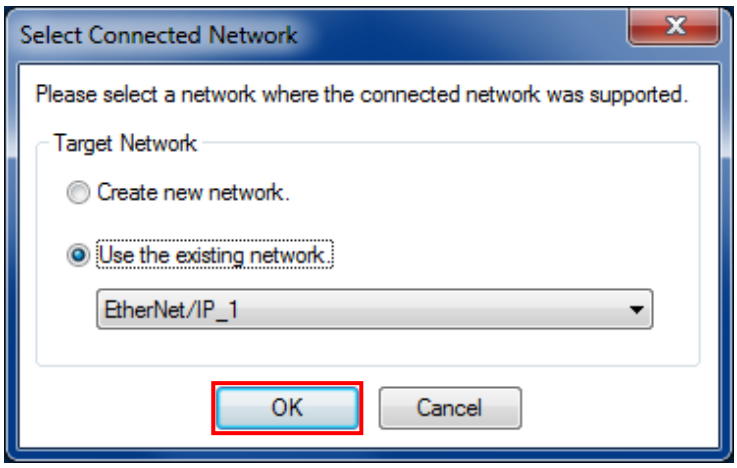
Confirm that the LAN cable is connected before taking the following procedure.
When it is not connected, turn OFF the power supply to each device and then connect the LAN cable.

7.4.2. Connecting Online with the PLC and Uploading the Configuration

Connect online with the PLC and upload the network configuration.

1	Select ***Select Interface*** - ***CJ2 USB/Serial Port*** from the Option Menu.	
2	Select ***Connect*** from the Network Menu.	
3	The Setup Interface Dialog Box is displayed. Confirm that the following settings are made. ・Port Type: USB ・Port: OMR0 ・Baud Rate: 115200 Bit/s Click the **OK** Button.	
4	The Select Connect Network Port Dialog Box is displayed. Select **Back Plane** - **CJ2M-EIP21** - **TCP:2**, and click the **OK** Button.	

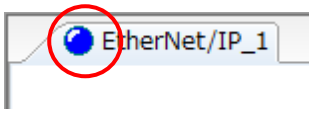
5 The Select Connected Network Dialog Box is displayed.
Click the **OK** Button.



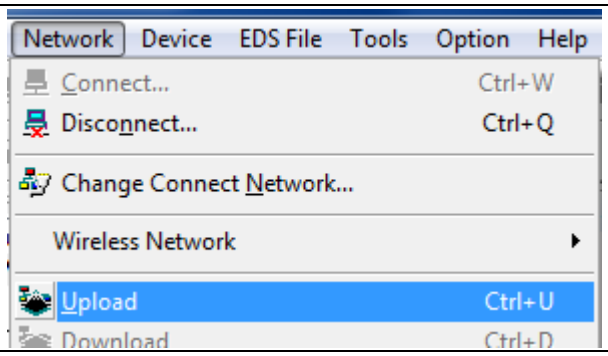
Additional Information

If an online connection cannot be made to the PLC, check the cable connection.
Or, return to step 1, check the settings and repeat each step.
For details, refer to *6.2.9. Connecting the Network Configurator to the Network* in *Section 6 Tag Data Link Functions of the EtherNet/IP Unit Operation Manual* (Cat. No. W465).

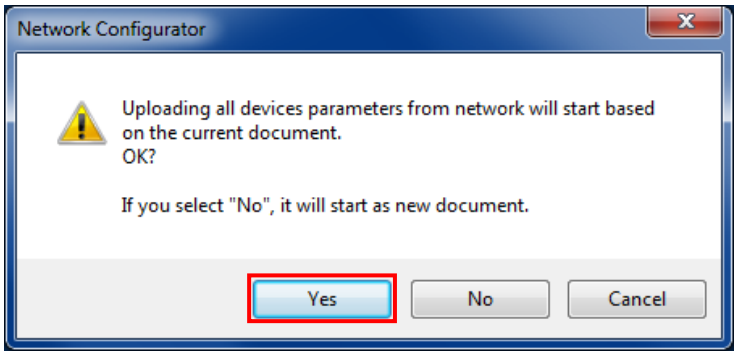
6 When an online connection is established normally, the color of the icon on the figure changes to blue.

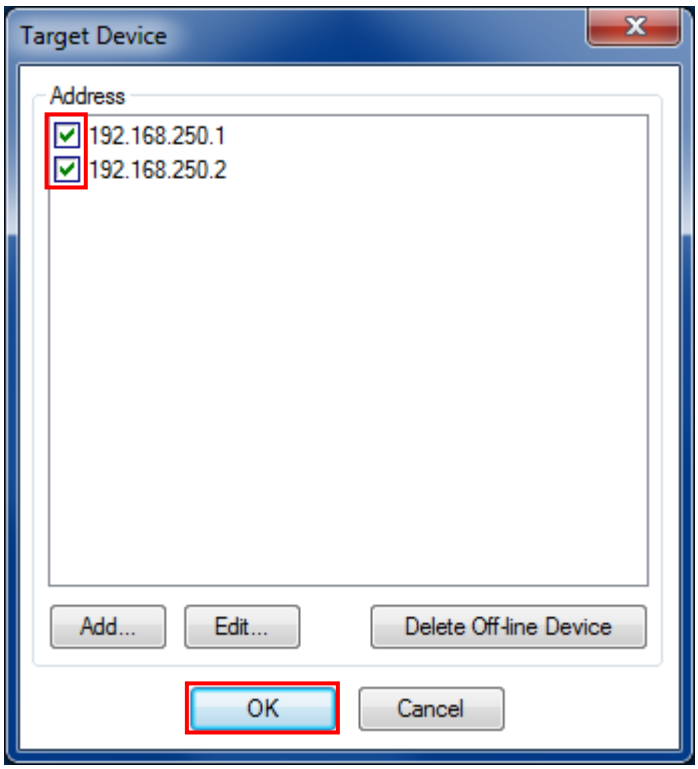
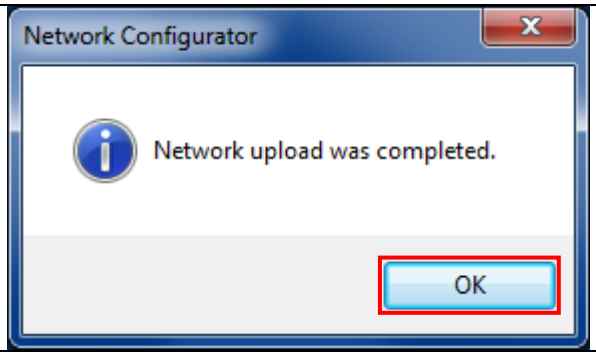
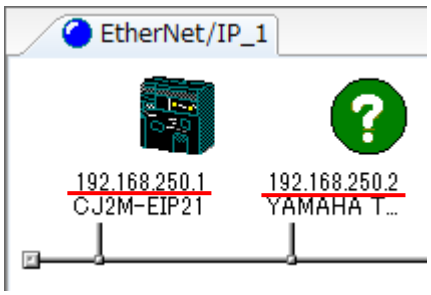


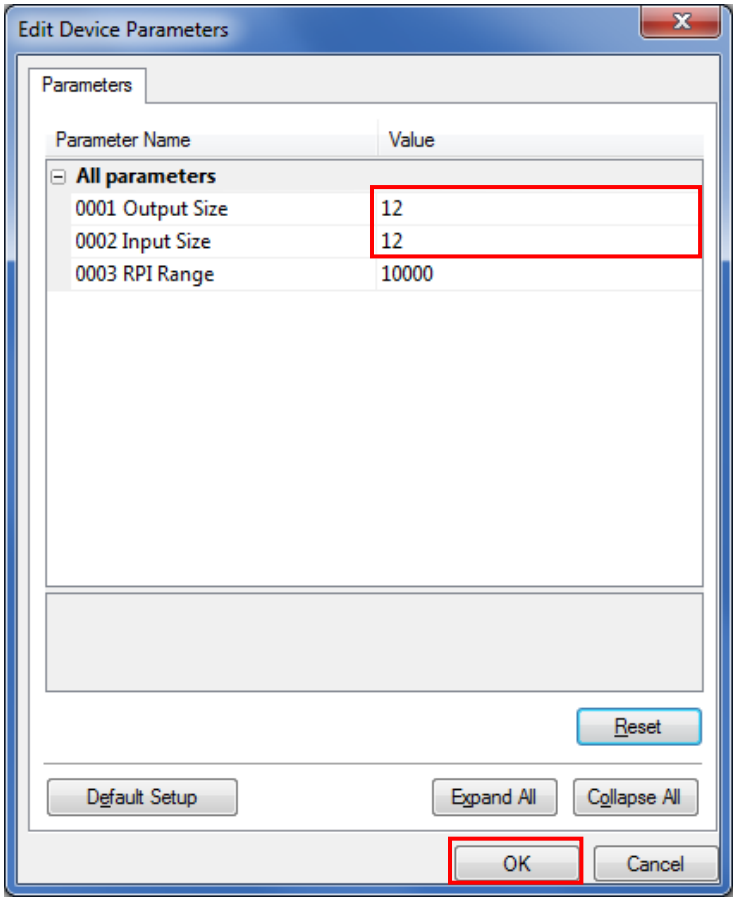
7 Select ***Upload*** from the Network Menu to upload the device information on the network.



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



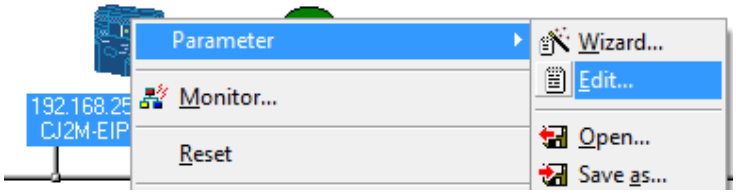
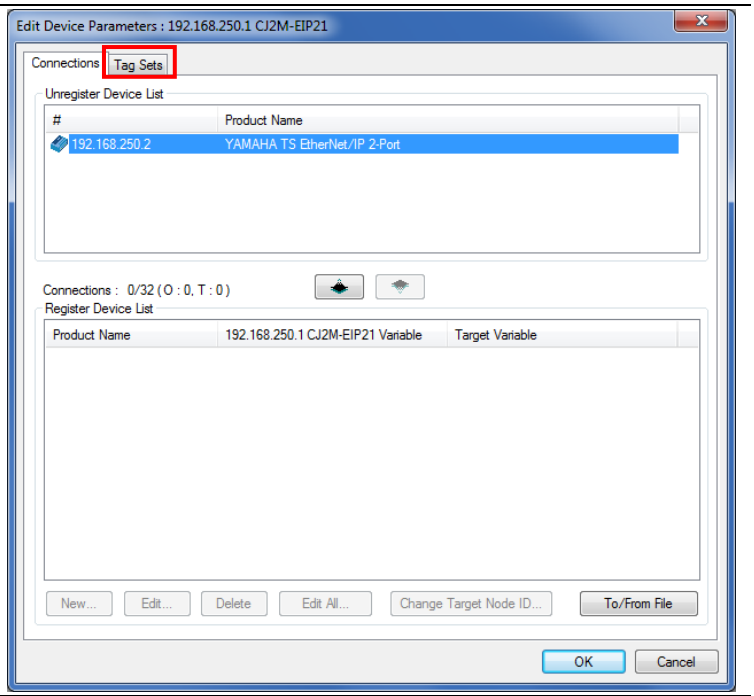
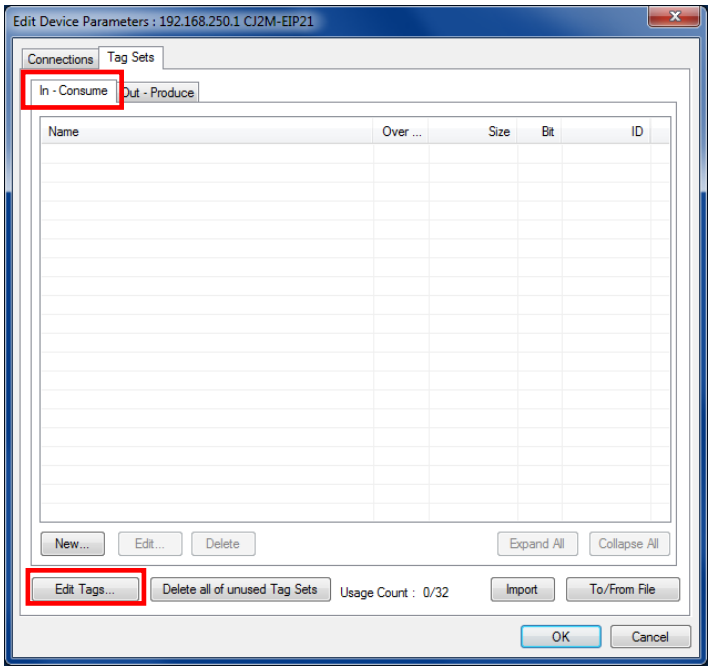
9	The Target Device Dialog Box is displayed. Select the*192.168.250.1* Check Box and the *192.168.250.2* Check Box, and click the **OK** Button. * If 192.168.250.1 and 192.168.250.2 are not displayed on the dialog box, click the **Add** Button to add the address. * The displayed addresses depend on the status of the Network Configurator.	
10	The device parameters are uploaded. When uploading is completed, the dialog box on the right is displayed. Check the contents and click the **OK** Button.	
11	After uploading is completed, confirm that the IP address of each node is updated on the Network Configuration Pane as follows: IP address of node 1: 192.168.250.1 IP address of node 2: 192.168.250.2	
12	Right-click the node 2 device and select ***Parameter*** - ***Edit***.	

13	The Edit Device Parameters Dialog Box is displayed. Enter the following values and click the **OK** Button. ・Output Size : *12* ・Input Size : *12*	

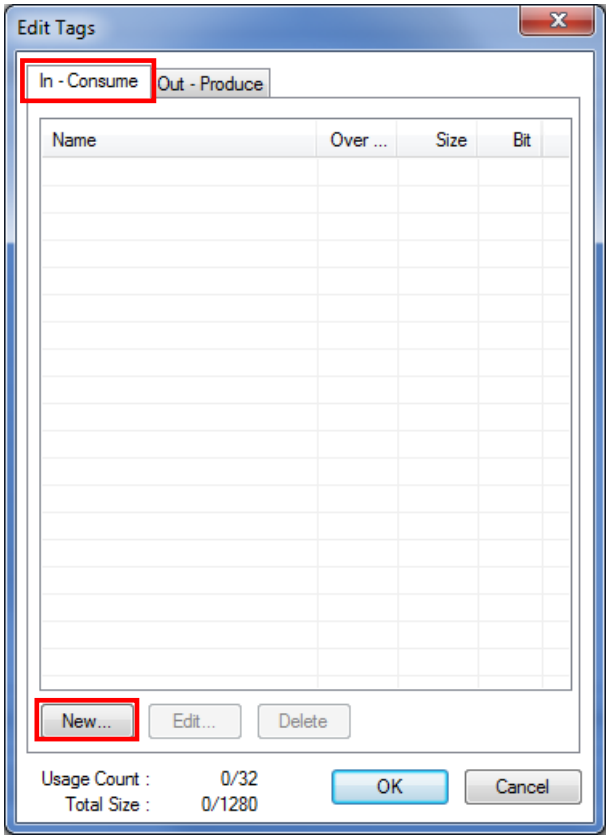
7.4.3. Setting Tags

Register the tags of the send area and receive area.

This section explains the receive settings and send settings of the target device in order.

1	On the Network Configuration Pane of the Network Configurator, right-click the node 1 device and select ***Parameter*** - ***Edit***.	
2	The Edit Device Parameters Dialog Box is displayed. Select the **Tag Sets** Tab.	
3	The data on the Tag Sets Tab is displayed. Select the **In-Consume** Tab and click the **Edit Tags** Button.	

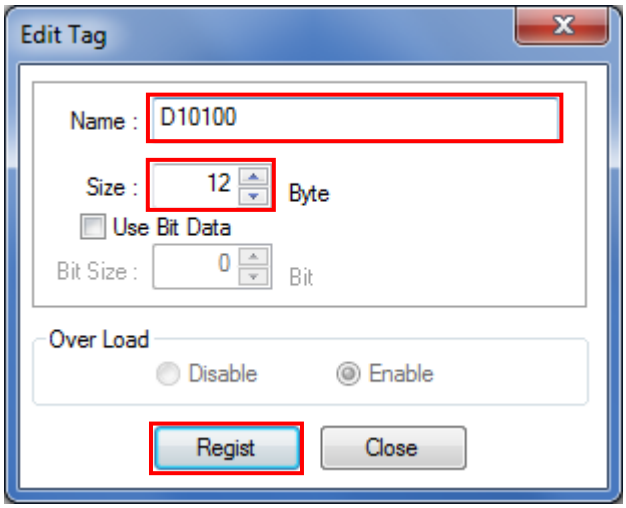
4 The Edit Tags Dialog Box is displayed. Select the **In - Consume** Tab and click the **New** Button.
Here, register an area where node 1 receives data from node 2.



5 The Edit Tag Dialog Box is displayed.
Enter the following values in the parameters.

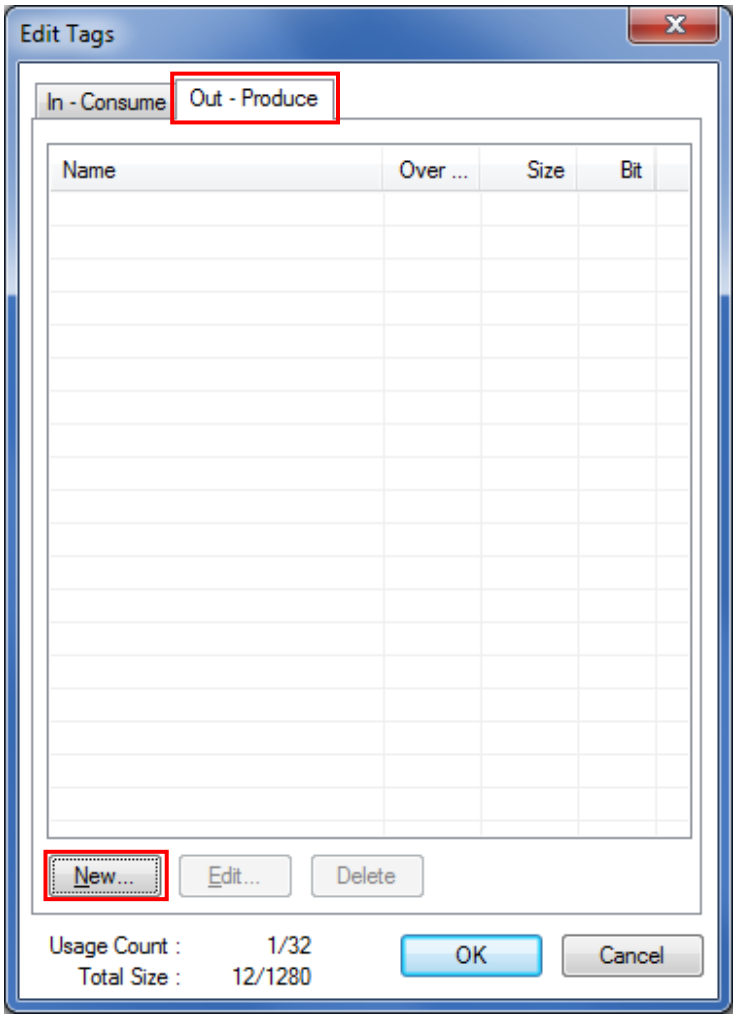
- Name: *D10100* (Start address of the input data to node 1)
- Size: *12* (Bytes)

After entering, click the **Regist** Button.



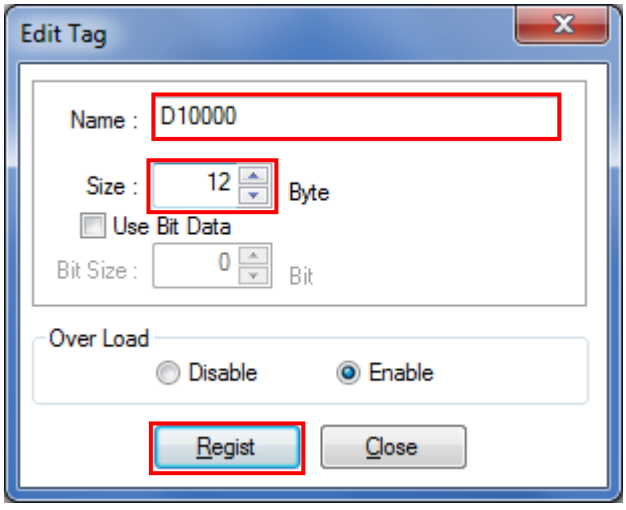
6 The Edit Tag Dialog Box is displayed again. Click the **Close** Button.

7 Select the **Out - Produce** Tab and click the **New** Button.
Here, register the data sent from node 1 to node 2.

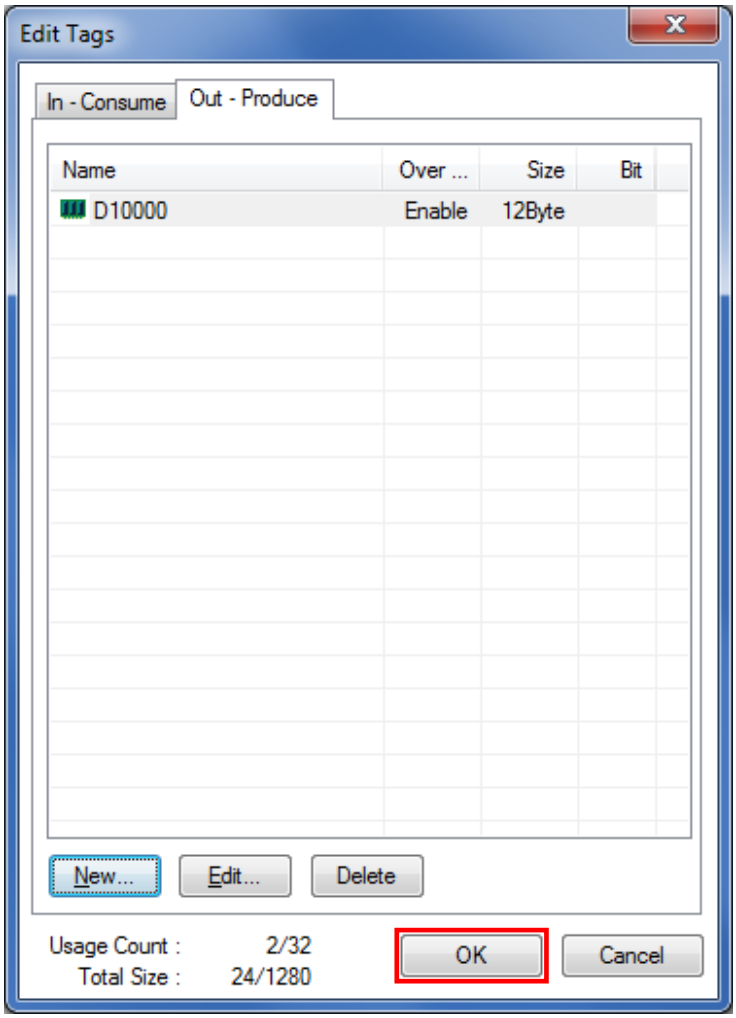
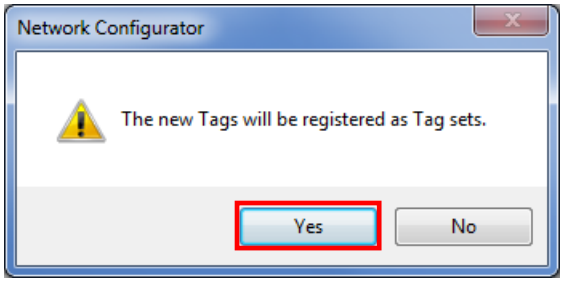


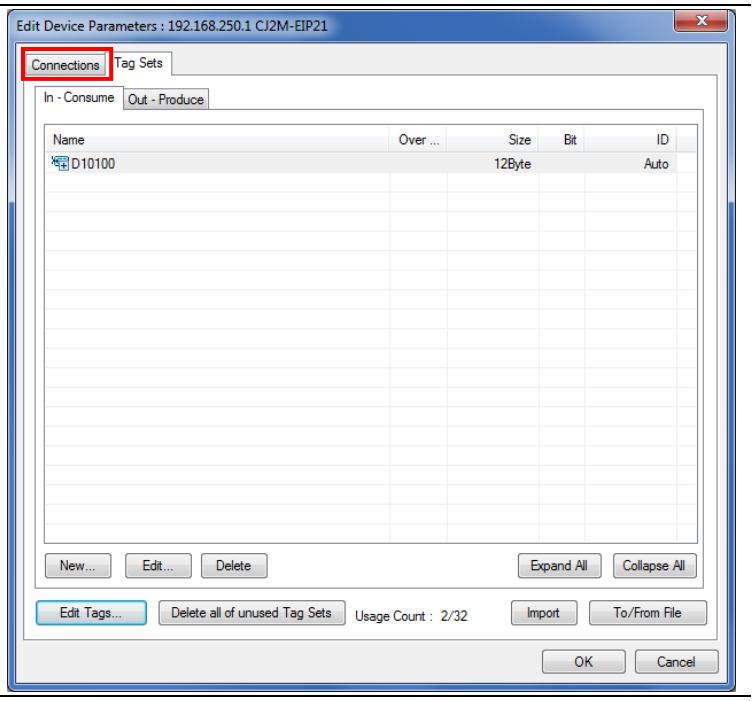
8 The Edit Tag Dialog Box is displayed.
Enter the following values in the parameters.
・Name: *D10000* (Start address of the output data from node 1)
・Size: *12* (Bytes)

After entering, click the **Regist** Button.



9 The Edit Tag Dialog Box is displayed again. Click the **Close** Button.

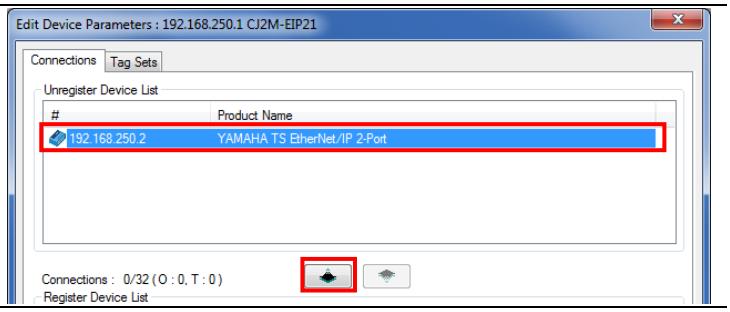
10	When you finish the registration, click the **OK** Button on the Edit Tag Dialog Box.	
11	The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.	

12	The Edit Device Parameters Dialog Box is displayed again. Select the **Connections** Tab.	

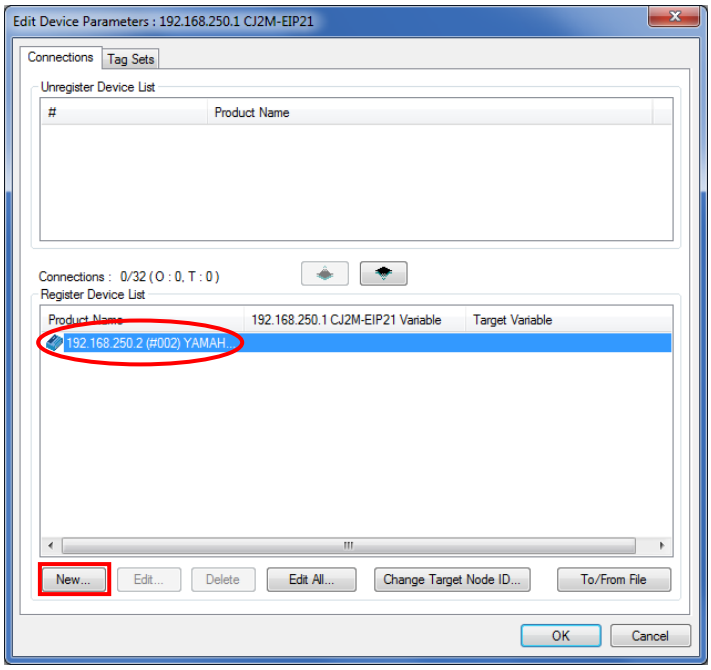
7.4.4. Setting the Connection

Associate the tags of the target device (that receives the open request) with the tags of the originator (that requests opening).

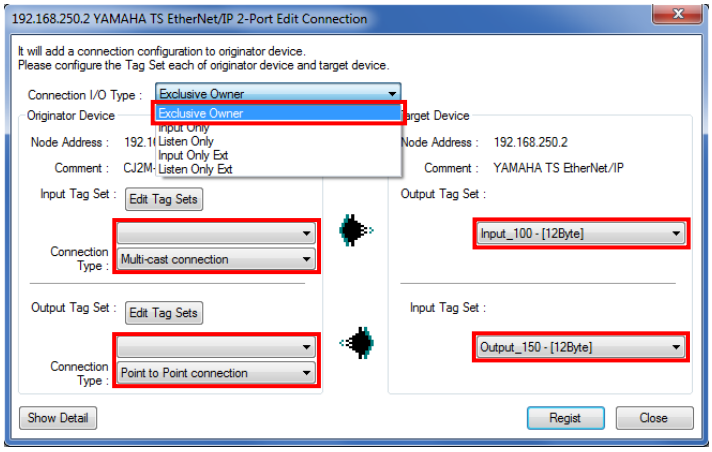
1 Select *192.168.250.2* in the Unregister Device List. Click the **Down Arrow** Button that is shown in the dialog box.



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



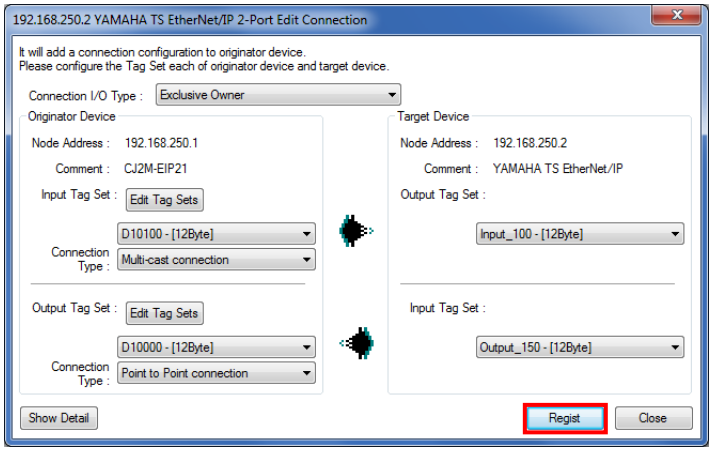
3 The Edit Connection Dialog Box is displayed. Select ***Exclusive Owner*** from the Connection I/O Type pull-down list.
Set the values listed in the following table to the *Originator Device* Field and the *Target Device* Field.



■ Settings of connection

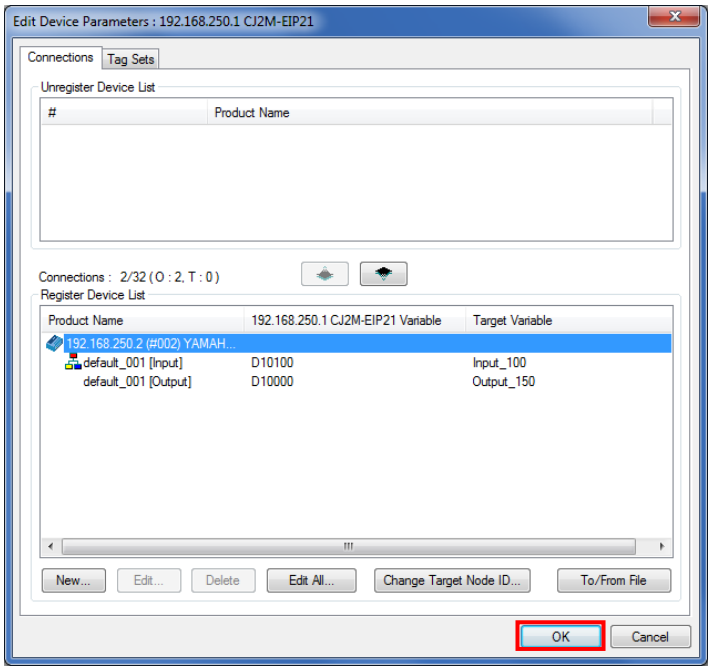
Connection allocation		Setting value
Connection I/O type		Discrete Exclusive Owner
Originator device	Input Tag Set	D10100-[12 Byte]
	Connection Type	Multi-cast connection
	Output Tag Set	D10000-[12 Byte]
	Connection Type	Point to Point connection
Target Device	Output Tag Set	Input_100-[12 Byte]
	Input Tag Set	Output_150-[12 Byte]

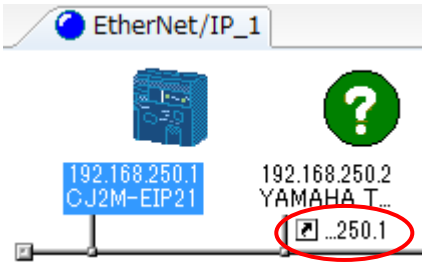
4 Confirm that the settings are correct and click the **Regist** Button.



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

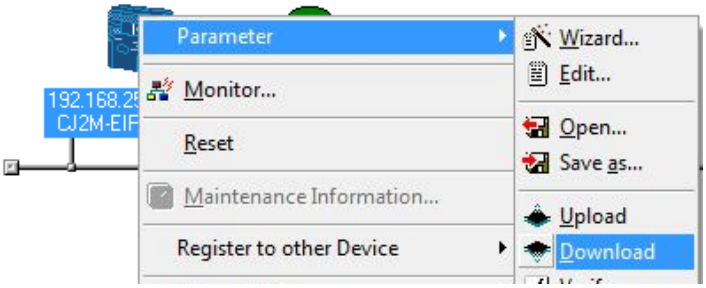
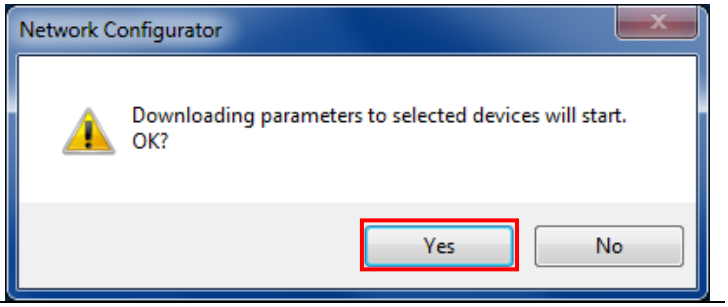
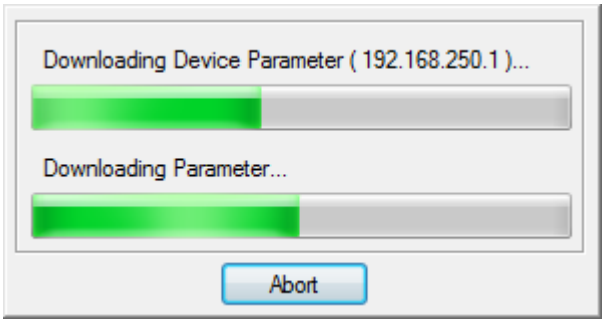
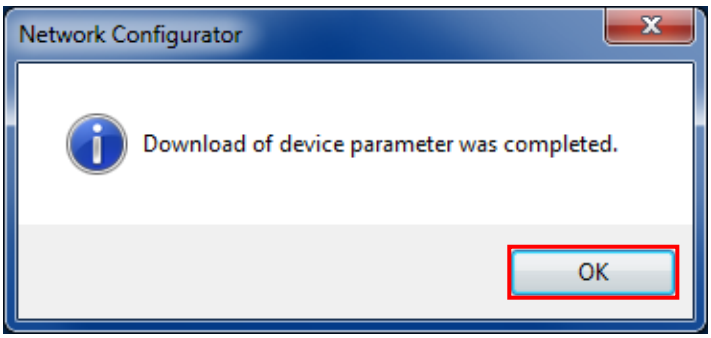
6 The Edit Device Parameters Dialog Box is displayed again. Click the **OK** Button.



7	When the connection setting is completed, the registered node address is displayed under the device icon of node 2 on the Network Configuration Pane.	

7.4.5. Transferring the Tag Data Link Parameters

Transfer the set tag data link parameters to the PLC.

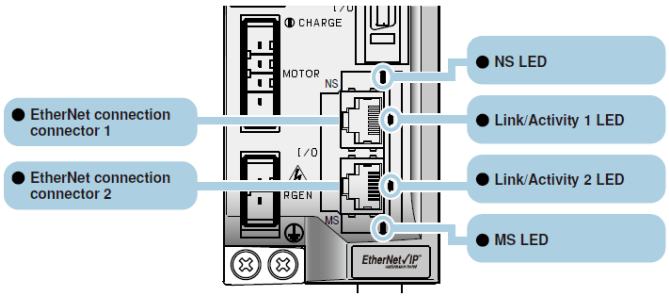
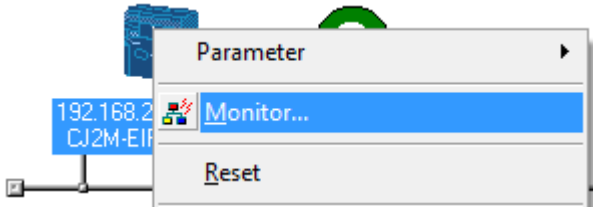
1	Right-click the device icon of node 1 on the Network Configuration Pane and select ***Parameter*** - ***Download***.	
	The dialog box on the right is displayed. Confirm that there is no problem and click the **Yes** Button.	
2	The tag data link parameters are downloaded from Network Configurator to the PLC.	
3	The dialog box on the right is displayed. Check the contents and click the **OK** Button.	

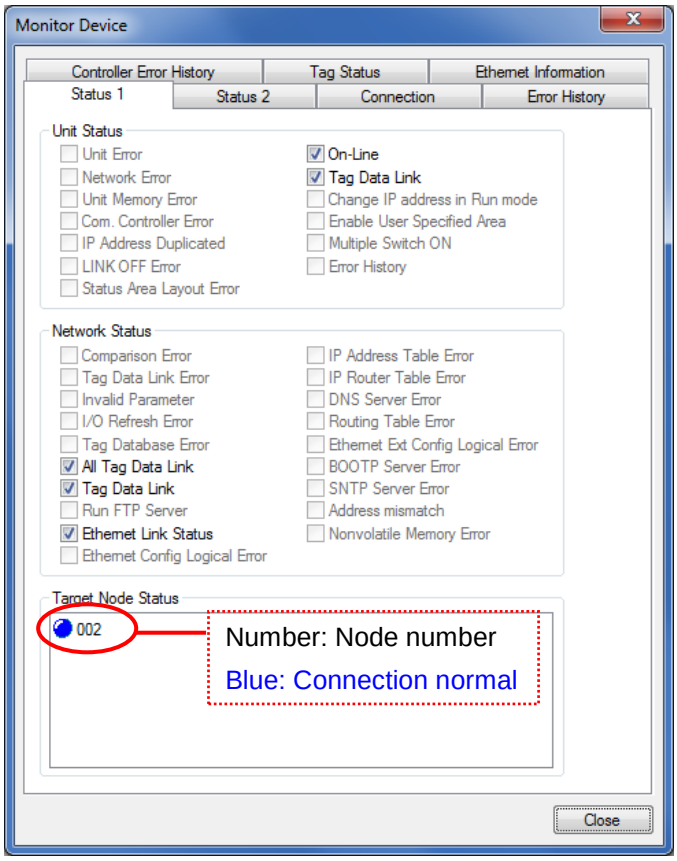
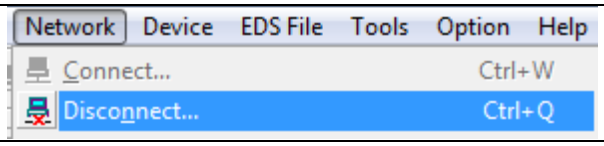
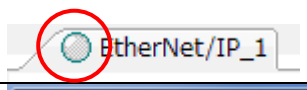
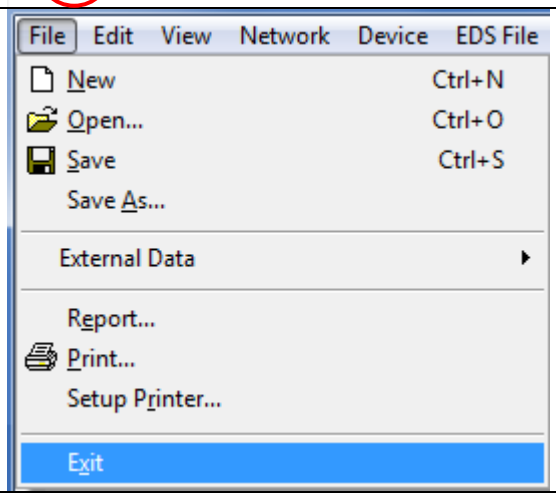
7.5. Checking the EtherNet/IP Communications

Confirm that the EtherNet/IP tag data links are operated normally.

7.5.1. Checking the Connection Status

Check the connection status of EtherNet/IP.

1	Confirm that the tag data links are normally in operation by checking the LED indicators on each device. ・PLC (EtherNet/IP Unit) The LED indicators in normal status are as follows: [MS]: Lit green [NS]: Lit green [COMM]: Lit yellow [100M] or [10M]: Lit yellow ・Robot Controller The LED indicators in normal status are as follows: [NS]: Lit green [LINK/Activity1]: Flashing green (Flashing while packets are being sent and received) [LINK/Activity2]: Not lit [MS]: Lit green	(EtherNet/IP Unit) (Robot Controller)  * The LED indicators of EtherNet connection connectors for TS-X and TS-P are shown in the figure above. This layout also applies to TS-S2.
2	Confirm that the tag data links are normally in operation by checking the status information on the Monitor Device Window of the Network Configurator. Right-click the device icon of node 1 on the Network Configuration Pane and select ***Monitor***.	

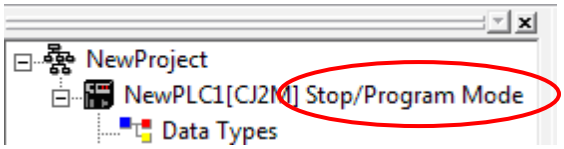
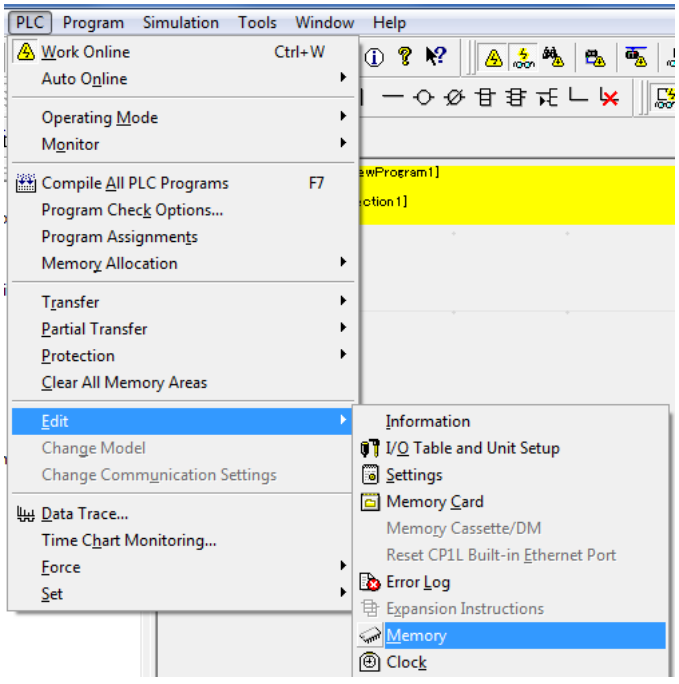
3	The dialog box on the right displays the Status 1 Tab Page of the Monitor Device Dialog Box. When the same check boxes are selected as shown on the right, the data links are normally in operation.	
4	Select ***Disconnect*** from the Network Menu to go offline.	
5	The color of the icon on the right figure changes to gray.	
6	Select ***Exit*** from the File Menu to exit the Network Configurator.	

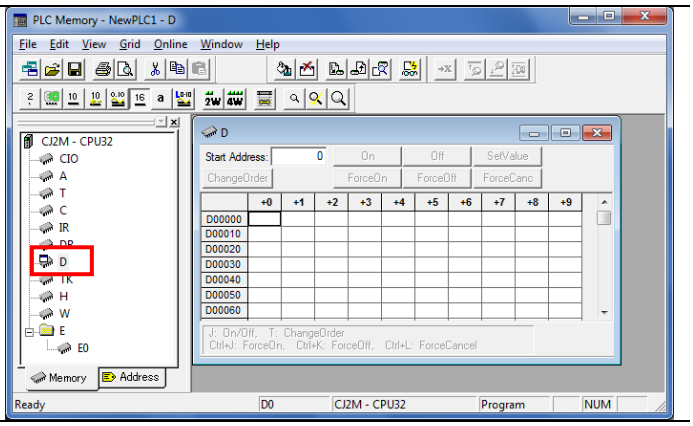
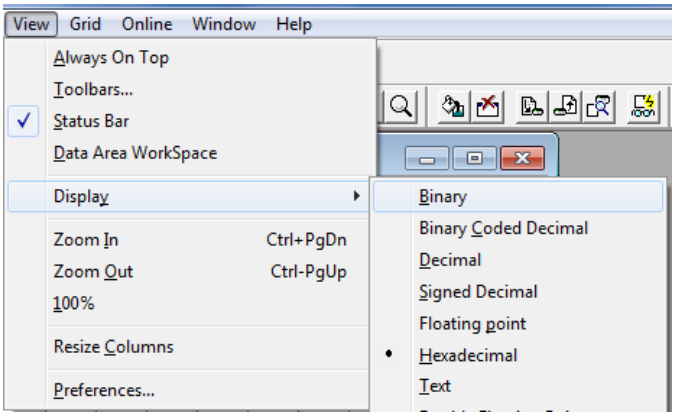
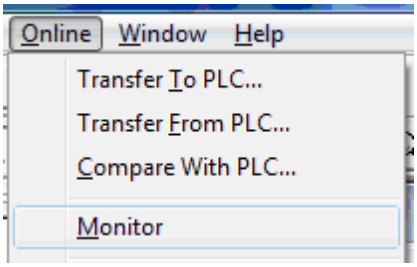
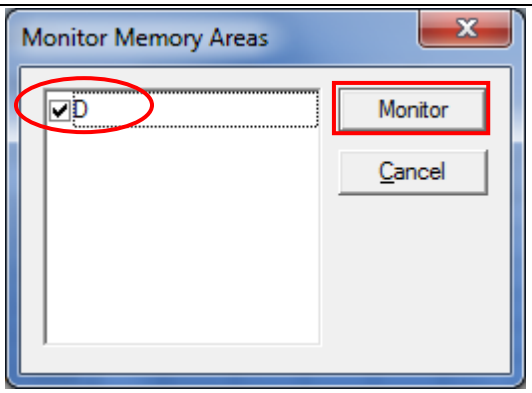
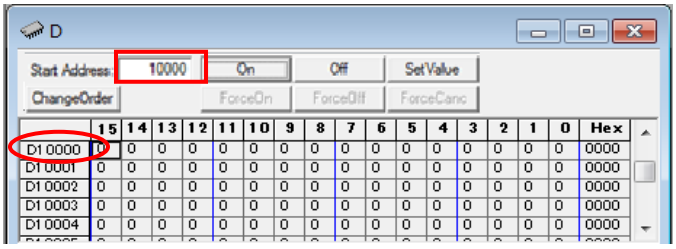
7.5.2. Checking the Data that are Sent and Received

Confirm that the correct data are sent and received.

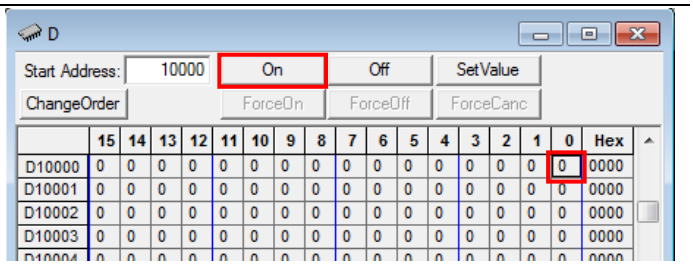
⚠ Caution

Confirm safety sufficiently before monitoring power flow and present value status in the Ladder Section window or before monitoring present values in the Watch window.
If force-set/reset or set/reset operations are incorrectly performed by pressing short-cut keys, the devices connected to Output Units may malfunction, regardless of the operating mode of the CPU Unit.

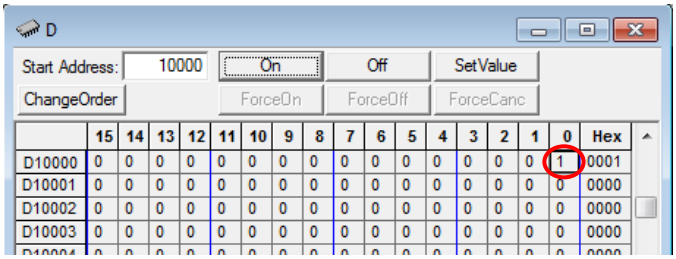
1	Confirm that the PLC is in Program Mode. * If the PLC is not in Program Mode, change to Program Mode by referring to step 1 of *7.3.3. Creating the I/O Table and setting IP Addresses*.	
2	Select ***Edit*** - ***Memory*** from the PLC Menu.	

3	Double-click **D** from the list in the PLC Memory Window that is displayed.	
4	Select ***Display*** - ***Binary*** from the View Menu.	
5	Select ***Monitor*** from the Online Menu.	
6	The Monitor Memory Areas Dialog Box is displayed. Select the *D* Check Box and click the **Monitor** Button.	
7	Enter *10000* in the *Start Address* Field in the D Window. Confirm that the start address was changed to D10000.	

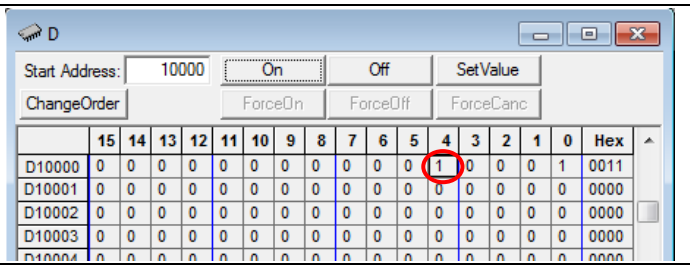
8 Select bit 0 of D10000 and click the **On** Button.



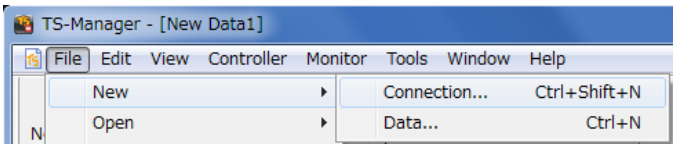
1 is set to bit 0 of D10000.



9 In the same way as step 8, set the value of bit 4 of D10000 to *1*.

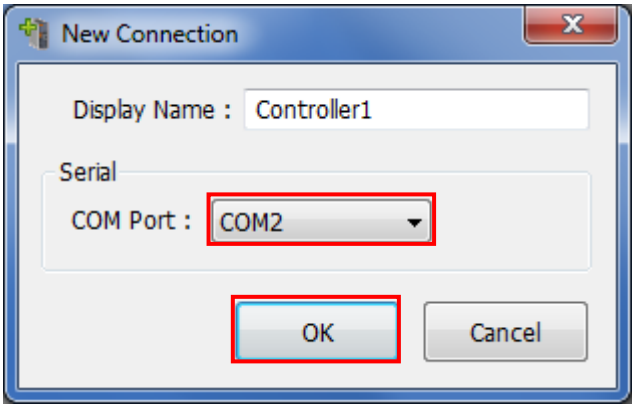


10 Select ***New*** - ***Connection*** from the File Menu in the TS Manager Dialog Box.

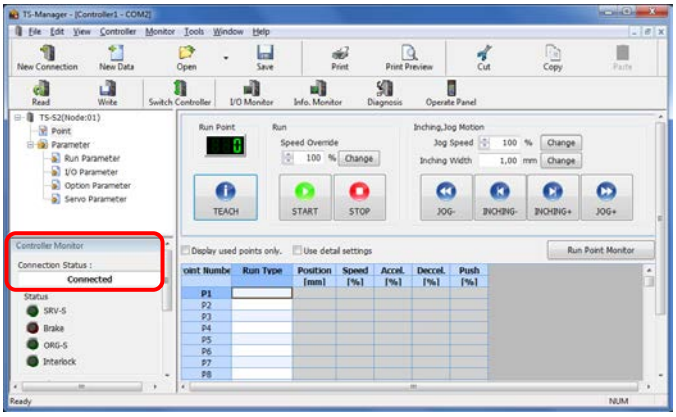


11 The New Connection Dialog Box is displayed. Select a COM port number from the COM Port pull-down list of the *Serial* Field.

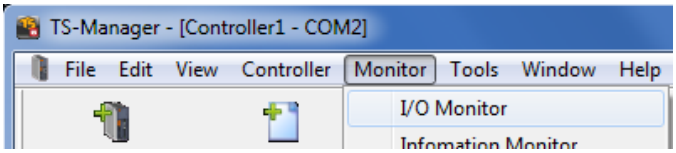
* For information on COM port number selection, refer to step 17 of *7.2.1. Parameter Settings.*



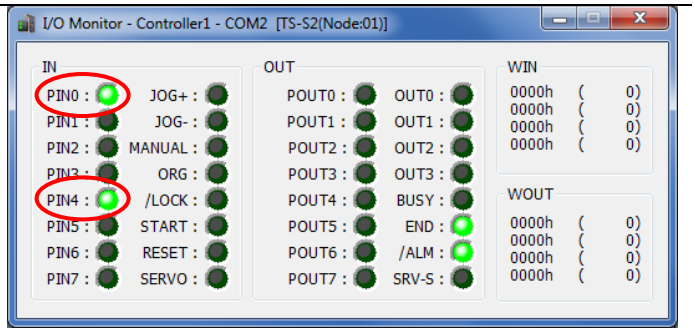
12 Connection Status on the Controller Monitor changes to Connected. The TS-Manager goes online with the Robot Controller.



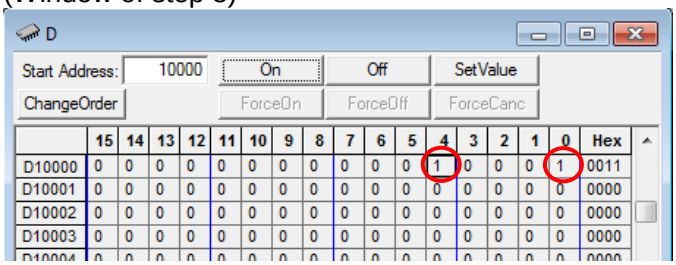
13 Select ***I/O Monitor*** from the Monitor Menu.



14 The I/O Monitor Dialog Box is displayed.
Confirm that PIN0 and PIN4 are turned ON (Lit green).



(Window of step 8)



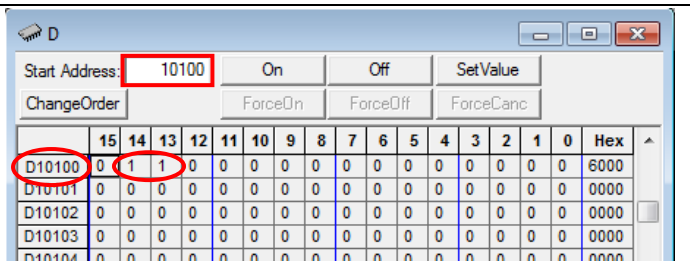
* Robot Controller IN: PIN0 to SERVO shown in the right table correspond to bit 0 to 15 of PLC D10000.

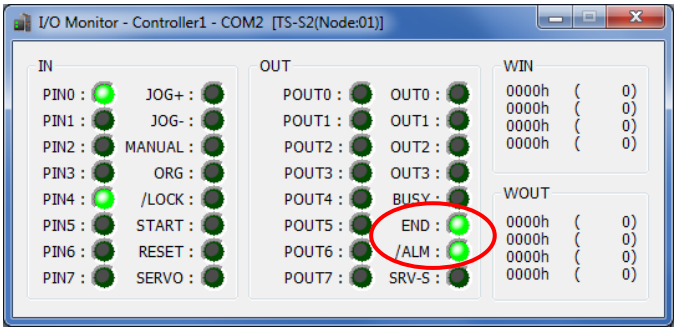
Robot Controller IN	PLC D10000
PIN0	Bit 0
PIN1	Bit 1
PIN2	Bit 2
PIN3	Bit 3
PIN4	Bit 4
:	:
SERVO	Bit 15

15

Enter *10100* in the *Start Address* Field in the D Window.
Confirm that the start address was changed to D10100.

Confirm that END and /ALM in the I/O Monitor Window of the TS-Manager are turned ON (Lit green) while the corresponding bits 13 and 14 of D10100 are set to 1.





* Robot Controller OUT: POUT0 to SRV-S shown in the right table correspond to bits 0 to 15 of D10100 of PLC memory.

Robot Controller OUT	PLC D10100
POUT0	Bit 0
POUT1	Bit 1
:	:
BUSY	Bit 12
END	Bit 13
/ALM	Bit 14
SRV-S	Bit 15

8. Initialization Method

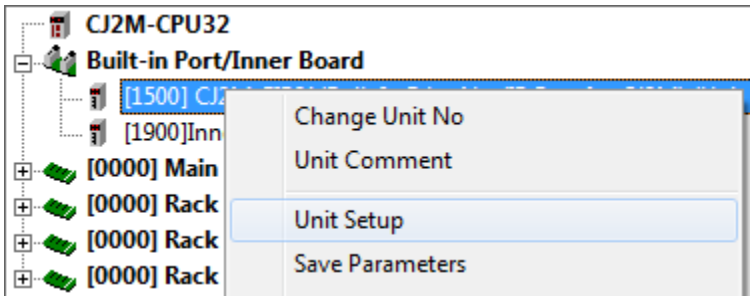
This document explains the setting procedure from the factory default setting.
Some settings may not be applicable as described in this document unless you use the devices with the factory default setting.

8.1. Initializing the PLC

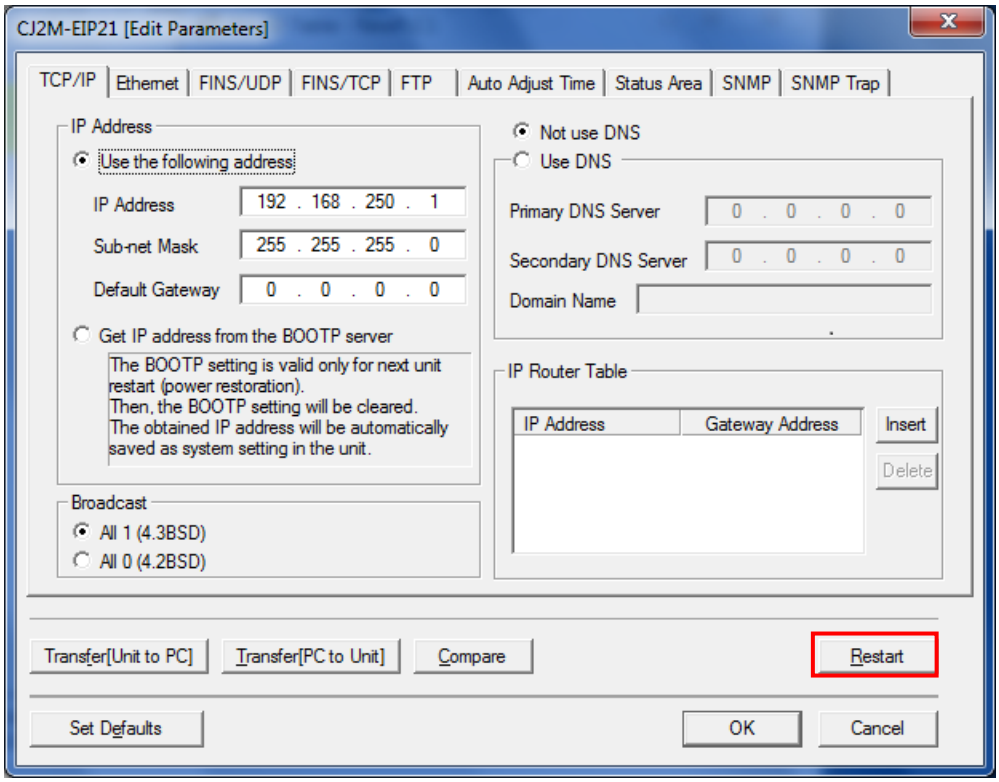
To initialize the settings of the PLC, it is necessary to initialize the CPU Unit and EtherNet/IP Unit. Change the PLC to PROGRAM mode before the initialization.

8.1.1. EtherNet/IP Unit

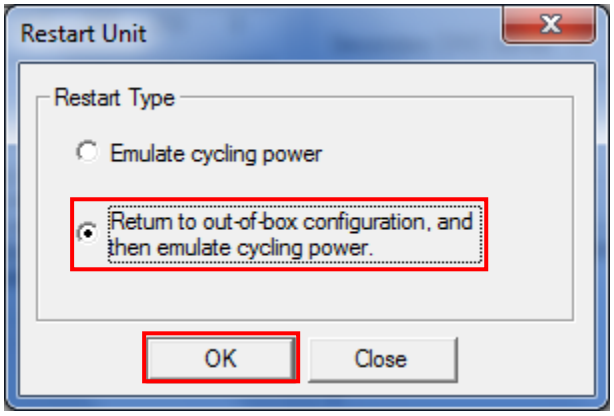
(1) Select ***Edit*** - ***I/O Table and Unit Setup*** from the PLC Menu of the CX-Programmer.
Right-click the EtherNet/IP Unit on the PLC IO Table Window and select ***Unit Setup*** from the menu.



(2) Click the **Restart** Button on the Edit Parameters Dialog Box.

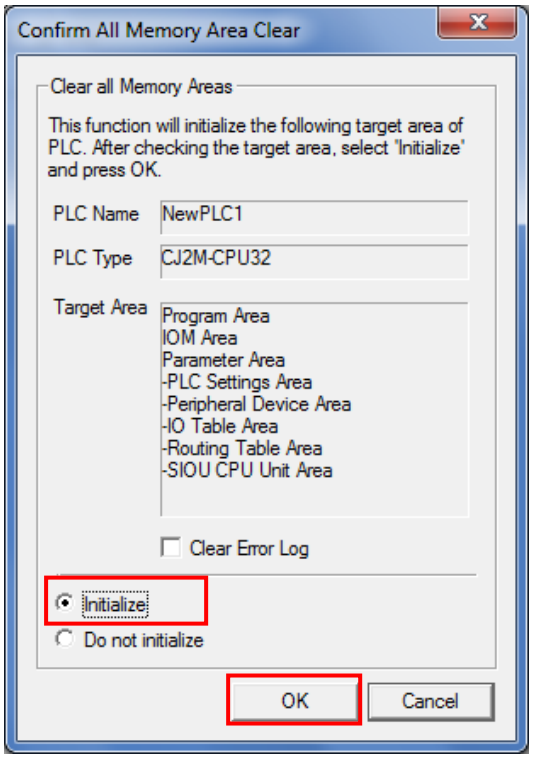


(3) A confirmation dialog box is displayed. Confirm that there is no problem and click the **Yes** Button. The Restart Unit Dialog Box is displayed. Select the *Return to out-of-box configuration, and then emulate cycling power* Option, and click the **OK** Button. A complete dialog box is displayed. Check the contents and click the **OK** Button.



8.1.2. CPU Unit

To initialize the settings of the CPU Unit, select ***Clear All Memory Areas*** from the PLC Menu of the CX-Programmer. On the Confirm All Memory Area Clear Dialog Box, select the *Initialize* Option and click the **OK** Button.



9. Revision History

Revision code	Date of revision	Revision reason and revision page
01	Mar. 31, 2014	First edition

OMRON Corporation **Industrial Automation Company**
Tokyo, JAPAN
Contact: www.ia.omron.com

Regional Headquarters
OMRON EUROPE B.V.
Wegalaan 67-69-2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ELECTRONICS LLC
One Commerce Drive Schaumburg,
IL 60173-5302 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

© OMRON Corporation 2014 All Rights Reserved.
In the interest of product improvement,
specifications are subject to change without notice.

Cat. No. P591-E1-01 0314(-)