OMRON

Machine Automation Controller NJ/NX-series

EtherNet/IP™ Connection Guide

CKD Corporation

ABSODEX Driver
(AXD Series)

Network Connection Guide

SYSMAC always in control

P772-E1-01

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1. Related Manuals

To ensure system safety, make sure you always read and follow the information provided in all *Safety Precautions* and *Precautions for Safe Use* in the manuals for each device used in the system.
The table below lists the manuals provided by CKD Corporation (hereinafter referred to as “CKD”) and OMRON Corporation (hereinafter referred to as “OMRON”), which pertain to this guide.

Manufacturer	Man.No.	Model	Manual name
OMRON	W500	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ-series CPU Unit Hardware User’s Manual
OMRON	W535	NX701-□□□□	NX-series CPU Unit Hardware User’s Manual
OMRON	W629	NX502-□□□□	NX-series NX502 CPU Unit Hardware User’s Manual
OMRON	W593	NX102-□□□□	NX-series NX102 CPU Unit Hardware User’s Manual
OMRON	W578	NX1P2-□□□□	NX-series NX1P2 CPU Unit Hardware User’s Manual
OMRON	W501	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	NJ/NX-series CPU Unit Software User’s Manual
OMRON	W506		NJ/NX-series CPU Unit Built-in EtherNet/IP™ Port User’s Manual
OMRON	W627	NX-EIP201	NX-series EtherNet/IP™ Unit User’s Manual
OMRON	W504	SYSMAC- SE2□□□	Sysmac Studio Version 1 Operation Manual
OMRON	5668592-2	W4S1-05D	Ethernet Switching Hub W4S1-05D User’s Manual
CKD	SM-A83981-A	AX□R-□□□□- □□NN	AX1R/AX2R/AX4R Series Direct Drive Actuator INSTRUCTION MANUAL
CKD	SM-A63469-A	AXD-□A2-□	AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL
CKD	SM-A63470-A	---	ABSODEX PC Setting Software AX-Tools INSTRUCTION MANUAL

2. Terms and Definitions

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

Term	Explanation and Definition
Node	It refers to a relay point, a branch point, or a terminal on an EtherNet/IP network comprised of devices with EtherNet/IP ports. Devices with one EtherNet/IP port are recognized as one node on the EtherNet/IP network, and devices with two EtherNet/IP ports are recognized as two nodes.
Tag	A tag is a unit that is used to exchange data with tag data links. Data is exchanged between the local network variables and remote network variables specified in the *tags* or between specified I/O memory areas.
Tag set	When a tag data link connection is established, one or more tags (up to eight tags including the Controller status) are configured as a collective set of tags. This is called as a *tag set*. Each *tag set* represents a unit of data for one tag data link connection. Tag data links are therefore created through a connection between one tag set and another tag set. A tag set name must be set for each tag set.
Tag data link	The standard EtherNet/IP implicit communications are called tag data links. Tag data links enable cyclic tag data exchanges on an EtherNet/IP network between Controllers or between Controllers and other devices.
Connection	A connection is used to exchange data as a unit within which data concurrency is maintained.
Connection type	There are two kinds of connection types for tag data links. One is a multi-cast connection, and the other is a unicast (point-to-point) connection. The multi-cast connection sends an output tag set in one packet to more than one node. The unicast connection separately sends one output tag set to each node. Therefore, the multi-cast connection can decrease the communications load if one output tag set is sent to more than one node.
Originator and target	To make tag data links, it is necessary to open a connection between nodes that perform tag data links. The node that requests the connection is called the *originator*, and the node that receives the request is called the *target*.
Tag data link parameters	In tag data link setting, *tag settings*, *tag set settings* and *connection settings* are collectively called *tag data link parameters*.
EDS file	A file that describes device-specific information such as the number of input/output points for EtherNet/IP devices.

3. Precautions

(1) Before building a system, understand the specifications of devices which are used in the system. Allow some margin for ratings and performance, and provide safety measures such as installing a safety circuit in order to minimize the risk in case of failure.
(2) To ensure system safety, make sure you always read and follow the information provided in all *Safety Precautions* and *Precautions for Safe Use* in the 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 guide without the permission of OMRON Corporation.
(5) The information contained in this guide is current as of November 2025.
It is subject to change for improvement without notice.

The following notations are used in this guide.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or may result in serious injury or death. Additionally, there may be 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 Correct Use

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

Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.

Symbol

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

4. Overview

This guide describes procedures for connecting a CKD ABSODEX Driver AXD Series (hereinafter referred to as the “ABSODEX Driver”) and an OMRON NJ/NX-series Machine Automation Controller (hereinafter referred to as the “Controller”) via EtherNet/IP and for checking their communication status.
Refer to *Section 6. EtherNet/IP Settings* and *Section 7. EtherNet/IP Connection Procedure* to understand setting methods and key points to operate EtherNet/IP tag data links.

5. Applicable Devices and Device Configuration

5.1. Applicable Devices

The applicable devices are as follows:

Manufacturer	Name	Model
OMRON	NJ/NX-series CPU Unit	NX701-□□□□ NX502-□□□□ NX102-□□□□ NX1P2-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□
OMRON	NX-series EtherNet/IP Unit	NX-EIP201
CKD	ABSODEX Driver	AXD-□A2-EN
CKD	Actuator	AX1R Series AX2R Series AX4R Series

Precautions for Correct Use

The connection and connection check procedures described in this guide use the models and versions listed in section 5.2, from among the above applicable devices.
You cannot use devices with versions earlier than the versions listed in section 5.2.
To use of applicable device models that are not listed in section 5.2. or versions that are later than those listed in section 5.2., check the differences in the specifications according to their instruction manuals before operating the devices.

Additional Information

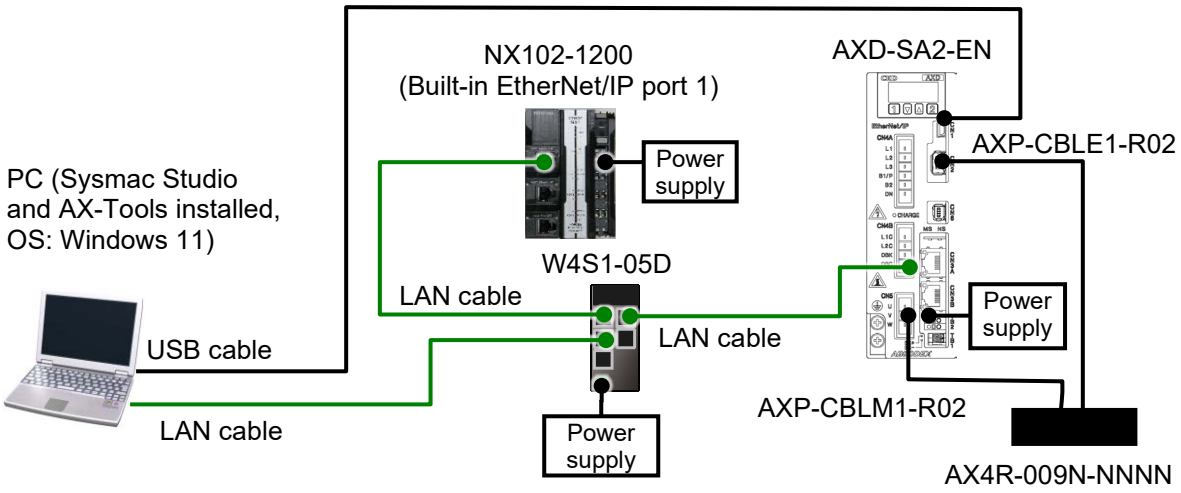
This guide describes the procedures for establishing the network connection. It does not provide information on operation, installation, wiring method, device functionality, or device operation, which is not related to the connection procedures. Refer to the manuals or contact the manufacturers of the applicable devices for other information.

Additional Information

For the configuration of actuators that can be connected to the ABSODEX Driver, please contact CKD Corporation.

5.2. Device Configuration

The system components required for reproducing the connection procedures described in this guide are as follows.



Manufacturer	Name	Model	Version
OMRON	NX-series CPU Unit (Built-in EtherNet/IP port)	NX102-1200	Ver. 1.60
---	Power supply (24 VDC for Controller)	---	
OMRON	Switching hub	W4S1-05D	Ver. 1.0
---	Switching hub power supply (24 VDC)	---	
OMRON	Sysmac Studio	SYSMAC-SE2□□□	Ver. 1.63
---	PC (OS: Windows 11)	---	
---	LAN cable (STP (shielded, twisted-pair) cable of Ethernet category 5 or higher)	---	
CKD	ABSODEX Driver	AXD-SA2-EN	Ver. 8.02.01
CKD	Power cable (2 m)	AXP-CBLM1-R02	
CKD	Encoder cable (2 m)	AXP-CBLE1-R02	
CKD	Actuator	AX4R-009N-NNNN	
CKD	EDS file	AXD.eds	Ver. 1.4
CKD	Setting Software	AX-Tools	Ver. 3.5.0.0
---	USB cable (Mini-B connector)	---	
---	External power supply for TB2 terminal (24 VDC)	---	

Precautions for Correct Use

Obtain the EDS file specified above before proceeding. For information on how to obtain the EDS file, contact CKD Corporation.

Precautions for Correct Use

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

Additional Information

For information on the specifications of power supplies that can be used for the Controller, refer to the *NX-series NX102 CPU Unit Hardware User's Manual* (Cat. No. W593).

Additional Information

For specifications of power supplies that can be used for the switching hub, refer to the *Ethernet Switching Hub W4S1-05D User's Manual* (5668592-2).

Additional Information

For information on the specifications of power supplies that can be used with the ABSODEX Driver, refer to the *AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL* (SM-A63469-A).

6. EtherNet/IP Settings

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

6.1. Parameters

The following parameters are required to connect the Controller and the ABSODEX Driver via EtherNet/IP.

Setting item	Controller port 1 (Node 1)	ABSODEX Driver (Node 2)
IP address	192.168.250.1	192.168.250.2
Subnet mask	255.255.255.0	255.255.255.0

6.2. Global Variables

The global variables are used for the Controller and can be specified as tags for tag data links. The settings for global variables are shown below.

■ Input Area (Controller ← ABSODEX Driver)

Name	Data type	Network publish	Assignment of destination device	Data size (bytes)
EIP002_OutputSignal_IN	BYTE[8]	Input	Output signal from the ABSODEX Driver to the Controller	8
EIP002_MonitorData_IN	DINT[3]	Input	Monitor data 1 to 3	12
EIP002_Response_IN	DINT[3]	Input	Response data	12

■ Details of ABSODEX Driver Input Signals

Global variable name	Data type	ABSODEX Driver data area
EIP002_OutputSignal_IN		
EIP002_OutputSignal_IN[0]	BYTE[8]	Refer to ■ *Details of Output Signals*.
EIP002_OutputSignal_IN[1]		Refer to ■ *Details of Output Signals*.
EIP002_OutputSignal_IN[2]		Refer to ■ *Details of Output Signals*.
EIP002_OutputSignal_IN[3]		Unavailable
EIP002_OutputSignal_IN[4]		Refer to ■ *Details of Output Signals*.
EIP002_OutputSignal_IN[5]		Unavailable
EIP002_OutputSignal_IN[6]		Unavailable
EIP002_OutputSignal_IN[7]		Unavailable
EIP002_MonitorData_IN		
EIP002_MonitorData_IN [0]	DINT[3]	Monitor data 1
EIP002_MonitorData_IN [1]		Monitor data 2
EIP002_MonitorData_IN [2]		Monitor data 3
EIP002_Response_IN		
EIP002_Response_IN [0]	DINT[3]	Response code
EIP002_Response_IN [1]		Read data
EIP002_Response_IN [2]		Unavailable

■ Details of Output Signals

The table below shows the bit-by-bit allocation for the above EIP002_OutputSignal_IN[0] to [2] and EIP002_OutputSignal_IN[4].

Global variable name	bit	Description
EIP002_OutputSignal_IN[0]	0	M code output (bit 0)
	to	to
	7	M code output (bit 7)
EIP002_OutputSignal_IN[1]	0	In-position output
	1	Positioning completion output
	2	Start input wait output
	3	Alarm output 1
	4	Alarm output 2
	5	Output 1 during indexing/Home position output
	6	Output 2 during indexing/Servo state output
	7	Ready output
EIP002_OutputSignal_IN[2]	0	Segment position strobe output
	1	M code strobe output
	2 to 7	Unavailable
EIP002_OutputSignal_IN[4]	0	Monitoring
	1	Instruction code execution completion
	2 to 7	Unavailable

■ Output Area (Controller → ABSODEX Driver)

Name	Data type	Network publish	Assignment of destination device	Data size (bytes)
EIP002_InputSignal_OUT	BYTE[8]	Output	Input signal from the Controller to the ABSODEX Driver	8
EIP002_MonitorCode_OUT	DINT[3]	Output	Monitor code 1 to 3	12
EIP002_Command_OUT	DINT[3]	Output	Command data	12

Global variable name	Data type	ABSODEX Driver data area
EIP002_InputSignal_OUT	BYTE[8]	
EIP002_InputSignal_OUT[0]		Refer to ■ *Details of Input Signals*.
EIP002_InputSignal_OUT[1]		Refer to ■ *Details of Input Signals*.
EIP002_InputSignal_OUT[2]		Refer to ■ *Details of Input Signals*.
EIP002_InputSignal_OUT[3]		Unavailable
EIP002_InputSignal_OUT[4]		Refer to ■ *Details of Input Signals*.
EIP002_InputSignal_OUT[5]		Unavailable
EIP002_InputSignal_OUT[6]		Unavailable
EIP002_InputSignal_OUT[7]		Unavailable
EIP002_MonitorCode_OUT	DINT[3]	
EIP002_MonitorCode_OUT[0]		Monitor code 1
EIP002_MonitorCode_OUT[1]		Monitor code 2
EIP002_MonitorCode_OUT[2]		Monitor code 3
EIP002_Command_OUT	DINT[3]	
EIP002_Command_OUT[0]		Instruction code
EIP002_Command_OUT[1]		Write data/A code or P code
EIP002_Command_OUT[2]		Data specification/F code

■ Details of Input Signals

The table below shows the bit-by-bit allocation for the above EIP002_InputSignal_OUT[0] to [2] and EIP002_InputSignal_OUT[4].

Global variable name	bit	Description
EIP002_InputSignal_OUT[0]	0	Program No. selection input (bit 0)
	to	to
	3	Program No. selection input (bit 3)
	4	Program No. setting input, 2nd digit/ Program No. selection input (bit 4)
	5	Program No. setting input, 1st digit/ Program No. selection input (bit 5)
	6	Reset input
	7	Home positioning instruction input
EIP002_InputSignal_OUT[1]	0	Start of input
	1	Servo-on input/Program stop input
	2	Ready return input/Continuous rotation stop input
	3	Answer input/Position deviation counter reset input
	4	Forced stop input
	5	Brake release input
	6	Jog operation input (CW direction)
	7	Jog operation input (CCW direction)
EIP002_InputSignal_OUT[2]	0	Unavailable/Travel unit selection input (bit 0)
	1	Unavailable/Travel unit selection input (bit 1)
	2	Unavailable/Travel speed unit selection input
	3	Table operation, data input operation switching input
	4 to 7	Unavailable
EIP002_InputSignal_OUT[4]	0	Monitor output execution request
	1	Instruction code execution request
	2 to 7	Unavailable

Additional Information

For details on the allocation of tag data link data for the ABSODEX Driver, refer to *4.4. Input/Output* in the *AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL* (SM-A63469-A).

Additional Information

In Sysmac Studio, there are two input methods for specifying an array as the data type. If an array is specified in (1), it is converted to (2) after input, and the data type is always displayed in (2).

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

In this guide, the data type is described in *BOOL[16]* for simplicity.

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

6.3. Tag Set

The settings of the tag set for performing tag data links are shown below.
The tags in the tag sets are set in ascending order of the following OUT No. and IN No.

■ Input Area (Controller ← ABSODEX Driver)

Tag set name		Data size (bytes)
EIP002_IN		32
IN No.	Tag name (Global variable name)	Data size (bytes)
1	EIP002_OutputSignal_IN	8
2	EIP002_MonitorData_IN	12
3	EIP002_Response_IN	12

■ Output Area (Controller → ABSODEX Driver)

Tag set name		Data size (bytes)
EIP002_OUT		32
OUT No.	Tag name (Global variable name)	Data size (bytes)
1	EIP002_InputSignal_OUT	8
2	EIP002_MonitorCode_OUT	12
3	EIP002_Command_OUT	12

6.4. Connection Settings

The connection settings (i.e. tag data link table) are shown below.

Connection Name	Connection I/O Type	RPI (ms)	Timeout Value
default_001	Local Slave 1 - Exclusive Owner	50.0	RPI x 4

Input/ Output	Target Device (ABSODEX Driver)		Originator Device (Controller)		Connection Type
	Target Variable (Instance number)	Size (bytes)	Originator Variable (Tag set name)	Size (bytes)	
Input	101	32	EIP002_IN	32	Point to Point connection
Output	102	32	EIP002_OUT	32	Point to Point connection

7. EtherNet/IP Connection Procedure

This section describes the procedures for connecting the ABSODEX Driver and the Controller via EtherNet/IP. In this guide, it is assumed that the Controller and the ABSODEX Driver use the factory default settings. For how to initialize the devices, refer to *Section 8. Initialization Method*.

7.1. Work Flow

Take the following steps to connect the ABSODEX Driver and the Controller via EtherNet/IP and to operate tag data links.

7.2. CKD ABSODEX Driver Setup	Set up the CKD ABSODEX Driver.
▼	
7.2.1. Setting the Hardware	Connect the ABSODEX Driver cables.
▼	
7.2.2. Setting the Parameters	Set the IP address of the ABSODEX Driver.
▽	
7.3. Controller Setup	Set up the Controller.
▼	
7.3.1. Setting the IP Address	Start Sysmac Studio and set the IP address of the Controller.
▼	
7.3.2. Installing the EDS File	Install the EDS file.
▼	
7.3.3. Registering the Target Device	Register the target device.
▼	
7.3.4. Setting the Global Variables	Set global variables to use as tags for tag data links.
▼	
7.3.5. Registering the Tags	Register tags and tag sets.
▼	
7.3.6. Setting Connections	Set connections to associate the target variables with the originator variables.
▼	
7.3.7. Transferring the Project Data	Place Sysmac Studio online and transfer the connection settings and project data to the Controller.
▽	

7.4. Checking the EtherNet/IP Communications

Check that the EtherNet/IP tag data links are operating normally.

▼

7.4.1. Checking the Connection Status

Check the EtherNet/IP connection status.

▼

7.4.2. Checking the Sent and Received Data

Check that the correct data is sent and received.

7.2. CKD ABSODEX Driver Setup

Set up the CKD ABSODEX Driver.

7.2.1. Setting the Hardware

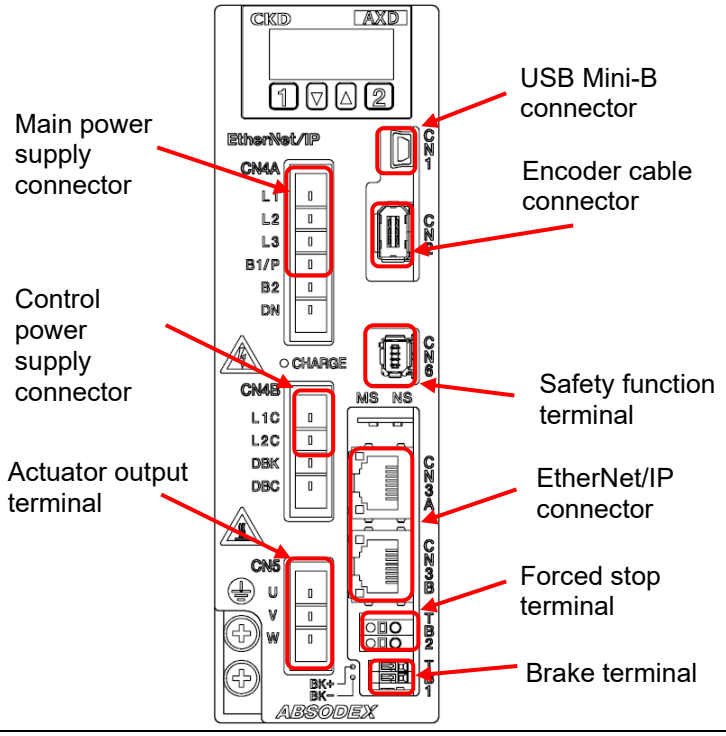
Connect the ABSODEX Driver cables.

Precautions for Correct Use

Turn OFF the power supply before setting the hardware.
If it is ON, the settings described in the following steps and subsequent procedures may not be applicable.

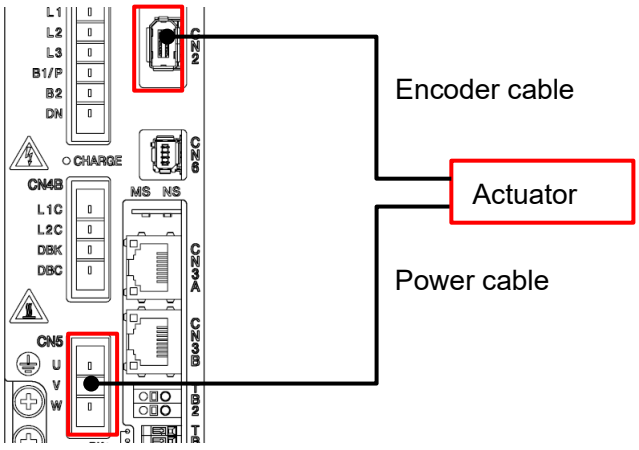
1 Check that the main power supply, control power supply, and external power supply for the ABSODEX Driver are OFF.

2 Check the positions of the ABSODEX Driver connectors by referring to the figure on the right.

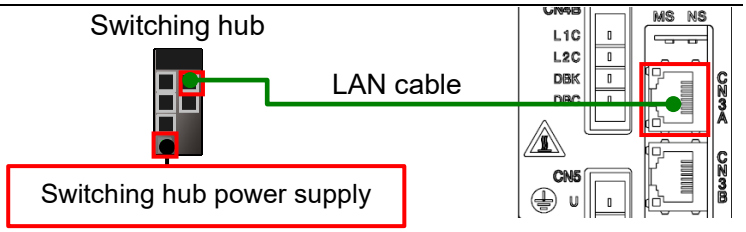


3 Connect the actuator's encoder cable to the "encoder cable connector."

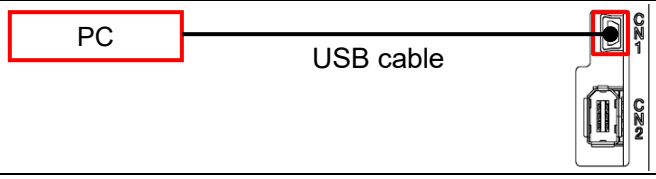
Connect the actuator's power cable to the "actuator output terminal."



4 Connect the “EtherNet/IP connector” and the switching hub with a LAN cable.
Connect the switching hub power supply to the switching hub.



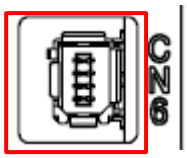
5 Connect the ABSODEX Driver’s “USB Mini-B connector” and the PC’s USB port with a USB cable.



6 Check that the safety function is disabled.
Check that the STO short-circuit plug is connected to the “safety function terminal.”

*In this guide, the safety function is disabled for the purpose of connection check.

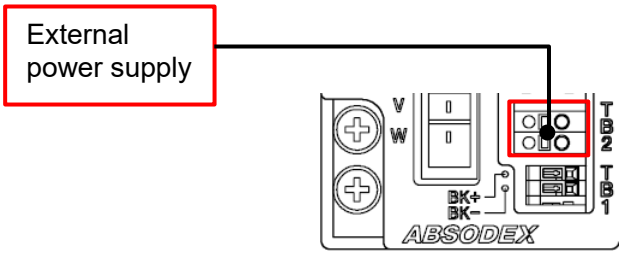
*For the wiring of the safety function terminal, refer to *3.4.3. Wiring for Safety Function* in the *AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL* (SM-A63469-A).



*The safety function is disabled by factory default, with the STO short-circuit plug connected to the “safety function terminal.”

7 Connect the external power supply to the “forced stop terminal” to disable the forced stop function of the ABSODEX Driver.

*For the wiring of the forced stop terminal, refer to *3.4.5. Wiring of Forced Stop Input (TB2)* in the *AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL* (SM-A63469-A).



7.2.2. Setting the Parameters

Set parameters for the ABSODEX Driver.

For setting the parameters, use *AX-Tools*. Install AX-Tools on the PC beforehand.

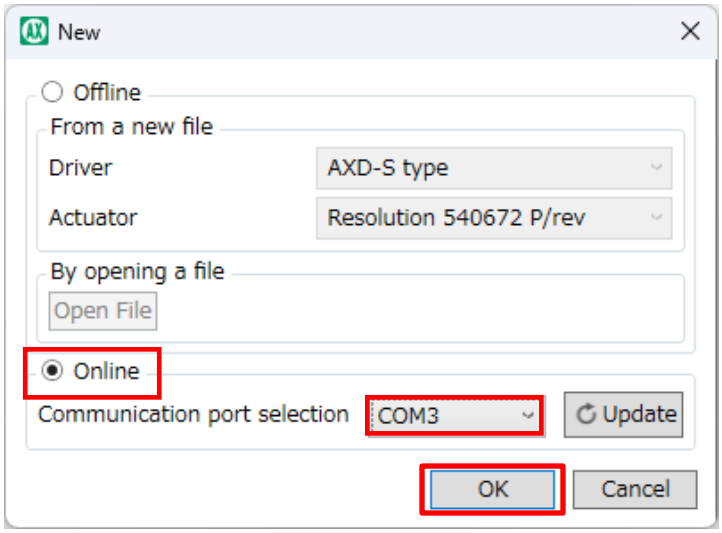
Additional Information

For how to install AX-Tools, refer to *2.2. Installing AX-Tools* in the *ABSODEX PC Setting Software AX-Tools INSTRUCTION MANUAL* (SM-A63470-A).

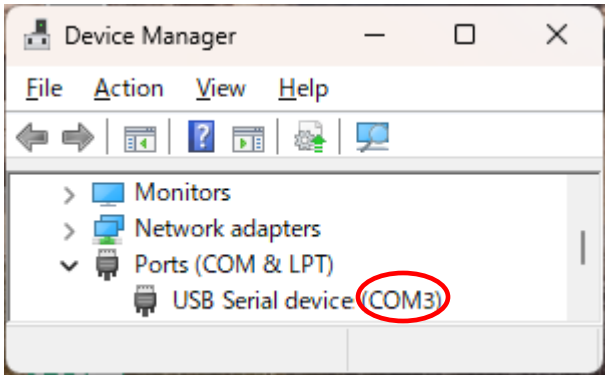
1 Turn ON the control power supply and main power supply for the ABSODEX Driver.

2 Start AX-Tools.

3 The **New** Dialog Box appears. Select the **Online** Option. Select the COM port number to use from the **Communication port selection** pull-down list and click **OK**.



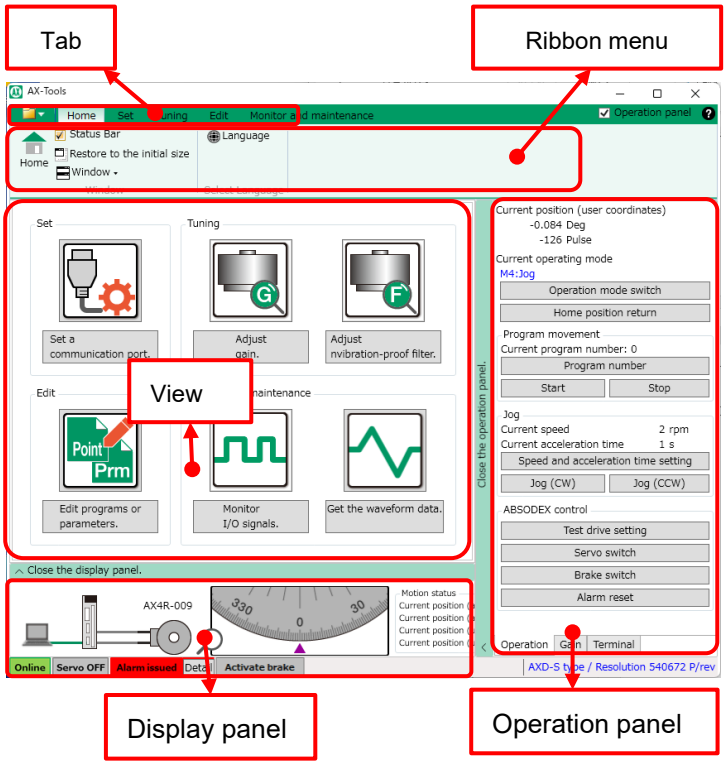
*If there are two or more serial ports on the PC, display Windows Device Manager and, under *Ports (COM & LPT)*, select the same port number as *the COM port number to which the driver is connected (COM3 in the example figure on the right)*.



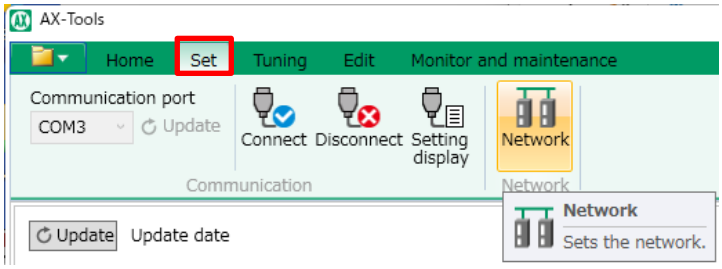
4 AX-Tools starts.

As shown in the figure on the right, each area of the AX-Tools screen is called as follows:

- Tab
- Ribbon menu
- View
- Operation panel
- Display panel

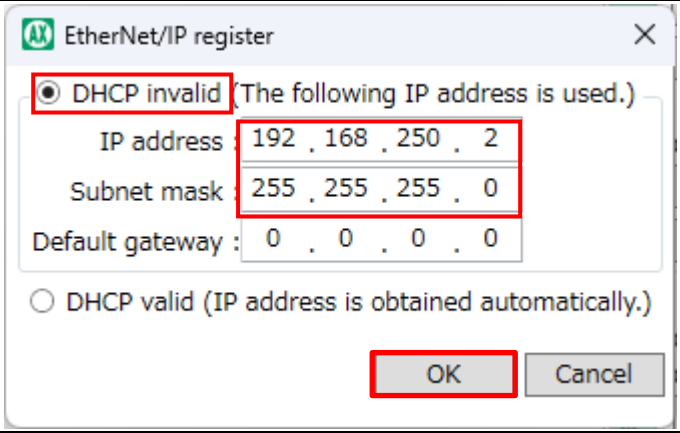


5 Select the **Set** Tab.
The view for the **Set** Tab is displayed. From the ribbon menu, select **Network**.

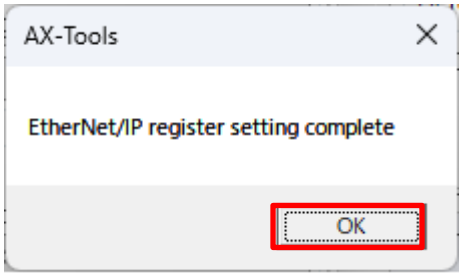


6 The **EtherNet/IP register** Dialog Box appears. Configure the address settings as follows and click **OK**.

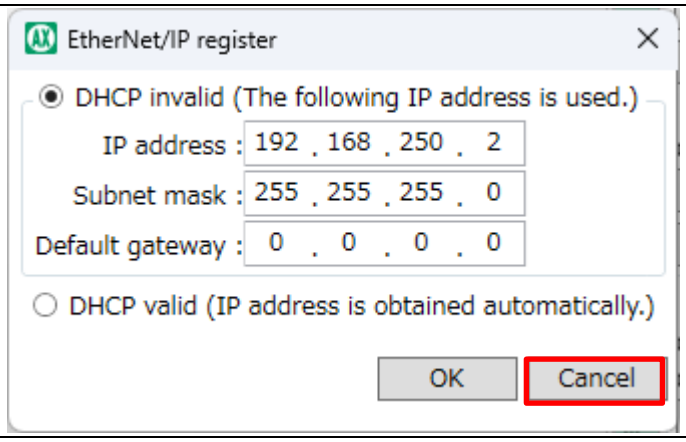
DHCP invalid: Selected
IP Address: 192.168.250.2
Subnet mask: 255.255.255.0



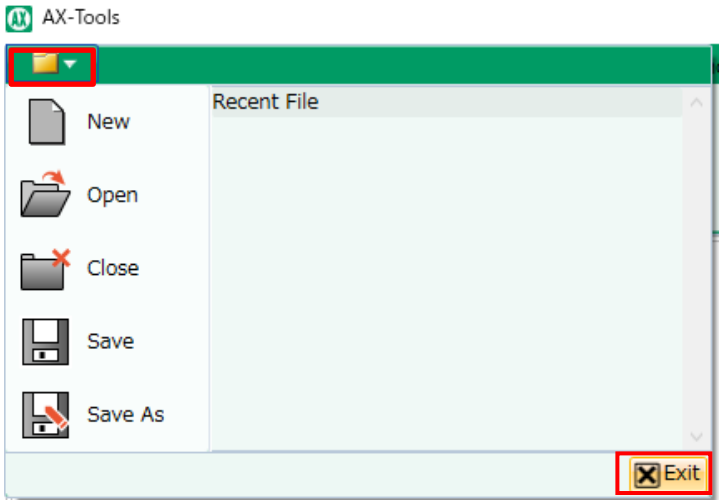
7 A setting completion dialog box appears. Check the message and click **OK**.



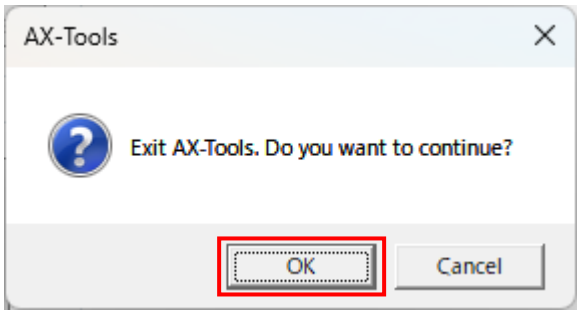
8 Click **Cancel** to close the **EtherNet/IP register** Dialog Box.



9 Click and select **Exit** from the menu to close AX-Tools.



10 A confirmation dialog box appears. Check the message and click **OK**.



11 Turn OFF the control power supply and main power supply for the ABSODEX Driver.

*In this guide, leave the PC and the ABSODEX Driver connected with the USB cable since you will use AX-Tools in *7.4.2. Checking the Sent and Received Data*.

7.3. Controller Setup

Set up the Controller.

7.3.1. Setting the IP Address

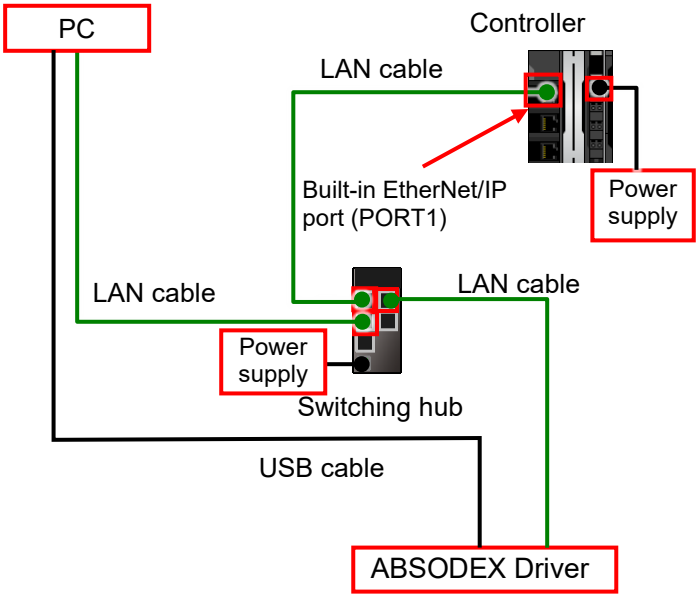
Start Sysmac Studio and set the IP address of the Controller.

1 Check that the power supply for the Controller, the power supply for the switching hub, and the control power supply for the ABSODEX Driver are OFF.

*Do not turn ON the main power supply for the ABSODEX Driver.

2 Connect the PC and the switching hub with a LAN cable.
Connect the switching hub and the Controller's **Built-in EtherNet/IP port (PORT1)** with a LAN cable.
Connect the other end of the LAN cable connected to the ABSODEX Driver to the switching hub.

Connect the power supply to the Controller and the switching hub.



*For the power supply connection to the Controller, refer to *5-4-1 Wiring the Unit Power Supply* in the *NX-series NX102 CPU Unit Hardware User's Manual* (Cat No. W593).

*In this guide, connect the PC and the ABSODEX Driver with a USB cable since you will use AX-Tools in *7.4.2. Checking the Sent and Received Data*.

3 Start Sysmac Studio.

*If a user account control dialog box appears at startup, select the option to start.

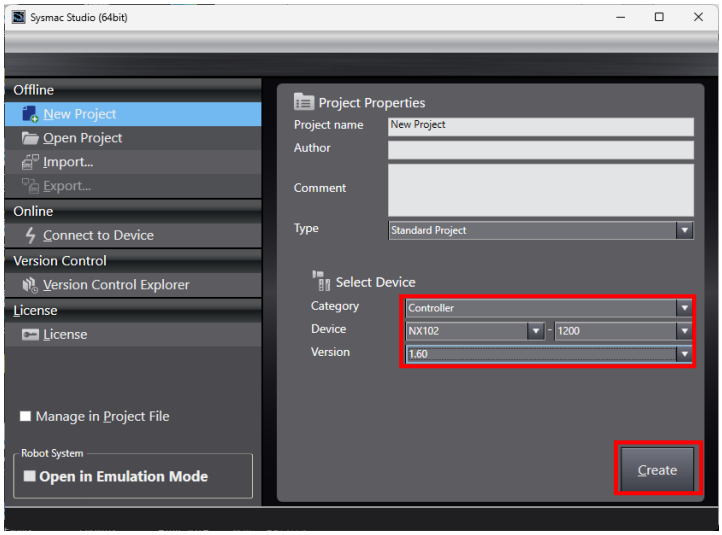
4 Sysmac Studio starts up.
Click **New Project**.

5 The **Project Properties** Pane appears. Select items appropriate for your Controller from the pull-down list in each field of **Select Device**. Click **Create**.

In this guide, the following Controller is used.

- Category: Controller
- Device: NX102-1200
- Version: 1.60

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



6 The **New Project** Window appears.

The following panes are displayed in the window.

Left: Multiview Explorer

Upper right: Toolbox

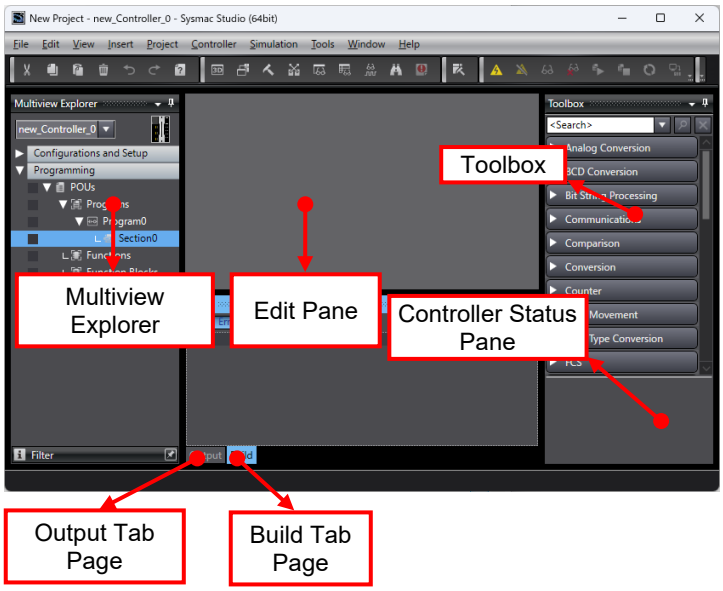
Lower right: Controller Status Pane

Top middle: Edit Pane

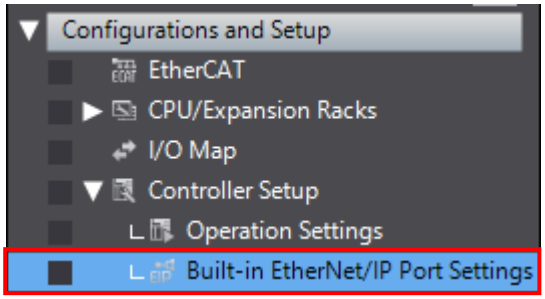
The following tabs are displayed in the lower middle of the window.

Output Tab Page

Build Tab Page

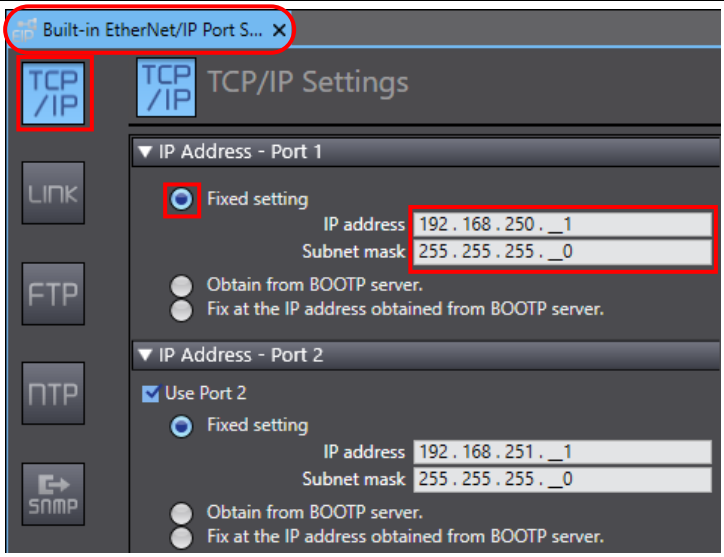


7 Double-click **Built-in EtherNet/IP Port Settings** under **Configurations and Setup** – **Controller Setup** in the **Multiview Explorer**.



8 The **Built-in EtherNet/IP Port Settings** Tab Page appears in the **Edit Pane**.
Check that **TCP/IP Settings** is selected, and check that **IP Address - Port 1** has the following values:

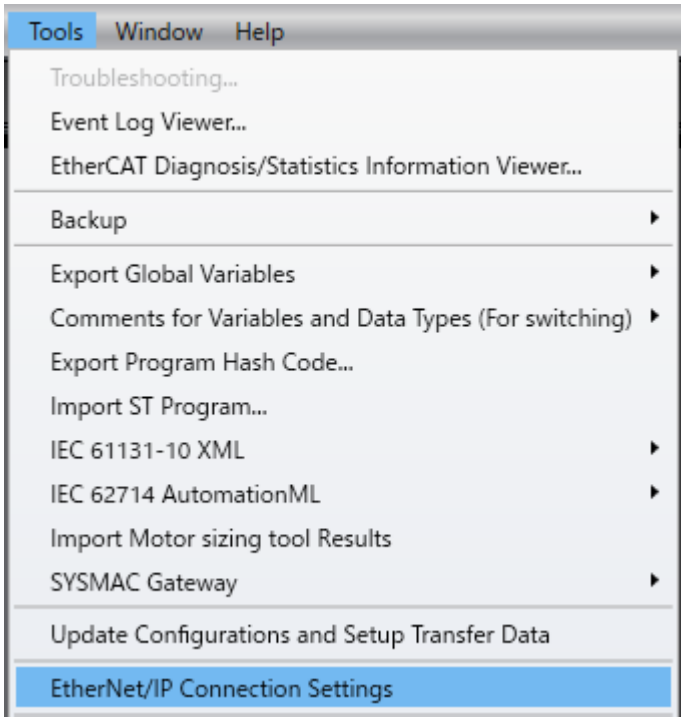
- Fixed setting: Selected
- IP address: 192.168.250.1
- Subnet mask: 255.255.255.0



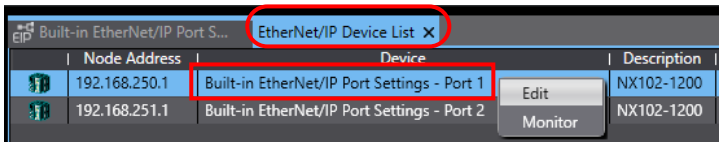
7.3.2. Installing the EDS File

Install the EDS file.

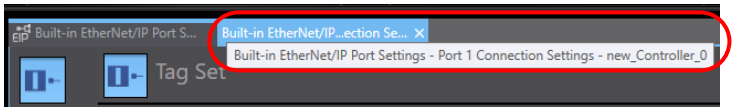
1 Select **EtherNet/IP Connection Settings** from the **Tools** Menu.



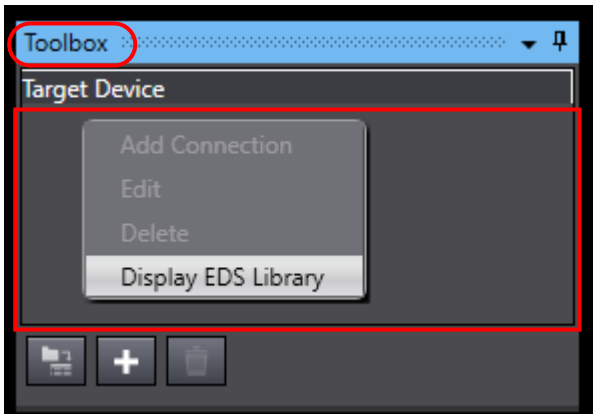
2 The **EtherNet/IP Device List** Tab Page appears in the **Edit Pane**.
Right-click **Built-in EtherNet/IP Port Settings - Port 1** and select **Edit** from the menu.



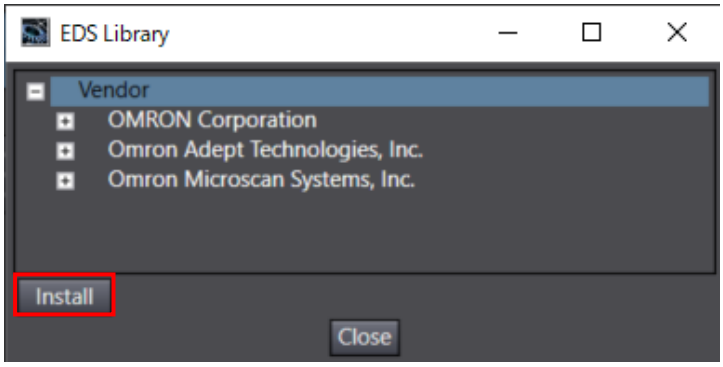
3 The **Built-in EtherNet/IP Port Settings - Port 1 Connection Settings** Tab Page appears in the **Edit Pane**.



4 Right-click on a space (marked in red) under **Target Device** in the **Toolbox**, and select **Display EDS Library** from the menu.

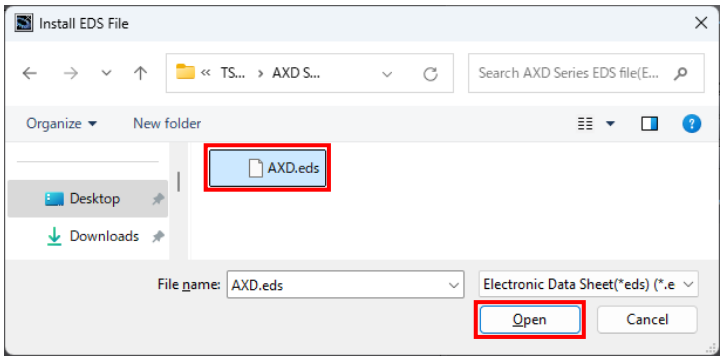


5 The **EDS Library** Dialog Box appears.
Click **Install**.



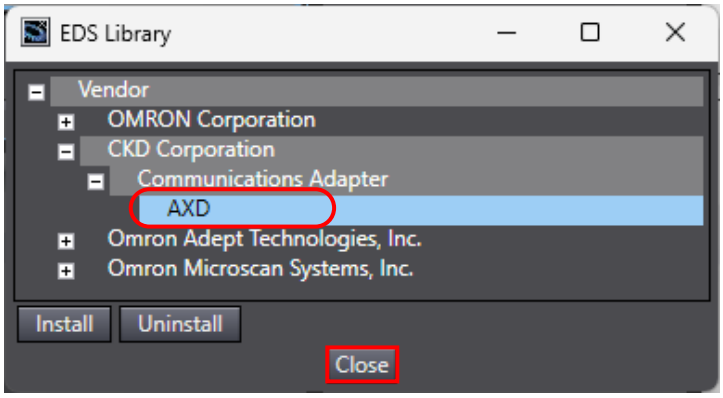
6 The **Install EDS File** Window appears. Select **AXD.eds** (the EDS file to install) and click **Open**.

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



7 Click the **+** Button for **CKD** in the **EDS Library** Dialog Box, and check that **CKD Corporation** – **Communications Adapter** – **AXD** is displayed.

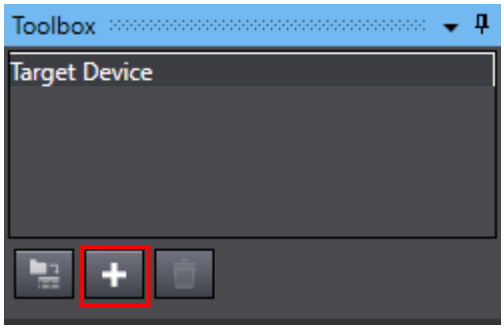
Click **Close**.



7.3.3. Registering the Target Device

Register the target device.

1 Click the **+** Button in the **Toolbox**.



2 Entry fields of the target device registration appear.

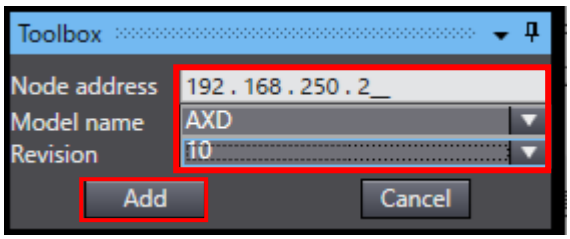
Enter *192.168.250.2* in the **Node address** Field.

Select the following model name and revision number from the respective pull-down lists in the **Model name** and **Revision** Fields.

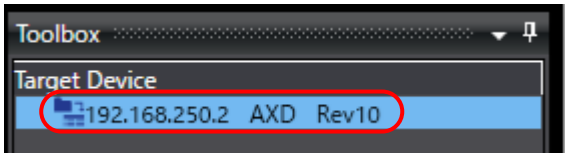
Model name: AXD

Revision: 10

Check the settings and click **Add**.



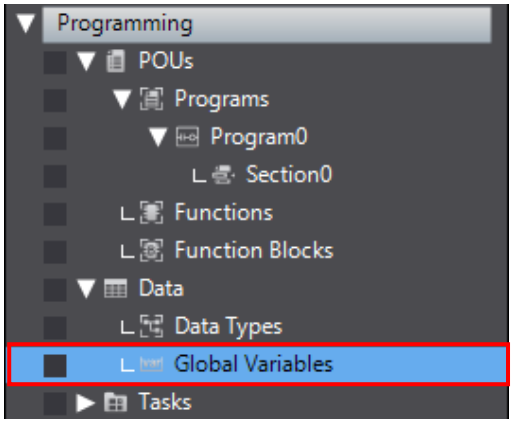
3 **192.168.250.2** is registered in **Target Device** in the **Toolbox**.



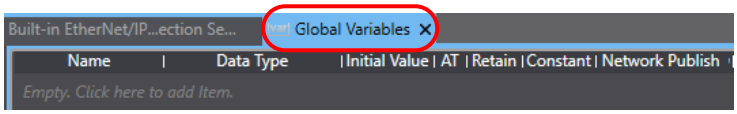
7.3.4. Setting the Global Variables

Set global variables to use as tags for tag data links.

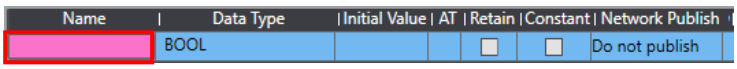
1 Double-click **Global Variables** under **Programming** – **Data** in the **Multiview Explorer**.



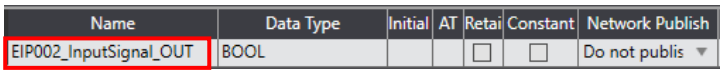
2 The **Global Variables** Tab Page appears in the **Edit Pane**.



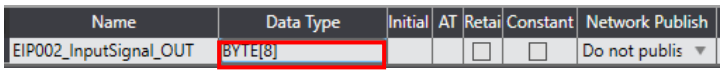
Click on a space under the column header **Name**. A new variable can be entered.



Enter *EIP002_InputSignal_OUT* in the **Name** Column.

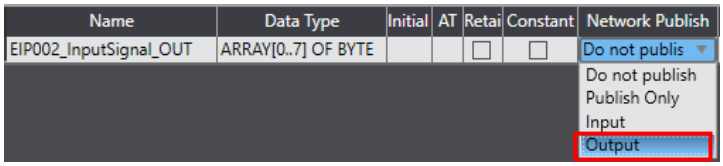


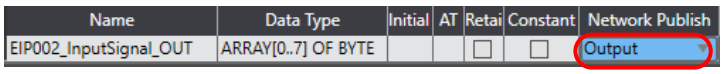
Enter *BYTE[8]* in the **Data Type** Column.



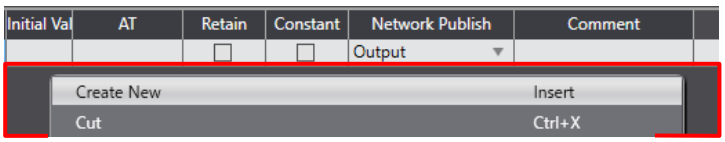
After confirming the entry, check that the **Data Type** changes to *ARRAY[0..7] OF BYTE*.

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





3 After confirming the entry, right-click on a space under the registered variable, and select **Create New** from the menu.



4 Perform the same operation as in step 2 to enter the following data in the new entry area.

- Name: EIP002_MonitorCode_OUT
  Data Type: DINT[3]
  Network Publish: Output
- Name: EIP002_Command_OUT
  Data Type: DINT[3]
  Network Publish: Output

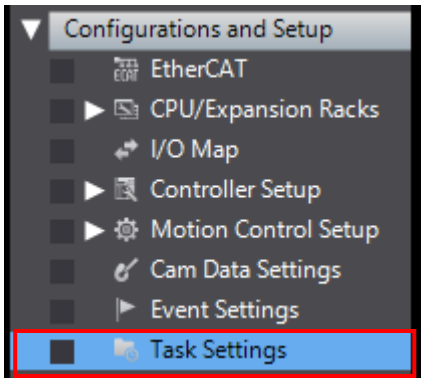
Name	Data Type	Initial	AT	Retai	Constant	Network Publish
EIP002_InputSignal_OUT	ARRAY[0..7] OF BYTE			☐	☐	Output
EIP002_MonitorCode_OUT	ARRAY[0..2] OF DINT			☐	☐	Output
EIP002_Command_OUT	ARRAY[0..2] OF DINT			☐	☐	Output

5 Perform the same operation as in steps 3 to 4 to enter the following data.

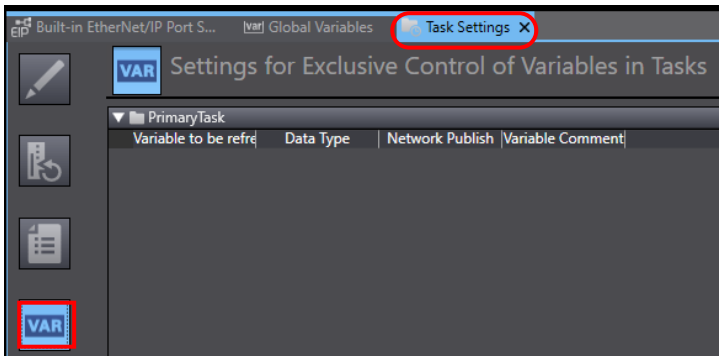
- Name: EIP002_OutputSignal_IN
  Data Type: BYTE[8]
  Network Publish: Input
- Name: EIP002_MonitorData_IN
  Data Type: DINT[3]
  Network Publish: Input
- Name: EIP002_Response_IN
  Data Type: DINT[3]
  Network Publish: Input

Name	Data Type	Initial	AT	Retai	Constant	Network Publish
EIP002_InputSignal_OUT	ARRAY[0..7] OF BYTE			☐	☐	Output
EIP002_MonitorCode_OUT	ARRAY[0..2] OF DINT			☐	☐	Output
EIP002_Command_OUT	ARRAY[0..2] OF DINT			☐	☐	Output
EIP002_OutputSignal_IN	ARRAY[0..7] OF BYTE			☐	☐	Input
EIP002_MonitorData_IN	ARRAY[0..2] OF DINT			☐	☐	Input
EIP002_Response_IN	ARRAY[0..2] OF DINT			☐	☐	Input

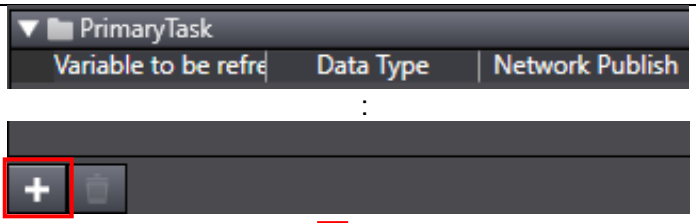
6 Double-click **Task Settings** under **Configurations and Setup** in the **Multiview Explorer**.



7 The **Task Settings** Tab Page appears in the **Edit Pane**. Click **VAR** to open the **Settings for Exclusive Control of Variables in Tasks** Window.

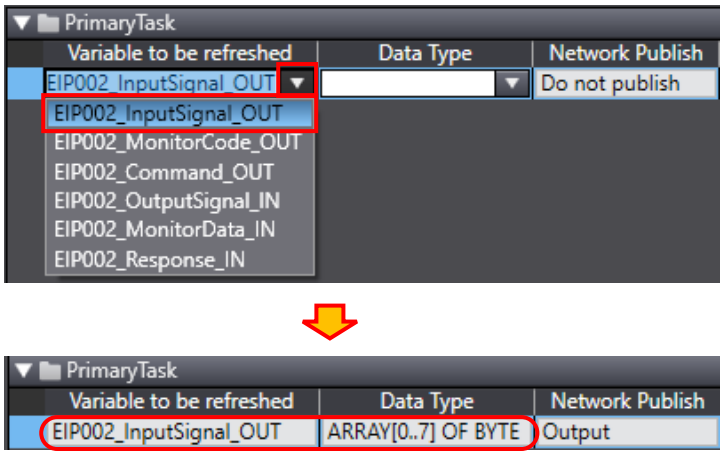


8 Click the **+** Button displayed on the lower side of the **Primary Task**.

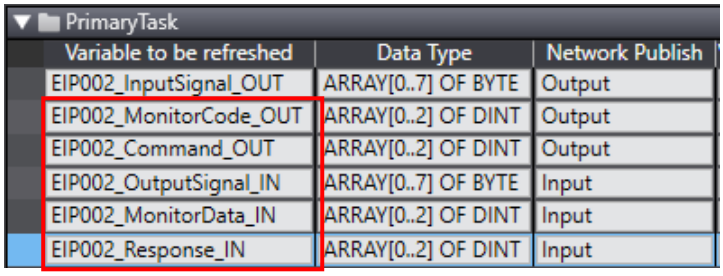


A new entry line is added to the **Primary Task**. Select **EIP002_InputSignal_OUT** from the pull-down list in the **Variable to be refreshed** Column.

*The data type is displayed automatically, so no value needs to be set.



9 Perform the same way as in step 8 to add all the variables set in this section to the **Variable to be refreshed** Column.

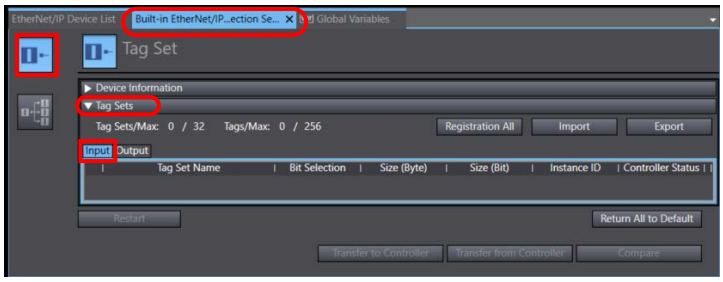


7.3.5. Registering the Tags

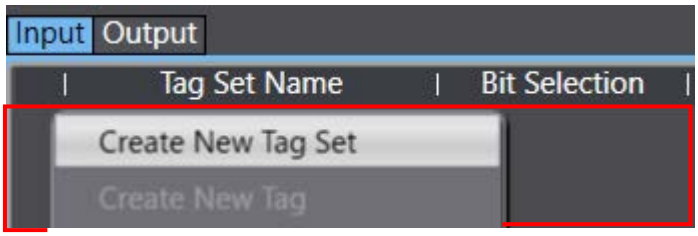
Register tags and tag sets.

1 Click the **Tag Set** Button on the **Built-in EtherNet/IP Port Settings - Port 1 Connection Settings** Tab Page.
Click the **Input** Tab in the **Tag Sets**.

*If the **Built-in EtherNet/IP Port Settings - Port 1 Connection Settings** Tab Page is not displayed, perform steps 1 through 3 of *7.3.2. Installing the EDS File* to display the tab page.

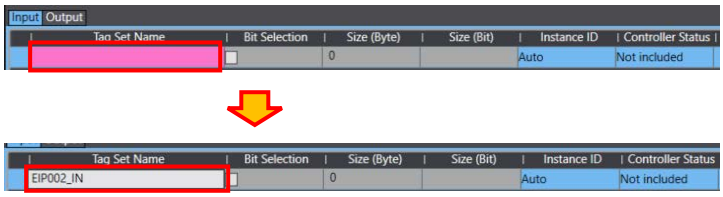


2 Right-click on a space on the **Input** Tab Page, and select **Create New Tag Set** from the menu.



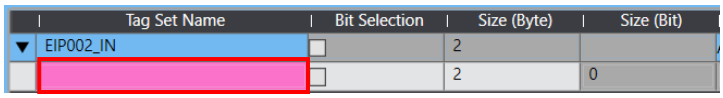
3 You can now enter a new tag set name. Select the newly added input area.

Enter **EIP002_IN**.



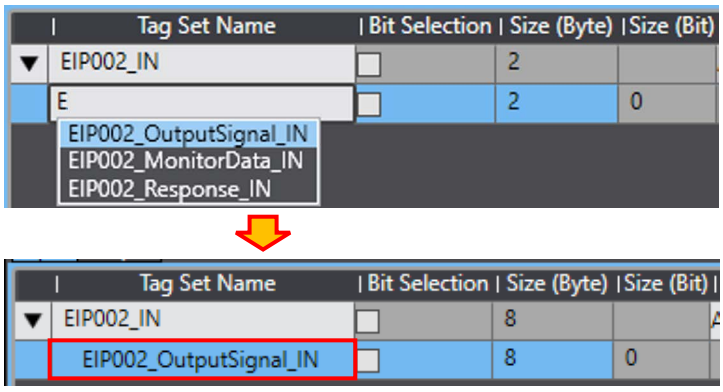
4 While selecting **EIP002_IN**, right-click on a space and select **Create New Tag** from the menu.

Under **EIP002_IN**, you can now enter a new tag name. Select the newly added input area.

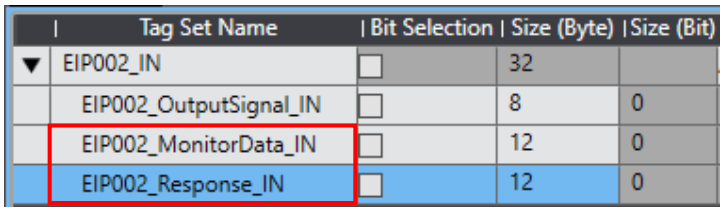


Enter the global variable of *IN No. 1* as a tag, which is listed in *6.3. Tag Set*.

*When you enter the first character *E* of the variable name in the input area, a list of the variable names that can be set as tags will appear as shown in the figure on the right.



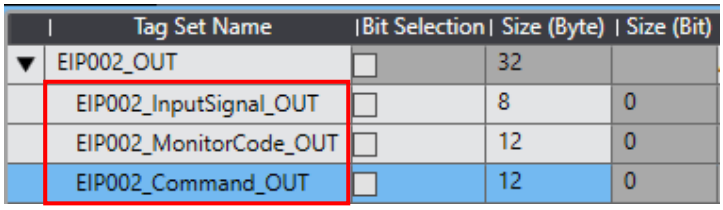
5 Perform the same operation as in step 4 to set the global variable as a tag in order of the *IN No.* shown in *6.3. Tag Set*.



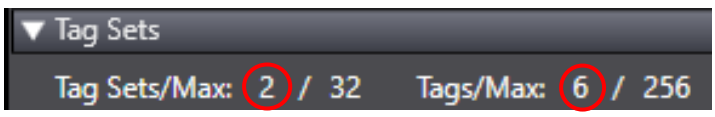
6 Select the **Output** Tab Page. Right-click on a space on the **Output** Tab Page, and select **Create New Tag Set** from the menu.

7 You can now enter a new tag set name. Perform the same operation as in step 3 to enter **EIP002_OUT**.

8 Perform the same operation as in step 4 to set the global variable as a tag in order of the *OUT No.* shown in *6.3. Tag Set*.

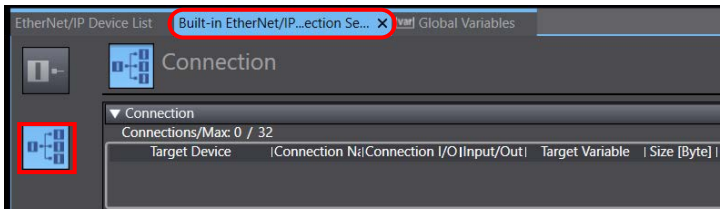
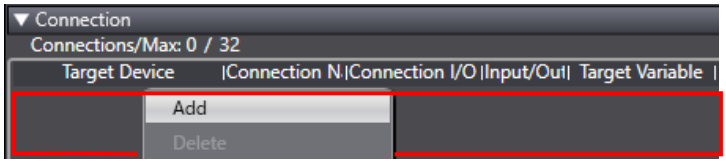
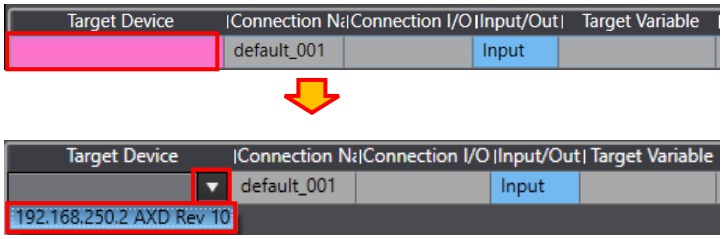
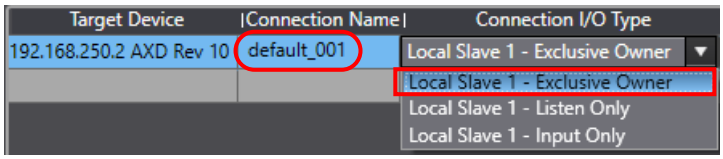
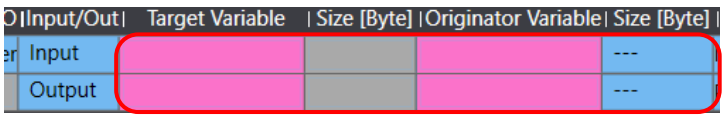


9 Check that the number of **Tag Sets** is **2** and that the number of **Tags** is **6**, the same as the number of set global variables.

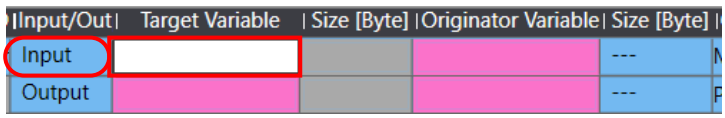


7.3.6. Setting Connections

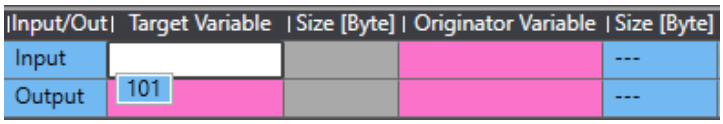
Set connections to associate the target variables with the originator variables.

1	Click the **Connection** Button on the **Built-in EtherNet/IP Port Settings - Port 1 Connection Settings** Tab Page.	
2	Right-click on a space under the column header **Target Device** in the **Connection**, and select **Add** from the menu.	
3	A new connection can be entered. Select the device **192.168.250.2** from the pull-down list in the **Target Device** Column.	
4	A new connection named **default_001** is created. Select **Local Slave 1 - Exclusive Owner** from the pull-down list in the **Connection I/O Type** Column.	
5	The **Target Variable** and **Originator Variable** can be set.	

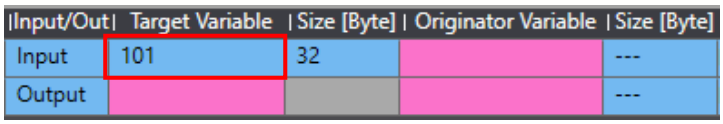
6 Click on the cell in the **Target Variable** Column for **Input**.



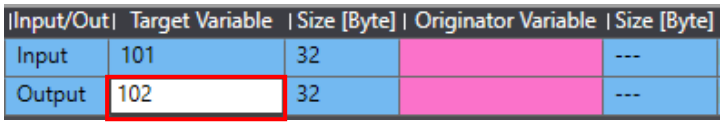
Press *Ctrl* + *Space* on the keyboard. Applicable instance numbers appear. (**101**, in this guide)



*A list of instance numbers will also appear when you enter the first character of the instance number (e.g. *1*).

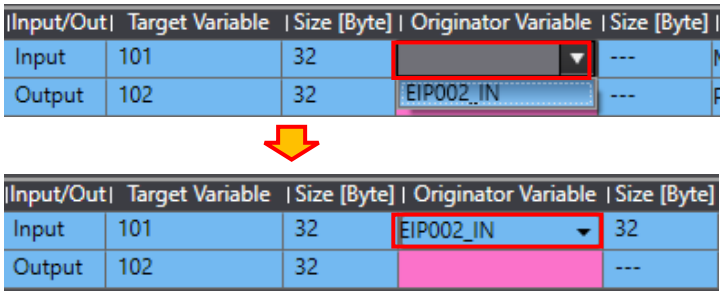


Select the instance number **101**.

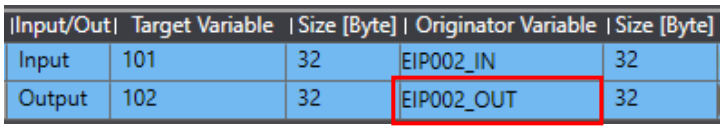


Perform the same operation to select the instance number **102** from the list in the **Target Variable** Column for **Output**.

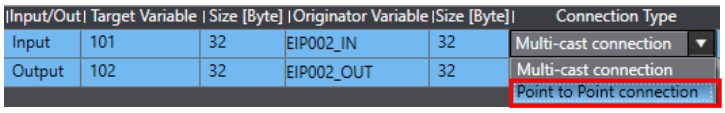
7 Click on the cell in the **Originator Variable** Column for **Input**.
A pull-down list of the previously registered tag set names appears. Select the tag set name **EIP002_IN**.



8 Perform the same operation to select the output tag set name *EIP002_OUT* in the **Originator Variable** Column for **Output**.

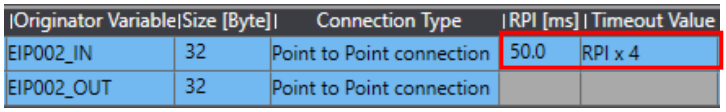


9 Select **Point to Point connection** in the **Connection Type** Column for all.

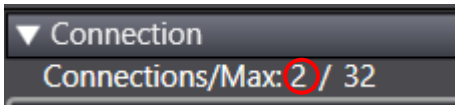


10 Change **RPI [ms]** and **Timeout Value** as needed.

*In this guide, the default values are used.



11 Check that the number of **Connections** is **2**.



7.3.7. Transferring the Project Data

Place Sysmac Studio online and transfer the connection settings and project data to the Controller.

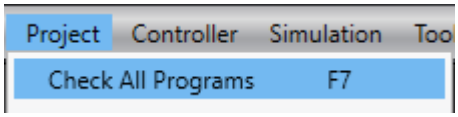
WARNING

When you transfer a user program, *Configurations and Setup* data, or device variables from Sysmac Studio, the devices and machines may operate unexpectedly regardless of the operating mode of the CPU Unit.
Before transferring the project data, check the safety of the destination devices.

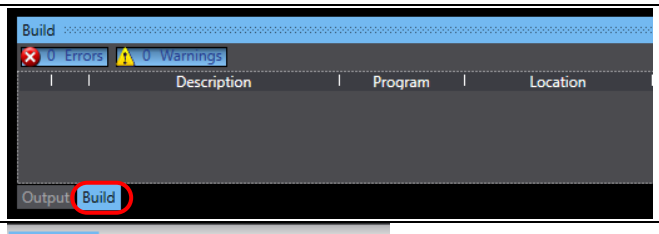
1 Turn ON the control power supplies for the Controller, the switching hub, and the ABSODEX Driver.

*Do not turn ON the main power supply of the Driver.

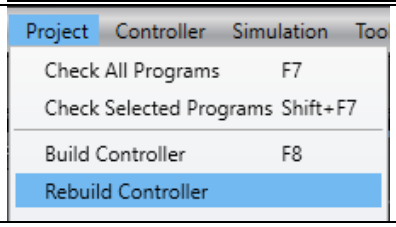
2 Select **Check All Programs** from the **Project** Menu.



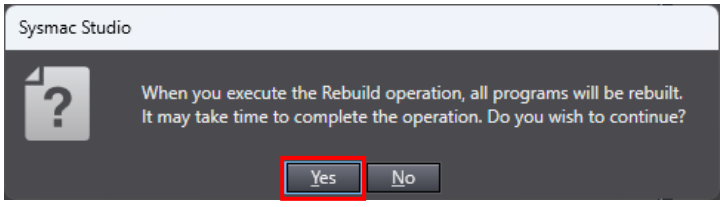
3 The **Build** Tab Page appears. Check that the tab page shows the results *0 Errors* and *0 Warnings*.



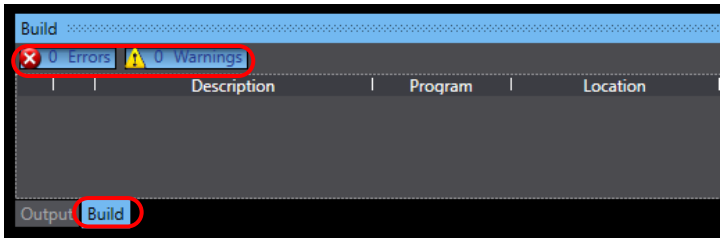
4 Select **Rebuild Controller** from the **Project** Menu.



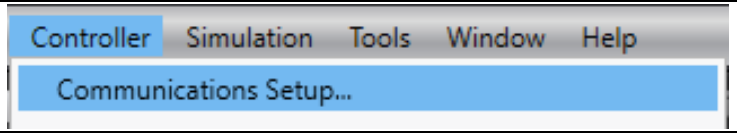
5 The dialog box on the right appears. Confirm that there is no problem, and click **Yes**.



6 Check that the **Build** Tab Page shows the results *0 Errors* and *0 Warnings*.



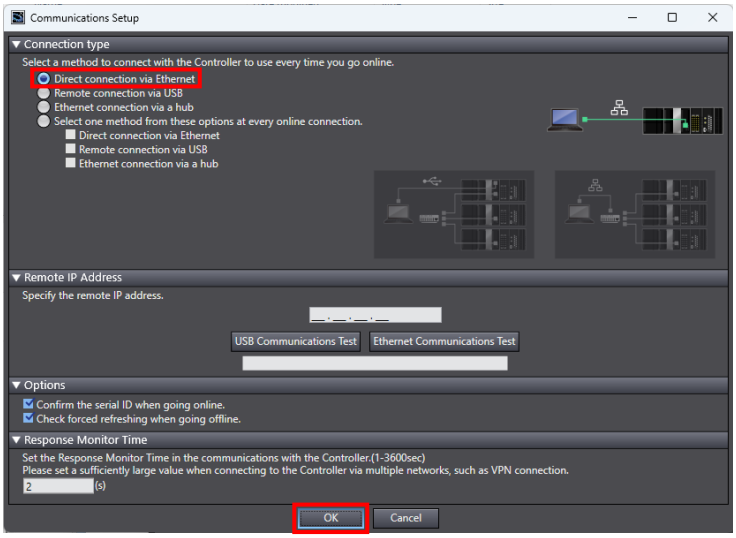
7 Select **Communications Setup** from the **Controller** Menu.



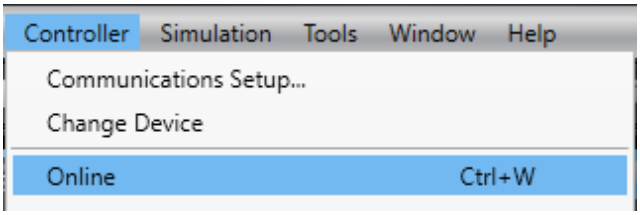
8 The **Communications Setup** Dialog Box appears. Check that **Direct connection via Ethernet** is set in the **Connection type** Field.

Click **OK**.

*The **Direct connection via Ethernet** is available regardless of with or without a switching hub if you make a 1:1 connection between Sysmac Studio and Controller.

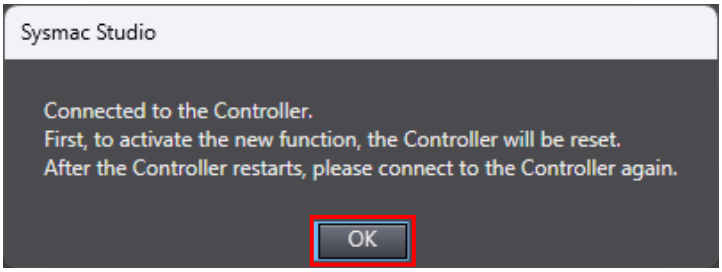


9 Select **Online** from the **Controller** Menu.



10 When the dialog box on the right appears, check the message and click **OK**. Then select **Online** again.

*The message of the dialog box varies with the Controller status. Check the message and click **OK** or an appropriate button to proceed with the processing.

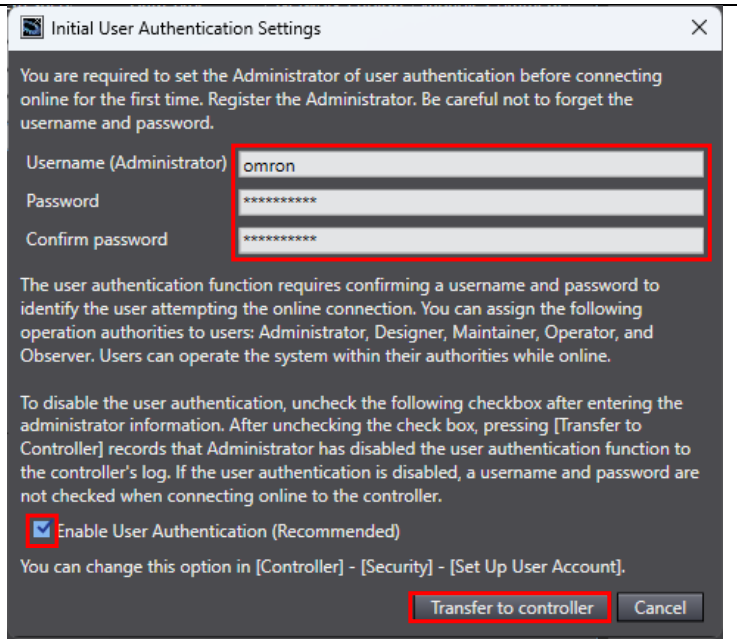


11 The **Initial User Authentication Settings** Dialog Box appears. Enter the user name and password.

*The input rules for the user name and password are as follows.

Username: 1 to 16 alphanumeric characters
Password: 8 to 32 alphanumeric characters

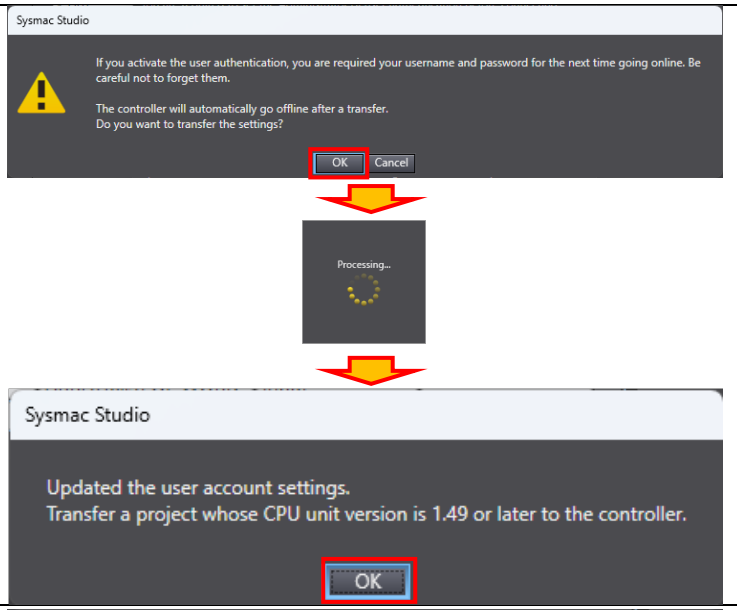
Confirm that the check box for **Enable User Authentication** is selected, and click **Transfer to controller**.



12 The dialog box on the right appears. Confirm that there is no problem, and click **OK**.

A message appears stating "Processing."

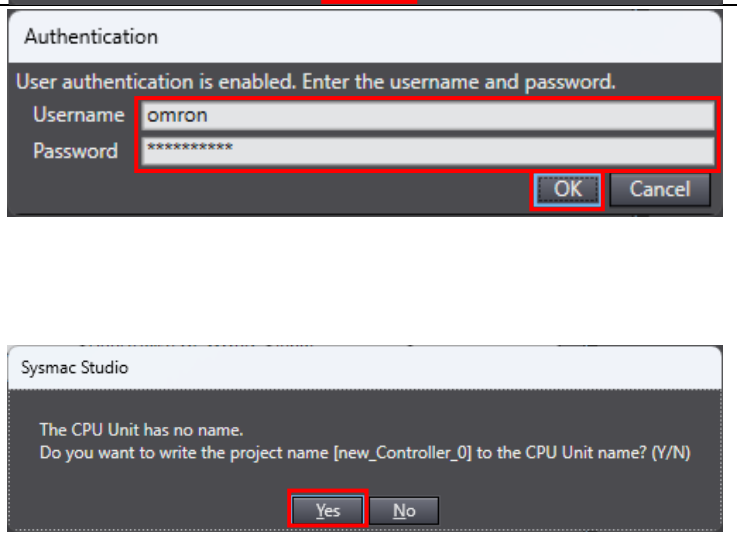
When the dialog box on the right appears, check the message and click **OK**. Then select **Online** again.



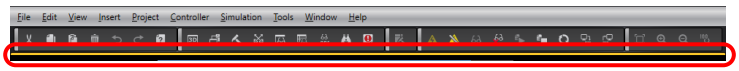
13 The **Authentication** Dialog Box appears. Enter the user name and password set in step 11, and click **OK**.

*If user authentication is enabled, the **Authentication** Dialog Box will appear when connecting online.

*If the dialog box on the right appears, check the message and click **Yes**.



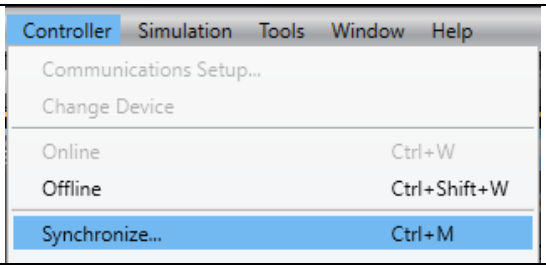
14 When an online connection is established, a yellow line appears under the toolbar.



Additional Information

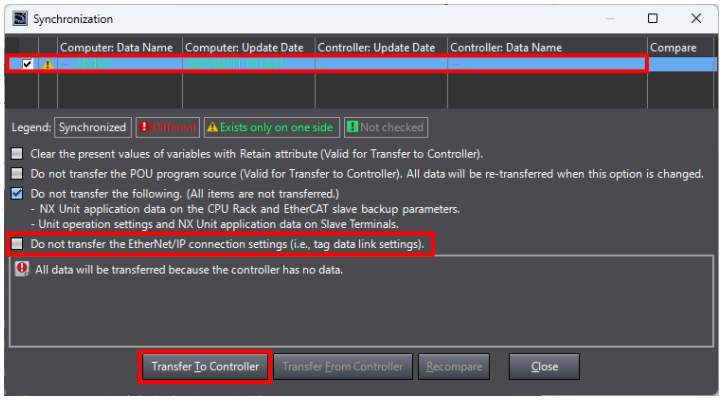
For details on the online connection to the Controller, refer to *Section 6. Online Connections to a Controller* and *Section 8. Other Functions – 8-3 Security Settings* in the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

15 Select **Synchronize** from the **Controller** Menu.

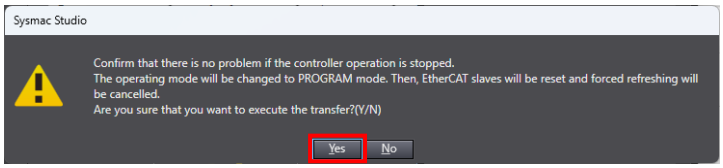


16 The **Synchronization** Dialog Box appears.
Confirm that the data to transfer is selected. (In the figure on the right, the check box for **NX102** is selected.)
Clear the check box for **Do not transfer the EtherNet/IP connection settings (i.e., tag data link settings)**.
Click the **Transfer to Controller** Button.

*When you execute **Transfer To Controller**, the data from Sysmac Studio is transferred to the Controller, and the data is synchronized.



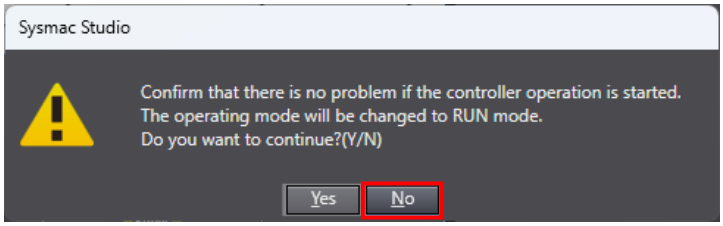
17 The dialog box on the right appears. Confirm that there is no problem, and click **Yes**.



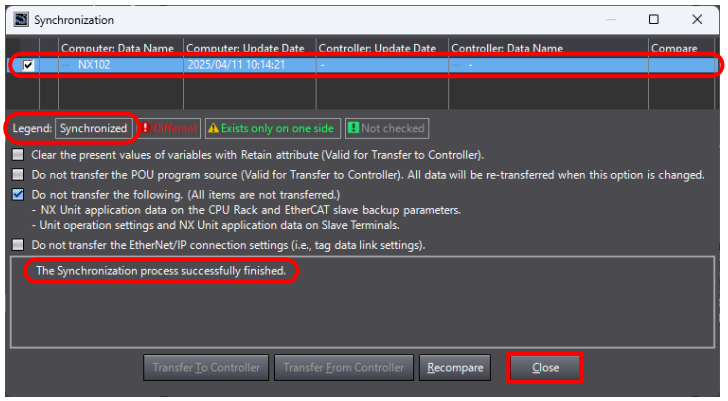
A message appears stating "Synchronizing."

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

*Do not return to *Run Mode*.



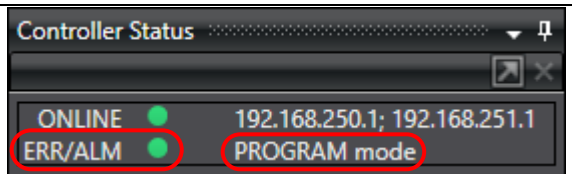
18 As shown in the figure on the right, the font color used to display the synchronized data changes to white which is the color used to specify **Synchronized**. Check that a message appears stating *The Synchronization process successfully finished*. Confirm that there is no problem, and click **Close**.



*When the project data created in Sysmac Studio matches the Controller data, a message appears stating *The Synchronization process successfully finished*.

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

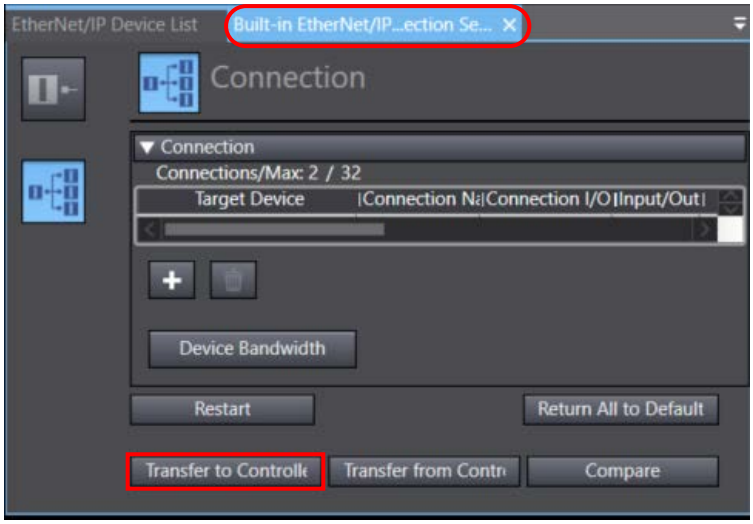
19 Check that the **ERR/ALM** indicator in the **Controller Status** Pane turns green and that **PROGRAM mode** is displayed.



Precautions for Correct Use

If you change connection settings (in the tag data link table) after executing **Synchronize**, you will not be able to transfer the connection settings (in the tag data link table) even by executing **Synchronize** again.

To transfer the connection settings changed after synchronization, display the **Built-in EtherNet/IP Port Settings - Port 1 Connection Settings** Tab Page and then click **Transfer to Controller**, as shown in the figure on the right.



7.4. Checking the EtherNet/IP Communications

Check that the EtherNet/IP tag data links are operating normally.

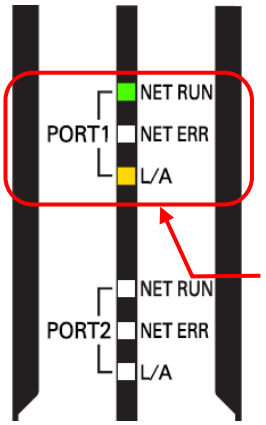
7.4.1. Checking the Connection Status

Check the EtherNet/IP connection status.

1 Check with the LED indicators on Controller that the tag data links are in normal operation

Below is the LED status in normal operation.
- NET RUN: Lit Green
- NET ERR: OFF
- LINK/ACT: Yellow flashing (Flashing while packets are being transmitted and received)

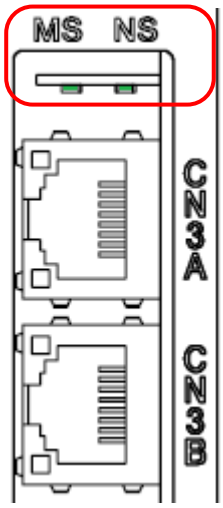
*The NJ-series Controllers also have the same LED indicator status.



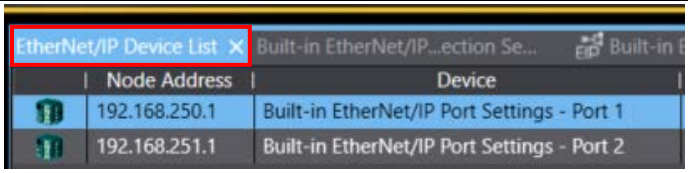
Built-in EtherNet/IP port (PORT1) Status indicators

2 Check the LED indicators on the ABSODEX Driver.

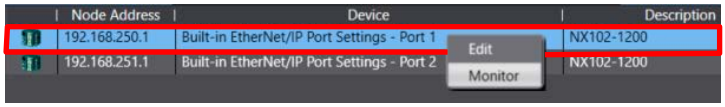
Below is the LED status in normal operation.
- MS: Lit Green
- NS: Lit Green



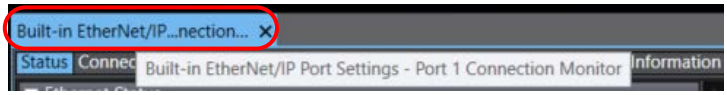
3 Click the **EtherNet/IP Device List** Tab Page.



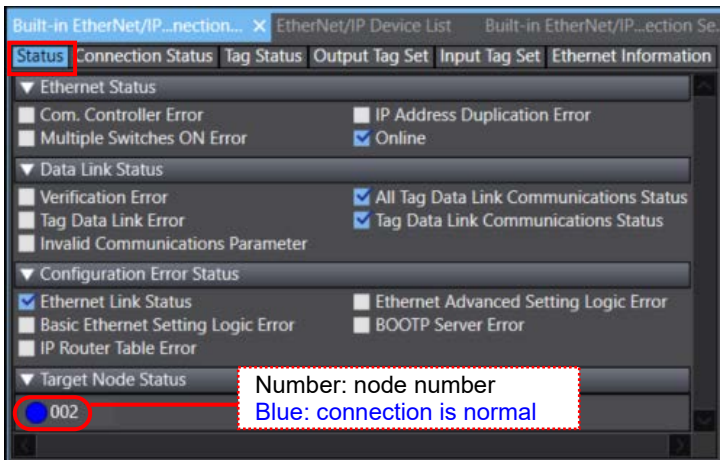
4 Right-click **Built-in EtherNet/IP Port Settings - Port 1** and select **Monitor** from the menu.



5 The **Built-in EtherNet/IP Port Settings - Port 1 Connection Monitor** Tab Page appears.

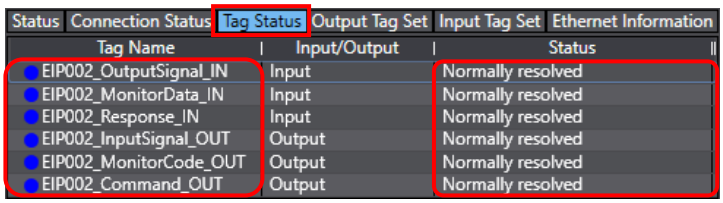


6 Select the **Status** Tab Page.
If the same check boxes as shown in the right figure are selected, the tag data links are operating normally.



7 Select the **Connection Status** Tab Page.
Check that ● (blue dot) appears to the left of the applicable connection in the **Connection Name** Column.
Check that **Status** is **00:0000**.

8 Select the **Tag Status** Tab Page.
Check that all the previously set tags are displayed in the **Tag Name** Column and that ● (blue dot) appears to the left of each tag. Check that **Normally resolved** is displayed in the **Status** Column for each tag.



7.4.2. Checking the Sent and Received Data

Check that the correct data is sent and received.

In this guide, the sent and received data check is done by using the monitor code function of the ABSODEX Driver to read the monitor data for the current position (pulse) within a full revolution (hereafter referred to as “Current position (pulse)”).

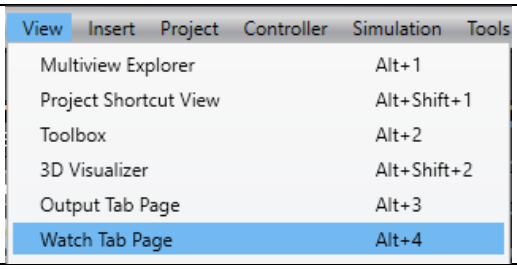
⚠ Caution

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

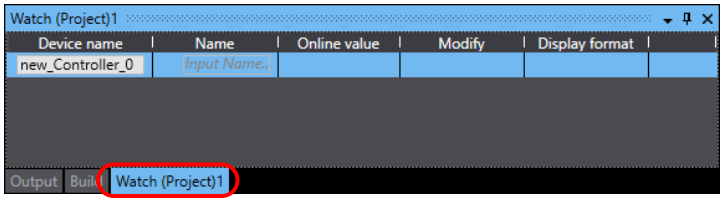
Additional Information

For details on how to output monitor data using the monitor code function, refer to *4.6. Monitor Code / Instruction Code* in the *AXD SERIES DRIVER FOR DIRECT DRIVE ACTUATOR EtherCAT/EtherNet/IP Specifications INSTRUCTION MANUAL* (SM-A63469-A).

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

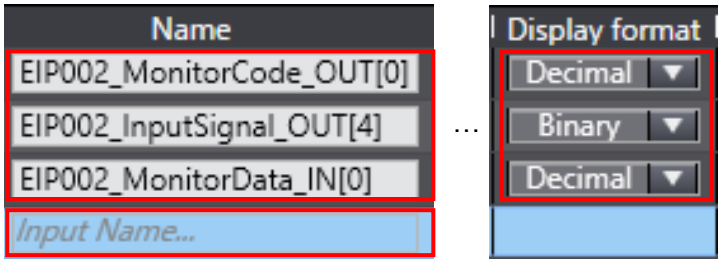


2 The **Watch (Project)1** Tab Page appears.



3 Click **Input Name** in the **Name** Column and enter the following variable names for monitoring. Select the **Display format** for each of the variables. When entering a new name, click **Input Name**.

Name: EIP002_MonitorCode_OUT[0]
Display format: Decimal
Name: EIP002_InputSignal_OUT[4]
Display format: Binary
Name: EIP002_MonitorData_IN[0]
Display format: Decimal



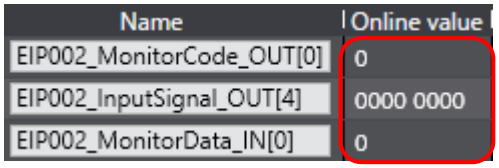
4 On the Watch Tab Page of Sysmac Studio, check that the following values are displayed in the **Online value** Column.

EIP002_MonitorCode_OUT[0]: 0

EIP002_InputSignal_OUT[4]: 0000 0000

EIP002_MonitorData_IN[0]: 0

*Refer to *6.2. Global Variables* for the description of each variable.



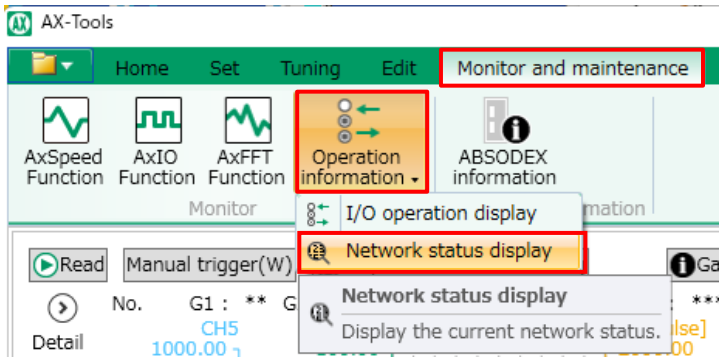
EIP002_MonitorCode_OUT[0]: Monitor code 1

EIP002_InputSignal_OUT[4], bit 0: Monitor output execution request

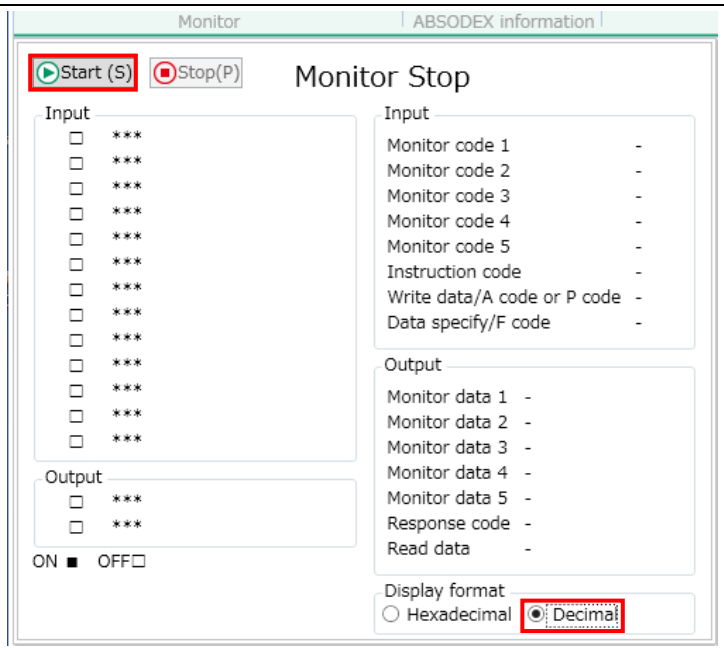
EIP002_MonitorData_IN[0]: Monitor data 1

5 Start AX-Tools and reconnect the ABSODEX Driver and AX-Tools by following the same procedure as in *7.2.2. Setting the Parameters*.

In AX-Tools, select the **Monitor and maintenance** Tab, click **Operation information** on the ribbon menu, and select **Network status display** from the menu.



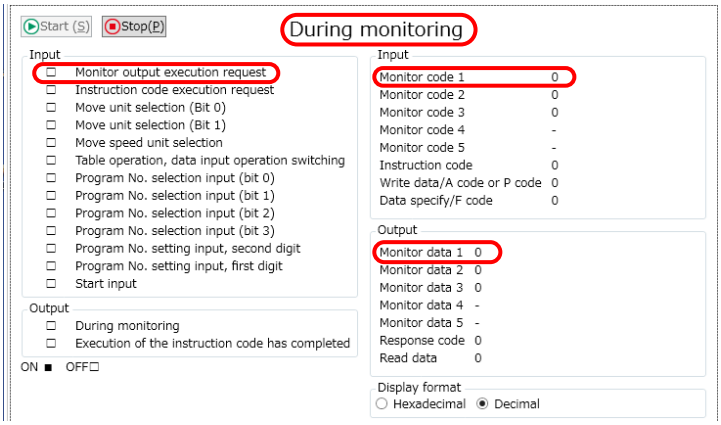
6 The **Network status display** View is displayed. Select **Decimal** in **Display format** and click **Start**.



7 The **Network status display** View shows “During monitoring.” Check that the monitor values are displayed as follows.

• Input
  Monitor output execution request: OFF (Disabled)
  Monitor code 1: 0
• Output
  Monitor data 1: 0

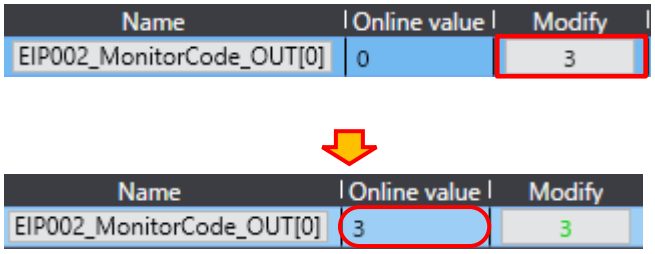
*This shows that the monitor values of the ABSODEX Driver match the online values in step 4.



8 In the Watch Pane of Sysmac Studio, enter *3* in the **Modify** Column for *EIP002_MonitorCode_OUT[0]*.

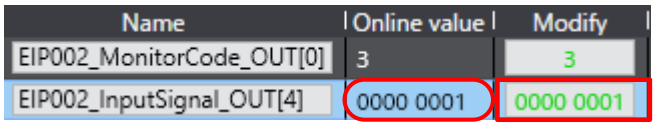
The value in the **Online value** Column for *EIP002_MonitorCode_OUT[0]* changes to *3*.

*For *Monitor code 1* above, set the monitor item number to import into *Monitor data 1*. In this guide, it is set to *3*, which is the monitor item number for *Current position (pulse)*.



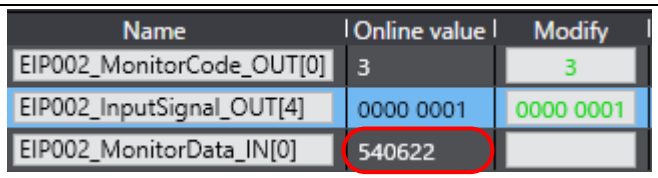
9 Set *0000 0001* for *EIP002_InputSignal_OUT[4]* by performing the same operation as in step 8.

*Setting *bit 0* (Monitor output execution request) of the above variable to *1* (Enabled) stores the value of the *monitor item number 3* (Current position (pulse)) set in step 8.



10 Check that the **Online value** Column displays the following value.

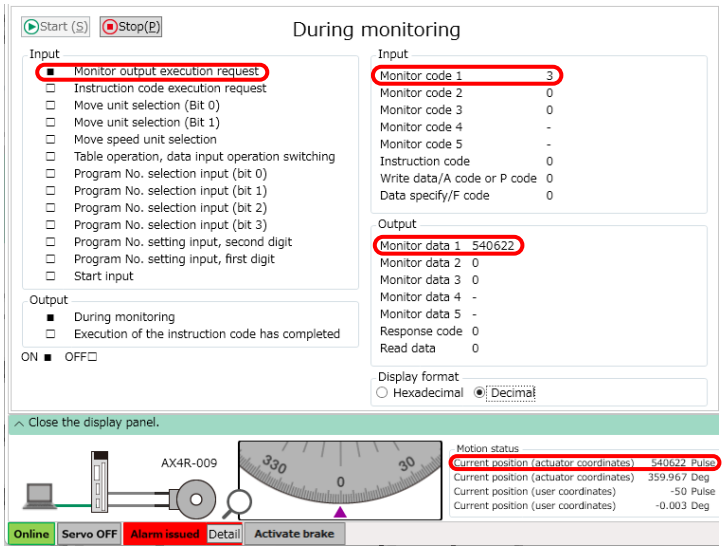
EIP002_ MonitorData_IN[0]: (*540622* in the example on the right)



*The value of *Current position (pulse)* is *540622* pulses depending on the ABSODEX Driver used.
The value of *Current position (pulse)* may vary depending on the ABSODEX Driver used.

11 In the **Network status display** View of AX-Tools, check that the monitor values are displayed as follows.

- Input
  Monitor output execution request: ON (Enabled)
  Monitor code 1: 3
- Output
  Monitor data 1: 540622
- **Motion status** on the display panel
  Check the value of **Current position (actuator coordinates)** (*540622 Pulse* in the example on the right).



*This indicates that the *Current position (pulse)* of the ABSODEX Driver is *540622*, which matches the value in step 10.

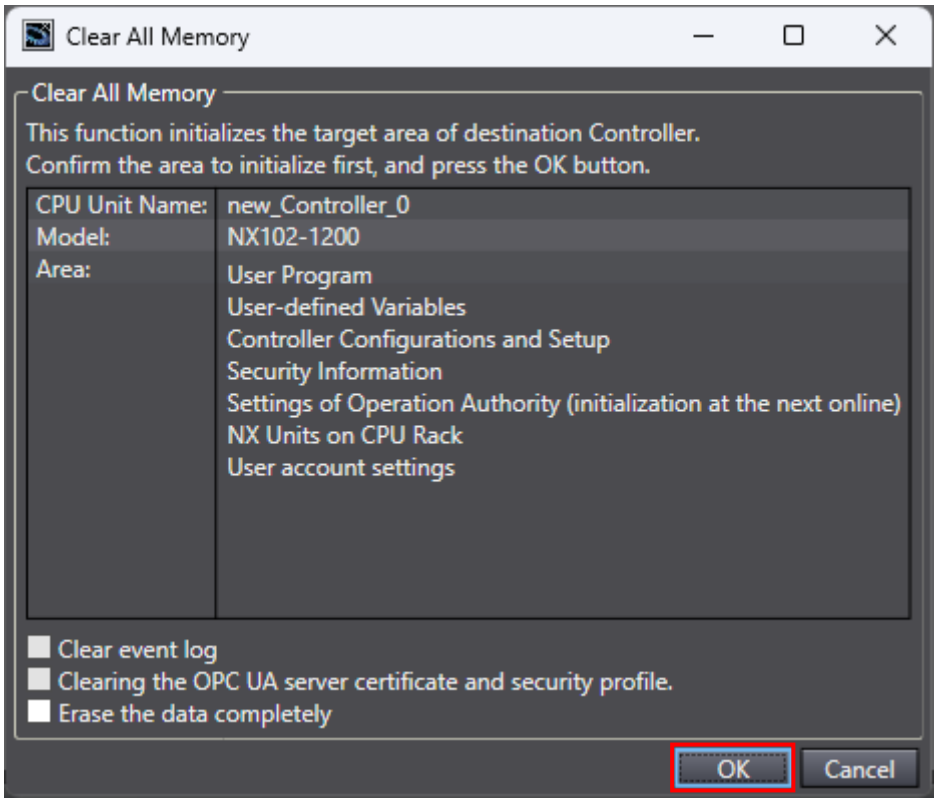
*The value of *Current position (pulse)* may vary depending on the ABSODEX Driver used.

8. Initialization Method

The setting procedures in this guide are based on the factory default settings.
Some procedures may not be applicable unless you use the devices with the factory default settings.

8.1. Initializing the Controller

To initialize the Controller, initialize the CPU Unit.
With Sysmac Studio, change the operating mode of Controller to PROGRAM mode and select **Clear All Memory** from the **Controller** Menu. When the **Clear All Memory** Dialog Box is displayed, confirm the contents and click **OK**.



8.2. Initializing the CKD ABSODEX Driver

For how to initialize the CKD ABSODEX Driver, refer to *3.5.11. ABSODEX initialization* in the *ABSODEX PC Setting Software AX-Tools INSTRUCTION MANUAL* (SM-A63470-A).

9. Revision History

Revision code	Revision date	Description of revision
01	January 2026	First edition

Note: Do not use this document to operate the Unit.

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Cat. No. P772-E1-01 0126 (0126)