OMRON

Programmable Terminal NA-series

Practices Guide
E3NW-ECT Window

NA5-15[]101[]
NA5-12[]101[]
NA5-9[]001[]
NA5-7[]001[]

Practices

Guide

sysmac
always in control

■ Introduction

This guide provides reference information for the use of E3NW-ECT Window. It does not provide safety information.

Be sure to obtain the NA-series Programmable Terminal User's Manuals, read and understand the safety points and other information required for use, and test sufficiently before actually using the equipment.

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Errors and Omissions

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Contents

1 Related Manuals

The following manuals are related to this manual.

Cat. No.	Model	Manual name
W500	NJ501-[][][][] NJ301-[][][][] NJ101-[][][][]	NJ-series CPU Unit Hardware User's Manual
W501	NX701-[][][][] NJ501-[][][][] NJ301-[][][][] NJ101-[][][][]	NJ/NX-series CPU Unit Software User's Manual
W506	NX701-[][][][] NJ501-[][][][] NJ301-[][][][] NJ101-[][][][]	NJ/NX-series CPU Unit Built-in EtherNet/IP^{TM} Port User's Manual
W505	NX701-[][][][] NJ501-[][][][] NJ301-[][][][] NJ101-[][][][]	NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual
W504	SYSMAC-SE2[][][]	Sysmac Studio Version 1 Operation Manual
W502	NX701-[][][][] NJ501-[][][][] NJ301-[][][][] NJ101-[][][][]	NJ/NX-series Instructions Reference Manual
0969584-7	W4S1-05[] W4S1-03B	W4S1 Switching Hub User's Manual
V117	NA5-15W[][][][] NA5-12W[][][][] NA5-9W[][][][] NA5-7W[][][][]	NA-series Programmable Terminal Hardware User's Manual
V118	NA5-15W[][][][] NA5-12W[][][][] NA5-9W[][][][] NA5-7W[][][][]	NA-series Programmable Terminal Software User's Manual
V119	NA5-15W[][][][] NA5-12W[][][][] NA5-9W[][][][] NA5-7W[][][][]	NA-series Programmable Terminal Device Connection User's Manual
V120	NA5-15W[][][][] NA5-12W[][][][] NA5-9W[][][][] NA5-7W[][][][]	NA-series Programmable Terminal Startup Guide
E429	E3NW-ECT	E3NW-ECT EtherCAT® Digital Sensor Communication Unit Operation Manual

2 Precautions

(1) When building an actual system, check the specifications of the component devices of the system, use within the ratings and specified performance, and implement safety measures such as safety circuits to minimize the possibility of an accident.
(2) For safe use of the system, obtain the manuals of the component devices of the system and check the information in each manual, including safety precautions, precautions for safe use.
(3) It is the responsibility of the customer to check all laws, regulations, and standards that the system must comply with.
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(5) The information in this guide is current as of April 2015.
No patent liability is assumed with respect to the use of the information contained herein. Moreover, because OMRON is constantly striving to improve its high-quality products, the information contained in this guide is subject to change without notice.
(6) The operation of each design template has been tested using the device configuration indicated in *section 4-1* of this guide. The display operation after incorporation of the templates is not guaranteed.

Special information in this document is classified as follows:

Precautions for Safe Use

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

Precautions for Correct Use

Indicates 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.

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3 Introduction

This guide explains how to operate the E3NW-ECT Window for NA.

For descriptions of terms used for the template screens, refer to the relevant manual supplied with the sensor amplifier being used.

3-1 Provided Files

The following project files are provided.

Use an appropriate file according to the screen size of the NA.

·E3NW_NA_9inch.smc2 ···················Project file for 7-inch/9-inch screen

·E3NW_NA_12inch.smc2 ················ Project file for 12-inch/15-inch screen

Ask your OMRON representative for information on how to obtain the files.
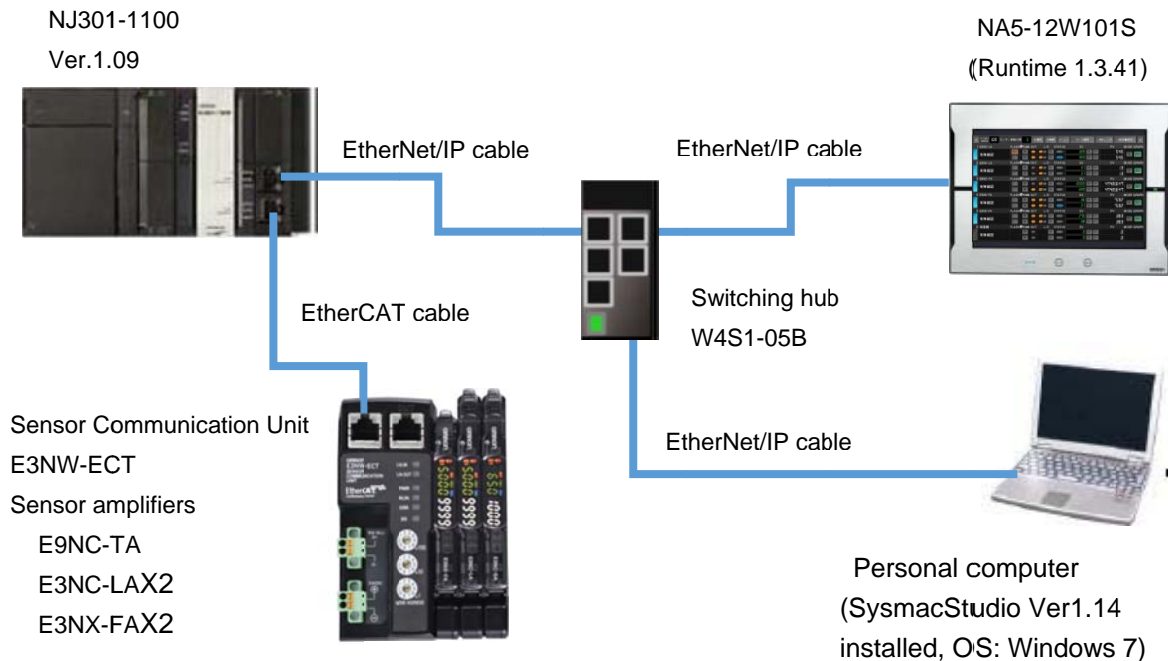
Precautions for Correct Use

The provided project files and this guide are samples for sales promotions.

The operation of the devices incorporated has been tested, however, must be checked by the user as the specifications described in this guide is not guaranteed by Omron.

4 Applicable Devices and System Configuration

4-1 Device Configuration

OMRON implemented the operation check using the following equipment.

NJ301-1100
Ver.1.09

NA5-12W101S
(Runtime 1.3.41)

EtherNet/IP cable

EtherNet/IP cable

EtherCAT cable

Switching hub
W4S1-05B

Sensor Communication Unit
E3NW-ECT
Sensor amplifiers
  E9NC-TA
  E3NC-LAX2
  E3NX-FAX2

EtherNet/IP cable

Personal computer
(SysmacStudio Ver1.14
installed, OS: Windows 7)

Manufacture	Name	Model	Version
OMRON	CPU Unit	NJ301-1100	Ver 1.09
OMRON	Power Supply Unit	PA3001	
OMRON	Programmable Terminal	NA5-12W101S	Runtime 1.3.41 OS 4.2.1
OMRON	SysmacStudio		Ver1.14
	PC (OS Windows7)		
OMRON	Sensor Communication Unit	E3NW-ECT	
OMRON	Sensor amplifier	E9NC-TA	
OMRON	Sensor amplifiers X2	E3NC-LA	
OMRON	Sensor amplifiers X2	E3NX-FA	
	EtherNet/IP cable X3		
	EtherCAT cable		
	Switching hub	W4S1-05B	

📖 Additional Information

This guide provides the procedure of the 3NW-ECT Window for NA.
For information on how to connect the NJ to NA, refer to *Section 6 Online Connections to a Controller* in the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

Additional Information

For information on how to connect the NJ to E3NW via EtherCAT, refer to the *NJ/NX-series CPU Unit Built-in EtherCAT® Port User's Manual* (Cat. No. W505) and the *E3NW-ECT EtherCAT® Digital Sensor Communication Unit Operation Manual* (Cat. No. E429).

4-2 System Specifications

This section describes the system specifications of this project.

Target	Model	Remarks
CPU	NJ-series	
HMI	NA5-series	7,9,12,15 inch supported.
Communication Unit	E3NW-ECT	Possible to use E3NW-DC (Distributed Unit).
Sensor amplifier	E3NX-FA Fiber Amplifier E3NC-LA Laser Amplifier E3NC-SA Laser Amplifier (CMOS) E3NC-TA Contact Amplifier	Applicable sensor head E32 -series Applicable sensor head E3NC-LH -series Applicable sensor head E3NC-SH -series Applicable sensor head E9NC-TH -series

Monitorable range on the screen.

Function	Monitorable range	Remarks
No. of nodes	1 to 192 The specified 1 node is displayed. Node 100 is used in this project file.	To monitor, enter a node No. to be monitored.∗1 The variables for 2 nodes such as node 100 and 101 are registered in this project file.
No. of Units	1 to 24 sensor amplifiers can be connected.	Unit No.25 to 30 cannot be allocated in this project file. There is no restriction on the connected position of each sensor amplifier.

∗1: When multiple Communication Units are connected, a program of the project file needs to be changed.

Monitorable and settable items on the screen.

Function	Input port	Target
Model name of connected sensor amplifier for each unit	-	-
Flashing function	1 / 2	-
Input port ON/OFF status monitor	1 / 2	-
Input port Light ON / Dark ON operation setting monitor/ setting	1 / 2	∗1
Smart tuning function	1 / 2	Setting all/ individual setting
Threshold (SV value) monitor/ setting ∗2	1 / 2	∗1
Incident light (PV value) monitor	1	-
ST DPC status monitor	-	-
Sensor detail setting	1 / 2	Setting all/ individual setting
Trend graph and change recording log (latest 30 logs)	1	-
For setting all, select all/clear all of sensor amplifiers	-	-
For setting all, individual select/individual clear of sensor amplifier	-	-

∗1: "Setting all" can be set on dedicated screens.

∗2: Setting can be changed with [+][-]key or numeric keypad.

Pop-up for EtherCAT NODE switching

Function	Remarks
Switches a node No. to be monitored. (a numeric keypad is used to change setting)	Displays a list of node No. connected in the system (up to 21 nodes).

Pop-up for language switching

Function	Remarks
Switches a display language.	Japanese, English, Chinese (Simplified), and Korean are supported.

Detailed settings screen (setting all/ individual setting)

Function	Remarks
Sets each function to the selected sensor amplifier.	The screen of "individual setting" shows the current settings (each button lamp turns on). The screen of "setting all" turns on each lamp button only when the corresponding function is selected.

Select tuning function screen (setting all/ individual setting)

Function	Remarks
Performs each tuning to the selected sensor amplifier.	There is no difference in function between individual setting and setting all. Since tuning functions vary depending on the model of sensor amplifiers, make sure that the same model of sensor amplifier is selected when performing the tuning all.

Settings selection display, Select workpiece screen

Function	Remarks
Reads the settings of the selected sensor amplifiers (Settings Selection Display) or all the connected sensor amplifiers (Select workpiece screen) into the PLC memory, or writes to amplifier.	"Settings Selection Display" is moved from "Detailed Settings Screen 1". "Select workpiece screen" is moved from the "Monitor screen".

Trend graph screen

Function	Remarks
Displays the incident light (PV-value) and threshold (SV-value) of the selected sensor amplifiers as a graph.	Only input 1 of the incident light (PV-value) and threshold (SV-value) can be displayed as a trend graph.

📓 Additional Information

For details on how to monitor and set each screen, refer to Section 6 *External Specifications of E3NW-ECT Window (for NJ)* in this guide.

4-3 Examples of Connecting Sensor Amplifiers

The connections as shown in the following examples are used in this project.

▣ Precautions for Correct Use
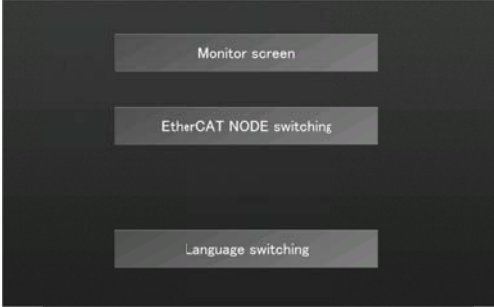
When this project is used, there is no restriction on installation position of sensor amplifiers. When changing PDO mappings and connecting 25 or more sensor amplifiers, they need to be within the mapping memory range, for instance, by limiting the connected position of the sensor amplifiers to be monitored.

Example 1

Example 2
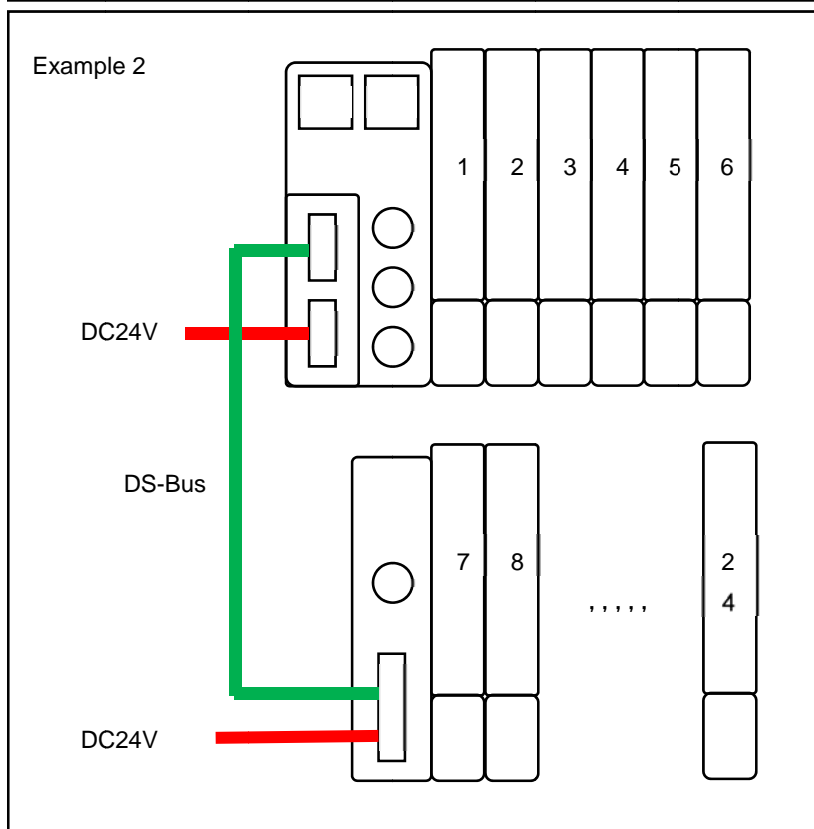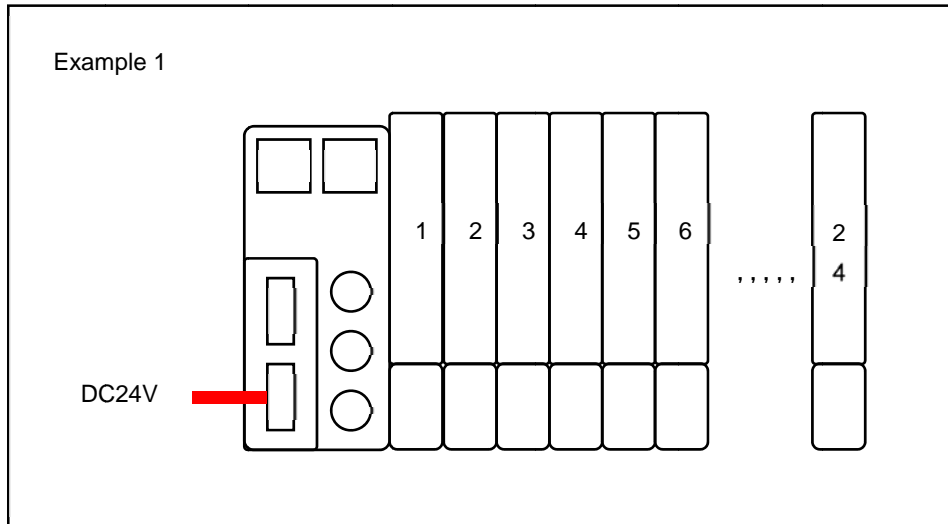
5 E3NW-ECT Window (for NJ)

5-1 Description of screens

This section describes the overview of each screen.

Menu screen	Pop-up for EtherCAT NODE switching
After the power is turned ON, this menu screen appears. Pages can be changed by clicking each item button.	Displays a node No. to be monitored as well as a list of node No. connected to the Controller.
Pop-up for language switching	Monitor screen
Switches a display language in the project.	Displays the status of the sensor amplifiers connected to the E3NW-ECT Communication Unit.
Detailed Settings Screen	Settings Selection Display
Displays and sets the status of each function to the selected sensor amplifier.	Reads and writes the status of the selected sensor amplifiers into 8 memory areas.
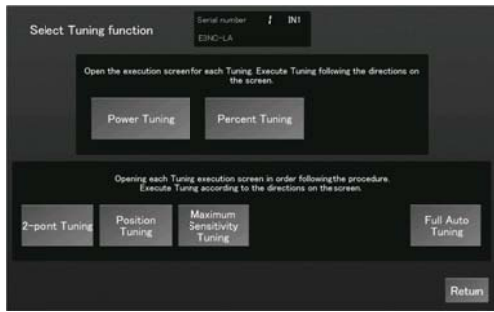
Select Tuning Function screen	Trend Graph Screen
Performs each tuning to the selected sensor amplifier.	Displays the status of the selected sensor amplifiers as a trend graph.
Setting all Detailed Settings Screen	Setting all thresholds and selecting all targeted serial numbers
Executes each setting to the multiple sensor amplifiers selected on the monitor screen at once.	Selects sensor amplifiers to be targeted for all settings.
Select all tuning function	Select workpiece screen
Executes each tuning to the multiple sensor amplifiers selected on the monitor screen at once.	Reads and writes the status of all the sensor amplifiers, which are connected to the E3NW-ECT Communication Unit, into 8 memory areas.
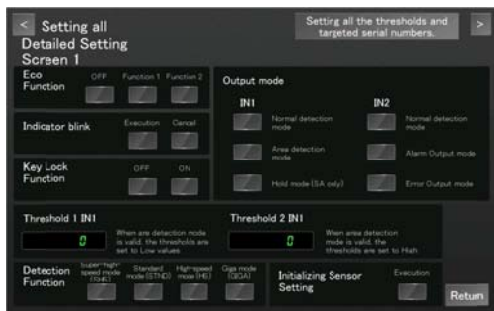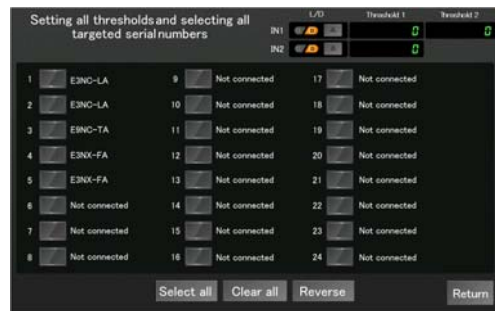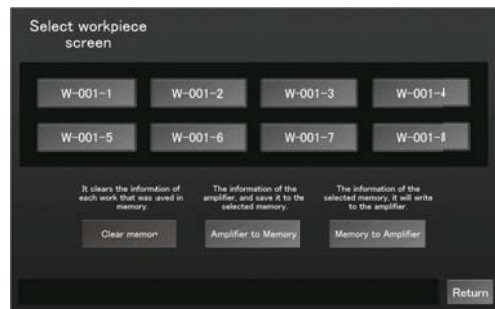
5-2 Transition of Screens

This section shows diagram of screen transition.

Monitor screen

Menu screen (Initial screen)

Pop-up for EtherCAT NODE switching

Pop-up for language switching

Select all tuning function

Select workpiece screen

Setting all Detailed Setting Screen

Monitor screen

Menu screen

Trend Graph Screen

Detailed Settings Screen

Select Tuning Function

Monitor screen

Detailed Settings Screen 1

Settings Selection Display

Monitor screen

Detailed Settings Screen 2

Monitor screen

Detailed Settings Screen 3

Monitor screen

Detailed Settings Screen 4

📖 Additional Information

Press the "Return" button on each [Detailed Settings Screen] to back to [Monitor screen]. [Detailed Settings Screens 2 and 4] show corresponding displays depending on the selected sensor amplifier.

Monitor screen

Trend Graph Screen

Displaying Trend graph log

📖

Additional Information

Press the "Return" button on each [Trend graph screen] to back to [Monitor screen].

Monitor screen

Setting all Detailed Setting Screen 1

Setting all thresholds and selecting all targeted serial numbers

Setting all Detailed Setting Screen 2

Monitor screen

Setting all Detailed Setting Screen 3

Monitor screen

Setting all Detailed Setting Screen 4

Monitor screen

Monitor screen

Select all Tuning functions
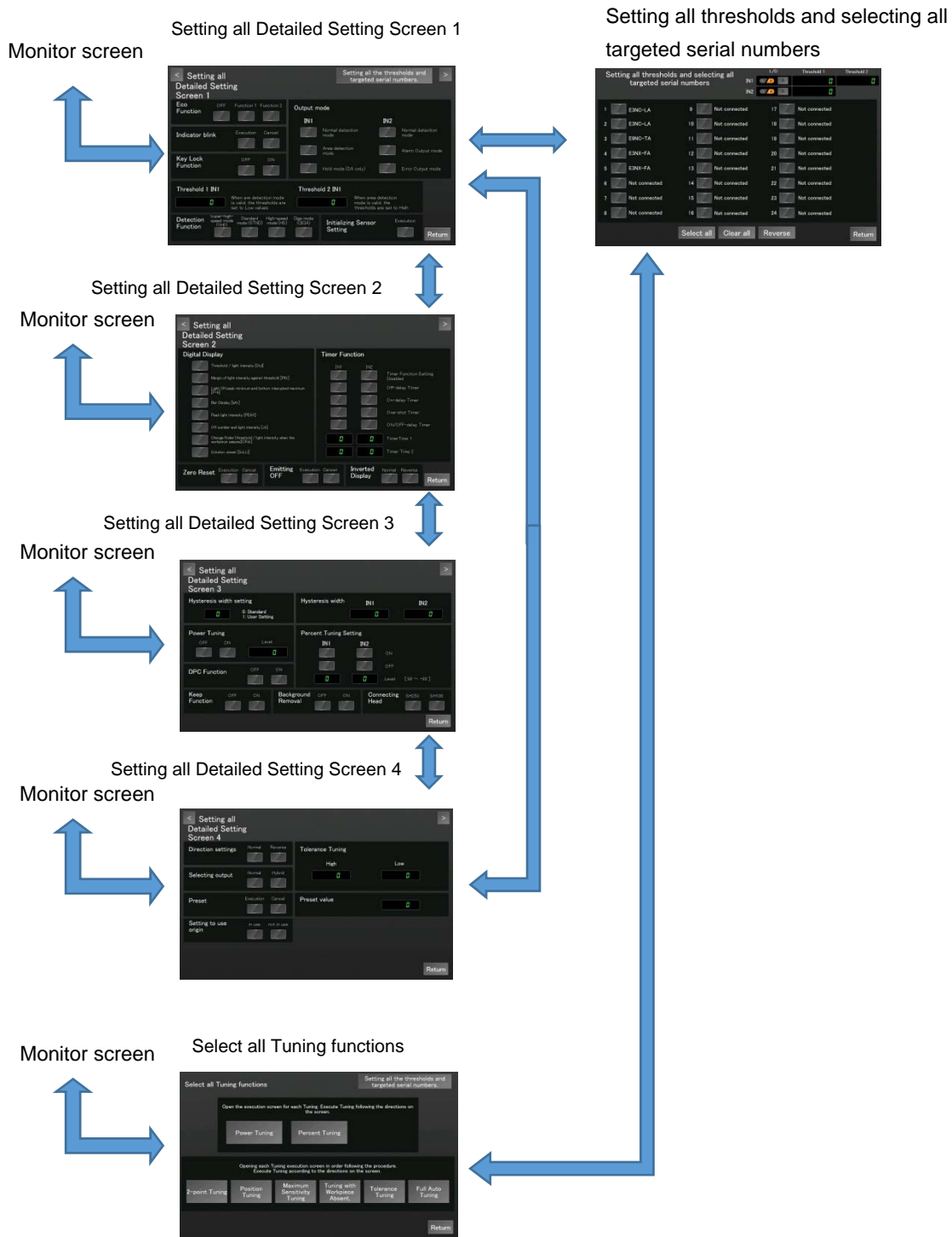
📖 Additional Information

Press the "Return" button on each [Setting all Detailed Settings Screen] or [Select all tuning functions] to back to [Monitor screen].

You can move to [Setting all thresholds and selecting all targeted serial numbers] from [Setting all Detailed Settings Screen] or [Select all tuning functions].

Press the "Return" button to go back to the previous screen.

Monitor screen

Select Tuning Function screen

or

Select all Tuning functions
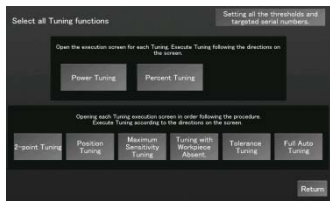
Power Tuning

Percent Tuning

2-point Tuning (Point 1)   2-point Tuning (Point 2)

Position Tuning   (Executing) Position Tuning
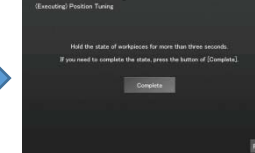
Maximum Sensitivity Tuning   (Executing) Maximum Sensitivity Tuning
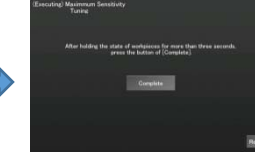
Full Auto Tuning   (Executing) Full Auto Tuning
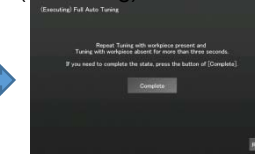
Execute Tolerance Tuning   (Executing) Execute Tolerance Tuning
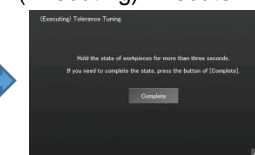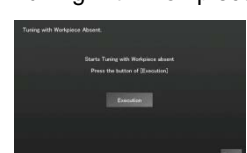
Tuning with Workpiece Absent   (Executing) Tuning with Workpiece Absent
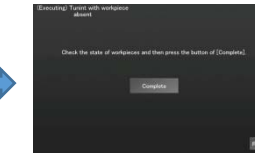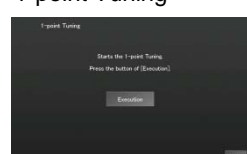
1-point Tuning   (Executing) 1-point Tuning
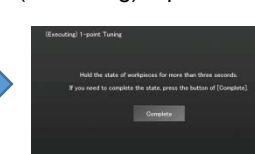
Additional Information

After tuning, [Monitor screen] is automatically displayed.

Or you can press the "Return" button to go back to [Monitor screen].

6 External Specifications of E3NW-ECT Window (for NJ)

This section describes the display of each screen and procedure in this project.
Make sure that the devices are connected as indicated in *section 4-1* before operating each screen. If the device is connected incorrectly, turn OFF the power to each device and connect them as indicated in *section 4-1.*

6-1 Menu Screen

After the power is turned ON, the following screen appears.
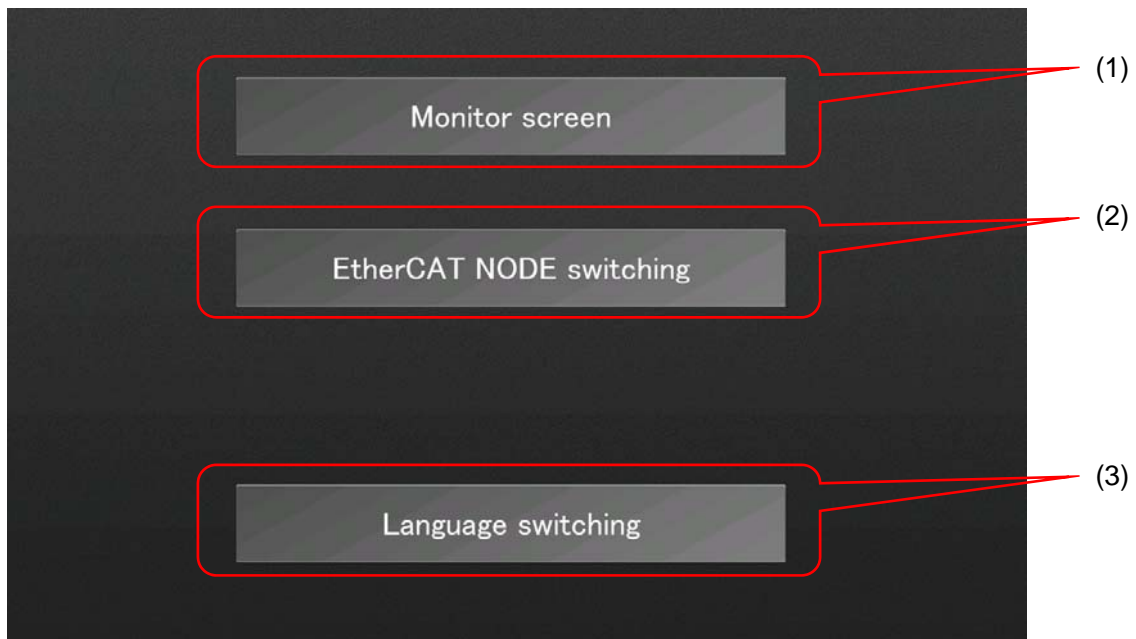
No.	Function	Description
(1)	"Monitor screen" button	Moves to the screen that displays and controls information for all sensor amplifiers that are connected to the E3NW-ECT Communication Unit.
(2)	"EtherCAT NODE switching" button	Displays a pop-up screen for EtherCAT NODE switching.
(3)	"Language switching" button	Displays a pop-up screen for language switching.

6-2 Monitor Screen

This monitor screen allows you to display and change the status of sensor amplifiers that are connected to the E3NW-ECT Communication Unit.

Up to 6 sensor amplifiers can be displayed per page.

No.	Function	Description
(1)	Sensor information	Displays and controls information for each sensor amplifier. For the details, see the next page.
(2)	Node address	Indicates a node address of the displayed slave.
(3)	Number of the sensors	Displays No. of the connected sensors and the status.
(4)	Button for all selection (Select all, Clear all)	Selects and clears all sensor amplifiers targeted for all settings (tuning, detail setting).
(5)	"Menu" button	Moves to the Menu screen.
(6)	"Select a workpiece" button	Moves to the Select workpiece screen.
(7)	"Tuning all" button	Moves to the Select all tuning function.
(8)	"All Detailed Settings" button	Moves to Setting all Detailed Settings Screen.
(9)	<> button	Moves forward or backward one page. (if the first page is showing, the last page will be displayed by pressing this button, and if the last page is showing, the first page will be displayed)
(10)	Button for individual selection (individual select, individual clear)	Selects and clears individual sensor amplifier targeted for all settings (tuning, detail setting).

No.	Function	Object	Description
(1)	Sensor information	-	Displays and controls information for each sensor amplifier.
(2)	Sensor function name	-	Displays a function name of sensor amplifier. (You can assign any function name for each sensor amplifier) A model name of the sensor amplifier is automatiically displayed. (as an example, model names are indicated on the screen)
(3)	Flashing operation	BL	Flashes sensor amplifiers. The button lamp will blink by pressing the button, and the sensor amplifier begins flashing. This is hidden if no sensor amplifier is connected.
(4)	Smart tuning	B	Moves to the Select tuning function screen. The top is for input 1 / The bottom is for input 2
(5)	Input status	L	Displays the status of input ON/OFF. The top is for input 1 / The bottom is for input 2 The color of indicator changes to red when the input is turned ON.
(6)	L_ON/D_ON status and function setting	B	Displays the status of amplifier function (L_ON/D_ON). You can change the operation setting by pressing the "▲" button. This indicator is hidden if no sensor amplifier is connected.
(7)	Status display	L	Indicates the ST LED/DPC LED on the topside of the sensor amplifier.
(8)	Display and change of threshold (SV)	B	Displays and changes the threshold for each input port of the sensor amplifier. The top is for input 1 / The bottom is for input 2 Use the [+]/ [-] keys or a numeric keypad to change the set value. ·The [+] key increments the value, and the [-] key decrements the value. ·As long as the button is held down, a digit to be changed is shifted in order from 1st digit to 10th digit, and then to 100th digit. ·If an unsupported value by the sensor amplifier is input, it will not be displayed properly. ·You can also input a value using the numeric keypad by directly touching in the numerical display part on the screen.
(9)	Display of incident light (PV)	L	Displays the incident light for input 1 of the sensor amplifier. Input 2 is for future expansion.
(10)	Detailed setting	B	Moves to the Detailed settings screen. This is hidden if no sensor amplifier is connected.
(11)	Display of trend graph	BL	Moves to the Trend graph screen for input 1 of the sensor amplifier. This is hidden if no sensor amplifier is connected.

📝 Additional Information

In the "Object" column above, B stands for Button, L for Lamp, and BL for Button Lamp.

6-3 Select Tuning Function Screen

This screen allows you to select a tuning function for each sensor amplifier.
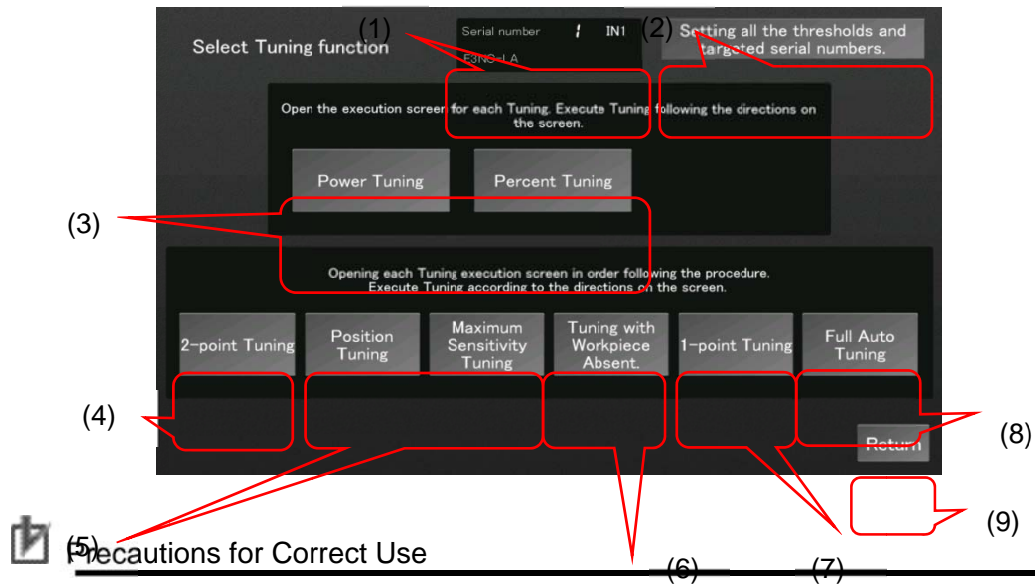
 Precautions for Correct Use

All buttons are shown on the above screen. In actual operation, only settable functions are displayed, depending on the type of sensor amplifiers of the selected unit.

No.	Function	Description	Remarks
(1)	Sensor information	Displays a calling sensor No., input No., and model name.	*1
(2)	"Setting all the thresholds and targeted serial numbers" button	Moves to the Setting all the thresholds and targeted serial numbers.	*2
(3)	"Power Tuning" button "Percent Tuning" button	Displays a screen for each tuning. Follow the direction on the screen to execute tuning.	*3
(4)	"2-point Tuning" button	Displays the tuning screen for point 1. Follow the direction on the screen to execute tuning.	
(5)	"Position Tuning" button "Maximum Sensitivity Tuning" button	Displays the screen 1 for tuning. Follow the direction on the screen to execute tuning.	*3
(6)	"Tuning with Workpiece Absent" button	Displays the screen 1 for tuning. Follow the direction on the screen to execute tuning.	*4
(7)	"1-point tuning" button "Execute Tolerance Tuning" button (when TA selected)	Displays the screen 1 for tuning. Follow the direction on the screen to execute tuning.	*5
(8)	"Full Auto Tuning" button	Displays the screen 1 for tuning. Follow the direction on the screen to execute tuning.	*6
(9)	"Return" button	Returns to the screen of calling sensor.	

*1. This is hidden when setting tuning all.
*2. This is shown when setting tuning all.
*3. This is shown when setting individual tuning while FA/LA amplifier is connected.
*4. This is shown when setting individual tuning while SA amplifier is connected.
*5. This is shown when setting individual tuning while SA / TA / AA amplifier is connected.
    When a TA amplifier is connected, the button name changes to "Execute Tolerance Tuning".
*6. This is shown when setting individual tuning while FA / LA / SA / AA amplifier is connected.

[Tuning functions for each type of sensor amplifier]

		Model					
		FA -series	LA -series	SA -series	TA -series	AA -series	25
Function name	2-point Tuning	OK	OK	OK	OK	OK	2 screens
	Full Auto Tuning	OK	OK	OK	-	OK	2 screens
	Position Tuning	OK	OK	-	-	-	2 screens
	Percent Tuning	OK	OK	-	-	-	1 screen
	Power Tuning	OK	OK	-	-	-	1 screen
	Maximum Sensitivity Tuning	OK	OK	-	-	-	2 screens
	1-point Tuning	-	-	OK	-	OK	2 screens
	Execute Tolerance Tuning	-	-	-	OK	-	2 screens
	Tuning with Workpiece Absent	-	-	OK	-	-	2 screens

Precautions for Correct Use

After a tuning is successfully performed, the subsequent screen or the monitor screen will be displayed. If the operation fails, the following message appears.

Command execution error
It indicates that a sensor does not support this command or cannot execute the command.

Close

Screen for tuning with 2 screens (No.1)

"2-point Tuning" screen
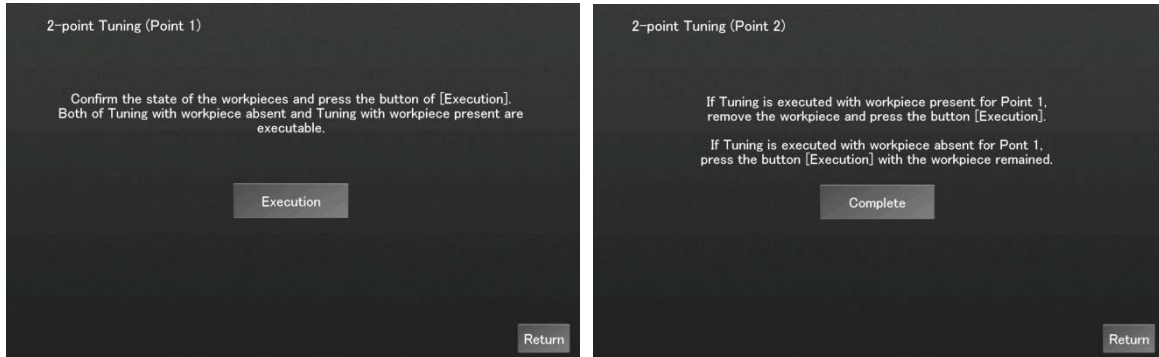
| 2-point Tuning (Point 1) | 2-point Tuning (Point 2) |

Confirm the state of the workpieces and press the button of [Execution].
Both of Tuning with workpiece absent and Tuning with workpiece present are executable.

Execution

Return

If Tuning is executed with workpiece present for Point 1, remove the workpiece and press the button [Execution].

If Tuning is executed with workpiece absent for Pont 1, press the button [Execution] with the workpiece remained.

Complete

Return

Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

"Position Tuning" screen

Position Tuning

Starts the Position Tuning
Press the button of [Execution]

Execution

Return

(Executing) Position Tuning

Hold the state of workpieces for more than three seconds.

If you need to complete the state, press the button of [Complete].

Complete

Return

Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

"Tuning with Workpiece Absent" screen

Tuning with Workpiece Absent.

Starts Tuning with Workpiece absent
Press the button of [Execution]

Execution

Return

(Executing) Tunint with workpiece absent

Check the state of workpieces and then press the button of [Complete].

Complete

Return

Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

Screen for tuning with 2 screens (No.2)

"Full Auto Tuning" screen

Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

"1-point Tuning" screen
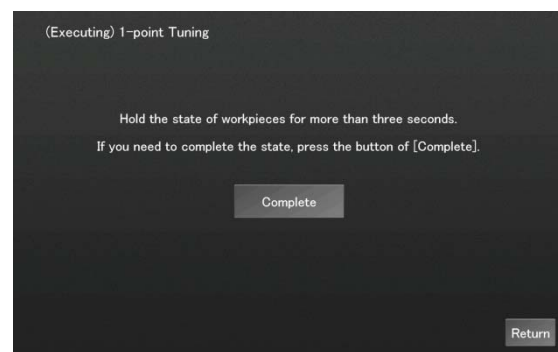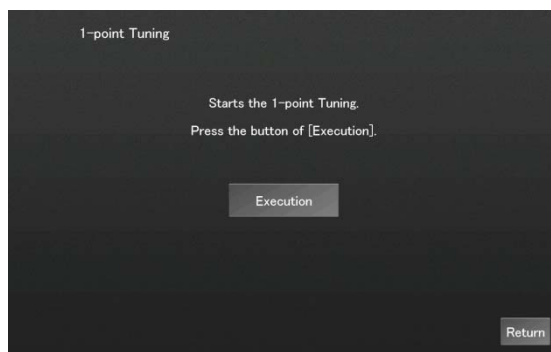
Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

"Maximum Sensitivity Tuning" screen
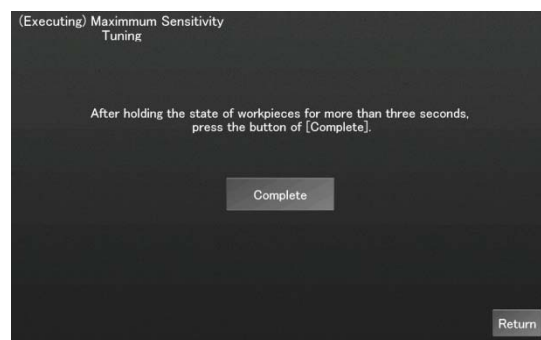
Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

📝 **Additional Information**

Screen for tuning with 2 screens (No.3)

"Execute Tolerance Tuning" screen
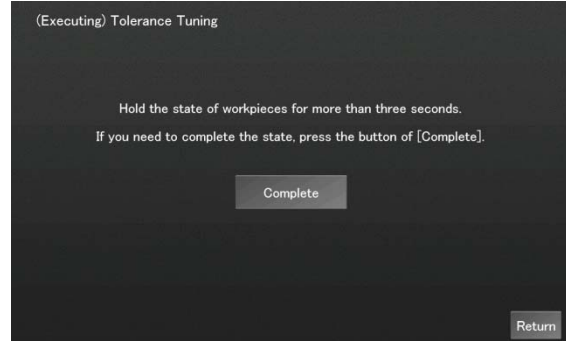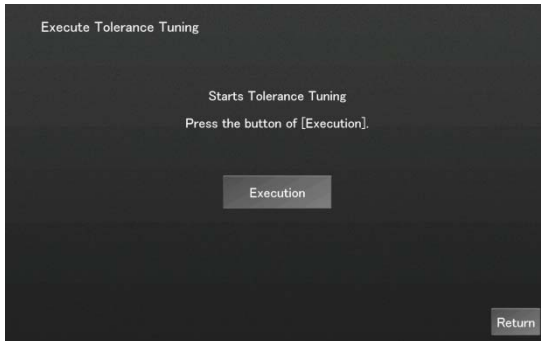
Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

📝 Screen for tuning with 1 screen

"Power Tuning" screen
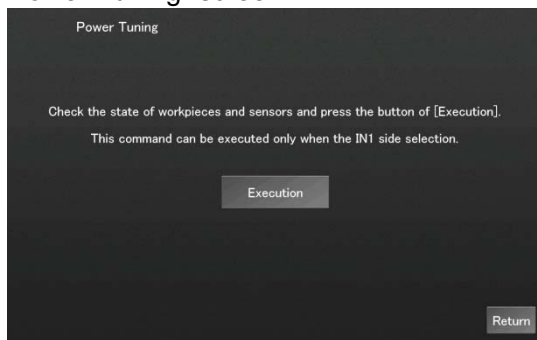
Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

"Percent Tuning" screen
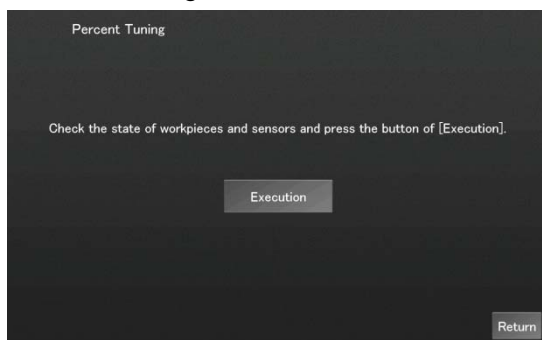
Follow the direction on the screen and press the "Execution" button.

Press the "Return" button to Return to the Monitor screen.

6-4 Select Workpiece Screen

This screen allows you to store various setting information for all the connected sensor amplifiers to the PLC memory. It is also used to write information to the sensor amplifiers.

Additional Information

The button framed in green indicates a memory area in which information is stored.

Select a memory area to perform the operation by pressing a toggle button.

* You cannot select multiple buttons simultaneously.

First release the button currently being selected, and then select another button.

With the select workpiece, the following information can be stored to the memory or written to the amplifiers.

・Threshold 1　Input 1, Input 2	・Threshold 2　Input 1	・Operation mode
・Detection function	・Timer function	・Timer time 1
・Timer time 2	・Zero reset	・Hold mode function
・Percent tuning setting	・Percent tuning level	・DPC function
・Power tuning setting	・Power tuning level	・Output mode
・Hysteresis width setting	・Hysteresis width 1	・Hysteresis width 2

Information of all the connected sensor amplifiers is read/written in order.

If a dummy unit exists between the sensor amplifiers, a position of the unit is not read.

No.	Function	Description
(1)	"Memory registration area" button	Specifies an area in which you want to store memory on the PLC . 8 memory areas are provided.
(2)	Operation button	Performs the operation to the specified memory area.
		Procedures) Select an area and press the operation button. After pressing the "Amplifier to Memory" or the "Memory to Amplifier" button, a message and the operation progress counter will be displayed in the status display area. This processing is done when the message disappears after the counter completes counting all the connected Units.
(3)	"Clear memory" button	Clears the stored memory information.
		Procedures) Select an area and press the operation button. After pressing the "Clear memory" button, the following message appears. Press the "Yes" button to clear the memory. This processing is done after the selected status is cleared.
(4)	"Return" button	Returns to the calling screen.

6-5 Detailed Setting Screen 1

This screen allows you to display the current value of the eco function, key lock function, output mode, detection function, and to change these settings. It also sets the threshold 1 and 2, and performs the indicator blink and initializes sensor setting.

Function	Object	Description
> button	B	Moves to the Detailed Settings Screen 2 (Moves to the Detailed Settings Screen 3 for a certain model of amplifiers).
< button	B	Moves to the Detailed Settings Screen 4(Moves to the Detailed Settings Screen 3 for a certain model of amplifiers).
"Return" button	B	Return to the Monitor screen.
Eco function	BL	Displays the status of current setting.
Key lock function	BL	The indicator in blue indicates the current setting.
Output mode	BL	If a lights-off button is pressed, the setting changes, and the changed button will
Detection function	BL	light blue.
Indicator blink	B	Executes each operation.
Initializing sensor setting	B	This instruction cannot indicate the status (i.e. lightning in blue).
Threshold 1	-	You can change the set value using a numeric keypad that is displayed by
Threshold 2	-	clicking in the numerical display area.
"Selecting setting" button	B	Moves to the Settings Selection Display.

📖 Additional Information

On the top of the screen, the status of the selected sensor amplifier is displayed.
You cannot change the set value there.

The example screen above shows all the function buttons that can be set on the screen.
In actual operation, function buttons unsettable by the connected sensor amplifiers are not displayed on the screen.

In the "Object" column above, B stands for Button, L for Lamp, and BL for Button Lamp.

📝 Precautions for Correct Use

If selecting, executing, or inputting the functions or values that are not supported by the sensor amplifiers, the following screen appears.

Command execution error
It indicates that a sensor does not support this command or cannot execute the command.

Close

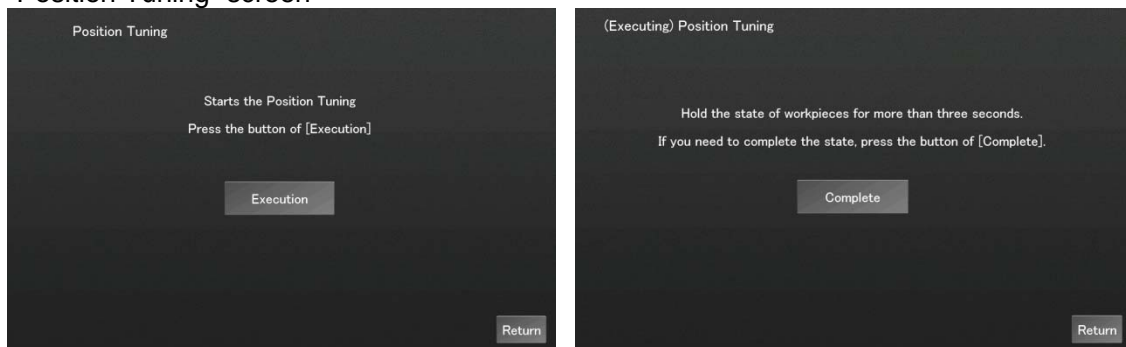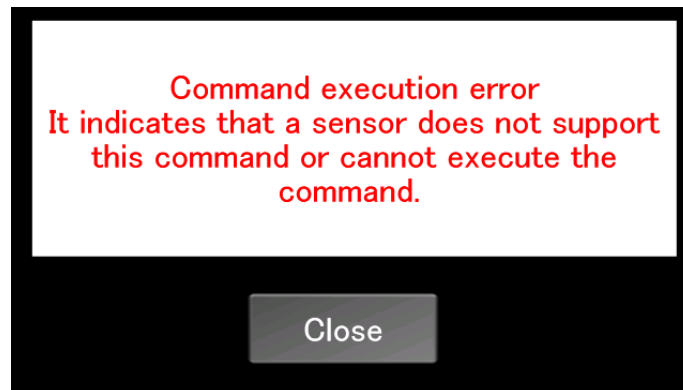In this case,   the setting will not be reflected.

6-6 Detailed Setting Screen 2

This screen allows you to display the current value of the digital display, timer function, inverted display, and to change these settings. It also sets the timer time, and performs the zero reset and emitting OFF.

Function	Object	Description
> button	B	Moves to the Detailed Settings Screen 3.
< button	B	Moves to the Detailed Settings Screen 1.
"Return" button	B	Return to the Monitor screen.
Digital Display	BL	Displays the status of current setting.
Timer Function	BL	The indicator in blue indicates the current setting.
Inverted Display	BL	If a lights-off button is pressed, the setting changes, and the changed button will light blue.
Zero Reset	B	Executes each operation.
Emitting OFF	B	This instruction cannot indicate the status (i.e. lightning in blue).
Timer Time 1	-	Displays the value of current setting.
Timer Time 2	-	You can change the set value using a numeric keypad that is displayed by clicking in the numerical display area.

Precautions for Correct Use

When a TA-series amplifier is selected, the Detailed Settings Screen 2 is not displayed as there is no settable item.

Additional Information

In the "Object" column above, B stands for Button, L for Lamp, and BL for Button Lamp.

6-7 Detailed Setting Screen 3

This screen allows you to display the current values of the percent/ power tuning settings and connecting head, and to change these settings. It also sets the percent, power tuning level, hysteresis width, and executes the DPC function, keep setting, background removal.

Function	Object	Description
> button	B	Moves to the Detailed Settings Screen 4 (Detailed Settings Screen 1 for certain model of amplifiers).
< button	B	Moves to the Detailed Settings Screen 2 (Detailed Settings Screen 1 for certain model of amplifiers).
"Return" button	B	Return to the Monitor screen.
Power tuning setting	BL	Displays the status of current setting.
Percent tuning setting	BL	The indicator in blue indicates the current setting.
Connecting head	BL	If a lights-off button is pressed, the setting changes, and the changed button will light blue.
DPC function	B	Executes each operation.
Keep setting	B	This instruction cannot indicate the status (i.e. lightning in blue).
Background removal	B	
Power tuning level	-	Displays the value of current setting.
Percent tuning level	-	You can change the set value using a numeric keypad that is displayed by
Hysteresis width setting	-	clicking in the numerical display area.
Hysteresis width IN1	-	
Hysteresis width IN2	-	

🗒 Additional Information

The example screen above shows all the function buttons that can be set on the screen. In actual operation, function buttons unsettable by the connected sensor amplifiers are not displayed on the screen.

In the "Object" column above, B stands for Button, L for Lamp, and BL for Button Lamp.

6-8 Detailed Setting Screen 4

This screen allows you to display the current value of the direction setting, selecting output, preset, setting to use origin, and to change these settings. It also sets the execute tolerance tuning high and low, and preset value.

Function	Object	Description
> button	B	Moves to the Detailed Settings Screen 1.
< button	B	Moves to the Detailed Settings Screen 3.
"Return" button	B	Return to the Monitor screen.
Direction setting	BL	Displays the status of current setting.
Selecting output	BL	The indicator in blue indicates the current setting.
Setting to use origin	BL	If a lights-off button is pressed, the setting changes, and the changed button
Preset	BL	will light blue.
Tolerance Tuning High	-	Displays the value of current setting.
Tolerance Tuning Low	-	You can change the set value using a numeric keypad that is displayed by
Preset Value	-	clicking in the numerical display area.

📝 Precautions for Correct Use

On the Detailed Setting Screen 4, you can only change settings of TA-series amplifiers. For this reason, this Detailed Setting Screen 4 can be displayed only when a TA-series amplifier is connected.

📑 Additional Information

In the "Object" column above, B stands for Button, L for Lamp, and BL for Button Lamp.

📝 Precautions for Correct Use

Some sensor amplifiers do not support the functions that can be set on the Detailed Settings Screens 1 to 4.

Detailed Setting Screen 1						
Function	FA	LA	SA	TA	AA	Remarks
Eco function	OK	OK	OK	OK	OK	
Indicator blink	OK	OK	OK	OK	OK	
Key lock function	OK	OK	OK	OK	OK	
Output mode	OK	OK	OK	OK	*2	
Threshold 1 IN1	OK	OK	OK	OK	OK	
Threshold 2 IN1	OK	OK	OK	OK	*2	
Detection function	OK	OK	OK	OK	OK	
Initializing sensor setting	OK	OK	OK	OK	OK	

Detailed Setting Screen 2						
Function	FA	LA	SA	TA	AA	Remarks
Digital display	OK	OK	*1	*2	*1	Including the solution viewer (button key on topside of the amplifier)
Timer Function	OK	OK	OK	*2	*2	
Timer Time 1	OK	OK	OK	*2	*2	
Timer Time 2	OK	OK	OK	*2	*2	
Zero reset	OK	OK	OK	*2	*2	
Emitting OFF	OK	OK	OK	*2	*2	
Inverted display	OK	OK	OK	*2	OK	

Detailed Setting Screen 3						
Function	FA	LA	SA	TA	AA	Remarks
Hysteresis width setting	OK	OK	OK	OK	OK	
Hysteresis width IN1	OK	OK	OK	*2	OK	
Hysteresis width IN2	OK	OK	OK	OK	OK	
Power tuning setting	OK	OK	*2	*2	*2	
Power tuning level	OK	OK	*2	*2	*2	
Percent tuning setting	OK	OK	*2	*2	*2	
Percent tuning level	OK	OK	*2	*2	*2	
DPC function	OK	OK	*2	*2	*2	
Keep setting	*2	*2	OK	*2	*2	
Background removal	*2	*2	OK	*2	*2	
Connecting head	*2	*2	OK	*2	*2	

*1: Some functions that can be set on the screen are not supported by the sensor amplifier.

*2: This function is not supported by the sensor amplifier. Accordingly, corresponding detailed settings screen will not be displayed.

Additional Information

You can display a Setting All Detailed Setting Screen by pressing the "All Detailed Settings" button at the top of the Monitor screen.

Differences from a Detailed Settings Screen, which is moved by pressing the "MODE" button on the Monitor screen of each sensor amplifier, are shown below.

・The sensor status and current value are not highlighted.

・The "Selecting setting" button is not displayed (Detailed Settings Screen1).

・The "Setting all the thresholds and targeted serial numbers" button is displayed (Detailed Settings Screen1).
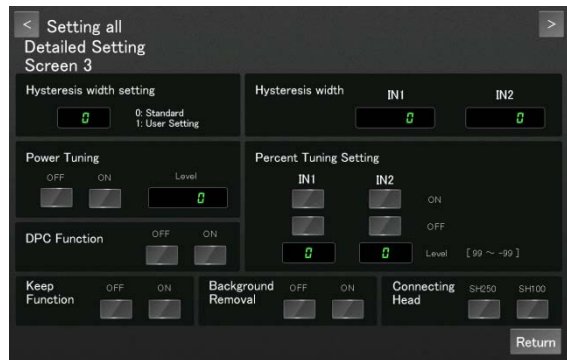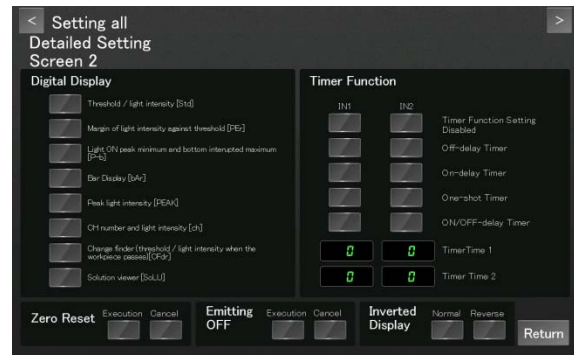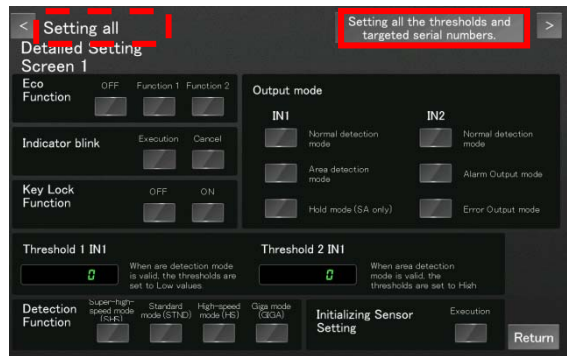
6-9 Settings Selection Display

This screen allows you to store various setting information for the selected sensor amplifier to the PLC memory. It is also used to write information to the sensor amplifier.

Additional Information

The button framed in green indicates a memory area in which information is stored.
Select a memory area to perform the operation by pressing a toggle button.
* You cannot select multiple buttons simultaneously.
  First release the button currently being selected, and then select another button.

With the select workpiece, the following information can be stored to the memory or written to the amplifiers.

·Threshold 1 Input 1, Input 2	·Threshold 2 Input 1	·Operation mode
·Detection function	·Timer function	·Timer time 1
·Timer time 2	·Zero reset	·Hold mode function
·Percent tuning setting	·Percent tuning level	·DPC function
·Power tuning setting	·Power tuning level	·Output mode
·Hysteresis width setting	·Hysteresis width 1	·Hysteresis width 2

On the top of the screen, the status of the selected sensor amplifier is displayed.
You cannot change the set value there.

No.	Function	Description
(1)	"Memory registration area" button	Specifies an area in which you want to store memory on the PLC . 8 memory areas are provided.
(2)	Operation button	Performs the operation to the specified memory area.
		Procedures) Select an area and press the operation button. After pressing the "Amplifier to Memory" or the "Memory to Amplifier" button, a message and the operation progress counter will be displayed in the status display area. This processing is done when the message disappears after the counter completes counting all the connected Units.
(3)	"Clear memory" button	Clears the stored memory information.
		Procedures) Select an area and press the operation button. After pressing the "Clear memory" button, the following message appears. Press the "Yes" button to clear the memory. This processing is done after the selected status is cleared.
(4)	"Return" button	Returns to the calling screen.

6-10 Trend Graph Screen

This screen allows you to display the threshold and incident light of each sensor amplifier as a graph.

No.	Function	Description
(1)	Trend graph screen	Displays the logged data of threshold (SV) and incident light (PV) for each sensor amplifier as a graph.
(2)	Button for collecting graph data	Performs the operation to the specified memory area.
		A button to start the log collection
		This button is automatically tuned ON when the screen is displayed. The indicator on the right side of the screen turns ON while the log is collecting.
		A button to stop the log collection You can use the scroll buttons while the logging is stopped.
(3)	Graph scaling	Changes a graph scaling. You can select from a magnification of X1, X2, X4,X8,X10, and X 50.
(4)	"Log" button	Moves to the Display Trend Graph log screen (see the next page).
(5)	"Return" button	Return to the Monitor screen.

Display TrendGraph log.

Month / day	Peak	Bottom	Peak difference	Bottom difference	Error log
10/30	32	0	1	0	20:11 Peak difference error
10/30	32	0	1	0	20:11 Peak difference error
10/30	32	0	1	0	20:11 Peak difference error
10/30	32	0	1	0	20:11 Peak difference error
10/30	0	30	0	1	20:11 Bottom difference error
10/30	32	0	1	0	20:11 Peak difference error
10/30	0	30	0	1	20:11 Bottom difference error
10/30	32	0	1	0	20:11 Peak difference error
10/30	0	30	0	1	20:11 Bottom difference error
10/30	32	0	1	0	20:11 Peak difference error

(5)

(5)

Return — (6)

No.	Function	Description
(5)	Scroll UP/Down	Scrolls up/down to display data by pressing this button. Press and hold down this button, data can be automatically scrolled up/down by one log.
(6)	"Return" button	Moves to the Trend Graph Screen.

📝 Additional Information

The following data can be logged.
・The maximum peak bottom value that is logged one day before the updated data.
・The peak bottom value at the incident light is determined to be alarmed.

The latest logged data is shown at the bottom.

The most recent 30 logs can be monitored.

Concept of alarm
peak/bottom difference

Peak

Alarm range
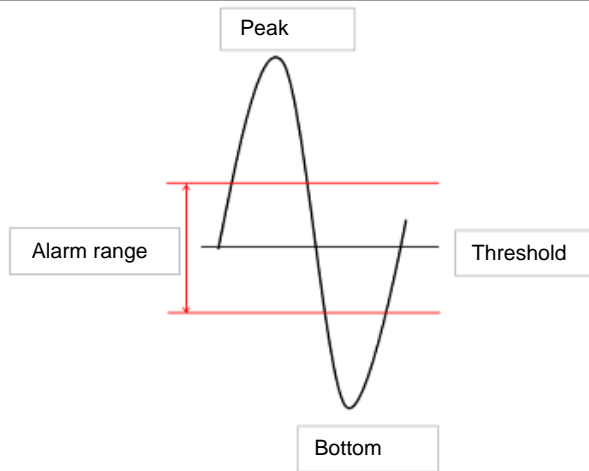
Threshold

Bottom

Alarm range:
A value falls below either
"Difference between
threshold and peak" or
"Difference between
threshold and bottom"

Judgment example)

"Difference between peak and threshold"
/Threshold
Example)
(9000-5000)/5000=0.8⇒80%OK
(7500-5000)/5000=0.5⇒50%OK
(5200-5000)/5000=0.04⇒4%NG

Peak

Alarm value: 5500

Threshold: 5000

Value for judgement: 4500

Alarm range

Bottom

For example, if alarm warning is
performed when threshold is 5000 and
at±10%.

Alarm is output when threshold is in range
from 4500 to 5500.

"Difference between threshold and bottom"
/Threshold
Example)
(5000-100)/5000=0.98⇒98%OK
(5000-3000)/5000=0.4⇒40%OK
(5000-4900)/5000=0.02⇒2%NG

* Once the above condition is met even for a short time, alarm is output but the error status is not
maintained.
 Note)
・When a value falls within the alarm range, error log is output, and the indicator color on the main screen
 changes to yellow. If the value goes to the normal range shortly afterward, the indicator returns to green
 which shows the normal status.
・An error log is output only once when the value goes into the alarm range from the normal range.

6-11 Setting All Thresholds and Selecting All Targeted Serial Numbers

This screen allows you to set all thresholds and operation modes.
It is also used to select all units targeted for the operation.
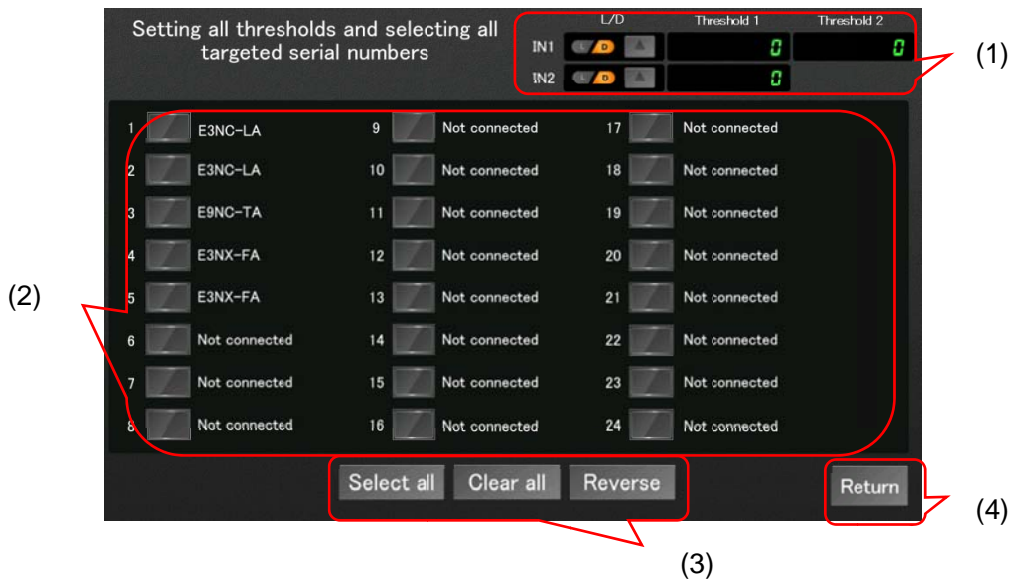
No.	Function	Object	Description
(1)	Input all thresholds and operation mode	B L	Sets the threshold and operation mode of each input. ・To input a threshold, use a numeric keypad that is displayed by touching in the numerical display area. ・To change the operation mode, press the ▲ button.
(2)	Selection of all targeted units	B	Selects/unselects units by pressing the unit No. button. When selecting units, refer to the model name of the connected amplifier appeared next to the unit No. button.
(3)	Function button	B	Performs the operation stated on the button to the selected units. ・The "Select all" and "Reverse" operations are not performed to the disconnected unit. ・If a dummy unit is set, "Not connected" is displayed.
(4)	"Return" button	B	Returns to the calling screen (Setting all Detailed Settings Screen 1/Select all tuning function).

🗒 Precautions for Correct Use

When a disconnected unit is selected, a command error doesn't appear even though a value is set.

Unlike individual setting, all setting does not display the current status of each sensor amplifier. Regardless of threshold for sensor amplifier, D_ON is set for operation mode by default.

When attempting to set the same threshold to another targeted unit, the value cannot be written to the unit simply by pressing the "ENT" key using the numeric keypad. In this case, first press "CLR" key to clear the value, input the same value, and then presses the "ENT" key.

6-12 Pop-up Screen for EtherCAT NODE Switching

This screen allows you to display and change the node address of the EtherCAT slave to be monitored. It is also used to display the node addresses of the EtherCAT slaves that are connected to the Controller.
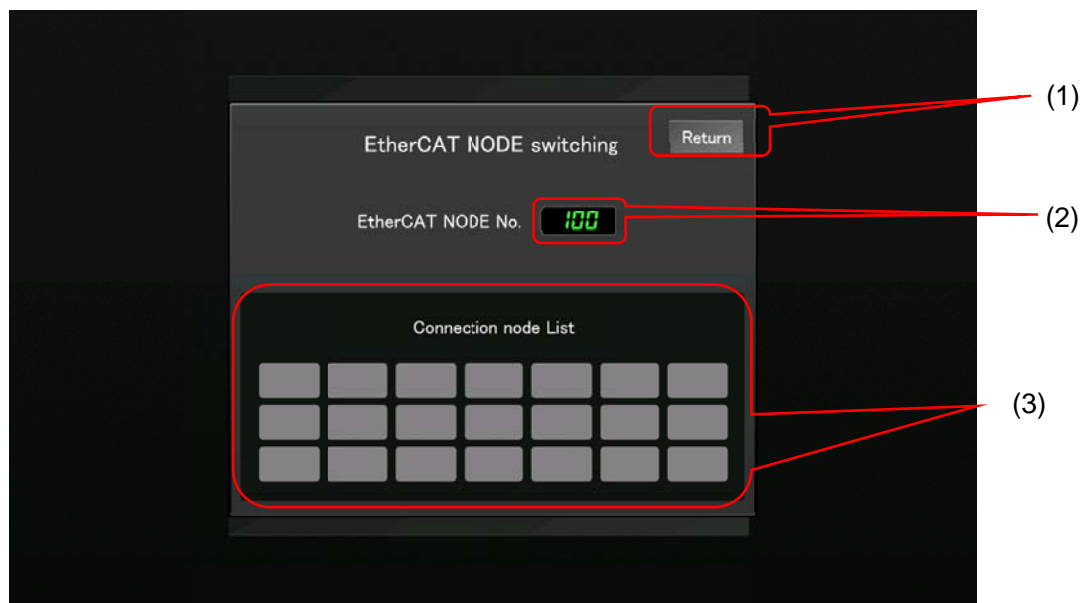
No.	Function	Description
(1)	"Return" button	Closes this screen and returns to the Menu screen.
(2)	Node address	Displays the node address No. to be monitored. You can change the set value using a numeric keypad that is displayed by clicking in the numerical display area. ∗ An error message appears if any value that is outside the range is entered.
(3)	Connection node list	Displays the node addresses of the EtherCAT slaves connected to the Controller. (Up to 21 node addresses can be displayed)

☑ Precautions for Correct Use

Node No. of all the EtherCAT slaves connected to the Controller are displayed in the connection node list.
In some optional environments, EtherCAT slaves other than E3NW-ECT may be contained. Make sure that the set node No. is for E3NW-ECT on the" Configurations and Setup " page in the Sysmac Studio.

6-13 Pop-up Screen for Language Switching

This screen allows you to switch language to be displayed.
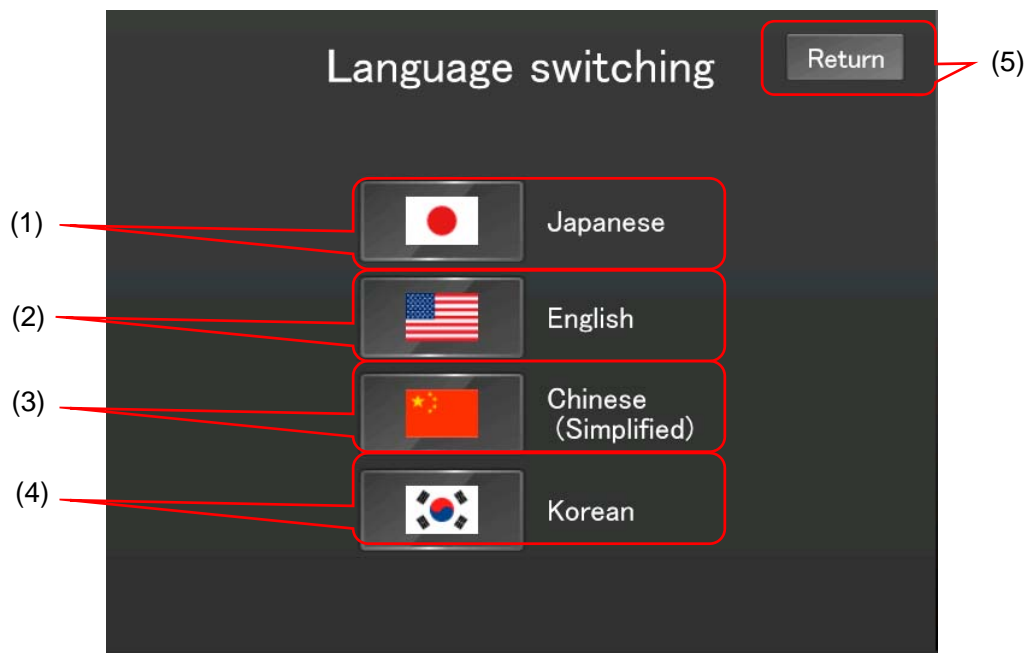
No.	Function	Description
(1)	Japanese	Switches the language on the buttons or labels into Japanese.
(2)	English	Switches the language on the buttons or labels into English.
(3)	Chinese (Simplified)	Switches the language on the buttons or labels into Chinese.
(4)	Korean	Switches the language on the buttons or labels into Korean.
(5)	"Return" button	Closes this screen and returns to the Menu screen.

📖 Additional Information

Select a button of national flag to switch a language.

7 Startup Procedure

This section describes the procedure for connecting the NJ, various types of sensor amplifiers, and NA to use the E3NW-ECT Window.
For the connection configuration, refer to *4-1 Device Configuration*.

7-1 Procedure

Take the following steps to start the system.

6-2 Building the System Configuration	Connect the NJ, sensor amplifiers, and NA with EtherNet cables.
↓	
Connecting the NJ to sensor amplifiers	Connect the NJ to each sensor amplifier via EtherCAT.
↓	
Connecting the NJ to NA	Connect the NJ to NA via the switching hub.
↓	
6-3 Setting and Transferring the Project Data	Transfer the project file to the NJ and NA.
↓	
Starting the Sysmac Studio and importing the project file	Start the Sysmac Studio and import the project file.
↓	
Checking the communication setting and executing the build	Check the communication setting and program for project data and execute the build.
↓	
Connecting online and transferring the project	Connect the Sysmac Studio online and transfer the project data to the NJ and NA.
↓	
Operating the screen	After transferring the project data, check for normal operation of each screen.

7-2 **Building the System Configuration**

This section explains how to connect each device and build the system configuration.

1	Attach Sensor Amplifier Units to the "E3NW-ECT" Sensor Communication Unit.
	After attaching the Sensor Amplifier Units, connect the EtherCAT port of NJ to the "IN" side of the E3NW-ECT port with an EtherNet cable.
3	Connect the NJ to the switching hub.
4	In the same way as step 3, connect the NA to the switching hub. Connect the switching hub to the Ethernet port 1 of NA.
5	Turn ON the power supplies to the NJ, NA, E3NW-ECT, and switching hub.

7-3 Setting and Transferring the Project Data

This section explains how to import, set, and transfer the project data.

1	Start the Sysmac Studio.	
	After starting the Sysmac Studio, click the "Import" button to import a project file.	
3	Select the project file to import. In this example, "E3NW_NA_9inch.smc2" file is selected.	
4	Open the project of the NJ. Select "PLC_NJ3_0" from the pull-down menu of Multiview Explorer.	
5	Check a node address in the EtherCAT Tab Page of the Sysmac Studio, and set the rotary switch of the E3NW-ECT to match the node address of the project. Node address is set to "100" here.	
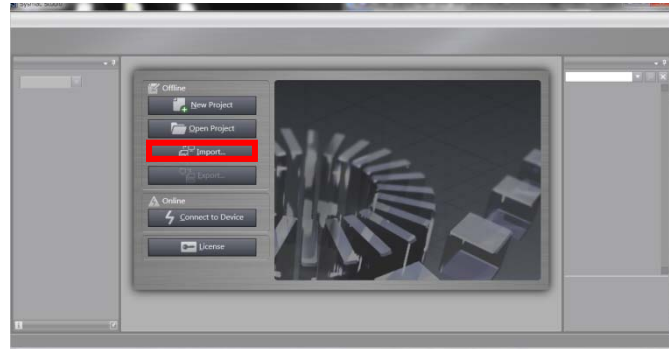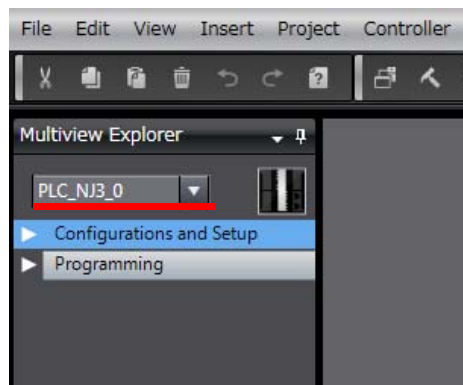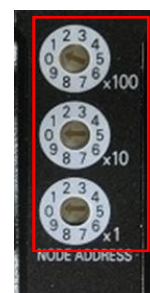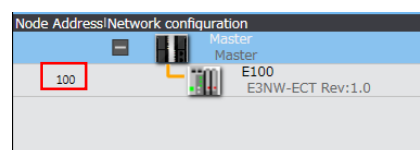
6	Click " Configurations and Setup "->"Controller Setup" ->"Built-in EtherNet/IP Setting" to check the IP address in TCP/IP Settings. IP address is set to "192.168.250.1" here.	
7	Click "Project "->"Build Controller" or press down the "F8" key to execute build and make sure that build ends normally. If a build error occurs, correct the project by following the message displayed in the Build Tab Page, and executes build again.	
8	Connect the NJ online with PC. Select "Synchronization" and click the "Transfer to Controller" button to transfer the project to the NJ. After the transfer, make sure that no error exists in the NJ.	
9	Open the project of the NA. Select " HMI_NA5_0" from the pull-down menu of Multiview Explorer.	
10	Click" Configurations and Setup"->"HMI Settings" to check the IP address in TCP/IP Settings. IP address is set to "192.168.250.2" here.	
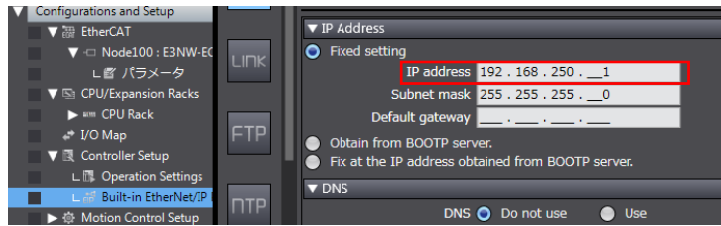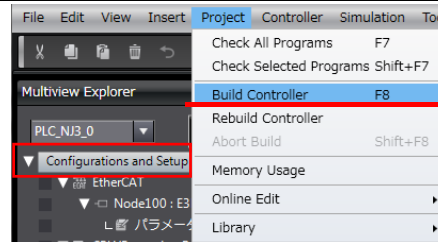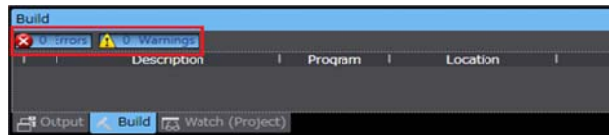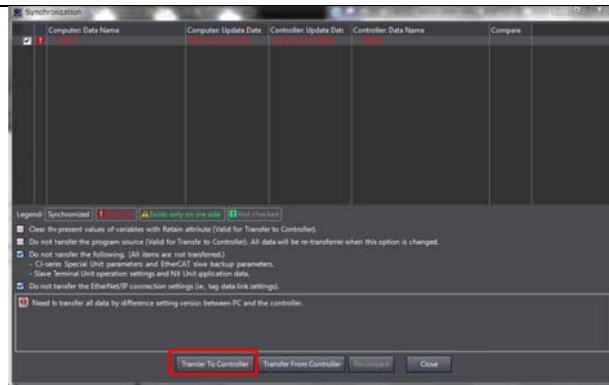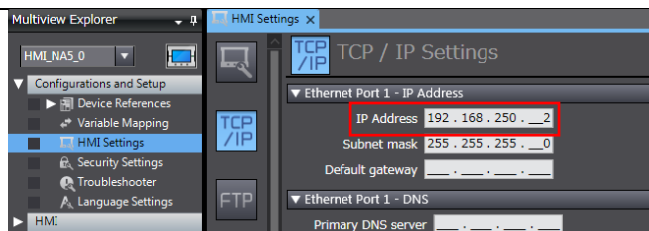
| 11 | Click "Project "->"Build HMI" or press down the "F8" key to execute build and make sure that build ends normally. | |
| | If a build error occurs, correct the project by following the message displayed in the Build Tab Page. | |

| 12 | Click "HMI"->"Online" to connect the NA online with PC.
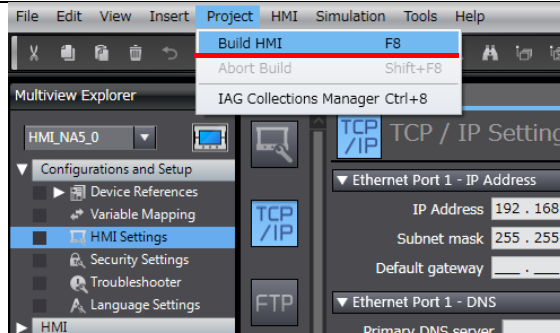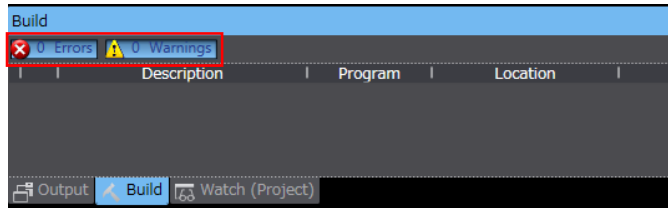
If OS for the NA needs to be updated, a pop-up will appear. Follow the direction to update OS. | |

| 13 | Select "Synchronization" and click the "Transfer to Device" button to transfer the project to the NA.
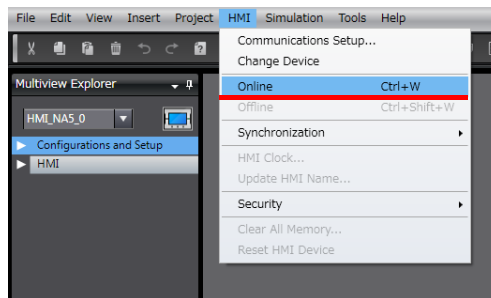
If OS was updated in step 12, connect the NA online with PC again, perform the synchronization, and transfer the project to the NA. | |
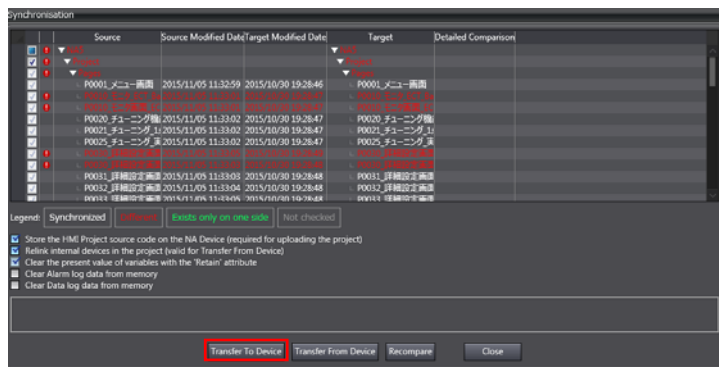
8 Program

8-1 Overview

This section describes details of the programs used in the E3NW-ECT Window project for NA.
All the variables and programs appeared in this section have been set in the project of the NJ.

Precautions for Correct Use

The communication with this program has been checked using the device configuration
indicated in *Section 4-1*; however, the operation is not guaranteed due to variations in the
device performance or possible disturbance such as electrical noise.

· Program configuration
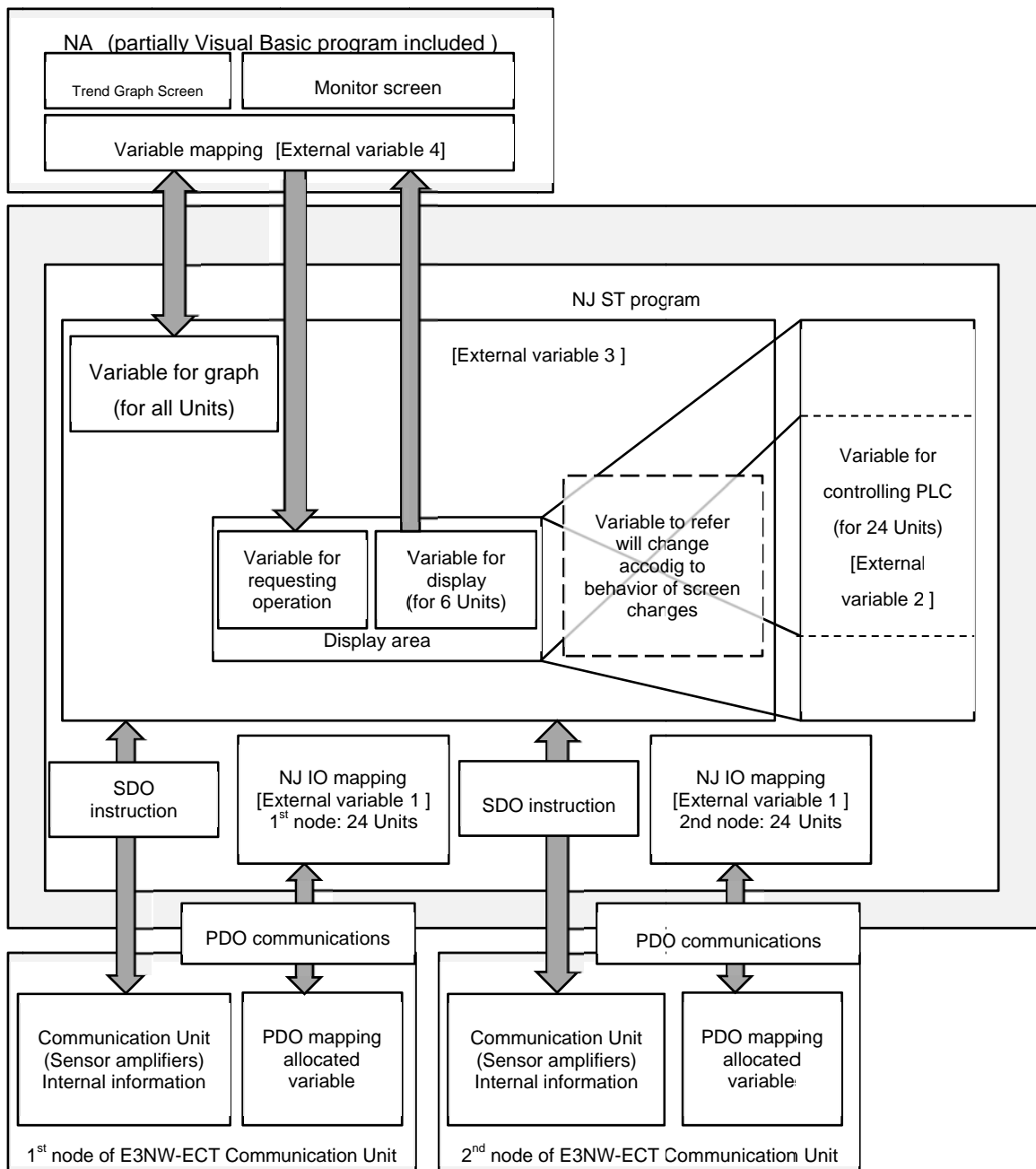
PDO mapping

> The PDO mapping used in this program is given below.

> In addition to the default mapping setting for E3NW-ECT Communication Unit, the sensor detection level for 24 sensor amplifiers (Input 1 only, 4 byte included) are assigned as PV values. This allows the corresponding sensor amplifiers to obtain PV values without depending on the connected position.

No.	PDO mapping to send		Factory setting of Communication Unit	Setting of this program
	No.	PDO entry		
1	257	Read input 1st word	OK	OK
2	258	Read input 2nd word	OK	OK
3	259	Read input 3rd word	-	OK
4	260	Read input 4th word	-	-
5	265	Status of Sensor Communications	OK	OK
6	267	Number of sensors to be set	OK	OK
7	268	Sensor warning status	OK	OK
8	273	Unit No. 01 sensor detection level IN1	OK	OK
9	274	Unit No. 01 sensor detection level IN2	-	-
10	275	Unit No. 02 sensor detection level IN1	OK	OK
11	276	Unit No. 02 sensor detection level IN2	-	-
12	277	Unit No. 03 sensor detection level IN1	OK	OK
13	278	Unit No. 03 sensor detection level IN2	-	-
14	279	Unit No. 04 sensor detection level IN1	OK	OK
15	280	Unit No. 04 sensor detection level IN2	-	-
16	281	Unit No. 05 sensor detection level IN1	OK	OK
17	282	Unit No. 05 sensor detection level IN2	-	-
18	283	Unit No. 06 sensor detection level IN1	OK	OK
19	284	Unit No. 06 sensor detection level IN2	-	-
20	285	Unit No. 07 sensor detection level IN1	OK	OK
21	286	Unit No. 07 sensor detection level IN2	-	-
22	287	Unit No. 08 sensor detection level IN1	OK	OK
23	288	Unit No. 08 sensor detection level IN2	-	-
24	289	Unit No. 09 sensor detection level IN1	-	OK
25	290	Unit No. 09 sensor detection level IN2	-	-
26	291	Unit No. 10 sensor detection level IN1	-	OK
27	292	Unit No. 10 sensor detection level IN2	-	-
28	293	Unit No. 11 sensor detection level IN1	-	OK
29	294	Unit No. 11 sensor detection level IN2	-	-
30	295	Unit No. 12 sensor detection level IN1	-	OK
31	296	Unit No. 12 sensor detection level IN2	-	-
32	297	Unit No. 13 sensor detection level IN1	-	OK
33	298	Unit No. 13 sensor detection level IN2	-	-
34	299	Unit No. 14 sensor detection level IN1	-	OK
35	300	Unit No. 14 sensor detection level IN2	-	-
36	301	Unit No. 15 sensor detection level IN1	-	OK
37	302	Unit No. 15 sensor detection level IN2	-	-
38	303	Unit No. 16 sensor detection level IN1	-	OK
39	304	Unit No. 16 sensor detection level IN2	-	-
40	305	Unit No. 17 sensor detection level IN1	-	OK
No.	PDO mapping to send		Factory setting of Communication Unit	Setting of this program
	No.	PDO entry		

No.			PDO mapping to send	Factory setting of Communication Unit	Setting of this program
	No.		PDO entry		
41	306		Unit No. 17 sensor detection level IN2	-	-
42	307		Unit No. 18 sensor detection level IN1	-	OK
43	308		Unit No. 18 sensor detection level IN2	-	-
44	309		Unit No. 19 sensor detection level IN1	-	OK
45	310		Unit No. 19 sensor detection level IN2	-	-
46	311		Unit No. 20 sensor detection level IN1	-	OK
47	312		Unit No. 20 sensor detection level IN2	-	-
48	313		Unit No. 21 sensor detection level IN1	-	OK
49	314		Unit No. 21 sensor detection level IN2	-	-
50	315		Unit No. 22 sensor detection level IN1	-	OK
51	316		Unit No. 22 sensor detection level IN2	-	-
52	317		Unit No. 23 sensor detection level IN1	-	OK
53	318		Unit No. 23 sensor detection level IN2	-	-
54	319		Unit No. 24 sensor detection level IN1	-	OK
55	320		Unit No. 24 sensor detection level IN2	-	-
56	321		Unit No. 25 sensor detection level IN1	-	-
57	322		Unit No. 25 sensor detection level IN2	-	-
58	323		Unit No. 26 sensor detection level IN1	-	-
59	324		Unit No. 26 sensor detection level IN2	-	-
60	325		Unit No. 27 sensor detection level IN1	-	-
61	326		Unit No. 27 sensor detection level IN2	-	-
62	327		Unit No. 28 sensor detection level IN1	-	-
63	328		Unit No. 28 sensor detection level IN2	-	-
64	329		Unit No. 29 sensor detection level IN1	-	-
65	330		Unit No. 29 sensor detection level IN2	-	-
66	331		Unit No. 30 sensor detection level IN1	-	-
67	332		Unit No. 30 sensor detection level IN2	-	-
68	333		Unit No. 01 threshold 1 IN1	-	-O
69	334		Unit No. 01 threshold 2 IN1	-	-
70	335		Unit No. 01 threshold 1 IN2	-	-O
71	336		Unit No. 02 threshold 1 IN1	-	-O
72	337		Unit No. 02 threshold 2 IN1	-	-
73	338		Unit No. 02 threshold 1 IN2	-	-O
74	339		Unit No. 03 threshold 1 IN1	-	-O
75	340		Unit No. 03 threshold 2 IN1	-	-
76	341		Unit No. 03 threshold 1 IN2	-	-O
77	342		Unit No. 04 threshold 1 IN1	-	-O
78	343		Unit No. 04 threshold 2 IN1	-	-
79	344		Unit No. 04 threshold 1 IN2	-	-O
80	345		Unit No. 05 threshold 1 IN1	-	-O
81	346		Unit No. 05 threshold 2 IN1	-	-
82	347		Unit No. 05 threshold 1 IN2	-	-O
83	348		Unit No. 06 threshold 1 IN1	-	-O
84	349		Unit No. 06 threshold 2 IN1	-	-
85	350		Unit No. 06 threshold 1 IN2	-	-O
86	351		Unit No. 07 threshold 1 IN1	-	-O
87	352		Unit No. 07 threshold 2 IN1	-	-
88	353		Unit No. 07 threshold 1 IN2	-	-O

			Factory setting of Communication Unit	Setting of this program
89	354	Unit No. 08 threshold 1 IN1	-	-O
90	355	Unit No. 08 threshold 2 IN1	-	--
91	356	Unit No. 08 threshold 1 IN2	-	-O-
92	357	Unit No. 09 threshold 1 IN1	-	-O
93	358	Unit No. 09 threshold 2 IN1	-	--
94	359	Unit No. 09 threshold 1 IN2	-	-O-
95	360	Unit No. 10 threshold 1 IN1	-	-O
96	361	Unit No. 10 threshold 2 IN1	-	--
97	362	Unit No. 10 threshold 1 IN2	-	-O-
98	363	Unit No. 11 threshold 1 IN1	-	-O
99	364	Unit No. 11 threshold 2 IN1	-	--
100	365	Unit No. 11 threshold 1 IN2	-	-O-
101	366	Unit No. 12 threshold 1 IN1	-	-O
102	367	Unit No. 12 threshold 2 IN1	-	--
103	368	Unit No. 12 threshold 1 IN2	-	-O-
104	369	Unit No. 13 threshold 1 IN1	-	-O
105	370	Unit No. 13 threshold 2 IN1	-	--
106	371	Unit No. 13 threshold 1 IN2	-	-O-
107	372	Unit No. 14 threshold 1 IN1	-	-O
108	373	Unit No. 14 threshold 2 IN1	-	--
109	374	Unit No. 14 threshold 1 IN2	-	-O-
110	375	Unit No. 15 threshold 1 IN1	-	-O
111	376	Unit No. 15 threshold 2 IN1	-	--
112	377	Unit No. 15 threshold 1 IN2	-	-O-
113	378	Unit No. 16 threshold 1 IN1	-	-O
114	379	Unit No. 16 threshold 2 IN1	-	--
115	380	Unit No. 16 threshold 1 IN2	-	-O-
116	381	Unit No. 17 threshold 1 IN1	-	-O
117	382	Unit No. 17 threshold 2 IN1	-	--
118	383	Unit No. 17 threshold 1 IN2	-	-O-
119	384	Unit No. 18 threshold 1 IN1	-	-O
120	385	Unit No. 18 threshold 2 IN1	-	--
121	386	Unit No. 18 threshold 1 IN2	-	-O-
122	387	Unit No. 19 threshold 1 IN1	-	-O
123	388	Unit No. 19 threshold 2 IN1	-	--
124	389	Unit No. 19 threshold 1 IN2	-	-O-
125	390	Unit No. 20 threshold 1 IN1	-	-O
126	391	Unit No. 20 threshold 2 IN1	-	--
127	392	Unit No. 20 threshold 1 IN2	-	-O-
128	393	Unit No. 21 threshold 1 IN1	-	-O
129	394	Unit No. 21 threshold 2 IN1	-	--
130	395	Unit No. 21 threshold 1 IN2	-	-O-
131	396	Unit No. 22 threshold 1 IN1	-	-O
132	397	Unit No. 22 threshold 2 IN1	-	--
133	398	Unit No. 22 threshold 1 IN2	-	-O-
134	399	Unit No. 23 threshold 1 IN1	-	-O
135	400	Unit No. 23 threshold 2 IN1	-	--
No.		PDO mapping to send	Factory setting of Communication Unit	Setting of this program
	No.	PDO entry		

No.	No.	PDO entry	Factory setting of Communication Unit	Setting of this program
136	401	Unit No. 23 threshold 1 IN2	-	-○--
137	402	Unit No. 24 threshold 1 IN1	-	-○
138	403	Unit No. 24 threshold 2 IN1	-	---
139	404	Unit No. 24 threshold 1 IN2	-	-○--
140	405	Unit No. 25 threshold 1 IN1	-	-
141	406	Unit No. 25 threshold 2 IN1	-	---
142	407	Unit No. 25 threshold 1 IN2	-	--
143	408	Unit No. 26 threshold 1 IN1	-	-
144	409	Unit No. 26 threshold 2 IN1	-	--
145	410	Unit No. 26 threshold 1 IN2	-	-
146	411	Unit No. 27 threshold 1 IN1	-	-
147	412	Unit No. 27 threshold 2 IN1	-	-
148	413	Unit No. 27 threshold 1 IN2	-	-
149	414	Unit No. 28 threshold 1 IN1	-	-
150	415	Unit No. 28 threshold 2 IN1	-	-
151	416	Unit No. 28 threshold 1 IN2	-	-
152	417	Unit No. 29 threshold 1 IN1	-	-
153	418	Unit No. 29 threshold 2 IN1	-	-
154	419	Unit No. 29 threshold 1 IN2	-	-
155	420	Unit No. 30 threshold 1 IN1	-	-
156	421	Unit No. 30 threshold 2 IN1	-	-
157	422	Unit No. 30 threshold 1 IN2	-	-
158	423	Unit No. 01 sensor detection level (4byte)	-	OK
159	424	Unit No. 02 sensor detection level (4byte)	-	OK
160	425	Unit No. 03 sensor detection level (4byte)	-	OK
161	426	Unit No. 04 sensor detection level (4byte)	-	OK
162	427	Unit No. 05 sensor detection level (4byte)	-	OK
163	428	Unit No. 06 sensor detection level (4byte)	-	OK
164	429	Unit No. 07 sensor detection level (4byte)	-	OK
165	430	Unit No. 08 sensor detection level (4byte)	-	OK
166	431	Unit No. 09 sensor detection level (4byte)	-	OK
167	432	Unit No. 10 sensor detection level (4byte)	-	OK
168	433	Unit No. 11 sensor detection level (4byte)	-	OK
169	434	Unit No. 12 sensor detection level (4byte)	-	OK
170	435	Unit No. 13 sensor detection level (4byte)	-	OK
171	436	Unit No. 14 sensor detection level (4byte)	-	OK
172	437	Unit No. 15 sensor detection level (4byte)	-	OK
No.		PDO mapping to send	Factory setting of Communication Unit	Setting of this program
	No.	PDO entry		

173	438	Unit No. 16 sensor detection level (4byte)	-	OK
174	439	Unit No. 17 sensor detection level (4byte)	-	OK
175	440	Unit No. 18 sensor detection level (4byte)	-	OK
176	441	Unit No. 19 sensor detection level (4byte)	-	OK
177	442	Unit No. 20 sensor detection level (4byte)	-	OK
178	443	Unit No. 21 sensor detection level (4byte)	-	OK
179	444	Unit No. 22 sensor detection level (4byte)	-	OK
180	445	Unit No. 23 sensor detection level (4byte)	-	OK
181	446	Unit No. 24 sensor detection level (4byte)	-	OK
182	447	Unit No. 25 sensor detection level (4byte)	-	-
183	448	Unit No. 26 sensor detection level (4byte)	-	-
184	449	Unit No. 27 sensor detection level (4byte)	-	-
185	450	Unit No. 28 sensor detection level (4byte)	-	-
186	451	Unit No. 29 sensor detection level (4byte)	-	-
187	452	Unit No. 30 sensor detection level (4byte)	-	-
188	512	Sysmac error status	OK	OK

📝 Precautions for Correct Use

When changing PDO mappings and connecting 25 or more sensor amplifiers, they need to be within the mapping memory range, for instance, by limiting the connected position of the sensor amplifiers to be monitored.

8-2 Variables to Use

■ Variables to Use
This section lists data types, external variables (user-defined global variables), and internal variables used in this program.

● Data type (structure type)
Data types are registered by the NJ. They also can be used in the NA.

[Amplifier information for controlling inside PLC]

Name	Data type	Description
AMP_Status	STRUCT	A structure of amplifier information
Amp_Name	STRING[30]	A name of amplifier
Name_In1	STRING[30]	Function In1
Name_In2	STRING[30]	Function In2
Led_In1	BOOL	LED In1
Led_In2	BOOL	LED In2
Led_ST	BOOL	LED ST
Led_DPC	BOOL	LED DPC
L_D_Select_In1	BOOL	Function setting IN1
L_D_Select_In2	BOOL	Function setting IN2
SV_In1	DINT	Threshold IN1
SV_In2	DINT	Threshold IN2
PV_IN1	DINT	Incident light IN1
PV_IN2	DINT	Incident light IN2
PV_IN1_4byte	DINT	Incident light 4byte IN1
Amp_Index	UINT	Amplifier index
Amp_Disp_Index	UINT	Amplifier display No.
Amp_Active	BOOL	Amplifier_enable/disable
DPC_Label	WORD	DPC label indication
Head_Flg	INT	Connecting head information (SA only)
W_Level	UINT	Warning level
DPC_Amp_Error	BOOL	Error in DPC amplifier
DPC_Calc_Error_P	BOOL	DPC peak calculation error
DPC_Calc_Error_B	BOOL	DPC bottom calculation error

[Trend graph log information]

Name	Data type	Description
LOG_DISP	STRUCT	Log information
Log_Date	STRING[20]	Log date
Peek	DINT	Peak value
Btm	DINT	Bottom value
Peek_Sa	DINT	Peak difference
Botm_Sa	DINT	Bottom difference
ErrLog_Time	STRING[10]	Error log time string
ErrLog_Mes	DINT	Error log message FLG
ErrLog_Assy	STRING[50]	Error log message display area

[Memory information of workpiece selection, setting selection]

Name	Data type	Description
AMP_WORK	STRUCT	Work memory information
Data_Set	BOOL	Data setting FLG
Threshold1_IN1	DINT	Threshold 1 IN1
Threshold1_IN2	DINT	Threshold 1 IN2
Threshold 2_IN1	DINT	Threshold 2 IN1
Output_Mode_IN1	UINT	Output mode IN1
Output_Mode_IN2	UINT	Output mode IN2
Operating_Mode_IN1	UINT	Operation modeIN1
Operating_Mode_IN2	UINT	Operation modeIN2
Detect_Fnc	UINT	Detection function
Timer_Fnc_IN1	UINT	Timer functionIN1
Timer_Fnc_IN2	UINT	Timer functionIN2
Timer_1_IN1	UINT	Timer 1 IN1
Timer_1_IN2	UINT	Timer 1 IN2
Timer_2_IN1	UINT	Timer 2 IN1
Timer_2_IN2	UINT	Timer 2 IN2
DPC_Set	UINT	DPC setting
Hysteresis_Width_Set	UINT	Hysteresis width setting
Hysteresis_Width1_IN1	UDINT	Hysteresis width 1_IN1
Hysteresis_Width1_IN2	UDINT	Hysteresis width 1_IN2
Hysteresis_Width2_IN1	UDINT	Hysteresis width 2_IN1
HoldMode_Set	UINT	Hold mode setting
Zero_Reset	UINT	Zero reset
Percent_Tunn_Set_IN1	UINT	Percent tuning set_IN1
Percent_Tunn_Set_IN2	UINT	Percent tuning set_IN2
Percent_Tunn_Level_IN1	INT	Percent tuning level_IN1
Percent_Tunn_Level_IN2	INT	Percent tuning level_IN2
Power_Tunn_Set	UINT	Power tuning set
Power_Tunn_Level	UDINT	Power tuning level

[Amplifier information for displaying the NA main monitor]

Name	Data type	Description
AMP_Status_Main	STRUCT	A structure of amplifier information
Amp_Index	UINT	Amplifier index
Led_In1	BOOL	LED In1
Led_In2	BOOL	LED In2

[Amplifier information for displaying the status of NA sensor amplifiers]

Name	Data type	Description
AMP_Status_Set	STRUCT	A structure of amplifier information
Led_ST	BOOL	LED ST
Led_DPC	BOOL	LED DPC
DPC_Label	WORD	DPC label indication
Led_In1	BOOL	LED In1
Led_In2	BOOL	LED In2
Amp_Index	UINT	Amplifier index
Amp_Disp_Index	UINT	Amplifier display No.
L_D_Select_In1	BOOL	Function setting IN1
L_D_Select_In2	BOOL	Function setting IN2
SV_In1	DINT	Threshold IN1
SV_In2	DINT	Threshold IN2
PV_IN1	DINT	Incident light IN1
PV_IN2	DINT	Incident light IN2

●External variable 1
　[Global variables to be allocated to the used slave]

Node No. 100

Name	Data type	Description	Allocation status	
			PDO	NA
E001_Read_input_1st_word	WORD	Input bits 00 to 15	OK	－
E001_Read_input_2nd_word	WORD	Input bits 16 to 31	OK	－
E001_Read_input_3rd_word	WORD	Input bits 32 to 47	OK	－
E001_Sensor_Communication_Status	BYTE	Sensor communication status 8bit	OK	－
E001_Number_of_Sensors_Setting	USINT	Number of sensors to be set	OK	－
E001_Number_of_Sensors_with_Dummy	USINT	Number of sensors (including dummy)	OK	－
E001_Sensor_Warning_Status	DWORD	Sensor warning status	OK	－
E001_No_01_Detection_Level_IN1	INT	Unit No. 01 sensor detection level IN1	OK	－
:	:	:	:	:
E001_No_24_Detection_Level_IN1 *1	INT	Unit No. 24 sensor detection level IN1 *1	OK	－
E001_No_01_Threshold_1_Settings_IN1	DINT	Unit No. 01 threshold 1 IN1	－	－
E001_No_01_Threshold_1_Settings_IN2	DINT	Unit No. 01 threshold 1 IN2	－	－
:	:	:	:	:
:	:	:	:	:
E001_No_24_Threshold_1_Settings_IN1 *1	DINT	Unit No. 24 threshold 1 IN1 *1	－	－
E001_No_24_Threshold_1_Settings_IN2 *1	DINT	Unit No. 24 threshold 1 IN2 *1	－	－
E001_No_01_Detection_Level_4byte	DINT	Unit No. 01 sensor detection level (4byte)	OK	－
:	:	:	:	:
E001_No_24_Detection_Level_4byte *1	DINT	Unit No. 24 sensor detection level (4byte) *1	OK	－
E001_In_Bit00	BOOL	Input bit 00	OK	－
:	:	:	:	:
E001_In_Bit47 *1	BOOL	Input bit 47 *1	OK	－
E001_Sensor_Communication_Busy	BOOL	Sensor communication busy	OK	－
E001_Sensor_Communication_Error	BOOL	Sensor communication error	OK	－
E001_Sysmac_Error_Status	BYTE	Sysmac error status	OK	－
E001_Observation	BOOL	Error information at observation level	OK	－
E001_Minor_Fault	BOOL	Error information at minor fault level	OK	－

*1: Since Unit No. in the "Name" column is given in a row, subsequent Unit No. is omitted.

Node No. 101

Name	Data type	Description	Allocation status	
			PDO	NA
E002_Read_input_1st_word	WORD	Input bits 00 to 15	OK	−
E002_Read_input_2nd_word	WORD	Input bits 16 to 31	OK	−
E002_Read_input_3rd_word	WORD	Input bits 32 to 47	OK	−
E002_Sensor_Communication_Status	BYTE	Sensor communication status 8bit	OK	−
E002_Number_of_Sensors_Setting	USINT	Number of sensors to be set	OK	−
E002_Number_of_Sensors_with_Dummy	USINT	Number of sensors (including dummy)	OK	−
E002_Sensor_Warning_Status	DWORD	Sensor warning status	OK	−
E002_No_01_Detection_Level_IN1	INT	Unit No. 01 sensor detection level IN1	OK	−
:	:	:	:	:
E002_No_24_Detection_Level_IN1 *1	INT	Unit No. 24 sensor detection level IN1 *1	OK	−
E002_No_01_Threshold_1_Settings_IN1	DINT	Unit No. 01 threshold 1 IN1	−	−
E002_No_01_Threshold_1_Settings_IN2	DINT	Unit No. 01 threshold 1 IN2	−	−
:	:	:	:	:
:	:	:	:	:
E002_No_24_Threshold_1_Settings_IN1 *1	DINT	Unit No. 24 threshold 1 IN1 *1	−	−
E002_No_24_Threshold_1_Settings_IN2 *1	DINT	Unit No. 24 threshold 1 IN2 *1	−	−
E002_No_01_Detection_Level_4byte	DINT	Unit No. 01 sensor detection level (4byte)	OK	−
:	:	:	:	:
E002_No_24_Detection_Level_4byte *1	DINT	Unit No. 24 sensor detection level (4byte) *1	OK	−
E002_In_Bit00	BOOL	Input bit 00	OK	−
:	:	:	:	:
E002_In_Bit47 *1	BOOL	Input bit 47 *1	OK	−
E002_Sensor_Communication_Busy	BOOL	Sensor communication busy	OK	−
E002_Sensor_Communication_Error	BOOL	Sensor communication error	OK	−
E002_Sysmac_Error_Status	BYTE	Sysmac error status	OK	−
E002_Observation	BOOL	Error information at observation level	OK	−
E002_Minor_Fault	BOOL	Error information at minor fault level	OK	−

*1: Since Unit No. in the "Name" column is given in a row, subsequent Unit No. is omitted.

📰 Additional Information

The "Allocation status" column indicates the following;
PDO: "OK" indicates that the variable is targeted for PDO mapping.
NA: "OK" indicates that the mutual communications with the NA are available.

📝 Precautions for Correct Use

The variables for node 101 in this project are registered in the NJ's global variables; however, the EtherCAT slave is not registered, the allocation destination is left blank. To use node 101, associate the variable by selecting ˝Configurations and Setup ˝ -> ˝ I/O Map" in the NJ project of the Sysmac Studio.

●External variable 2
[Common variables for NJ/NA using user program   NA/SDO non-reference]

Name	Data type	Description	Allocation status		
			Retain	SDO	NA
g_BTM_ErrLog_Out	BOOL	Bottom error output flag	-		
g_DL_Chg_Act	BOOL	Inputting operation mode	-		
g_DPC_ErrLog_Out	BOOL	DPC error output	-		
G_FL_Chg_Act	BOOL	Inputting flashing operation	-		
g_Hysteresis_Low1_Chg	BOOL	Hysteresis width Low1 change	OK		
g_Multi_Active	BOOL	Disable/enable selecting all	OK		
g_PEK_ErrLog_Out	BOOL	Peak error output flag	-		
g_ProjLightOff_Act2	BOOL	Emitting OFF execution IN2	OK		
g_ProjLightOff_Can2	BOOL	Emitting OFF cancel IN2	OK		
g_PV_Ave	BOOL	PV value-average flag	-		
g_SDO_FIRST_READ	BOOL	SDO instruction read first time only	-		
g_SDO_READ	BOOL	SDO instruction read	-		
g_SDO_SET_READ	BOOL	SDO instruction read only for the setting screen	-		
g_SV_Active	BOOL	SV value display update, stop flag	-		
g_SV_Chg_Act	BOOL	Inputting threshold by numeric keypad	-		
g_SV_UPDW	BOOL	Inputting threshold by + - key	-		
g_Sys_Start	BOOL	Start flag at startup	OK		
g_UNIT_Busy	BOOL	Communication Unit Busy	-		
g_BTM_ErrLog_No	INT	Bottom error output targeted unit	-		
g_DitectionFunc_Set	INT	Detection function setting information	-		
g_DPC_ErrLog_No	INT	DPC error output targeted unit	-		
g_PEK_ErrLog_No	INT	Peak error output targeted unit	-		
g_Write_Sk_In1	INT	Threshold input 1 write value	-		
g_Write_Sk_In2	INT	Threshold input 2 write value	-		
g_READ_Data	LINT	SDO read data	-		
g_SET_Data	LINT	SDO write data	-		
g_SET_DataSize	UINT	SDO data size	-		
g_SET_Index	UINT	SDO index	-		
g_Hysteresis_Low_IN1	UDINT	Hysteresis Low IN1	OK		
g_SET_SubIndex	USINT	SDO sub index	-		
g_MemViewer	AMP_WORK	Amplifier registration viewer	OK		

[Data type is array or structure]

Name	Data type	Description	Allocation status		
			Retain	SDO	NA
g_DL_ModeStatus_Active	ARRAY[0..30] OF BOOL	Operation mode LED show/hide	OK		
g_FL_ModeStatus_Active	ARRAY[0..30] OF BOOL	Flashing LED show/hide	OK		
g_FL_ModeStatus_IN1	ARRAY[0..30] OF BOOL	Flashing operation status Input 1	OK		

g_FL_ModeStatus_IN1_BLINK	ARRAY[0..30] OF BOOL	Flashing blink IN1	-		
g_FL_ModeStatus_IN2	ARRAY[0..30] OF BOOL	Flashing operation status Input 2	OK		
g_FL_ModeStatus_IN2_BLINK	ARRAY[0..30] OF BOOL	Flashing blink IN2	-		
g_GraphDisp	ARRAY[0..30] OF BOOL	Trend graph button display	OK		
g_Node_No_Select	ARRAY[0..199] OF BOOL	Node No. to be displayed	-		
g_DispSensorDat2	ARRAY[0..30] OF INT	Information 2 of sensor amplifier for displaying the screen	OK		
g_Graph_Range_HI	ARRAY[0..30] OF DINT	Upper limit of trend graph range	OK		
g_Graph_Range_Low	ARRAY[0..30] OF DINT	Lower limit of trend graph range	OK		
g_PV_Graph_IN1	ARRAY[0..30,0..1600] OF DINT	Incident light for graph IN1	-		
g_PV_In1	ARRAY[0..30] OF DINT	Incident lightInput 1	OK		
g_PV_In1_2byte	ARRAY[0..30] OF DINT	2 byte of incident light input 1	-		
g_PV_In1_2byte_AVE	ARRAY[0..30] OF DINT	2 byte average value of incident light input 1	-		
g_PV_In1_4byte	ARRAY[0..30] OF DINT	4 byte of incident light input 1	-		
g_PV_In1_Err_B	ARRAY[0..30] OF DINT	Bottom value when error occurs	-		
g_PV_In1_Err_P	ARRAY[0..30] OF DINT	Peak value when error occurs	-		
g_PV_In1_Max	ARRAY[0..30] OF DINT	Updating the maximum incident light input 1 at each time	-		
g_PV_In1_Max_Day	ARRAY[0..30] OF DINT	Maximum incident light input 1 for each day	-		
g_PV_In1_Min	ARRAY[0..30] OF DINT	Updating the minimum incident light input 1 at each time	-		
g_PV_In1_Min_Day	ARRAY[0..30] OF DINT	Updating the minimum incident light input 1 for each day	-		
g_PV_In1_Sa_B	ARRAY[0..30] OF DINT	Bottom difference Input 1	-		
g_PV_In1_Sa_P	ARRAY[0..30] OF DINT	Peak difference input 1	-		
g_PV_In2	ARRAY[0..30] OF DINT	Incident light input 2	-		
g_SV_Graph_IN1	ARRAY[0..30,0..1600] OF DINT	Threshold for graph IN1	-		
g_SV_In1_ECT	ARRAY[0..30] OF DINT	Threshold input 1 obtain for each node	-		
g_SV_In2_ECT	ARRAY[0..30] OF DINT	Threshold input 2 obtain for each node	-		
g_SV_Key_In1	ARRAY[0..30] OF DINT	Threshold screen input value 1	OK		
g_SV_Key_In2	ARRAY[0..30] OF DINT	Threshold screen input value 2	OK		
g_Temp_PV_In1	ARRAY[0..30,0..100] OF DINT	[Unit , buffer for average]	-		
g_DPC_Label_Set	ARRAY[0..30] OF WORD	DPC ZERO label setting	OK		
g_GraphLogBuff	ARRAY[0..30,0..30] OF LOG_DISP	Buffer for operation log PV-value [30 units, 30 logs]	OK		

Additional Information

The "Allocation status" column indicates the following;

Retain："OK" indicates that the variable is to be retained.

SDO："OK" indicates that the variable is to be obtained via SDO communications.

NA："OK" indicates that the mutual communications with the NA are available.

●External variable3
[Common variables for NJ/NA using user program   NA/SDO reference]

Name	Data type	Description	Allocation status		
			Retain	SDO	NA
g_DispBlink_Off1	BOOL	Display blink cancel IN1	OK		OK
g_DispBlink_On1	BOOL	Display blink execution IN1	OK		OK
g_DispDirect_1	BOOL	Display direction normal	OK		OK
g_DispDirect_2	BOOL	Display direction invert	OK		OK
g_DL_ModeCHG_IN1	BOOL	Operation mode change input 1	OK		OK
g_DL_ModeCHG_IN2	BOOL	Operation mode change input 2	OK		OK
g_FL_ModeCHG_IN1	BOOL	Flashing operation change input 1	OK		OK
g_FL_ModeCHG_IN2	BOOL	Flashing operation change input 2	OK		OK
g_Graph_Alarm_ChgFlg	BOOL	Alarm for trend graph Set value change Flag	OK		OK
g_Graph_ loging	BOOL	Graph loging	-		OK
g_Graph_Scr_L_Full	BOOL	Move to start of graph 1 data	-		OK
g_Graph_Scr_L1	BOOL	Graph 1 data move	-		OK
g_Graph_Scr_R_Full	BOOL	Move to end of graph 1 data	-		OK
g_Graph_Scr_R1	BOOL	Graph 1 data move	-		OK
g_Graph_Scr_Reset	BOOL	Graph 1 data delete	-		OK
g_GraphDisp_Dwn	BOOL	Trend graph scroll down	OK		OK
g_GraphDisp_Up	BOOL	Trend graph scroll up	OK		OK
g_Hysteresis_Chg	BOOL	Hysteresis width change	OK		OK
g_Hysteresis_High_Chg	BOOL	Hysteresis width High change	OK		OK
g_Hysteresis_Low2_Chg	BOOL	Hysteresis width Low 2 change	OK		OK
g_Multi_OpMode_IN1	BOOL	Operation mode IN1 for multi	OK		OK
g_Multi_OpMode_IN1_Color	BOOL	Operation mode IN1 display color for multi	OK	OK	OK
g_Multi_OpMode_IN2	BOOL	Operation mode IN2 for multi	OK		OK
g_Multi_OpMode_IN2_Color	BOOL	Operation mode IN2 display color for multi	OK	OK	OK
g_Multi_Select_Cansel	BOOL	Selecting all clear all	OK		OK
g_Multi_Select_Rev	BOOL	Selecting all invert	OK		OK
g_Multi_Select_Set	BOOL	Selecting all	OK		OK
g_Multi_Set	BOOL	All detailed settings	OK		OK
g_Multi_Set_ON	BOOL	All detailed settings execution	OK		OK
g_Multi_SV_IN1_1_CHG	BOOL	Thresholds all IN1_1 input	OK		OK
g_Multi_SV_IN1_2_CHG	BOOL	Thresholds all IN1_2 input	OK		OK
g_Multi_SV_IN2_CHG	BOOL	Thresholds all IN2_ input	OK		OK
g_Multi_Tuning	BOOL	Tuning all	OK		OK
g_Multi_Tuning_ON	BOOL	Tuning all execution	OK		OK
g_Page_Next	BOOL	Move to next page	-		OK
g_Page_Prev	BOOL	Return to previous page	-		OK
g_PowerTun_Chg1	BOOL	Power Tuning target value change1	OK		OK
Name	Data type	Description	Allocation status		

Name	Data type	Description	Retain	SDO	NA
g_Priset_Data_Chg	BOOL	Preset value change	-		OK
g_ProjLightOff_Act1	BOOL	Emitting OFF execution IN1	OK		OK
g_ProjLightOff_Can1	BOOL	Emitting OFF cancel IN1	OK		OK
g_SensorInit	BOOL	Initializing sensor setting	OK		OK
g_SetSelect_Act	BOOL	Setting selection execution	OK		OK
g_SetSelect_AMP_To_PLC	BOOL	Storing the setting information of amplifier to PLC memory	OK		OK
g_SetSelect_Disp	BOOL	Displaying operation progress of PLC memory	OK		OK
g_SetSelect_MemClr	BOOL	PLC memory clear	OK		OK
g_SetSelect_No_Mem	BOOL	Storing the setting selection No.	OK		OK
g_SetSelect_PLC_To_AMP	BOOL	Storing the setting information of PLC memory to amplifier	OK		OK
g_Sv_ChgFlg_In1	BOOL	Threshold direct input change input 1	OK		OK
g_Sv_ChgFlg_In2	BOOL	Threshold direct input change input 2	OK		OK
g_Sv_Down_In1	BOOL	Threshold - Input 1	OK		OK
g_Sv_Down_In2	BOOL	Threshold - Input 2	OK		OK
g_SV_In1_1_Chg	BOOL	Threshold IN1_1 change	OK		OK
g_SV_In1_2_Chg	BOOL	Threshold IN1_2 change	OK		OK
g_Sv_PreChgFlg_In1	BOOL	Threshold direct input change advance notice input 1	OK		OK
g_Sv_PreChgFlg_In2	BOOL	Threshold direct input change advance notice input 2	OK		OK
g_SV_RD_Pass	BOOL	Read value direct display flag	-		OK
g_Sv_Up_In1	BOOL	Threshold + Input 1	OK		OK
g_Sv_Up_In2	BOOL	Threshold + Input 2	OK		OK
g_Threshold_Chg1	BOOL	Percent tuning change IN1	OK		OK
g_Threshold_Chg2	BOOL	Percent tuning change IN2	OK		OK
g_TimerSet1_Chg1	BOOL	Timer time 1 change 1	OK		OK
g_TimerSet1_Chg2	BOOL	Timer time 1 change 2	OK		OK
g_TimerSet2_Chg1	BOOL	Timer time 2 change 1	OK		OK
g_TimerSet2_Chg2	BOOL	Timer time 2 change 2	OK		OK
g_tolerance_High_Chg	BOOL	Tolerance high value change	-		OK
g_tolerance_Low_Chg	BOOL	Tolerance low value change	-		OK
g_Tune_Power1	BOOL	Power tuning execution	OK		OK
g_Tune_Wk1	BOOL	Workpiece present/ absent tuning point 1	OK		OK
g_Tuning_Exe	BOOL	Display FLG during tuning	OK		OK
g_Tuning_TextFlg1	BOOL	Tuning message setting FLG	OK		OK
g_WorkSelect_Act	BOOL	Workpiece selection execution	OK		OK
g_WorkSelect_AMP_To_PLC	BOOL	Storing the work information of amplifier to PLC memory	OK		OK
g_WorkSelect_Disp	BOOL	Displaying operation progress of PLC memory	OK		OK
g_WorkSelect_MemClr	BOOL	PLC memory clear	OK		OK
Name	Data type	Description	Allocation status		

Name	Data type	Description	Retain	SDO	NA
g_WorkSelect_No_Mem	BOOL	Storing the workpiece selection No.	OK		OK
g_WorkSelect_PLC_To_AMP	BOOL	Storing the work information of PLC memory to amplifier	OK		OK
g_ZeroReset_Color1	BOOL	Zero reset button display color IN1	OK	OK	OK
g_ZeroReset_Color2	BOOL	Zero reset button display color IN2	OK	OK	OK
g_ZeroReset_Off1	BOOL	Zero reset cancel IN1	OK		OK
g_ZeroReset_On1	BOOL	Zero reset execution IN1	OK		OK
g_goki_CNT	INT	Display unit setting	-		OK
g_Multi_SV_IN1_1	INT	Thresholds all IN1_1 input	OK	OK	OK
g_Multi_SV_IN1_2	INT	Thresholds all IN1_2 input	OK	OK	OK
g_Multi_SV_IN2	INT	Thresholds all IN2	OK	OK	OK
g_PercentTun_Level_IN1	INT	Percent tuning level IN1	OK	OK	OK
g_PercentTun_Level_IN2	INT	Percent tuning level IN2	OK	OK	OK
g_SV_In1_1_Set	INT	Threshold input 1_1	OK	OK	OK
g_SV_In1_2_Set	INT	Threshold input 1_2	OK	OK	OK
g_Priset_Data	DINT	Preset value	-	OK	OK
g_PV_In1_Max_Disp	DINT	Peak value input1 for screen display	OK		OK
g_PV_In1_Min_Disp	DINT	Bottom value input1 for screen display	OK		OK
g_tolerance_High	DINT	Tolerance high	-	OK	OK
g_tolerance_Low	DINT	Tolerance low	-	OK	OK
g_DL1_CallNo	UINT	D/L change IN1 call No.	OK		OK
g_DL2_CallNo	UINT	D/L change IN2 call No.	OK		OK
g_FL1_CallNo	UINT	Flashing operation change IN1 call No.	OK		OK
g_FL2_CallNo	UINT	Flashing operation change IN 2 call No.	OK		OK
g_Graph_Alarm_Disp	UINT	Alarm display value for trend graph	OK		OK
g_Graph_ED_No	UINT	Graph scale display end No.	-		OK
g_Graph_Scale	UINT	Interval for obtaining graph (scaling)	-		OK
g_Graph_ST_No	UINT	Graph scale display start No.	-		OK
g_Graph1_CallNo	UINT	Input 1 trend graph call No.	OK		OK
g_HMI_PageNo	UINT	HMI display page No. (from 0)	-		OK
g_Hysteresis_Set	UINT	Hysteresis width setting	OK	OK	OK
g_MultiTuning_Message	UINT	Tuning all message FLG	OK		OK
g_NDA	UINT	Node address	OK		OK
g_SENSOR_CNT_Color	UINT	No. of the connected sensor status	OK		OK
g_Set_CallNo	UINT	Function settings screen calling unit No.	OK		OK
g_SetSelect_No	UINT	Setting selection No.	OK		OK
g_SV_CallNo	UINT	Threshold + - calling unit No.	OK		OK
g_SV_TenKey_In1	UINT	Numeric keypad input IN1	OK		OK
g_SV_TenKey_In2	UINT	Numeric keypad input IN2	OK		OK
g_Timer_Time1_In1	UINT	Timer time 1 input 1	OK	OK	OK
g_Timer_Time1_In2	UINT	Timer time 1 input 2	OK	OK	OK
g_Timer_Time2_In1	UINT	Timer time 2 input 1	OK	OK	OK
g_Timer_Time2_In2	UINT	Timer time 2 input 2	OK	OK	OK
Name	Data type	Description	Allocation status		
			Retain	SDO	NA

g_Tune1_CallNo	UINT	Input 1tuning call No.	OK		OK
g_Tune2_CallNo	UINT	Input 2tuning call No.	OK		OK
g_Tuning_IN_Message	UINT	Tuning input port	OK		OK
g_Tuning_Message	UINT	Tuning function message FLG	OK		OK
g_WorkSelect_No	UINT	Workpiece selection No.	OK		OK
g_Hysteresis_High	UDINT	Hysteresis high	OK	OK	OK
g_Hysteresis_Low_IN2	UDINT	Hysteresis low IN2	OK	OK	OK
g_PowerT_Target_In1	UDINT	Power Tuning target value input 1	OK	OK	OK
g_SENSOR_CNT	USINT	No. of the connected sensors	OK		OK
g_SetSelect_All	USINT	PLC memory setting selection number of operations	OK		OK
g_SetSelect_CNT	USINT	PLC memory setting selection operation progress counter	OK		OK
g_WorkSelect_All	USINT	PLC memory Workpiece selection number of operations	OK		OK
g_WorkSelect_CNT	USINT	PLC memory Workpiece selection operation progress counter	OK		OK
g_WorkSelect_GokiCNT	USINT	PLC memory Workpiece selection operation progress unit counter	OK		OK
g_DispName	STRING[50]	Display name	OK		OK
g_Pop_DispName	STRING[50]	Pop-up display name NJ request	OK		OK
g_Pop_NA_DispName	STRING[50]	Pop-up display name NA operation	OK		OK

[Data type is array or structure]

Name	Data type	Description	Allocation status		
			Retain	SDO	NA
g_AMPHead	ARRAY[0..2] OF BOOL	Sensor connected amplifier head	OK		OK
g_AMPHead_Color	ARRAY[0..2] OF BOOL	Status of sensor amplifier head	OK		OK
g_BackDel	ARRAY[0..5] OF BOOL	Background removal	OK		OK
g_BackDel_Color	ARRAY[0..5] OF BOOL	Background removal button display color	OK	OK	OK
g_direction_Color	ARRAY[0..2] OF BOOL	Direction setting display color	-	OK	OK
g_direction_Select	ARRAY[0..2] OF BOOL	Direction setting	-		OK
g_DispDirect_Color	ARRAY[0..5] OF BOOL	Direction setting button display color	OK	OK	OK
g_DispMode	ARRAY[0..20] OF BOOL	Display mode	OK		OK
g_DispMode_Color	ARRAY[0..20] OF BOOL	Display mode button display color	OK	OK	OK
g_DispSensor_Active	ARRAY[0..30] OF BOOL	Checking the sensor amplifier implementation	-		OK
g_DitectFunc_Color	ARRAY[0..10] OF BOOL	Detection function button display color	OK		OK
g_DitectionFunction	ARRAY[0..10] OF BOOL	Detection function	OK		OK
g_DL_ModeStatus_Active_HMI	ARRAY[0..6] OF BOOL	Operation mode show/hide HMI	-		OK

g_DL_ModeStatus_IN1_HMI	ARRAY[0..6] OF BOOL	Operation mode status input 1 HMI	-		OK
g_DL_ModeStatus_IN2_HMI	ARRAY[0..6] OF BOOL	Operation mode status input 2 HMI	-		OK
g_DPC_Led_status_HMI	ARRAY[0..6] OF BOOL	DPC LED status HMI	-		OK
g_DPC_SetMode1	ARRAY[0..10] OF BOOL	DPC setting IN1	OK		OK
g_DPC_SetMode1_Color	ARRAY[0..10] OF BOOL	DPC setting IN1 button display color	OK		OK
g_EcoMode	ARRAY[0..5] OF BOOL	ECO mode	OK		OK
g_EcoMode_Color	ARRAY[0..5] OF BOOL	ECO mode button display color	OK	OK	OK
g_FL_ModeStatus_Active_HMI	ARRAY[0..6] OF BOOL	Flashing operation LED show/hide HMI	-		OK
g_FL_ModeStatus_IN1_HMI	ARRAY[0..6] OF BOOL	flashing operation status input 1 HMI	-		OK
g_FL_ModeStatus_IN1_HMI_BLINK	ARRAY[0..6] OF BOOL	Flashing blink IN1 HMI	-		OK
g_FL_ModeStatus_IN2_HMI	ARRAY[0..6] OF BOOL	flashing operation status input 2 HMI	-		OK
g_FL_ModeStatus_IN1_HMI_BLINK	ARRAY[0..6] OF BOOL	Flashing blink IN2 HMI	-		OK
g_GraphDisp_HMI	ARRAY[0..6] OF BOOL	Trend graph button display HMI	-		OK
g_KeepSet	ARRAY[0..5] OF BOOL	Keep setting	OK		OK
g_KeepSet_Color	ARRAY[0..5] OF BOOL	Keep setting button display color	OK	OK	OK
g_KeyLock	ARRAY[0..5] OF BOOL	Key lock function	OK		OK
g_KeyLock_Color	ARRAY[0..5] OF BOOL	Key lock function button display color	OK	OK	OK
g_Multi_Select_Ctrl	ARRAY[0..30] OF BOOL	Selecting all unit selection	OK		OK
g_Multi_Select_Ctrl_HMI	ARRAY[0..6] OF BOOL	Selecting all unit selection HMI	-		OK
g_Origin_Color	ARRAY[0..2] OF BOOL	Setting to use origin display color	-	OK	OK
g_Origin_Select	ARRAY[0..2] OF BOOL	Setting to use origin	-		OK
g_Output_Color	ARRAY[0..2] OF BOOL	Selecting output display color	-	OK	OK
g_Output_Select	ARRAY[0..2] OF BOOL	Selecting output	-		OK
g_OutPutMode2	ARRAY[0..10] OF BOOL	Output mode IN2	OK		OK
g_OutPutMode1_Color	ARRAY[0..10] OF BOOL	Output mode IN1 display color	OK	OK	OK
g_OutPutMode1	ARRAY[0..10] OF BOOL	Output mode IN1	OK		OK
g_OutPutMode2_Color	ARRAY[0..10] OF BOOL	Output mode IN2 display color	OK	OK	OK
g_PercentTun_IN1	ARRAY[0..5] OF BOOL	Percent tuning setting IN1	OK		OK
g_PercentTun_IN1_Color	ARRAY[0..5] OF BOOL	Percent tuning setting display color IN1	OK	OK	OK
g_PercentTun_IN2	ARRAY[0..5] OF BOOL	Percent tuning setting IN2	OK		OK
g_PercentTun_IN2_Color	ARRAY[0..5] OF BOOL	Percent tuning setting display color IN2	OK	OK	OK
g_PowerTun_Set	ARRAY[0..5] OF BOOL	Power tuning setting	OK		OK
g_PowerTun_Set_Color	ARRAY[0..5] OF BOOL	Power Tuning display color	OK	OK	OK
g_Priset_Color	ARRAY[0..2] OF BOOL	Preset setting display color	-	OK	OK
g_Priset_Select	ARRAY[0..2] OF BOOL	Preset setting	-		OK

g_SET1_Visibility	ARRAY[0..9] OF BOOL	Setting 1 item display	-		OK
g_SET2_Visibility	ARRAY[0..9] OF BOOL	Setting 2 item display	-		OK
g_SET3_Visibility	ARRAY[0..9] OF BOOL	Setting 3 item display	-		OK
g_SET4_Visibility	ARRAY[0..9] OF BOOL	Setting 4 item display	-		OK
g_SetMemory_ACT	ARRAY[0..10] OF BOOL	Setting selection status	OK		OK
g_SetSelect	ARRAY[0..10] OF BOOL	Setting selection	-		OK
g_ST_Led_status_HMI	ARRAY[0..6] OF BOOL	ST LED status HMI	-		OK
g_TimerFunc1_Color	ARRAY[0..10] OF BOOL	Timer function IN1 display color	OK	OK	OK
g_TimerFunc2_Color	ARRAY[0..10] OF BOOL	Timer function IN2 display color	OK	OK	OK
g_TimerFunction1	ARRAY[0..10] OF BOOL	Timer function IN1	OK		OK
g_TimerFunction2	ARRAY[0..10] OF BOOL	Timer function IN2	OK		OK
g_Tuning_ActFlg	ARRAY[0..5] OF BOOL	Tuning disable/enable FLG	OK		OK
g_WorkMemory_ACT	ARRAY[0..10] OF BOOL	Workpiece memory status [10 memories]	OK		OK
g_WorkSelect	ARRAY[0..10] OF BOOL	Workpiece selection	-		OK
g_DispSensorDat1	ARRAY[0..30] OF INT	Sensor amplifier information 1 for displaying screen	OK	OK	OK
g_DispSensorDat1_HMI	ARRAY[0..6] OF INT	Sensor amplifier information1 for displaying HMI screen	-		OK
g_PV_HMI	ARRAY[0..1600] OF DINT	Incident light for displaying HMI	-		OK
g_PV_In1_HMI	ARRAY[0..6] OF DINT	Incident light input 1 HMI	-		OK
g_PV_In2_HMI	ARRAY[0..6] OF DINT	Incident light input 2 HMI	-		OK
g_SV_HMI	ARRAY[0..1600] OF DINT	Threshold for displaying HMI	-		OK
g_SV_In1	ARRAY[0..30] OF DINT	ThresholdInput 1	OK		OK
g_SV_In1_HMI	ARRAY[0..6] OF DINT	ThresholdInput 1 HMI	-		OK
g_SV_In2	ARRAY[0..30] OF DINT	ThresholdInput 2	OK		OK
g_SV_In2_HMI	ARRAY[0..6] OF DINT	ThresholdInput 2 HMI	-		OK
g_Node_No	ARRAY[0..199] OF STRING[10]	Recognized node No.	-		OK
g_USER_AMP_Name	ARRAY[0..30] OF STRING[50]	User function name	OK		OK
g_USER_AMP_Name_HMI	ARRAY[0..6] OF STRING[50]	User function name HMI	-		OK
g_DMY_AMP	ARRAY[0..30] OF BYTE	Dummy amplifier information	OK	OK	OK
g_DPC_Label_Set_HMI	ARRAY[0..6] OF WORD	DPC ZERO label setting HMI	-		OK
g_GraphStatus_IN1_HMI	ARRAY[0..6] OF WORD	Graph LED lighting status IN1 HMI	-		OK
g_SetSelect_SetFlg	ARRAY[0..10] OF WORD	Setting selection status flag	OK		OK
g_WorkSelect_SetFlg	ARRAY[0..10] OF WORD	Workpiece selection status flag	OK		OK
g_AMP_HMI	ARRAY[0..6] OF AMP_Status_Main	HMI to display amplifier information Only	-		OK

g_Set_AMP	ARRAY[0..1] OF AMP_Status_Set	Amplifier information for setting screen	OK	OK	OK
g_GraphDispBuff	ARRAY[0..10] OF LOG_DISP	Buffer for trend graph	OK		OK
g_DL_ModeStatus_IN1	ARRAY[0..30] OF BOOL	Operation mode status input 1	OK	OK	
g_DL_ModeStatus_IN2	ARRAY[0..30] OF BOOL	Operation mode status input 2	OK	OK	
g_DPC_Led_status	ARRAY[0..30] OF BOOL	DPC LED status	OK	OK	
g_ST_Led_status	ARRAY[0..30] OF BOOL	ST LED status	OK	OK	
g_Temp_Sk_In1	ARRAY[0..30] OF INT	Threshold input 1	-	OK	
g_Temp_Sk_In2	ARRAY[0..30] OF INT	Threshold input 2	-	OK	
g_GraphStatus_IN1	ARRAY[0..30] OF WORD	Graph LED lighting status IN1	OK	OK	
g_AMP	ARRAY[0..30] OF AMP_Status	Amplifier information all units	OK	OK	
g_SetMemory	ARRAY[0..10] OF AMP_WORK	Setting selection information	OK	OK	
g_WorkMemory	ARRAY[0..30,0..10] OF AMP_WORK	Workpiece memory information [30 units, 10 memories]	OK	OK	

📑 Additional Information

The "Allocation status" column indicates the following;

Retain："OK" indicates that the variable is to be retained.

SDO："OK" indicates that the variable is to be obtained via SDO communications.

NA："OK" indicates that the mutual communications with the NA are available.

●External variable 4
[NA using user program only]

Name	Data type	Description	Allocation status	
			SDO	NA
AMP_30_Disp	Boolean	Unit No. 30 display flag	−	OK
g_Multi_Btn_ON	Boolean	All buttons ON	−	OK
g_NDA_Chg	Boolean	Node address change	−	OK
g_TA_AMP_SetMenu	Boolean	Operation flag when using TA-series amplifiers	−	OK
HMI_DL_ModeCHG_IN1	Boolean	Operation mode change input 1	−	OK
HMI_DL_ModeCHG_IN2	Boolean	Operation mode change input 2	−	OK
HMI_FL_ModeCHG_IN1	Boolean	Flashing operation mode change input 1	−	OK
HMI_FL_ModeCHG_IN2	Boolean	Flashing operation mode change input 2	−	OK
keyClose	Boolean	Close the key	−	OK
Minus	Boolean	With/without sign	−	OK
OverMax	Boolean	Exceeding input upper limit flag	−	OK
UnderMin	Boolean	Exceeding input lower limit flag	−	OK
ValEnter	Boolean	Value enter flag	−	OK
Multi_AMPHead_Color	Boolean(1)	Sensor connected amplifier head status	−	OK
Multi_BackDel_Color	Boolean(1)	Background removal button display color	−	OK
Multi_direction_Color	Boolean(1)	Detection function button display color	−	OK
Multi_DispDirect_Color	Boolean(1)	Direction setting button display color	−	OK
Multi_DPC_SetMode1_Color	Boolean(1)	DPC setting IN1 button display color	−	OK
Multi_KeepSet_Color	Boolean(1)	Keep setting button display color	−	OK
Multi_KeyLock_Color	Boolean(1)	Key lock function button display color	−	OK
Multi_Origin_Color	Boolean(1)	Setting to use origin display color	−	OK
Multi_Output_Color	Boolean(1)	Selecting output display color	−	OK
Multi_PercentTun_IN1_Color	Boolean(1)	Percent tuning setting display color IN1	−	OK
Multi_PercentTun_IN2_Color	Boolean(1)	Percent tuning setting display color IN2	−	OK
Multi_PowerTun_Set_Color	Boolean(1)	Power tuning setting display color	−	OK
Multi_Priset_Color	Boolean(1)	Preset setting display color	−	OK
Multi_ZeroReset_Color	Boolean(1)	Zero reset button display color	−	OK
Multi_EcoMode_Color	Boolean(2)	ECO mode button display color	−	OK
Multi_OutPutMode2_Color	Boolean(2)	Output mode IN2 display color	−	OK
Multi_DitectFunc_Color	Boolean(3)	Detection function button display color	−	OK
Multi_OutPutMode1_Color	Boolean(3)	Output mode IN1 display color	−	OK
Multi_TimerFunc1_Color	Boolean(4)	Timer function IN1 button display color	−	OK
Multi_TimerFunc2_Color	Boolean(4)	Timer function IN2 button display color	−	OK
g_select_Lang	Boolean(10)	Language selection	−	OK
Multi_DispMode_Color	Boolean(10)	Display mode button display color	−	OK
g_Bef_NDA	UShort	Node address before change	−	OK
g_Multi_CallNo	UShort	Call No. when operating all.	−	OK
g_NDA_CHK	UShort	Node address shortly after input	−	OK
g_SetSelect_No_HMI	UShort	Setting selection No.	−	OK

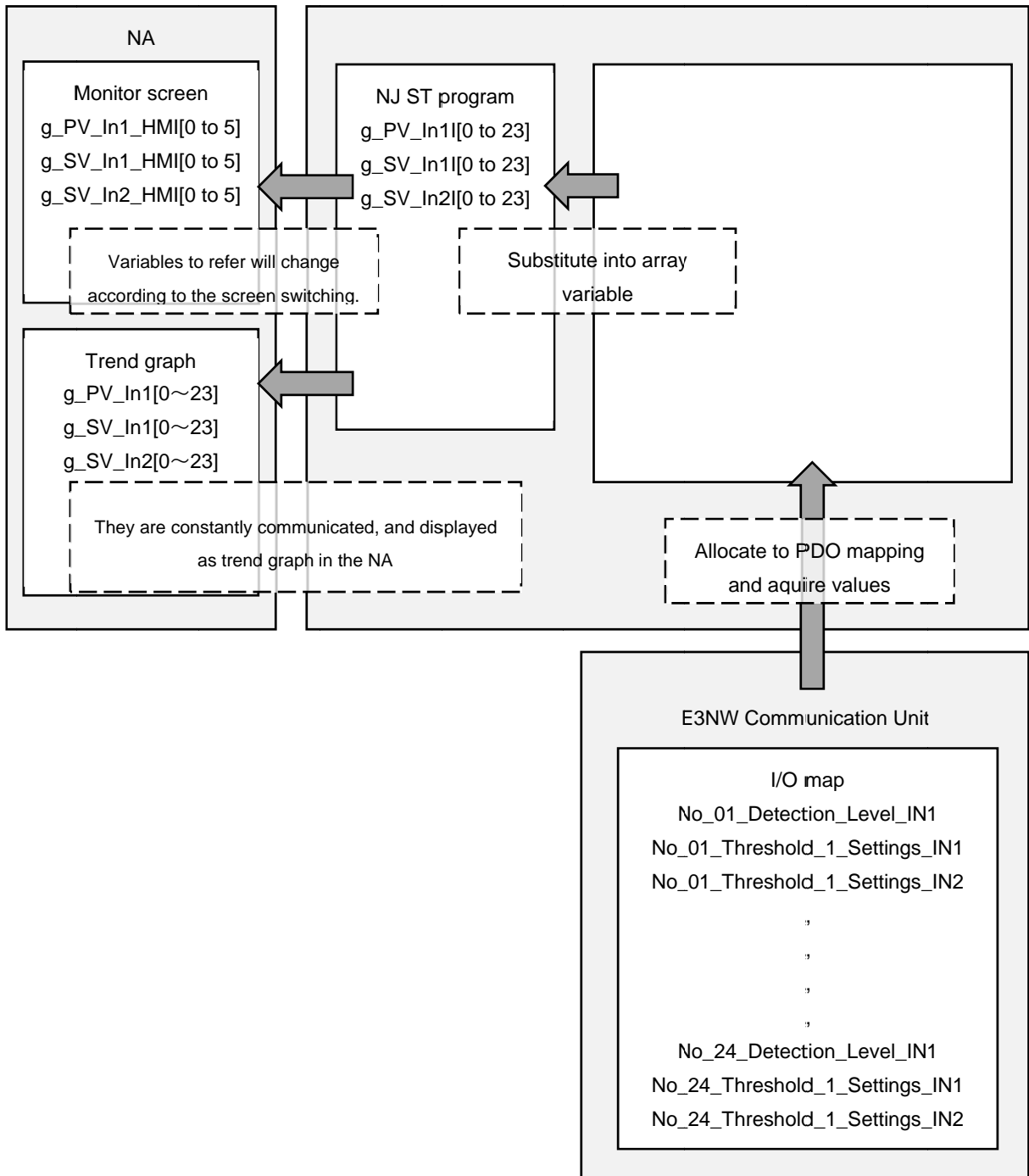|				
g_Tune_Act_CallNo	UShort	Tuning call No.	－	OK
g_WorkSelect_No_HMI	UShort	Workpiece selection No.	－	OK
HMI_DL1_CallNo	UShort	D/L change IN1 call No.	－	OK
HMI_DL2_CallNo	UShort	D/L change IN2 call No.	－	OK
HMI_FL1_CallNo	UShort	Flashing operation change IN1 call No.	－	OK
HMI_FL2_CallNo	UShort	Flashing operation change IN2 call No.	－	OK
HMI_Multi_CallNo	UShort	Call No. when operating all.	－	OK
HMI_Set_CallNo	UShort	Detail setting call No.	－	OK
HMI_SV_CallNo	UShort	Threshold + - calling unit No.	－	OK
HMI_SV_TenKey_In1	UShort	Numeric keypad input IN1	－	OK
HMI_SV_TenKey_In2	UShort	Numeric keypad input IN2	－	OK
HMI_Tune1_CallNo	UShort	Input 1 tuning call No.	－	OK
HMI_Tune2_CallNo	UShort	Input 2 tuning call No.	－	OK
Setting1_timerSet	Integer	Timer Time setting No.	－	OK
DataDisplayID	UInteger	Data display identification No	－	OK
ViewInt	UInteger	Integer of display digit	－	OK
KeybordInput	Double	Converting user input to numerical value	－	OK
Maxval	Double	Upper limit input	－	OK
Minval	Double	Lower limit input	－	OK
g_Disp_RetName	String	Return display name	－	OK
g_Multi_Disp_RetName	String	Return display name when operating all	－	OK
PreHMI_CurrentPage	String	Screen before transition	－	OK
UserInputError	String	Input value for error display	－	OK
g_Log_Text	String(9)	Graph log text	－	OK

📑 Additional Information

The "Allocation status" column indicates the following;

SDO："OK" indicates that the variable is to be obtained via SDO communications.

NA："OK" indicates that the mutual communications with the NA are available.

■ Example of variable allocation

The following diagram shows a flow from input ports of PV value and SV value to NA.

NA

Monitor screen
g_PV_In1_HMI[0 to 5]
g_SV_In1_HMI[0 to 5]
g_SV_In2_HMI[0 to 5]

NJ ST program
g_PV_In1I[0 to 23]
g_SV_In1I[0 to 23]
g_SV_In2I[0 to 23]

Variables to refer will change
according to the screen switching.

Substitute into array
variable

Trend graph
g_PV_In1[0〜23]
g_SV_In1[0〜23]
g_SV_In2[0〜23]

They are constantly communicated, and displayed
as trend graph in the NA

Allocate to PDO mapping
and aquire values

E3NW Communication Unit

I/O map
No_01_Detection_Level_IN1
No_01_Threshold_1_Settings_IN1
No_01_Threshold_1_Settings_IN2

,
,
,
,

No_24_Detection_Level_IN1
No_24_Threshold_1_Settings_IN1
No_24_Threshold_1_Settings_IN2

Precautions for Correct Use

The above diagram shows an example of variable names and how to substitute values
for devices.
In actual operation, refer to variable names that are allocated to the actual function.

8-3 Program in ST Language

■ Functional configurations of the program
This program is written in ST language. The functional configurations are listed below.

Task	E3NW_MAIN	
Function	Acquires information of system configuration. Controls the pages on the Monitor screen. Updates information of the sensor amplifiers within the display range.	
FB	None	
Line	Description	Detail
1-51	Processing for specified node	Specifies the location to refer for each node.
52-128	First time setup at start-up	Sets the initial value and initializes variables.
129-148	Network configuration check	Checks the node address recognized by the system.
149-156	TIMER processing	Sets various timer functions.
157-236	First time operation at system start-up	Reads information of the connected amplifier. Writes the initial value to the trend graph-related variable.
237-364	Display update of each read value	Updates the data collections according to the selected main monitor screen. Always updates values to display within the display range.

Task	PANEL_INPUT	
Function	Responds to button operation on the Monitor screen. * Changes SV value (Entry with a numeric keypad, or [+][-] key). Switch an operation mode.	
FB	Press_Hold_Button, SDO_WRITE_OBJ	
Line	Description	Detail
1-50	First time setup at start-up	Sets the initial value and initializes variables.
51-70	TIMER processing	Sets various timer functions.
71-184	Flashing input	Prepares to issue a control command according to the input status of flashing function.
185-276	Operation mode input	Prepares to issue a control command according to the status of input operation mode.
277-388	Check of write value inputted by numeric keypad	Checks whether or not to write the value inputted by numeric keypad.
389-910	Check of write value inputted by [+][-] keys	·Checks whether or not to write the value inputted by [+][-] keys. (input by next button cannot be accepted until processing of the pressed button ends) ·Checks whether or not to shift the digit to be changed when inputting value by the [+][-] keys. The digit to be changed is shifted by every 20 times you pressed the button in a row (use of FB)
911-990	Operation upon SDO instruction write completion	Writes the operation results.
991-1002		This is the execution part of SDO writing function.

Task	PDO_PV_SV_IO	
Function	Substitutes the input information of the Unit mapped to PDO into the display variables.	
FB	None	
Line	Description	Detail
1-47	First time setup at start-up	Sets the initial value and initializes variables.
48-580	Updating constantly	Obtains the PV-value, SV-value, and input status.

		*Average is performed 100 times for PV-value.
		Whether or not to use 4byte of PV value, the model of amplifiers are referred.
		Reads the value according to the status and conditions of drawing update.
		Substitute the IN state to the display variable.

Task	SDO_FIRST_READ	
Function	This is operated at system startup for the first time. Acquires the connection information (amplifier type, dummy information). This operation is disabled for disconnected Units.	
FB	SDO_READ_OBJ	
Line	Description	Detail
1-24	First time setup at start-up	Sets the initial value and initializes variables.
25-252	SDO instruction read	Reads the status of dummy setting and model of sensor amplifier.
253-264		This is the execution part of SDO writing function.

Task	SDO_AMP_READ	
Function	Acquires information of sensor amplifiers that are displayed on the Monitor screen and various setting screen. (PDO information excluded) Operation mode status. LED status. While the target screen is being displayed, communications are always established and screen information is updated.	
FB	SDO_READ_OBJ	
Line	Description	Detail
1-33	First time setup at start-up	Sets the initial value and initializes variables.
34-297	SDO instruction read	Reads the sensor status of operation mode.
298-308		This is the execution part of SDO writing function.

Task	SET_DISP1	
Function	Only when an entry is made on the screen while the Detailed Settings Screen 1 is being displayed, executes the corresponding operation (setting all included) .	
FB	SDO_READ_OBJ , SDO_WRITE_OBJ	
Line	Description	Detail
1-35	First time setup at start-up	Sets the initial value and initializes variables.
36-48	Multi setting check	Performs the flag setting when inputting multi setting.
49-66	Screen operation (P0030_Detailed Settings Screen 1 excluded)	Initializes the displayed information on the screen.
67-85	Screen operation	Initializes the variables shortly after changing the screen.
85-99	(P0030_Detailed Settings Screen 1 only)	Prepares to issue a control command according to the status of each input button and input value.
100-283		Reads the current set value shortly after changing the screen.
284-611		Writes each setting according to the instruction selected by each button.
612-675		This is the execution part of SDO reading/writing FB.

Task	SET_DISP2	
Function	Only when an entry is made on the screen while the Detailed Settings Screen 2 is being displayed, executes the corresponding operation (setting all included)	
FB	SDO_READ_OBJ , SDO_WRITE_OBJ	
Line	Description	Detail

1-35	First time setup at start-up	Sets the initial value and initializes variables.
36-53	Screen operation (P0031_Detailed Settings Screen 2 excluded)	Initializes the displayed information on the screen.
54-72	Screen operation	Initializes the variables shortly after changing the screen.
73-86	(P0031_Detailed Settings Screen 2 only)	Prepares to issue a control command according to the status of each input button and input value.
87-310		Reads the current set value shortly after changing the screen.
311-787		Writes each setting according to the instruction selected by each button.
788-813		This is the execution part of SDO reading/writing FB.

Task	SET_DISP3	
Function	Only when an entry is made on the screen while the Detailed Settings Screen 3 is being displayed, executes the corresponding operation (setting all included).	
FB	SDO_READ_OBJ , SDO_WRITE_OBJ	
Line	Description	Detail
1-34	First time setup at start-up	Sets the initial value and initializes variables.
35-54	Screen operation (P0032_Detailed Settings Screen 3 excluded)	Initializes the displayed information on the screen.
55-77	Screen operation	Initializes the variables shortly after changing the screen.
78-86	(P0032_Detailed Settings Screen 3 only)	Prepares to issue a control command according to the status of each input button and input value.
87-347		Reads the current set value shortly after changing the screen.
348-824		Writes each setting according to the instruction selected by each button.
825-850		This is the execution part of SDO reading/writing FB.

Task	SET_DISP4	
Function	Only when an entry is made on the screen while the Detailed Settings Screen 4 is being displayed, executes the corresponding operation (setting all included).	
FB	SDO_READ_OBJ , SDO_WRITE_OBJ	
Line	Description	Detail
1-37	First time setup at start-up	Sets the initial value and initializes variables.
38-56	Screen operation (P0033_Detailed Settings Screen 4 excluded)	Initializes the displayed information on the screen.
57-78	Screen operation	Initializes the variables shortly after changing the screen.
79-92	(P0033_Detailed Settings Screen 4 only)	Prepares to issue a control command according to the status of each input button and input value.
93-270		Reads the current set value shortly after changing the screen.
271-610		Writes each setting according to the instruction selected by each button.
611-636		This is the execution part of SDO reading/writing FB.

Task	SET_MEM_AMP	
Function	Executes the corresponding operation on the Settings Selection Display. Reads and writes operation of setting values of the specified amplifier (26 items).	
FB	SDO_MEM_READ , SDO_MEM_WRITE	
Line	Description	Detail
1-24	First time setup at start-up	Sets the initial value and initializes variables.
25-35	Screen operation	Initializes the displayed information on the screen.

	(P0035_Settings Selection Display excluded)	
36-49	Screen operation	Initializes the variables shortly after changing the screen.
50-62	(P0035_Settings Selection Display only)	Prepares to issue a control command according to the status of each input button and operation function.
63-225		Reads and writes various settings according to the request of each button.
226-270		Reads and writes amplifier according to the request of each function.
271-292		This is the execution part of SDO reading/writing FB.
293-368	Function check	Displays acquired data (for function check).

Task	SET_MEM_WORK	
Function	Executes the corresponding operation on the Select workpiece screen. Reads and writes operation of setting values of all the amplifiers (26 items).	
FB	SDO_MEM_READ , SDO_MEM_WRITE	
Line	Description	Detail
1-24	First time setup at start-up	Sets the initial value and initializes variables.
25-35	Screen operation (P0034_the select workpiece screen excluded)	Initializes the displayed information on the screen.
36-48	Screen operation	Initializes the variables shortly after changing the screen.
49-52	(P0034_the select workpiece screen only)	Prepares to issue a control command according to the status of each input button and selected operational function.
53-219		Reads and writes various settings according to the request of each button.
220-270		Writes the set value to the amplifier according to the instruction.
271-290		This is the execution part of SDO reading/writing FB.
291-366		Displays acquired data (for function check).

Task	SET_GRAPH	
Function	Displays a trend graph. Determines the error in the peak and bottom.	
FB	None	
Line	Description	Detail
1-31	First time setup at start-up	Sets the initial value and initializes variables.
32-45	Screen operation (P0040_Trend graph_ n screen excluded)	Initializes the variables shortly after changing the screen. Writes the current value to each variable.
46-134	Screen operation (P0040_Trend graph_ n screen only)	Initializes the variables shortly after changing the screen. Prepares to issue a control command according to the status of each input button and selected operational function.
135-183		Updates peak bottom value of each input port.
184-273		Check alarm for the peak bottom value.
274-289	Operating constantly	Calculates the data for log write.
290-336		Creates the logs of updated date.
337-410		Creates the error logs.
411-436	Function check	Displays sample text on the trend graph log screen(for function check)

Task	SET_GRAPH_LOG
Function	Displays trend graph logs. Displays 10 latest logs in the display variable range.

	Changes the display range according to the request of button operation.	
FB	None	
Line	Description	Detail
1-29	First time setup at start-up	Sets the initial value and initializes variables.
30-74	Screen operation	Initializes the variables shortly after changing the screen.
75-87	(P0041_Trend graph_ log screen only)	Sets various timer functions.
88-244		Updates the display contents according to the status of button input.
245-266	Function check	Displays sample text on the trend graph log screen (for function check)

Task	TUNING_DISP	
Function	Controls according to the requested operation from the Tuning screen (setting all included).	
FB	SDO_WRITE_OBJ	
Line	Description	Detail
1-32	First time setup at start-up	Sets the initial value and initializes variables.
33-44	Multi setting check	Performs the flag setting when inputting multi setting.
45-65	Screen operation	Initializes the variables shortly after changing the screen.
66-168	(P0020_TuningFunction screen only)	Sets to show/hide buttons on the screen.
169-314	Operating constantly	Prepares to issue a control command according to the status of each input button.
315-364		Performs operation after SDO write.
365-377		This is the execution part of SDO writing FB.

Task	MULTI_CTRL	
Function	Changes all thresholds of all targeted Units, and operation mode.	
FB	SDO_WRITE_OBJ	
Line	Description	Detail
1-33	First time setup at start-up	Sets the initial value and initializes variables.
34-78	Screen operation (P0010_Monitor screen_ECT screen, P0039_All_Threshold_unit selection screen)	Changes the state according to the status selected by input button.
79-89	Screen operation	Initializes the displayed information on the screen.
90-108	(P0039_All_Threshold_unit selection screen only)	Initializes the variables shortly after changing the screen.
109-358		Prepares to issue a control command according to the status of each input button and selected operational function.
359-400		Performs operation after SDO write.
401-413		This is the execution part of SDO writing FB.

Additional Information

For details of each instruction used in ST program of NJ, refer to the *NJ/NX-series Instructions Reference Manual* (Cat. No. W502).

8-4 Function Block

This section describes FB (Function Block) used in this program and the functional configurations.

Name	Press_Hold_Button
Function	Performs the incrementing and decrementing operation by pressing and holding down a button.

[Input/output variables]

Variable name	Input/Output	Data type	Description
Calc_Execute	Input	BOOL	Execute
Calc_Status	Input	BOOL	The key is pressed and holding down
Calc_Cycle	Input	TIME	Cycle of incrementing and decrementing
Plus_Minus	Input	BOOL	Incrementing and decrementing flag TRUE= increment : FALSE=decrement
Inp_Data	Input	DINT	Value when starting operation
Calc_Busy	Output	BOOL	Executing the incrementing and decrementing operation
Calc_Data	Output	DINT	Calculated result

Name	SDO_MEM_READ
Function	Reads 26 items that are set from the sensor amplifiers with the setting selection and the workpiece selection. To use, call SDO_READ_OBJ FB from this FB.
FB	SDO_READ_OBJ

[Input/output variables]

Variable name	Input/Output	Data type	Description
R_Execute	Input	BOOL	Execute
R_Area	Input	UINT	Memory location
R_AMP	Input	UINT	Amplifier to be executed (0=all units/0<>specified unit)
R_ALL_AMP	Input	UINT	No. of the connected sensors
R_NDA	Input	UINT	Node address
R_UNIT_Busy	Input	BOOL	Unit status
R_Goki_CNT	Output	USINT	Execution unit No.
R_CNT	Output	USINT	Execution item No.
R_Done	Output	BOOL	Complete
R_Busy	Output	BOOL	During execution
R_Error	Output	BOOL	Error

[External variable]

Variable name	Data type	Description
g_DispSensor_Active	ARRAY[0..30] OF BOOL	Checking the implementation of sensor amplifiers
g_DMY_AMP	ARRAY[0..30] OF BYTE	Dummy amplifier information
g_SetMemory	ARRAY[0..10] OF AMP_WORK	Setting selection information

Variable name	Data type	Description
g_WorkMemory	ARRAY[0..30,0..10] OF AMP_WORK	Workpiece memory information [30 units, 10 memories]

Name	SDO_MEM_WRITE
Function	Writes 26 items that are set by the sensor amplifier in the setting selection and the workpiece selection. To use, call the SDO_WRITE_OBJ FB from this FB.
FB	SDO_WRITE_OBJ

[Input/output variables]

Variable name	Input/Output	Data type	Description
W_Execute	Input	BOOL	Execute
W_Area	Input	UINT	Memory location
W_AMP	Input	UINT	Amplifier to be executed (0=all units/0<>specified unit)
W_ALL_AMP	Input	UINT	No. of the connected sensors
W_NDA	Input	UINT	Node address
W_UNIT_Busy	Input	BOOL	Unit status
W_Goki_CNT	Output	USINT	Execution unit No.
W_CNT	Output	USINT	Execution item No.
W_Done	Output	BOOL	Complete
W_Busy	Output	BOOL	During execution
W_Error	Output	BOOL	Error

[External variable]

Variable name	Data type	Description
g_DispSensor_Active	ARRAY[0..30] OF BOOL	Checking the implementation of sensor amplifiers
g_DMY_AMP	ARRAY[0..30] OF BYTE	Dummy amplifier information
g_SetMemory	ARRAY[0..10] OF AMP_WORK	Setting selection information
g_WorkMemory	ARRAY[0..30,0..10] OF AMP_WORK	Workpiece memory information [30 units, 10 memories]

Name	SDO_READ_OBJ
Function	Reads SDO according to a read instruction from each program.

[Input/output variables]

Variable name	Input/Output	Data type	Description
R_Execute	Input	BOOL	Execute
R_Unit_Busy	Input	BOOL	Unit to be read is busy
R_Index	Input	UINT	Read index
R_SubIndex	Input	USINT	Read Sub Index
R_IsCompleteAccess	Input	BOOL	Read complete Access
R_NDA	Input	UINT	Read node address
R_TimeOut	Input	UINT	Read timeout value
R_Data	Input/Output	LINT	Read value
R_Size	Output	UINT	Read size
R_Done	Output	BOOL	Complete
R_Busy	Output	BOOL	During execution
R_Error	Output	BOOL	Error information
R_ErrorID	Output	WORD	Error ID
R_AbortCode	Output	DWORD	Abort code

Name	SDO_WRITE_OBJ
Function	Writes SDO according to a write instruction from each program.

[Input/output variables]

Variable name	Input/Output	Data type	Description
W_Execute	Input	BOOL	Execute
W_Unit_Busy	Input	BOOL	Unit to be written is busy
W_Index	Input	UINT	Write Index
W_SubIndex	Input	USINT	Write Sub Index
W_IsCompleteAccess	Input	BOOL	Write Complete Access
W_NDA	Input	UINT	Write node address
W_Data	Input	LINT	Write value
W_Size	Input	UINT	Write size
W_TimeOut	Input	UINT	Write timeout value
W_Done	Output	BOOL	Complete
W_Busy	Output	BOOL	During execution
W_Error	Output	BOOL	Error information
W_ErrorID	Output	WORD	Error ID
W_AbortCode	Output	DWORD	Abort code

Revision History

Revision code	Date	Revised content
01	December, 2015	Original production

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