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Servo

MELSERVO Basics (MR-J4-GF Servo Amplifier I/O Mode)

This course is for participants who will use a MR-J4-GF servo amplifier compatible with CC-Link IE Field Network for the first time.

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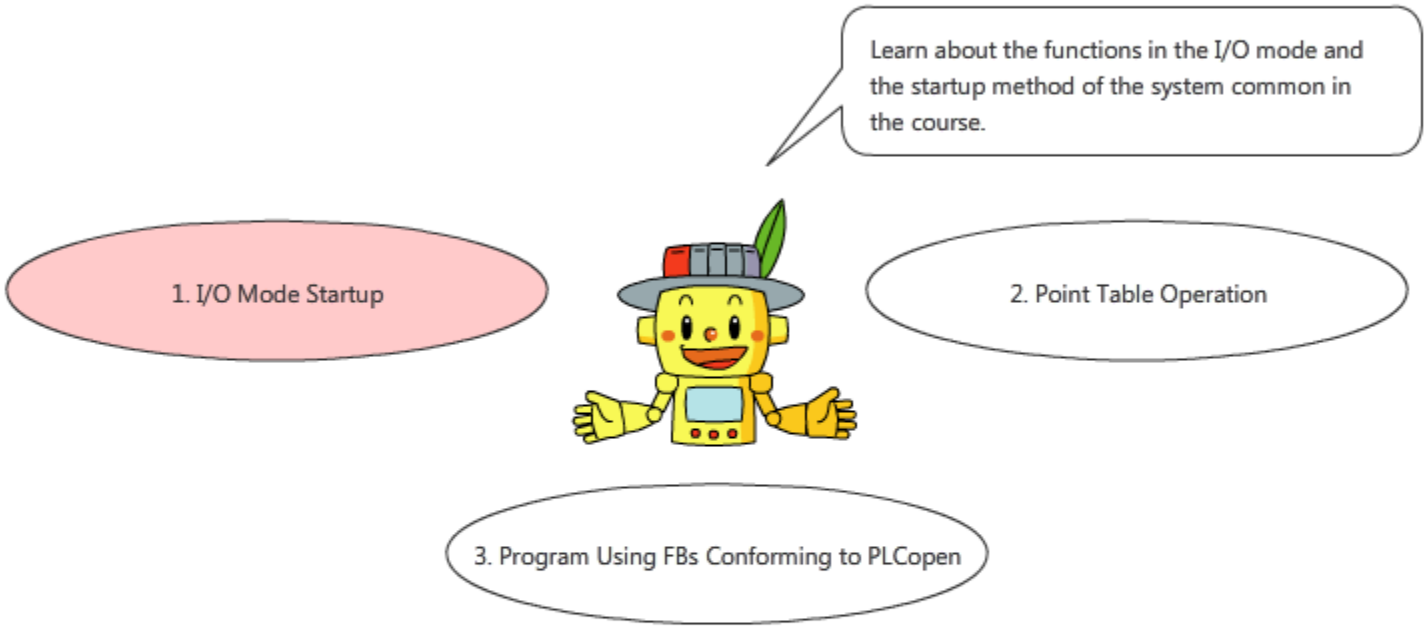
L(NA)00209ENG

Introduction Purpose of the Course

This course targets those who establish a system using the MELSERVO-J4 series servo amplifier compatible with CC-Link IE Field Network for the first time. This course describes the procedures for system design, installation, wiring and program examples.



The basic knowledge of MELSEC iQ-R series PLCs, AC servos, and positioning control is required to take this course.

For beginners, taking the following courses is recommended.
- "MELSEC iQ-R Series Basics" course
- "GX Works3 (Ladder)" course
- "MELSERVO Basics (MR-J4)" course
- "FA Equipment for Beginners (Positioning)" course

Introduction Course Structure

The contents of this course are as follows.
We recommend that you start from Chapter 1.

Chapter 1 - I/O Mode Startup

Learn about the functions in the I/O mode and the startup method of the system common in the course.

Chapter 2 - Point Table Operation

Learn about the positioning operation method using a point table.

Chapter 3 - Program Using FBs Conforming to PLCopen

Learn about the programming which uses function blocks conforming to PLCopen.

Final Test

5 sections in total (7 questions) Pass grade: 60% or higher

Introduction How to Use This e-Learning Tool

Go to the next page		Go to the next page.
Back to the previous page		Back to the previous page.
Move to the desired page		"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning		Exit the learning. Window such as "Contents" screen and the learning will be closed.

Introduction Cautions for Use

Safety precautions

When you learn by using actual products, please fully read the safety precautions in the corresponding manuals and use them correctly.

Precautions in this course

- The displayed screens of the software version that you use may differ from those in this course.

  The following shows the software used in this course and each software version.

  - MELSOFT GX Works3 Ver.1.032J
  - MELSOFT MR Configurator2 Ver.1.60N

Reference materials

The following is the reference related to the learning. (You can learn without it.)
Click the name of the reference material to download.

Name of reference	File format	File size
Recording paper	Compressed file	6.37 kB

Chapter 1 I/O Mode Start up

This chapter describes the startup method of the MR-J4-GF servo amplifier with the I/O mode in the work order.

1.1 Functions in the I/O Mode

The MR-J4-GF servo amplifier has two station-specific modes: Motion mode and I/O mode.
They have the following differences.

Motion mode ····· This mode performs advanced motion control such as interpolation control, synchronous control, and speed-torque control of multiple axes with the combination of the Simple Motion module.
Learn about the motion mode in the "Servo System Controller MELSEC iQ-R series Simple Motion Module (CC-Link IE Field Network)" course.

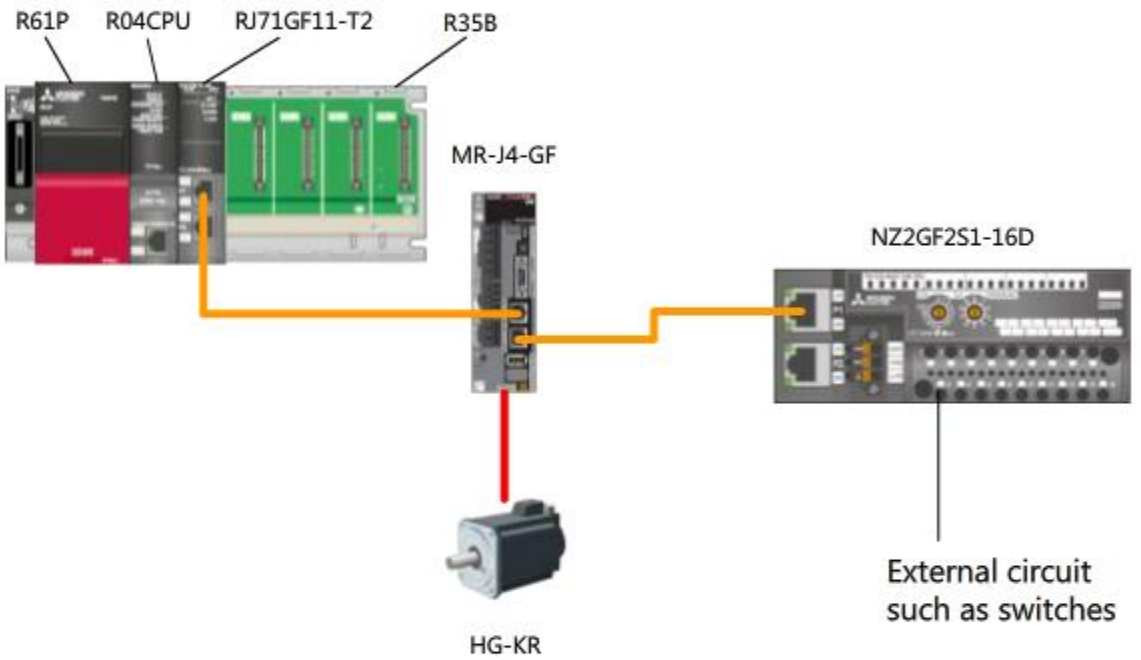
I/O mode ····· This mode drives a belt conveyor and rotation table easily by using the positioning function built in the servo amplifier. A module other than the Simple Motion module can be used as a master station.

The motion mode and I/O mode can be used together on the same network. When using them together, use the master station, such as RD77GF, that is compatible with the motion mode.
The I/O mode has two positioning modes: Point table method and indexer method.
For the point table method, select the point table (255 points at maximum) set in the servo amplifier in advance, and send a start signal to start positioning to the selected position.
For the indexer method, select a position (station position) on the rotation table equally divided into 2 to 255, and send a start signal to start positioning to the selected position.

The I/O mode is supported by the servo amplifier with software version A1 or later, and the indexer operation with A3 or later.
Check the software version of the servo amplifier with [Diagnosis] - [System Configuration] of MR Configurator2.

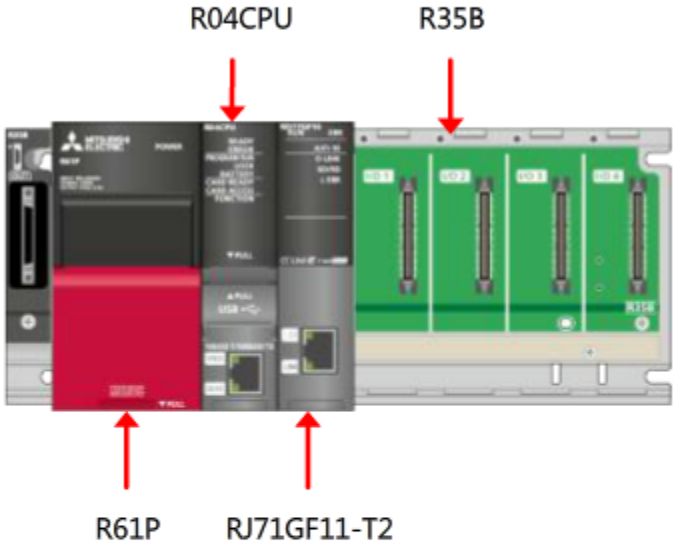
1.2 System Configuration

The following figure shows the system configuration. The machine part will be described in sections 1.8 and 3.3.
Connect an external circuit to the remote input module.



1.3 Mounting Modules

Mount each module on the base unit as shown below.
For details, refer to the MELSEC iQ-R Module Configuration Manual.



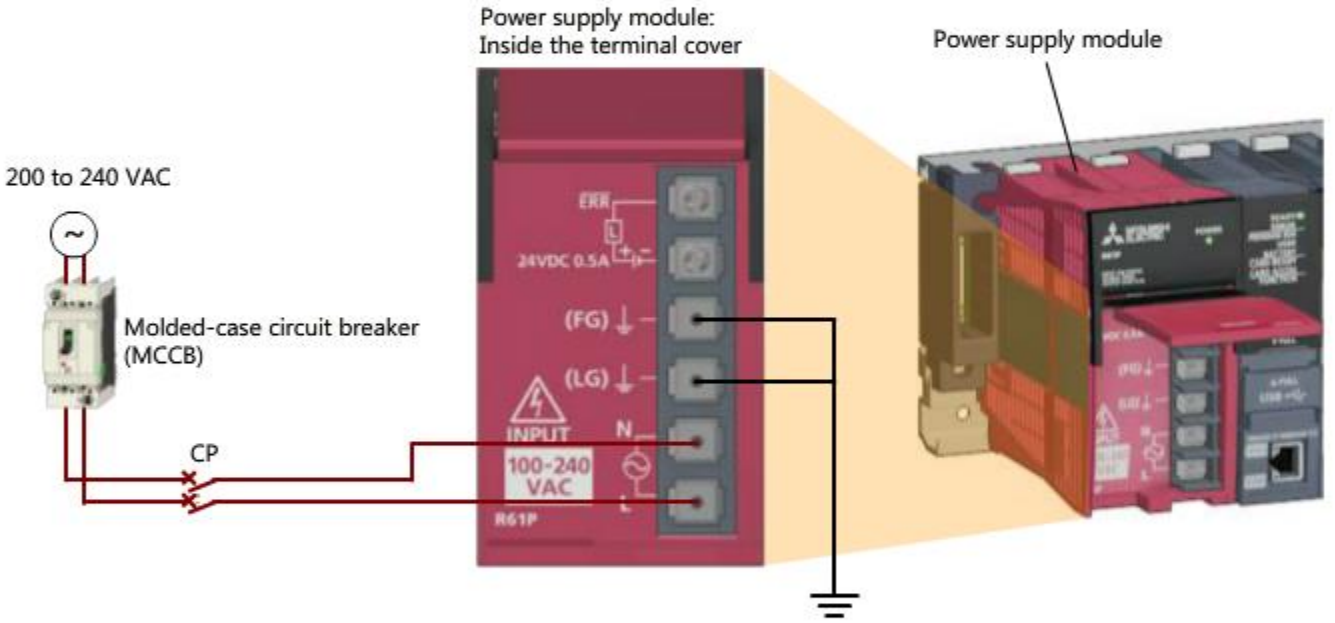
*Instead of using R04CPU and RJ71GF11-T2, CC-Link IE embedded CPU (R04ENCPU) can be used.

1.4 Wiring a Power Supply and Connecting Cables

The wiring diagram in this section is an outline. For actual wiring, be sure to refer to the manuals of each module.

(1) Wiring the PLC power supply

The following shows an example for connecting the power supply and ground lines to the power supply module.
Open the terminal cover at the front of the power supply module and connect the wires.
To reduce noise in the power supply system, connect an isolation transformer.

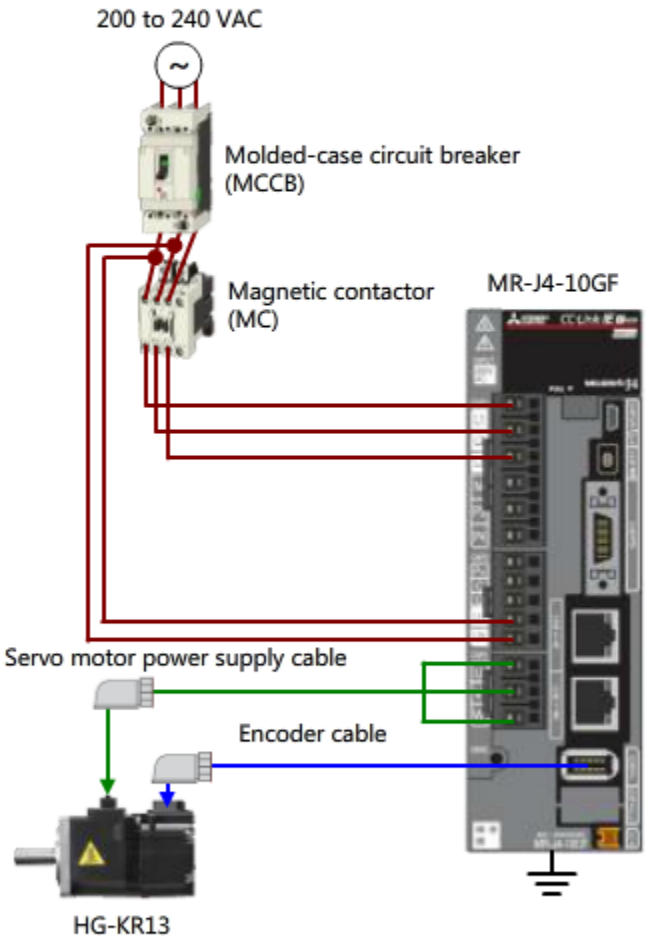


Item	Applicable wire size	Tightening torque
Power wire	0.75 to 2 mm^2 (AWG18 to AWG14)	1.02 to 1.38 N·m
Ground wire	0.75 to 2 mm^2 (AWG18 to AWG14)	1.02 to 1.38 N·m

1.4 Wiring a Power Supply and Connecting Cables

(2) Wiring the power supply of the servo amplifier and the servo motor

Wire the control circuit power supply (L11, L21) and the main circuit power (L1, L2, L3) to the servo amplifier, and connect the power cable and encoder cable.



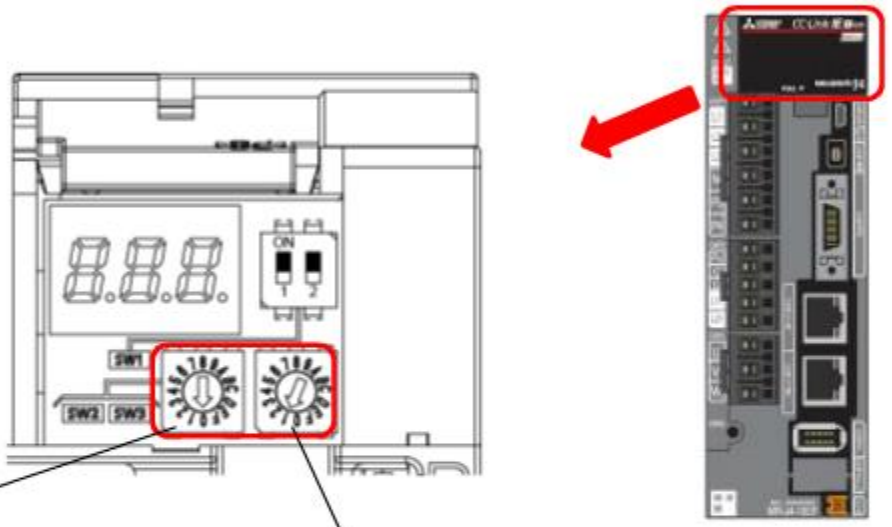
The following table lists the wire size of when the servo amplifier MR-J4-10GF is used.
When using a servo amplifier with a different capacity, refer to the Instruction Manual for its model.

Item	Applicable wire size	Tightening torque
Control circuit power supply (L11, L21)	1.25 mm^2 to 2 mm^2 (AWG16 to 14)	-
Main circuit power supply (L1, L2, L3)	2 mm^2 (AWG14)	-
Ground wire	1.25 mm^2 (AWG16)	1.2 N·m

1.5 Setting Station Numbers

(1) Setting station numbers of the servo amplifiers

Use the rotary switches (SW2 and SW3) to set the station numbers of the servo amplifiers.
Set the station numbers in hexadecimal.



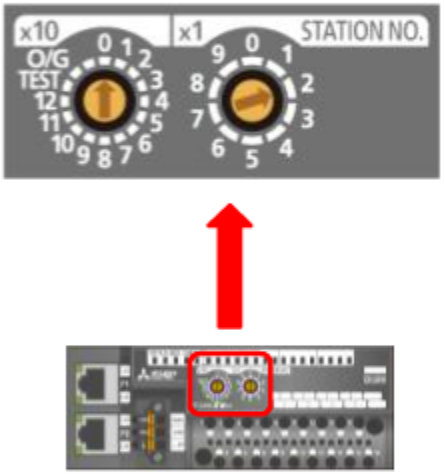
SW2
Station number setting
rotary switch (upper)

SW3
Station number setting
rotary switch (lower)

1.5 Setting Station Numbers

(2) Setting a station number of the remote input module

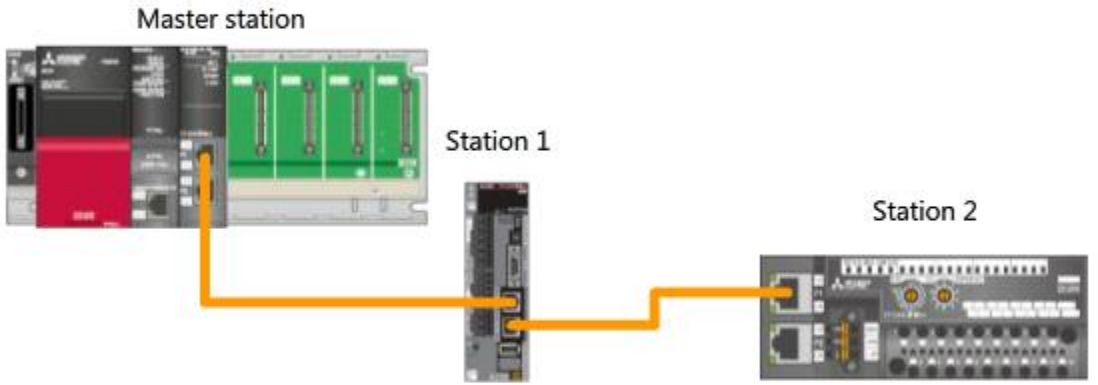
Use the station number setting switch at the front of the module to set a station number.
Set numbers in the hundreds and tens places with the rotary switch on the left side and a number in the ones place with the rotary switch on the right side.



1.6 Connecting CC-Link IE Field Network

Connect RJ71GF11-T2, MR-J4-GF and the remote input module with Ethernet cables.
Connect them in a line topology as follows in this course.

Use the Ethernet cables with the following standard for CC-Link IE Field Network.
The maximum station-to-station distance of the Ethernet cable is 100 m. However, the distance may be shorter depending on the operating environment of the cable.

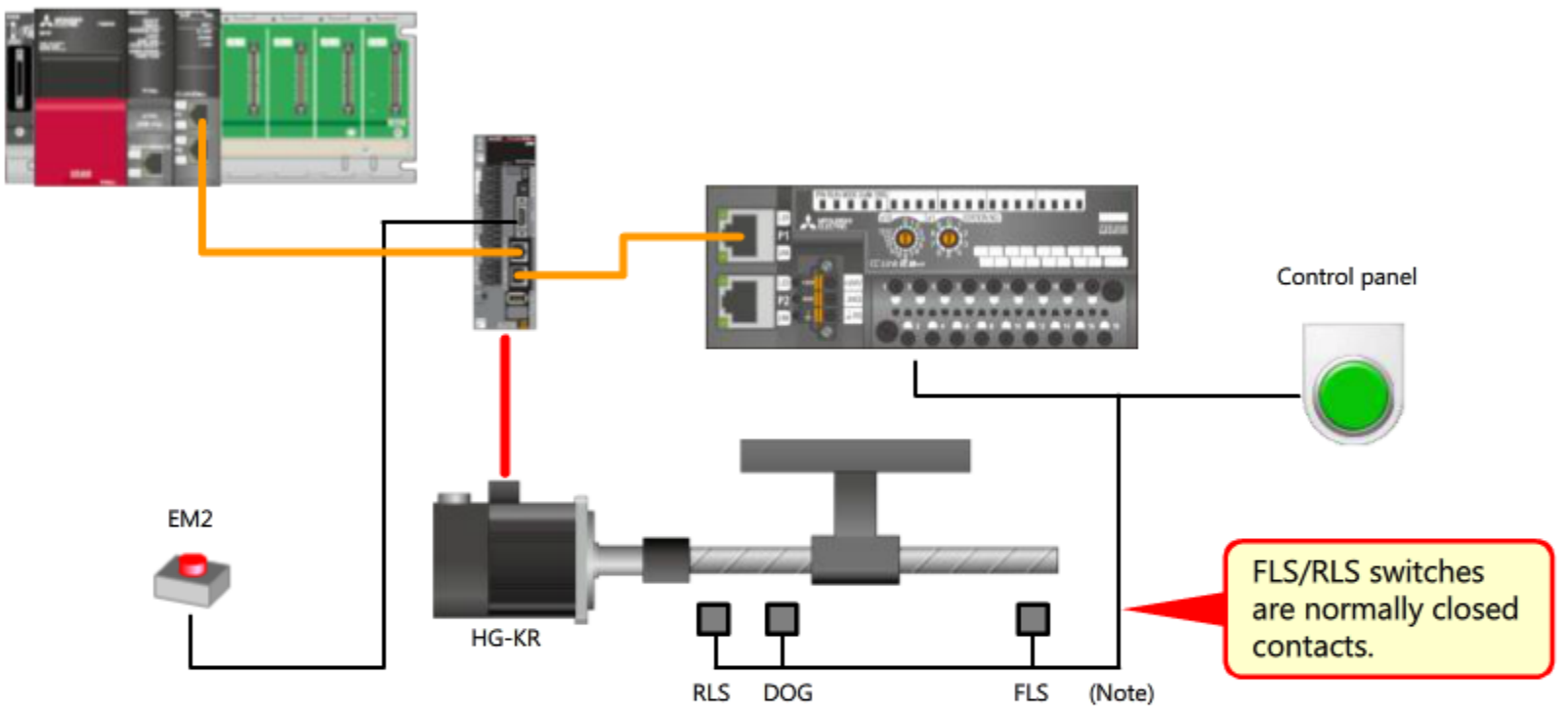


Ethernet cable	Connector	Standard
Category 5e or higher, straight cable (double shielded, STP)	RJ45 connector	Applicable cables: •IEEE802.3 (1000BASE-T) •ANSI/TIA/EIA-568-B (Category 5e)

1.7 Device Configuration

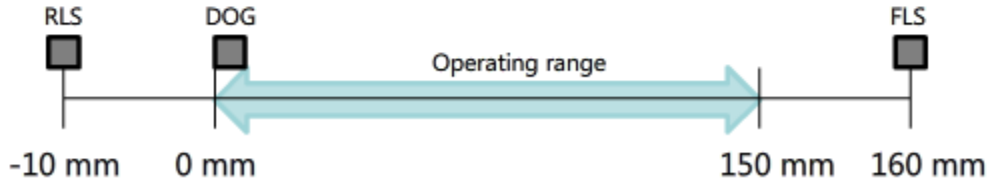
(1) Device configuration

The device configuration includes one axis of ball screw.



Lead of ball screw (pitch): 10 mm

The limit switches are provided at the positions shown below.

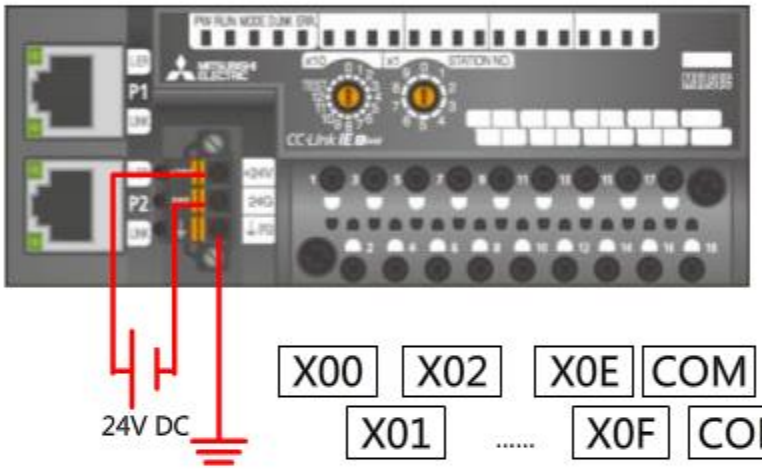


(Note) In this course, the proximity dog switch and stroke limit switch are connected to the remote input module for purpose of illustration. To increase the accuracy of home position return, connect them directly to the servo amplifier.

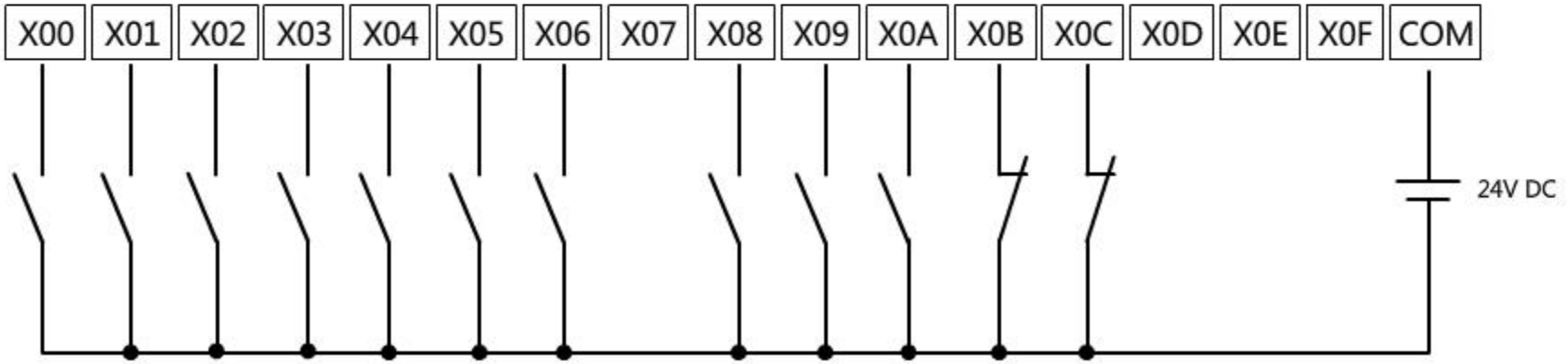
1.7 Device Configuration

(2) Wiring an external circuit

Connect an external circuit to the remote input module in this course.
The following figure shows the assignment and wiring of each signal for chapter 2.



X00: Servo-ON
X01: Forward rotation start
X02: Reverse rotation start
X03: Monitor start
X04: Pause/Restart
X05: Point table selection 0
X06: Point table selection 1
X07: Not connected
X08: Automatic/Manual selection
X09: Reset
X0A: Proximity dog
X0B: Upper stroke limit
X0C: Lower stroke limit
X0D: Not connected
X0E: Not connected
X0F: Not connected

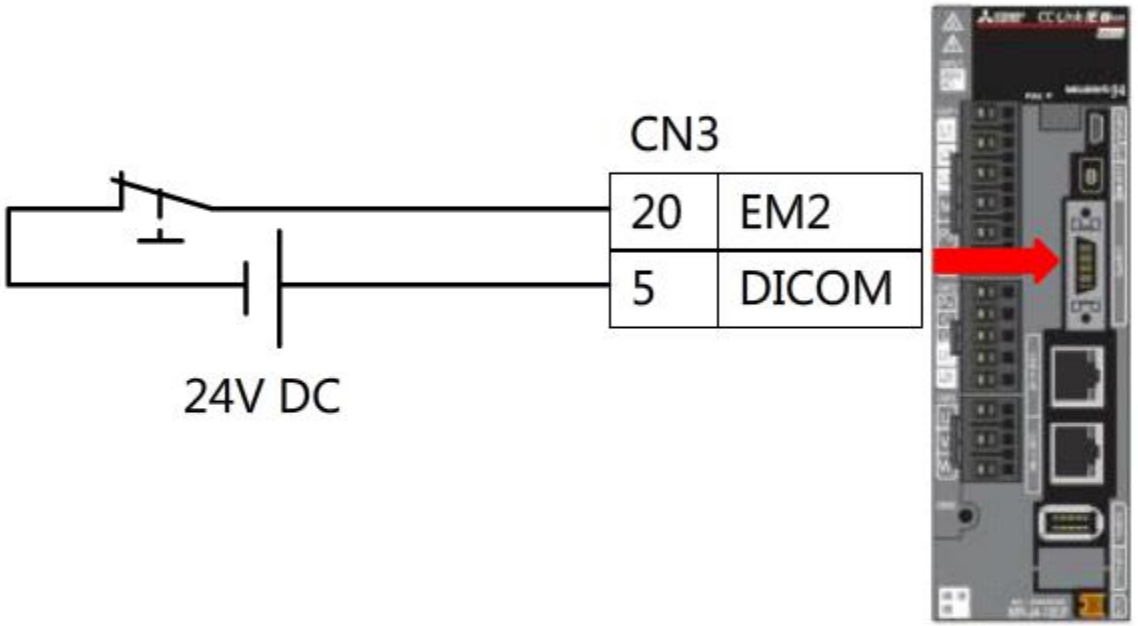


1.7 Device Configuration

(3) Wiring an forced stop switch (EM2)

Connect the forced stop switch to CN3 of the servo amplifier.

Connect the switch as follows.

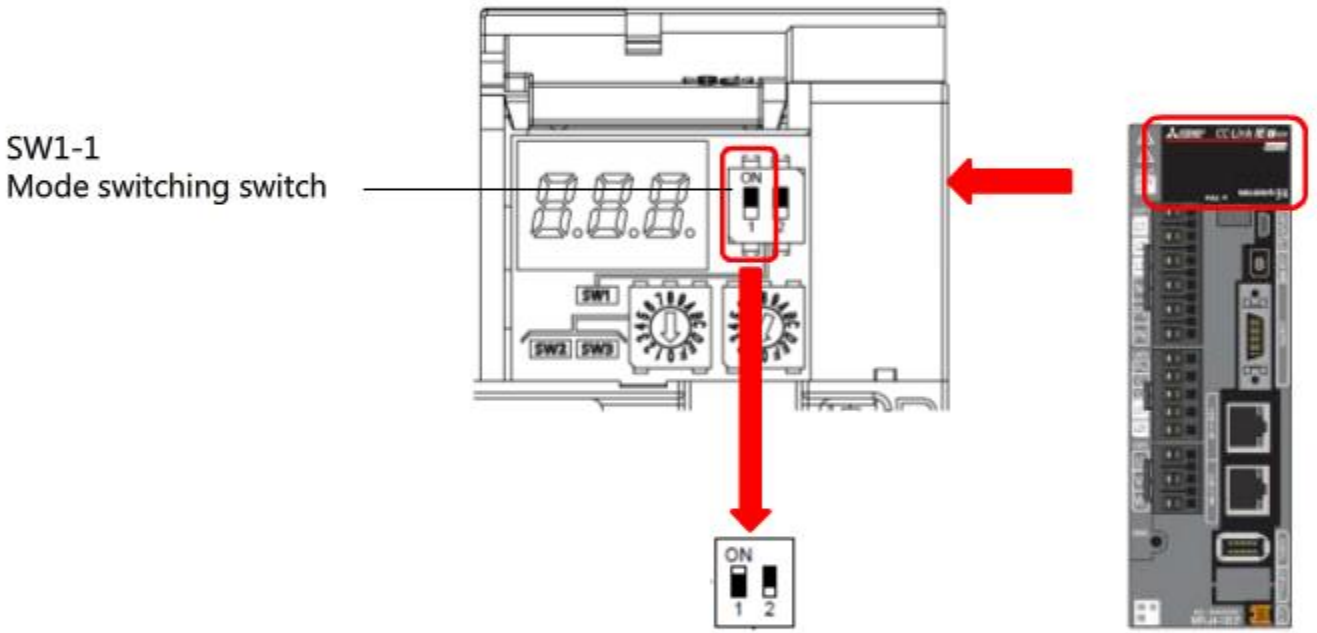


1.8 Test Operation

Before operating the system by the command from the controller, perform a test operation, and check that the machine operates properly.

(1) Test operation mode

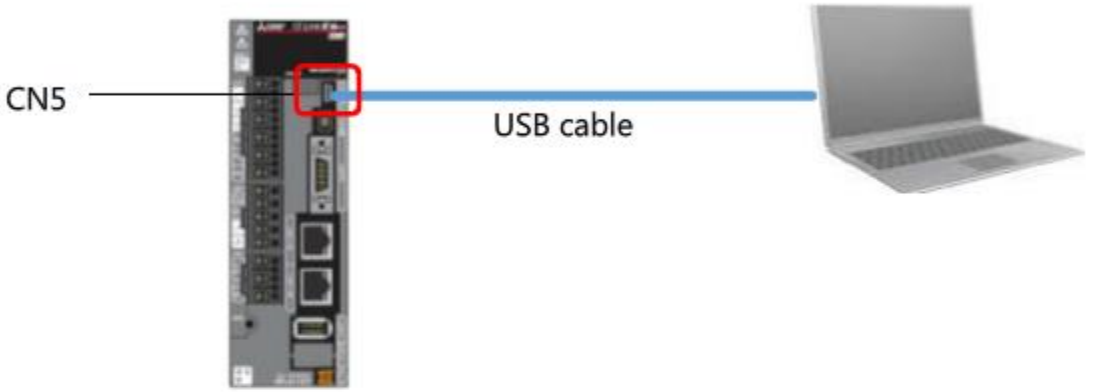
Turn ON (up) SW1-1 which is inside the display cover of the servo amplifier.



1.8 Test Operation

(2) Connecting a servo amplifier and a personal computer

Connect the servo amplifier and a personal computer with a USB cable.



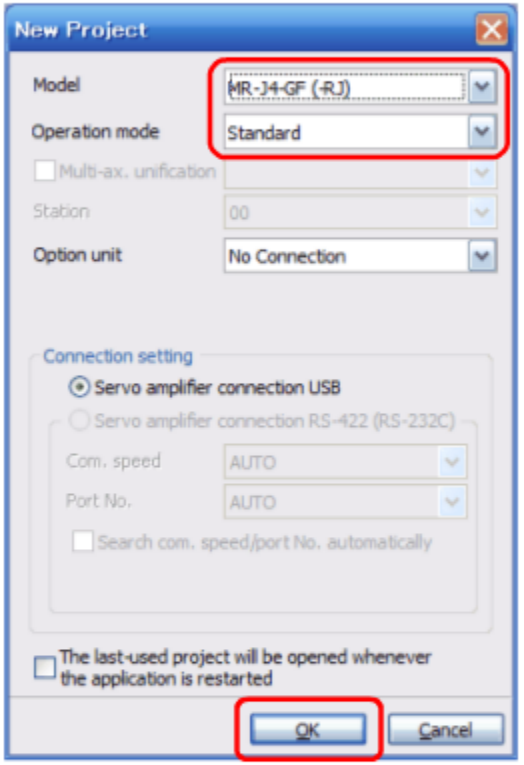
(3) Turning on power supplies

Power on the servo amplifier. The display of servo amplifier displays "b01.".

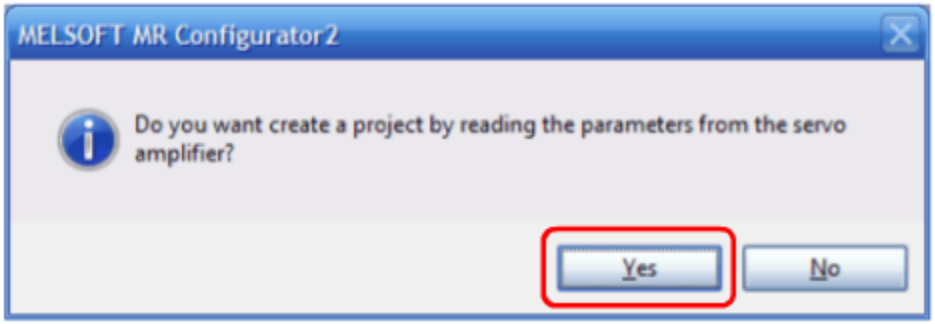
1.8 Test Operation

(4) Test operations using MR Configurator2

1) Start MR Configurator2. Set "Model" to "MR-J4-GF" and create a new project.

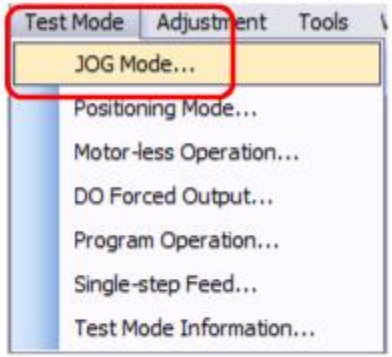


2) When the following appears, click "Yes". MR Configurator2 starts reading the parameters.

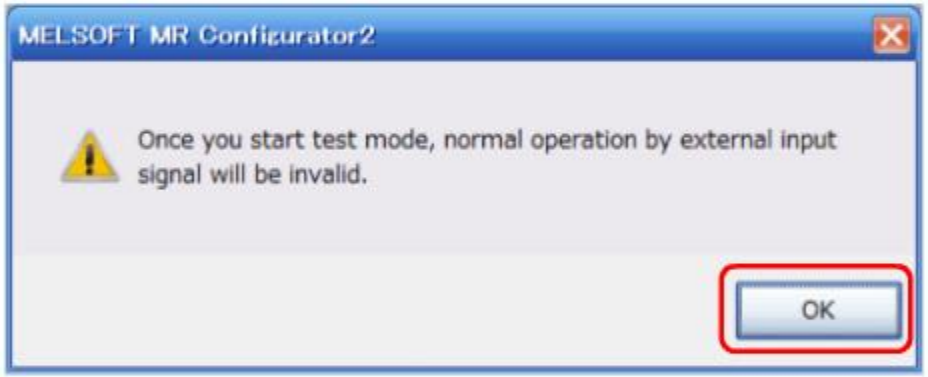


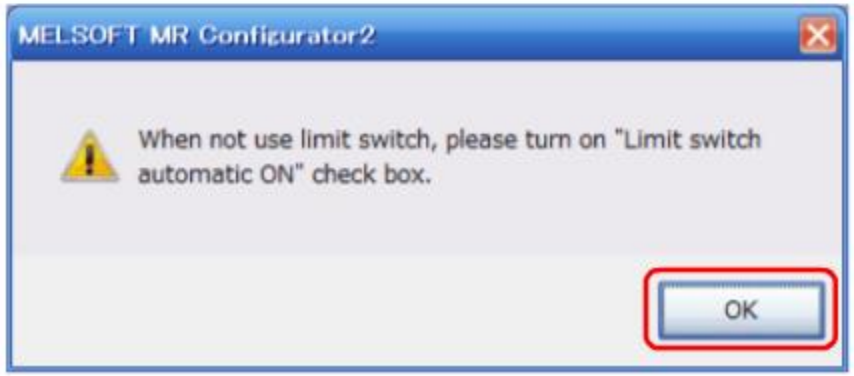
1.8 Test Operation

3) Select [Test Mode] - [JOG Mode] in the menu bar.



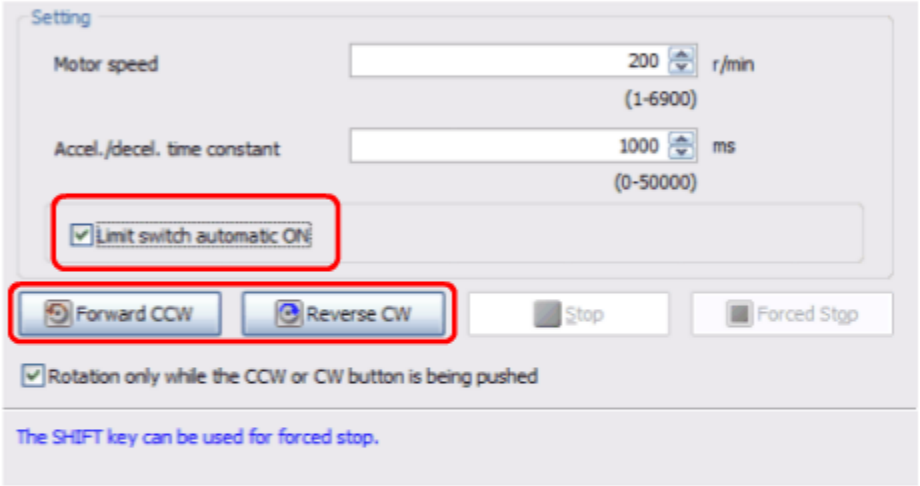
4) The following two messages appear. Click "OK".



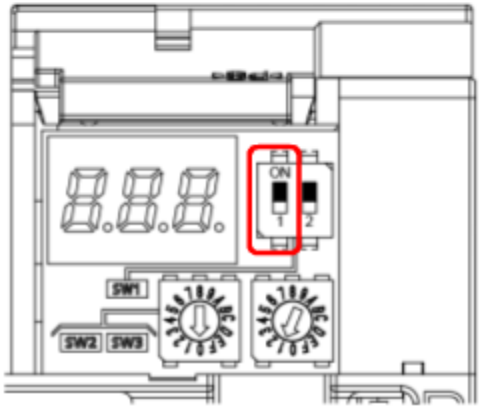


1.8 Test Operation

5) The JOG operation window appears. Put a check to "Limit switch automatic ON".
The limit switch does not work at this point. Prevent the machine from crashing.
Click the [Forward CCW] or [Reverse CW] button to rotate the motor.
Check that the ball screw operates normally, and that the relation between the rotation direction of the motor and moving direction of the ball screw is normal.



6) To quit the JOG operation, close the JOG operation window.
The machine turns to the servo-off status. Avoid an unexpected move of the machine.
After powering off the servo amplifier, turn off SW1-1 again.



1.9 Summary of This Chapter

In this chapter, you have learned:

- System Configuration
- Mounting Modules
- Wiring a Power Supply and Connecting Cables
- Setting Station Numbers
- Connecting CC-Link IE Field Network
- Device Configuration
- Test Operation

Important points

System Configuration	• Configure a system which connects MELSEC iQ-R series PLCs and MELSERVO J4 series servo amplifiers over CC-Link IE Field Network.
Mounting Modules	• Mount the power supply module R61P, PLC CPU module R04CPU, and CC-Link IE Field Network Master/Local module RJ71GF11-T2 on the base unit R35B.
Wiring a Power Supply and Connecting Cables	• Wire the power supply to the PLCs and servo amplifiers. • Connect the servo motor power cables and encoder cables to the servo amplifiers.
Setting Station Numbers	• Set the station numbers to the servo amplifiers and the remote input module.
Connecting CC-Link IE Field Network	• Connect the servo amplifiers and the remote input module with Ethernet cables.
Device Configuration	• Use the system that drives one axis of ball screw. • Connect the external circuit including start switches and limit switches to the remote input module.
Test Operation	• Set the servo amplifier to the test operation mode. • Check the operation with the JOG operation function of MR Configurator2.

Chapter 2 Point Table Operation

This chapter describes the positioning operation method using a point table.

2.1 GX Works3 Setting

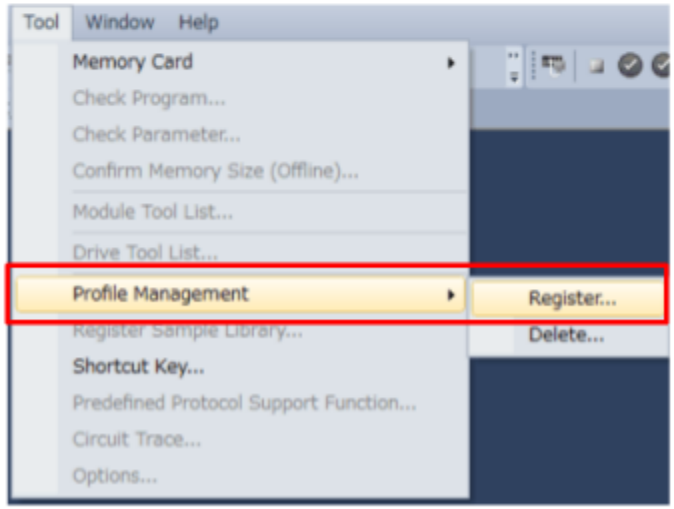
(1) Registering profiles

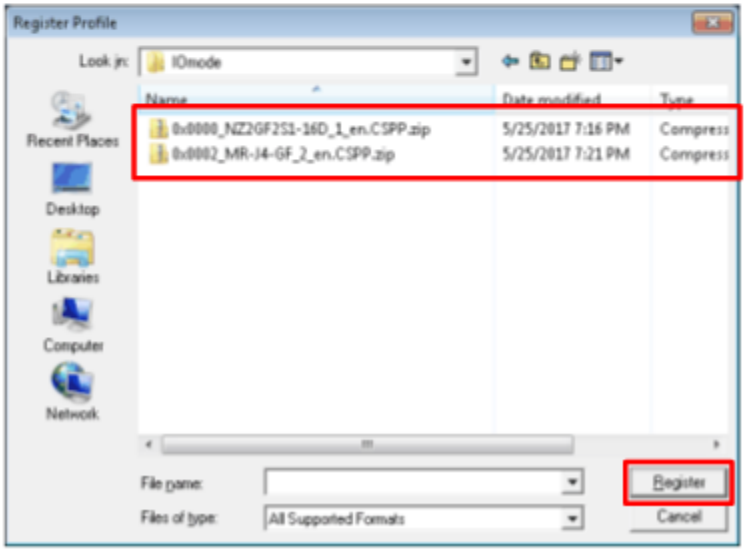
Register profiles of the MR-J4-GF and the NZ2GF2S1-16D. Once you register the profiles, there is no need to register them later.

1) Download the profile data of the MR-J4-GF and the NZ2GF2S1-16D from the following table, and store the zip files in arbitrary places .
(You do not need to decompress the zip files.)

Data	File format	File size
MR-J4-GF Profile	Compressed file	9.73 kB
NZ2GF2S1-16D Profile	Compressed file	11.7 kB

2) Start GX Works3.
3) Select [Tool] - [Profile Management] - [Register] with no project opened.
4) Select the stored zip file and click [Register].



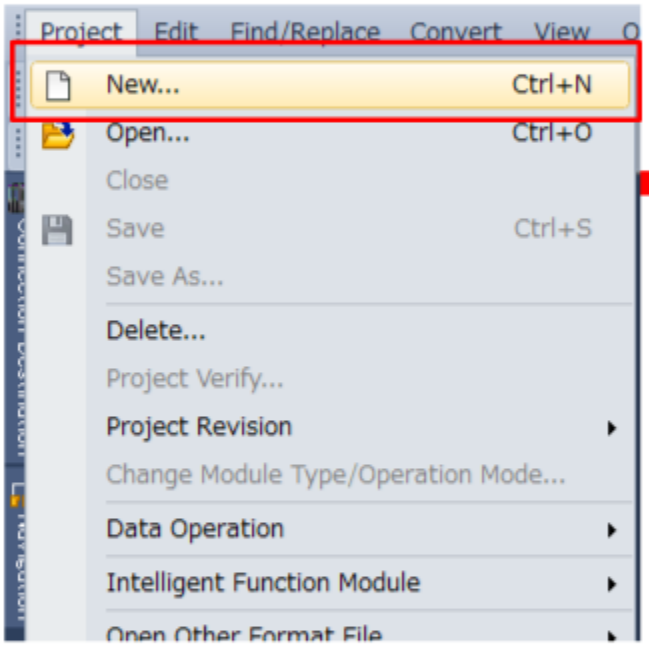


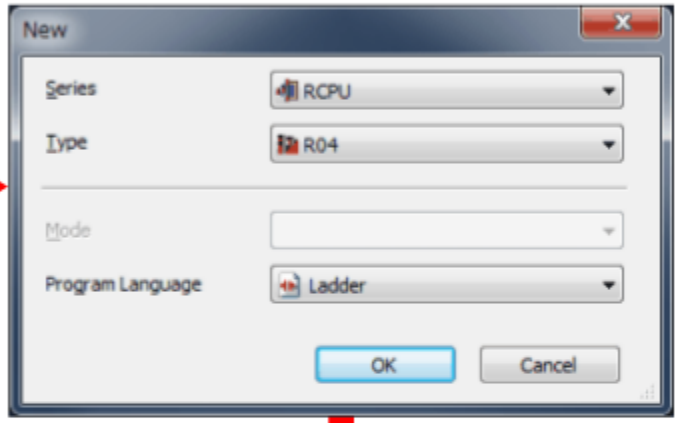
2.1 GX Works3 Setting

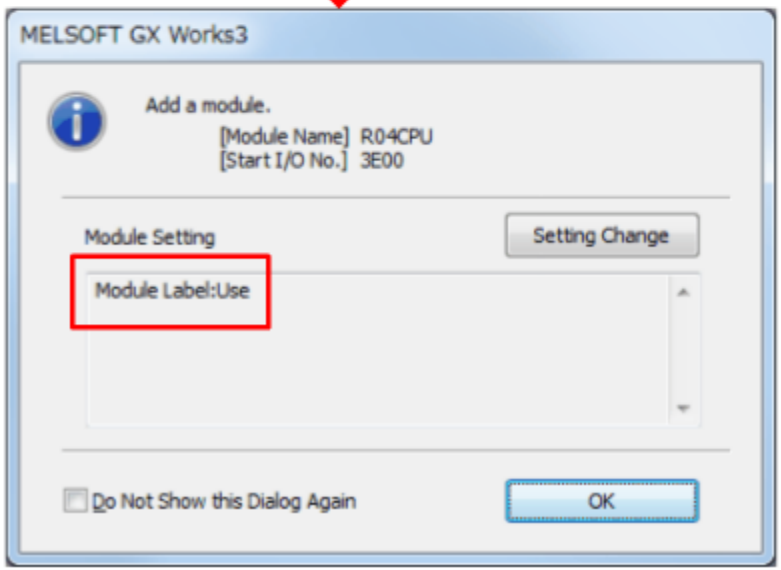
(2) Creating a Project

Create a project for GX Works3.

1) Select [Project]-[New].
2) Set the following items as follows in the New window.
3) Set Module Label to [Use] in Module Setting.





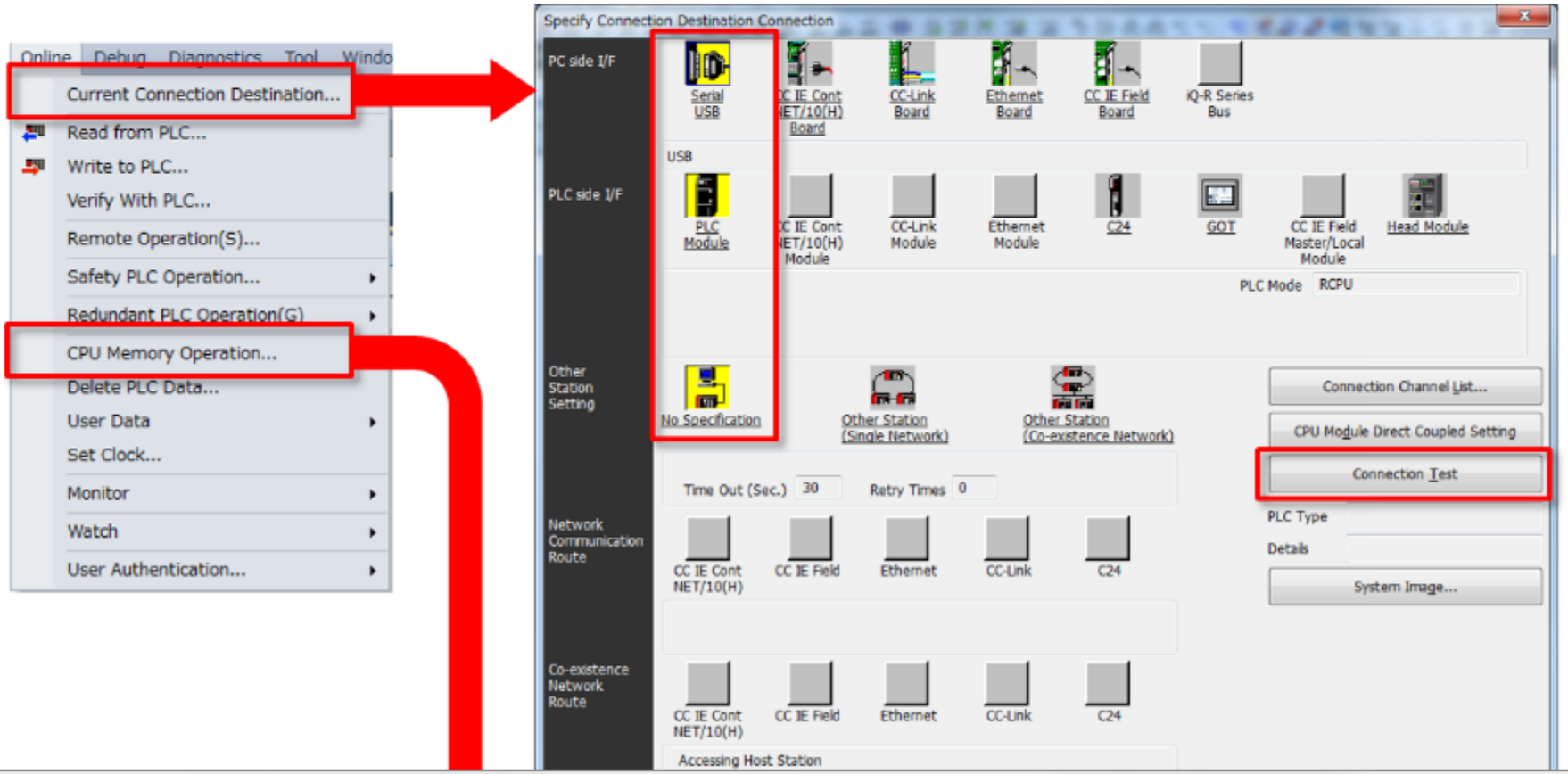


2.1 GX Works3 Setting

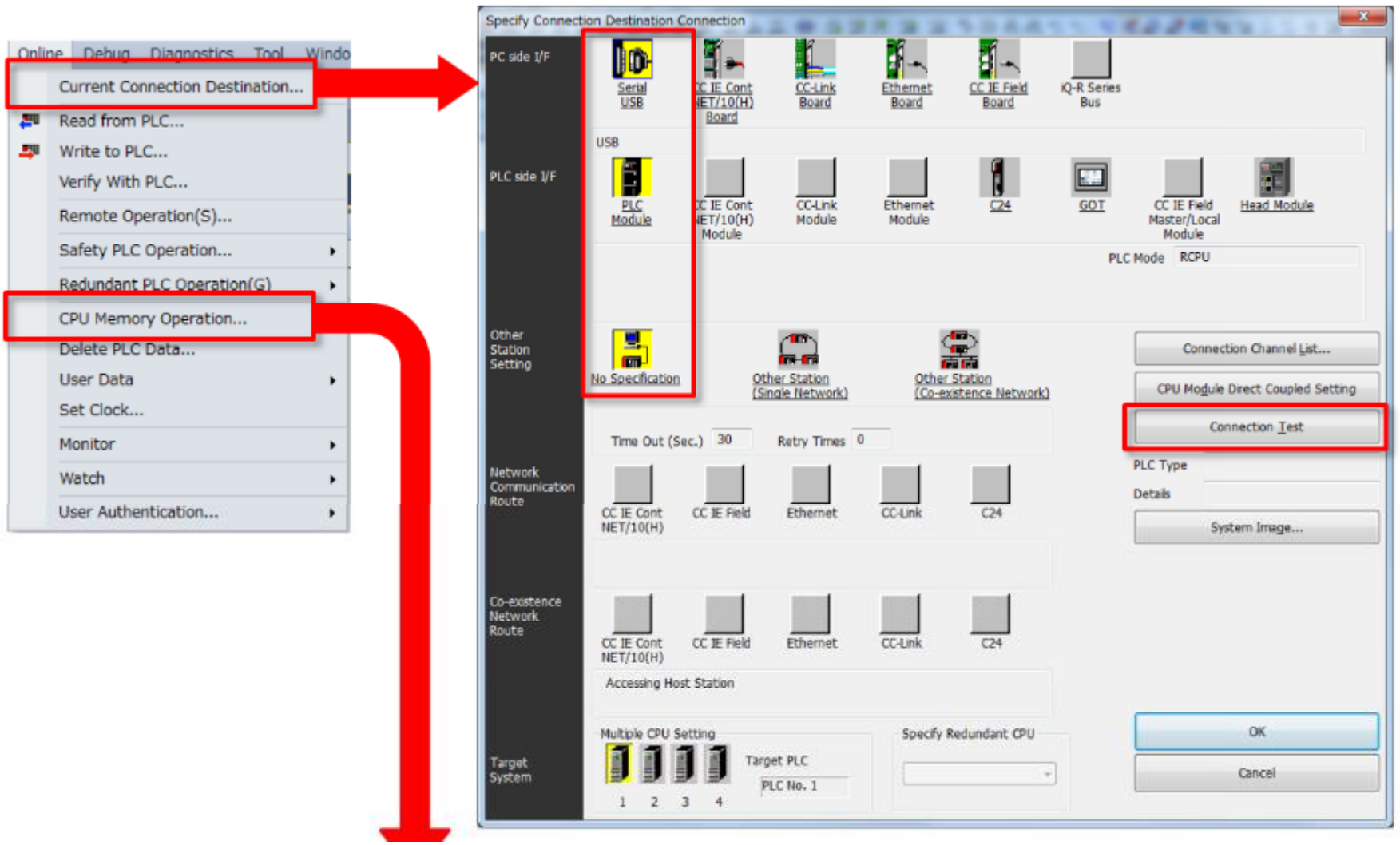
(3) Initializing the Memory

Initialize the memory of the PLC CPU.

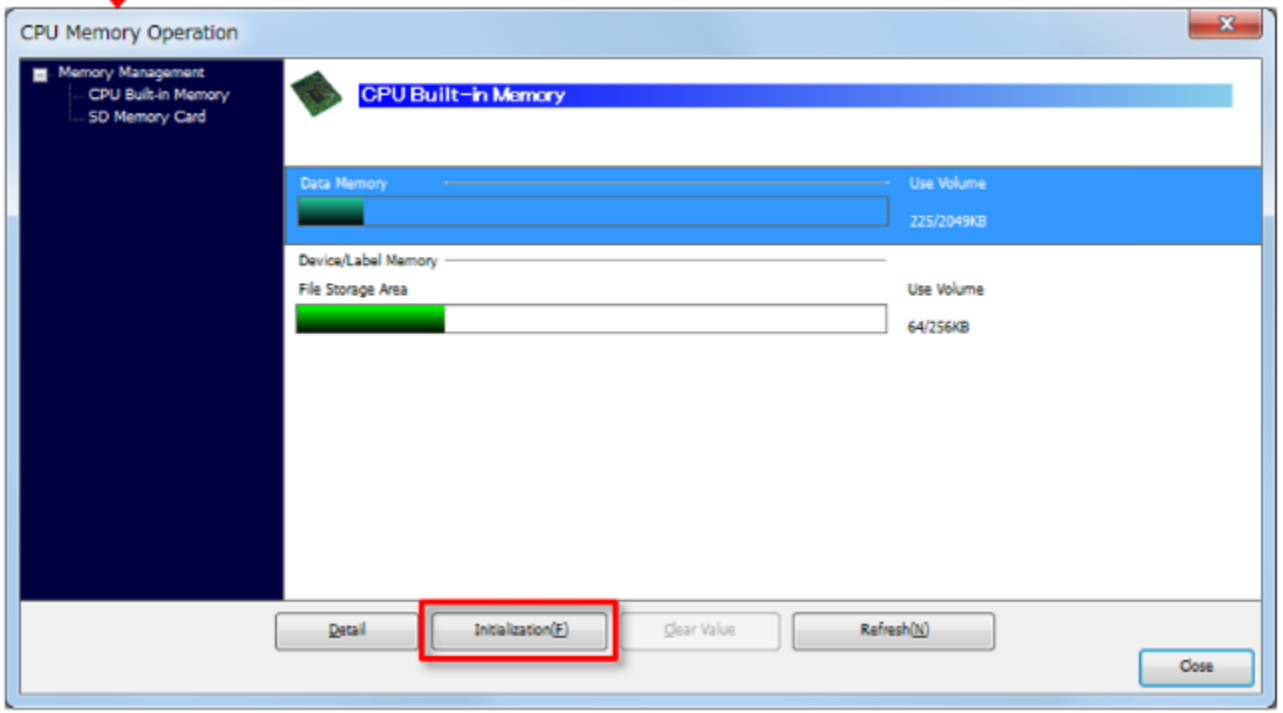
1) Connect the R04CPU and a personal computer with a USB cable.
2) Set the connection setting of GX Works3 to the USB connection.
   Select [Online] - [Current Connection Destination]. Set the connection destination as follows.
   Select [Connection Test] to check if the communication is established correctly. If it is established correctly, click [OK] to close the window.
3) Initialize the memory.
   Select [Online] - [CPU Memory Operation]. When the CPU Memory Operation window appears, click [Initialization].
   When the message "Initialize the selected memory. Are you sure you want to continue?" appears, click [Yes].



2.1 GX Works3 Setting



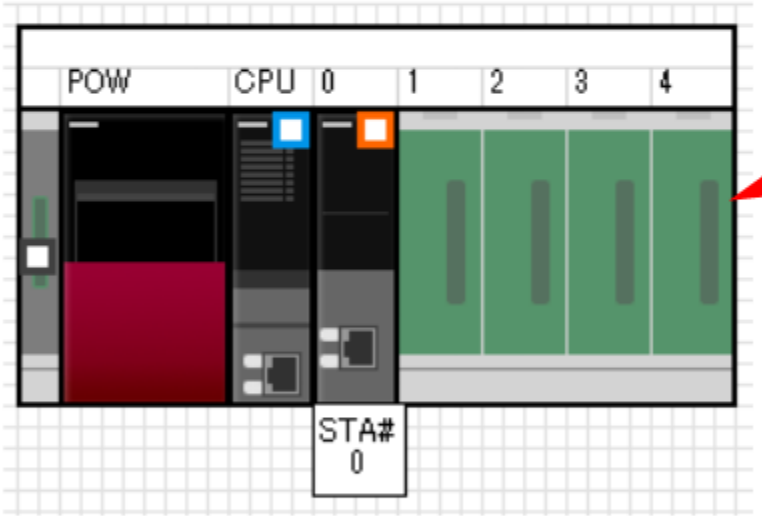
2.1 GX Works3 Setting

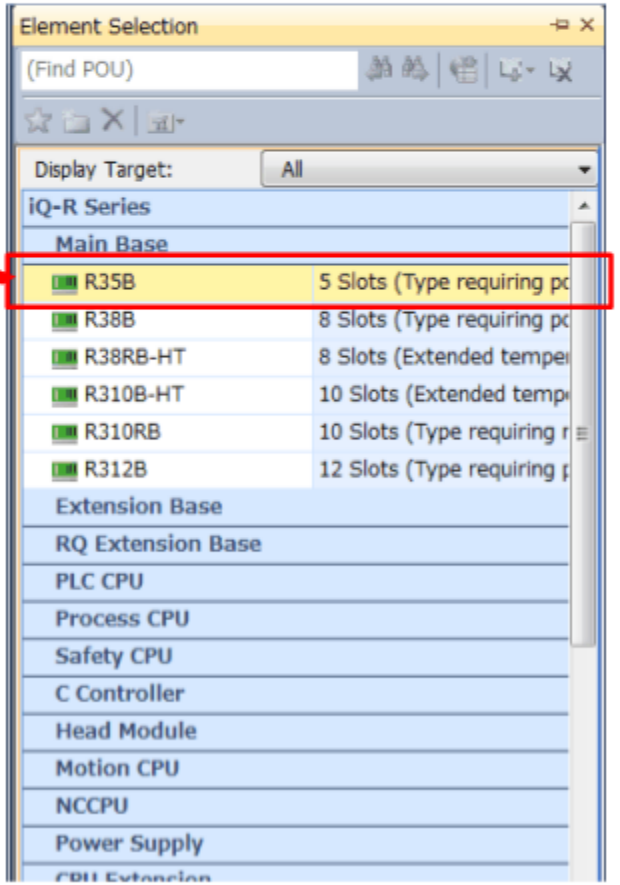


2.1 GX Works3 Setting

(4) Creating a module configuration diagram

Create a module configuration diagram.
Select [Module Configuration] from the project tree.
Select the POU List tab from the Element Selection window, and drag and drop the module to be used.
Select figures corresponding to the PLC modules used in an actual system.
After creating the module configuration diagram, select [Edit]-[Parameter]-[Fix] and closet the Module Configuration window.



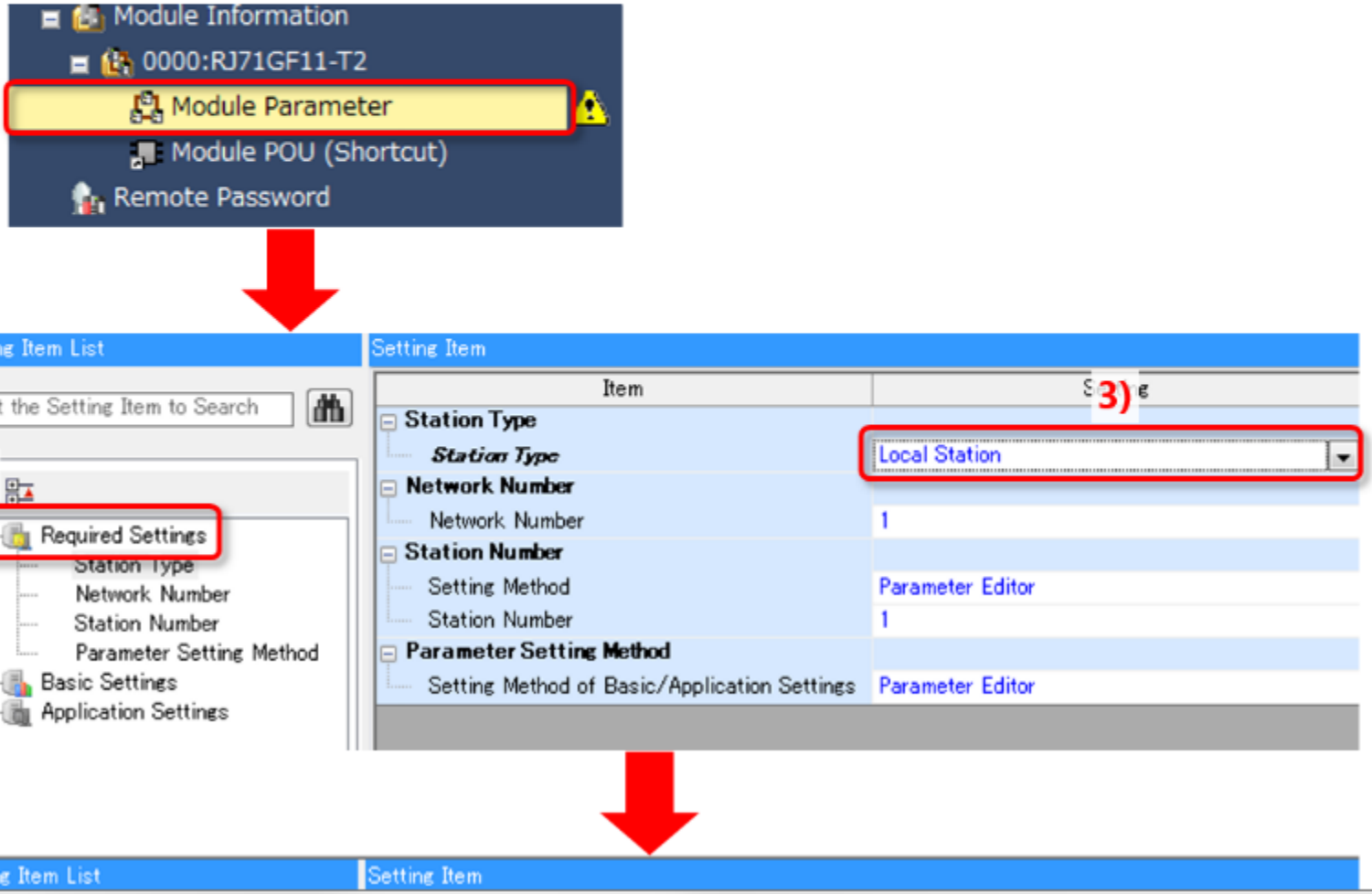


2.1 GX Works3 Setting

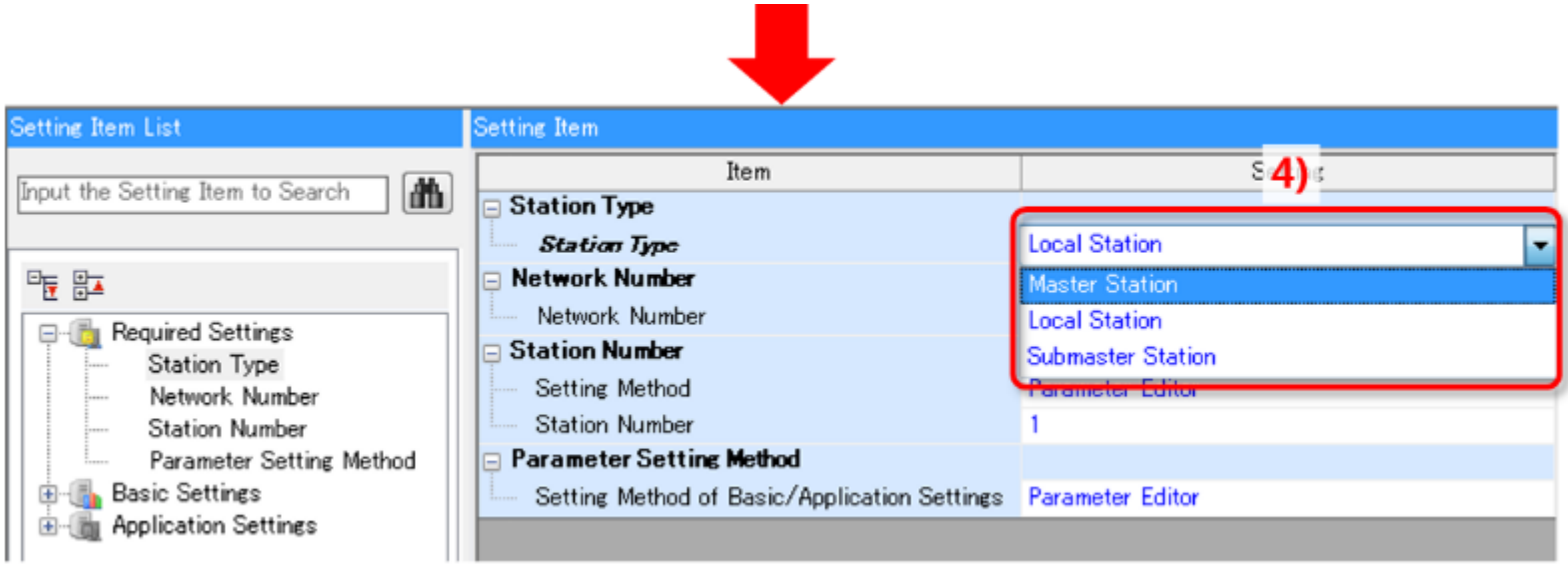
(5) CC-Link IE Field Network master/local module setting

Use the CC-Link IE Field Network master/local module as the master station in this course.

1) Double-click [Module Parameter] from the project tree.
2) Click [Required Settings].
3) Click [Local Station] of [Station Type] and display the [▼] button on the right side.
4) Click the [▼] button, and select "Master Station" from the drop-down menu.



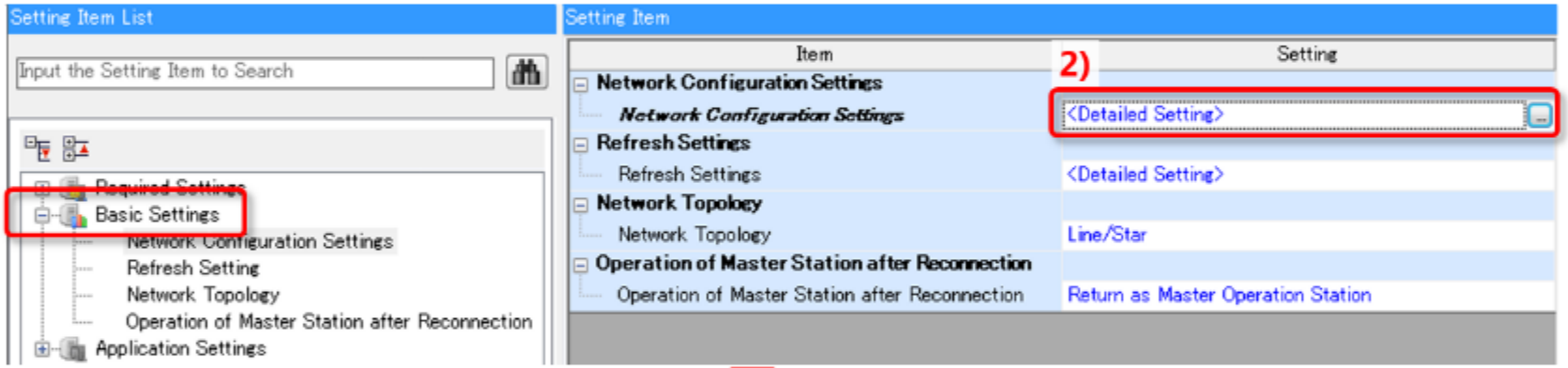
2.1 GX Works3 Setting

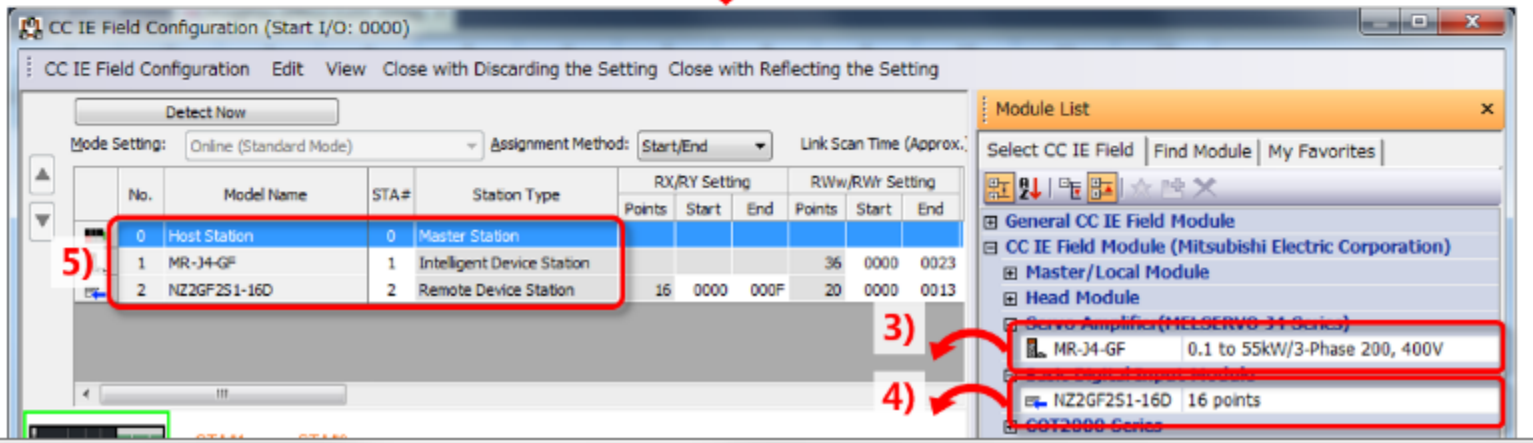


2.1 GX Works3 Setting

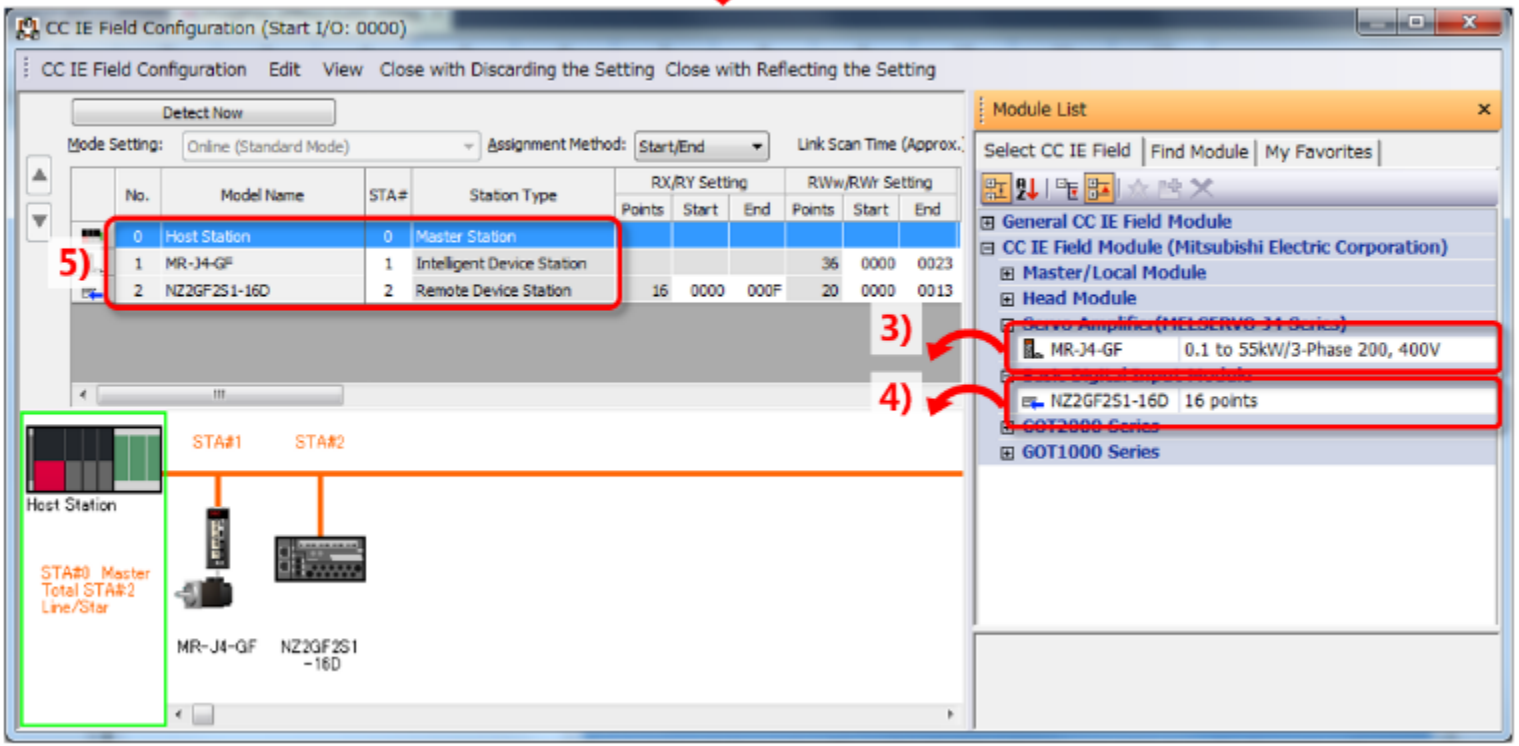
(6) Adding a slave station

1) Select [Basic Settings] from "Setting Item List".
2) Double-click <Detailed Settings> for "Network Cofiguration Settings". The [CC IE Field Configuration] window appears.
3) Drag and drop [Servo Amplitier(MELSERVO-J4 Series)] - [MR-J4-GF] from [Module List] on the right side of the window to the module list on the left side.
4) Drag and drop [Basic Digital Input Module] - [NZ2GF2S1-16D] from [Module List] on the right side of the window to the module list on the left side.
5) Check that the MR-J4-GF and NZ2GF2S1-16D are registered in the station list and the network configuration diagram.





2.1 GX Works3 Setting

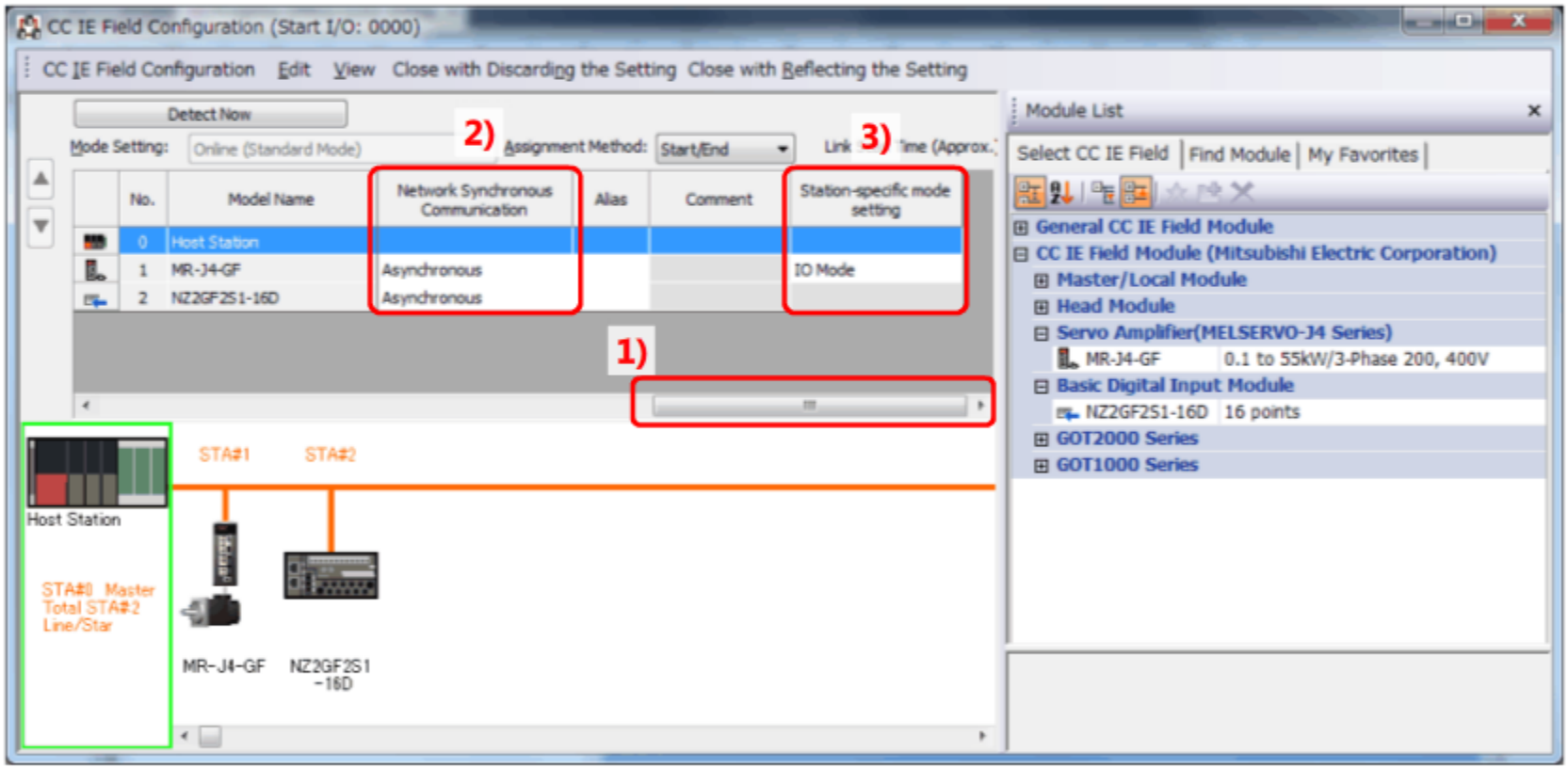


2.1 GX Works3 Setting

(7) Synchronous communication setting and station-specific mode setting

Set the network synchronous communication setting and station-specific mode.

1) Scroll the station list to the rightmost to display [Network Synchronous Communication] and [Station-specific mode setting].
2) Set [MR-J4-GF] and [NZ2GF2S1-16D] to "Asynchronous" in [Network Synchronous Communication]. (Note)
3) Set the operation mode of MR-J4-GF in [Station-specific mode setting]. Set [MR-J4-GF] to "IO Mode" in this course.



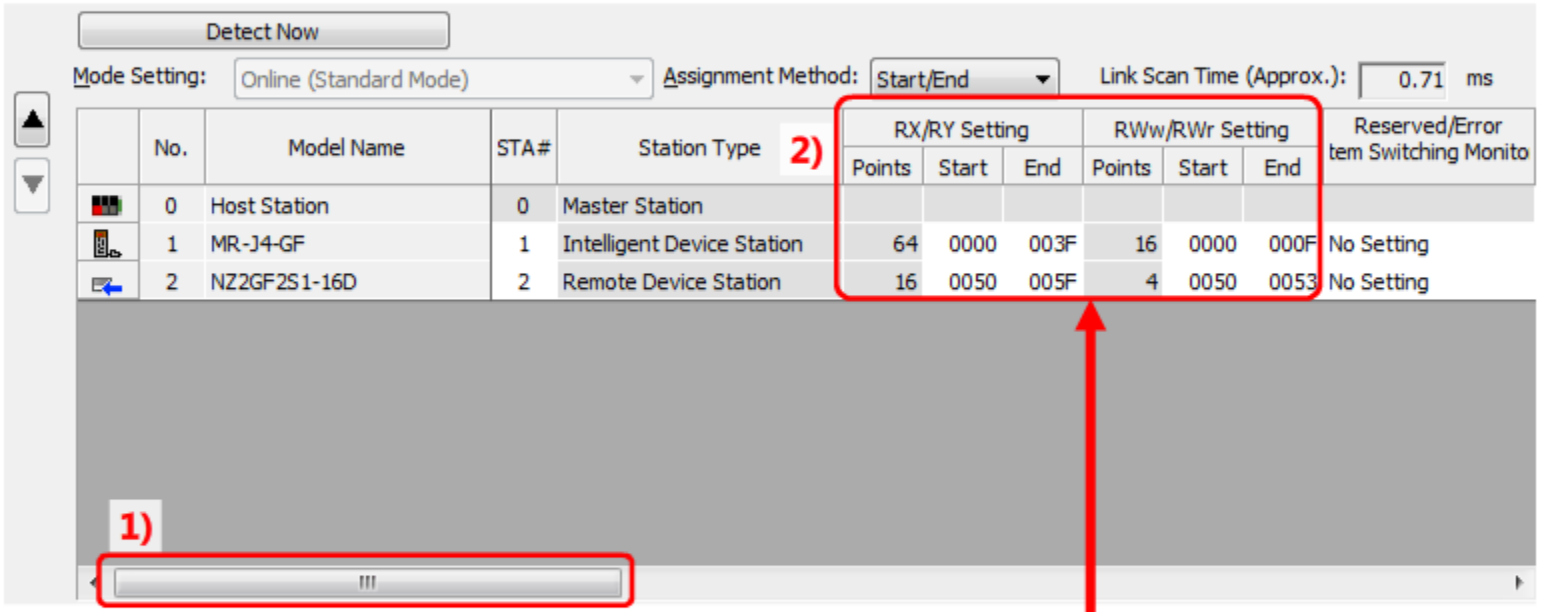
(Note) When setting "Network Synchronous Communication" of the remote input module to "Synchronous", the setting is restricted depending on the serial number of the remote input module.
For details, refer to the CC-Link IE Field Network Remote I/O Module User's Manual.

2.1 GX Works3 Setting

(8) Link device setting

Assign the link devices (RX/RY,RWw/RWr) to the slave station. Refer to the MR-J4-GF Instruction Manual (IO Mode) for the description of each signal (link device profile).

1) Scroll the station list to the left to display [RX/RY Setting] and [RWw/RW Setting].
2) Assign the devices as follows.

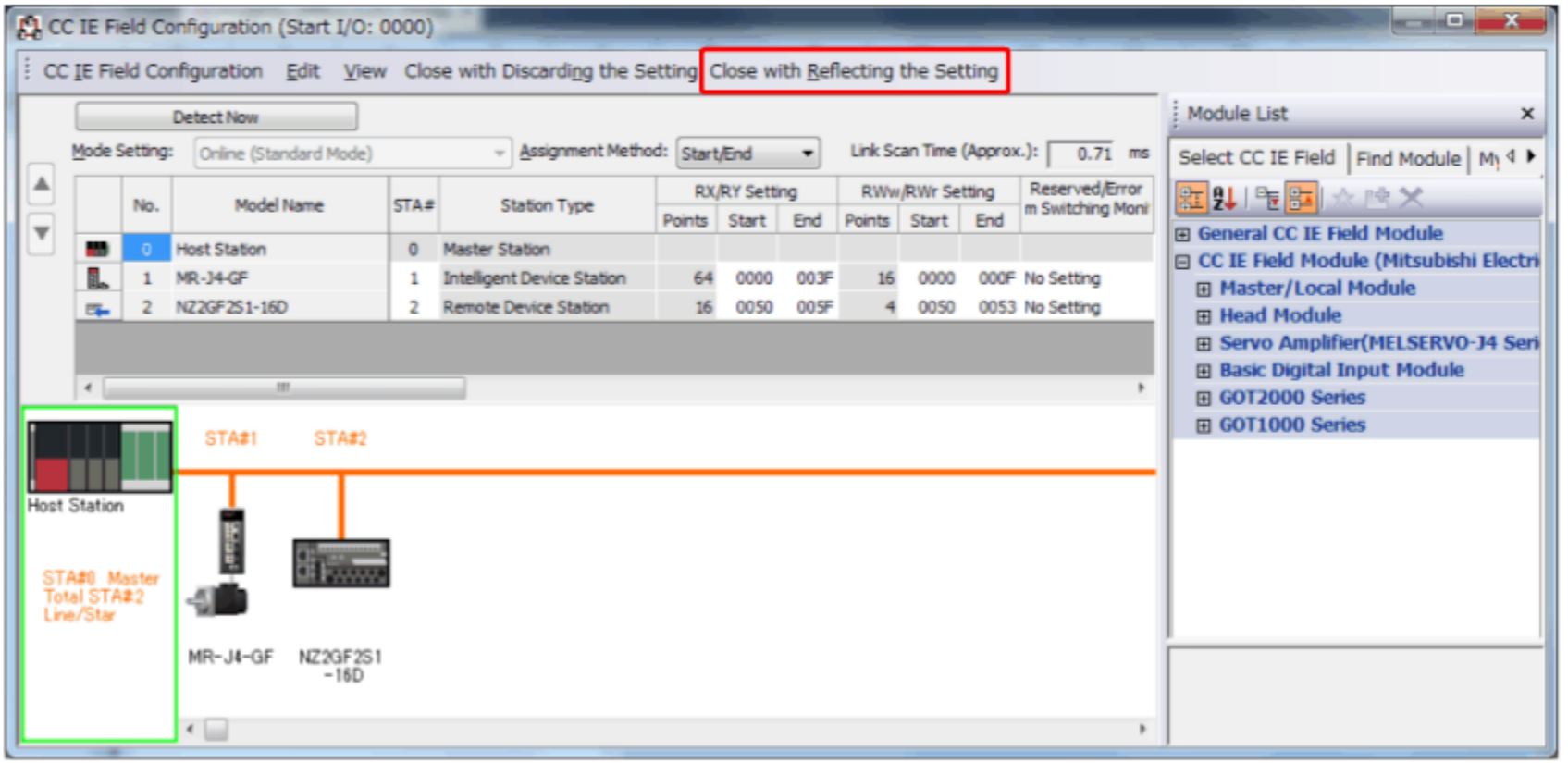


Assign RX00 to RX3F, RY00 to RY3F, RWw00 to RWw0F, and RWr00 to RWr0F to the servo amplifier.
Assign RX50 to RX5F to the remote input module.
Since RWw/RWr of the remote input module are not used in this course, it is four points, which is the minimum point.

2.1 GX Works3 Setting

(9) Reflecting the setting

After configuring the settings, click the [Close with Reflecting the Setting] at the upper of the window.

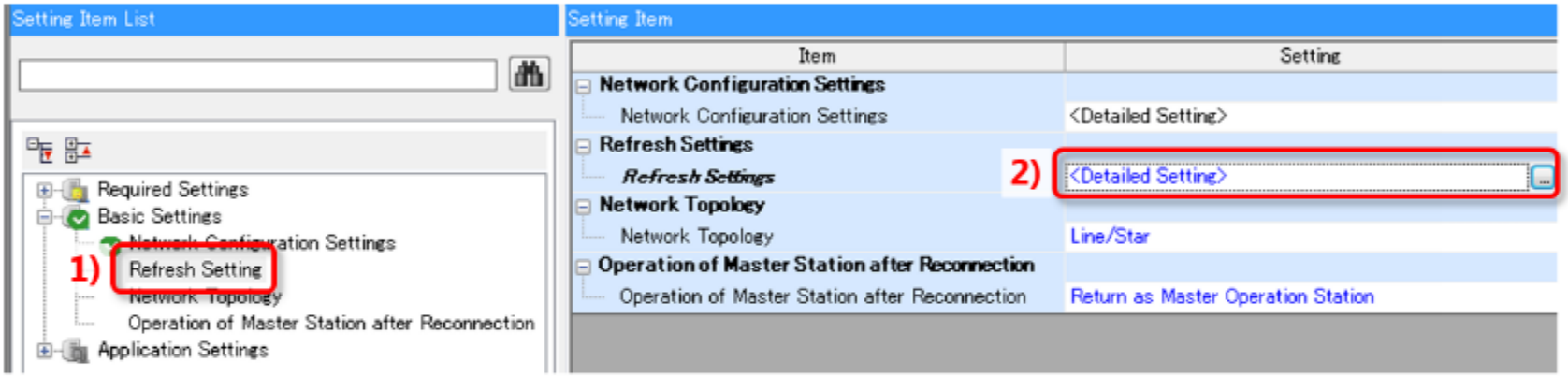


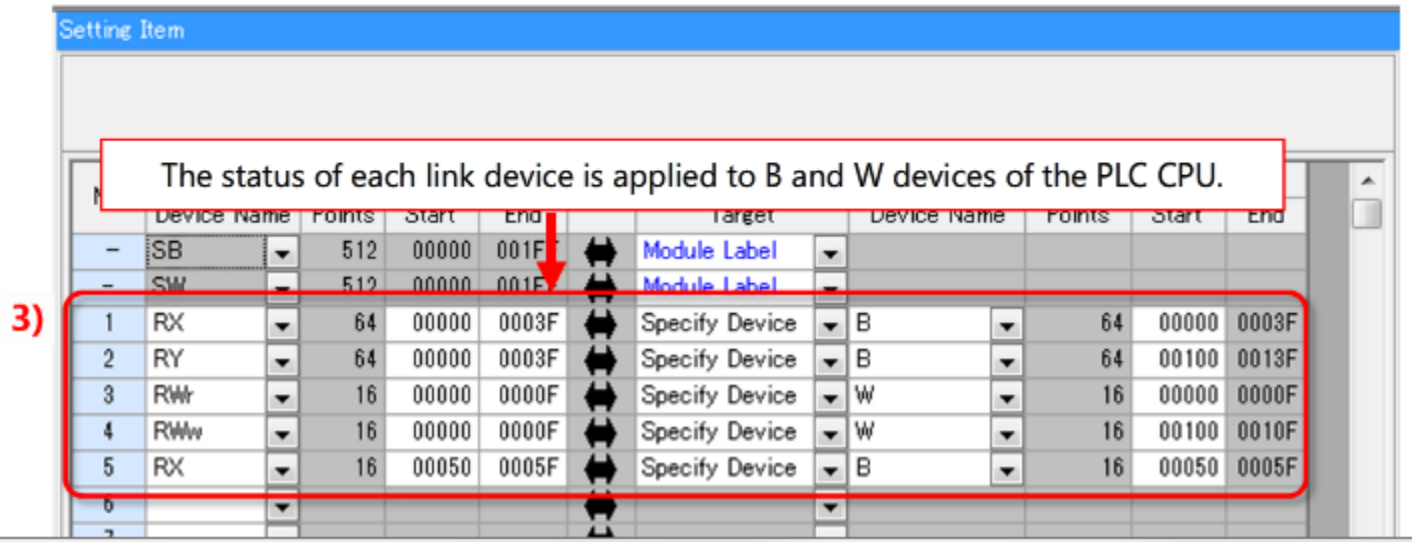
2.1 GX Works3 Setting

(10) Link refresh setting

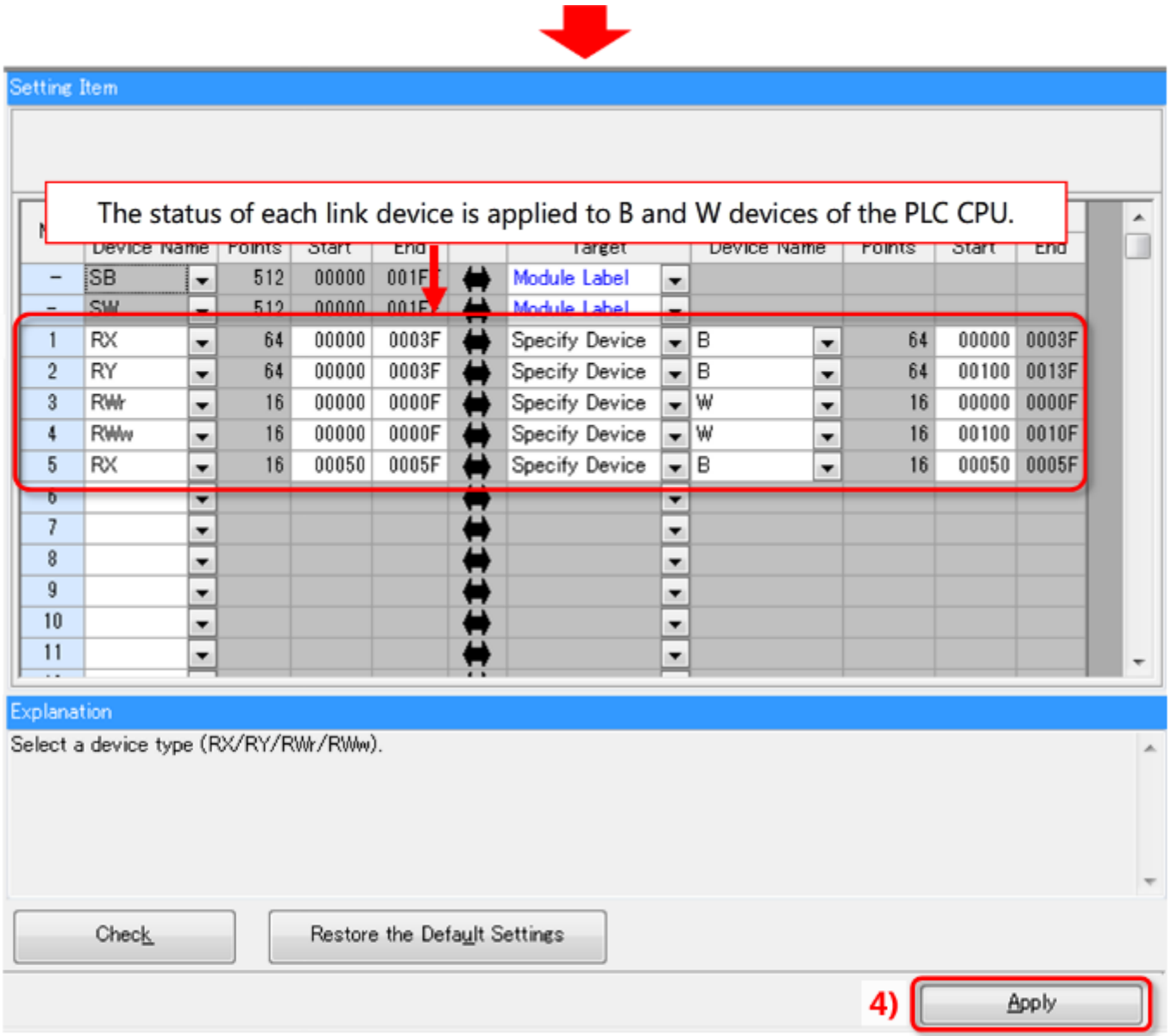
Set the transfer range between the link device and the CPU module.

1) Click [Basic Settings] - [Refresh Setting] in the Module Parameter (Network) window.
2) Double-click <Detailed Setting> of [Refresh Settings].
3) Configure the settings as follows.
4) When the setting is completed, click [Apply].





2.1 GX Works3 Setting



	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
–	SB	512	00000	001F		Module Label				
–	SW	512	00000	001F		Module Label				
1	RX	64	00000	0003F		Specify Device	B	64	00000	0003F
2	RY	64	00000	0003F		Specify Device	B	64	00100	0013F
3	RWr	16	00000	0000F		Specify Device	W	16	00000	0000F
4	RWw	16	00000	0000F		Specify Device	W	16	00100	0010F
5	RX	16	00050	0005F		Specify Device	B	16	00050	0005F
6										
7										
8										
9										
10										
11										

2.1 GX Works3 Setting

(11) Link refresh image

The following shows an image of the link refresh with the setting so far.

PLC CPU

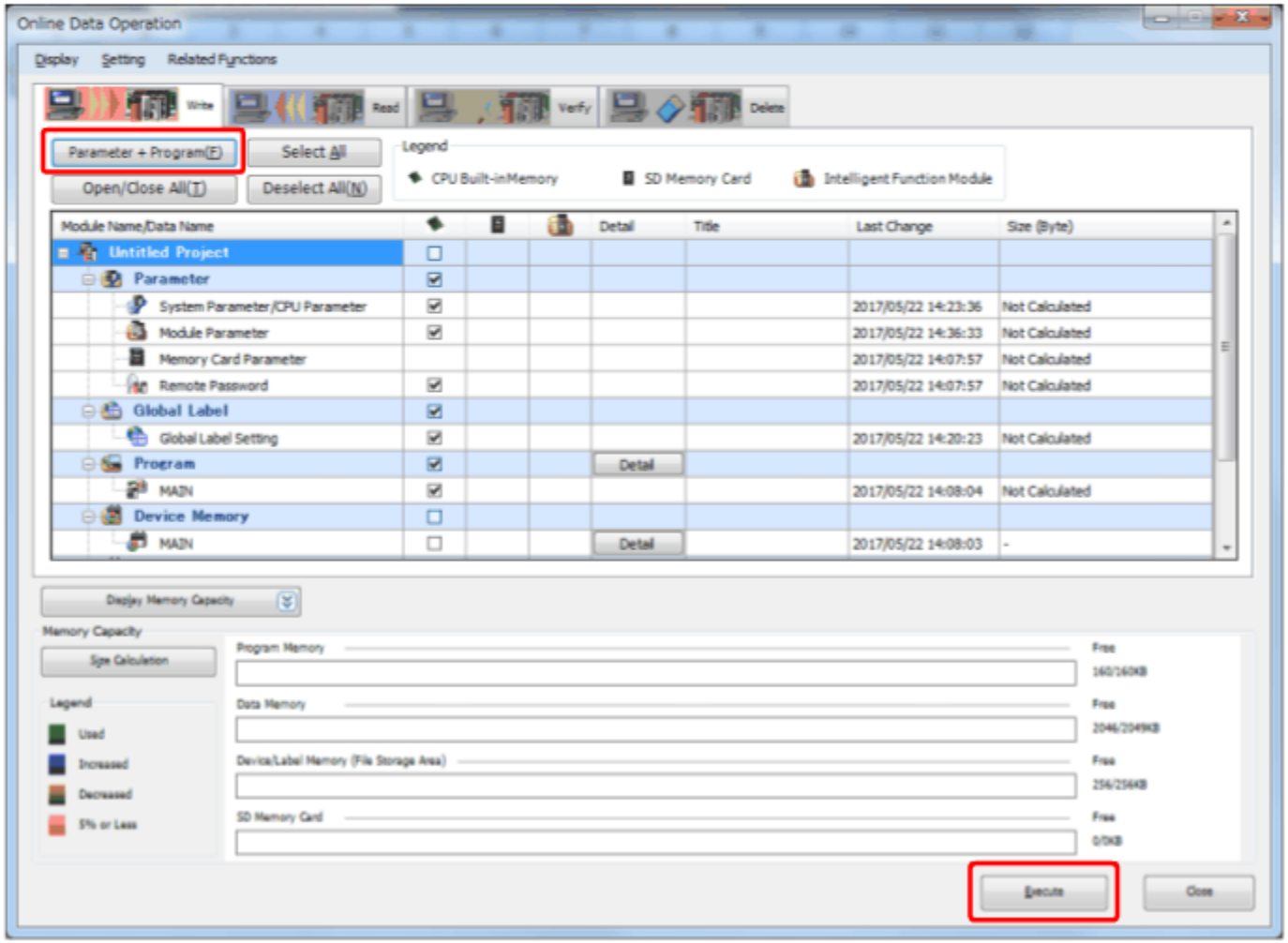
Servo amplifier

Remote input module

2.2 Writing Data to the PLC

(1) Writing a project

Check that the PLC is on.
Select [Online] - [Write to PLC] in the menu bar.
Click the [Parameter + Program] to determine the data to write to the PLC.
Click [Execute] and write the data to the PLC CPU.



2.2 Writing Data to the PLC

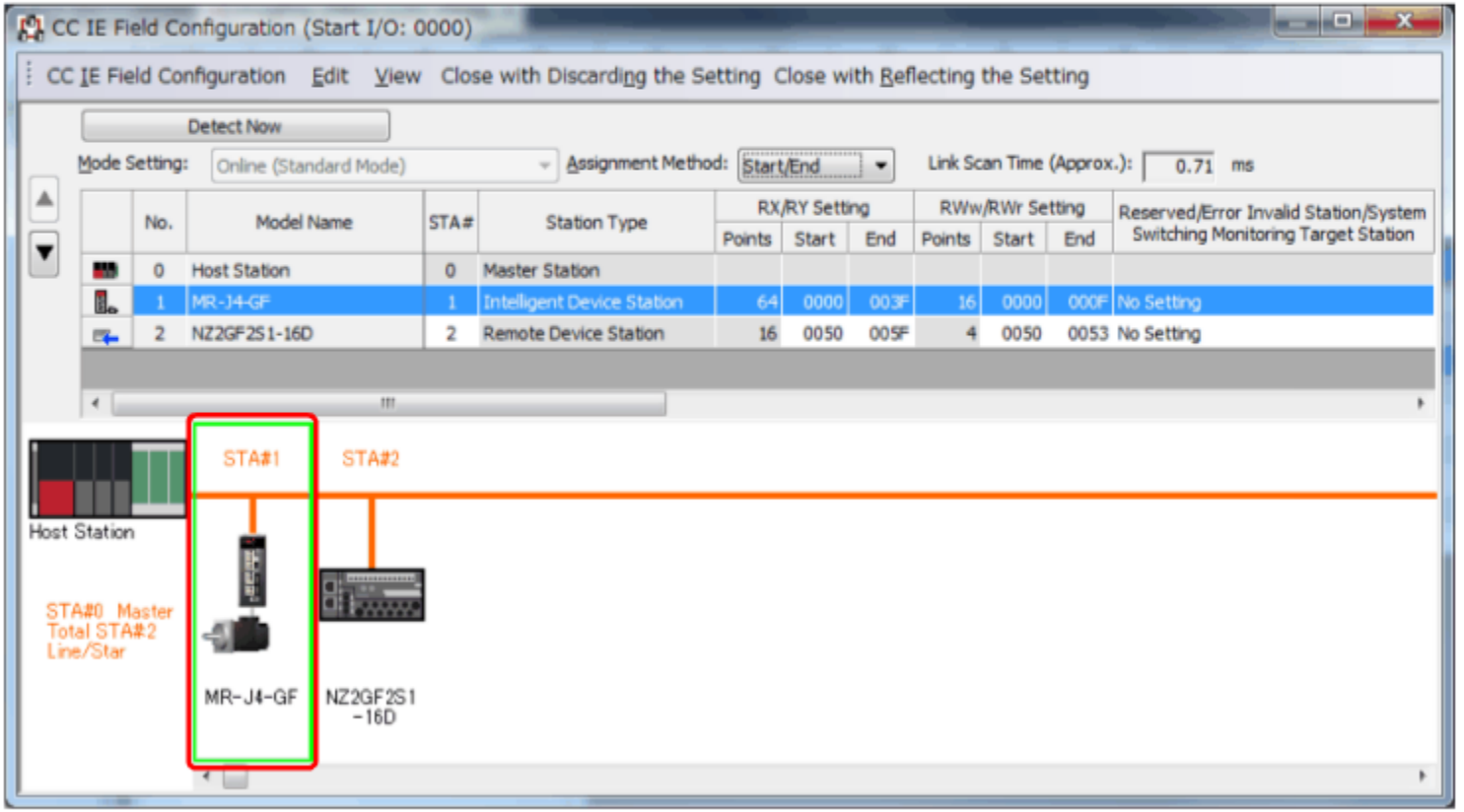
(2) Powering on the entire system

When the writing is completed, power on the servo amplifier and remote input module.
When the station-specific mode of the MR-J4-GF servo amplifier is set to "Motion Mode" (default), the alarm 9D.2 occurs.
You can clear the alarm by changing the parameter as explained in the next section.
When the mode is already set to "IO Mode", the alarm 9D.2 does not occur and "C01" is displayed.

2.3 Parameter Settings of the Servo Amplifier

2.3.1 Starting MR Configurator2

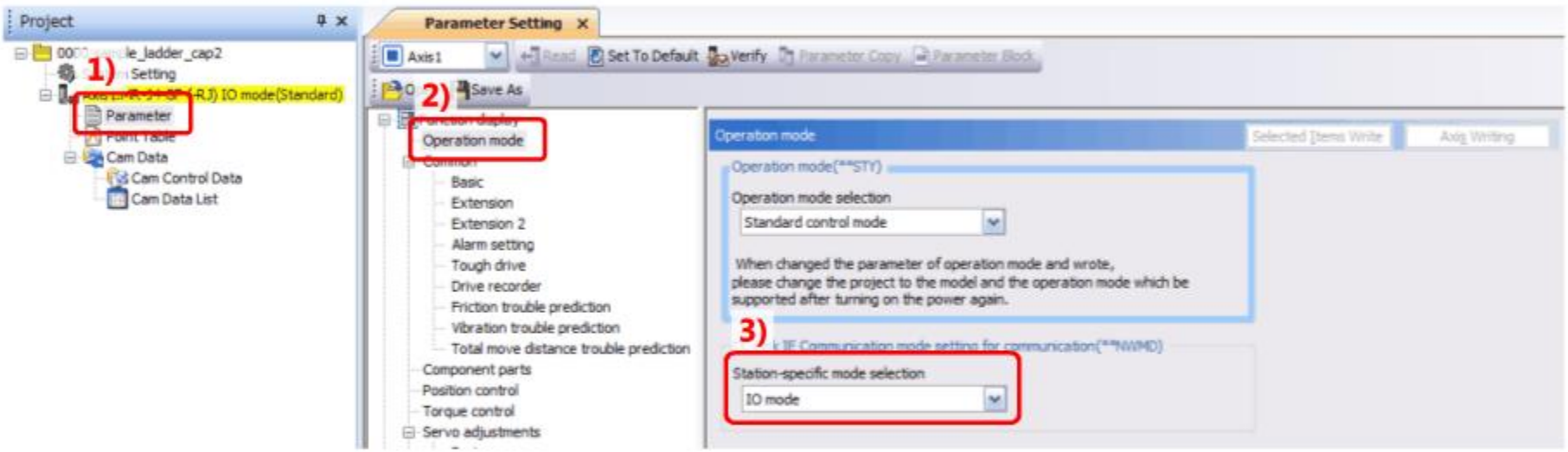
This section describes the parameter setting of the servo amplifier via CC-Link IE Field Network.
Double-click [Module Parameter (Network)] from the project tree of GX Works3.
Open [Basic Settings] - [Network Configuration Settings].
Double-clicking the servo amplifier of STA#1 starts MR Configurator2.



2.3.2 Parameter Setting Details

(1) Station-specific mode selection

1) When MR Configurator2 is launched, select [Parameter] from the project tree.
2) Select [Function display] - [Operation mode] on the parameter setting window.
3) Set [Station-specific mode selection] to [IO mode].

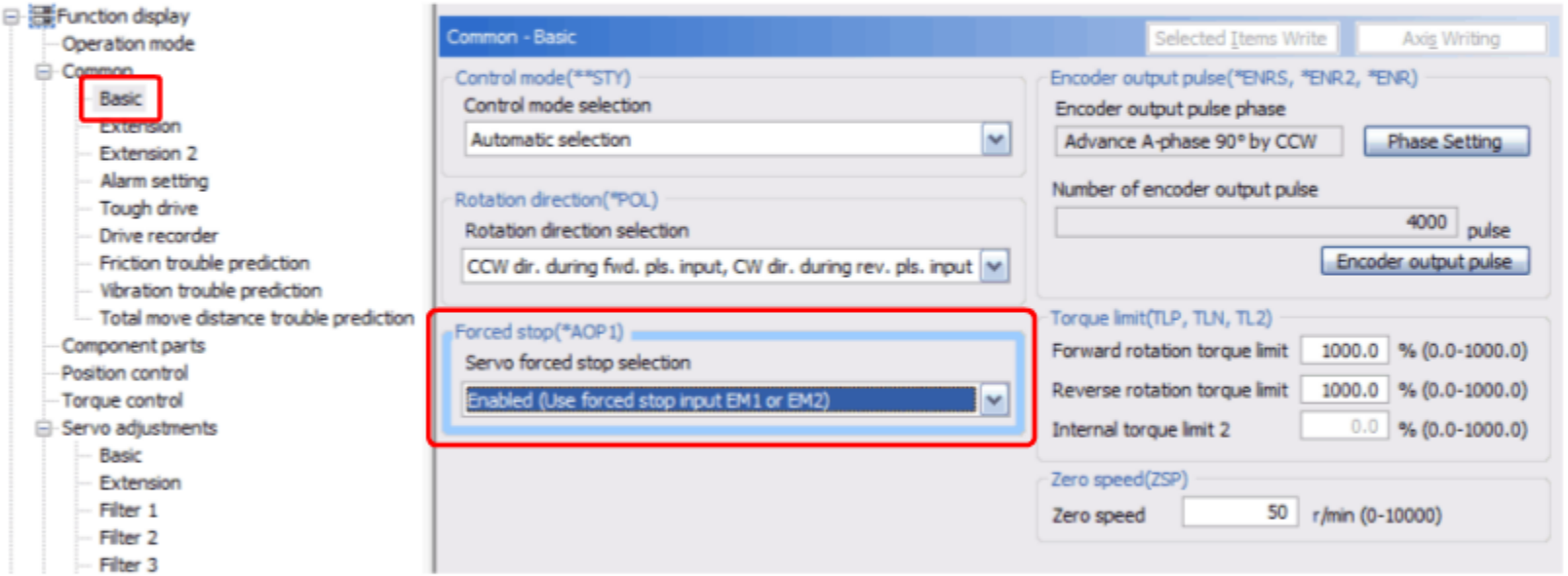


2.3.2 Parameter Setting Details

(2) Basic setting

For the system that uses the MR-J4-GF servo amplifier in the I/O mode, a forced stop is enabled with the input signal of the servo amplifier.
Set [Servo forced stop selection] in [Common] - [Basic] to "Enabled (Use forced stop input EM1 or EM2)".

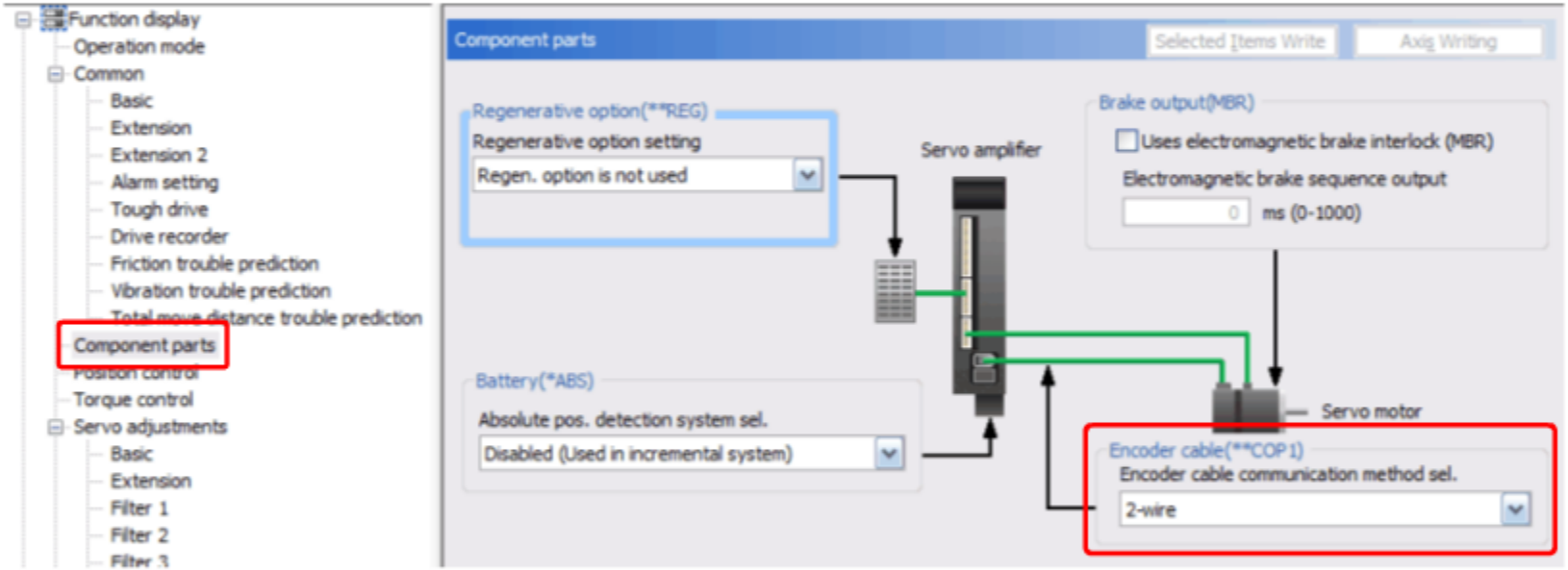
To change the rotation direction of the motor, change [Rotation direction selection] In this window.



2.3.2 Parameter Setting Details

(3) Component parts (encoder cable communication method selection)

Set the actually connected encoder cable type (2-wire or 4-wire) in [Encoder cable communication method sel.] in the [Component parts] window.
To use an absolute position detection system, set [Absolute pos. detection system sel.] to "Enabled (Used in ABS pos. detect system)" on this window.
The battery MR-BAT6V1SET-A is required for the use of the absolute position detection system.



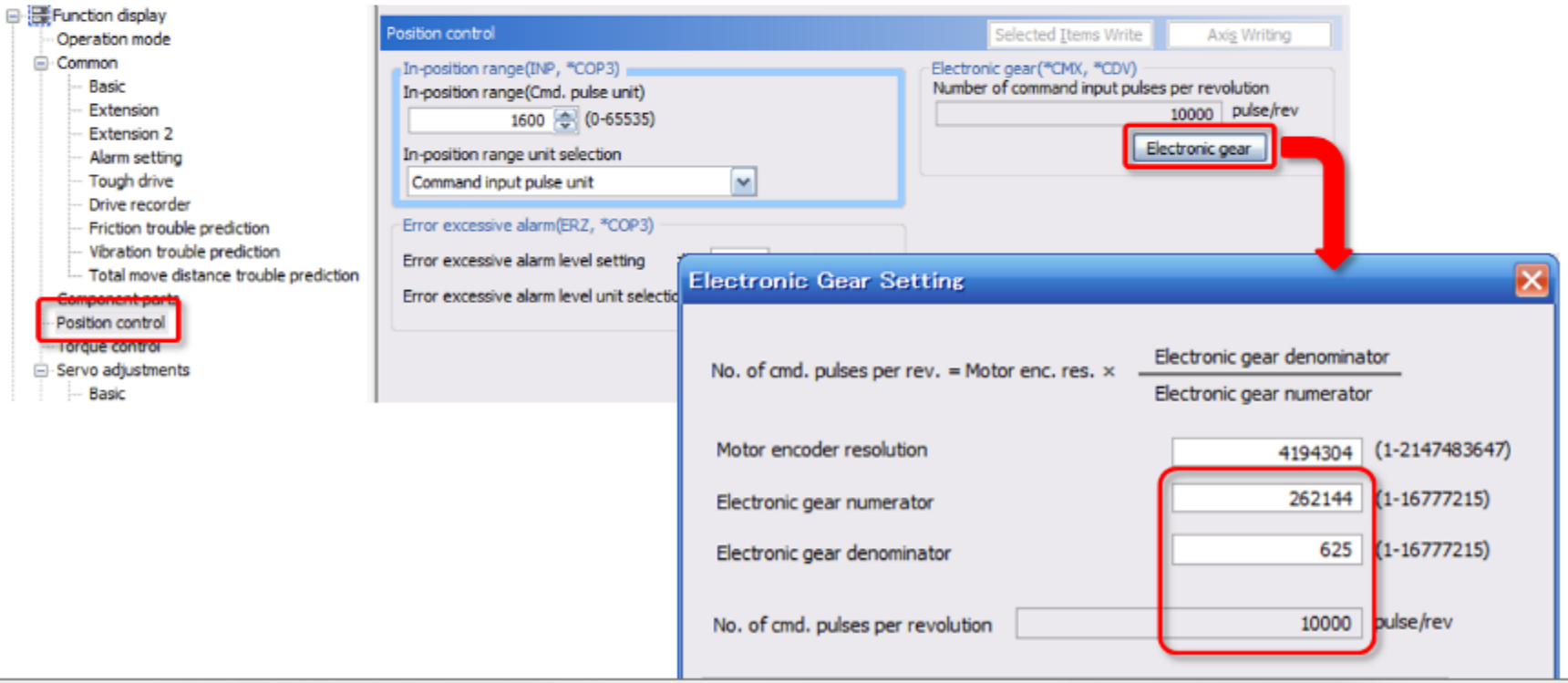
2.3.2 Parameter Setting Details

(4) Position control (electronic gear)

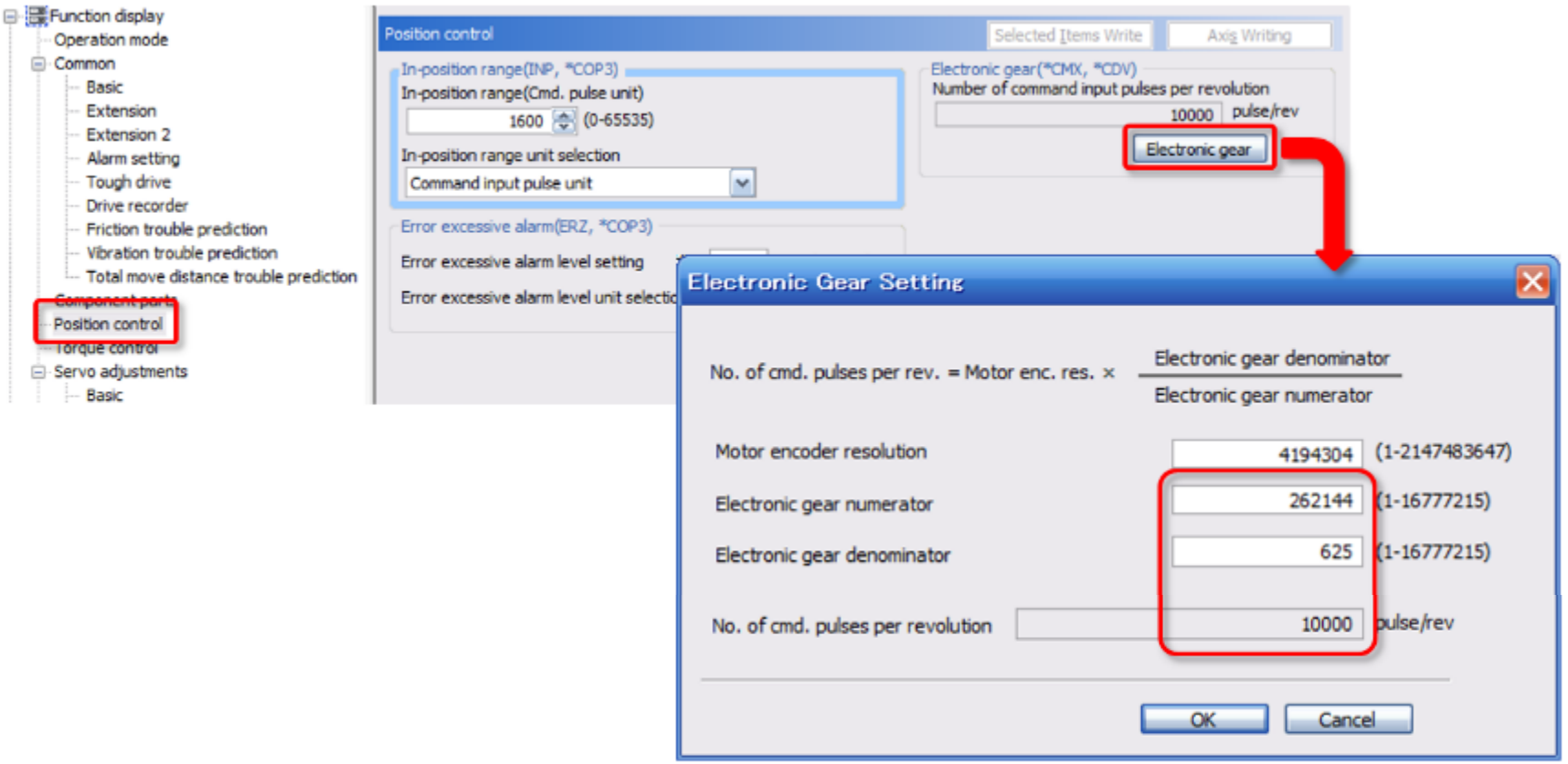
Set the command unit to mm with setting the electric gear.
In the example of this chapter, the lead of ball screw (pitch) is 10 mm and no external deceleration gear is mounted, thus the gear moves 10 mm in one rotation of the motor.
The default setting of the command unit is in 0.001 mm. Set the number of command pulse per rotation to 10000 pulse/rev and the gear moves 0.001 mm by the command of 1 pulse. Calculate the electronic gear with the following equation.

$$\text{Number of command pulse per revolution} = \text{motor encorder resolution} \times \frac{\text{Electric gear denominator}}{\text{Electric gear numerator}}$$

Electric gear numerator = 4194304, electric denominator = 10000
Reduced to: Electric gear numerator = 262144, electric gear denominator = 625



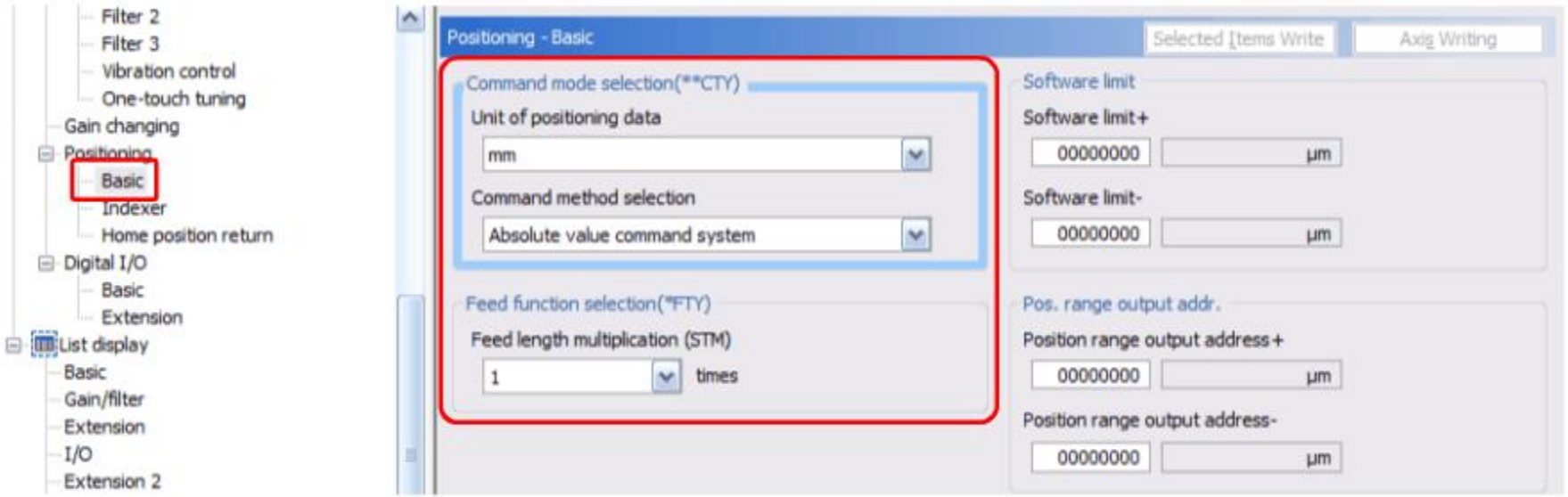
2.3.2 Parameter Setting Details



2.3.2 Parameter Setting Details

(5) Position setting (basic setting)

Click [Positioning] - [Basic]. Set the command unit and command method.
Set [Unit of positioning data] to "mm" and [Command method selection] to "Absolute value command system" in this chapter. (Note)
Set [Feed length multiplication] to "1". The positioning command unit will be 0.001 mm.

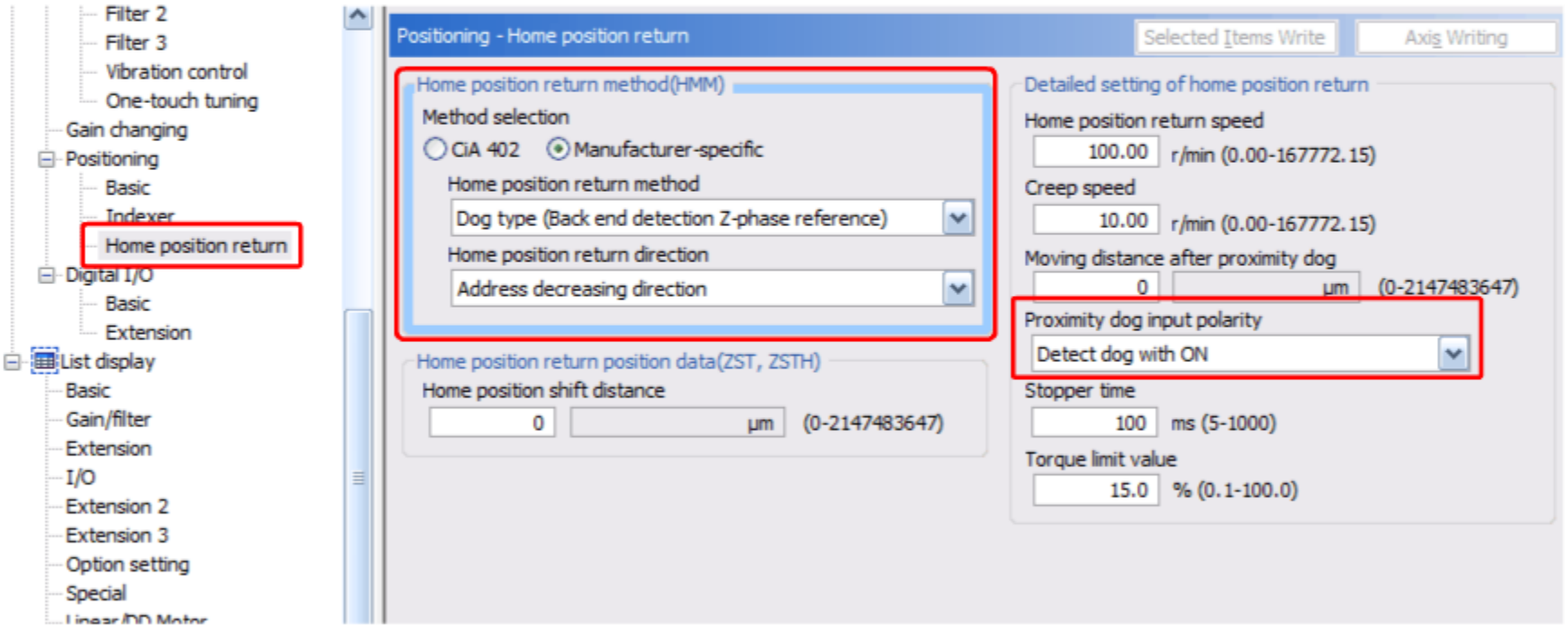


(Note) The increment value command method cannot be used in the absolute value detection system.

2.3.2 Parameter Setting Details

(6) Positioning (home position return)

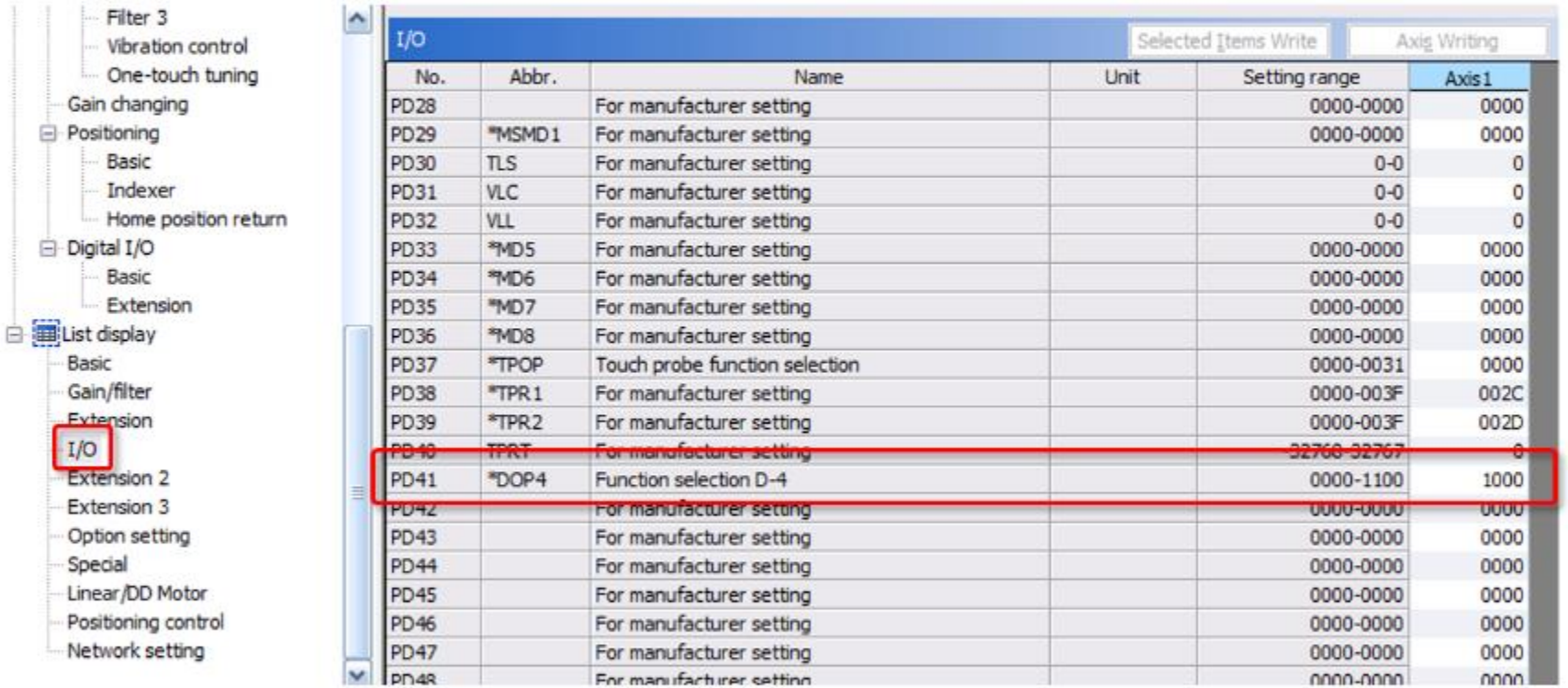
Click [Positioning] - [Home position return] and set a home position return method.
Set [Home position return method] to "Manufacture-specific" in this chapter.
Set [Home position return method] to "Dog type (Back end detection Z-phase reference)".
Set [Home position return direction] to "Address decreasing direction".
Set the input polarity of the proximity dog to "Detect dog with ON".



2.3.2 Parameter Setting Details

(7) I/O setting

Select [List display] - [I/O].
Always set the parameter PD41.
Since the proximity dogs and limit switches are input from the controller (the link device is used) in this course, set the parameter PD41 to "1000".



No.	Abbr.	Name	Unit	Setting range	Axis1
PD28		For manufacturer setting		0000-0000	0000
PD29	*MSMD1	For manufacturer setting		0000-0000	0000
PD30	TLS	For manufacturer setting		0-0	0
PD31	VLC	For manufacturer setting		0-0	0
PD32	VLL	For manufacturer setting		0-0	0
PD33	*MD5	For manufacturer setting		0000-0000	0000
PD34	*MD6	For manufacturer setting		0000-0000	0000
PD35	*MD7	For manufacturer setting		0000-0000	0000
PD36	*MD8	For manufacturer setting		0000-0000	0000
PD37	*TPOP	Touch probe function selection		0000-0031	0000
PD38	*TPR1	For manufacturer setting		0000-003F	002C
PD39	*TPR2	For manufacturer setting		0000-003F	002D
PD40	TPRT	For manufacturer setting		-32768-32767	0
PD41	*DOP4	Function selection D-4		0000-1100	1000
PD42		For manufacturer setting		0000-0000	0000
PD43		For manufacturer setting		0000-0000	0000
PD44		For manufacturer setting		0000-0000	0000
PD45		For manufacturer setting		0000-0000	0000
PD46		For manufacturer setting		0000-0000	0000
PD47		For manufacturer setting		0000-0000	0000
PD48		For manufacturer setting		0000-0000	0000

Parameter PD41

bit0(_ _ _ X)	For manufacturer setting
bit1(_ _ X _)	
bit2(_ X _ _)	Stroke limit enabling condition selection

2.3.2 Parameter Setting Details

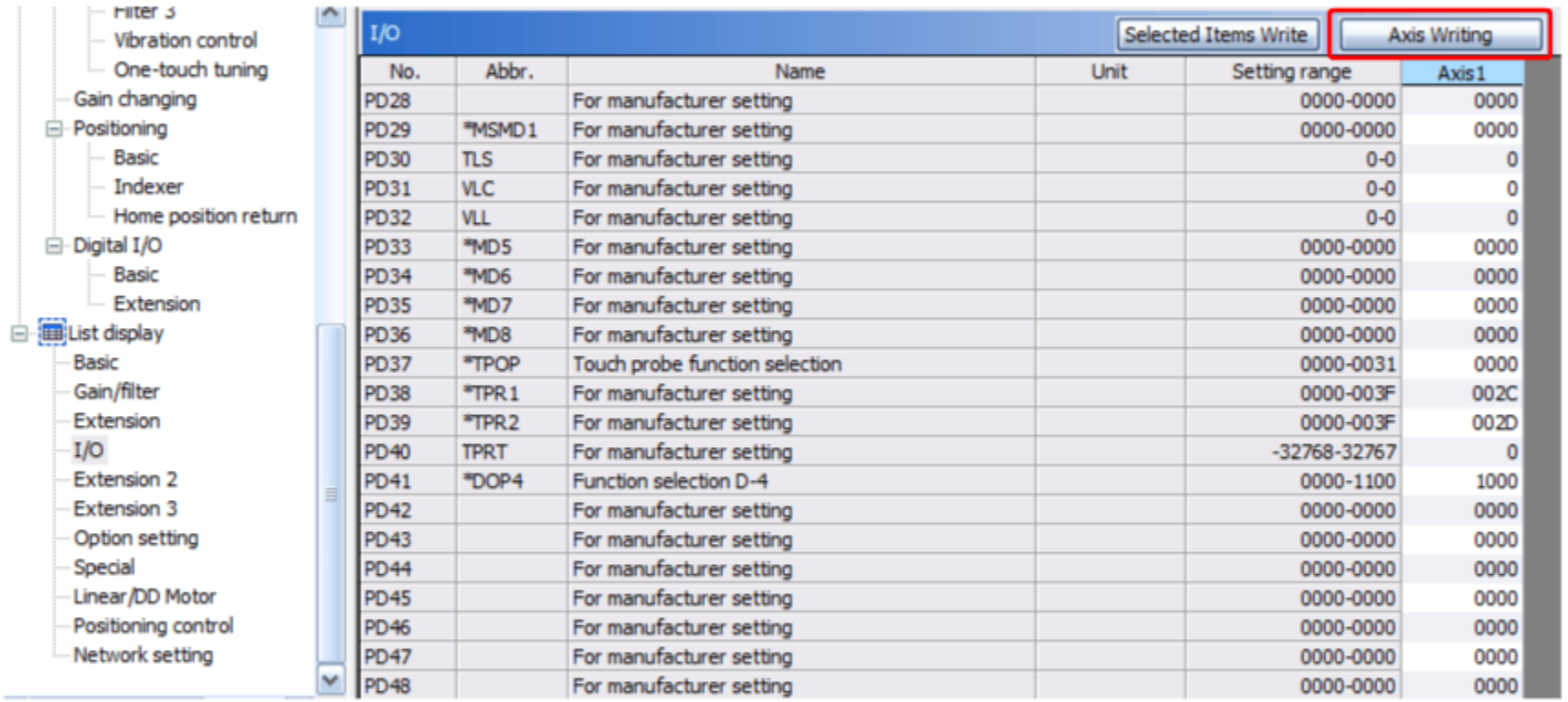
Parameter PD41

bit0(_ _ _ X)	For manufacturer setting
bit1(_ _ X _)	
bit2(_ X _ _)	Stroke limit enabling condition selection 0: Stroke limit always enabled 1: Enabled only for home position return mode
bit3(X _ _ _)	Select an input method for the proximity dogs and limit switches. 0: Input from servo amplifier 1: Input from controller

2.3.2 Parameter Setting Details

(8) Writing data to the servo amplifier

When the parameters are input, click [Axis Writing] and write parameters to the servo amplifier.
After writing the parameters, cycle the power of the servo amplifier.



No.	Abbr.	Name	Unit	Setting range	Axis1
PD28		For manufacturer setting		0000-0000	0000
PD29	*MSMD1	For manufacturer setting		0000-0000	0000
PD30	TLS	For manufacturer setting		0-0	0
PD31	VLC	For manufacturer setting		0-0	0
PD32	VLL	For manufacturer setting		0-0	0
PD33	*MD5	For manufacturer setting		0000-0000	0000
PD34	*MD6	For manufacturer setting		0000-0000	0000
PD35	*MD7	For manufacturer setting		0000-0000	0000
PD36	*MD8	For manufacturer setting		0000-0000	0000
PD37	*TPOP	Touch probe function selection		0000-0031	0000
PD38	*TPR1	For manufacturer setting		0000-003F	002C
PD39	*TPR2	For manufacturer setting		0000-003F	002D
PD40	TPRT	For manufacturer setting		-32768-32767	0
PD41	*DOP4	Function selection D-4		0000-1100	1000
PD42		For manufacturer setting		0000-0000	0000
PD43		For manufacturer setting		0000-0000	0000
PD44		For manufacturer setting		0000-0000	0000
PD45		For manufacturer setting		0000-0000	0000
PD46		For manufacturer setting		0000-0000	0000
PD47		For manufacturer setting		0000-0000	0000
PD48		For manufacturer setting		0000-0000	0000

2.3.3 Setting the Point Table

Select [Point table] from the project tree.
Set the positioning data. Configure the settings as follows.
When the setting is completed, click [Write All].

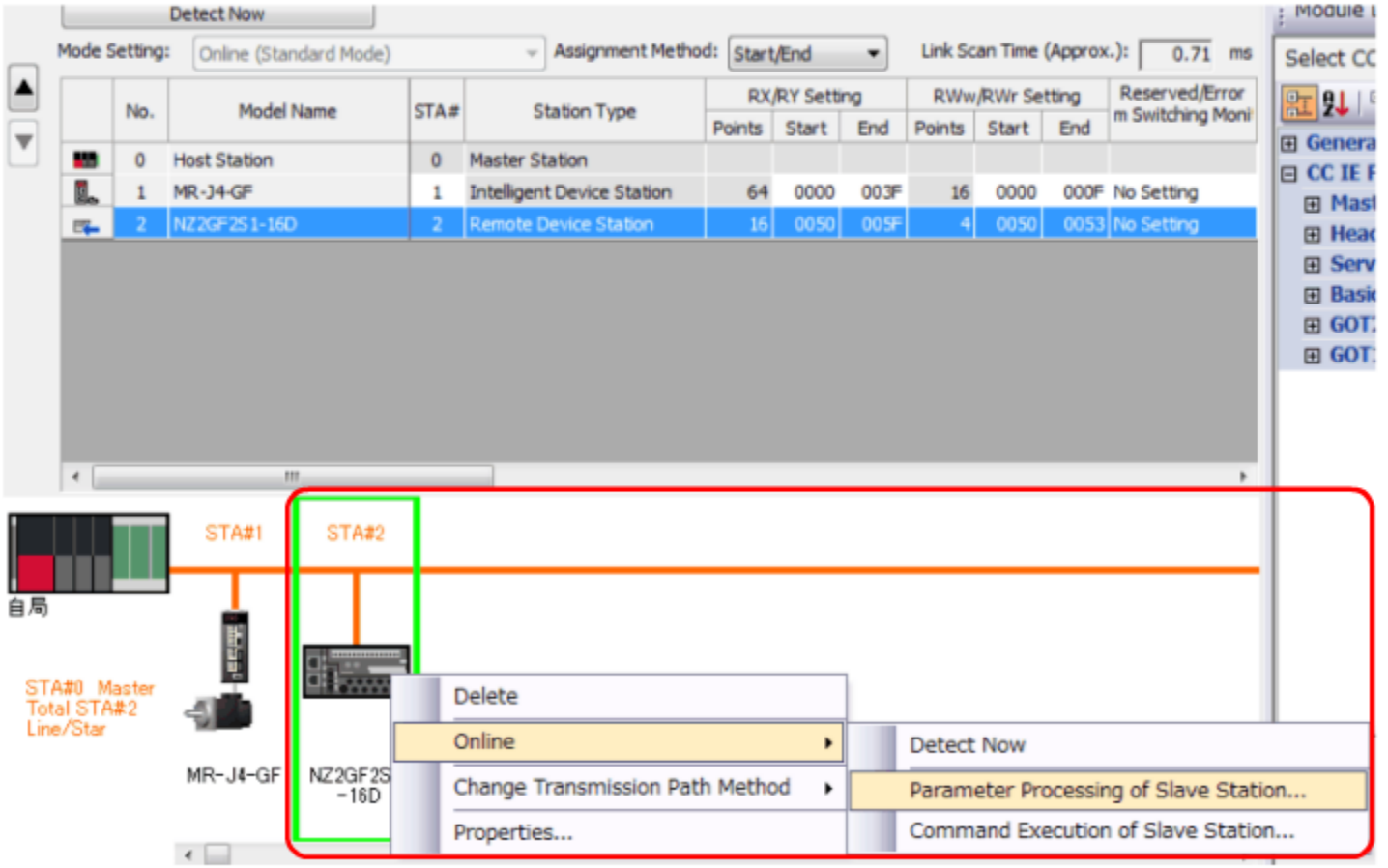
Point table positioning operation (Absolute value command system) | Selected Items Write | Write All | Update Project

No.	Target position -999.999-999.999 mm	Rotation speed 0.00-167772.15 r/min	Accel. time const. 0-20000 ms	Decel. time const. 0-20000 ms	Dwell time 0-20000 ms	Auxiliary func. 0-3,8-11
1	100.000	100.00	150	150	10	0
2	150.000	100.00	150	150	10	0
3	50.000	150.00	150	150	1000	1
4	100.000	150.00	150	150	1000	1
5	150.000	150.00	150	150	1000	1
6	0.000	150.00	150	150	1000	0
7	0.000	0.00	0	0	0	0
8	0.000	0.00	0	0	0	0

2.4 Parameter Settings of the Remote Input Module

(1) Calling the parameter setting window

For the remote input module, the ladder program of the initial processing can be omitted with setting the parameter.
Double-click [Module Parameter(Network)] from the project tree of GX Works3.
Open [Basic Settings] - [Network Configuration Settings].
Right-click the icon of the station number 2, the remote input module, and select [Online] - [Parameter Processing of Slave Station].

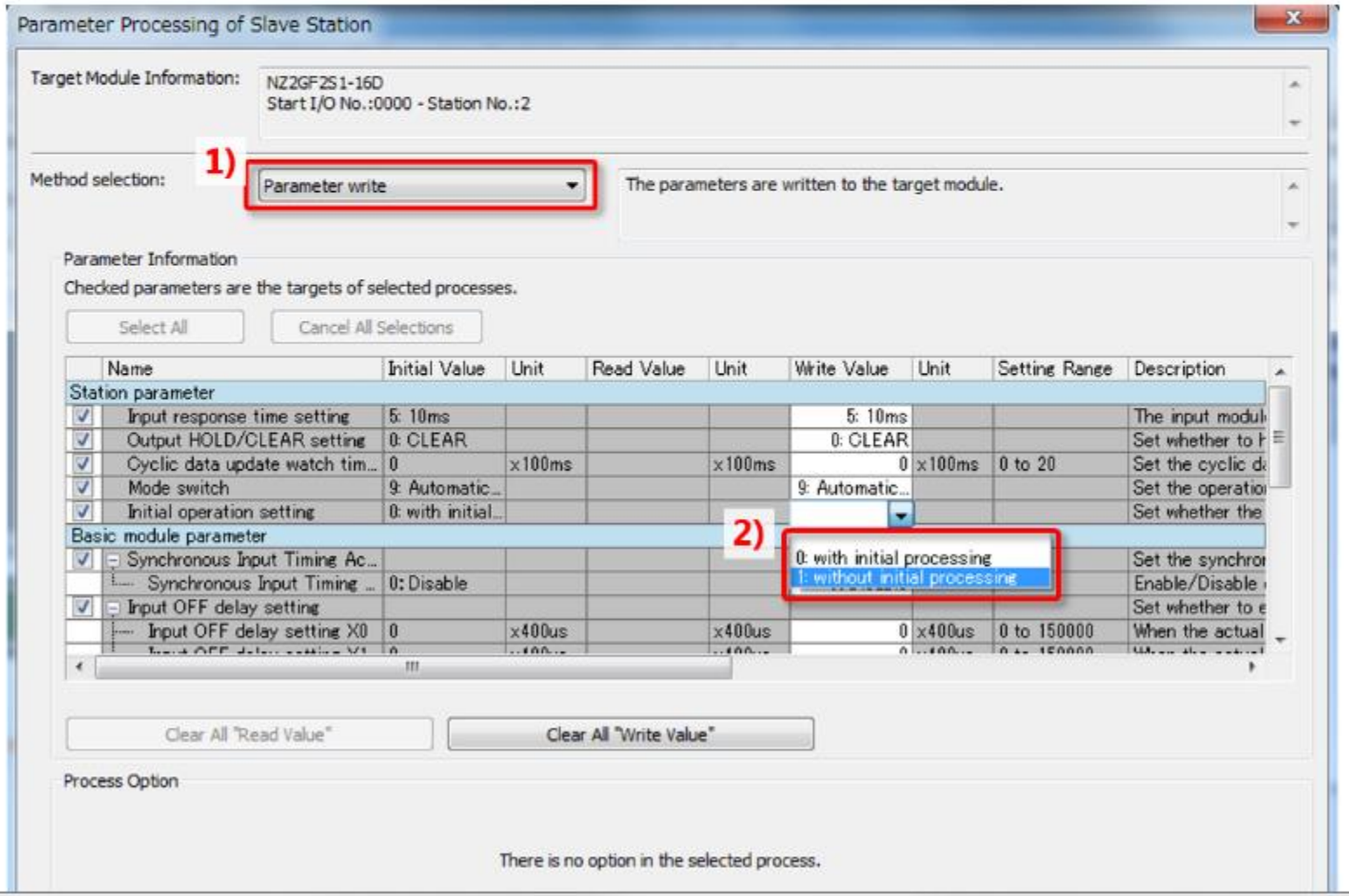


2.4 Parameter Settings of the Remote Input Module

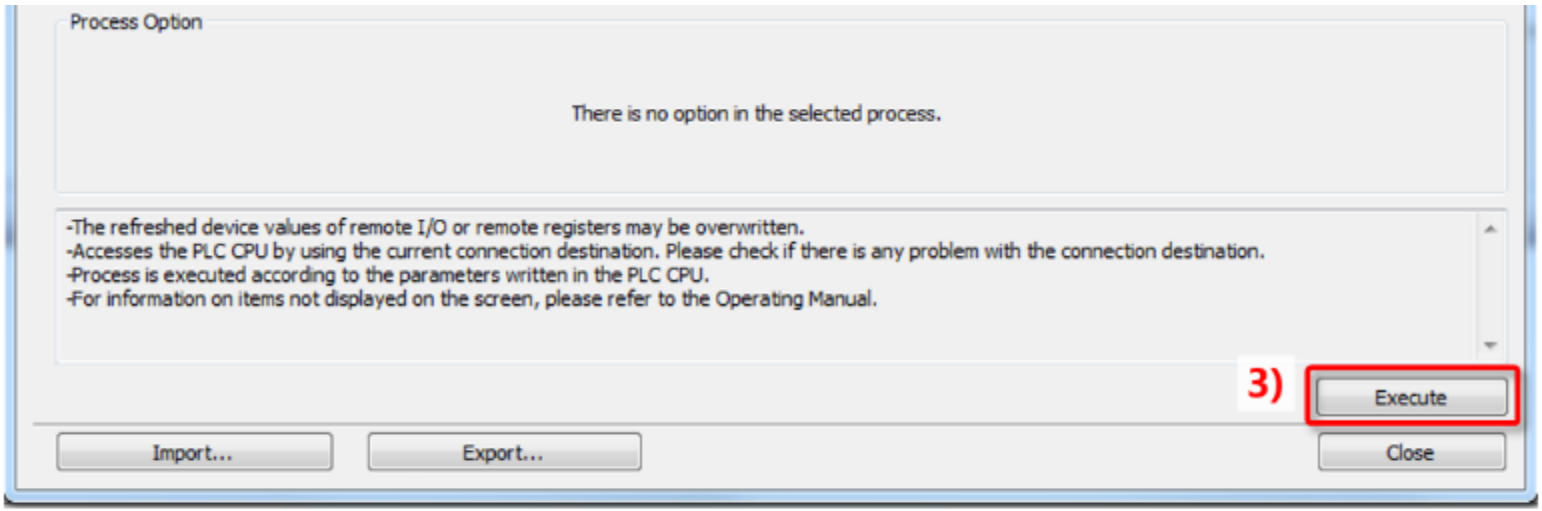
(2) Writing parameters

The "Parameter Processing of Slave Station" window appears.

1) Set [Method selection] to "Parameter write".
2) Set [Initial operation setting] to "1: without initial processing". Enter the initial values to other items. (Note)
3) Click [Execute].



2.4 Parameter Settings of the Remote Input Module



(Note) Enter the values to all items under the write value. Parameters cannot be written unless all values are entered.

2.5 Program Example

This section describes the program example of the PLC.

2.5.1 Downloading a Sample Program

Download the sample program from the following table. Decompress the zip file in an arbitrary place.

Data	File format	File size
Chapter 2 Sample program	Compressed file	990 kB

2.5.2 Labels to be used

(1) Global label

Register a link device of the servo amplifier used in a program and a remote input module signal to a global label.

	Label Name	Data Type		Class	Assign (Device/Label)	Initial Value	Constant	English(Display Target)
1	bAx1_SON	Bit	...	VAR_GLOBAL	B100			Axis1 ServoON
2	bAx1_ST1	Bit	...	VAR_GLOBAL	B101			Axis1 Forward Rotation Start
3	bAx1_ST2	Bit	...	VAR_GLOBAL	B102			Axis1 Reverse Rotation Start
4	bAx1_DOG	Bit	...	VAR_GLOBAL	B103			Axis1 Proximity Dog
5	bAx1_MD0	Bit	...	VAR_GLOBAL	B106			Axis1 Auto/Manual Selection
6	bAx1_MOR	Bit	...	VAR_GLOBAL	B108			Axis1 Monitor Output Execution Demand
7	bAx1_FLS	Bit	...	VAR_GLOBAL	B110			Axis1 Upper Stroke Limit
8	bAx1_RLS	Bit	...	VAR_GLOBAL	B111			Axis1 Lower Stroke Limit
9	bAx1_RES	Bit	...	VAR_GLOBAL	B13A			Axis1 Reset
10	bAx1_CRD	Bit	...	VAR_GLOBAL	B3B			Axis1 Remote Station Communication Ready
11	uAx1_w_MONITOR1	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	W100			Axis1 Monitor1
12	uAx1_w_MONITOR2	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	W102			Axis1 Monitor2
13	uAx1_w_PTBLNUMSLCT	Word [Unsigned]/Bit String [16-bit]	...	VAR_GLOBAL	W106			Axis1 Point Table No. Selection
14	bRI_SVON	Bit	...	VAR_GLOBAL	B50			Remote Input ServoON
15	bRI_StartFW	Bit	...	VAR_GLOBAL	B51			Remote Input Forward Rotation Start
16	bRI_StartRV	Bit	...	VAR_GLOBAL	B52			Remote Input Reverse Rotation Start
17	bRI_MonitorON	Bit	...	VAR_GLOBAL	B53			Remote Input Monitor Start
18	bRI_Table0	Bit	...	VAR_GLOBAL	B55			Remote Input Point Table 0
19	bRI_Table1	Bit	...	VAR_GLOBAL	B56			Remote Input Point Table 1
20	bRI_AutoManual	Bit	...	VAR_GLOBAL	B58			Remote Input Auto/Manual Selection
21	bRI_Reset	Bit	...	VAR_GLOBAL	B59			Remote Input Reset
22	bRI_DOG	Bit	...	VAR_GLOBAL	B5A			Remote Input Proximity Dog
23	bRI_FLS	Bit	...	VAR_GLOBAL	B5B			Remote Input Upper Stroke Limit
24	bRI_RLS	Bit	...	VAR_GLOBAL	B5C			Remote Input Lower Stroke Limit

(2) Local label

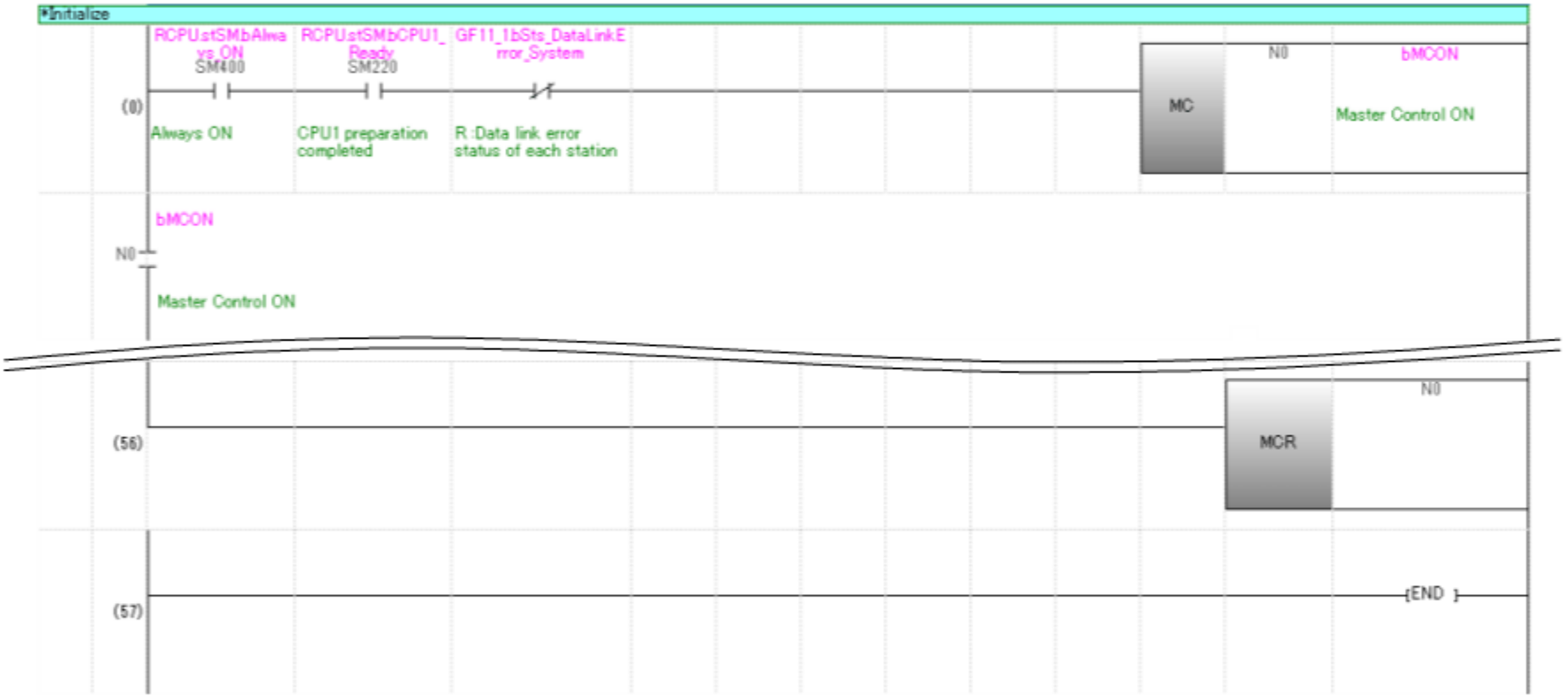
Register a device used in a program to a local label.

	Label Name	Data Type		Class	Initial Value	Constant	English(Display Target)
1	bMCON	Bit	...	VAR			Master Control ON

2.5.3 Detailed Explanation of the Program

(1) Initial processing

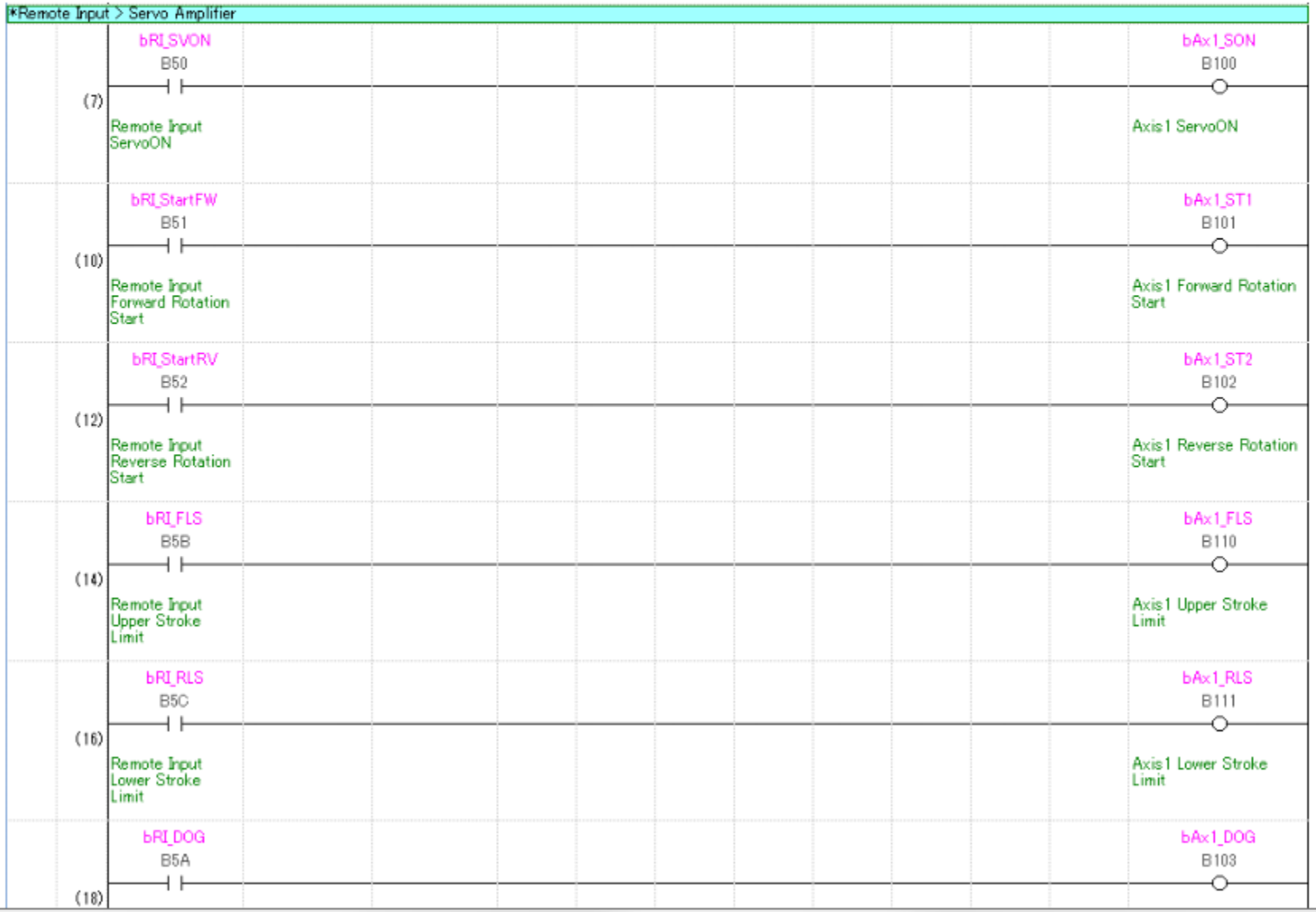
When the PLC CPU and CC-Link IE Field master module are normally started and no error occurs in the data link of each station, the interlock by the MC command is released.



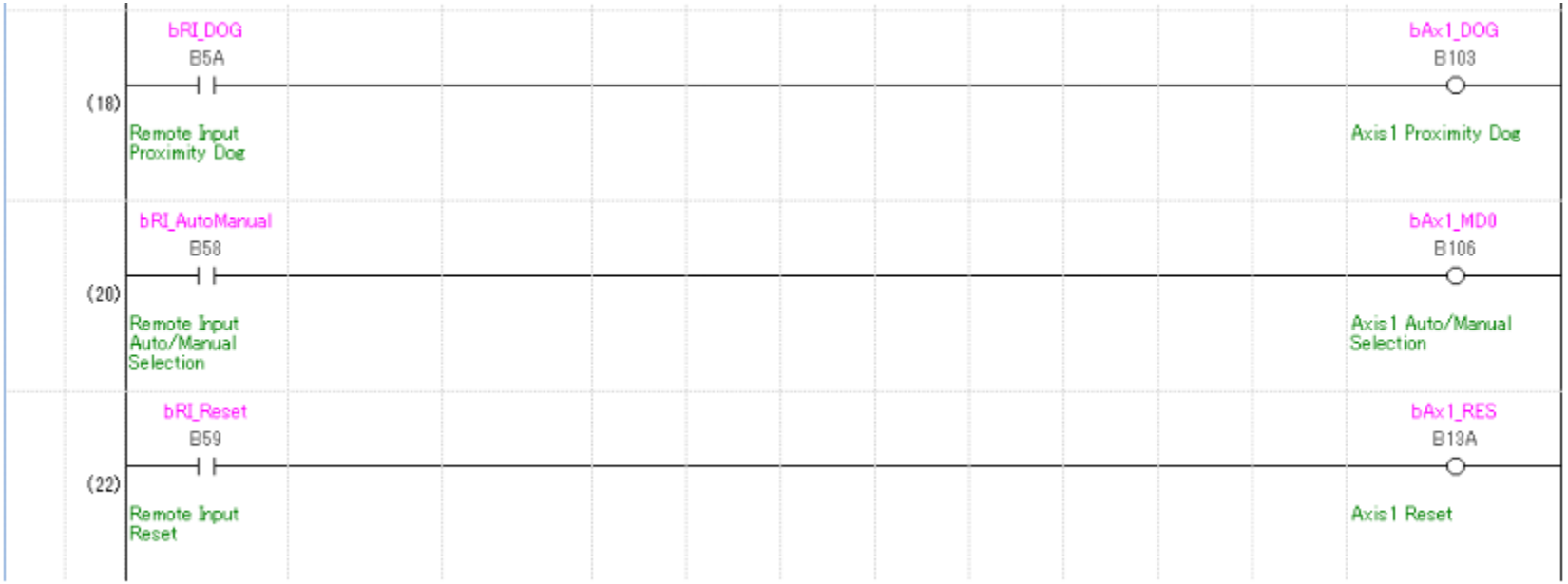
2.5.3 Detailed Explanation of the Program

(2) ON/OFF of the bit device

Reflect the ON/OFF status of the remote input module to the link device of the servo amplifier.



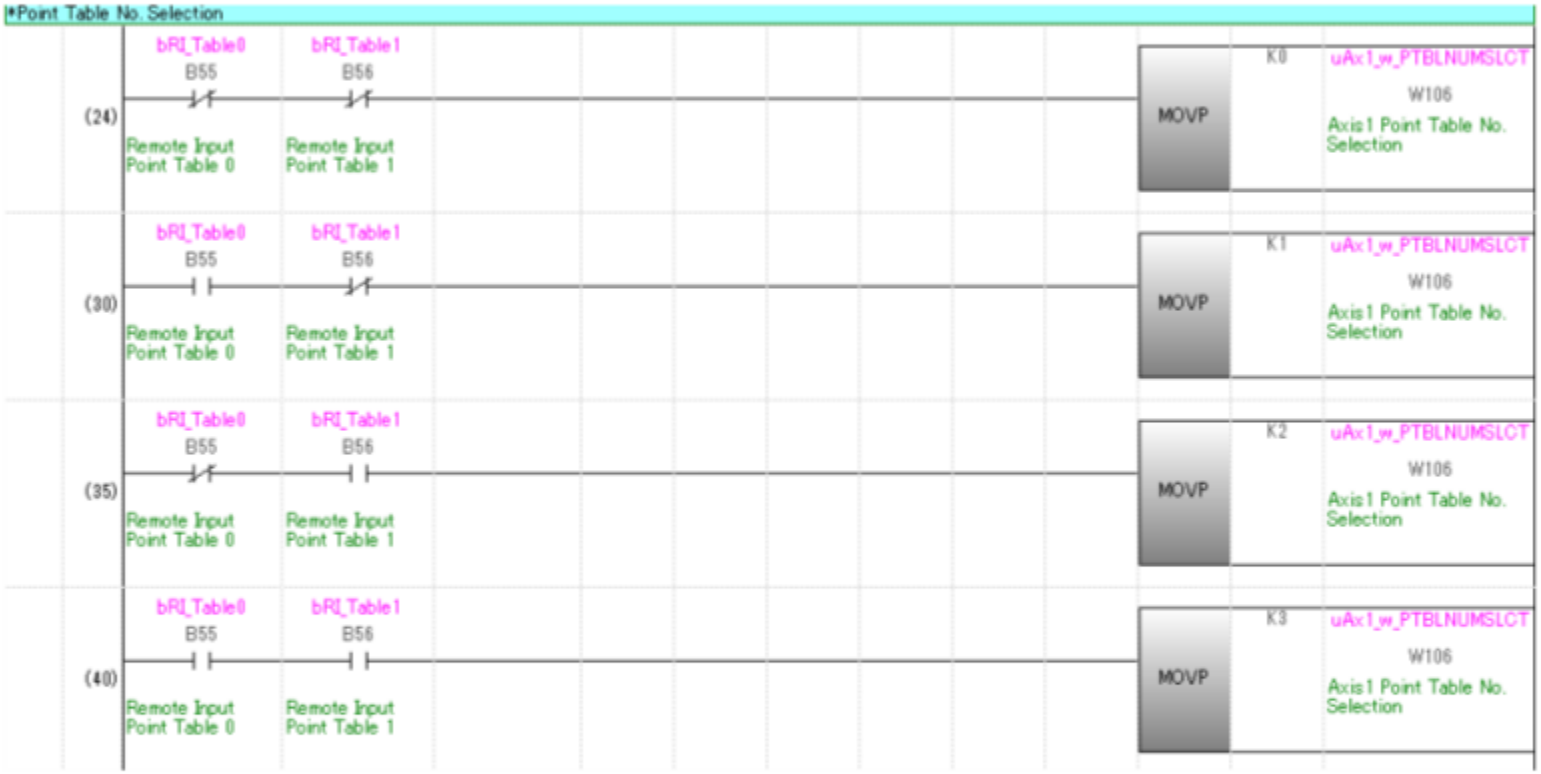
2.5.3 Detailed Explanation of the Program



2.5.3 Detailed Explanation of the Program

(3) Point table selection

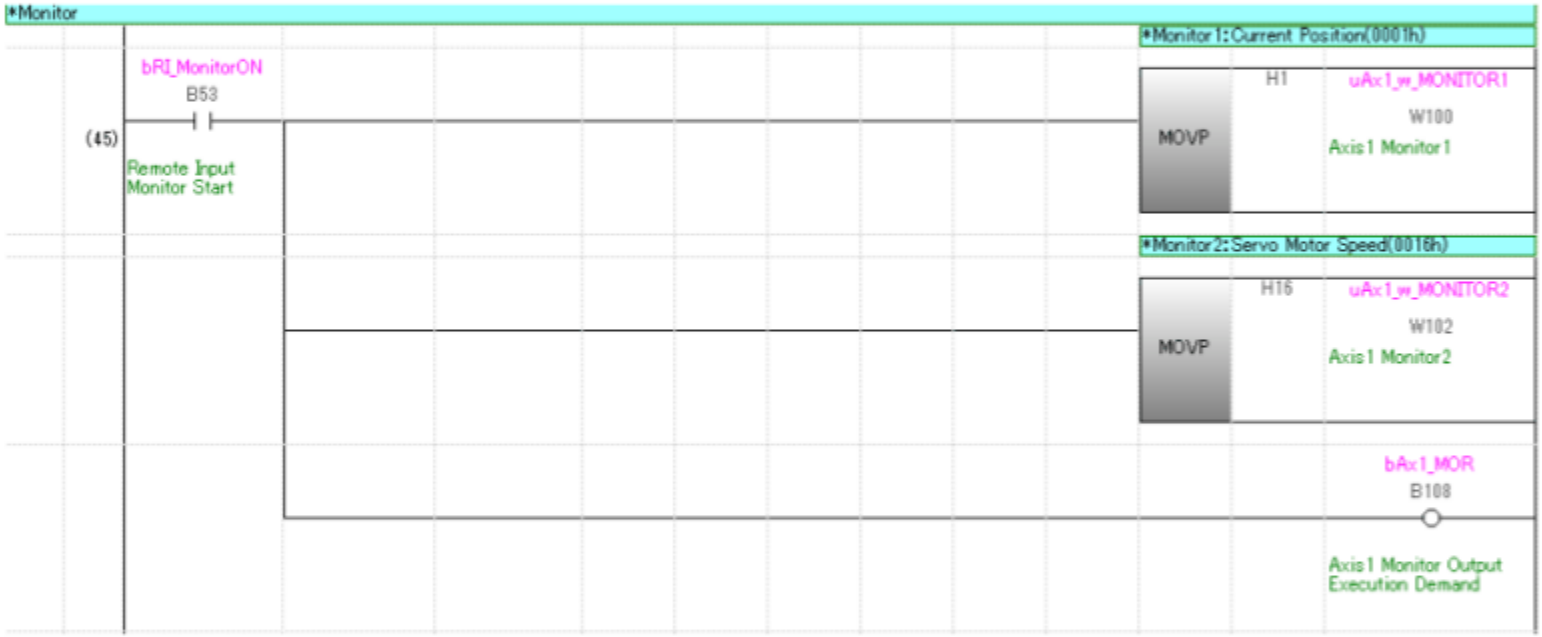
Switch the point table number by the remote input module signal.
Switch the point table number 0, 1, 2, and 3 by the combination of the point table 0 signal and point table 1 signal.



2.5.3 Detailed Explanation of the Program

(4) Monitor

When the monitoring start signal of the remote input module turns on, the current command position is stored to the device of monitor 1, and the motor rotation speed to the device of monitor 2. What to be monitored content can be changed by modifying the monitoring code specified by the MOVP instruction.
For the monitoring code, refer to the MR-J4-GF Instruction Manual (IO Mode).



2.6 Operation Check

The operation check is completed.
Go to the next page.

2.7 Summary of This Chapter

In this chapter, you have learned:

- GX Works3 Setting
- Writing Data to the PLC
- Parameter Settings of the Servo Amplifier
- Parameter Settings of the Remote Input Module
- Program Example
- Operation Check

Important points

GX Works3 Setting	• When you use the MR-J4-GF servo amplifier and the remote input module for the first time, register their profiles in GX Works3. • Create a project and initialize the CPU. • Use the CC-Link IE Field Network master/local module as the master station. • Register the servo amplifier and the remote input module to the slave station. • Assign the link devices to the servo amplifier and the remote input module. • Set the link refresh between the link device and device of the PLC CPU.
Parameter Settings of the Servo Amplifier	• Connect the servo amplifier and a personal computer via CC-Link IE Field Network. • Start MR Configurator2 and set parameters. • Register the positioning data to the point table.
Program Example	• Register a link device of a servo amplifier and a remote input module signal to a global label. • Reflect the remote input module signal to the link device of the servo amplifier. • Select the point table by combining ON/OFF of the two point table selection signals.
Operation Check	• The servo motor is driven by the command from the circuit connected to the remote input module.

Chapter 3 PLCopen Compatible FB Library

PLCopen Motion Control Function Block (FB) is provided for the IO mode of MR-J4-GF.
The Motion Control FB has a standard interface. Thus, using the FB leads to simplification of program development process and reduction of maintenance time owing to improved readability.

This chapter describes the program using the Motion Control FB.

3.1 Downloading the FB Library and Sample Program

Download the FB library and sample program from the following table.
Decompress the zip file in an arbitrary place.

Data	File format	File size
PLCopen FB library (Note)	Compressed file	12.7 MB
Chapter 3 Sample Program	Compressed file	1.68 MB

[COLUMN] What is PLCopen?

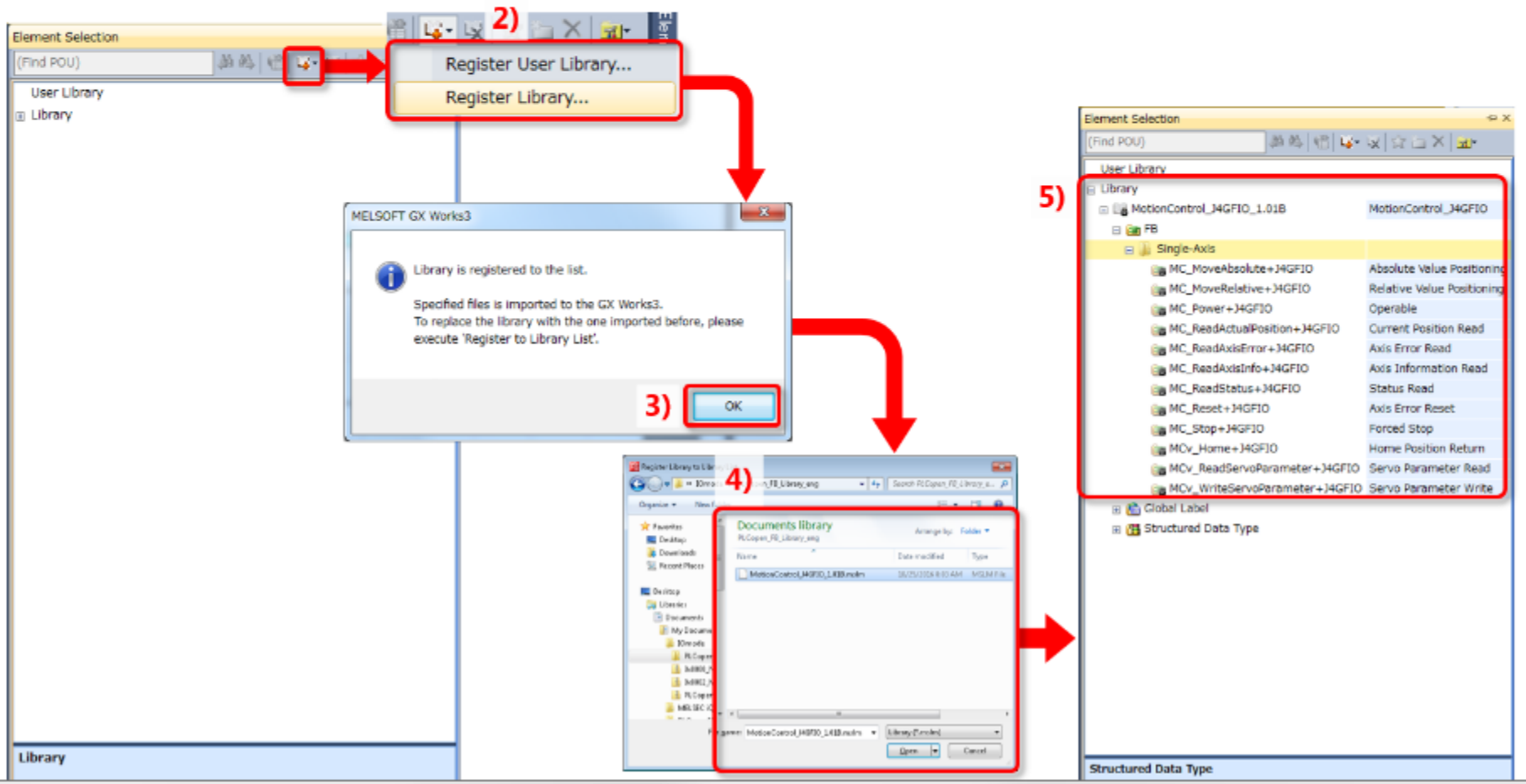
PLCopen is an independent organization, aiming at improving the development efficiency of PLC applications, promoting the international standard IEC 61131-3 for PLC programming, and creating and certificating the standard function block (FB) specification which is independent from vendor.
Using the FB specified by PLCopen can create the programming which does not depend on PLC manufacturers since the FB I/O and operation specifications are standardized. This makes the program structured and improves the reusability, resulting in the reduction of engineering cost.

(Note) For the details of the FB library, refer to enclosed PLCopen Motion Control Function Block Reference Manual.

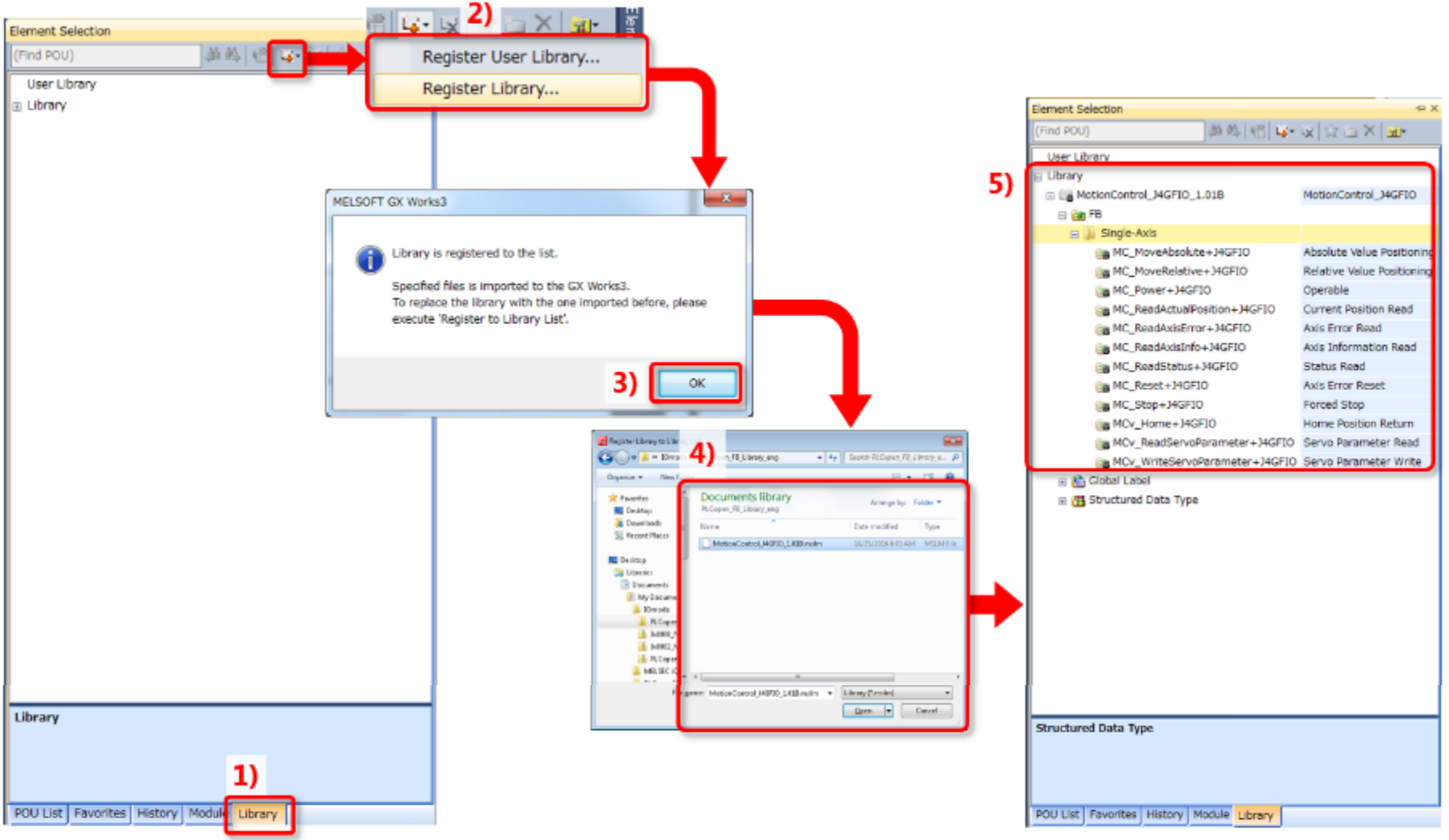
3.2 Registering the FB Library

This section describes the registration method of the FB library.
Once you register the library, there is no need to register them later.

1) Open a new project with GX Works3, and select the [Library] tab in the [Element Selection] window.
2) Click the [Register to Library List] icon, and select [Register Library].
3) When the dialog box appears, click [OK].
4) Select and open [MotionControl_J4GFIO_1.01B.mlsm] stored in the arbitrary place.
5) The FB is registered in the [Element Selection] window.



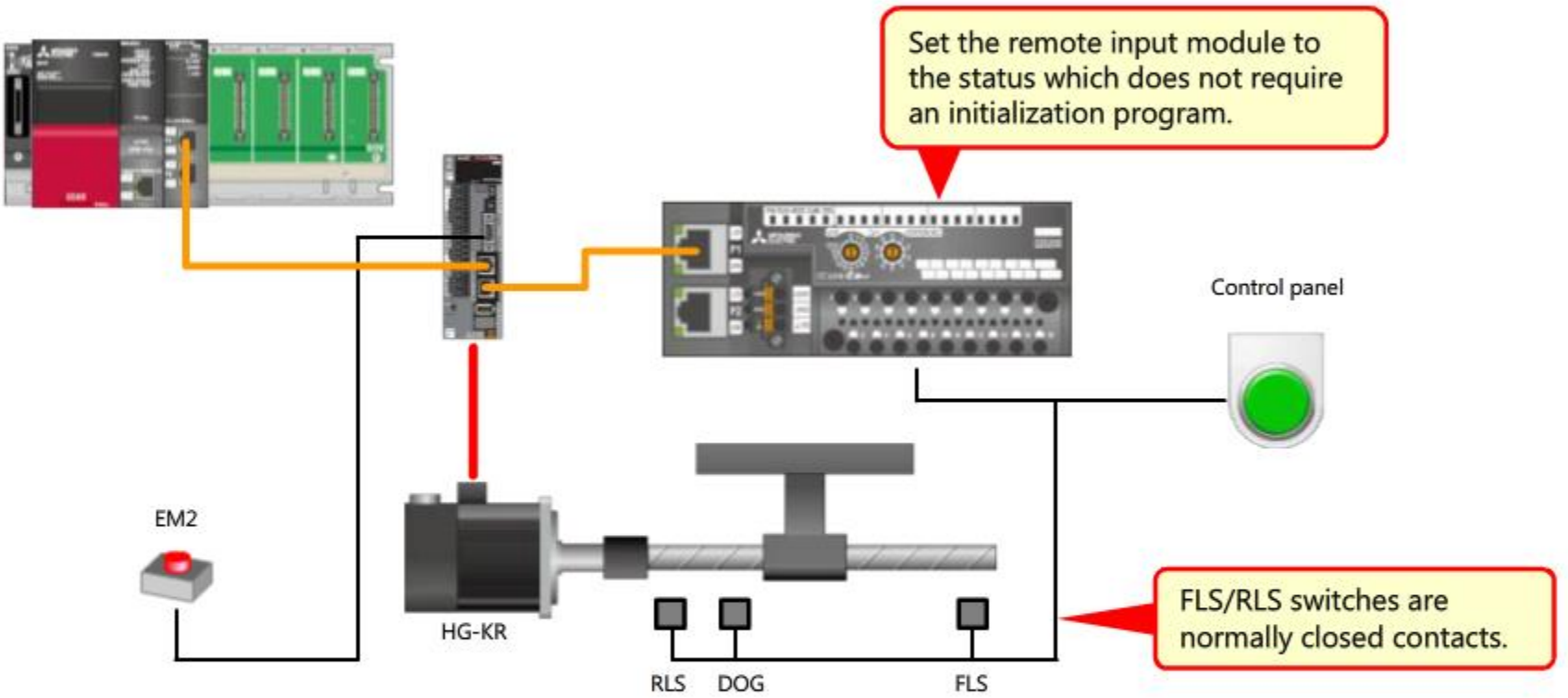
3.2 Registering the FB Library



3.3 System Configuration

(1) Device configuration

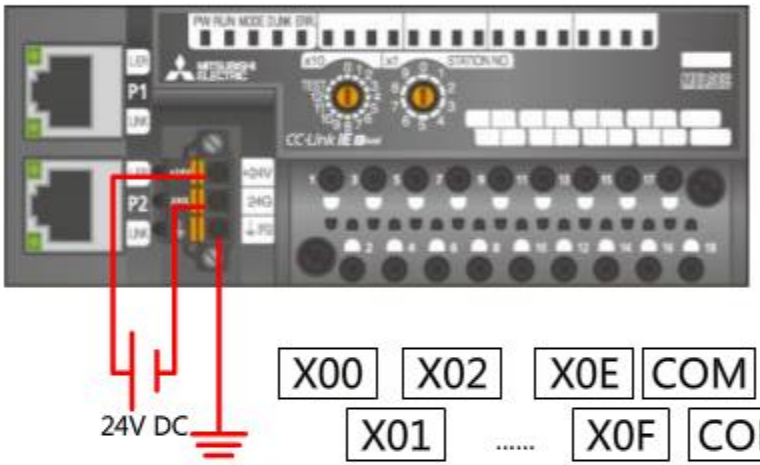
The system configuration used in this section is the same as the one used in section 1.7.



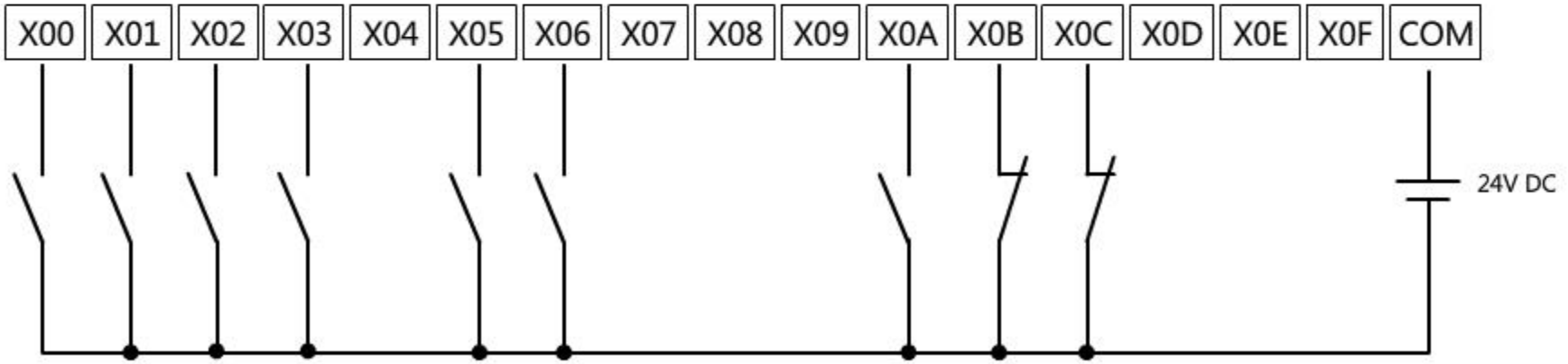
3.3 System Configuration

(2) Wiring an external circuit

Connect an external circuit to the remote input module.
The following figure shows the wiring of each signal and assignment for chapter 3.



X00: Servo-on request
X01: Home position return request
X02: Positioning start request
X03: Error reset
X04: Not connected
X05: Position number selection 1
X06: Position number selection 2
X07: Not connected
X08: Not connected
X09: Not connected
X0A: Proximity dog
X0B: Upper stroke limit
X0C: Lower stroke limit
X0D: Not connected
X0E: Not connected
X0F: Not connected



3.4 GX Works3 Setting

The setting method up to 2.1 (7) is the same as section 2.1.
Perform the procedure from creating a project to setting the station-specific mode according to section 2.1.

(1) Link device setting

In the sample program, the link device of the slave station is set the same as the one in section 2.1 (8).

Detect Now

Mode Setting: Online (Standard Mode) Assignment Method: Start/End Link Scan Time (Approx.): 0.71 ms

	No.	Model Name	STA#	Station Type	RX/RY Setting			RWw/RWr Setting			Reserved/Error Invalid Station/System Switching Monitoring Target Station
					Points	Start	End	Points	Start	End	
	0	Host Station	0	Master Station							
	1	MR-J4-GF	1	Intelligent Device Station	64	0000	003F	16	0000	000F	No Setting
	2	NZ2GF2S1-16D	2	Remote Device Station	16	0050	005F	4	0050	0053	No Setting

When using two or more servo amplifiers in the I/O mode, it is recommended that you assign the consecutive area to RX/RY and RWw/RWr as follows.
This makes the link refresh setting and structure setting easier.
(Refer to section 3.4 (2) and 3.6.2 (3).)

Detect Now

Mode Setting: Online (Standard Mode) Assignment Method: Start/End Link Scan Time (Approx.): 0.75 ms

	No.	Model Name	STA#	Station Type	RX/RY Setting			RWw/RWr Setting			Reserved/Error Invalid Station/System Switching Monitoring Target Station
					Points	Start	End	Points	Start	End	
	0	Host Station	0	Master Station							
	1	MR-J4-GF	1	Intelligent Device Station	64	0000	003F	16	0000	000F	No Setting
	2	MR-J4-GF	2	Intelligent Device Station	64	0040	007F	16	0010	001F	No Setting
	3	NZ2GF2S1-16D	3	Remote Device Station	16	0180	018F	4	0050	0053	No Setting

When RX/RY of the first axis is set to 00 to 3F, it is recommended that you set the second axis to 40 to 7F.

3.4 GX Works3 Setting

(2) Link refresh setting

Consecutively assign the total number of RX and RY of the axes used in the I/O mode to the bit device on the CPU side (the link refresh destination) where the status of RX/RY is stored.
(64 points for each RX and RY per axis)
For example, when using only one axis as this course, set the device so that RX00 to 3F are B00 to B3F, and RY00 to RY3F are B40 to B7F.
When using two axes, set the device so that RX00 to RX7F are B00 to B7F, and RY00 to RY7F are B80 to B0FF.
Likewise, consecutively assign the total number of RWw and RWr of the axes used in the I/O mode to the word device.
(16 points for each RWw and RWr per axis)

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF		Module Label				
-	SW	512	00000	001FF		Module Label				
1	RX	64	00000	0003F		Specify Device	B	64	00000	0003F
2	RY	64	00000	0003F		Specify Device	B	64	00040	0007F
3	RWr	16	00000	0000F		Specify Device	W	16	00000	0000F
4	RWw	16	00000	0000F		Specify Device	W	16	00010	0001F
5	RX	16	00050	0005F		Specify Device	B	16	00080	0008F

3.4 GX Works3 Setting

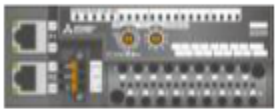
(3) Link refresh image

The following shows a image of the link refresh of the sample program in this chapter.

PLC CPU

Servo amplifier

Remote input module



B00-3F ← RX00-3F

B40-7F → RY00-3F

W00-0F ← RWr00-0F

W10-1F → RWw00-0F

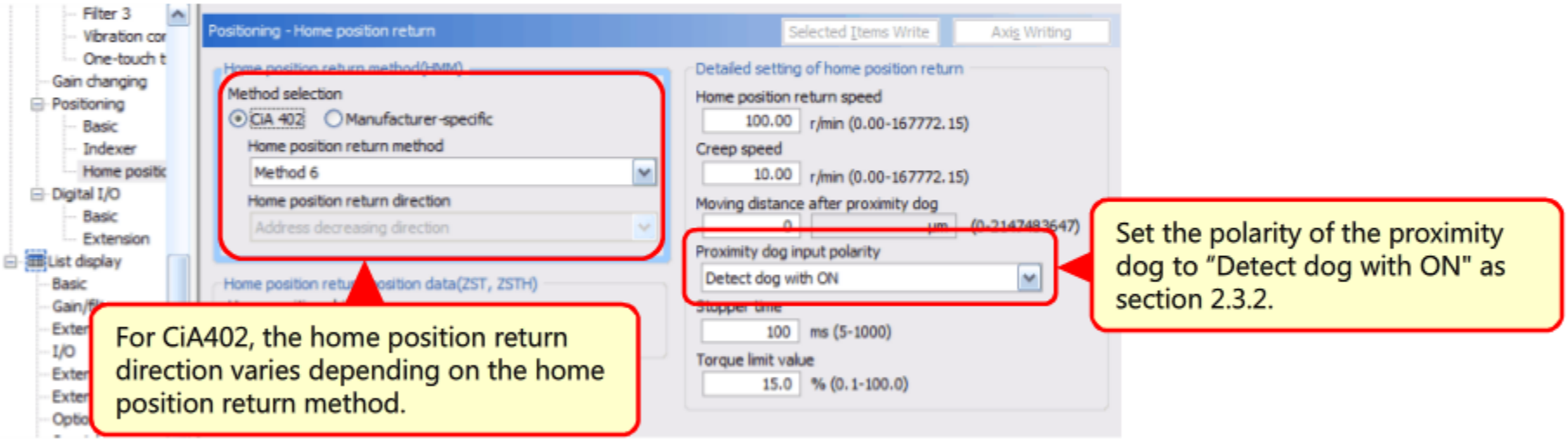
B80-8F ← RX50-5F

3.5 Parameter Settings of the Servo Amplifier

The parameters of the servo amplifier are almost the same as those in section 2.3.2.
In this chapter, change the setting of the home position return parameter only.

(1) Setting the home position return parameter

Set "CiA 402 Mode" to the home position return method in [Positioning] - [Home position return].
In this chapter, set Method 6 of CiA 402 Homing Method.
Select "CiA 402" in [Method selection].
Select "Method 6" in [Home position return method].



[COLUMN] Home position return methods with CiA402 type

The CiA 402 drive profile is a device profile described in IEC 61800-7-201 and IEC 61800-7-301 for the drive and motion control. The search method and reference point of the home position are described as Homing Method in CiA 402.
In Method 6, the axis moves in the address decreasing direction when the home position return is performed. The home position is a position of the first Z-phase after the proximity dog switch (Home Switch) is detected.
For details, refer to MR-J4-GF SERVO AMPLIFIER INSTRUCTION MANUAL.

3.5 Parameter Settings of the Servo Amplifier

(2) Point table setting

When positioning with the FB, it is not necessary to set the point table.
The data will be registered to the point table when you execute the FB.

Point table positioning operation (Absolute value command system)

Selected Items Write | Write All | Update Project

No.	Target position -999.999-999.999 mm	Rotation speed 0.00-167772.15 r/min	Accel. time const. 0-20000 ms	Decel. time const. 0-20000 ms	Dwell time 0-20000 ms	Auxiliary func. 0-3,8-11
1	0.000	0.00	0	0	0	0
2	0.000	0.00	0	0	0	0
3	0.000	0.00	0	0	0	0
4	0.000	0.00	0	0	0	0
5	0.000	0.00	0	0	0	0
6	0.000	0.00	0	0	0	0
7	0.000	0.00	0	0	0	0
8	0.000	0.00	0	0	0	0
9	0.000	0.00	0	0	0	0

3.6 Program Example

This section describes the program example of the PLC.

3.6.1 Labels to be used

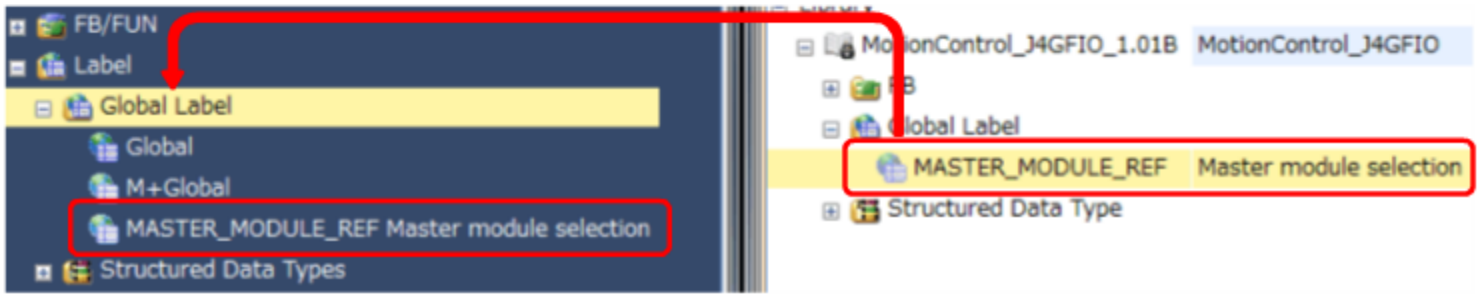
(1) Global label

Register each signal of the remote input module and each link device of the servo amplfiier to a global label.
The structure of No.1 and 2 are explained in section 3.6.2 (2), and (3).

	Label Name	Data Type		Class	Assign (Device/Label)	Initial Value	Constant	English(Display Target)
1	Axis1	AXIS_REF_J4GF	...	VAR_GLOBAL	Detailed Setting			Axis1 Information
2	G_stLinkIEF	stRemotReg(0..0)	...	VAR_GLOBAL	Detailed Setting			Structure for Remote Device Control
3	bRI_PowerON	Bit	...	VAR_GLOBAL	B80			Remote Input Servo ON
4	bRI_Home	Bit	...	VAR_GLOBAL	B81			Remote Input Home
5	bRI_MoveAbs	Bit	...	VAR_GLOBAL	B82			Remote Input Start Absolute Positioning
6	bRI_ErrReset	Bit	...	VAR_GLOBAL	B83			Remote Input Errror Reset
7	bRI_PosNum1	Bit	...	VAR_GLOBAL	B85			Remote Input Position No. 1
8	bRI_PosNum2	Bit	...	VAR_GLOBAL	B86			Remote Input Position No. 2
9	bRI_DOG	Bit	...	VAR_GLOBAL	B8A			Remote Input Proximity Dog
10	bRI_FLS	Bit	...	VAR_GLOBAL	B8B			Remote Input Upper Stroke Limit
11	bRI_RLS	Bit	...	VAR_GLOBAL	B8C			Remote Input Lower Stroke Limit
12	bAx1_DOG	Bit	...	VAR_GLOBAL	B43			Axis1 Proximity Dog
13	bAx1_FLS	Bit	...	VAR_GLOBAL	B50			Axis1 Upper Stroke Limit
14	bAx1_RLS	Bit	...	VAR_GLOBAL	B51			Axis1 Lower Stroke Limit

When using PLCopen MotionControl FB with a new project file, register "MASTER_MODULE_REF" to the global label with the following operation.
(This has already been registered in the sample program, and thus this operation is not necessary.)

Drag and drop "MASTER_MODULE_REF" under [Global Label] in the [Library] tab in the [Element Selection] window to [Global Label] in the project tree.



3.6.1 Labels to be used

(2) Local label

Register each device used for the FB I/O and its initial value of the positioning data as a constant to a local label.

	Label Name	Data Type		Class	Initial Value	Constant	English(Display Target)
1	bAx1_PowerONComp	Bit		VAR			Servo ON Complete
2	bAx1_PowerONError	Bit		VAR			Servo ON Error
3	uAx1_PowerONErrID	Word [Unsigned]/Bit String [16-bit]		VAR			Servo ON Error Code
4	bAx1_HomingComp	Bit		VAR			Homing Complete
5	bAx1_HomingError	Bit		VAR			Homing Error
6	uAx1_HomingErrID	Word [Unsigned]/Bit String [16-bit]		VAR			Homing Error Code
7	bAx1_MoveAbsComp	Bit		VAR			Positioning Complete
8	bAx1_MoveAbsError	Bit		VAR			Positioning Error
9	uAx1_MoveAbsErrID	Word [Unsigned]/Bit String [16-bit]		VAR			Positioning Error Code
10	bAx1_ResetComp	Bit		VAR			Reset Complete
11	bAx1_ResetError	Bit		VAR			Reset Error
12	uAx1_ResetErrID	Word [Unsigned]/Bit String [16-bit]		VAR			Reset Error Code
13	lePosition	FLOAT [Double Precision]		VAR			Command Position
14	leSpeed	FLOAT [Double Precision]		VAR			Command Speed
15	udAccel	Double Word [Unsigned]/Bit String [32-bit]		VAR			Command Accel Time Const
16	udDecel	Double Word [Unsigned]/Bit String [32-bit]		VAR			Command Decel Time Const
17	lePos0_Position	FLOAT [Double Precision]		VAR_CONSTANT		100.000	No.0 Position
18	lePos0_Speed	FLOAT [Double Precision]		VAR_CONSTANT		100.00	No.0 Speed
19	udPos0_Acc	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		100	No.0 Accel Time Const
20	udPos0_Dec	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		100	No.0 Decel Time Const
21	lePos1_Position	FLOAT [Double Precision]		VAR_CONSTANT		50.000	No.1 Position
22	lePos1_Speed	FLOAT [Double Precision]		VAR_CONSTANT		50.00	No.1 Speed
23	udPos1_Acc	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		100	No.1 Accel Time Const
24	udPos1_Dec	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		100	No.1 Decel Time Const
25	lePos2_Position	FLOAT [Double Precision]		VAR_CONSTANT		0	No.2 Position
26	lePos2_Speed	FLOAT [Double Precision]		VAR_CONSTANT		100	No.2 Speed
27	udPos2_Acc	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		50	No.2 Accel Time Const
28	udPos2_Dec	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		50	No.2 Decel Time Const
29	lePos3_Position	FLOAT [Double Precision]		VAR_CONSTANT		150.000	No.3 Position
30	lePos3_Speed	FLOAT [Double Precision]		VAR_CONSTANT		200.00	No.3 Speed
31	udPos3_Acc	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		50	No.3 Accel Time Const
32	udPos3_Dec	Double Word [Unsigned]/Bit String [32-bit]		VAR_CONSTANT		50	No.3 Decel Time Const
33	MC_Power_J4GFIO_1	MC_Power+J4GFIO		VAR			[FB]Servo ON
34	MCv_Home_J4GFIO_1	MCv_Home+J4GFIO		VAR			[FB]Home
35	uPosNumber	Word [Unsigned]/Bit String [16-bit]		VAR			Position No.
36	MC_MoveAbsolute_J4GFIO_1	MC_MoveAbsolute+J4GFIO		VAR			[FB]Start Absolute Positioning
37	MC_Reset_J4GFIO_1	MC_Reset+J4GFIO		VAR			[FB]Error Reset

3.6.1 Labels to be used

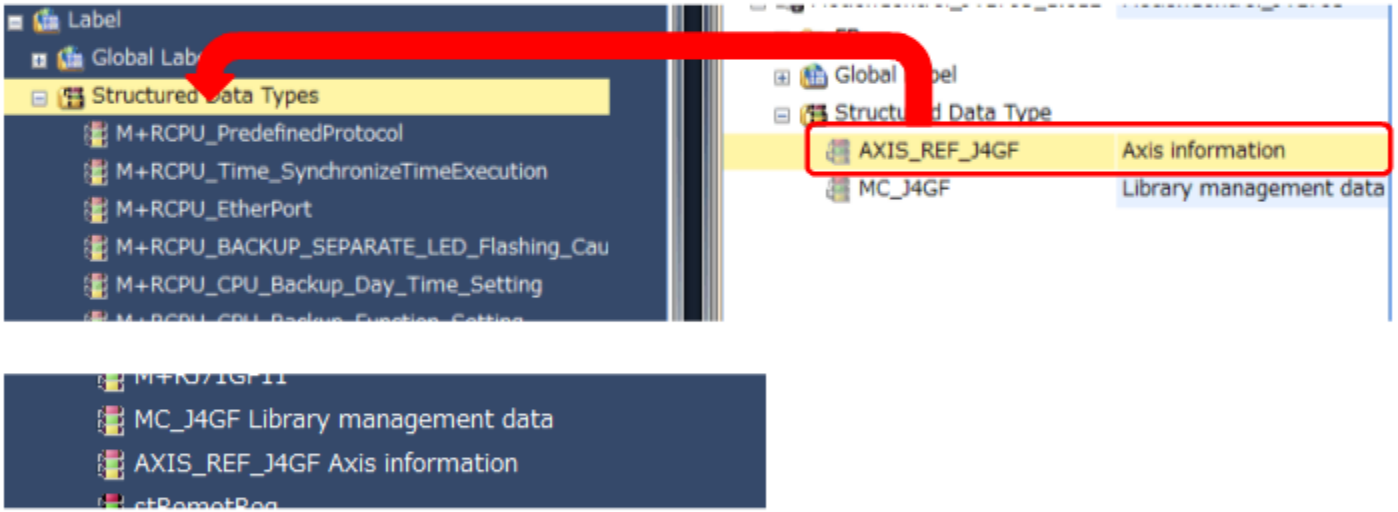
The command position, command speed, and acceleration/deceleration constants of four points are registered respectively.

3.6.2 Structures

(1) AXIS_REF_J4GF type and MC_J4GF type

When using PLCopen MotionControl FB in a new project file, register the structure of the AXIS_REF_J4GF type and MC_J4GF type to the project with the following operation.
(This has already been registered in the sample program.)

"AXIS_REF_J4GF" and "MC_J4GF" are under [Structured Data Type] in the [Library] tab on the [Element Selection] window.
Drag and drop "AXIS_REF_J4GF" to "Structured Data Type" in the project tree.
"MC_J4GF" and "AXIS_REF_J4GF" are registered in the project tree.

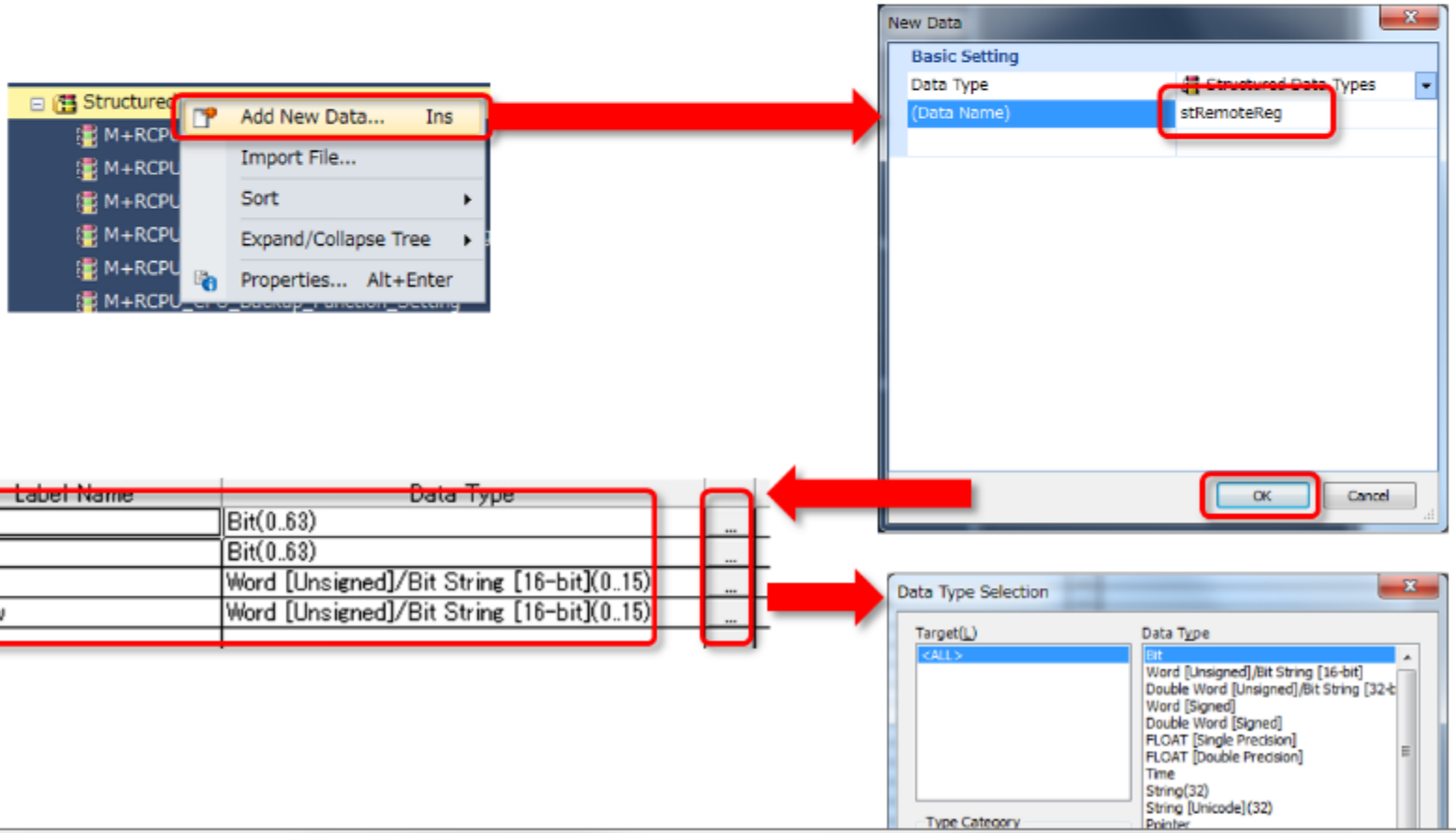


3.6.2 Structures

(2) stRemoteReg type

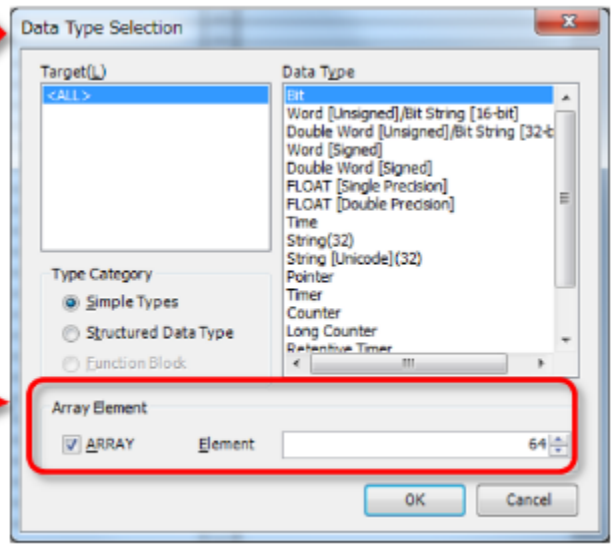
When using PLCopen MotionControl FB in a new project file, register the structure of the stRmoteReg type to the project with the following operation.
(This has already been registered in the sample program.)

The stRemoteReg type structure is necessary for the FB to operate the link device.
Right-click [Structured Data Types] in the project tree, and select [Add New Data].
Enter "stRemoteReg" to "Data Name", and click [OK].
The [Structure Setting] window appears. Enter the label name as the following figure.



3.6.2 Structures

3	unRWr	Word [Unsigned]/Bit String [16-bit](0..15)	...
4	unRWw	Word [Unsigned]/Bit String [16-bit](0..15)	...
5			



Array the bit device as 64 (number of element) × N (number of axis).
Array the word device as 16 (number of element) × N (number of axis).

3.6.2 Structures

(3) Registering the structures

When using PLCopen MotionControl FB in a new project file, define the structure of the AXIS_REF_J4GF type and stRmoteReg type to the global label with the following operation.
(This has already been registered in the sample program.)

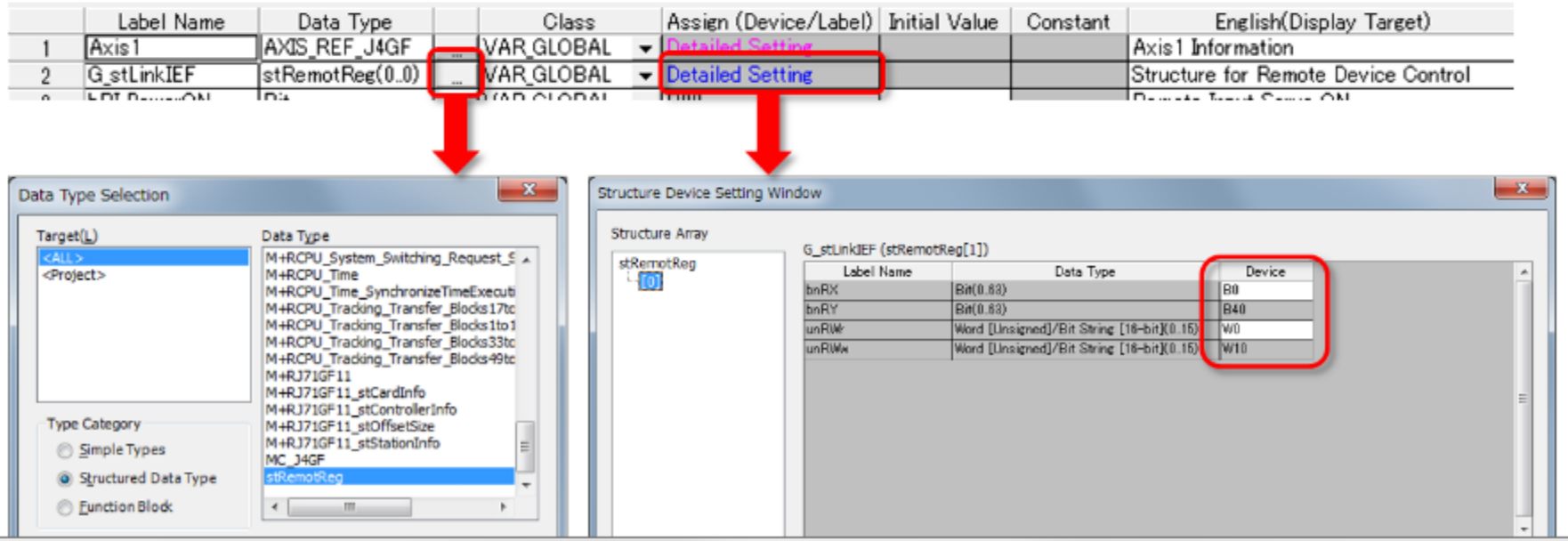
Open the [Global Label] window.

(a) AXIS_REF_J4GF

Register the AXIS_REF_J4GF type structure named "Axis1".

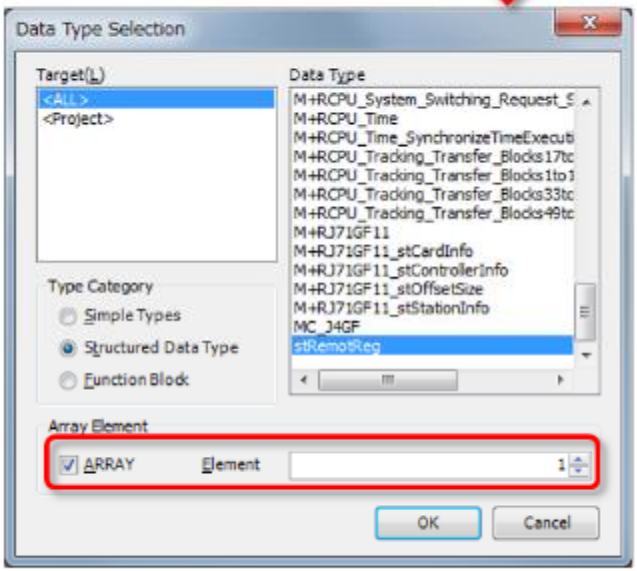
(b) stRemoteReg

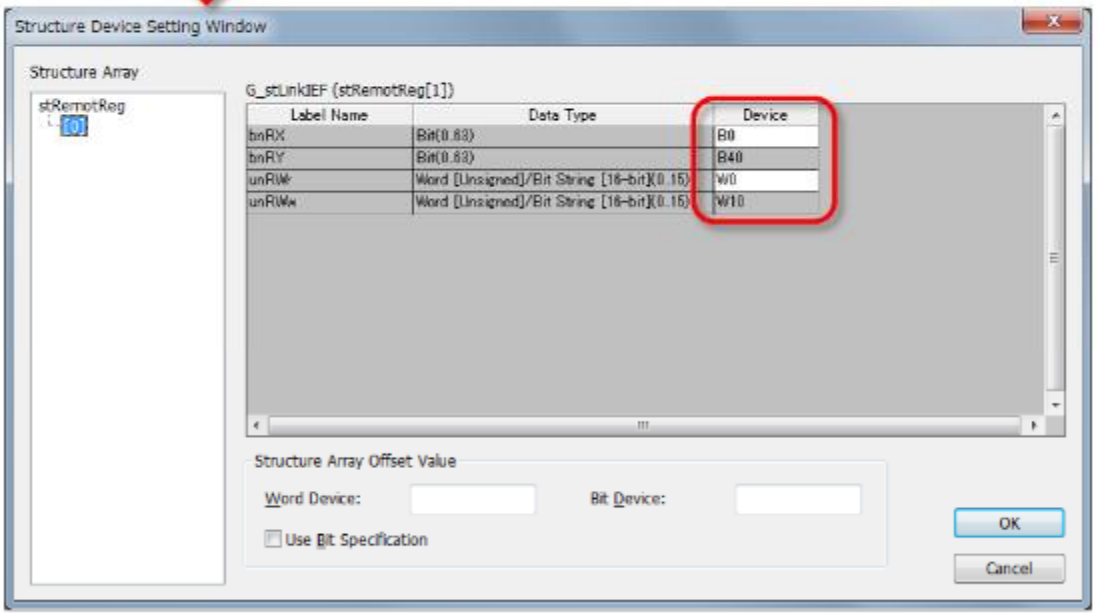
Register the structure named "G_stLinkIEF". This label itself is also defined by an array.
The number of the elements for the network numbers is required. Since only network number 1 is used in this course, set 1 to the "Element".
Click "Detailed Setting" in the [Assign (Device/Label)] field.
"Structure Device Setting Window" appears. Accurately input the device of the PLC CPU which has been set as the refresh destination of RX/RY and RWr/RWw of the servo amplifier.



3.6.2 Structures

	Label Name	Data Type		Class	Assign (Device/Label)	Initial Value	Constant	English(Display Target)
1	Axis1	AXIS_REF_J4GF	...	VAR_GLOBAL	Detailed Setting			Axis1 Information
2	G_stLinkIEF	stRemotReg(0..0)	...	VAR_GLOBAL	Detailed Setting			Structure for Remote Device Control

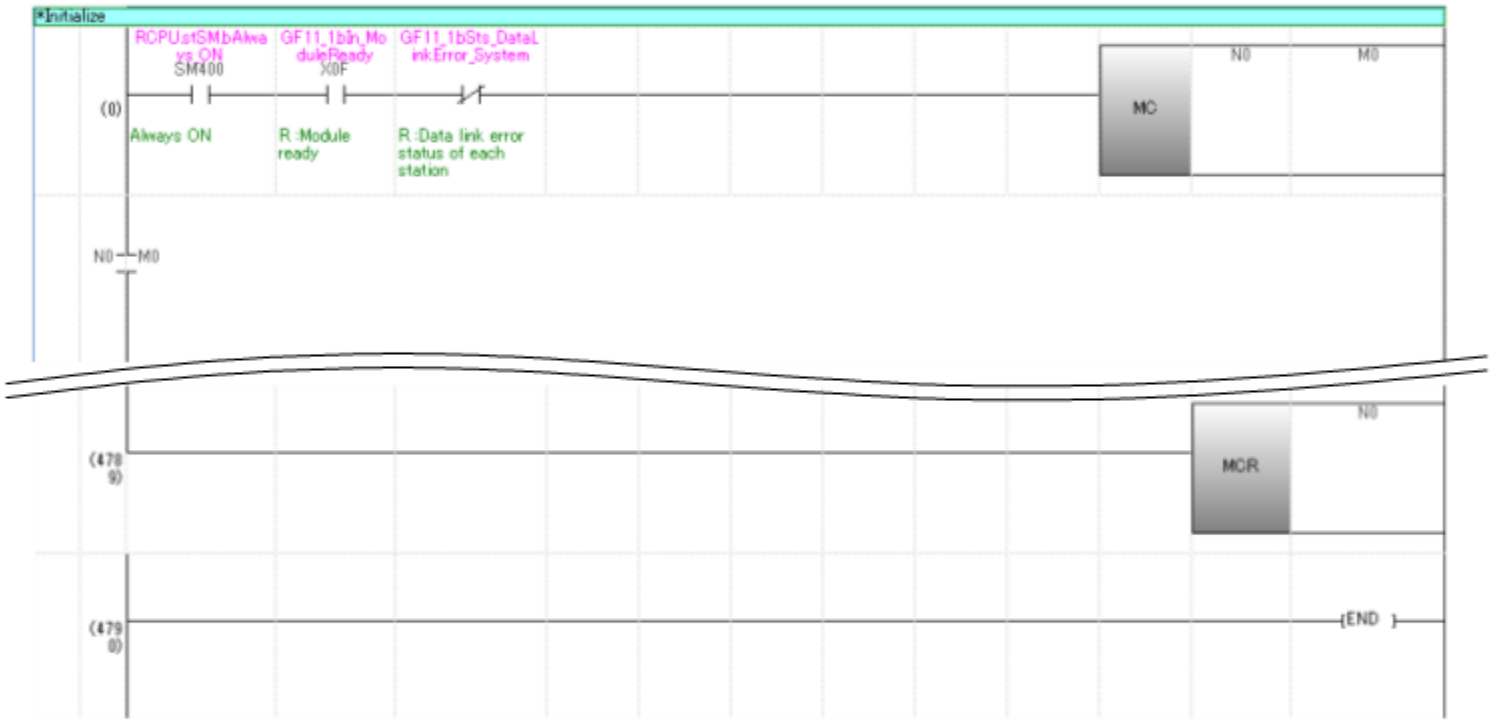




3.6.3 Detailed Explanation of the Program

(1) Initial processing

When the PLC CPU and CC-Link IE Field master module are normally started and no error occurs in the data link of each station, the interlock by the MC command is released.



3.6.3 Detailed Explanation of the Program

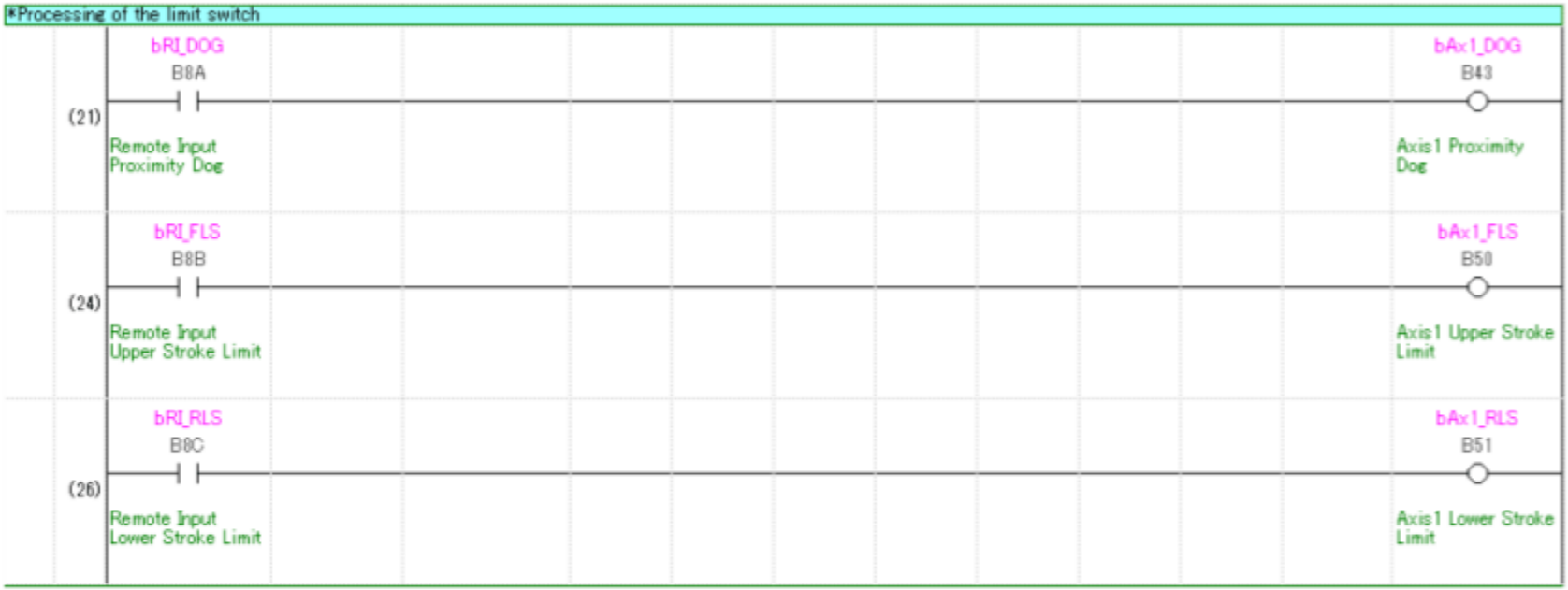
(2) Structure member setting

Set the information necessary for the members of structure Axis1.

3.6.3 Detailed Explanation of the Program

(3) Limit switch processing

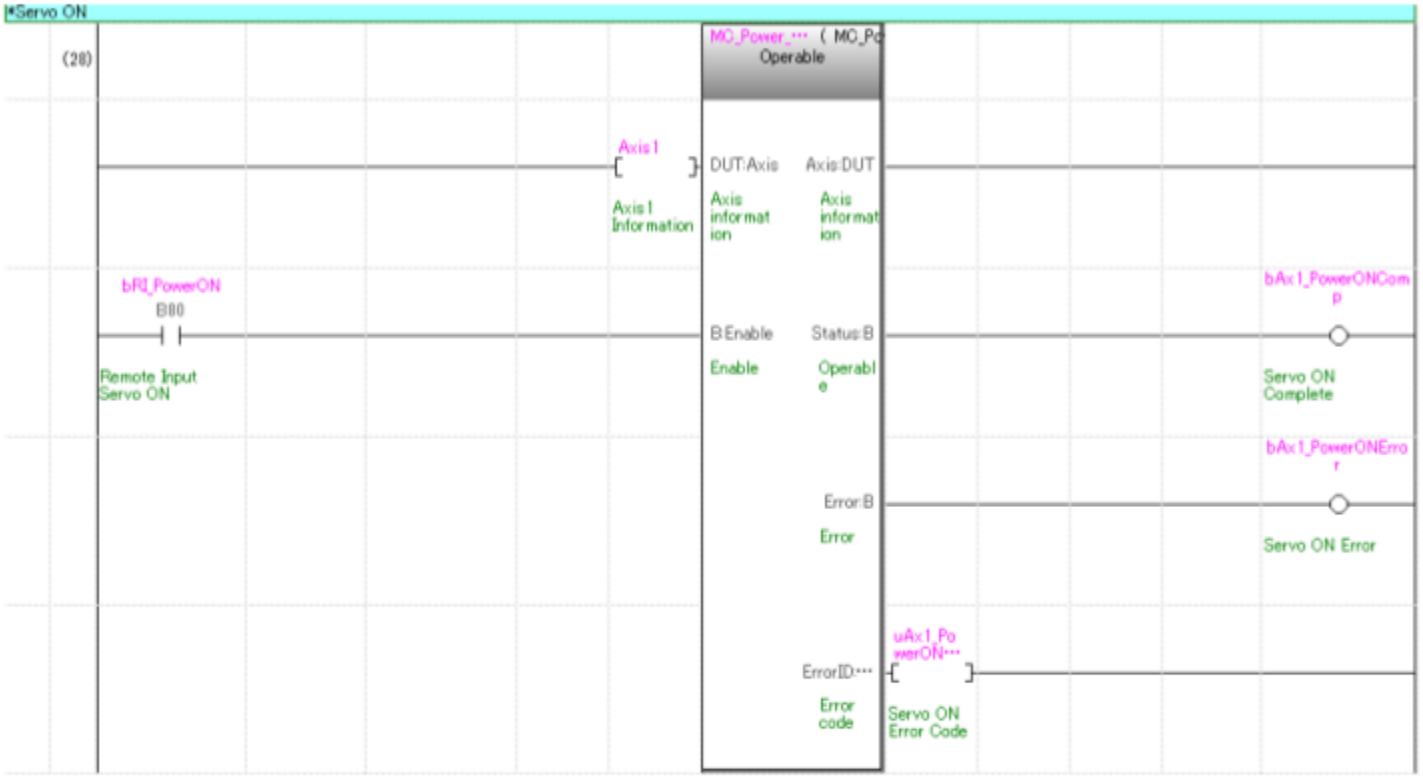
Reflect the remote input module signal to the link device of the servo amplifier.



3.6.3 Detailed Explanation of the Program

(4) Servo-on

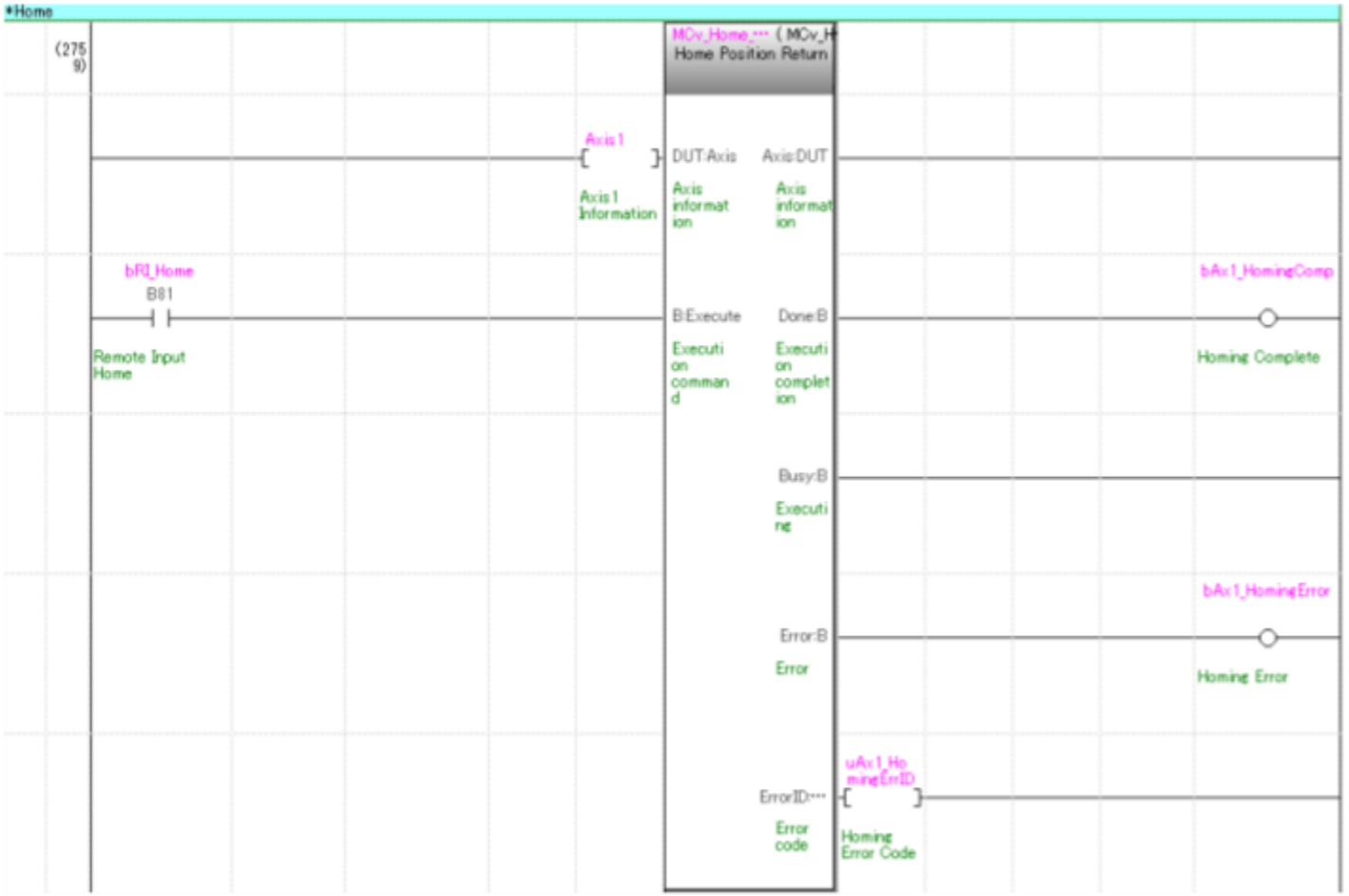
Execute the function block "MC_Power".



3.6.3 Detailed Explanation of the Program

(5) Home position return

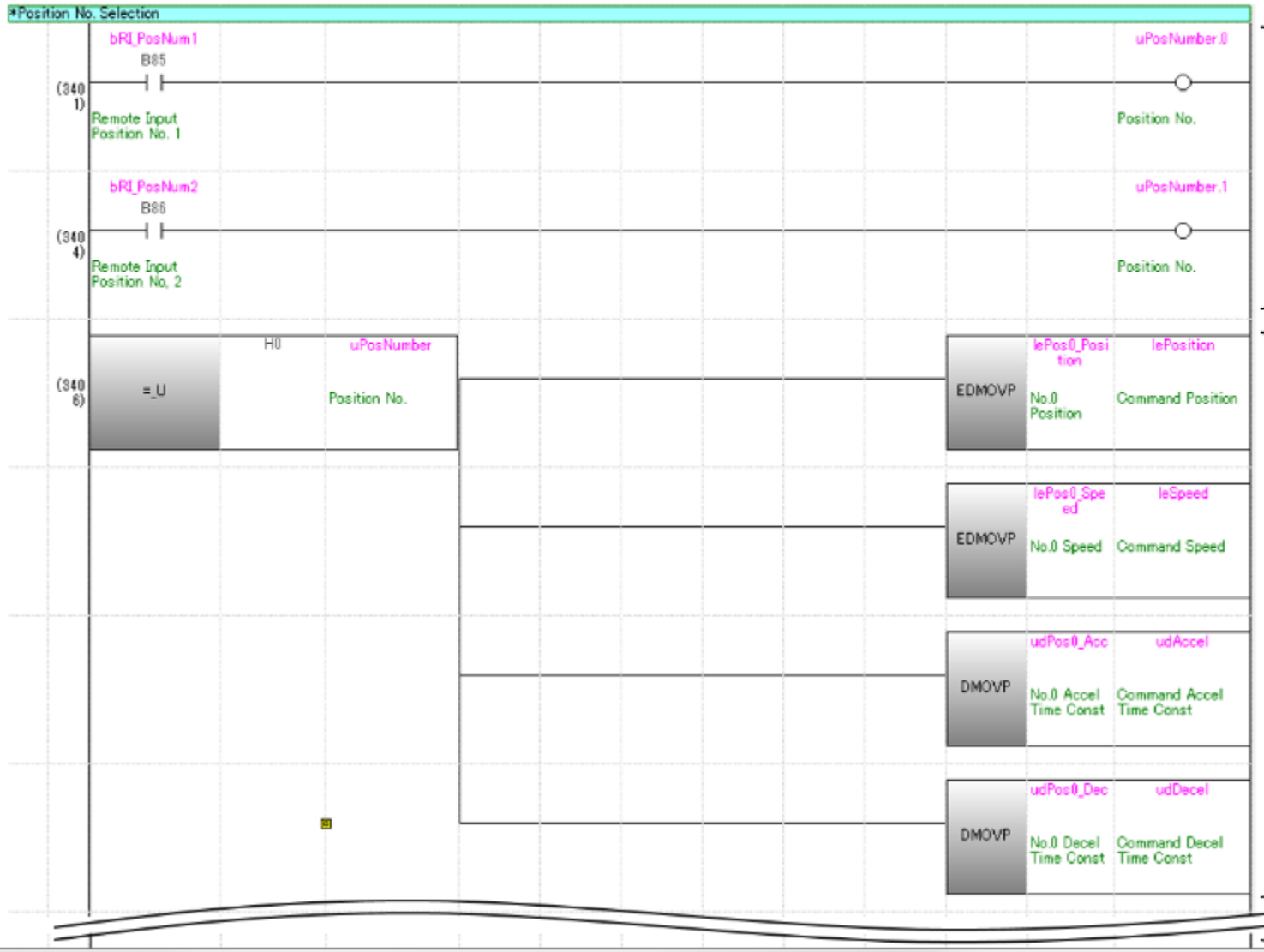
Execute the function block "MC_Home".



3.6.3 Detailed Explanation of the Program

(6) Position number selection

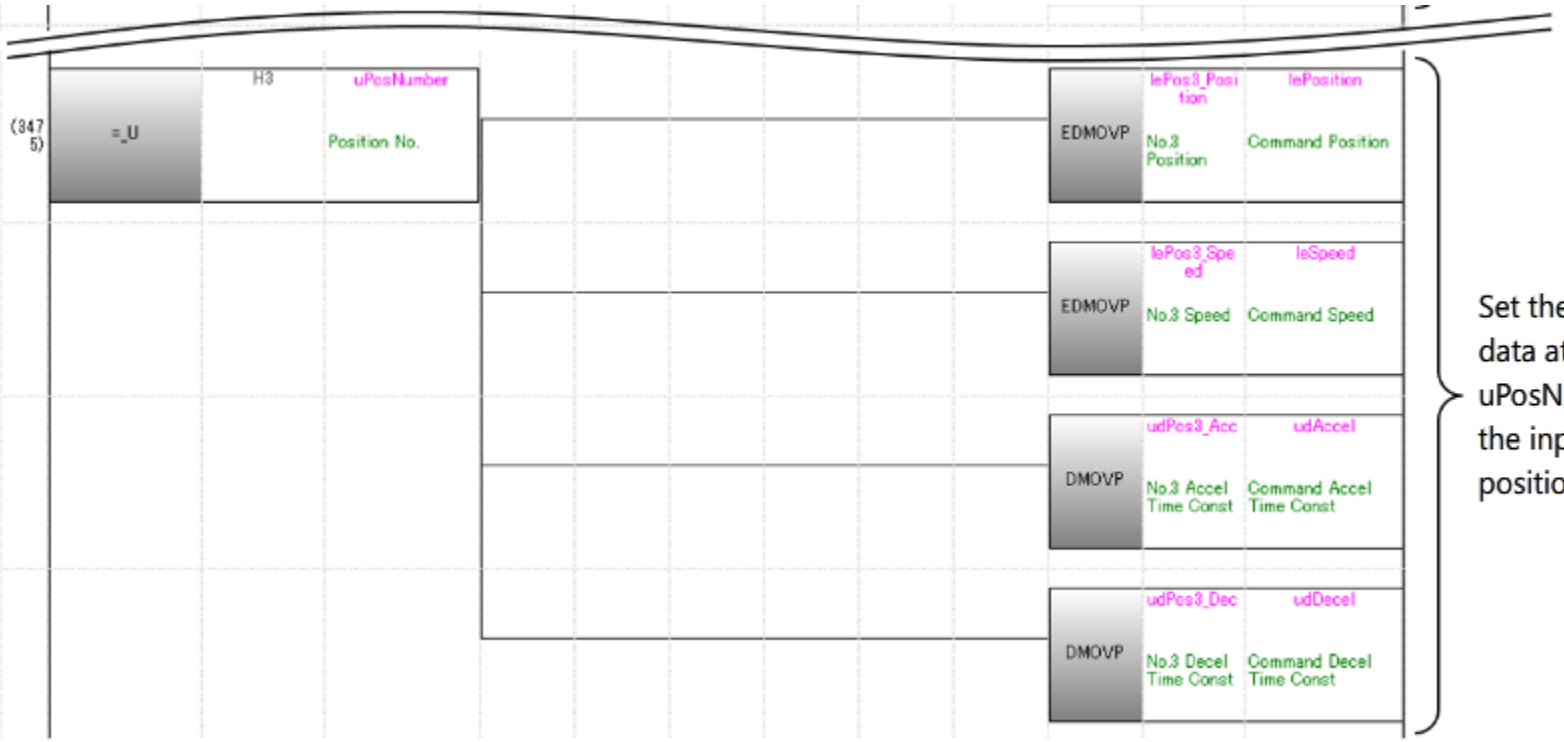
Select the position numbers for four points by the ON/OFF combination of the remote input module signal B85 (→RX55) and B86 (→RX56).



Assign B85 to bit0 of uPosNumber, and B86 to bit1 of uPosNumber.

Set the positioning data at the time uPosNumber is 0 to the input positioning start FB.

3.6.3 Detailed Explanation of the Program

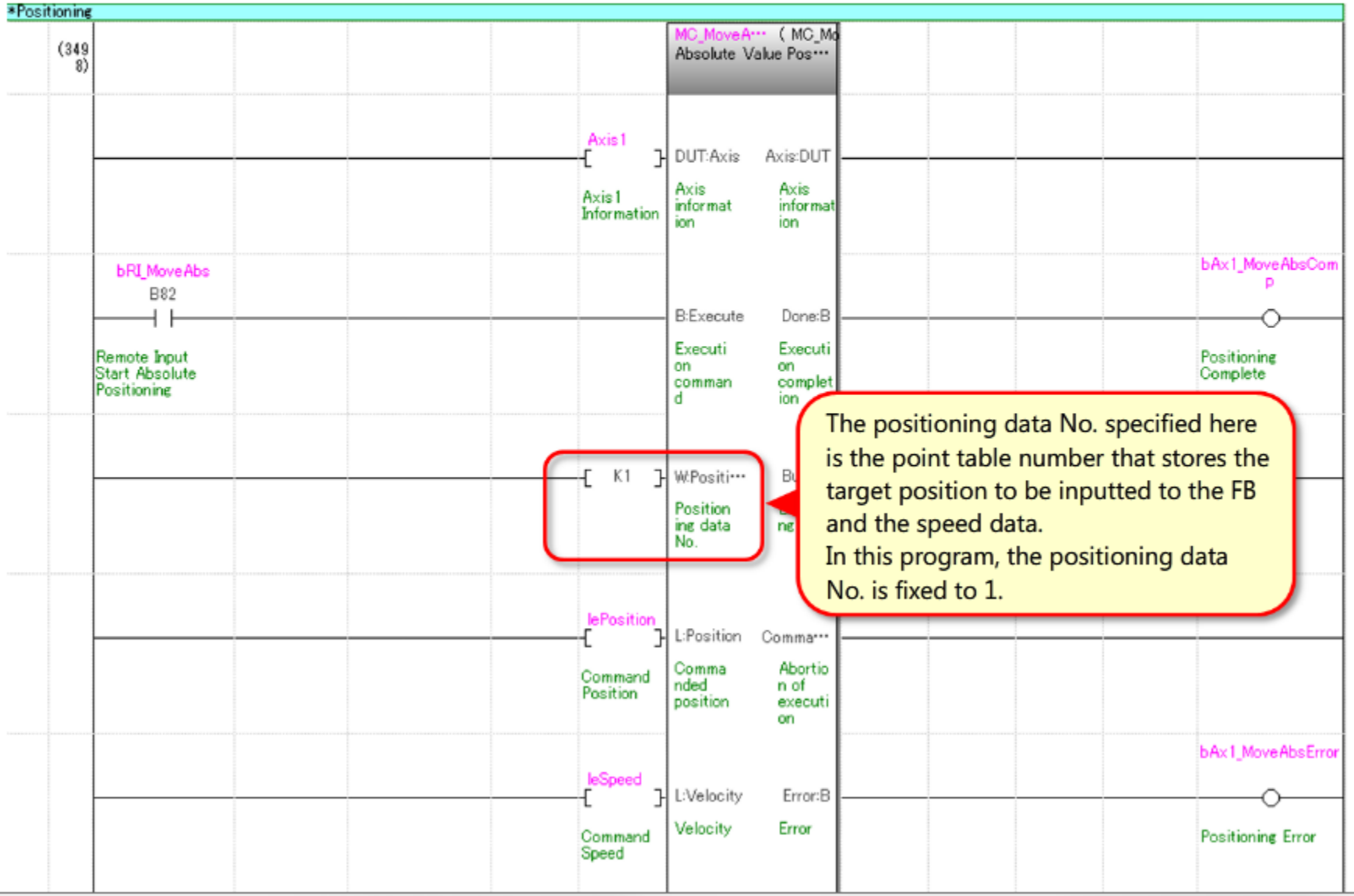


Set the positioning data at the time uPosNumber is 3 to the input positioning start FB.

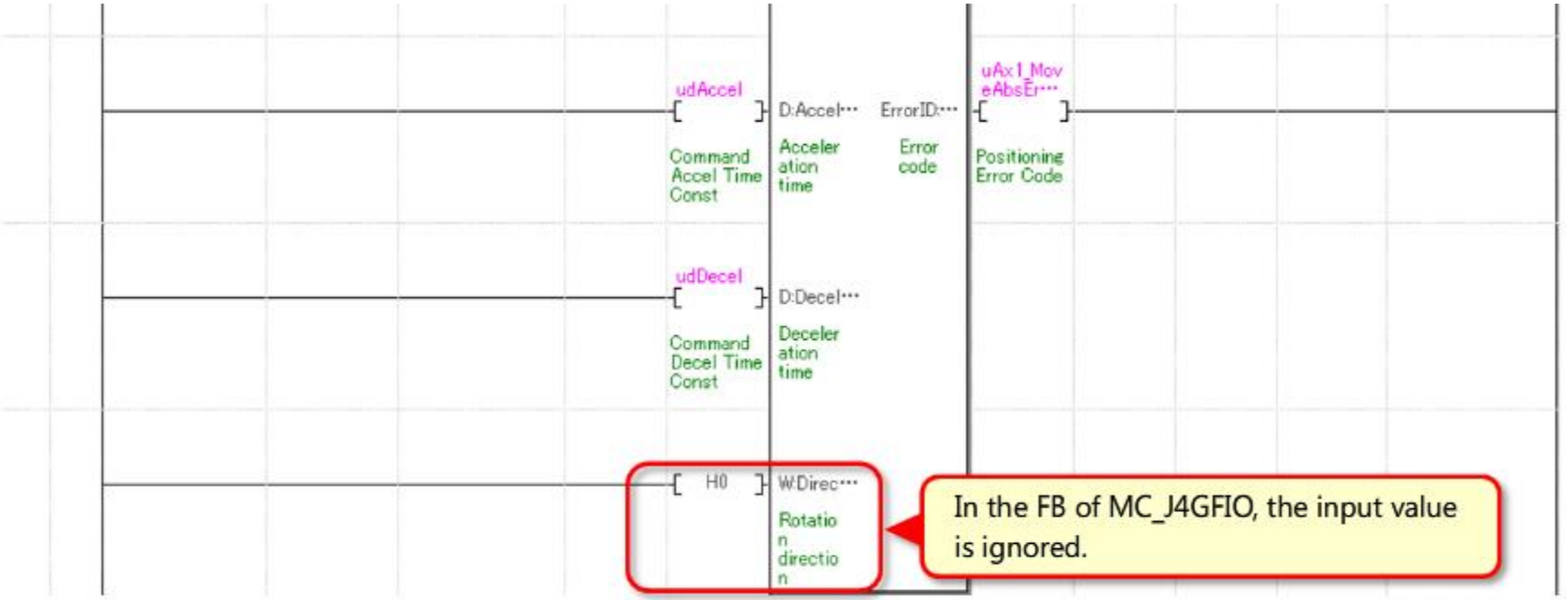
3.6.3 Detailed Explanation of the Program

(7) Positioning operation

Execute the function block "MC_MoveAbsolute".



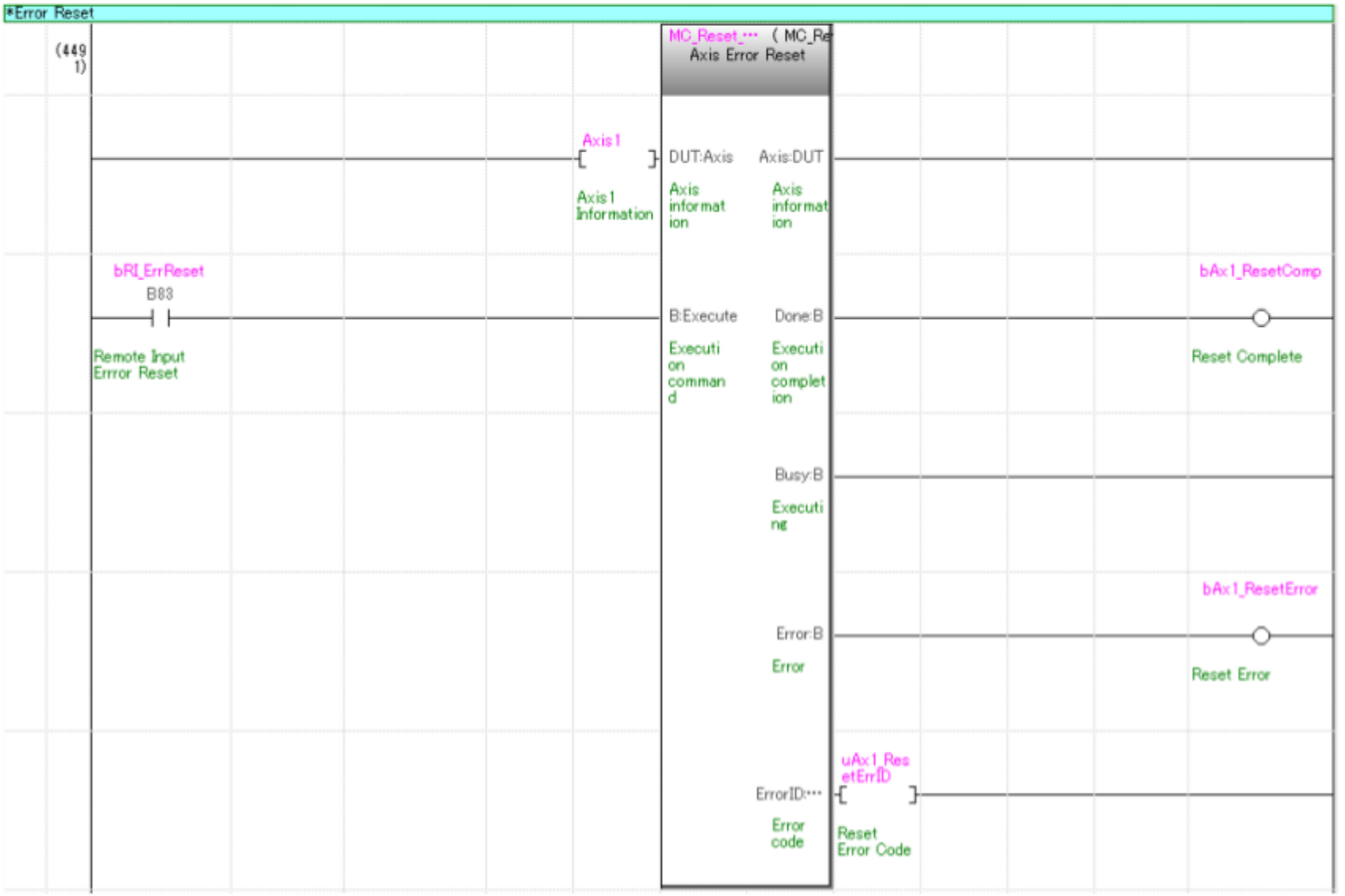
3.6.3 Detailed Explanation of the Program



3.6.3 Detailed Explanation of the Program

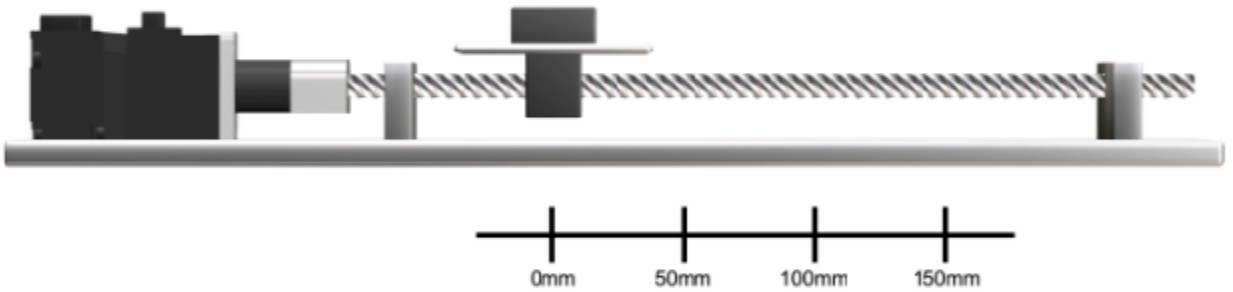
(8) Error reset

Execute the function block "MC_Reset".



3.7 Operation Check

Command position : 0.000mm
Command speed : 100.00r/min
Acceleration constants : 50msec
Deceleration constants : 50msec



The operation check is completed.
Go to the next page.

3.8 Summary of This Chapter

In this chapter, you have learned:

- Registering the FB Library
- GX Works3 Setting
- Parameter Settings of the Servo Amplifier
- Program Example
- Operation Check

Important points

Registering the FB Library	• Register the FB library file in the project file.
GX Works3 Setting	• Set consecutive areas equivalent to the total number of RX/RY and RWw/RWr of the servo amplifier used in the I/O mode to the device on the CPU side, which is the link refresh destination.
Parameter Settings of the Servo Amplifier	• In the sample program, the home position return method is set to Method 6 of the CiA 402 drive profile. • When positioning with the FB, the point table is not necessary to be set.
Program Example	• Define the AXIS_REF_J4G, MC_J4GF, and st_RemoteReg type structure. • Reflect the remote input module signal to the link device of the servo amplifier.
Operation Check	• The positioning operation is performed with an execution of the FB.

Test Final Test

Now that you have completed all of the lessons of the MELSERVO Basics (MR-J4-GF Servo Amplifier I/O Mode) Course, you are ready to take the final test.
If you are unclear on any of the topics covered, please take this opportunity to review those topics.
There are a total of 5 questions (7 items) in this Final Test.
You can take the final test as many times as you like.

How to score the test
After selecting the answer, make sure to click the **Answer** button. Your answer will be lost if you proceed without clicking the Answer button. (Regarded as unanswered question.)

Score results
The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.

Correct answers : 5

Total questions : 5

Percentage : 100%

To pass the test, you have to answer **60%** of the questions correct.

Proceed | Review

- Click the **Proceed** button to exit the test.
- Click the **Review** button to review the test. (Correct answer check)
- Click the **Retry** button to retake the test again.

Test Final Test 1

Select all the correct sentences describing the I/O mode of the MR-J4-GF servo amplifier.
(Multiple selections available)

- [ ] When using the MR-J4-GF servo amplifier in the I/O mode, the simple motion module must be used as the controller.
- [ ] The I/O mode and motion mode can be used together on the same network.
- [ ] Positioning can be performed by turning on/off the link device on CC-Link IE Field Network.

Answer Back

Test Final Test 2

Select the correct terms for () in the following sentences.

- When using MR-J4-GF for the first time, register (1) [▼] in GX Works3.
- Call (2) [▼] when setting the parameter and point table of the MR-J4-GF servo amplifier.
- Register the device connected to the network to (3) [▼] of CC-Link IE Field Network.

Term

(1)	1: Profile	2: Module label
(2)	1: MR Configurator2	2: MT Works2
(3)	1: Master station	2: Slave station

Answer Back

Test Final Test 3

Select the correct window to which the link device number of the CC-Link IE Field communication is assigned.

- Network Configuration Settings
- Refresh Setting
- Refresh Timing Setting

Answer Back

Test Final Test 4

Select all the correct setting items set with the parameters of the servo amplifier among the following items.
(Multiple selections available)

- [ ] Station number
- [ ] Home position return method
- [ ] Speed control value
- [ ] Point Table data

Answer Back

Test Final Test 5

Select all the correct statements about advantages of the program using the Motion Control FB of PLCOpen.
(Multiple selections available)

- [ ] The program is black boxed and protected by FB.
- [ ] The readability of the program improves.
- [ ] The standard interface improves reusability.
- [ ] The Motion Control FB allows programming which does not depend on PLC manufacturers, leading to reduction of training costs.

Answer Back

Test Score

You have completed the Final Test. You results area as follows.
To end the Final Test, proceed to the next page.

Correct answers : 5

Total questions : 5

Percentage : 100%

Proceed Review

Congratulations. You passed the test.

Servo_MELSERVO_Basics(MR-J4-GF_Servo_Amplifier_IO_Mode)

You have completed the MELSERVO Basics (MR-J4-GF Servo Amplifier I/O Mode) Course.

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course will be useful in the future.

You can review the course as many times as you want.

Review Close