

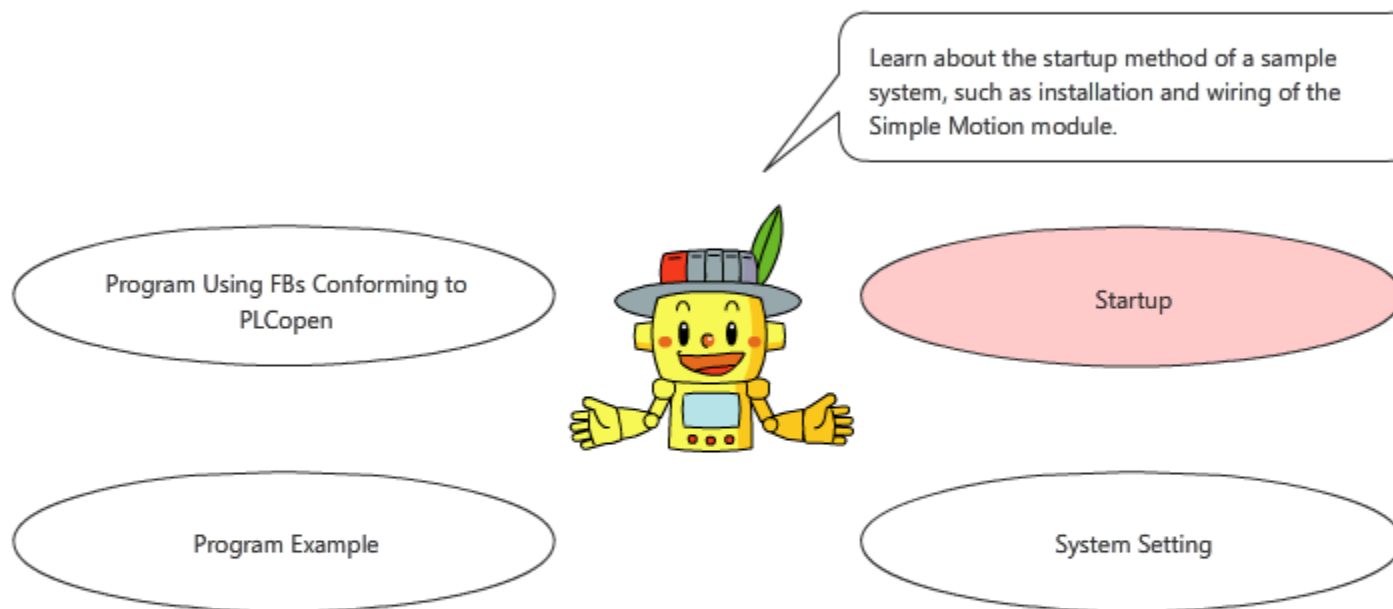
Servo System Controller

MELSEC iQ-R Series Simple Motion Module (CC-Link IE Field Network)

This course is for participants who will establish a motion control system using the MELSEC iQ-R series CC-Link IE Field Network Simple Motion module for the first time.

Introduction Purpose of the Course

This course targets those who establish a motion control system using the MELSEC iQ-R series CC-Link IE Field Network Simple Motion module for the first time. This course describes the procedures for system design, installation, wiring, and the operations required before operating the Simple Motion module with MELSOFT GX Works3, the PLC engineering software.



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 - Startup

Learn about the startup method of a sample system, such as installation and wiring of the Simple Motion module.

Chapter 2 - System Setting

Learn about the settings of CC-Link IE Field Network, Simple Motion module, and parameters of the servo amplifier with GX Works3.

Chapter 3 - Program Example

Learn about the programming for the Simple Motion module using a sample program.

Chapter 4 - 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) Passing 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	6.72 kB

Chapter 1 Startup

This chapter describes the startup method of the sample system in the work order: installation, wiring, and external circuit configurations of the Simple Motion module and servo amplifiers.

1.1 Startup Procedure

The following shows the flow of descriptions in this chapter.

Mounting modules

Wiring a power supply and connecting cables

Setting station numbers

Connecting CC-Link IE Field Network

Wiring an external circuit

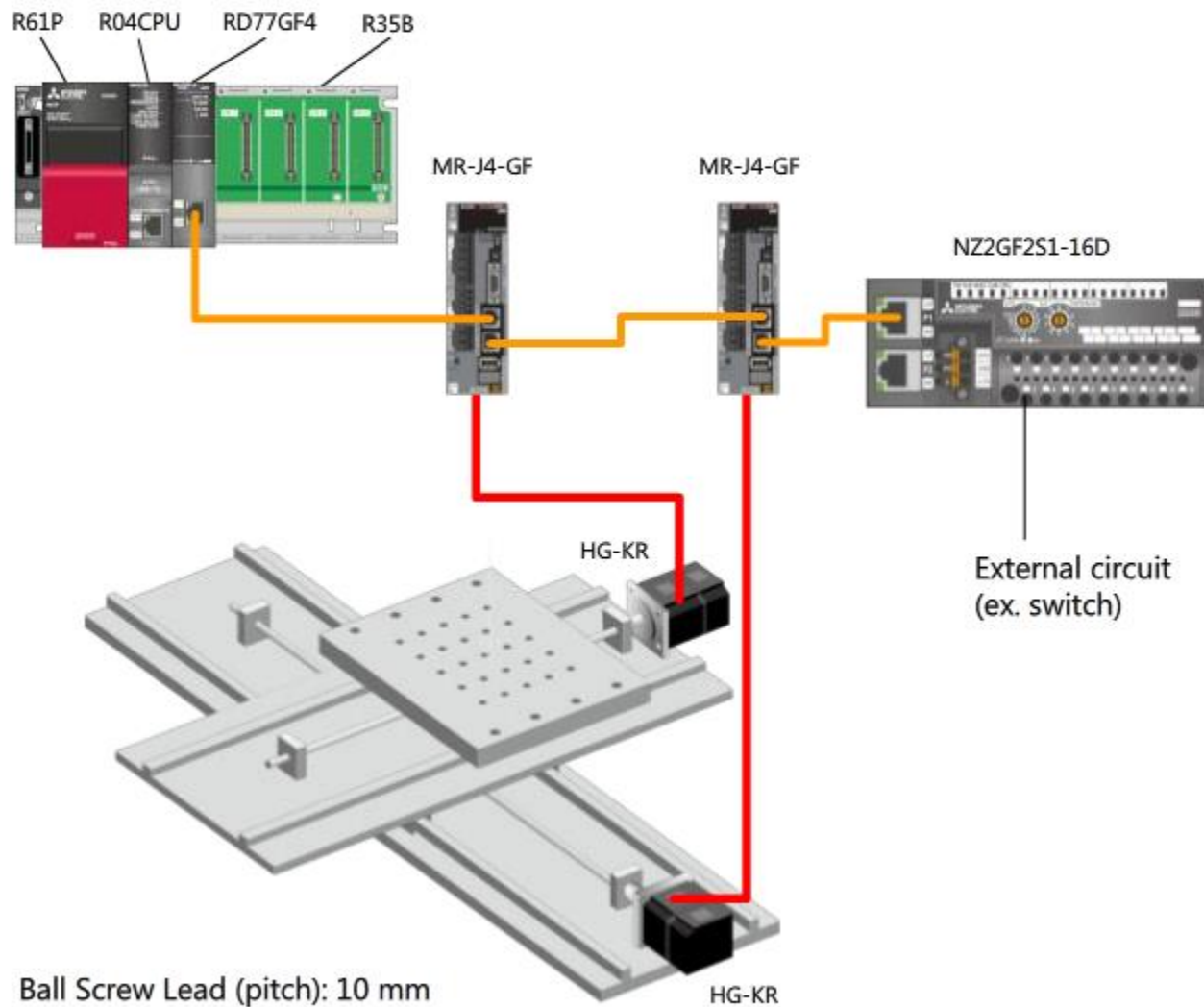
Powering on the system



1.2 System Configuration

(1) Device configuration of the sample system

Use the X-Y table with two axes. Connect an external circuit to the remote input module.

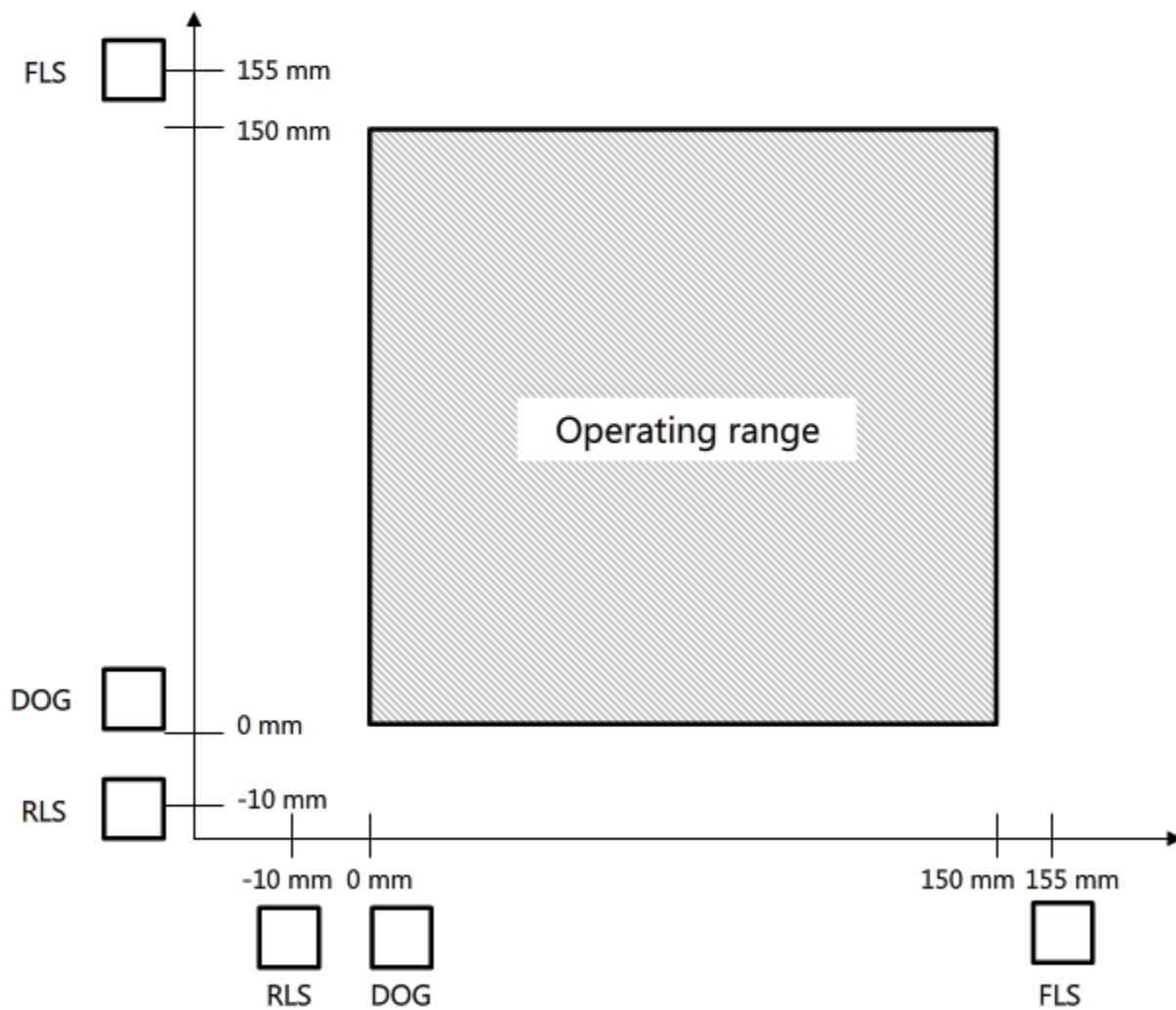


1.2 System Configuration

(2) Providing proximity dogs and stroke limits

The following shows the operating range of the X-Y table.

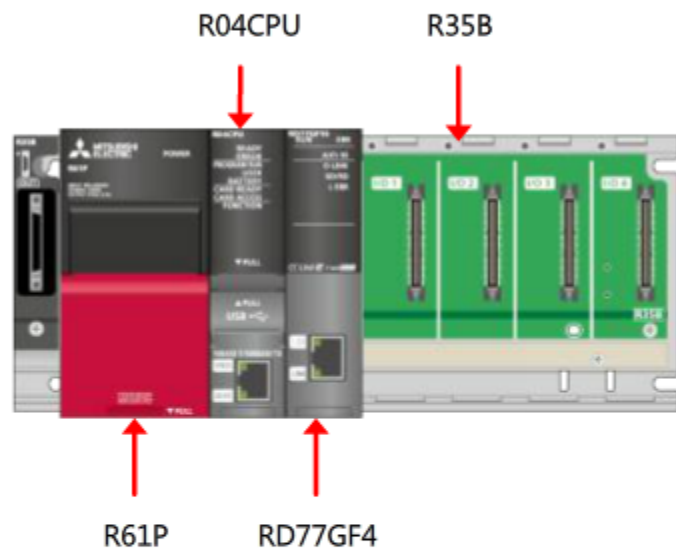
The DOG and FLS/RLS switches are provided at the positions shown below.



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.



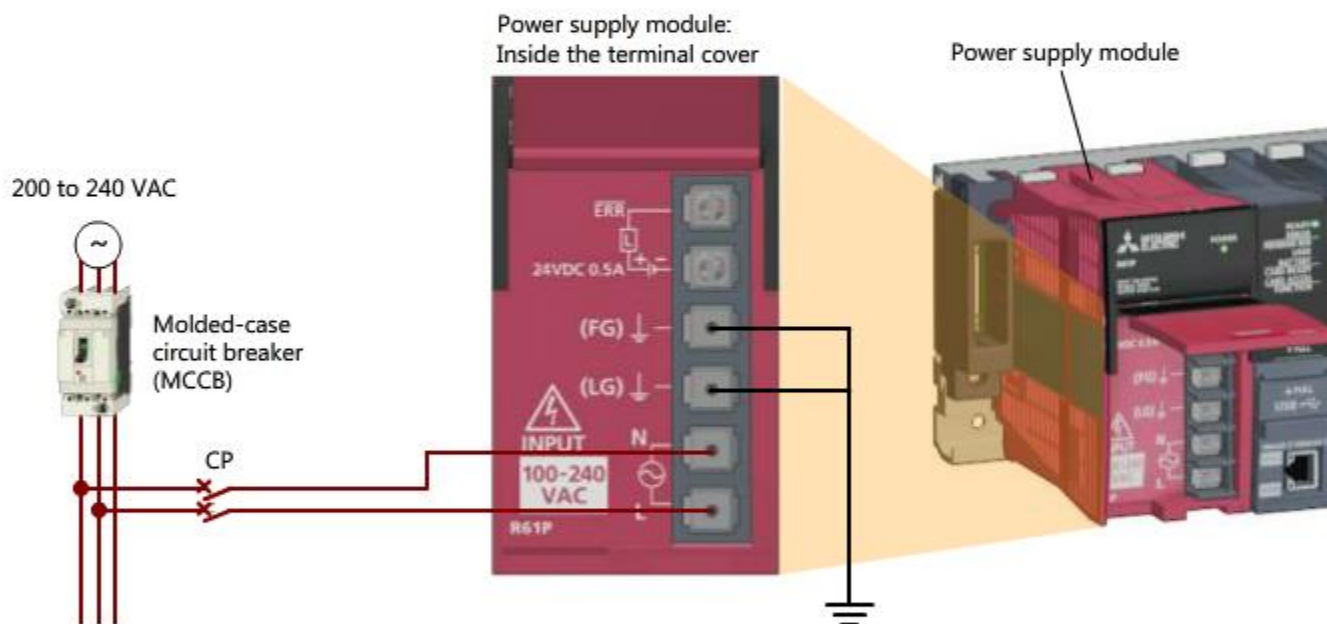
1.4

Wiring a Power Supply and Connecting Cables

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

(1) Wiring the PLC power supply

The following shows an example when power cables and ground cables are connected to the power supply module. At wiring, open the terminal cover at the front of the power supply module and connect the cables. To reduce noise in the power supply system, connect an isolation transformer.



To the power supply wiring of the servo amplifier

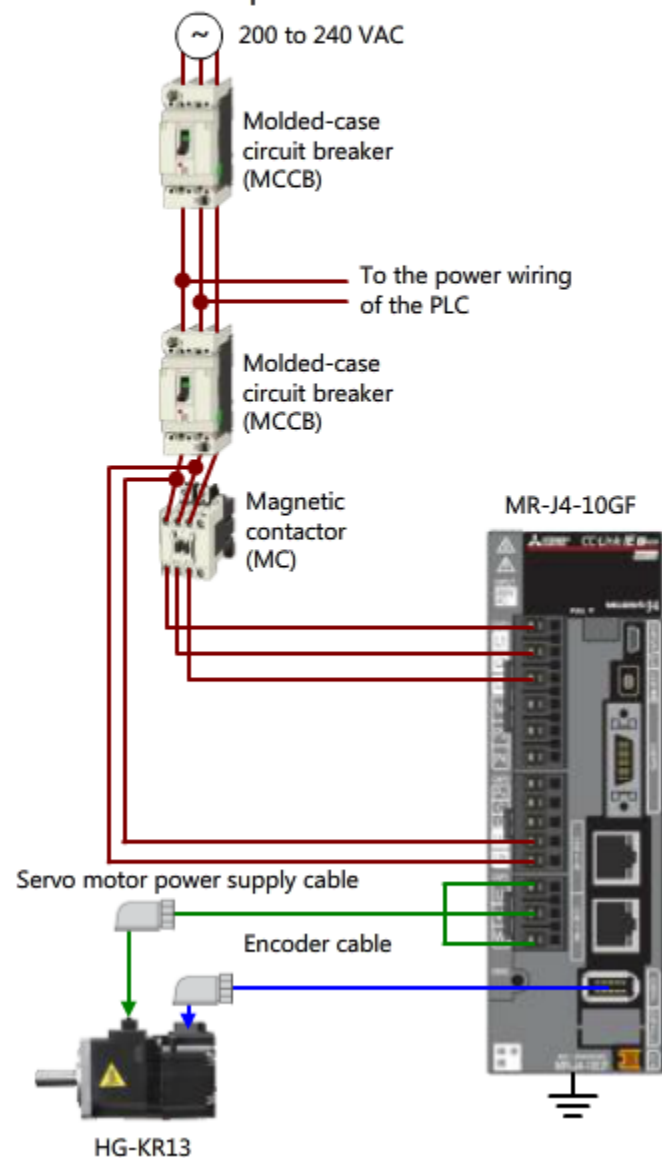
Item	Applicable wire size	Tightening torque
Power cable	0.75 to 2 mm ² (18 to 14 AWG)	1.02 to 1.38 N·m
Ground cable	0.75 to 2 mm ² (18 to 14 AWG)	1.02 to 1.38 N·m

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.

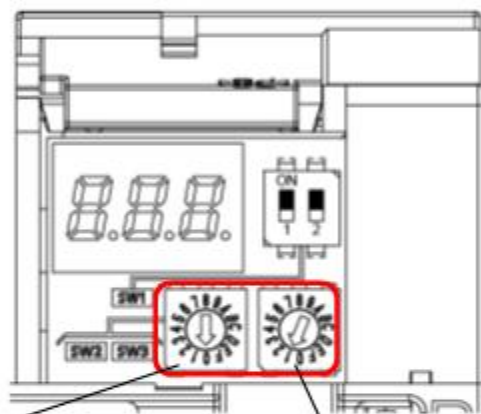
If the servo amplifier has different capacity, refer to the Instruction Manual for its model.

Item	Applicable wire size	Tightening torque
Control circuit power supply (L11, L21)	1.25 mm ² to 2 mm ² (16 to 14 AWG)	-
Main circuit power (L1, L2, L3)	2 mm ² (14 AWG)	-
Ground cable	1.25 mm ² (16 AWG)	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)

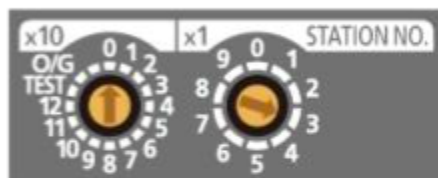


1.5 Setting Station Numbers

(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

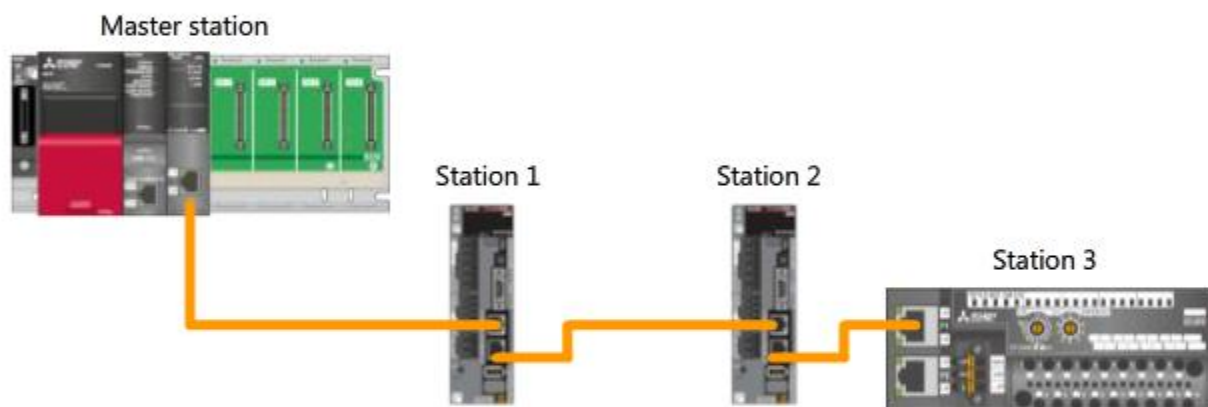
Connecting CC-Link IE Field Network

Connect the RD77GF Simple Motion module, two servo amplifiers (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: <ul style="list-style-type: none"> •IEEE802.3 (1000BASE-T) •ANSI/TIA/EIA-568-B (Category 5e)

1.7 Wiring an External Circuit

Connect an external circuit to the remote input module in this course.

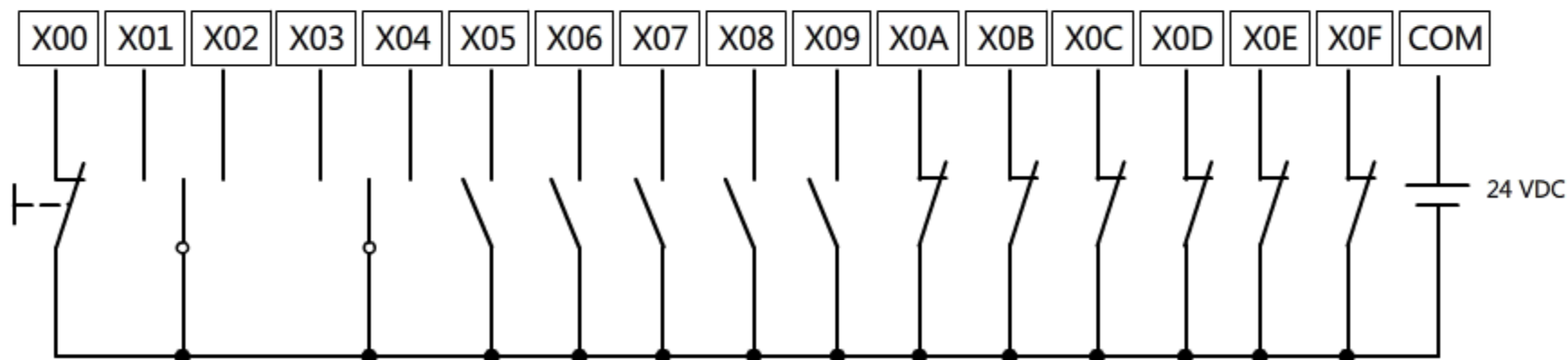
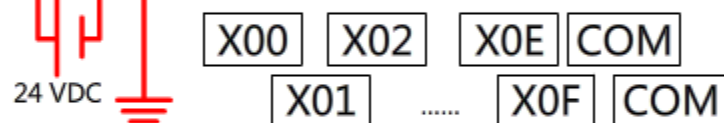
The following figure shows the assignment and wiring of each signal.

Use normally closed contacts for the forced stop, forward rotation/reverse rotation limit, and proximity dog.



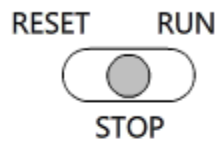
X00: Forced stop
 X01: X-axis forward rotation JOG
 X02: X-axis reverse rotation JOG
 X03: Y-axis forward rotation JOG
 X04: Y-axis reverse rotation JOG
 X05: X-axis start
 X06: Y-axis start
 X07: Error reset

X08: Y-axis synchronous start
 X09: Positioning number selection
 X0A: X-axis proximity dog
 X0B: X-axis forward rotation limit
 X0C: X-axis reverse rotation limit
 X0D: Y-axis proximity dog
 X0E: Y-axis forward rotation limit
 X0F: Y-axis reverse rotation limit



1.8**Powering on the System**

Check that the RUN/STOP/RESET switch of the PLC is set to STOP.



Power on the system. The servo amplifier displays "Ab".



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
- Wiring an External Circuit
- Powering on the System

Important points

System Configuration	<ul style="list-style-type: none"> • Configure a system which connects MELSEC iQ-R series PLCs and MELSERVO J4 series servo amplifiers over CC-Link IE Field Network.
Mounting Modules	<ul style="list-style-type: none"> • Mount the power supply module R61P, PLC CPU module R04CPU, and Simple Motion module RD77GF4 on the base unit R35B.
Wiring a Power Supply and Connecting Cables	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Set the station numbers of the servo amplifiers and remote input module
Connecting CC-Link IE Field Network	<ul style="list-style-type: none"> • Connect the Simple Motion module, servo amplifiers, and remote input module with the Ethernet cables.
Wiring an External Circuit	<ul style="list-style-type: none"> • Connect the external circuit including start switches and limit switches to the remote input module.
Powering on the System	<ul style="list-style-type: none"> • Set the RUN/STOP/RESET switch of the PLC CPU to STOP before power-on.

Chapter 2 System Setting

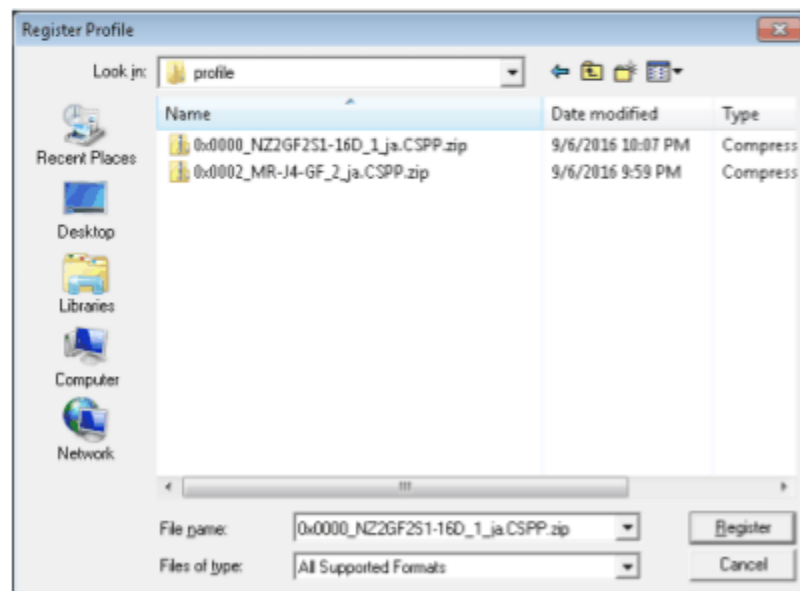
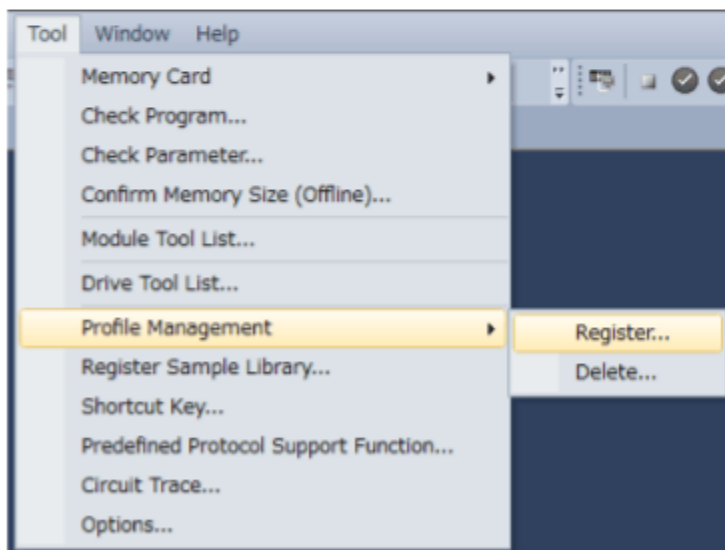
The following shows a version of each software used in this chapter.

GX Works3 ver.1.032J or later
MR Configurator2 ver.1.60N or later

2.1 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.

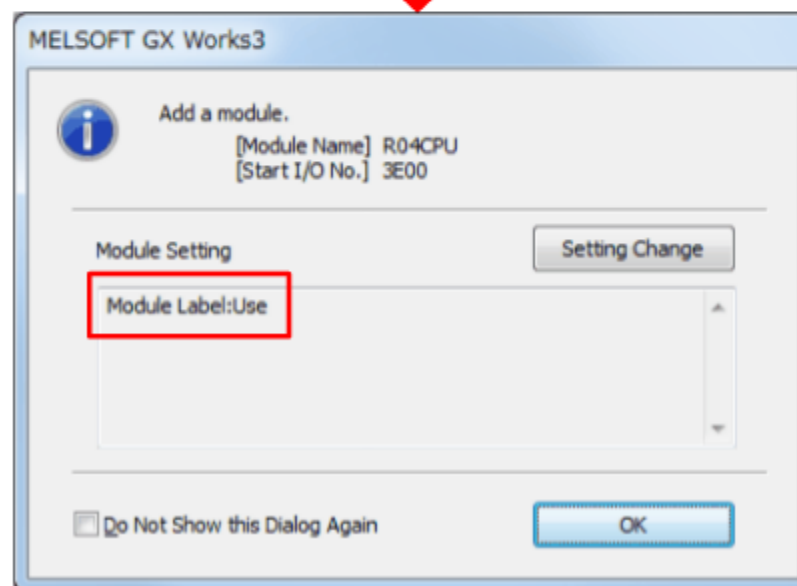
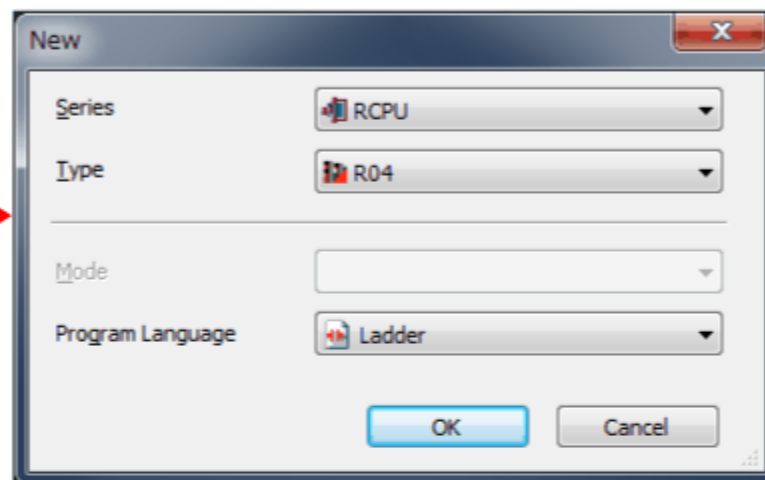
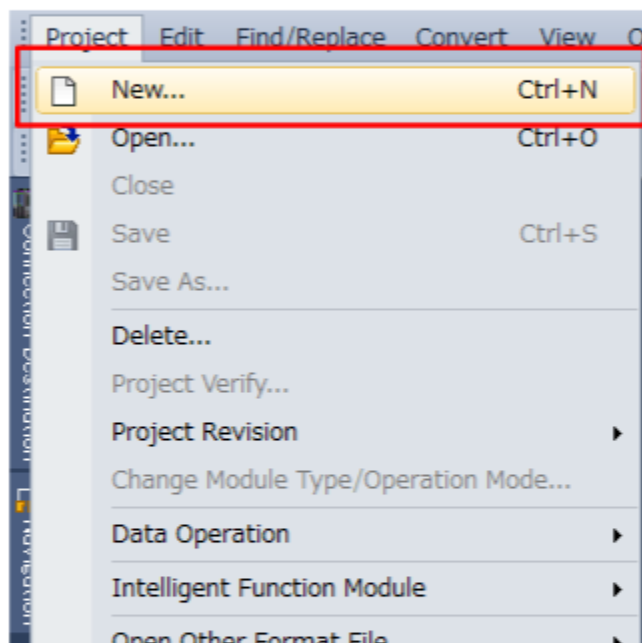
- 1) Download the profile data of the MR-J4-GF and the NZ2GF2S1-16D from [here](#) and [here](#), and store the zip files in arbitrary places.
(You do not need to decompress the zip files.)
- 2) Start GX Works3.
- 3) Select [Tool] - [Profile Management] - [Register] with no project opened.
- 4) Select the stored zip file and click [Register].



2.2 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.



2.3

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.

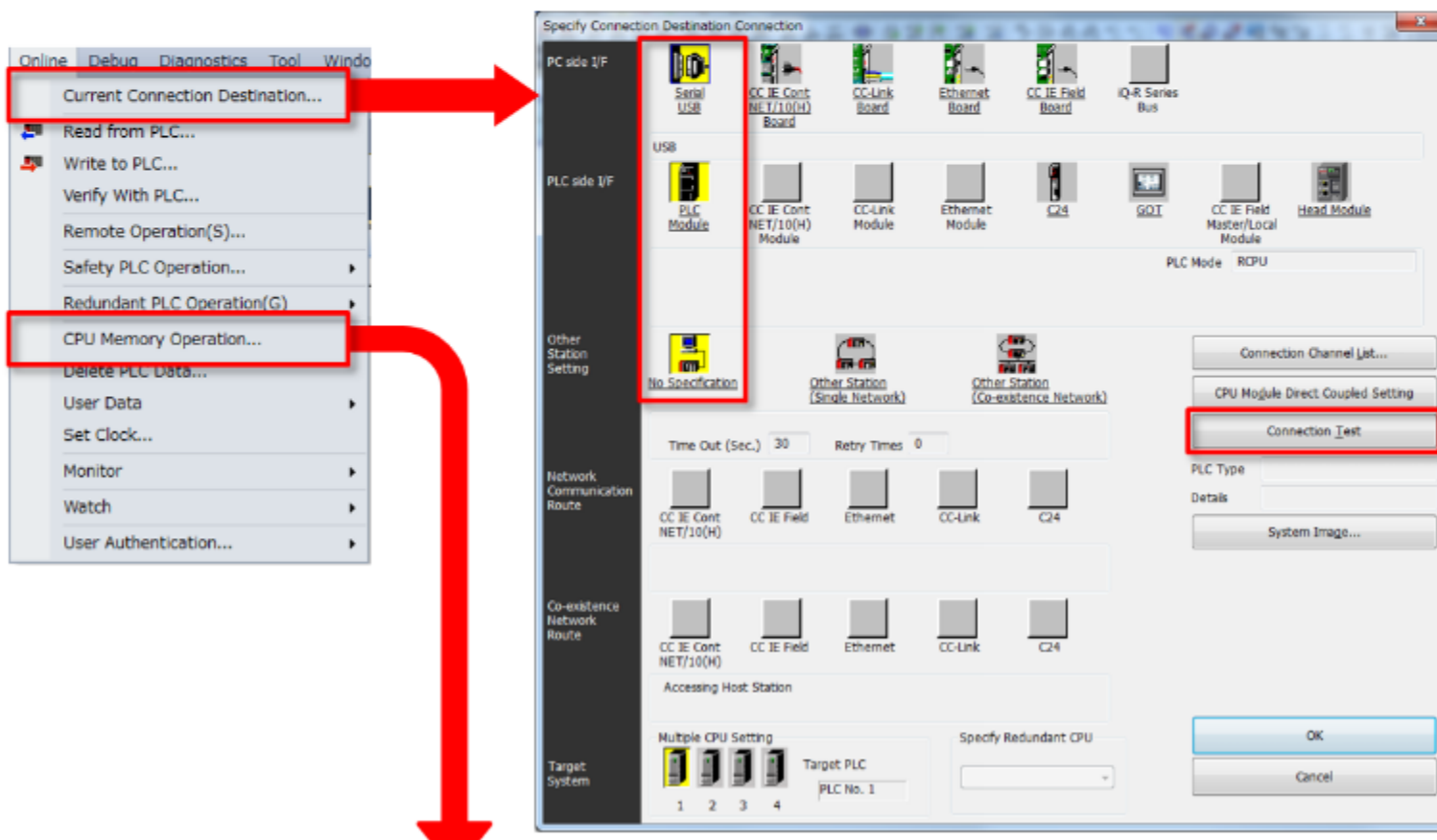
Select [Online] - [Current Connection Destination]. Set the connection destination as follows.

Select [Connection Test] to check if the communication is performed properly. If it is performed properly, click [OK] to close the window.

- 3) Initialize the memory.

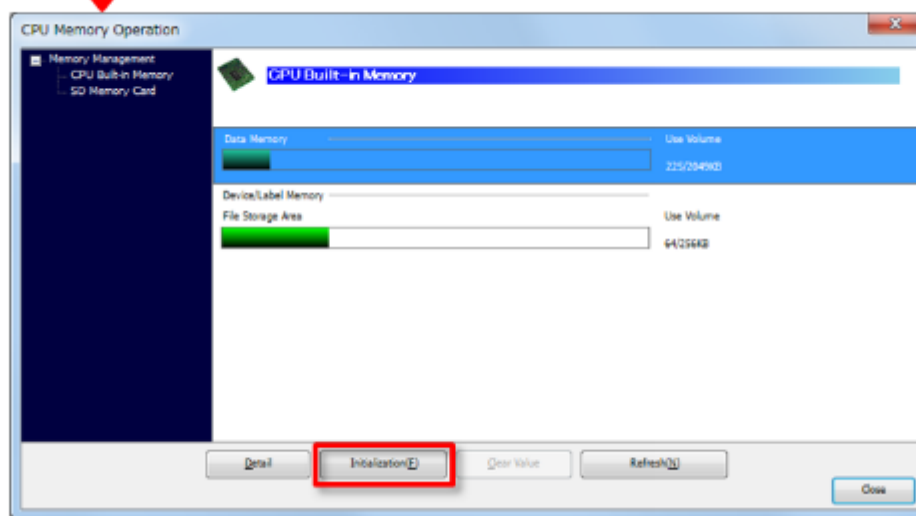
Select [Online] - [CPU Memory Operation]. When the CPU Memory Operation window appears, click the [Initialization] button.

When the message "Initialize the selected memory. Are you sure you want to continue?" appears, click [Yes].



2.3

Initializing the Memory



2.4

Module Configuration Diagram

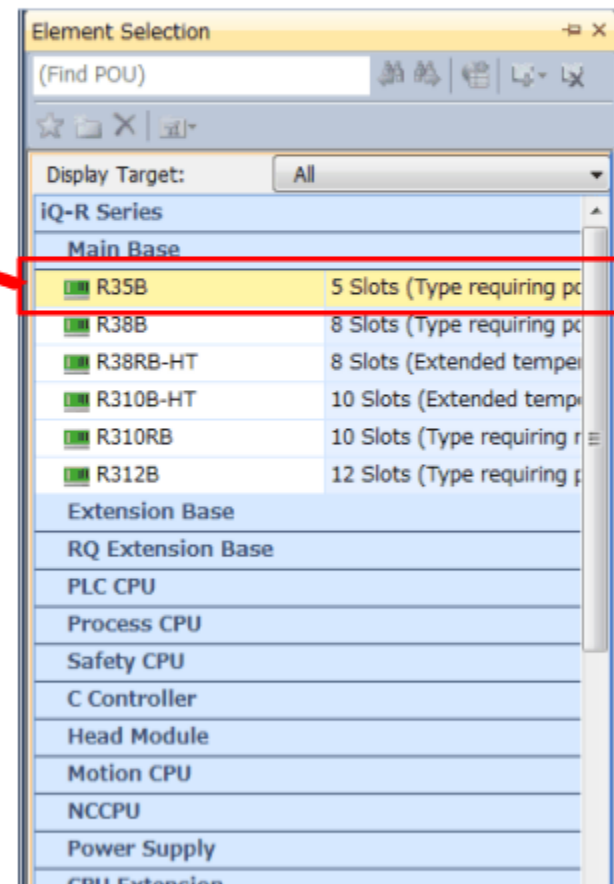
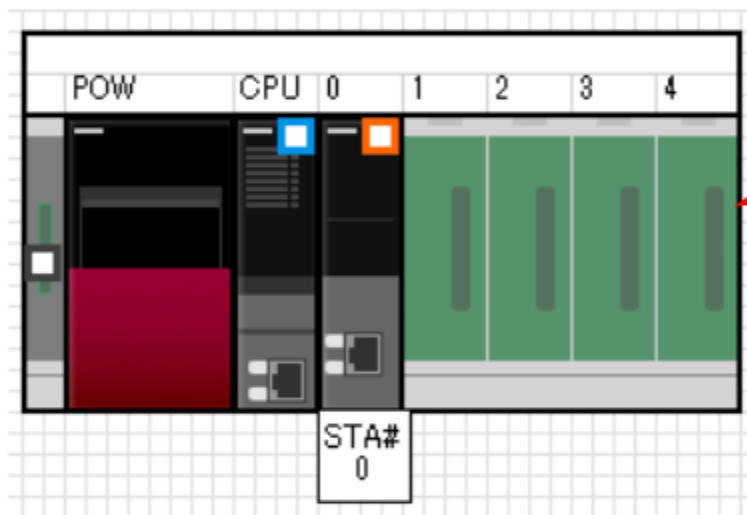
Create a module configuration diagram.

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.

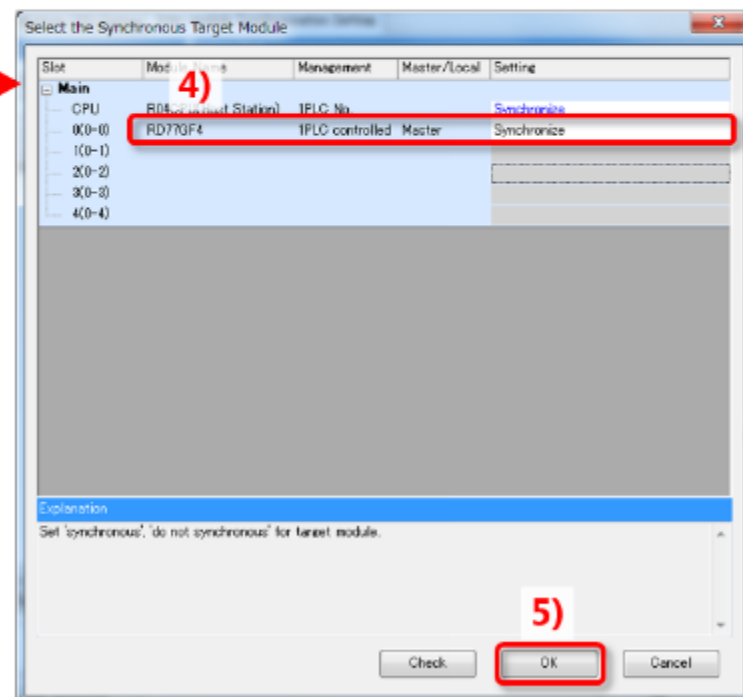
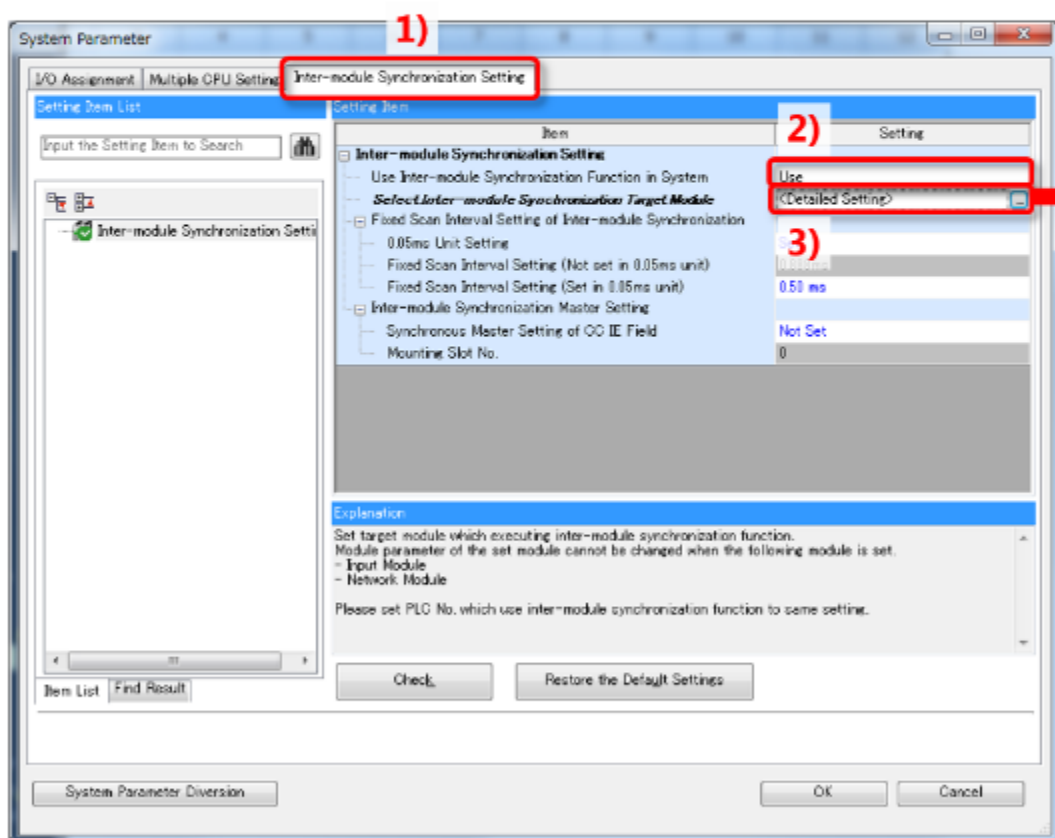
After creating the module configuration diagram, select [Edit]-[Parameter]-[Fix] and close the Module Configuration window.



Enable the inter-module synchronization in this course. (Note)

Select [Parameter] - [System Parameter] from the project tree.

- 1) Select the Inter-module Synchronization Setting tab.
- 2) Set [Use Inter-module Synchronization Function in System] to "Use".
- 3) Click <Detailed Setting> of [Select Inter-module Synchronization Target Module].
- 4) Set RD77GF4 to "Synchronize" in the Select the Synchronous Target Module window.
- 5) Click the [OK] button to close the window.



(Note) When the firmware version of the RD77GF is "04" or earlier, always enable the inter-module synchronization.

Check the firmware version with the following procedure.

1. Follow the procedure and create a module configuration diagram, enabling communication with the CPU module.

(Note) When the firmware version of the RD77GF is "04" or earlier, always enable the inter-module synchronization.

Check the firmware version with the following procedure.

1. Follow the procedure and create a module configuration diagram, enabling communication with the CPU module.
2. Select [Diagnostics] - [System Monitor] in the menu bar.
3. Click the [Product Information List] button at the lower center of the System Monitor Main Base window.
4. Scroll the Product Information List window to the right and check the firmware version.

The screenshot shows the 'System Monitor Main Base' window with the 'Product Information List' dialog box open. The dialog box contains a table with the following data:

	Network Information (Port 2)	IP Address (Port1 IPv4)	IP Address (Port2 IPv4)	Module Synchronization Status	Firmware Version	Production information
Basic-Power Supply	-	-	-	-	-	□□□□□□□□
Basic-CPU	-	192.168.3.39	-	-	07	-
Basic-I/O 0	-	-	-	-	01	0F9FC930909F611
Basic-I/O 1	-	-	-	-	-	-
Basic-I/O 2	-	-	-	-	-	-
Basic-I/O 3	-	-	-	-	-	-
Basic I/O 4	-	-	-	-	-	-

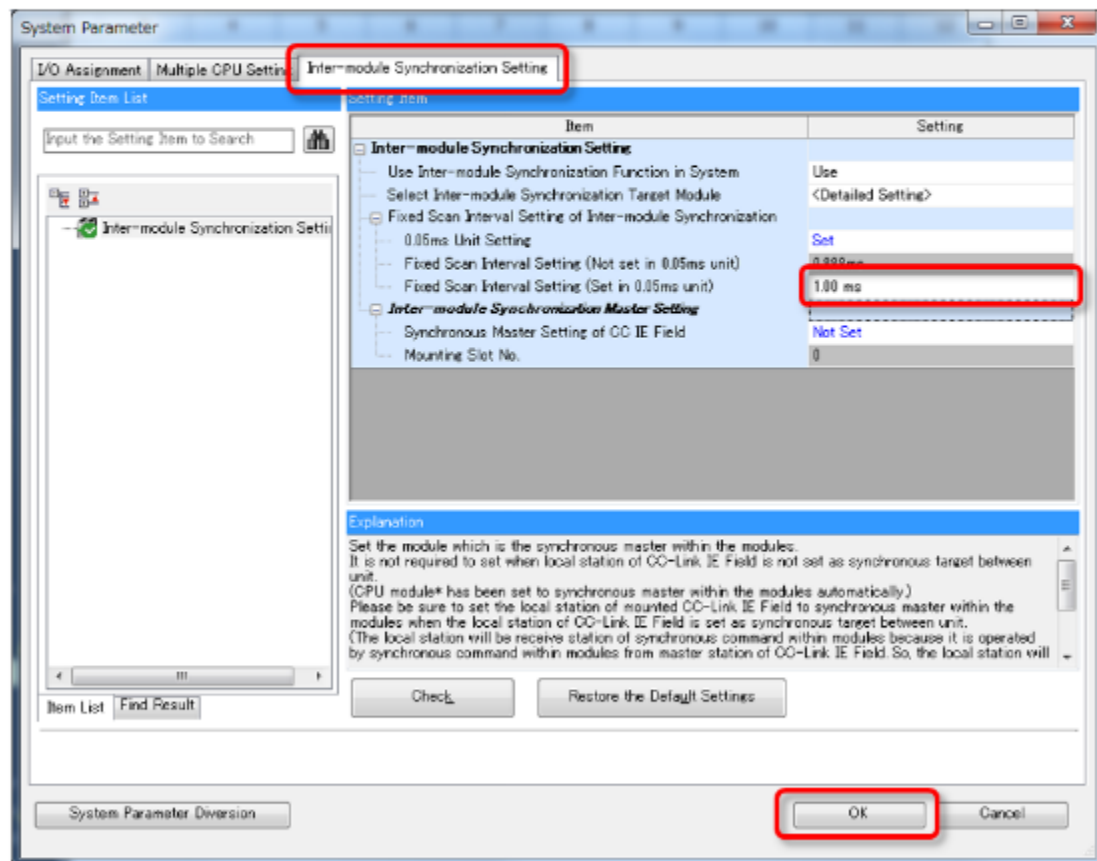
2.6

Setting the Fixed Scan Interval

Set the synchronization interval in [Fixed Scan Interval Setting] in the [Inter-module Synchronization Setting] tab. The settable values of the inter-module synchronization cycle change depending on the control and the number of link device points.

Set Fixed Scan Interval Setting to 1.00 ms to connect the remote input module in this course.

When the setting is completed, click the [OK] button.



Reference value of fixed scan interval

Number of total stations	Fixed scan interval
1 to 4 stations	0.50ms
5 to 13 stations	1.00ms
14 to 64 stations	2.00ms
65 to 120 stations	4.00ms

[COLUMN] Fixed scan interval

When the warning 0CC0H [Synchronization cycle time over], the error 2600H [Inter-module synchronization process error], or the error 193FH [Operation cycle time over error] occurs, set a larger value or check the following points.

[COLUMN] Fixed scan interval

When the warning 0CC0H [Synchronization cycle time over], the error 2600H [Inter-module synchronization process error], or the error 193FH [Operation cycle time over error] occurs, set a larger value or check the following points.

- Check that the operation cycle is optimal according to the number of stations.
- Set [Pr.152] Maximum number of control axes.
- Set [Application Settings] - [Supplementary Cyclic Settings] - [Station-based Block Data Assurance] of the network parameter to "Disable".

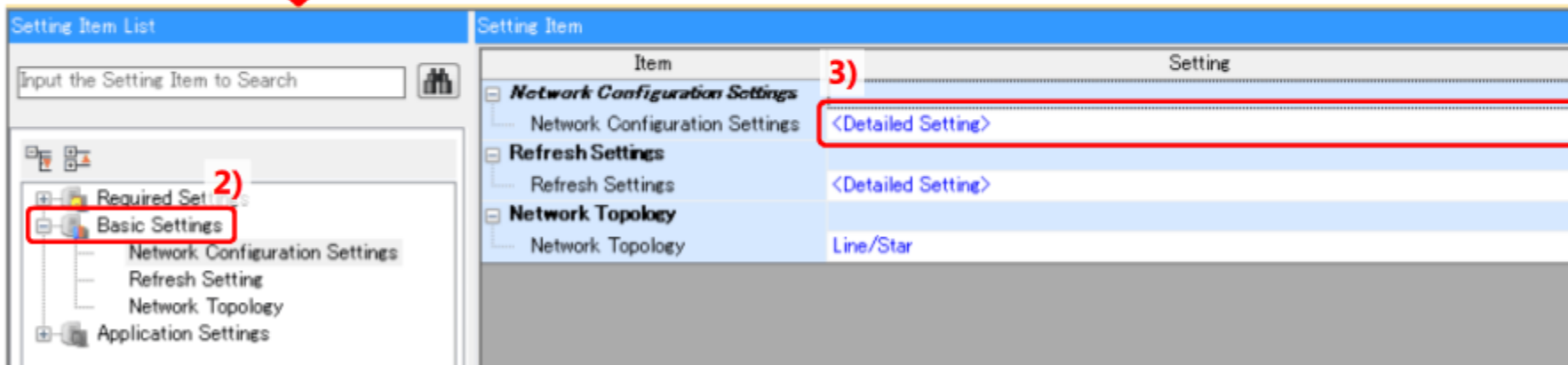
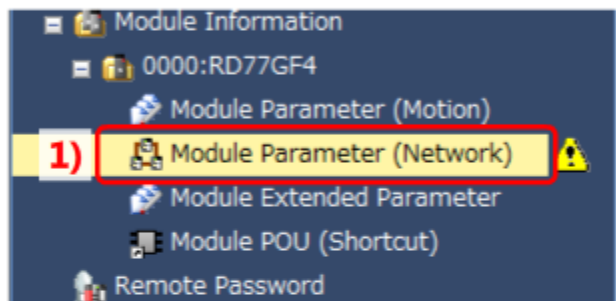
When using a remote input module, set [Station-based Block Data Assurance] to "Enable".

2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

(1) Adding a remote station

Register a remote station to be used in the project.

- 1) Double-click [Module Parameter (Network)] from the project tree.
- 2) Click [Basic Settings].
- 3) Double-click <Detailed Setting> of [Network Configuration Settings].



2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

The [CC IE Field Configuration] window appears.

- 4) Drag and drop [Servo Amplifier (MELSERVO-J4 Series)] - [MR-J4-GF] to the module list on the left twice from [Module List] at the right of the screen.
- 5) Drag and drop [Basic Digital Input Module] - [NZ2GF2S1-16D] to the module list from [Module List].
- 6) Check that two servo amplifiers (MR-J4-GF) and NZ2GF2S1-16D are registered in the module list.

CC IE Field Configuration (Start I/O: 0000)

Mode Setting: Online (High-Speed Mode) Assignment Method: Start/End Link Scan Time (Approx.): ms

No.	Model Name	STA#	Station Type	RX/RV Setting		RWw/RWv Setting			Reserved/Err m Switching M	
				Points	Start	End	Points	Start		End
1	MR-J4-GF	1	Intelligent Device Station				36	0060	0083	No Setting
2	MR-J4-GF	2	Intelligent Device Station				36	0084	00A7	No Setting
3	NZ2GF2S1-16D	3	Remote Device Station	16	0000	000F	52	0000	0033	No Setting

STA#0 Master
Total STA#3
Line/Star

MR-J4-GF MR-J4-GF NZ2GF2S1-16D

Module List

Select CC IE Field Find Module M1

General CC IE Field Module
CC IE Field Module (Mitsubishi Electric)
Master/Local Module
Head Module
Servo Amplifier (MELSERVO-J4 Series)
MR-J4-GF 0.1 to 55kW/3-P
Basic Digital Input Module
NZ2GF2S1-16D 16 points
GOT2000 Series
GOT1000 Series

[COLUMN] RD77GF as a network master station

In addition to a function as a Simple Motion module, the RD77GF has a function as a master station equivalent to the master/local module of CC-Link IE Field Network. As the RD77GF can be used not only for motion control but also for a function as a network master, the remote I/O module can be connected on the same network. This feature can reduce the cost on the system configuration.

* The RD77GF does not support the function of the submaster station.

2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

(2) Assigning link devices

Assign the link devices (RX/RY, RWw/RWr) to the remote station.

- 1) Scroll the module list to the right, and display [RX/RY Setting] and [RWw/RWr Setting].
- 2) Assign the devices as follows.

Detect Now

Mode Setting: Online (High-Speed Mode) Assignment Method: Start/End Link Scan Time (Approx.):

No.	Model Name	STA#	Station Type	RX/RY Setting			RWw/RWr Setting			Reserved/Error Switching I
				Points	Start	End	Points	Start	End	
0	Host Station	0	Master Station							
1	MR-J4-GF	1	Intelligent Device Station				36	0060	0083	No Setting
2	MR-J4-GF	2	Intelligent Device Station				36	0084	00A7	No Setting
3	NZ2GF2S1-16D	3	Remote Device Station	16	0000	000F	52	0000	0033	No Setting

1) [Scroll bar]

2) [Assignment Method: Start/End]

(Note) [RWw/RWr Setting for MR-J4-GF]

X00 to X0F of the remote input module are assigned to RX00 to RX0F.

(Note) When Assignment Method is set to Start/End, changing the start address of RWw/RWr may set 4 in Points. Always set 36 points for RWw/RWr of the MR-J4-GF servo amplifier.

2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

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

Set the other settings.

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

Detect Now

Mode Setting: Online (High-Speed Mode) Assignment Method: Point/Start Link Scan Time (A.x.): ms

No.	Model Name	Network Synchronous Communication	Alias	Comment	Station-specific mode setting
0	Host Station				
1	MR-J4-GF	Synchronous			Motion Mode
2	MR-J4-GF	Synchronous			Motion Mode
3	NZ2GF2S1-16D	Asynchronous			

[COLUMN] Station-specific mode of the MR-J4-GF servo amplifier

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

The motion mode and I/O mode can be used together on the same network.

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.

I/O mode This mode drives the 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.

2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

(Note) When setting Network Synchronous Communication of the remote input module to "Synchronous", there are restrictions 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.

2.7 Setting Remote Stations (Servo Amplifiers, Remote I/O)

(4) Reflecting the setting

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

CC IE Field Configuration (Start I/O: 0000)

CC IE Field Configuration Edit View Close with Discarding the Setting **Close with Reflecting the Setting**

Detect Now

Mode Setting: Online (High-Speed Mode) Assignment Method: Point/Start Link Scan Time (Approx.):

No.	Model Name	Network Synchronous Communication	Alias	Comment	Station-specific mode setting
0	Host Station				
1	MR-J4-GF	Synchronous			Motion Mode
2	MR-J4-GF	Synchronous			Motion Mode
3	NZ2GF2S1-16D	Asynchronous			

Host Station

STA#1 STA#2 STA#3

MR-J4-GF MR-J4-GF NZ2GF2S1-16D

STA#0 Master
Total STA#3
Line/Star

Module List

Select CC IE Field Find Modu

- General CC IE Field Module
- CC IE Field Module (Mitsubishi I)
 - Master/Local Module
 - Head Module
 - Servo Amplifier(MELSERVO-J)
 - MR-J4 0.1 to 55kW/3-Phase
 - Basic Digital Input Module
 - NZ2GI 16 points
 - GOT2000 Series
 - GOT1000 Series

[Outline]
DC input module(spring clamp terminal block type)

[Specification]
DC inout 16 points

2.8

Refresh Setting

The status of RX00 to RX0F is applied to X100 to X10F of the PLC CPU.

3)

No.	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	16	00000	0000F	Specify Device	X	16	00100	0010F
2	RWr	4	00000	00003	Specify Device	W	4	00000	00003
3	RWw	4	00000	00003	Specify Device	W	4	00100	00103
4									
5									
6									
7									
8									
9									
10									

Explanation

The end number (hexadecimal) of the device range to be refreshed is displayed.

Check Restore the Default Settings

4) Apply

2.8

Refresh Setting

(2) Refresh setting of the axis monitor and control monitor

- 1) Double-click [Module Parameter (Motion)] from the project tree.
 - 2) Click [Refresh settings] - [Refresh at the set timing.].
 - 3) Check that Target is set to "Module Label".
 - 4) Check that [Transfer to the CPU.] - [Current feed value] is set to "Enable".
- With this setting, each data of the axis monitor is transferred to the module label.

The screenshot displays the software interface for configuring the refresh setting. On the left, the 'Parameter' tree shows 'Module Parameter (Motion)' selected, indicated by a red box and the number '1'. A red arrow points from this selection to the 'Setting Item List' pane. In the 'Setting Item List', 'Refresh at the set timing.' is selected, indicated by a red box and the number '2'. The 'Setting Item' pane shows the 'Target' dropdown set to 'Module Label', indicated by a red box and the number '3'. Below this, a table lists various items with their status for each axis. The 'Current feed value' item is highlighted, and its 'Enable' status is indicated by a red box and the number '4'.

Item	Axis1	Axis2	Axis3	Axis4
Refresh at the set timing.				
Transfer to the CPU.				
Current feed value	Enable	Enable	Enable	Enable
Machine feed value	Enable	Enable	Enable	Enable
Feedrate	Enable	Enable	Enable	Enable
Axis error No.	Enable	Enable	Enable	Enable
Axis warning No.	Enable	Enable	Enable	Enable
Valid M code	Enable	Enable	Enable	Enable
Axis operation status	Enable	Enable	Enable	Enable
Current speed	Enable	Enable	Enable	Enable
Axis feedrate	Enable	Enable	Enable	Enable
Speed-position switching control positioning movement am	Enable	Enable	Enable	Enable
External input signal	Enable	Enable	Enable	Enable
Status	Enable	Enable	Enable	Enable
Target value	Enable	Enable	Enable	Enable
Transfer the buffer memory data to the specified device				

(3) Setting the refresh timing

- 1) Click [Refresh settings]-[Refresh Timing].
- 2) Check that [Refresh Timing] is set to "At the Execution Time of END Instruction".

With this setting, the values of the axis monitor and control monitor are refreshed when the CPU module performs the END instruction processing.

The screenshot shows the 'Setting Item' window with the following configuration:

Item	Axis1	Axis2	Axis3	A
Encoder option information	Enable	Enable	Enable	Enable
Reverse torque limit stored value	Enable	Enable	Enable	Enable
Speed during command	Enable	Enable	Enable	Enable
Torque during command	Enable	Enable	Enable	Enable
Control mode switching status	Enable	Enable	Enable	Enable
Positioning data being executed (Axis to be interpolated)	Enable	Enable	Enable	Enable
Deceleration start flag	Enable	Enable	Enable	Enable
Transfer to the CPU.				
Pre-reading data analysis status	Enable	Enable	Enable	Enable
External command signal monitor	Enable	Enable	Enable	Enable
Refresh Timing				
Refresh Timing				
Refresh Group [n](n: 1-64)				
Refresh Timing (I/O)				
Refresh Timing				

1) In the left sidebar, 'Refresh Timing' is selected under 'Refresh settings'.

2) In the main table, 'At the Execution Time of END Instruction' is selected for the 'Refresh Timing' item.

Explanation: Set refresh timing.

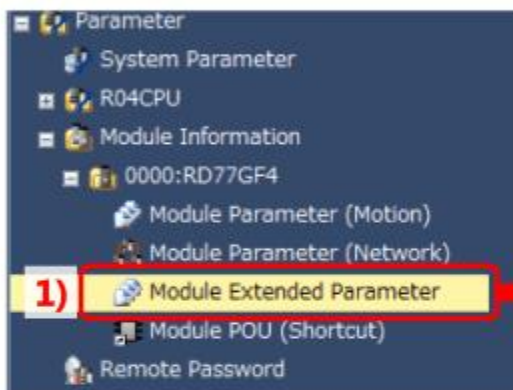
Buttons: Check, Restore the Default Settings

2.9

Simple Motion Parameter Setting

(1) Module extended parameter

- 1) Double-click [Module Extended Parameter] from the project tree.
- 2) The [Simple Motion Module Setting Function] window appears.



A screenshot of the 'Simple Motion Module Setting Function' window. The window title is '0000:RD77GF4[]-Parameter'. The left pane shows the 'Navigation' tree with 'Parameter' selected. The right pane displays a table of parameters for two axes. A red arrow labeled '2)' points from the 'Module Extended Parameter' in the project tree to this window.

Item	Axis #1	Axis #2
Common parameter	The parameter does not rely on axis and relate to	
Pr. 82: Forced stop valid/invalid selection	1: Invalid	
Pr. 152: Control axis number upper limit	0	
Basic parameters 1	Set according to the machine and applicable motor	
Pr. 100: Connected Machine	No Setting	No Setting
Pr. 101: Virtual servo amplifier setting	0: Use Real Servo Amplifier	0: Use Real Servo Amplifier
Pr. 1: Unit setting	3: pulse	3: pulse
Pr. 2: No. of pulses per rotation	20000 pulse	20000 pulse
Pr. 3: Movement amount per rotation	20000 pulse	20000 pulse
Pr. 4: Unit magnification	1x1 Times	1x1 Times
Pr. 7: Bias speed at start	0 pulse/s	0 pulse/s
Basic parameters 2	Set according to the machine and applicable motor	
Pr. 8: Speed limit value	20000 pulse/s	20000 pulse/s
Pr. 9: Acceleration time 0	1000 ms	1000 ms
Pr. 10: Deceleration time 0	1000 ms	1000 ms
Detailed parameters 1	Set according to the system configuration when th	
Pr. 11: Backlash compensation		

2.9

Simple Motion Parameter Setting

(2) Common parameters and basic parameters

1) Common parameters

Set [Common parameter] - [Pr.82: Forced stop valid/invalid selection] to "3: Valid (Link Device)".

Assign link devices in 2.9 (6).

Set the number of axes to be used in [Pr.152: Control axis number upper limit]. Set "2" in this course.

2) Basic parameters 1 and 2

The basic parameters 1 can be set in a batch with the [Compute Basic Parameters 1] button.

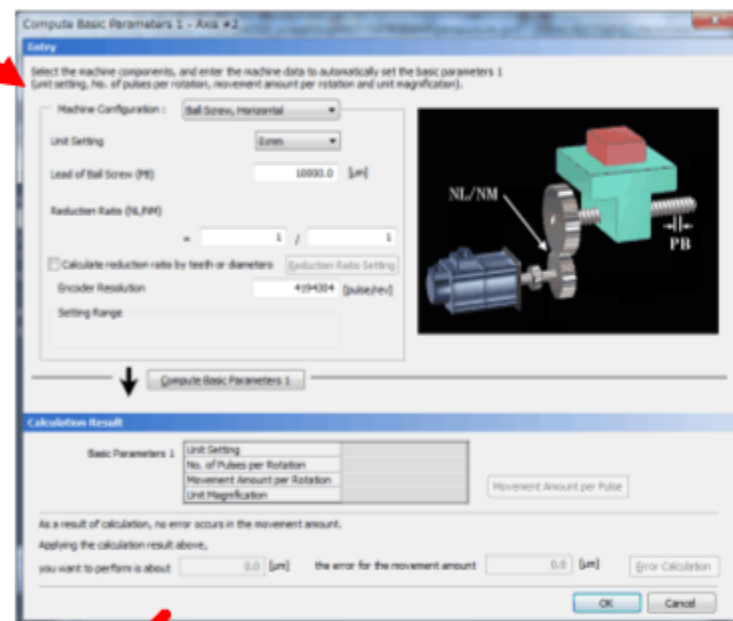
Set Ball Screw, Horizontal, Lead of Ball Screw (PB) to 10 mm, and Reduction Ratio to 1/1.

Set the basic parameters 2 considering the maximum speed and reduction ratio of the motor, and machine specifications.

Display Filter: Display All

2) Compute Basic Parameters 1

Item	Axis #1	Axis #2	
Common parameter	The parameter does not rely on axis and relate to		
1) Pr.82:Forced stop valid/invalid s...	3:Valid (Link Device)		
Pr.152:Control axis number upp...	2		
Basic parameters 1	Set according to the machine and applicable moto		
Pr.100:Connected Machine	MR-J4-GF	MR-J4-GF	No Sett
Pr.101:Virtual servo amplifier se...	0:Use Real Servo Amplifier	0:Use Real Servo Amplifier	0:Use R
Pr.1:Unit setting	0:mm	0:mm	3:pulse
Pr.2:No. of pulses per rotation	4194304 pulse	4194304 pulse	20000 ɶ
Pr.3:Movement amount per rota...	10000.0 ɶm	10000.0 ɶm	20000 ɶ
Pr.4:Unit magnification	1:x1 Times	1:x1 Times	1:x1 Tir
Pr.7:Bias speed at start	0.00 mm/min	0.00 mm/min	0 pulse,
Basic parameters 2	Set according to the machine and applicable moto		
Pr.8:Speed limit value	60000.00 mm/min	60000.00 mm/min	200000
Pr.9:Acceleration time 0	100 ms	100 ms	1000 ms
Pr.10:Deceleration time 0	100 ms	100 ms	1000 ms
Detailed parameters 1	Set according to the system configuration when th		



(3) Detailed parameters 1

Set the software stroke limits and external signals (FLS/RLS/DOG) in the link device in Detailed parameters

1. Configure the settings as follows.

Assign link devices in 2.9 (6).

Item	Axis #1	Axis #2
Detailed parameters 1	Set according to the system configuration w	
Pr. 11:Backlash compensation a...	0.0 μm	0.0 μm
Pr. 12:Software stroke limit uppe...	0.0 μm	0.0 μm
Pr. 13:Software stroke limit lowe...	0.0 μm	0.0 μm
Pr. 14:Software stroke limit selec...	0:Set Software Stroke L...	0:Set Software Stroke L...
Pr. 15:Software stroke limit valid...	1:Invalid	1:Invalid
Pr. 16:Command in-position width	10.0 μm	10.0 μm
Pr. 17:Torque limit setting value	300.0 %	300.0 %
Pr. 18:M-code ON signal output t...	0:WITH Mode	0:WITH Mode
Pr. 19:Speed switching mode	0:Standard Speed Switc...	0:Standard Speed Switc...
Pr. 20:Interpolation speed desig...	0:Vector Speed	0:Vector Speed
Pr. 21:Feed current value during...	0:Not Update of Feed C...	0:Not Update of Feed C...
Pr. 22:Input signal logic selection...	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection...	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection...	0:Negative Logic	0:Negative Logic
Pr. 22:Input signal logic selection...	0:Negative Logic	0:Negative Logic
Pr. 81:Speed-position function s...	0:Speed-position Switch...	0:Speed-position Switch...
Pr. 116:FLS signal selection : Inp...	3:Link Device	3:Link Device
Pr. 117:RLS signal selection : Inp...	3:Link Device	3:Link Device
Pr. 118:DOG signal selection : In...	3:Link Device	3:Link Device
Pr. 119:STOP signal selection : I...	2:Buffer Memory	2:Buffer Memory
Detailed parameters 2	Set according to the system configuration w	

(4) Detailed parameters 2

Set the acceleration/deceleration constants and JOG speed limit values in Detailed parameters 2. Assign the devices as follows.

Item	Axis #1	Axis #2
Detailed parameters 2	Set according to the system configuration w	
Pr.25:Acceleration time 1	10 ms	10 ms
Pr.26:Acceleration time 2	500 ms	500 ms
Pr.27:Acceleration time 3	1000 ms	1000 ms
Pr.28:Deceleration time 1	10 ms	10 ms
Pr.29:Deceleration time 2	500 ms	500 ms
Pr.30:Deceleration time 3	1000 ms	1000 ms
Pr.31:JOG speed limit value	3000.00 mm/min	3000.00 mm/min
Pr.32:JOG operation acceleratio...	0:100	0:100
Pr.33:JOG operation deceleratio...	0:100	0:100
Pr.34:Acceleration/deceleration ...	0:Trapezoidal Accelerati...	0:Trapezoidal Accelerati...
Pr.35:S-curve ratio	100 %	100 %
Pr.36:Rapid stop deceleration time	10 ms	10 ms
Pr.37:Stop group 1 rapid stop s...	0:Normal Deceleration S...	0:Normal Deceleration S...
Pr.38:Stop group 2 rapid stop s...	0:Normal Deceleration S...	0:Normal Deceleration S...
Pr.39:Stop group 3 rapid stop s...	0:Normal Deceleration S...	0:Normal Deceleration S...
Pr.40:Positioning complete signa...	300 ms	300 ms
Pr.41:Allowable circular interpol...	10.0 μm	10.0 μm
Pr.83:Speed control 10x multipli...	0:Invalid	0:Invalid
Pr.84:Restart permissible value ...	0 pulse	0 pulse
Pr.90:Operation setting for SPD...	0:Command Torque	0:Command Torque
Pr.90:Operation setting for SPD...	0:Command Speed	0:Command Speed
Pr.90:Operation setting for SPD...	0:Check the Switching C...	0:Check the Switching C...
Pr.122:Manual pulse generator ...	0:Do Not Execute Spee...	0:Do Not Execute Spee...
Pr.123:Manual pulse generator ...	200.00 mm/min	200.00 mm/min
HPR parameter	Set the values required for carrying out HPI	

2.9

Simple Motion Parameter Setting

(5) HPR parameter

Set the home position return speed and acceleration/deceleration time in HPR parameter. Configure the settings as follows.

Set the home position return method with parameters of the servo amplifier.

For details, refer to 2.13.3 (4).

Item	Axis #1	Axis #2
HPR parameter	Set the values required for carrying out HPR	
Pr.44:HPR direction	0:Forward Direction (Ad...	0:Forward Direction (Ad...
Pr.45:HP address	0.0 μ m	0.0 μ m
Pr.46:HPR speed	2000.00 mm/min	2000.00 mm/min
Pr.51:HPR acceleration time selection	0:100	0:100
Pr.52:HPR deceleration time selection	0:100	0:100
Pr.55:Operation setting for incompleti...	0:Positioning Control is ...	0:Positioning Control is ...

(6) External input signal assignment parameter

Set the number and polarity of the link device for the forced stop signal, FLS/RLS signal, and DOG signal in External input signal assignment parameter.

Assign the devices as follows.

Item	Axis #1	Axis #2
External input signal assignment...	Set the link device to assign external input	
Forced stop signal	Set the link device to assign forced stop si	
Pr.900:Type	11h:RX	
Pr.901:Start No.	H0000	
Pr.902:Bit specification	H0	
Pr.903:Logic setting	0:Negative Logic	
Upper limit signal	Set the link device to assign upper limit si	
Pr.910:Type	11h:RX	11h:RX
Pr.911:Start No.	H000B	H000E
Pr.912:Bit specification	H0	H0
Pr.913:Logic setting	0:Negative Logic	0:Negative Logic
Lower limit signal	Set the link device to assign lower limit si	
Pr.920:Type	11h:RX	11h:RX
Pr.921:Start No.	H000C	H000F
Pr.922:Bit specification	H0	H0
Pr.923:Logic setting	0:Negative Logic	0:Negative Logic
Proximity dog signal	Set the link device to assign proximity dog	
Pr.930:Type	11h:RX	12h:RY
Pr.931:Start No.	H000A	H000D
Pr.932:Bit specification	H0	H0
Pr.933:Logic setting	0:Negative Logic	0:Negative Logic
Stop signal	Set the link device to assign stop signal.	
Pr.940:Type	00h:Invalid	00h:Invalid
Pr.941:Start No.	H0000	H0000
Pr.942:Bit specification	H0	H0
Pr.943:Logic setting	0:Negative Logic	0:Negative Logic
Manual pulse generator input	Set the link device to assign manual pulse	
Pr.700:Type	00h:Invalid	00h:Invalid
Pr.701:Start No.	H0000	H0000
Pr.702:Count direction setting	0:Plus Count	0:Plus Count
Pr.703:Ring counter max.	0	0
Pr.704:Ring counter min.	0	0

(7) Other parameters

Assign the positioning start signal to the link device in this course. Set the items in [External positioning start request] as follows.

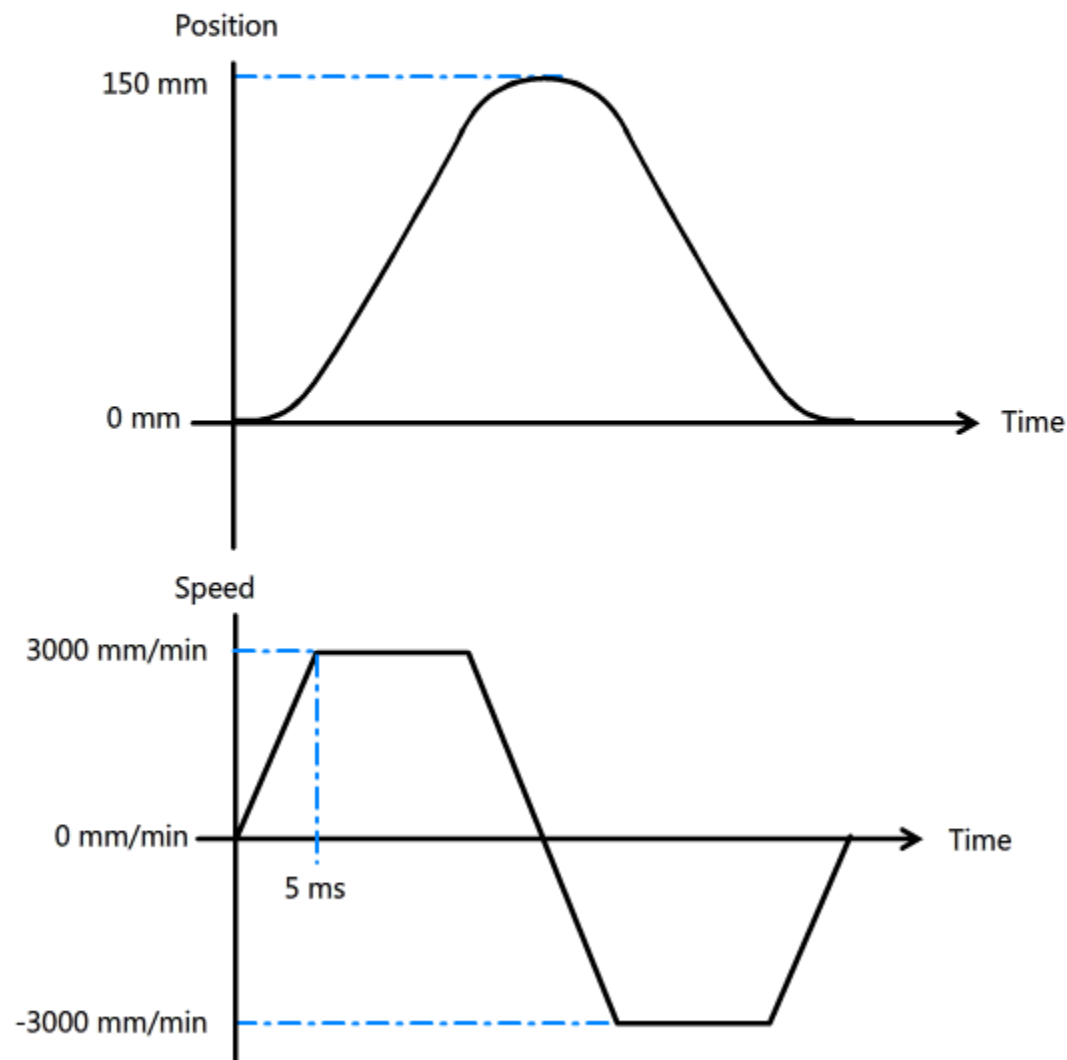
The external command signal assignment parameters and the servo cyclic transmission parameters do not need to be changed.

Item	Axis #1	Axis #2
External command signal assign...	Set the link device to assign external com...	
External positioning start requ...	Set the link device to execute positioning s...	
Pr.950:Type	11h:RX	11h:RX
Pr.951:Start No.	H0005	H0006
Pr.952:Bit specification	H0	H0
Pr.953:Logic setting	0:Negative Logic	0:Negative Logic
External speed change request	Set the link device to execute speed chang...	
Pr.960:Type	00h:Invalid	00h:Invalid
Pr.961:Start No.	H0000	H0000
Pr.962:Bit specification	H0	H0
Pr.963:Logic setting	0:Negative Logic	0:Negative Logic
Skip request	Set the link device to execute skip request.	
Pr.970:Type	00h:Invalid	00h:Invalid
Pr.971:Start No.	H0000	H0000
Pr.972:Bit specification	H0	H0
Pr.973:Logic setting	0:Negative Logic	0:Negative Logic
Speed-position control switchi...	Set the link device to execute speed-positi...	
Pr.980:Type	00h:Invalid	00h:Invalid
Pr.981:Start No.	H0000	H0000
Pr.982:Bit specification	H0	H0
Pr.983:Logic setting	0:Negative Logic	0:Negative Logic

2.10 Positioning Data Setting

(1) Definition of positioning data

Set the positioning data for the X-axis and Y-axis.
Set the following operation pattern in this course.



2.10 Positioning Data Setting

(2) Registering the positioning data

- 1) Double click [Positioning Data] - [Axis #1 Positioning Data] from the project tree in the [Simple Motion Module Setting Function] window.
- 2) Register data as follows.
- 3) Register data in [Axis #2 Positioning Data] in the same way.

Project: 0000:RD77GF4

- System Setting
- Mark Detection
- Parameter
- Positioning Data
 - 1) Axis #1 Positioning Data
 - 3) Axis #2 Positioning Data
 - Axis #3 Positioning Data
 - Axis #4 Positioning Data

Display Filter: Display All | Data Setting Assistant | Offline Simulation | Automatic Command Speed Calc. | Automatic Sub Arc Calc.

No.	Operation pattern	Control method	Axis to be interpolated	Acceleration (mm/s ²)	Deceleration (mm/s ²)	Positioning address	Arc address	Command speed	Dwell time	M-code
2)	1:CONT	0th:ABS Linear 1	-	0:100	0:100	150000.0 μm	0.0 μm	3000.00 mm/min	0 ms	0
	<Positioning Comment>									
2	0:END	0th:ABS Linear 1	-	0:100	0:100	0.0 μm	0.0 μm	3000.00 mm/min	0 ms	0
	<Positioning Comment>									
3	<Positioning Comment>									
4	<Positioning Comment>									
5	<Positioning Comment>									

2.11 Synchronous Parameter Setting

This section describes the setting for driving the Y-axis to synchronize with the X-axis.

(1) Setting the input axis

Open the Input Axis Parameter window and set [Servo input axis type] to "1: Feed Current Value" in Axis #1.

The screenshot shows the 'Input Axis Parameter' window. On the left is a tree view with 'Input Axis Parameter' selected. The main area is a table with columns 'Item', 'Axis #1', and 'Axis #2'. The 'Servo input axis' section is expanded, showing 'Pr.300: Servo input axis type' set to '1: Feed Current Value' for Axis #1 and '0: Invalid' for Axis #2. Below this is the 'Synchronous encoder axis' section.

Item	Axis #1	Axis #2
Servo input axis		
Pr.300: Servo input axis type	1: Feed Current Value	0: Invalid
Detail setting		
Synchronous encoder axis		

2.11 Synchronous Parameter Setting

(2) Creating cam data

Create cam data of the axis 2 (Y-axis).

- 1) Right-click [Cam Data] in the project tree and select "Add New Data".
- 2) Set Cam No. to "1" and Setting Method to "Set by Stroke ratio" - "Cam Curve".
- 3) Create a cam pattern as follows.

The screenshot illustrates the steps for creating cam data. On the left, the project tree shows 'Cam Data' selected, with a context menu open. A red box highlights the 'Add New Data...' option, with a red arrow pointing to the 'New Data' dialog box. The dialog box shows 'Cam No.' set to 1 and 'Setting Method' set to 'Set by Stroke Ratio' - 'Cam Curve'. A red box highlights these settings, with a red arrow pointing to the 'Cam Graph' window. The 'Cam Graph' window shows the 'Setting Method' as 'Stroke Ratio (Cam Curve)', 'Resolution' as 256, and 'Stroke Setting Range' as -100.000000 to 100.000000 [%]. The graph displays a blue curve representing the cam pattern, with a red dot at the peak. The graph is titled 'Cam Graph' and includes options for 'Display Graph' (Stroke, Speed, Acceleration, Jerk) and 'Display Magnification' (Width 100, %Height 100, %).

2.11

Synchronous Parameter Setting

Setting Method :

Resolution :

Stroke Setting Range :
-100.0000000 to 100.0000000 [%]

[Return to Basic Setting](#)

Cam Graph

Display Graph
 Stroke Speed Acceleration Jerk

Display Magnification
 Width % Height % [Point Data](#)

Stroke Setting

Fine-tune the cam curve by section

Section	Start [degree]	End [degree]	Stroke [%]	Cam Curve
1	0.00000	180.00000	100.0000000	Single Hypot.
2	180.00000	0	0.0000000	Single Hypot.
3				
4				
5				
6				
7				

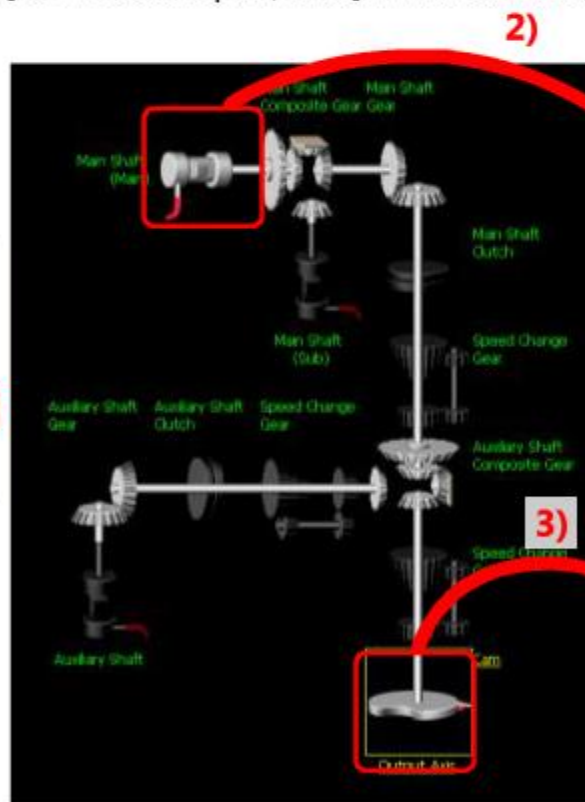
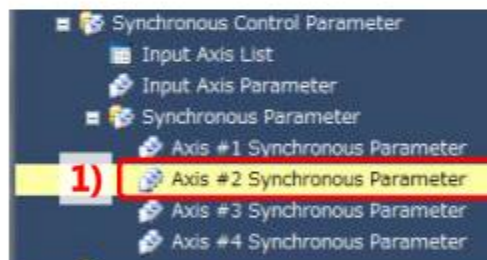
3)

2.11 Synchronous Parameter Setting

(3) Setting the synchronous parameter

Set the synchronous parameter of the axis 2 (Y-axis).

- 1) Double-click [Axis #2 Synchronous Parameter] in the project tree.
- 2) The parameter setting window for the advanced synchronous control appears.
When Main Shaft (Main) is clicked, the cursor moves to [Pr.400: Type].
Set [Pr.400: Type] to "1: Servo Input Axis" and [Pr.400: Axis No.] to "1".
- 3) When Cam of Output Axis is clicked, the cursor moves to [Cam axis cycle unit] - [Pr.438: Unit setting selection] in Output axis. Set [Pr.439: Cam axis length per cycle] to "150.0000 mm", [Pr.441: Cam stroke amount] to "150000.0 μm ", and [Pr.440: Cam No.] to "1".



Item	Setting value
Synchronous control module setting	Set each module parameter.
Main shaft	
Main input axis	
Pr.400:Type	1:Servo Input Axis
Pr.400:Axis No.	1
Sub input axis	
Pr.401:Type	0:Invalid
Pr.401:Axis No.	0
Main shaft composite gear	

Output axis	
Cam axis cycle unit	
Pr.438:Unit setting selection	0:Use Unit of Main Input Axis
Pr.438:Unit	0:mm
Pr.438:Number of decimal places	0
Pr.442:Cam axis length per cycle change setting	0:Invalid
Pr.439:Cam axis length per cycle	150.0000 mm
Pr.441:Cam stroke amount	150000.0 μm
Pr.440:Cam No.	1
Pr.444:Cam axis phase compensation advance time	0 μs
Pr.445:Cam axis phase compensation time constant	10 ms
Pr.446:Synchronous control deceleration time	0 ms
Pr.447:Output axis smoothing time constant	0 ms

2.12 Writing data to the PLC

Select [Online] - [Write to PLC] in the menu bar.

Click the [Parameter + Program] button to determine the data to be written to the PLC.

"Simple Motion Module" or "CPU Module" can be selected as a storage destination of the module extended parameter.

"Simple Motion Module" is set as an initial setting.

Select Intelligent Function Module.

The screenshot shows the 'Online Data Operation' window with the following components:

- Menu Bar:** Display, Setting, Related Functions
- Toolbar:** Write, Read, Verify, Delete
- Buttons:** Parameter + Program, Select All, Open/Close All, Deselect All
- Legend:** CPU Built-in Memory, SD Memory Card, Intelligent Function Module
- Table:** A table listing parameters with columns for Module Name/Data Name, checkboxes, Detail, Title, Last Change, and Size (Byte). A red box highlights the 'Detail' button for the 'Module Extended Parameter-0000-R...' row.
- Memory Capacity Section:**
 - Display Memory Capacity button
 - Memory Capacity: Size Calculation button
 - Legend: Used (green), Increased (blue), Decreased (orange), 5% or Less (red)
 - Program Memory: 157/160KB (Free)
 - Data Memory: 1624/2049KB (Free)
 - Device/Label Memory (File Storage Area): 152/256KB (Free)
 - SD Memory Card: 0/0KB (Free)
- Buttons:** Execute, Close

Module Name/Data Name		Detail	Title	Last Change	Size (Byte)
capture	<input checked="" type="checkbox"/>				
Parameter	<input checked="" type="checkbox"/>				
System Parameter /CPU Parameter	<input checked="" type="checkbox"/>			2017/01/11 11:47:17	Not Calculated
Module Parameter	<input checked="" type="checkbox"/>			2017/01/12 9:57:48	Not Calculated
Module Extended Parameter-0000-R...	<input type="checkbox"/>	<input checked="" type="checkbox"/> Detail		2017/01/12 9:57:48	Not Calculated
Memory Card Parameter	<input checked="" type="checkbox"/>			2017/01/11 11:28:29	Not Calculated
Remote Password	<input checked="" type="checkbox"/>			2017/01/11 11:28:29	Not Calculated
Global Label	<input checked="" type="checkbox"/>				
Global Label Setting	<input checked="" type="checkbox"/>			2017/01/11 11:40:25	Not Calculated
Global Label Initial Value	<input checked="" type="checkbox"/>				
GLB.DP	<input checked="" type="checkbox"/>			2017/01/11 11:40:25	Not Calculated
Local Label Initial Value	<input checked="" type="checkbox"/>				

2.13 Parameter Settings of the Servo Amplifier

The Simple Motion module does not manage the parameters of the servo amplifier unlike the SSCNETIII/H compatible Simple Motion module.

Set parameters to each servo amplifier.

2.13.1 Starting MR Configurator2

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.

CC IE Field Configuration (Start I/O: 0000)

CC IE Field Configuration Edit View Close with Discarding the Setting Close with Reflecting the Setting

Detect Now

Mode Setting: Online (High-Speed Mode) Assignment Method: Start/End Link Scan Time (Approx.): - ms

No.	Model Name	STA#	Station Type	RX/RV Setting			RWw/RWr Setting			Reserved/Error em Switching Monit
				Points	Start	End	Points	Start	End	
0	Host Station	0	Master Station							
1	MR-J4-GF	1	Intelligent Device Station				36	0060	0083	No Setting
2	MR-J4-GF	2	Intelligent Device Station				36	0084	00A7	No Setting
3	NZ2GF2S1-16D	3	Remote Device Station	16	0000	000F	52	0000	0033	No Setting

Host Station

STA#0 Master
Total STA#3
Line/Star

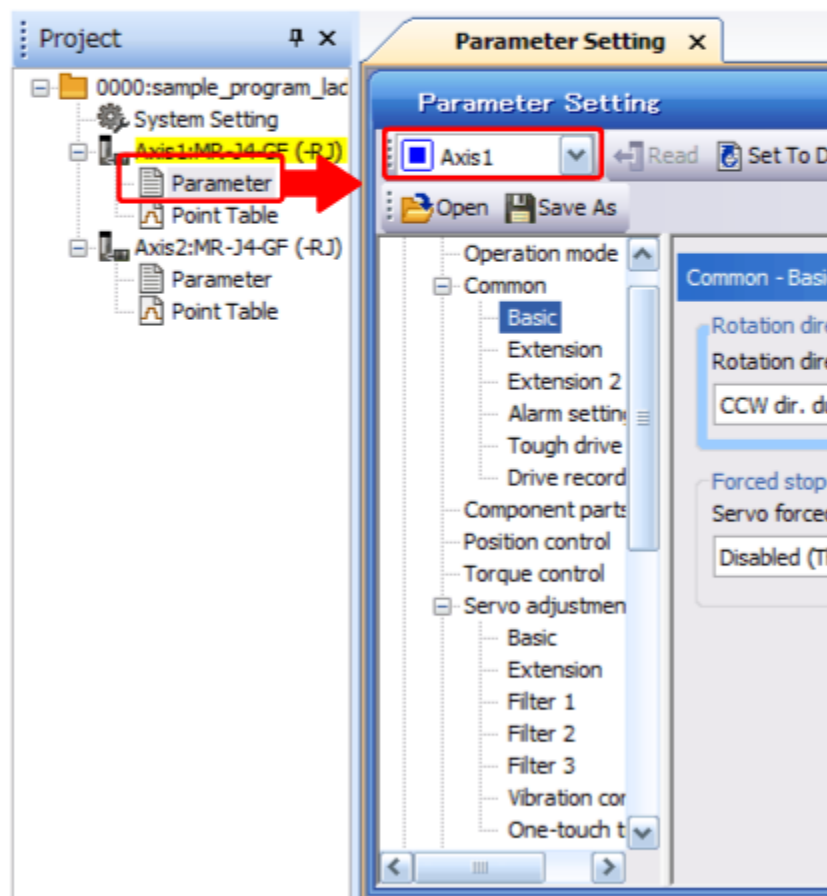
MR-J4-GF MR-J4-GF NZ2GF2S1-16D

2.13.2 Servo Amplifier Selection

To set the parameter of the servo amplifier of the axis 1, double-click [Axis 1: MR-J4-GF(-RJ) Standard (Motion mode)] - [Parameter] from the project tree of MR Configurator2.

To set the parameter of the servo amplifier of the axis 2, double-click [Axis 2: MR-J4-GF(-RJ) Standard (Motion mode)] - [Parameter].

The servo amplifier whose parameter is to be set can be switched from the drop-down menu at the upper left of the Parameter Setting window.



2.13.3 Parameter Setting Details

- (1) Set Station-specific mode selection to "Motion mode" in the [CC-Link IE Communication mode setting for communication] section of [Operation mode].

The screenshot displays the 'Parameter Setting' window for 'Axis 1'. The left-hand navigation pane shows a tree structure under 'Function display', with 'Operation mode' highlighted. The main workspace is titled 'Operation mode' and contains two sections:

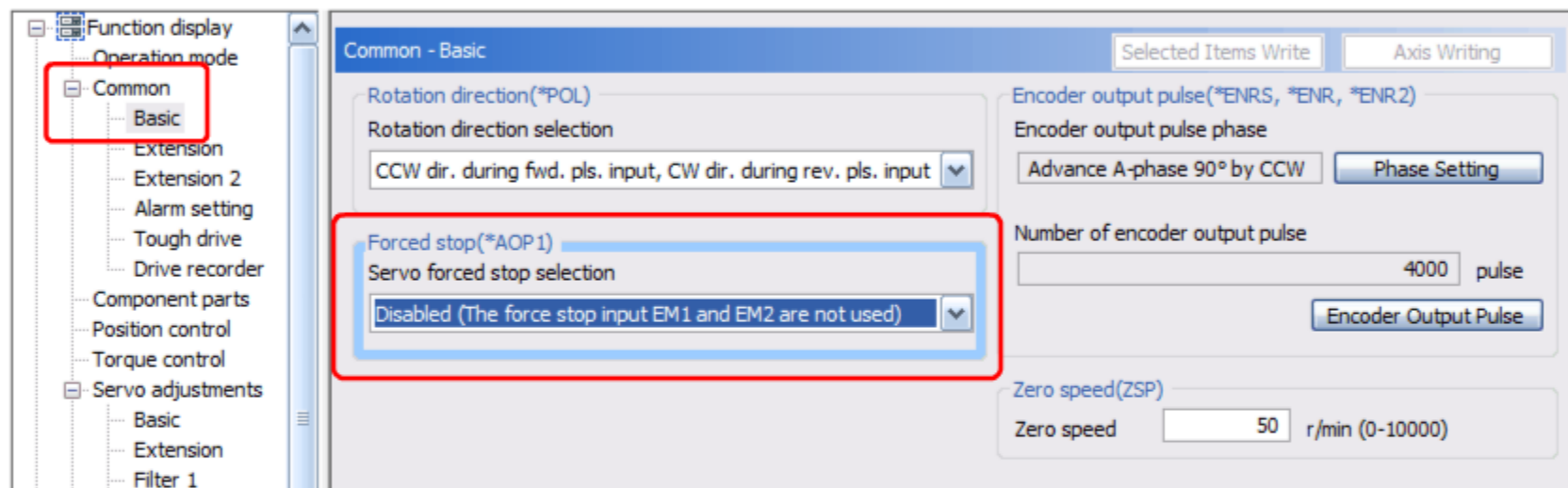
- Operation mode(**STY)**: Includes a dropdown for 'Operation mode selection' currently set to 'Standard control mode'. Below it is a note: "When changed the parameter of operation mode and wrote, please change the project to the model and the operation mode which be supported after turning on the power again."
- CC-Link IE Communication mode setting for communication(**NWMD)**: Includes a dropdown for 'Station-specific mode selection' currently set to 'Motion mode'.

Buttons for 'Selected Items Write' and 'Axis Writing' are visible in the top right of the main workspace.

2.13.3 Parameter Setting Details

- (2) Set [Servo forced stop selection] of [Common] - [Basic] to "Disabled (The force stop input EM1 and EM2 are not used)" since the forced stop is performed with the signal from the remote input module in the system of this course.

To change the rotation direction of the motor, change [Rotation direction setting] on this window.



The screenshot shows the parameter setting interface for the MELSEC_iQ-R_Series_Simple_Motion_Module. The left sidebar displays a tree view with the following structure:

- Function display
 - Operation mode
 - Common (highlighted with a red box)
 - Basic (highlighted with a red box)
 - Extension
 - Extension 2
 - Alarm setting
 - Tough drive
 - Drive recorder
 - Component parts
 - Position control
 - Torque control
 - Servo adjustments
 - Basic
 - Extension
 - Filter 1

The main window displays the 'Common - Basic' settings. The 'Forced stop(*AOP1)' section is highlighted with a red box, showing the 'Servo forced stop selection' dropdown menu set to 'Disabled (The force stop input EM1 and EM2 are not used)'. Other settings include:

- Rotation direction(*POL): Rotation direction selection: CCW dir. during fwd. pls. input, CW dir. during rev. pls. input
- Encoder output pulse(*ENRS, *ENR, *ENR2): Encoder output pulse phase: Advance A-phase 90° by CCW, Phase Setting
- Number of encoder output pulse: 4000 pulse, Encoder Output Pulse
- Zero speed(ZSP): Zero speed: 50 r/min (0-10000)

2.13.3 Parameter Setting Details

- (3) Correctly set whether the encoder cable actually wired is 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.

The screenshot shows the 'Component parts' window in the parameter setting software. The window is divided into several sections:

- Regenerative option (**REG)**: Regenerative option setting is set to 'Regen. option is not used'.
- Battery (*ABS)**: Absolute pos. detection system sel. is set to 'Disabled (Used in incremental system)'.
- Encoder cable (**COP 1)**: Encoder cable communication method sel. is set to '2-wire'.
- Brake output (MBR)**: Uses electromagnetic brake interlock (MBR) is unchecked. Electromagnetic brake sequence output is set to 0 ms (0-1000).

The diagram shows a Servo amplifier connected to a Servo motor. The 'Component parts' menu item in the left sidebar is highlighted with a red box.

2.13.3 Parameter Setting Details

- (4) Click [Positioning] - [Home position return] and set a home position return method.
Set [Home position return method] to "Dog type (Back end detection Z-phase reference)" in this course.
Set [Home position return direction] to "Address decreasing direction".

The screenshot displays the 'Positioning - Home position return' configuration window. On the left, a tree view shows the navigation path: Positioning > Home position return. The main window is divided into several sections:

- Home position return method(HMM):** This section is highlighted with a red box. It includes:
 - Method selection: CIA 402, Manufacturer-specific
 - Home position return method: Dog type (Back end detection Z-phase reference)
 - Home position return direction: Address decreasing direction
- Home position return position data(ZST, ZSTH):** Home position shift distance is set to 0 pulse (0-2147483647).
- Detailed setting of home position return:**
 - Home position return speed: 100.00 r/min (0.00-167772.15)
 - Creep speed: 10.00 r/min (0.00-167772.15)
 - Moving distance after proximity dog: 0 pulse (0-2147483647)
 - Proximity dog input polarity: Detect dog with OFF
 - Stopper time: 100 ms (5-1000)
 - Torque limit value: 15.0 % (0.1-100.0)

2.13.3 Parameter Setting Details

(5) 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 "1100".

I/O		Selected Items Write		Axis Writing	
No.	Abbr.	Name	Units	Setting range	Axis1
PD26		For manufacturer setting		0000-0000	0000
PD27		For manufacturer setting		0000-0000	0000
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	1100
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

bit0(_ _ _ X)	For manufacturer setting
bit1(_ _ X _)	
bit2(_ X _ _)	To use the RD77GF, always set "1".
bit3(X _ _ _)	Select an input method for the proximity dogs and limit switches. 0: Input from servo amplifier 1: Input from controller

2.13.4 Writing Parameters

When the parameters have been input, click the [Axis Writing] button and write parameters to the servo amplifier. After writing the parameters, power off the servo amplifier and then power on it again.

The screenshot shows the 'I/O' parameter list in the software. The 'Axis Writing' button is highlighted with a red box. The parameter PD41 is highlighted with a black box.

No.	Abbr.	Name	Unit	Setting range	Axis 1
PD19	*MD4	For manufacturer setting		0000-0000	0000
PD20	*SLA1	For manufacturer setting		0-0	0
PD21	*SLA2	For manufacturer setting		0-0	0
PD22	*SLA3	For manufacturer setting		0-0	0
PD23	*SLA4	For manufacturer setting		0-0	0
PD24		For manufacturer setting		0000-0000	0000
PD25		For manufacturer setting		0000-0000	0000
PD26		For manufacturer setting		0000-0000	0000
PD27		For manufacturer setting		0000-0000	0000
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	1100
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

2.14 Summary of This Chapter

In this chapter, you have learned:

- Registering Profiles
- Creating a Project
- Initializing the Memory
- Module Configuration Diagram
- Enabling the Inter-module Synchronization
- Setting the Fixed Scan Interval
- Adding remote stations (servo amplifiers, remote I/O)
- Refresh Setting
- Simple Motion Parameter Setting
- Positioning Data Setting
- Synchronous Parameter Setting
- Writing data to the PLC
- Parameter Settings of the Servo Amplifier

Important points

Registering Profiles	<ul style="list-style-type: none"> • When you use the MR-J4-GF and the NZ2GF2S1-16D for the first time, register their profiles in GX Works3.
Setting the Fixed Scan Interval	<ul style="list-style-type: none"> • Adjust the fixed scan interval depending on the number of stations and remote station type to be used.
Adding remote stations (servo amplifiers, remote I/O)	<ul style="list-style-type: none"> • Add a remote station in the CC IE Field Configuration window. • Assign the link devices to the remote station and check that the numbers do not duplicate.
Refresh Setting	<ul style="list-style-type: none"> • Set the link refresh so that the link devices are automatically transferred to the specified device of the PLC CPU.
Simple Motion Parameter Setting	<ul style="list-style-type: none"> • Configure the settings related to the axis control of the Simple Motion module.
Parameter Settings of the Servo Amplifier	<ul style="list-style-type: none"> • Since the RD77GF does not manage the parameters of the servo amplifier, directly write the parameters to the servo amplifier.

Chapter 3 Program Example

This chapter describes the operation check of the Simple Motion module and servo amplifiers set in Chapter 2 with a sample program.

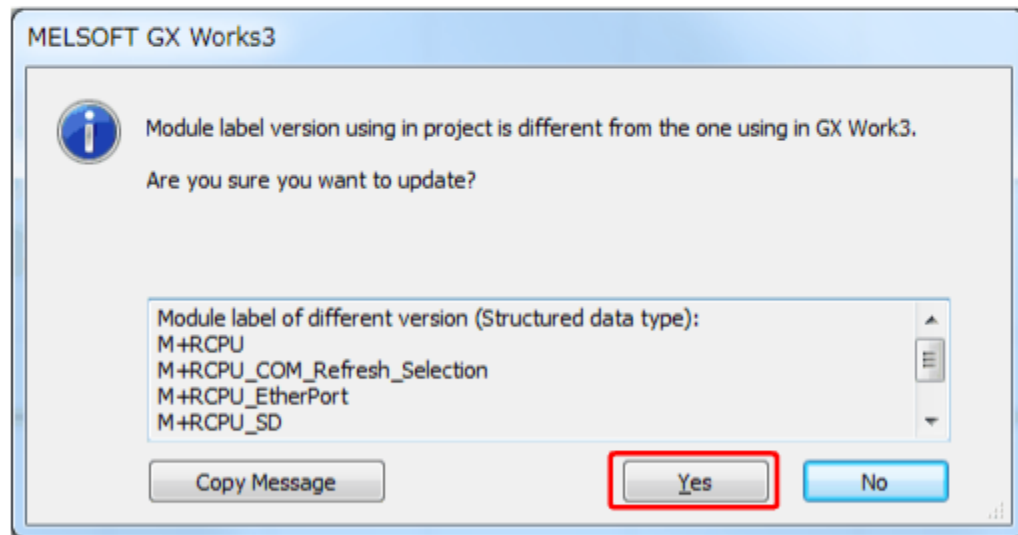
3.1 Downloading a Sample Program

Download a sample program from [here](#). Decompress the zip file in an arbitrary place.

The sample program is created with GX Works3 Ver.1.032J.

When the sample program is opened with GX Works3 of a new version, the following dialog indicating the difference of the module label version may appear.

In this case, click "Yes" and update the module label.



After the module label has been updated, the program is set as not-compiled. Compile the program before writing it to the programmable controller.

3.2

Used Labels

(1) Global label

Register a remote input module signal to a global label.

	Label Name	Data Type		Class	Assign (Device/Label)	Initial Value	Constant	English(Display Target)
1	bEMI	Bit	...	VAR_GLOBAL	X100	0		Forced Stop
2	bXJOG_FW	Bit	...	VAR_GLOBAL	X101	0		X Axis JOG+
3	bXJOG_RV	Bit	...	VAR_GLOBAL	X102	0		X Axis JOG-
4	bYJOG_FW	Bit	...	VAR_GLOBAL	X103	0		Y Axis JOG+
5	bYJOG_RV	Bit	...	VAR_GLOBAL	X104	0		Y Axis JOG-
6	bXSTART	Bit	...	VAR_GLOBAL	X105	0		X Axis Start
7	bYSTART	Bit	...	VAR_GLOBAL	X106	0		Y Axis Start
8	bERROR_RESET	Bit	...	VAR_GLOBAL	X107	0		ERROR Reset
9	bYSYNC	Bit	...	VAR_GLOBAL	X108	0		Y Axis Synchronous ON
10	bPosNumSelection	Bit	...	VAR_GLOBAL	X109	0		Positioning Number Selection
11	bXDOG	Bit	...	VAR_GLOBAL	X10A	0		X Axis DOG
12	bXFLS	Bit	...	VAR_GLOBAL	X10B	0		X Axis FLS
13	bXRLS	Bit	...	VAR_GLOBAL	X10C	0		X Axis RLS
14	bYDOG	Bit	...	VAR_GLOBAL	X10D	0		Y Axis DOG
15	bYFLS	Bit	...	VAR_GLOBAL	X10E	0		Y Axis FLS
16	bYRLS	Bit	...	VAR_GLOBAL	X10F	0		Y Axis RLS
17	uRemoteInputStatusArea	Word [Unsigned]/	...	VAR_GLOBAL	W0	0		Remote Input Module Status Area
18	uRemoteInputOperationArea	Word [Unsigned]/	...	VAR_GLOBAL	W100	0		Remote Input Module Operation Area

(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	uXPositioningNumber	Word [Unsigned]/Bit String [16-bit]	...	VAR			X Axis Positioning Number
2	uYPositioningNumber	Word [Unsigned]/Bit String [16-bit]	...	VAR			Y Axis Positioning Number
3	bXHPRComp	Bit	...	VAR			X Axis HPR Completion
4	bYHPRComp	Bit	...	VAR			Y Axis HPR Completion

3.3

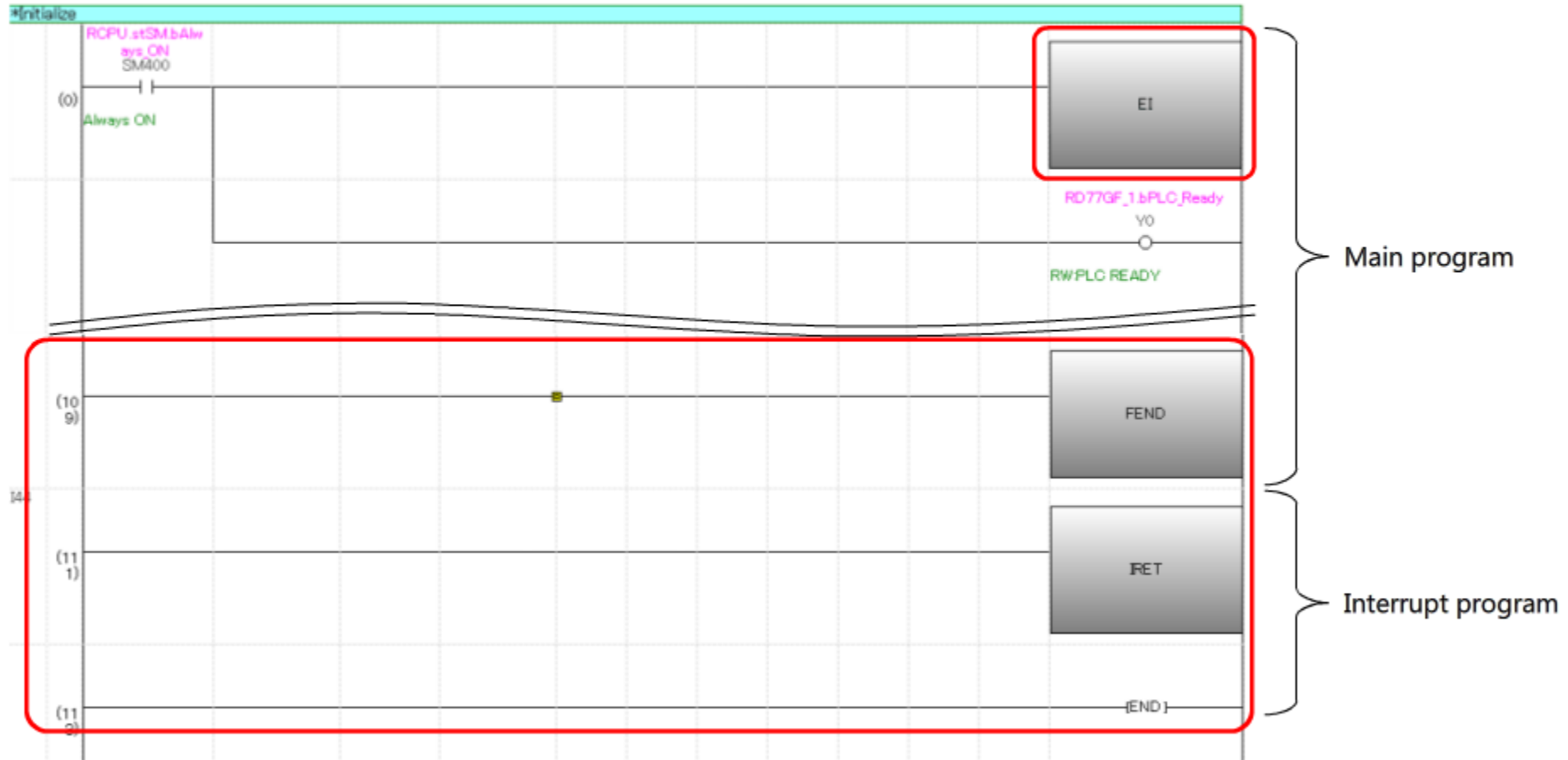
Explanation of the Sample Program

(1) Inter-module synchronous interrupt program (I44)

Enable the inter-module synchronization in this course.

In this case, the inter-module synchronous interrupt program (I44) needs to be created.

When the program does not include EI or I44, I/O signal (X/Y) of the RD77GF is not refreshed.

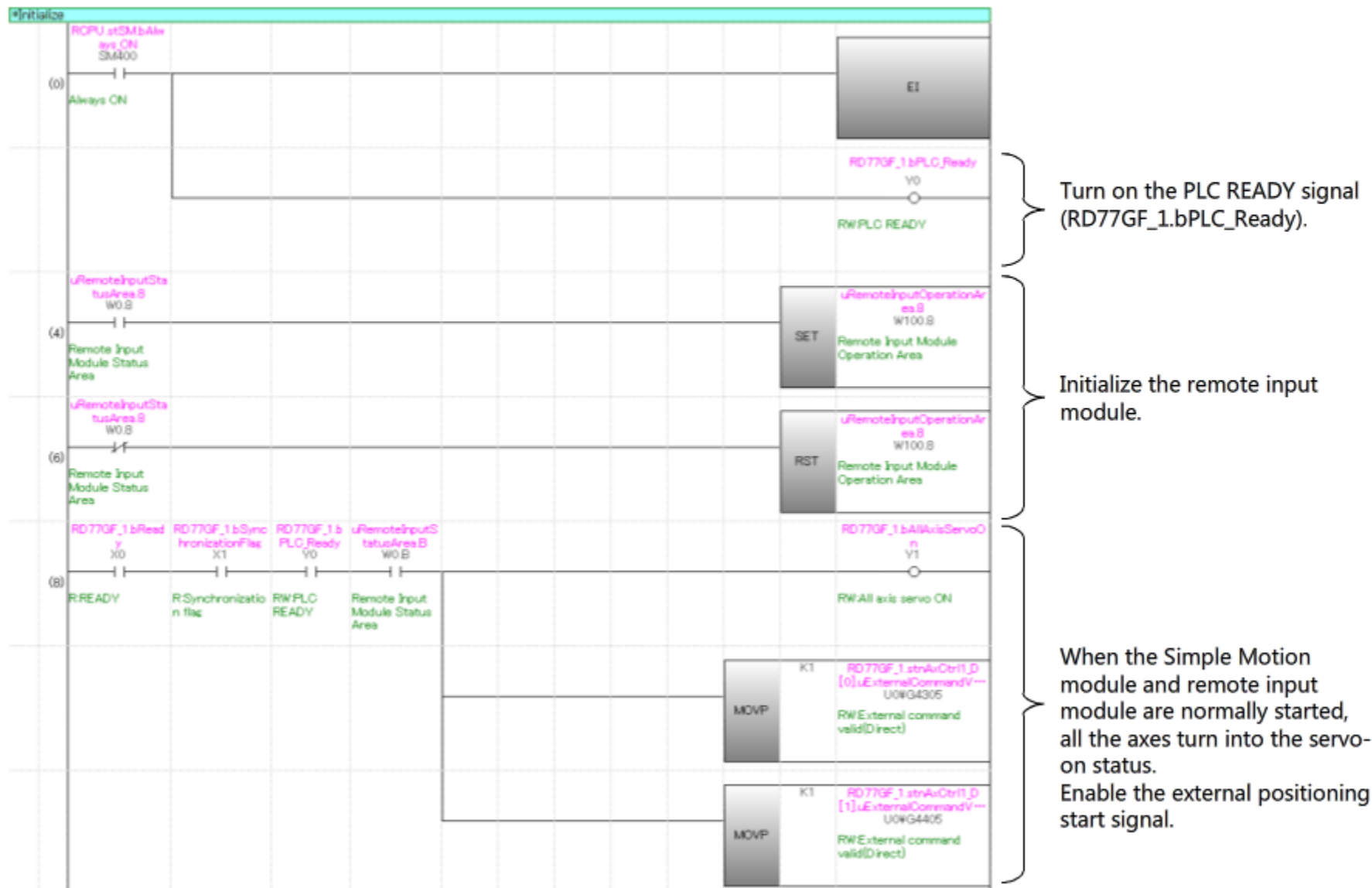


3.3

Explanation of the Sample Program

(2) Initial setting (All axes servo ON)

This program is used to configure the initial setting. It initializes the remote input module and turns all the axes into the servo-on status.



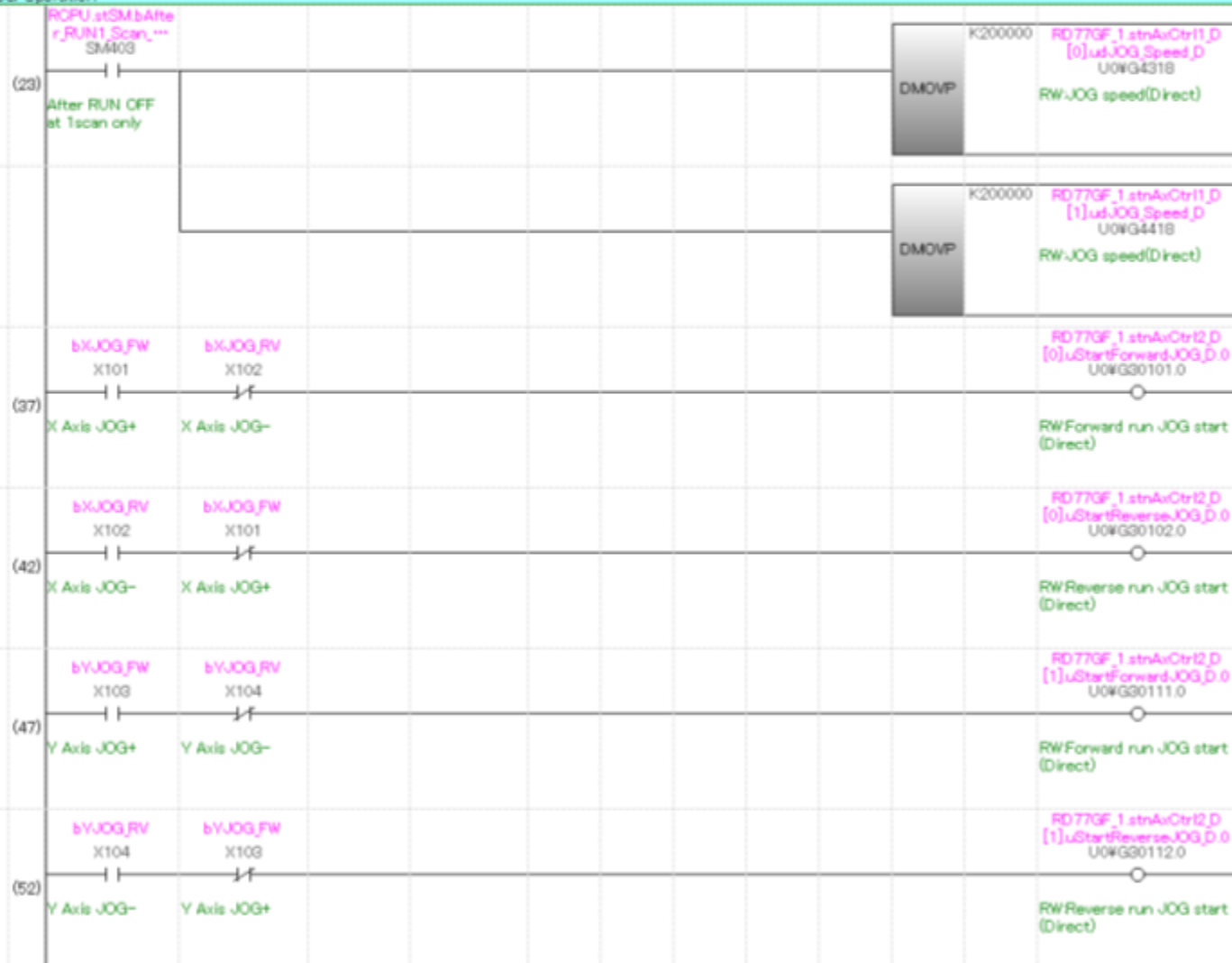
3.3

Explanation of the Sample Program

(3) JOG operation

This program is used to perform JOG operation.

JOG Operation



Set the JOG speed of both X-axis and Y-axis to 2000.00 mm/min.

Perform the JOG operation of the X-axis. The forward rotation JOG and reverse rotation JOG prevented from turning on at the same time.

Perform the JOG operation of the Y-axis. The forward rotation JOG and reverse rotation JOG prevented from turning on at the same time.

3.3

Explanation of the Sample Program

(4) Home position return/Positioning operation (X-axis)

This program is used to perform home position return and positioning operation for the X-axis. Positioning is started by the remote device (RX05/RX06).

*Positioning/Home Position Return

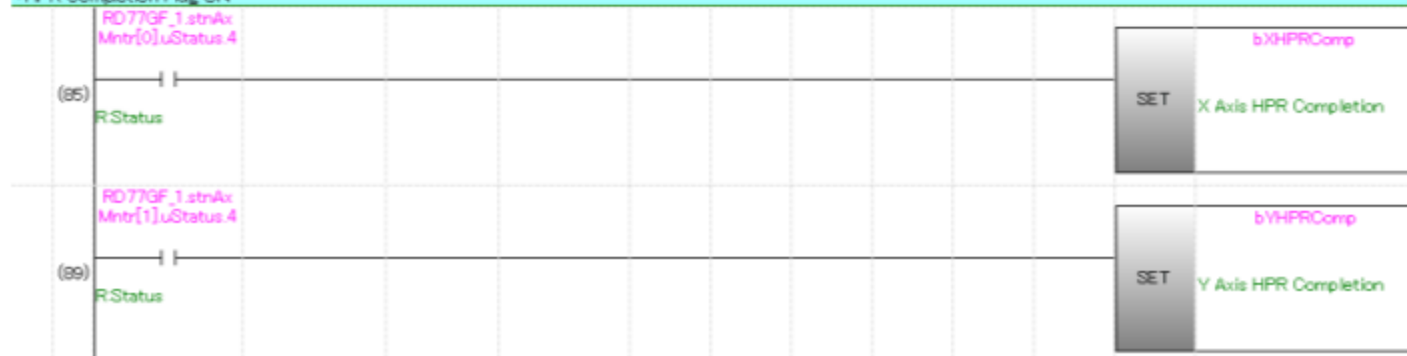
*Positioning Number Selection



When Positioning number selection (`bPosNumSelection`) is off, the positioning number is set to "9001".

When Positioning number selection (`bPosNumSelection`) is on and a home position return has been performed once at least, the positioning number is set to "1".

*HPR Completion Flag ON



Once a home position return is performed after power-on, Home position return completion flag (`bXHPRComp`/`bYHPRComp`) is turned on.

3.3

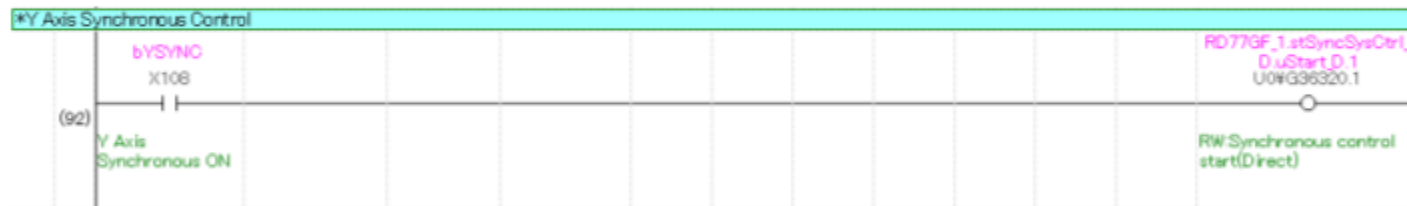
Explanation of the Sample Program

(5) Synchronous control

This program is used to switch the mode of the Y-axis to the synchronous control mode.

When Y Axis Synchronous ON (bYSYNC) is turned on, the bit1 (RD77GF_1.stSyncSysCtrl_D.uStart_D.1) of the buffer memory of Synchronous control start is turned on. This sets [Md.26: Axis operation status] of the Y-axis to "Synchronous control".

To release the synchronous control of the Y-axis, turn off Y Axis Synchronous ON (bYSYNC) and the bit1 of the buffer memory.



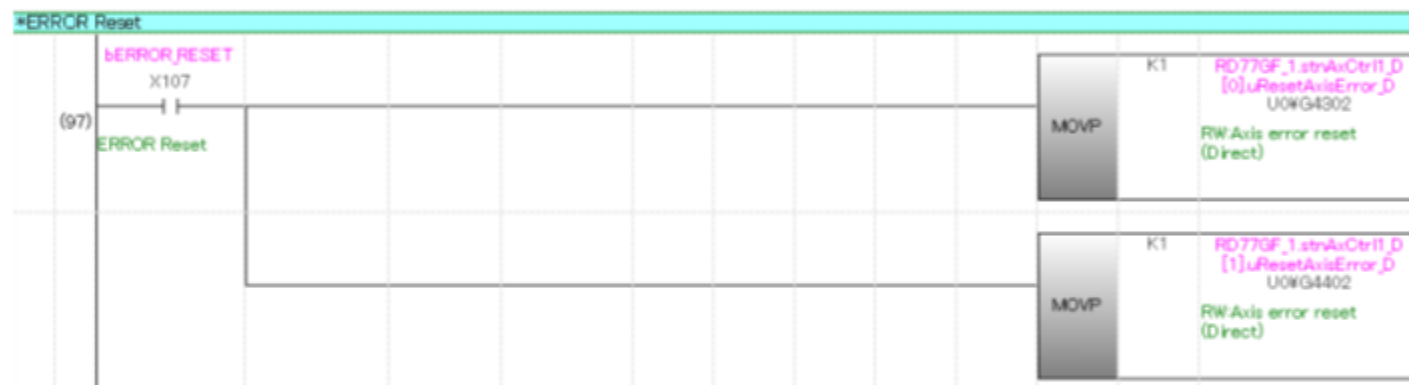
3.3 Explanation of the Sample Program

(6) Error reset

This program is used to reset the error which has occurred in the Simple Motion module.

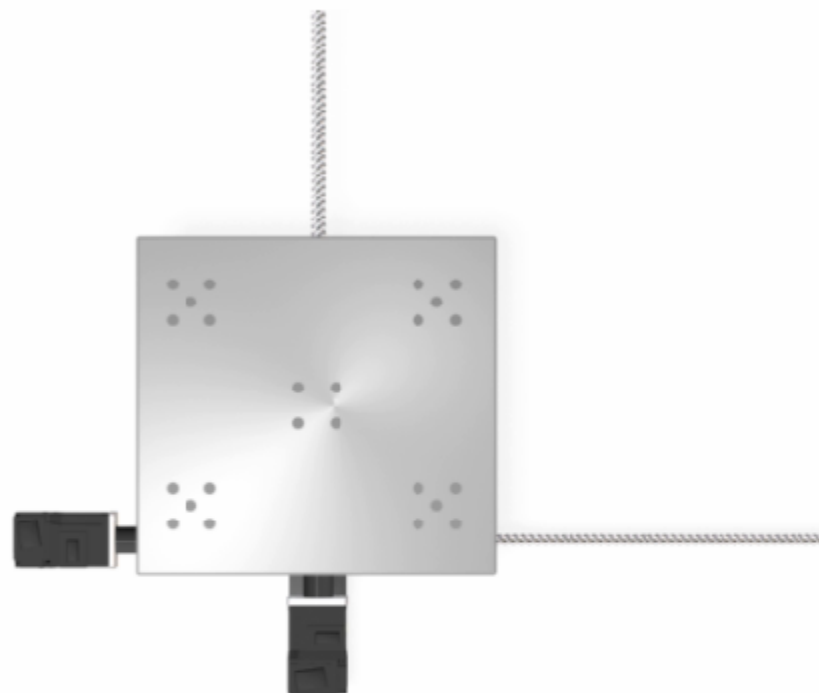
When ERROR Reset (bERROR_RESET) turns on, "1" is written in the buffer memory areas for error reset (RD77GF_1.stnAxCtrl1_D[0].uResetAxisError_D (Axis 1) and RD77GF_1.stnAxCtrl1_D[1].uResetAxisError_D (Axis 2)) to reset the error.

When the error is reset, "0" is automatically set in the buffer memory area.



3.4

Operation Check of the Sample Program



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



3.5**Summary of This Chapter**

In this chapter, you have learned:

- Downloading a Sample Program
- Used Labels
- Explanation of the Sample Program
- Operation Check of the Sample Program

Important points

Used Labels	<ul style="list-style-type: none">• Register the remote input module signal to the global label.
Explanation of the Sample Program	<ul style="list-style-type: none">• When the inter-module synchronization is enabled, the inter-module synchronous interrupt program (I44) needs to be created.
Operation Check of the Sample Program	<ul style="list-style-type: none">• The X-Y table moves according to the signal from the remote input module.

Chapter 4 Program Using FBs Conforming to PLCopen

PLCopen Motion Control Function Block (FB) is provided for the RD77GF.

The Motion Control FB has a standard interface. Thus, using the FB leads to simplification of the program development process and reduction of maintenance time owing to improved readability.

This chapter describes the program using the Motion Control FB.

4.1 Downloading the FB Library and Sample Program

Download the FB library and sample program from [here](#) and [here](#). Decompress the zip file in an arbitrary place.

[COLUMN] What is PLCopen?

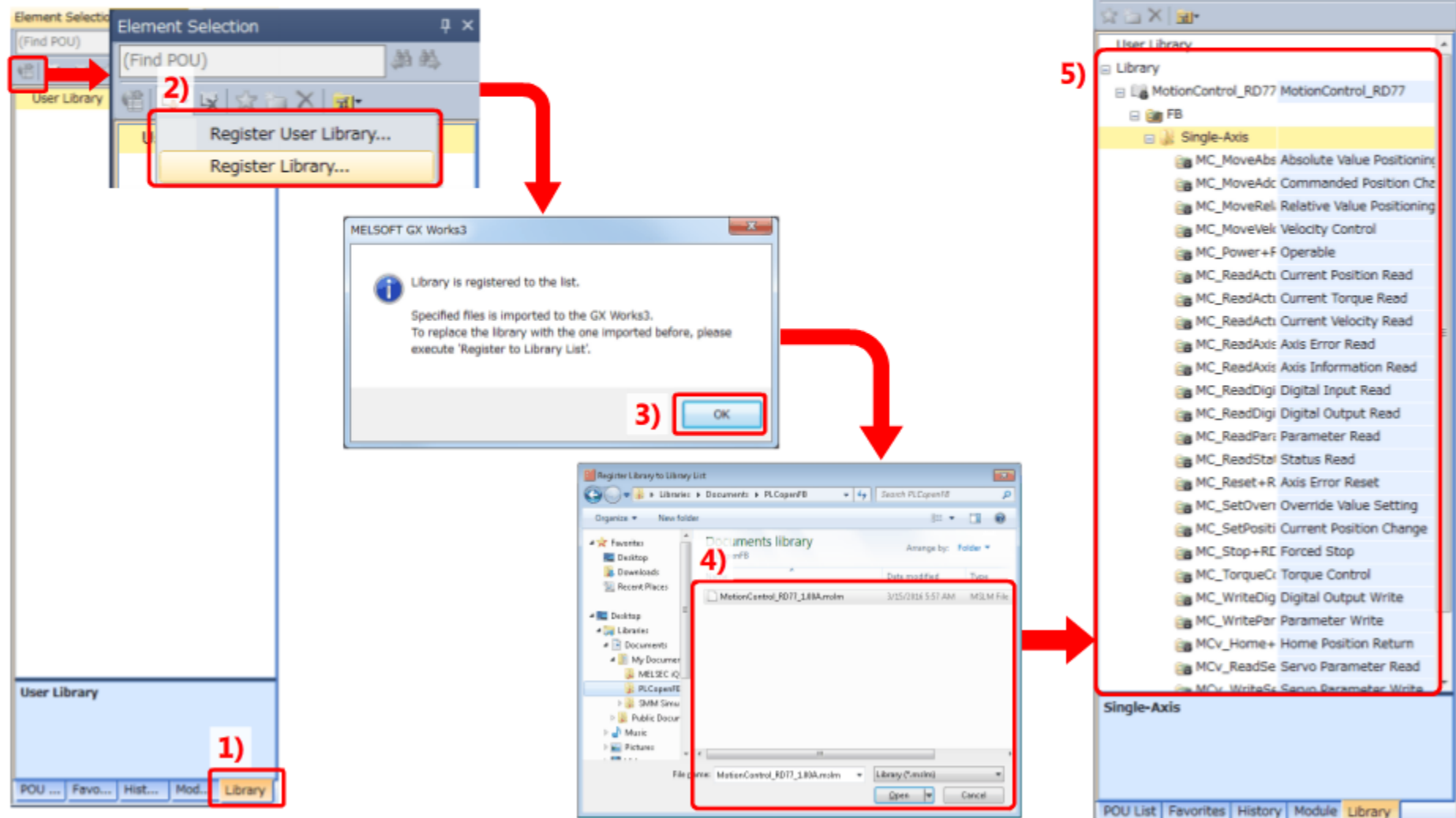
PLCopen is an independent organization, aiming at improving the development efficiency of PLC applications, promoting the international standard IEC 61131-3 for PLC programming, and creating and certifying the standard function block (FB) specification which is independent from vendor.

Using the FB certificated by PLCopen allows programming which does not depend on PLC manufacturers since the I/O and operation specifications of the FB are standardized. This feature allows structured programs, improving reusability and reducing engineering costs.

4.2

Registering the FB Library

- 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_RD77_1.01B.mism] stored in the arbitrary place.
- 5) The FB is registered in the Element Selection window.



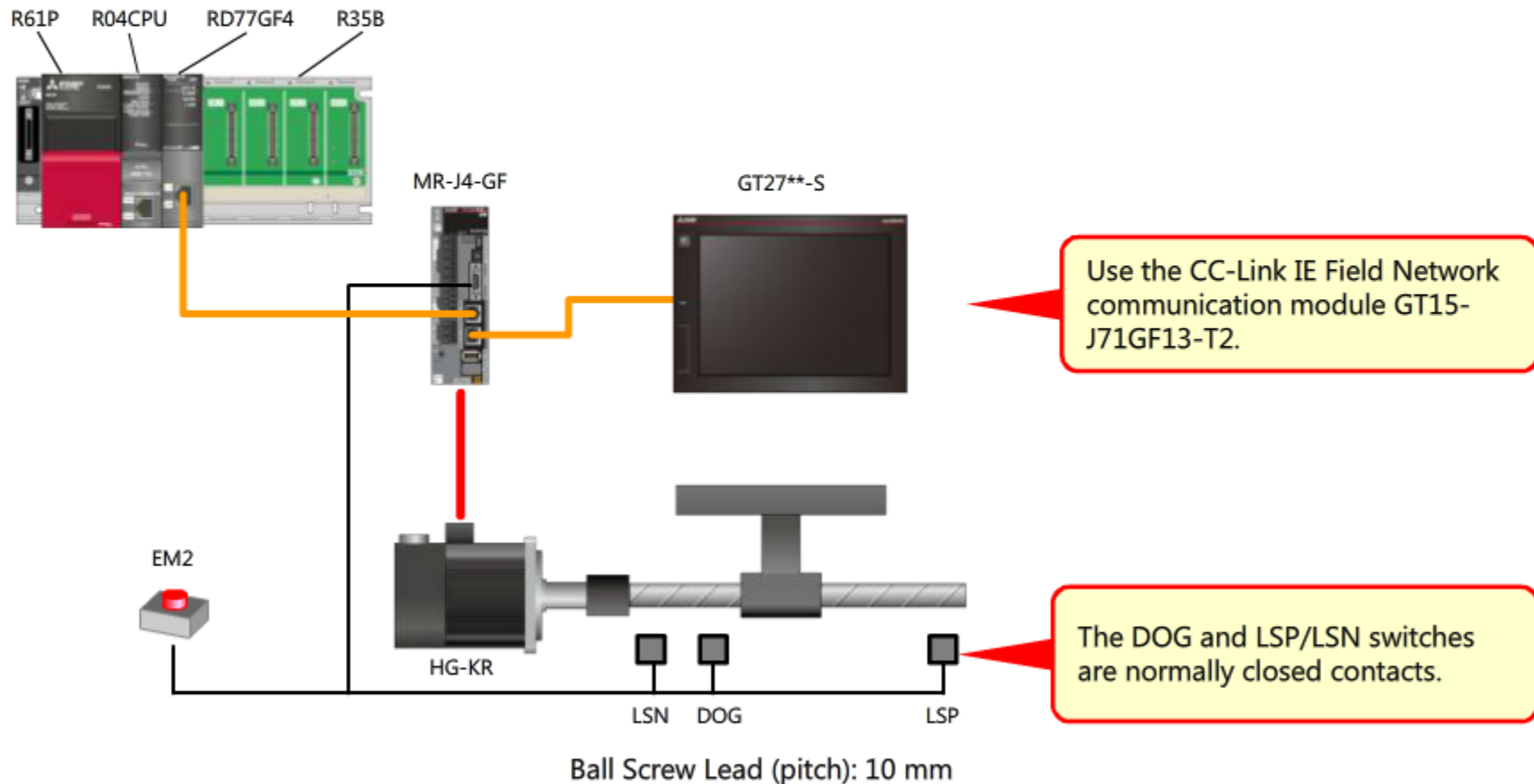
4.3 System Configuration

The following figure shows the system configuration used in this chapter.

A GOT is used for the easy explanation of the link device operation.

(When operating the link device in a program, the GOT is not required.)

An external circuit, such as stroke limit switches, is assumed to be connected to the servo amplifier.



4.4

Explanation of the Sample Program

(1) Assigning link devices

Assign link devices as follows.

Detect Now

Mode Setting: Online (High-Speed Mode) Assignment Method: Start/End Link Scan Time (Approx.):

No.	Model Name	STA#	Station Type	RX/RX Setting			RWw/RWr Setting		
				Points	Start	End	Points	Start	End
0	Host Station	0	Master Station						
1	MR-J4-GF	1	Intelligent Device Station				36	0000	0023
2	GT27**S	2	Intelligent Device Station	16	0100	010F	16	0100	010F

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	16	00100	0010F	Specify Device	X	16	00100	0010F		
2	RWr	16	00100	0010F	Specify Device	W	16	00100	0010F		
3	RWw	16	00100	0010F	Specify Device	W	16	00200	0020F		

Operate RX100 to 10F and RWr100 to 10F by using the GOT.

4.4

Explanation of the Sample Program

(2) Parameter setting

Set [Module extended parameter] as follows.

1) Set "Forced stop valid/invalid selection" on the controller to "Invalid" since the forced stop is performed with the input signal of the servo amplifier.

Set [Control axis number upper limit] to "1".

2) Since each signal of the proximity dog, upper limit, and reverse rotation limit is input to the servo amplifier, set [Detailed parameters 1] as follows.

1)

Item	Axis #1
Common parameter	The parameter does not
Pr.82:Forced stop valid/invalid selection	1:Invalid
Pr.152:Control axis number upper limit	1
Basic parameters 1	Set according to the ma
Pr.100:Connected Machine	MR-J4-GF
Pr.101:Virtual servo amplifier setting	0:Use Real Servo Amplifier
Pr.1:Unit setting	0:mm
Pr.2:No. of pulses per rotation	4194304 pulse
Pr.3:Movement amount per rotation	10000.0 μm
Pr.4:Unit magnification	1:x1 Times
Pr.7:Bias speed at start	0.00 mm/min
Basic parameters 2	Set according to the ma
Pr.8:Speed limit value	60000.00 mm/min
Pr.9:Acceleration time 0	100 ms
Pr.10:Deceleration time 0	100 ms
Detailed parameters 1	Set according to the sys
Pr.11:Backlash compensation amount	0.0 μm
Pr.12:Software stroke limit upper limit value	0.0 μm
Pr.13:Software stroke limit lower limit value	0.0 μm
Pr.14:Software stroke limit	0:Set Software Stroke Limit to

4.4

Explanation of the Sample Program

Pr. 14:Software stroke limit selection	0:Set Software Stroke Limit to Feed Current Value
Pr. 15:Software stroke limit valid/invalid setting	1:Invalid
Pr. 16:Command in-position width	10.0 μm
Pr. 17:Torque limit setting value	300.0 %
Pr. 18:M-code ON signal output timing	0:WITH Mode
Pr. 19:Speed switching mode	0:Standard Speed Switching Mode
Pr. 20:Interpolation speed designation method	0:Vector Speed
Pr. 21:Feed current value during speed control	0:Not Update of Feed Current Value
Pr. 22:Input signal logic selection : Lower limit	0:Negative Logic
Pr. 22:Input signal logic selection : Upper limit	0:Negative Logic
Pr. 22:Input signal logic selection : Stop signal	0:Negative Logic
Pr. 22:Input signal logic selection : Proximity dog signal	0:Negative Logic
Pr. 81:Speed-position function selection	0:Speed-position Switching Control (INC Mode)
Pr. 116:FLS signal selection : Input type	1:Servo Amplifier
Pr. 117:RLS signal selection : Input type	1:Servo Amplifier
Pr. 118:DOG signal selection : Input type	1:Servo Amplifier
Pr. 119:STOP signal selection : Input type	2:Buffer Memory

2)

4.4

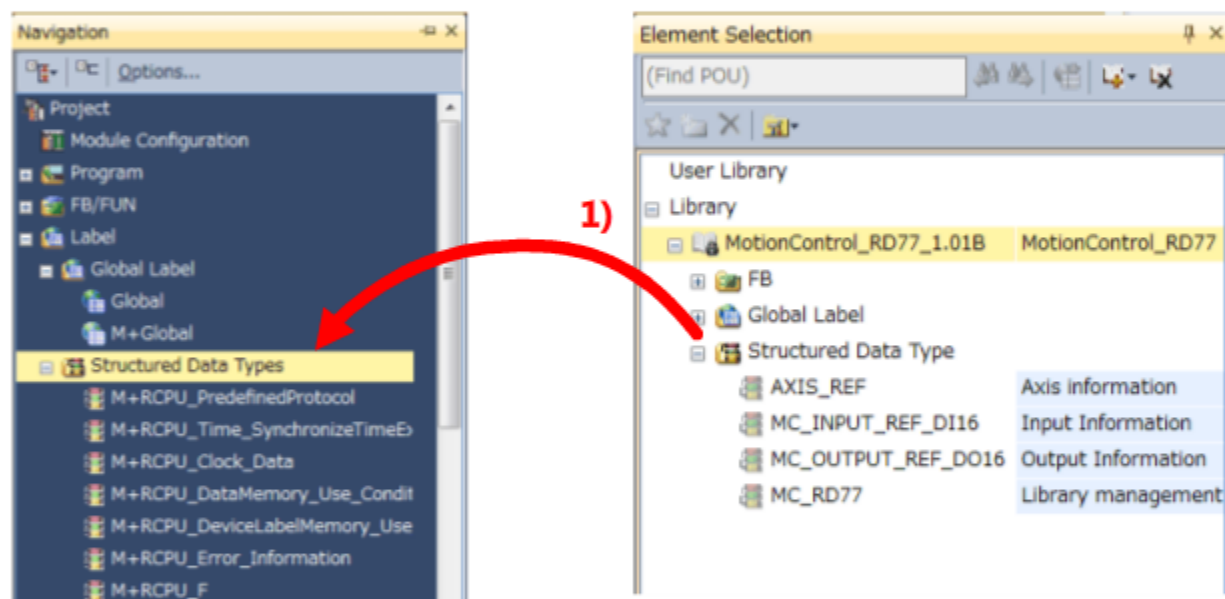
Explanation of the Sample Program

(3) Structures to be used

To use the FB, register the structured data type "AXIS_REF".

(The sample program has been registered. The following operation is not required.)

- 1) Select [Library] - [MotionControl_RD77_1.01B] - [Structured Data Type] in the Element Selection window, and drag and drop [AXIS_REF] in [Label] - [Structured Data Types] of the Navigation tree.
- 2) Double-click [Label] - [Global Label] - [Global] of the Navigation tree and open the Global Label Setting window. Create a structure of AXIS_REF type named "Axis1".



<Filter> Easy Display Display Setting Check

2)

	Label Name	Data Type		Class	Assign (Device/Label)	Initial Value
1	Axis1	AXIS_REF	...	VAR_GLOBAL	Detailed Setting	
2	IGOT_Distance	FLOAT [Double Precision]	...	VAR_GLOBAL	D1 00	0
3	IGOT_Velocity	FLOAT [Double Precision]	...	VAR_GLOBAL	D1 04	0
4	IGOT_Acceleration	FLOAT [Double Precision]	...	VAR_GLOBAL	D1 08	0

4.4

Explanation of the Sample Program

(4) Inter-module synchronous interrupt program (I44)

The inter-module synchronization is enabled in the sample program. Thus, the inter-module synchronous interrupt program (I44) is required.

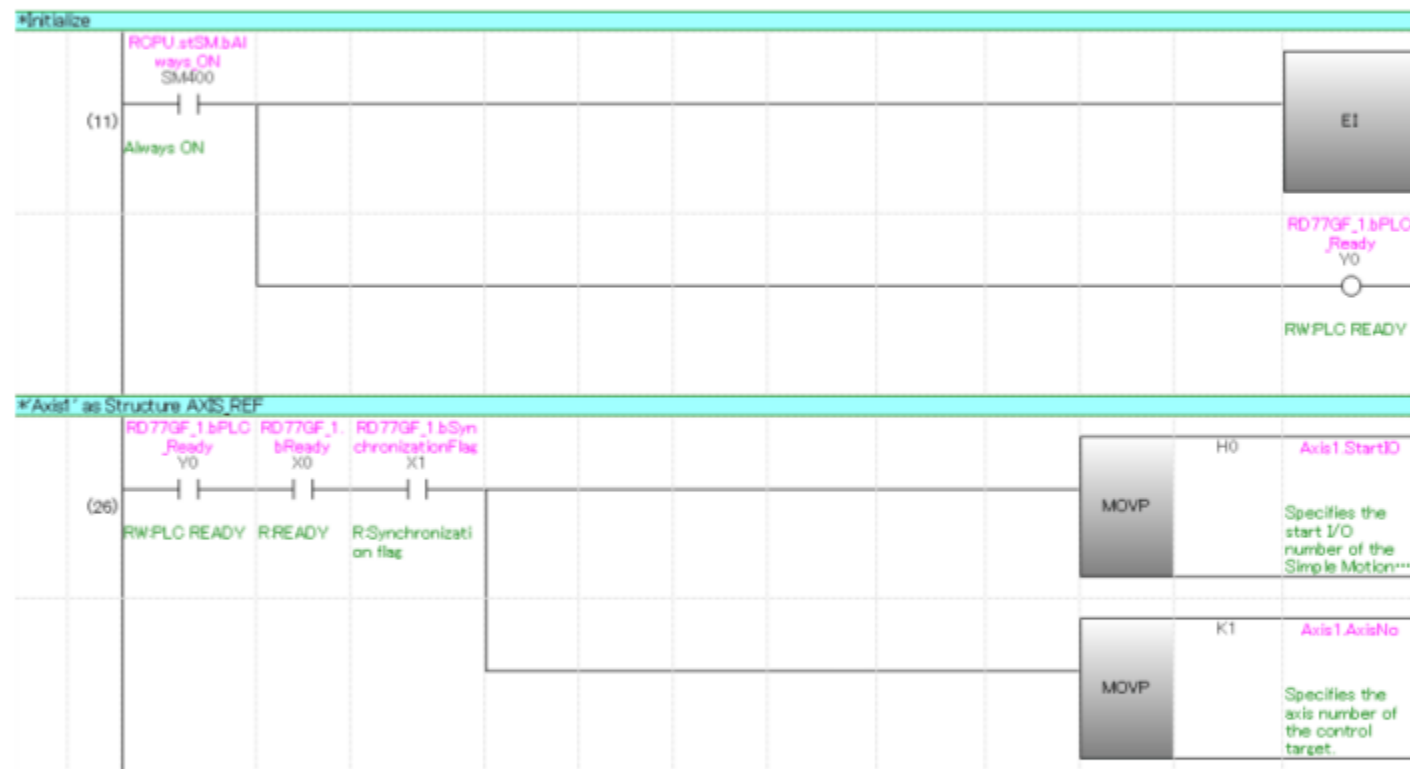


4.4

Explanation of the Sample Program

(5) Initial setting

When the Simple Motion module starts normally after PLC_READY (RD77GF_1.bPLC_Ready) turns on, register values to the members "StartIO" and "AxisNo" of the AXIS_REF type structure "Axis1".



4.4

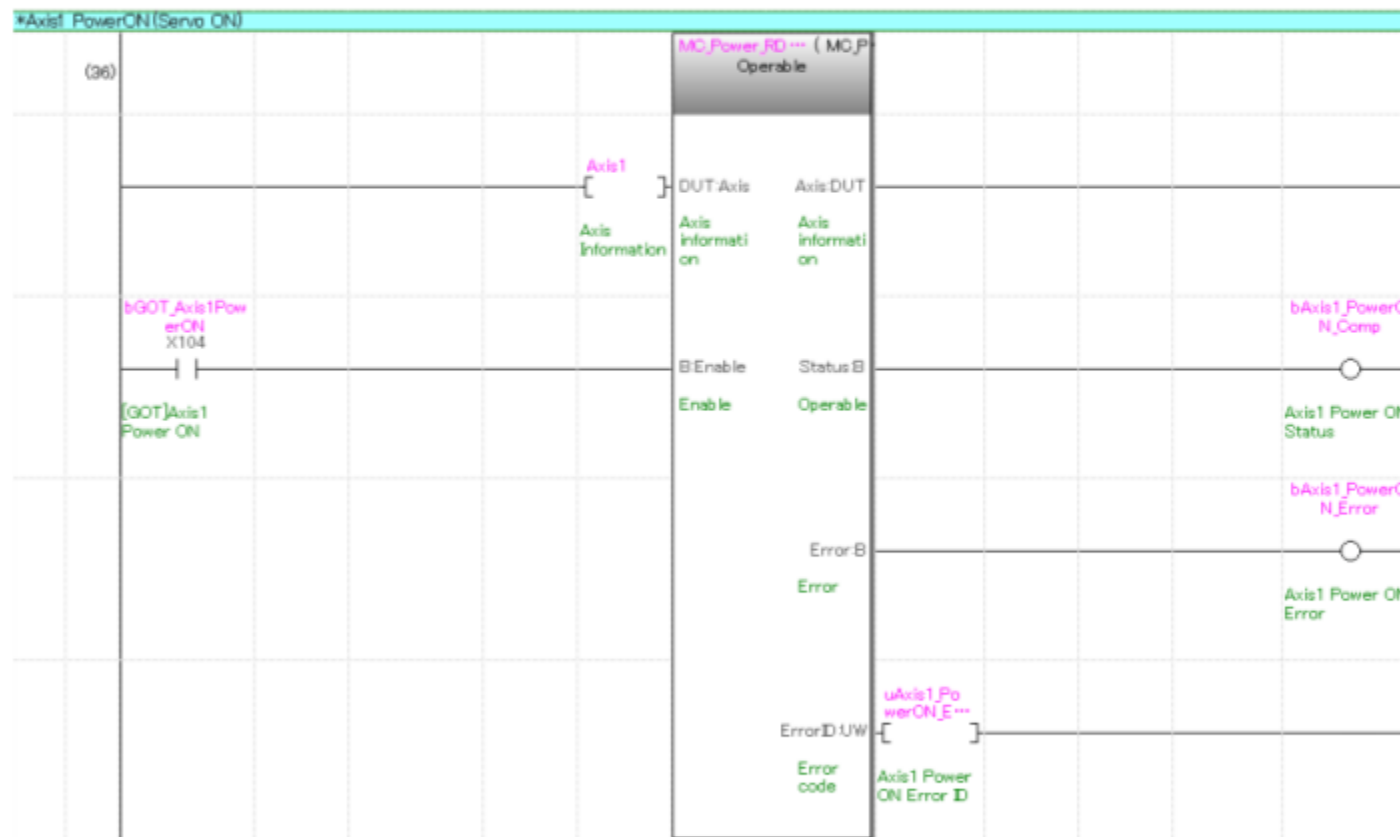
Explanation of the Sample Program

(6) Power ON (Servo ON)

Input the axis information and the enable signal in the FB.

Input the structure "Axis1" to the axis information and Power ON button of the GOT to the enable signal.

If the program operates properly, Status output (bAxis1_PowerON_Comp) of the FB will turn on and the servo motor will be in the servo-on status.



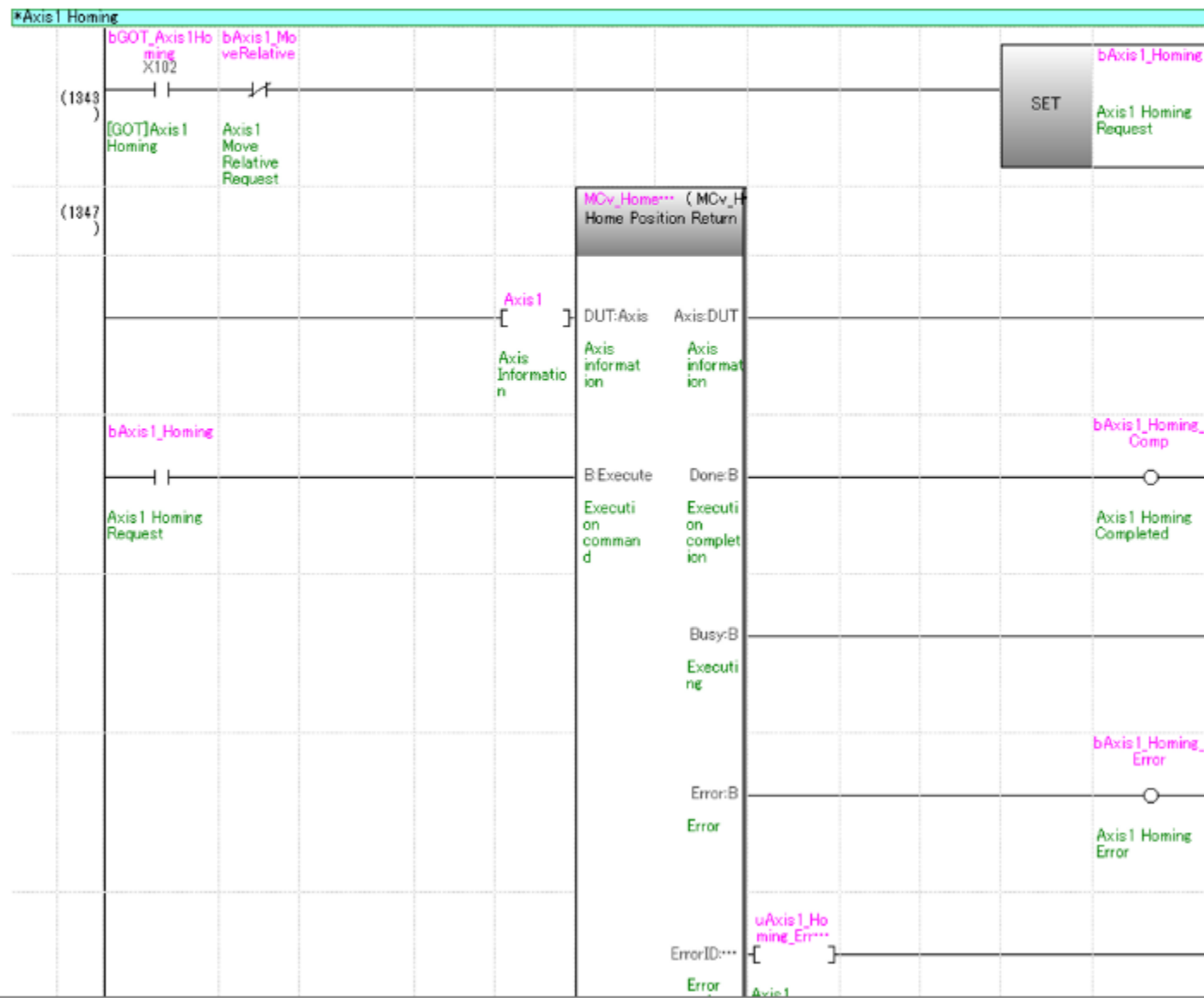
4.4

Explanation of the Sample Program

1/2

(7) Homing (Home position return)

Perform the home position return before positioning control.

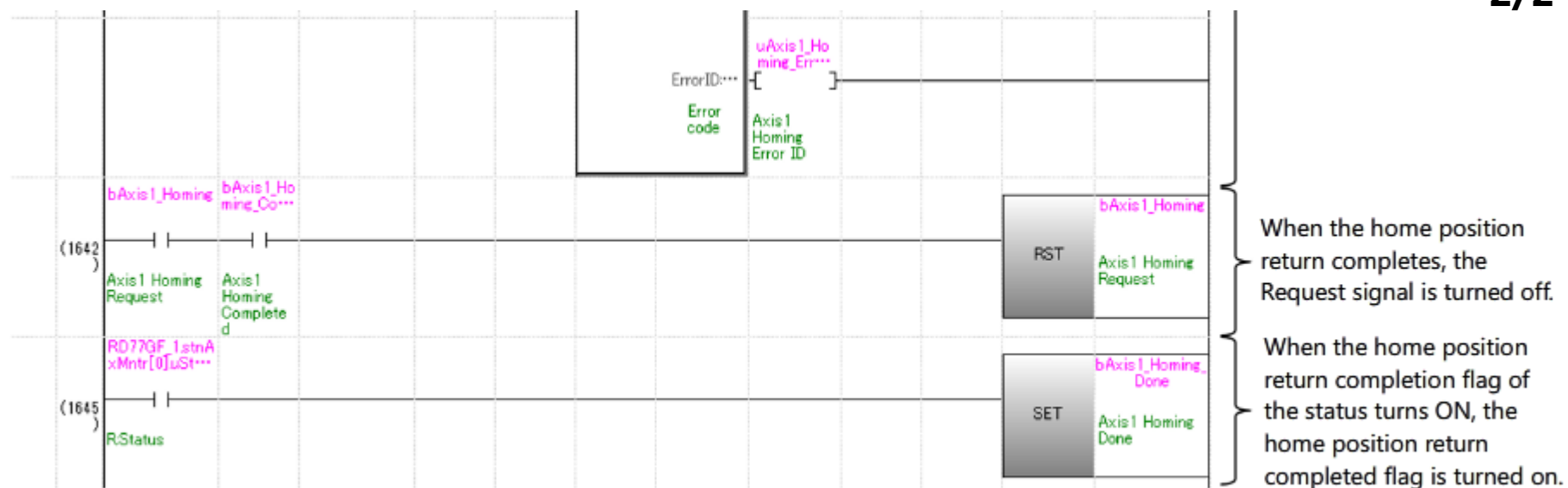


When the home position return button of the GOT is touched, the Request signal (bAxis1_Homing) turns on. The home position return and positioning are prevented from starting at the same time.

Execute the FB. When the home position return completes, Done (bAxis1_Homing_Comp) of the FB is turned on.

4.4

Explanation of the Sample Program



4.4

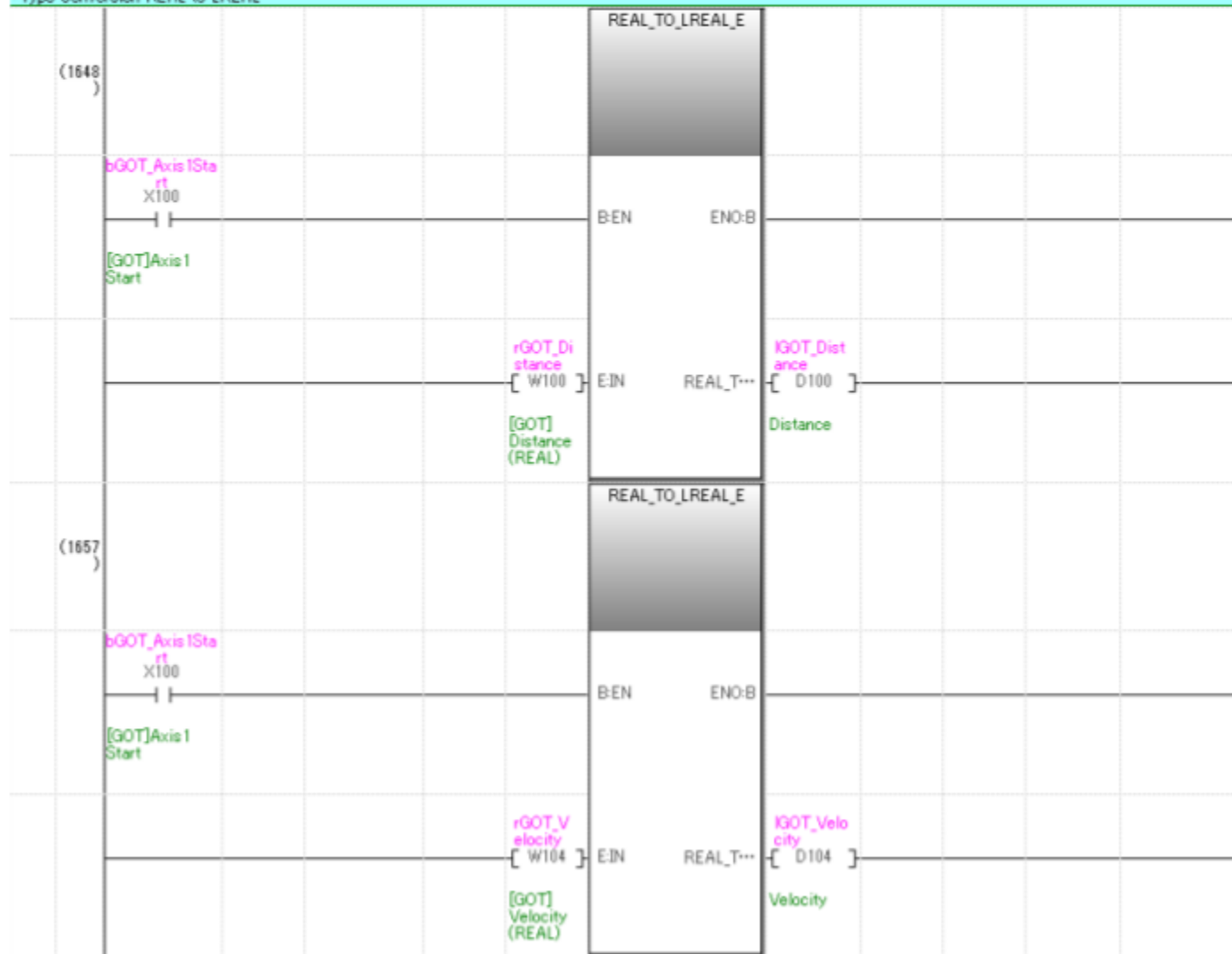
Explanation of the Sample Program

(8) Move Relative (Relative positioning)

Perform the positioning operation with the relative position specification.

Since the movement distance and speed input with the GOT are the REAL type values (single-precision real number), convert them into the LREAL type (double-precision real number). When GOT is not used, this program is not required.

*Type Conversion REAL to LREAL



The input value of GOT movement distance (RWr100) is converted into the double-precision real number type.

The input value of GOT movement speed (RWr104) is converted into the double-precision real number type.

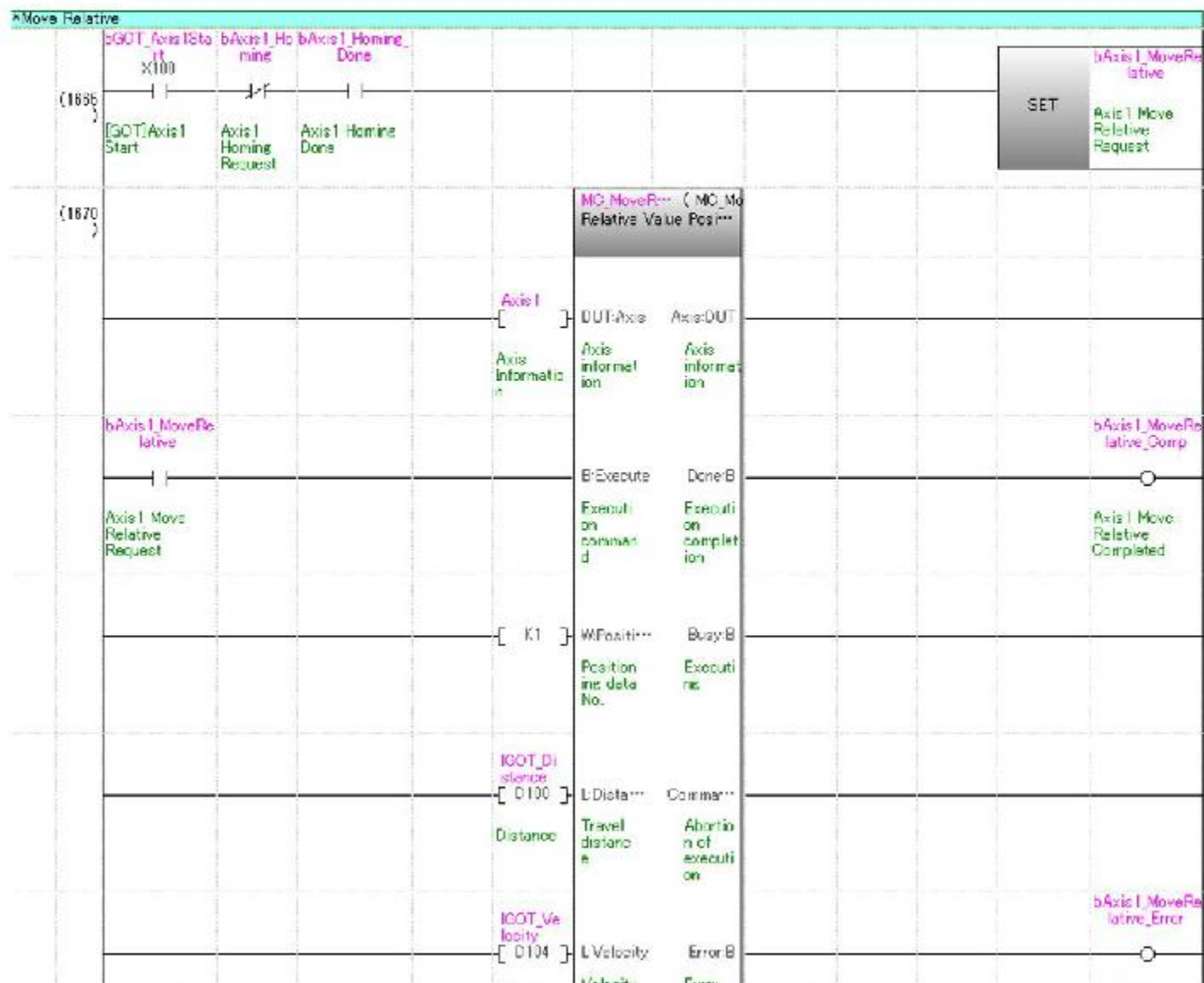
4.4

Explanation of the Sample Program

1/2

(8) Move Relative (Relative positioning)

Execute the FB.



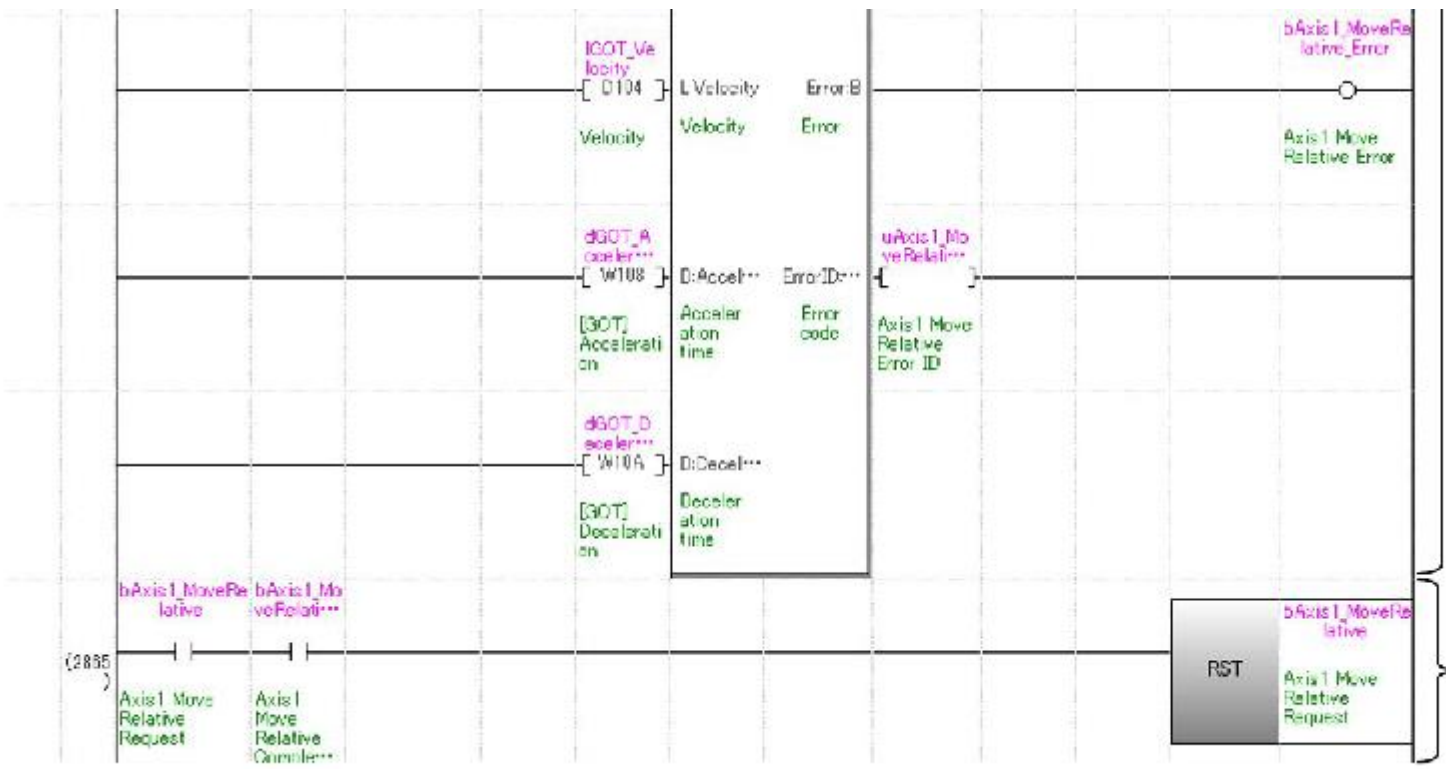
When the positioning start button of the GOT is touched, the Request signal (`bAxis1_MoveRelative`) is turned on.

The home position return and positioning are prevented from starting at the same time.

When Homing Done is off (home position return is not performed), Request does not turn on.

Execute the FB.
When the positioning completes, Done (`bAxis1_MoveRelative_Comp`) of the FB is turned on.

4.4 Explanation of the Sample Program



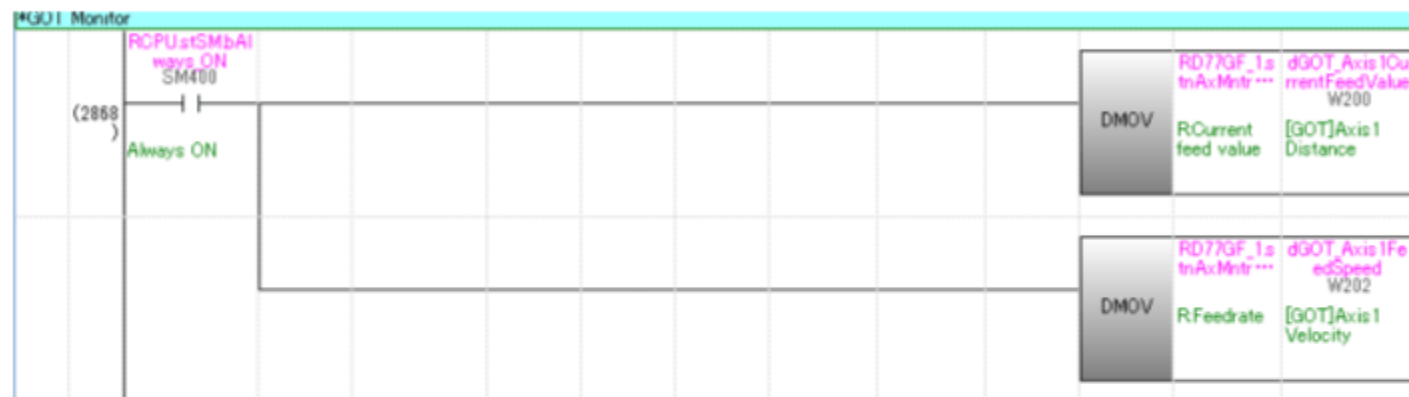
When the positioning completes, the Request signal is turned off.

4.4

Explanation of the Sample Program

(9) GOT monitoring program

This program is used to display the feed current value and feed speed on the GOT.
When GOT is not used, this program is not required.



The buffer values of the feed current value and the feed speed are written in RWw100 and RWw102.

4.5

Parameter Settings of the Servo Amplifier

Basically set the parameters of the servo amplifier in the same way as described in the section 2.13. This section describes the settings that are different from the section 2.13.

(1) Setting the external I/O signal

In the system of this chapter, the external circuit such as proximity dog is connected to the servo amplifier. Configure the settings as follows.

- 1) Set [Servo forced stop selection] to "Enabled (Use forced stop input EM1 or EM2)".
- 2) Set the parameter PD41 to "0100".

Common - Basic

Rotation direction(*POL)
Rotation direction selection
CCW dir. during fwd. pls. input, CW dir. during rev. pls. input

Encoder output pulse(*ENRS, *ENR, *ENR2)
Encoder output pulse phase
Advance A-phase 90° by CCW Phase Setting

Number of encoder output pulse
4000 pulse
Encoder Output Pulse

Zero speed(ZSP)
Zero speed 50 r/min (0-10000)

I/O

No.	Abbr.	Name	Unit	Setting range	Axis1
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	TPK1	For manufacturer setting		-32768-32767	0
PD41	*DOP4	Function selection D-4		0000-1100	0100
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) Home position return method

Set the home position return method with parameters of the servo amplifier.

Set [Home position return method] to "CiA402" in the system of this chapter. For details, refer to the MR-J4-GF SERVO AMPLIFIER INSTRUCTION MANUAL.

In this example, use Method6 of CiA402Homing Method.

Positioning - Home position return

Home position return method(HMM)

Method selection
 CiA 402 Manufacturer-specific

Home position return method
 Method 6

Home position return direction
 Address decreasing direction

Detailed setting of home position return

Home position return speed
 100.00

Proximity dog input polarity
 Detect dog with OFF

Stopper time
 100 ms (5-1000)

Torque limit value
 15.0 % (0.1-100.0)

When "CiA402" is set, the home position return direction is not set here.

Set the polarity of the proximity dog switch.

[COLUMN] Home position return methods of CiA402 mode


The CiA402 drive profile is a device profile for the drive and motion control, which is defined in IEC 61800-7-201 and IEC 61800-7-301. The search method and reference point of the home position are determined as Homing Method in the CiA402. In Method6, 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 the MR-J4-GF SERVO AMPLIFIER INSTRUCTION MANUAL.

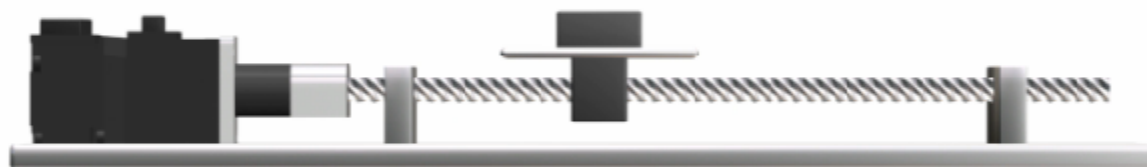
4.6

Operation Check of the Sample Program



< GOT >

rGOT_Distance (RWr100)	-150.0000mm	udGOT_Acceleration (RWr108)	100msec	bGOT_Axis1Start (RX100)
rGOT_Verocity (RWr104)	2000.00mm/min	udGOT_Deceleration (RWr10A)	100msec	
Feed current value (RWw100)	0.0000mm	Feedrate (RWw102)	0.00mm/min	



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



4.7**Summary of This Chapter**

In this chapter, you have learned:

- Downloading the FB Library and Sample Program
- Registering the FB Library
- System Configuration
- Explanation of the Sample Program
- Parameter Settings of the Servo Amplifier
- Operation Check of the Sample Program

Important points

Registering the FB Library	<ul style="list-style-type: none">• When the FB library is registered, a list of FBs is displayed in the Library tag in the Element Selection window.
Explanation of the Sample Program	<ul style="list-style-type: none">• When setting Home position return method to CiA402 Mode, set the actual home position return method with the parameters of the servo amplifier.• Define the AXIS_REF_RD77 type structure.• The standardized inputs in the Motion Control FB of PLCopen can reduce the engineering costs.

Now that you have completed all of the lessons of the **MELSEC iQ-R Series Simple Motion Module (CC-Link IE Field Network)** 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.

Select all the correct statements about the servo system which uses the CC-Link IE Field Network. (Multiple selection available)

- CC-Link IE Field Network uses the optical cable with noise resistance.
- CC-Link IE Field Network allows the remote input module and servo amplifier to be connected on the same network.
- The servo amplifier MR-J4-GF compatible with CC-Link IE Field Network has two modes: Motion mode and I/O mode.

[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 the window where the parameters and positioning data of the RD77GF are set from the (2) in the Navigation tree of GX Works3.
- Adjust the fixed scan interval depending on the number of stations and (3) type to be used.

Term

- | | |
|----------------------------------|------------------------------|
| (1) 1: Profile | 2: Module label |
| (2) 1: Module parameter (motion) | 2: Module extended parameter |
| (3) 1: Master station | 2: Remote station |

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

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
- Encoder cable communication method

[Answer](#)[Back](#)

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**Test Score**

You have completed the Final Test. Your results are 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.

You have completed the **MELSEC iQ-R Series Simple Motion Module (CC-Link IE Field Network)** 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