MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

PLCopen Motion Control Function Block Reference

PLCopen®

motion
control

CONTENTS

1 OVERVIEW

1.1 List of FB libraries

These FB libraries are used in a system in which the MELSEC iQ-R series Simple Motion modules or the CC-Link IE Field-compatible modules and MELSERVO-J4 servo amplifiers are connected.

MotionControl_RD77

This library is used with the Simple Motion module RD77GF or RD77MS.

Point

- When using the RD77GF, set "[Pr.PN03] Communication mode setting for CC-Link IE communication" of the MR-J4-GF to "0: Motion mode". Up to 32 stations can be controlled.
- Up to 16 stations can be controlled with the RD77MS.

Item	Description	Version
MC_Power+RD77	Operation possible	03D
MCv_Home+RD77	Home position return	02C
MC_Stop+RD77	Forced stop	02C
MC_MoveAbsolute+RD77	Absolute value positioning	02C
MC_MoveRelative+RD77	Relative value positioning	02C
MC_MoveAdditive+RD77	Commanded position change	02C
MC_MoveVelocity+RD77	Velocity control	02C
MC_TorqueControl+RD77	Torque control	02C
MC_SetPosition+RD77	Current position change	02C
MC_SetOverride+RD77	Override value setting	02C
MC_ReadParameter+RD77	Parameter read	03D
MC_WriteParameter+RD77	Parameter write	03D
MC_ReadActualPosition+RD77	Current position read	02C
MC_ReadActualVelocity+RD77	Current velocity read	02C
MC_ReadActualTorque+RD77	Current torque read	02C
MC_ReadStatus+RD77	Status read	02C
MC_ReadAxisInfo+RD77	Axis information read	04E
MC_ReadAxisError+RD77	Axis error read	02C
MC_Reset+RD77	Axis error reset	02C
MC_ReadDigitalInput+DI16	Digital input read	01B
MC_ReadDigitalOutput+DO16	Digital output read	01B
MC_WriteDigitalOutput+DO16	Digital output write	01B
MCv_ReadServoParameter+RD77GF	Servo parameter read	02C
MCv_WriteServoParameter+RD77GF	Servo paramerter write	03D
MCv_Jog+RD77	JOG operation	00A
MCv_Inch+RD77	Inching operation	00A

MotionControl_J4GFIO

This library is used in a system in which the CC-Link IE Field Network master module and the CC-Link IE Field Network compatible servo amplifier MR-J4-GF are connected.

> **Point**
> - For the MR-J4-GF, set "[Pr.PN03] Communication mode setting for CC-Link IE communication" to "1: I/O mode". Up to 120 stations can be controlled.
> - When the RD77GF is used, this library can be used together with MotionControl_RD77. Do not assign two or more FB libraries to one control axis.

Item	Description	Version
MC_Power+J4GFIO	Operation possible	02C
MCv_Home+J4GFIO	Home position return	02C
MC_Stop+J4GFIO	Forced stop	02C
MC_MoveAbsolute+J4GFIO	Absolute value positioning	02C
MC_MoveRelative+J4GFIO	Relative value positioning	02C
MC_ReadActualPosition+J4GFIO	Current position read	02C
MC_ReadStatus+J4GFIO	Status read	02C
MC_ReadAxisInfo+J4GFIO	Axis information read	02C
MC_ReadAxisError+J4GFIO	Axis error read	02C
MC_Reset+J4GFIO	Axis error reset	02C
MCv_ReadServoParameter+J4GFIO	Servo parameter read	02C
MCv_WriteServoParameter+J4GFIO	Servo parameter write	02C

1.2 FB Status Diagram

The following figure shows the status diagram of this FB library.

An axis is always in a defined status. A solid arrow in the status diagram figure indicates a transition caused by the start of an FB. A dashed arrow indicates a transition caused by the command end of an axis or the system.

MotionControl_RD77
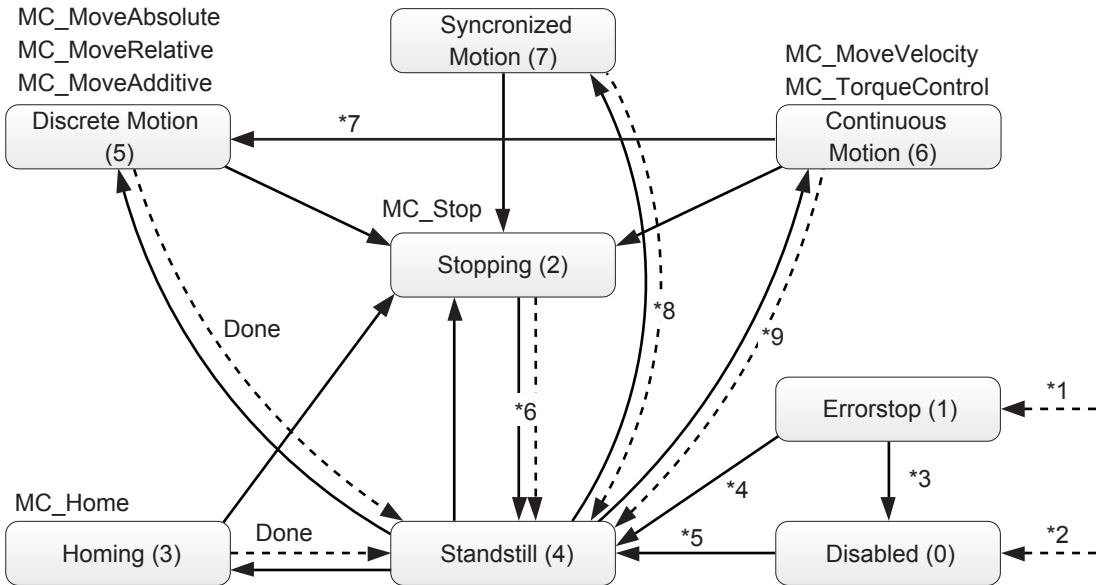
*1 When an error occurs in the axis, the status transits from any status.
*2 When Enable of MC_Power is OFF and no error has occurred in the axis
*3 When MC_Reset is executed and Status of MC_Power is OFF
*4 When MC_Reset is executed and both Enable and Status of MC_Power are ON
*5 When both Enable and Status of MC_Power are ON
*6 When Done of MC_Stop is ON and Execute of MC_Stop is OFF (except for MC_Power)
*7 When Velocity of MC_MoveVelocity is 0 or the axis has stopped because Torque of MC_TorqueControl turns 0
*8 When "[Cd.380] Synchronous control start" of the Simple Motion module is turned OFF.
*9 When "[Cd.181] Forward run JOG start" or "[Cd.182] Reverse run JOG start" of the Simple Motion module is turned OFF.

| Status	Description
Disabled	Indicates the initial status of an axis. Enable of MC_Power is OFF and no error has occurred in the axis.
ErrorStop	The status transits to this status when an error occurs. This status remains while an error has occurred.
Stopping	The status transits to this status when MC_Stop is executed. This status remains while Execute of MC_Stop is ON. "[Cd.380] Synchronous control start", "[Cd.181] Forward run JOG start" and "[Cd.182] Reverse run JOG start" do not turn OFF.
Homing	Indicates that home position return is in execution.
Standstill	Indicates that MC_Power is ON and no error has occurred in the axis.
DiscreteMotion	Indicates that the positioning control FB is in execution. The status transits to this status when MC_MoveAbsolute, MC_MoveRelative, or MC_Additive is executed.
ContinuousMotion	Indicates that the continuous control FB is in execution. The status transits to this status when MC_MoveVelocity or MC_TorqueControl is executed.
SyncronizedMotion	Indicates that the synchronous control is in execution. This FB does not use this status.

MotionControl_J4GFIO
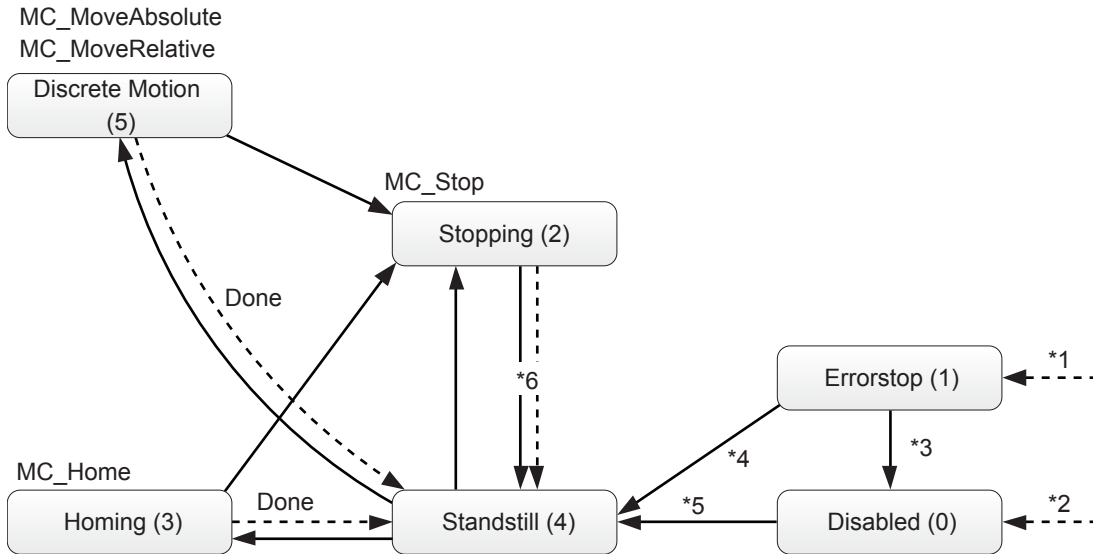
MC_MoveAbsolute
MC_MoveRelative

*1 When an error occurs in the axis, the status transits from any status.
*2 When Enable of MC_Power is OFF, and no error has occurred in the axis
*3 When MC_Reset is executed, and Status of MC_Power is OFF
*4 When MC_Reset is executed, and both Enable and Status of MC_Power are ON
*5 When both Enable and Status of MC_Power are ON
*6 When Done of MC_Stop is ON, and Execute of MC_Stop is OFF (except for MC_Power)

Status	Description
Disabled	Indicates the initial status of an axis. Enable of MC_Power is OFF and no error has occurred in the axis.
ErrorStop	The status transits to this status when an error occurs. This status remains while an error has occurred.
Stopping	The status transits to this status when MC_Stop is executed. This status remains while Execute of MC_Stop is ON.
Homing	Indicates that home position return is in execution.
Standstill	Indicates that MC_Power is ON and no error has occurred in the axis.
DiscreteMotion	Indicates that the positioning control FB is in execution. The status transits to this status when MC_MoveAbsolute or MC_MoveRelative is executed.

1 OVERVIEW
1.2 FB Status Diagram

1.3　Unit

The following table lists the units used in this FB library.

When a value whose number of decimal places exceeds the number of significant digits is input in each unit, the value is rounded off at the significant digit.

(Example) When the unit is inch and an input value of an FB is 123.456789, the value after being rounded off is 123.45679.

- MotionControl_RD77

Select mm, inch, degree, or pulse as the control unit with the parameter [Pr.1] of the Simple Motion module.

- MotionControl_J4GFIO

Select mm, inch, or pulse as the control unit with the parameter [Pr.PT01] of the servo amplifier.

FB library	MotionControl_RD77	MotionControl_J4GFIO
Control unit	mm, inch, degree, pulse	mm, inch, pulse
Positioning range	Absolute system or when the current value is changed • -214748364.8 to 214748364.7 (μm) • -21474.83648 to 21474.83647 (inch) • 0 to 359.99999 (degree) • -2147483648 to 2147483647 (pulse) Incremental system • -214748364.8 to 214748364.7 (μm) • -21474.83648 to 21474.83647 (inch) • -21474.83648 to 21474.83647 (degree) • -2147483648 to 2147483647 (pulse)	• -999.999 to 999.999 [$\times 10$^STM] (mm) • -999999 to 999999 [$\times 10$^(STM-4)] (inch) • -999999 to 999999 (pulse) (STM = Feed length multiplication [Pr.PT03])
Velocity command	Position control or JOG operation • 0.01 to 20000000.00 (mm/min) • 0.001 to 2000000.000 (inch/min) • 0.001 to 2000000.000 (degree/min)[*1] • 1 to 1000000000 (pulse/s) Velocity control • -20000000.00 to 20000000.00 (mm/min) • -2000000.000 to 2000000.000 (inch/min) • -2000000.000 to 2000000.000 (degree/min)[*1] • -1000000000 to 1000000000 (pulse/s) Torque control • 0 to 20000000.00 (mm/min) • 0 to 2000000.000 (inch/min) • 0 to 2000000.000 (degree/min)[*1] • 0 to 1000000000 (pulse/s)	0.00 to 167772.15 ([r/min] or [mm/s]) Set a value within the permissible rotation speed or permissible speed of the servo motor.
Acceleration/deceleration time	Position control • 1 to 8388608 (ms) Velocity control • 0 to 65535 (ms)	0 to 20000 [ms]

*1　When "1: Valid" is set for "[Pr.83] Speed control 10 × multiplier setting for degree axis", a detailed parameter 2 of the Simple Motion module, the velocity specification range is decupled.
Position control or JOG operation: 0.01 to 20000000.00 [degree/min]
Velocity control: -2000000.00 to 20000000.00 [degree/min]
Torque control: 0 to 20000000.00 [degree/min]

1.4 Applicable Hardware and Software/Restrictions and Precautions

MotionControl_RD77

Item	Description	
Applicable hardware and software	CPU module	MELSEC iQ-R series CPU module R**CPU
	Applicable module	MELSEC iQ-R series Simple Motion module RD77GF**, RD77MS**
	Engineering software	MELSOFT GX Works3 of version 1.056J or later

MotionControl_J4GFIO

Item	Description	
Applicable hardware and software	CPU module	MELSEC iQ-R series CPU module R**CPU, R**ENCPU
	Applicable module	CC-Link IE Field Network master/local module RJ71GF11-T2, RJ71EN71 MELSEC iQ-R series Simple Motion module RD77GF**
	Engineering software	MELSOFT GX Works3 of version 1.035M or later
	Slave unit	CC-Link IE Field Network compatible MELSERVO-J4 servo amplifier MR-J4-GF (A1 or later)

Item	Description
Restrictions and precautions	The following describes restrictions and precautions common to all FBs. The restrictions and precautions specific to each FB are separately described. Refer to ☞ Page 12 DETAILS OF THE FB LIBRARY. 1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB does not detect an alarm or a warning that has occurred in the servo amplifier. Program the processing to monitor alarms and warnings in the servo amplifiers. For the alarms and warnings that have occurred in the servo amplifiers, refer to the instruction manual of the servo amplifiers in use. 3) The FB cannot be used in an interrupt program. 4) Please ensure that an execution command (Execute or Enable) can be turned OFF with a program. Do not use this FB in programs that are only executed once, such as a subroutine program and FOR-NEXT loop because an execution command (Execute or Enable) cannot be turned OFF in these programs. 5) When two or more FBs are used, be careful not to repeatedly specify and simultaneously start an axis. 6) Set a circuit for each input label in an FB. 7) When an execution command (Execute or Enable) is turned ON, the FB reads data of the input label. Thus, set the input label before turning ON an execution command (Execute or Enable). 8) Do not change the values of other input labels after turning ON an execution command (Execute or Enable). For some FBs such as the one whose operation type is real-time execution, however, input labels can be changed even after an execution command (Execute or Enable) is turned ON. For details, refer to ☞ Page 12 DETAILS OF THE FB LIBRARY. 9) MotionControl_RD77 can control 32 slave stations (axes) with the RD77GF or 16 stations (axes) with the RD77MS. MotionControl_J4GFIO can control 1 to 120 stations. Set a station number of the servo amplifier within the setting range. 10) The number of FB steps in a program varies depending on the CPU model to be used and I/O definitions. 11) This FB uses index registers Z8 to Z9. Do not use these index registers in an interrupt program. 12) When turning OFF an execution command (Execute) of the positioning control FB to abort the FB after turning it ON, be sure to turn it OFF while Busy is ON. 13) MotionControl_J4GFIO accesses the servo parameter groups PA, PD, and PT. Before using FBs, set [Pr.PA19] of the servo amplifier to "00ABh". 14) MotionControl_J4GFIO accesses link devices. Before accessing the link devices with user-created programs, turn ON LinkDeviceUse of the AXIS_REF_J4GFIO structure and check that LinkDeviceAccessible of the same structure turns ON. 15) MotionControl_J4GFIO operates with the point table No. input method. 16) A duplicated coil warning may occur during compilation. However, the warning does not generate any problems. 17) When using the macro type and subroutine type together in a program, use firmware version "26" or later of the R**CPU or R**ENCPU. 18) When using a subroutine type FB in a ladder program, connect the I/O label to the input and output sides of the FB. 19) When the test operation of the engineering tool is executed, the module does not accept the command from the CPU module, and the FB does not operate as intended. After the test operation, reset the CPU module, and then operate the program.

1.5 FB Operation

There are two FB operation types: Pulsed execution type and real-time execution type.

This FB library operates in the pulsed execution type (multiple scan type).

Operation type		Description
Pulsed execution type	One scan execution type	There are two pulsed execution types: One scan execution type which completes in one scan after the start of an FB, and multiple scan execution type which processes over multiple scans. The FB is executed when an execution command (Execute or Enable) turns ON, and normal completion or error completion turns ON when the FB execution is completed. When an execution completion (normal completion or error completion) turns ON, no processing is performed in the FB even if the execution command is ON. Changes in the input label data under this condition are not reflected to the FB processing. Hold the execution command until the normal completion or error completion turns ON. If the execution command is turned OFF before the normal completion or error completion turns ON, the FB aborts and ends the processing with the normal completion and error completion being OFF.
	Multiple scan execution type	
Real-time execution type		The FB is executed when an execution command turns ON, and normal completion or error completion turns ON when the FB execution is completed. Even if the execution completion (normal completion) turns ON, a processing is performed in the FB when the execution command is ON. Changes in the input label data under this condition are reflected to the FB processing. When the execution completion (error completion) turns ON, the processing is aborted.

1.6 System Configuration Example

Configuration example with RD77GF

Applicable library: MotionControl_RD77, MotionControl_J4GFIO

CC-Link IE Field
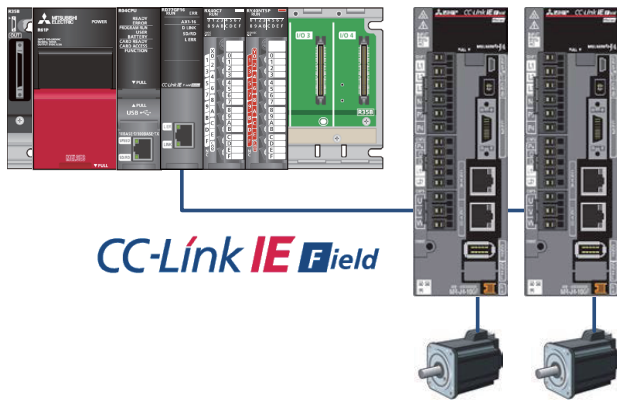
Configuration example with RD77MS

Applicable library: MotionControl_RD77

SSCNET III/H
SERVO SYSTEM CONTROLLER NETWORK
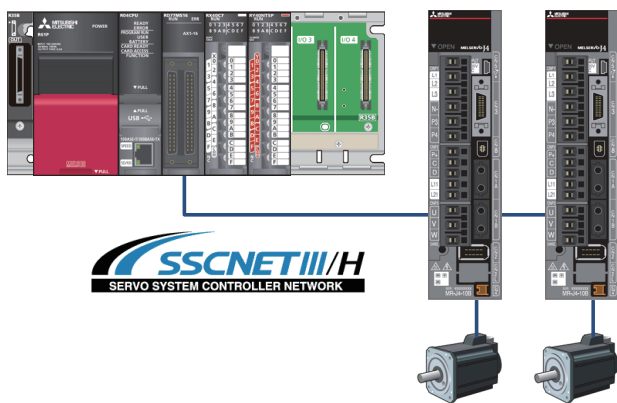
Configuration example with RnCPU + RJ71EN71, RnCPU + RJ71GF11-T2, or RnENCPU

Applicable library: MotionControl_J4GFIO

CC-Link IE Field

1.7 Relevant Manuals

1.8 Notes

This manual describes functions of the function blocks.

This manual does not include the information on restrictions for using modules, PLC CPUs, and the combination of the both.

Please read the user's manuals of the products before using them.

Please note the followings and use the FBs described in this manual.

- When using the FBs in an actual system, confirm that the FBs do not cause system control problems.
- Consider the locations where interlock conditions are required in the system and insert interlock conditions.
- Mitsubishi Electric Corporation will not compensate any damages caused by the FBs.
- Contents may be deleted or changed without prior notice.

2 DETAILS OF THE FB LIBRARY

2.1 MC_Power (Operation Possible)

Name

MC_Power+RD77

MC_Power+J4GFIO

Overview

Item	Description
Function overview	Switches the status of the servo amplifier of the specified axis to Operable.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_Power _RD77 (Axis, Enable, Status, Error, ErrorID) MC_Power_J4GFIO (Axis, Enable, Status, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)
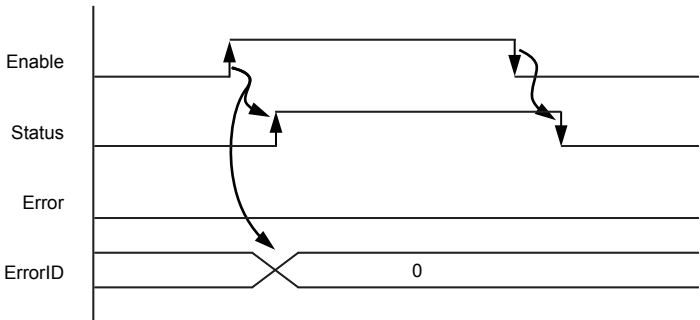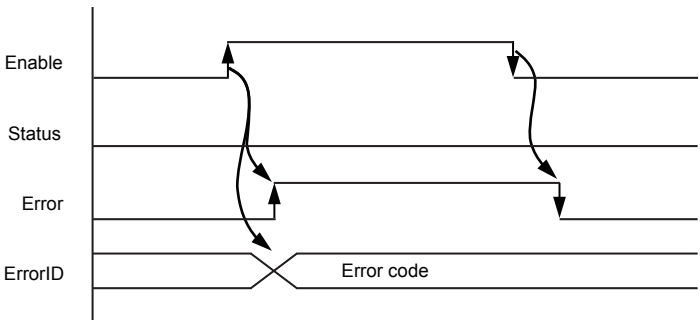
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	While Enable is ON, the axis control is valid.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Status	Operable	Bit	OFF	It indicates that the servo amplifier is ready for operation.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_Power+RD77	RD77GF, RD77MS
		MC_Power+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU	MELSEC iQ-R series CPU	
	Applicable engineering tool	GX Works3	
Language	Structured Text		
Number of basic steps	MC_Power+RD77	1346 steps	
	MC_Power+J4GFIO	2778 steps	
Function description	This FB initializes the information of a selected axis and switches the axis status to Operable. When Enable turns ON, the FB initializes the information of the specified axis. Always use this FB when using the FBs described in this manual. For MotionControl_RD77, when the power is turned ON and the CPU module status is switched from STOP to RUN, the display of the servo amplifier changes to "c**". For MotionControl_J4GFIO, when the power is turned ON, the display of the servo amplifier changes to "c**". While Enable is ON, the selected axis is in the servo ON status. The display of the servo amplifier changes to "d**" and Status turns ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING. The axis status (AxisStatus) of the AXIS_REF structure transits from Disabled to Standstill. When the power of the servo amplifier is shut off, the axis status (AxisStatus) transits to ErrorStop. For the axis status (AxisStatus), refer to ☞ Page 5 FB Status Diagram.		
Restrictions and precautions	<When MotionControl_RD77 is used> • Before executing this FB, set the axis number (AxisNo) and the start I/O number (StartIO) of the AXIS_REF structure. <When MotionControl_J4GFIO is used> • When an error has occurred in this FB, no axis is controllable. Errors will occur in other FBs and the FBs will not function. • Before executing this FB, set the axis number (AxisNo), the start I/O number of the module (StartIO), the master module (MasterModule), the structure array element number (RemoteRegArrayNo), and the transmission delay time (WaitTime) of the AXIS_REF structure.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2.2 MCv_Home (Home Position Return)

Name

MCv_Home+RD77

MCv_Home+J4GFIO

Overview

Item	Description
Function overview	Executes the home position return of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MCv_Home_RD77 (Axis, Execute, Done, Busy, Error, ErrorID) MCv_Home_J4GFIO (Axis, Execute, Done, Busy, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Done	Execution completion	Bit	OFF	It indicates that the home position return is completed.
(4)	Busy	Executing	Bit	OFF	It indicates that the home position return is in execution.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MCv_Home+RD77	RD77GF, RD77MS
		MCv_Home+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MCv_Home+RD77		299 steps
	MCv_Home+J4GFIO		644 steps
Function description	This FB executes home position return of the specified axis based on the set home position return parameters. This FB is executed when Execute turns ON. Busy is ON during home position return. When the processing is normally completed, Done turns ON and Busy turns OFF. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING. Axis status (AxisStatus) of the AXIS_REF structure: When the FB is started with the axis in the Standstill status, the status changes to Standstill when the processing is completed.		
Restrictions and precautions	Set home position parameters with an engineering tool in advance. <When MotionControl_J4GFIO is used> When the update of the slave device status is delayed due to the transmission delay, the completion of the previous movement may be acquired depending on the timing of the FB status check. Adjust the transmission delay time (WaitTime) of the AXIS_REF structure according to the usage environment.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs]		

2.3   MC_Stop (Forced Stop)

Name

MC_Stop+RD77

MC_Stop+J4GFIO

Overview

Item	Description
Function overview	Stops the specified axis.

Symbol
[Structured Ladder]
	
	MC_Stop+RD77
	
	(1) — DUT: Axis Axis :DUT — (1)
	(2) — B: Execute Done :B — (3)
	                              Busy :B — (4)
	                              Error :B — (5)
	                              ErrorID :UW — (6)
	
	MC_Stop+J4GFIO
	
	(1) — DUT: Axis Axis :DUT — (1)
	(2) — B: Execute Done :B — (3)
	                              Busy :B — (4)
	                              Error :B — (5)
	                              ErrorID :UW — (6)

Symbol [Structured Text]	MC_Stop_RD77 (Axis, Execute, Done, Busy, Error, ErrorID) MC_Stop_J4GFIO (Axis, Execute, Done, Busy, Error, ErrorID)

Labels

■I/O label

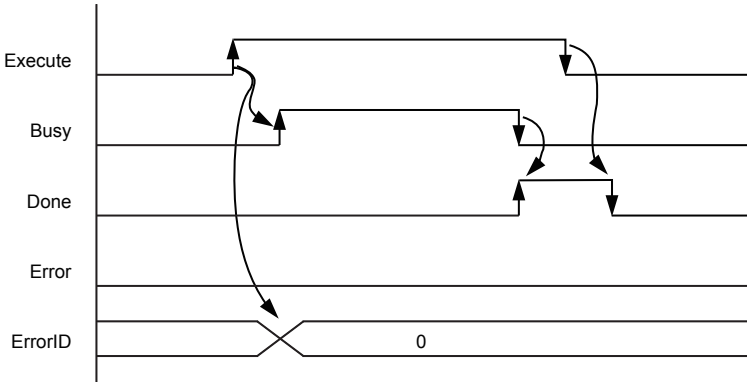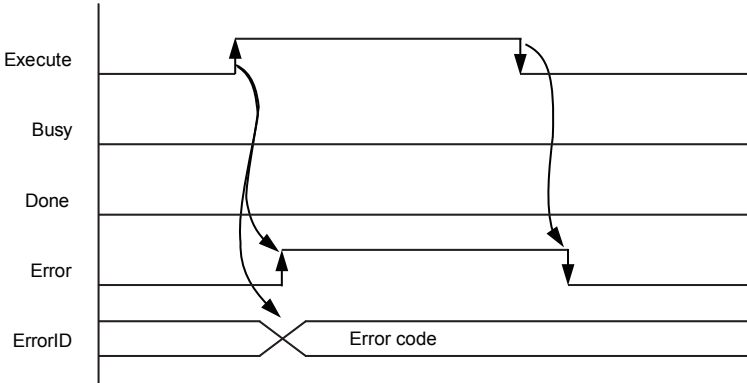| No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)
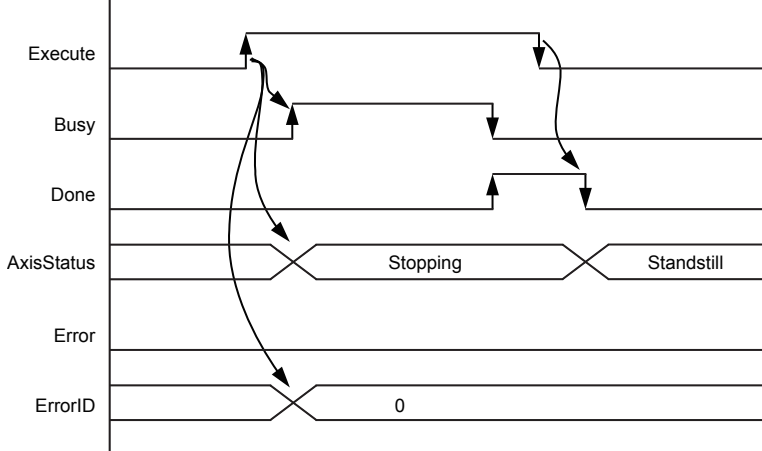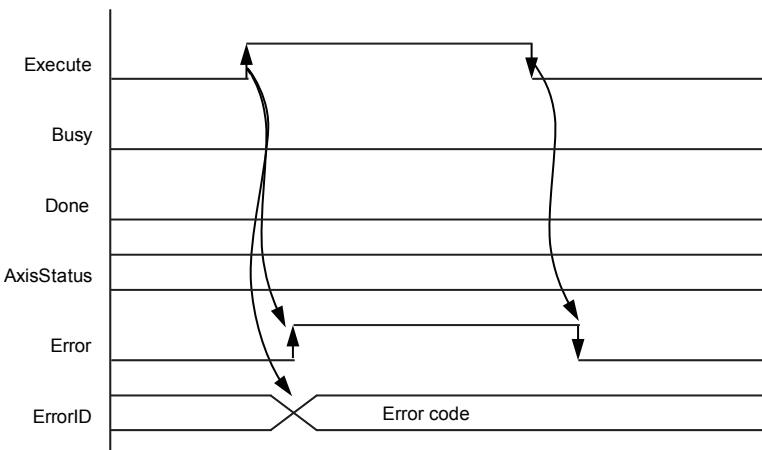
■Input labels (Load: ∏: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Done	Execution completion	Bit	OFF	It indicates that the velocity has reached 0.
(4)	Busy	Executing	Bit	OFF	It indicates that the velocity is decreasing to 0.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_Stop+RD77	RD77GF, RD77MS
		MC_Stop+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_Stop+RD77		207 steps
	MC_Stop+J4GFIO		286 steps
Function description	This FB stops the control of the specified axis and changes the axis status to Stopping. This FB aborts the motion FBs in execution. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. Done turns ON when the processing is completed and the axis stops. Other FBs cannot be executed until the axis velocity reaches 0. The axis status (AxisStatus) of the AXIS_REF structure transits to Stopping. While Execute is ON or the velocity has not reached 0, the Stopping status remains. The axis status transits to Standstill when Done turns ON and Execute turns OFF. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_RD77 is used> • The deceleration time specified by the positioning control FB and the continuous control FB in execution is applied to the deceleration time to stop. In the torque control, this FB instantly stops the control of the specified axis. • When the continuous control FB is being executed, the control mode turns to the position control mode after being stopped. <When MotionControl_J4GFIO is used> • The deceleration time specified by the positioning control FB in execution is applied to the deceleration time to stop.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2.4 MC_MoveAbsolute (Absolute Value Positioning)

Name

MC_MoveAbsolute+RD77

MC_MoveAbsolute+J4GFIO

Overview

Item	Description
Function overview	Specifies the commanded absolute position of the specified axis and executes positioning.
Symbol [Structured Ladder]	

MC_MoveAbsolute+RD77

	Input		Output	
(1)	DUT: Axis	Axis :DUT	(1)
(2)	B: Execute	Done :B	(9)
(3)	W: PositionDataNo	Busy :B	(10)
(4)	L: Position	CommandAborted :B	(11)
(5)	L: Velocity	Error :B	(12)
(6)	D: Acceleration	ErrorID :UW	(13)
(7)	D: Deceleration		
(8)	W: Direction		

MC_MoveAbsolute+J4GFIO

	Input		Output	
(1)	DUT: Axis	Axis :DUT	(1)
(2)	B: Execute	Done :B	(9)
(3)	W: PositionDataNo	Busy :B	(10)
(4)	L: Position	CommandAborted :B	(11)
(5)	L: Velocity	Error :B	(12)
(6)	D: Acceleration	ErrorID :UW	(13)
(7)	D: Deceleration		
(8)	W: Direction		

Symbol [Structured Text]	MC_MoveAbsolute_RD77 (Axis, Execute, PositionDataNo, Position, Velocity, Acceleration, Deceleration, Direction, Done, Busy, CommnadAborted, Error, ErrorID) MC_MoveAbsolute_J4GFIO (Axis, Execute, PositionDataNo, Position, Velocity, Acceleration, Deceleration, Direction, Done, Busy, CommnadAborted, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

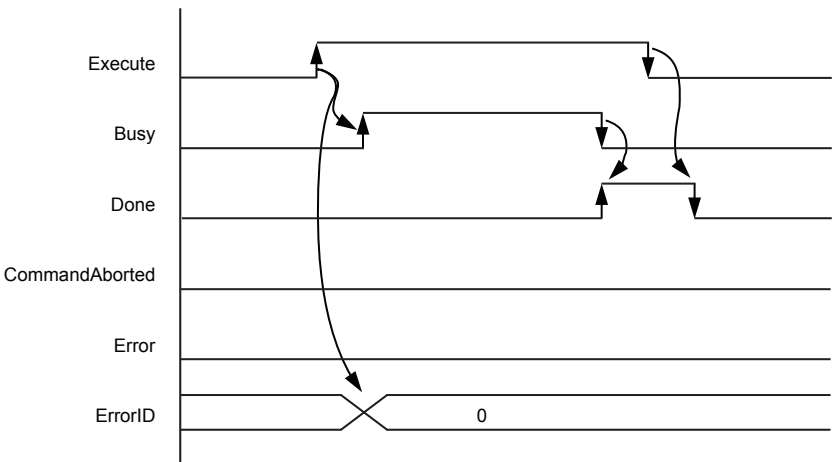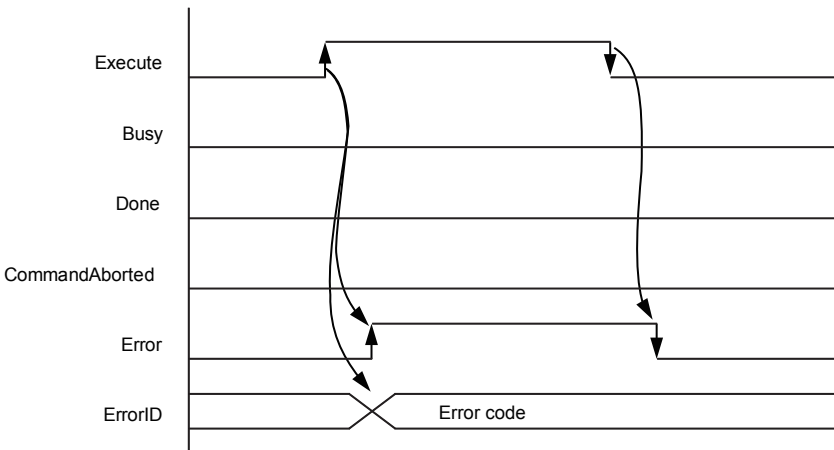### ■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	PositionDataNo	Positioning data No.	Word [signed]	↑	1 to 100	<MotionControl_RD77> Specify the positioning data No. to store positioning data. <MotionControl_J4GFIO> Specify the point table No. to store positioning data.
(4)	Position	Commanded position	Double-precision real number	↑	☞ Positioning range on Page 7 Unit	Set the commanded absolute position.
(5)	Velocity	Velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Set the velocity command value for positioning.
(6)	Acceleration	Acceleration time	Double word [signed]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	<MotionControl_RD77> Set the time taken for the velocity to change from 0 to the velocity limit value. <MotionControl_J4GFIO> Set the time taken for the servo motor to reach the rated rotation velocity.
(7)	Deceleration	Deceleration time	Double word [signed]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	<MotionControl_RD77> Set the time taken for the velocity to change from the velocity limit value to 0. <MotionControl_J4GFIO> Set the time taken for the servo motor to stop from the rated rotation velocity.
(8)	Direction	Rotation direction	Word [signed]	↑	1, 2, 3	<MotionControl_RD77> Specify a rotation direction. MC_DIRECTION defined values can be used. Select one of the following three values. • mcPositiveDirection positive direction (1) • mcNegativeDirection negative direction (2) • mcShortestWay shortest path (3) <MotionControl_J4GFIO> Any setting value is ignored.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(9)	Done	Execution completion	Bit	OFF	It indicates that the commanded axis has reached the commanded position.
(10)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(11)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(12)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(13)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_MoveAbsolute+RD77	RD77GF, RD77MS
		MC_MoveAbsolute+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_MoveAbsolute+RD77		1467 steps
	MC_MoveAbsolute+J4GFIO		989 steps
Function description	This FB executes positioning of the specified axis to the set absolute position. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the processing is completed and positioning of the axis is completed, Done turns ON. When one path to the commanded position is determined, the Direction input is ignored. The axis status (AxisStatus) of the AXIS_REF structure during positioning control is DiscreteMotion. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_RD77 is used> • When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • This library uses positioning data of one point. Set the positioning data No. used in this library (No. not used in other programs). • When positioning motion FBs are used in combination, the operation of the FB that is executed later is the operation of the commanded position change function. When the accumulative travel distance from the position where the first FB was executed is larger than 2147483647 or smaller than -2147483648, an error occurs. • When an execution command (Execute) of FB was turned ON while "[Cd.183] Execution prohibition flag" of the Simple Motion module was ON, turn OFF the flag while the execution command is ON to start the positioning control. If the execution command is turned OFF before the flag OFF, the positioning control cannot be cancelled just by turning OFF the execution command because FB has been accepted to start. Use MC_Stop to cancel the positioning control. • When positioning control completes in a time that is shorter than the scan time of the PLC due to slight movements or other factors, set the operation cycle of the simple Motion module to a time that is longer than the scan time of the PLC. <When MotionControl_J4GFIO is used> • This library uses one point of a point table. Set a point table No. used in this library (No. not used in other programs). • For an axis on which this FB is in execution, another MC_MoveAbsolute or MC_MoveRelative cannot be executed. Doing so causes an error for the FB executed later, and the FB in execution continues the operation. • If the FB has been completed in the status where Error is ON and ErrorID is 1300h by a warning, clearing the warning will clear ErrorID to zero. • The setting of the input label "Direction" is ignored. • When the update of the slave device status is delayed due to the transmission delay, the completion of the previous movement may be acquired depending on the timing of the FB status check. Adjust the transmission delay time (WaitTime) of the AXIS_REF structure according to the usage environment.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		

Item	Description
Timing chart	[When the FB is normally completed] Execute Busy Done CommandAborted Error ErrorID 0 [When an error occurs] Execute Busy Done CommandAborted Error ErrorID Error code

2.5   MC_MoveRelative (Relative Value Positioning)

Name

MC_MoveRelative+RD77

MC_MoveRelative+J4GFIO

Overview

Item	Description
Function overview	Moves an axis for the specified distance from the current position.
Symbol [Structured Ladder]	<table><tr><td colspan="2" align="center">MC_MoveRelative+RD77</td></tr><tr><td>(1) — DUT: Axis</td><td>Axis :DUT — (1)</td></tr><tr><td>(2) — B: Execute</td><td>Done :B — (8)</td></tr><tr><td>(3) — W: PositionDataNo</td><td>Busy :B — (9)</td></tr><tr><td>(4) — L: Distance</td><td>CommandAborted :B — (10)</td></tr><tr><td>(5) — L: Velocity</td><td>Error :B — (11)</td></tr><tr><td>(6) — D: Acceleration</td><td>ErrorID :UW — (12)</td></tr><tr><td>(7) — D: Deceleration</td><td></td></tr></table> <table><tr><td colspan="2" align="center">MC_MoveRelative+J4GFIO</td></tr><tr><td>(1) — DUT: Axis</td><td>Axis :DUT — (1)</td></tr><tr><td>(2) — B: Execute</td><td>Done :B — (8)</td></tr><tr><td>(3) — W: PositionDataNo</td><td>Busy :B — (9)</td></tr><tr><td>(4) — L: Distance</td><td>CommandAborted :B — (10)</td></tr><tr><td>(5) — L: Velocity</td><td>Error :B — (11)</td></tr><tr><td>(6) — D: Acceleration</td><td>ErrorID :UW — (12)</td></tr><tr><td>(7) — D: Deceleration</td><td></td></tr></table>
Symbol [Structured Text]	MC_MoveRelative_RD77 (Axis, Execute, PositionDataNo, Distance, Velocity, Acceleration, Deceleration, Done, Busy, CommnadAborted, Error, ErrorID) MC_MoveRelative_J4GFIO (Axis, Execute, PositionDataNo, Distance, Velocity, Acceleration, Deceleration, Done, Busy, CommnadAborted, Error, ErrorID)

Labels

■I/O label

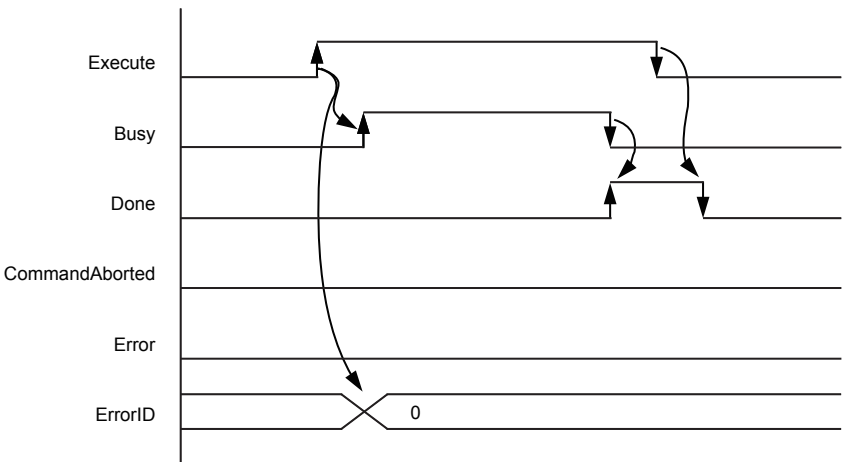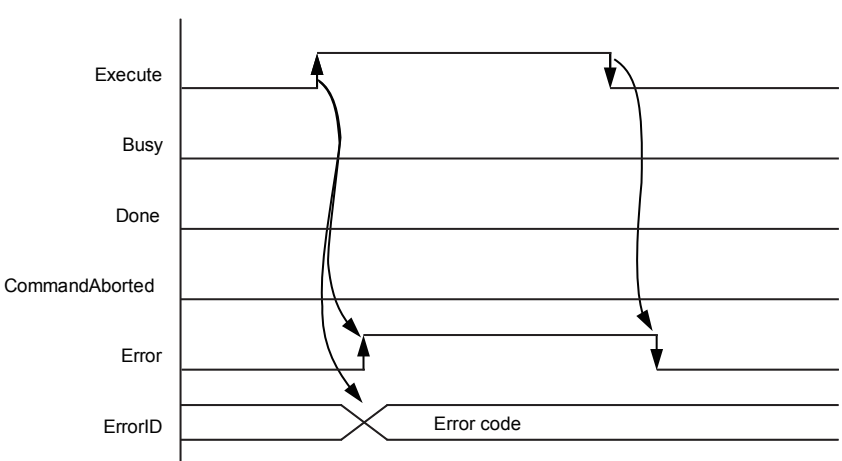| No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	PositionDataNo	Positioning data No.	Word [signed]	↑	1 to 100	<MotionControl_RD77> Specify the positioning data No. to store positioning data. <MotionControl_J4GFIO> Specify the point table No. to store positioning data.
(4)	Distance	Travel distance	Double-precision real number	↑	☞ Positioning range on Page 7 Unit	Set the travel distance.
(5)	Velocity	Velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Set the velocity command value for positioning.
(6)	Acceleration	Acceleration time	Double word [signed]	↑	☞ Acceleration/deceleration time on Page 7 Unit	<MotionControl_RD77> Set the time taken for the velocity to change from 0 to the velocity limit value. <MotionControl_J4GFIO> Set the time taken for the servo motor to reach the rated rotation velocity.
(7)	Deceleration	Deceleration time	Double word [signed]	↑	☞ Acceleration/deceleration time on Page 7 Unit	<MotionControl_RD77> Set the time taken for the velocity to change from the velocity limit value to 0. <MotionControl_J4GFIO> Set the time taken for the servo motor to stop from the rated rotation velocity.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(8)	Done	Execution completion	Bit	OFF	It indicates that the commanded axis has reached the commanded position.
(9)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(10)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(11)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_MoveRelative+RD77	RD77GF, RD77MS
		MC_MoveRelative+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_MoveRelative+RD77		1191 steps
	MC_MoveRelative+J4GFIO		989 steps
Function description	This FB moves an axis for the specified distance from the set value of the specified axis. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the processing is completed and positioning of the axis is completed, Done turns ON. The axis status (AxisStatus) of the AXIS_REF structure during positioning control is DiscreteMotion. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_RD77 is used> • When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • This library uses positioning data of one point. Set the positioning data No. used in this library (No. not used in other programs). • When positioning motion FBs are used in combination, the operation of the FB that is executed later is the operation of the commanded position change function. When the accumulative travel distance from the position where the first FB was executed is larger than 2147483647 or smaller than -2147483648, an error occurs. • When an execution command (Execute) of FB was turned ON while "[Cd.183] Execution prohibition flag" of the Simple Motion module was ON, turn OFF the flag while the execution command is ON to start the positioning control. If the execution command is turned OFF before the flag OFF, the positioning control cannot be cancelled just by turning OFF the execution command because FB has been accepted to start. Use MC_Stop to cancel the positioning control. • When positioning control completes in a time that is shorter than the scan time of the PLC due to slight movements or other factors, set the operation cycle of the simple Motion module to a time that is longer than the scan time of the PLC. <When MotionControl_J4GFIO is used> • This library uses one point of a point table. Set a point table No. used in this library (No. not used in other programs). • For an axis on which this FB is in execution, another MC_MoveRelative or MC_MoveAbsolute cannot be executed. Doing so causes an error for the FB executed later, and the FB in execution continues the operation. • If the FB has been completed in the status where Error is ON and ErrorID is 1300h by a warning, clearing the warning will clear ErrorID to zero. • When the update of the slave device status is delayed due to the transmission delay, the completion of the previous movement may be acquired depending on the timing of the FB status check. Adjust the transmission delay time (WaitTime) of the AXIS_REF structure according to the usage environment.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		

Item	Description
Timing chart	[When the FB is normally completed] Execute Busy Done CommandAborted Error ErrorID 0 [When an error occurs] Execute Busy Done CommandAborted Error ErrorID Error code

2.6　MC_MoveAdditive (Commanded Position Change)

Name

MC_MoveAdditive+RD77

Overview

Item	Description
Function overview	Adds a specified relative position in the previous positioning command of the specified axis and executes positioning.
Symbol [Structured Ladder]	<table><tr><td colspan="2" style="text-align:center">MC_MoveAdditive+RD77</td></tr><tr><td>(1) — DUT: Axis</td><td>Axis :DUT — (1)</td></tr><tr><td>(2) — B: Execute</td><td>Done :B — (8)</td></tr><tr><td>(3) — W: PositionDataNo</td><td>Busy :B — (9)</td></tr><tr><td>(4) — L: Distance</td><td>CommandAborted :B — (10)</td></tr><tr><td>(5) — L: Velocity</td><td>Error :B — (11)</td></tr><tr><td>(6) — D: Acceleration</td><td>ErrorID :UW — (12)</td></tr><tr><td>(7) — D: Deceleration</td><td></td></tr></table>
Symbol [Structured Text]	MC_MoveAddtive_RD77 (Axis, Execute, PositionDataNo, Distance, Velocity, Acceleration, Deceleration, Done, Busy, CommnadAborted, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	PositionDataNo	Positioning data No.	Word [signed]	↑	1 to 100	Specify the positioning data No. to store positioning data.
(4)	Distance	Travel distance	Double-precision real number	↑	☞ Positioning range on Page 7 Unit	Set the travel distance of the relative position.
(5)	Velocity	Commanded velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Set the axis feedrate at positioning.
(6)	Acceleration	Acceleration time	Double word [signed]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	Set the time taken for the velocity to change from 0 to the velocity limit value.
(7)	Deceleration	Deceleration time	Double word [signed]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	Set the time taken for the velocity to change from the velocity limit value to 0.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(8)	Done	Execution completion	Bit	OFF	It indicates that the commanded axis has reached the commanded position.
(9)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(10)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(11)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	1154 steps	
Function description	This FB adds the specified relative position in the previous positioning command of the specified axis and executes positioning. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the processing is completed and positioning of the axis is completed, Done turns ON. The axis status (AxisStatus) of the AXIS_REF structure during positioning control is DiscreteMotion. This FB can be used when the axis status is Standstill or DiscreteMotion. This FB cannot be used when the axis status is ContinuousMotion. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • This library uses positioning data of one point. Set the positioning data No. used in this library (No. not used in other programs). • When positioning motion FBs are used in combination, the operation of the FB that is executed later is the operation of the commanded position change function. When the accumulative travel distance from the position where the first FB was executed is larger than 2147483647 or smaller than -2147483648, an error occurs. • When an execution command (Execute) of FB was turned ON while "[Cd.183] Execution prohibition flag" of the Simple Motion module was ON, turn OFF the flag while the execution command is ON to start the positioning control. If the execution command is turned OFF before the flag OFF, the positioning control cannot be cancelled just by turning OFF the execution command because FB has been accepted to start. Use MC_Stop to cancel the positioning control. • When positioning control completes in a time that is shorter than the scan time of the PLC due to slight movements or other factors, set the operation cycle of the simple Motion module to a time that is longer than the scan time of the PLC.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[When the FB is normally completed] Execute Busy Done CommandAborted Error ErrorID 0 [When an error occurs] Execute Busy Done CommandAborted Error ErrorID Error code

2.7 MC_MoveVelocity (Velocity Control)

Name

MC_MoveVelocity+RD77

Overview

Item	Description
Function overview	Controls the velocity of the specified axis to the commanded velocity.
Symbol [Structured Ladder]	 MC_MoveVelocity+RD77 (1) — DUT: Axis / Axis :DUT — (1) (2) — B: Execute / InVelocity :B — (7) (3) — L: Velocity / Busy :B — (8) (4) — UW: Acceleration / Active :B — (9) (5) — UW: Deceleration / CommandAborted :B — (10) (6) — W: Direction / Error :B — (11) ErrorID :UW — (12)
Symbol [Structured Text]	MC_MoveVelocity_RD77 (Axis, Execute, Velocity, Acceleration, Deceleration, Direction, InVelocity, Busy, Active, CommandAborted, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Velocity	Commanded velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Set the command velocity.
(4)	Acceleration	Acceleration time	Word [unsigned]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	Set the time taken for the velocity to change from 0 to the velocity limit value.
(5)	Deceleration	Deceleration time	Word [unsigned]	↑	☞ Acceleration/ deceleration time on Page 7 Unit	Set the time taken for the velocity to change from the velocity limit value to 0.
(6)	Direction	Rotation direction	Word [signed]	↑	1, 2	Specify a rotation direction. MC_DIRECTION defined values can be used. Select one of the following two values. • mcPositiveDirection positive direction (1) • mcNegativeDirection negative direction (2)

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(7)	InVelocity	Commanded velocity reached	Bit	OFF	It indicates that the velocity has reached the specified value.
(8)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(9)	Active	Controlling	Bit	OFF	It indicates that the FB is controlling the axis.
(10)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(11)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	633 steps	
Function description	This FB controls the velocity of the specified axis to the specified velocity. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the mode of the axis changes to the velocity control mode, Active turns ON. When the velocity of the axis has reached the commanded velocity, InVelocity turns ON. Once InVelocity turns ON when the velocity of the axis has reached the commanded velocity, InVelocity remains ON until Execute turns OFF or the control is aborted. The axis status (AxisStatus) of the AXIS_REF structure transits to ContinuousMotion. Abort the execution of the FB and switch the control by executing a new MC_MoveVelocity or MC_TorqueControl. MC_Stop is used to stop the operation. When the control is aborted, CommandAborted turns ON. When Execute turns OFF, CommandAborted turns OFF. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• This FB cannot be executed while the positioning control FB is in execution (AxisStatus is DiscreteMotion). • When the mode is switched from the velocity control mode to the torque control mode, the motor velocity may momentarily fluctuate. Thus, switching the mode from the velocity control mode to the torque control mode after stopping the servo motor is recommended.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[When the FB is normally completed]

[When an error occurs]

2.8   MC_TorqueControl (Torque Control)

Name

MC_TorqueControl+RD77

Overview

Item	Description
Function overview	Controls the specified axis with the specified torque.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_TorqueControl_RD77 (Axis, Execute, Torque, TorqueRampFwd, TorqueRampRev, Velocity, Direction, InTorque, Busy, Active, CommandAborted, Error, ErrorID)

For the Symbol [Structured Ladder]:

```
                    MC_TorqueControl+RD77
(1) ——  DUT: Axis                        Axis :DUT  —— (1)
(2) ——  B: Execute                      InTorque :B  —— (8)
(3) ——  E: Torque                           Busy :B  —— (9)
(4) ——  UW: TorqueRampFwd                 Active :B  —— (10)
(5) ——  UW: TorqueRampRev        CommandAborted :B  —— (11)
(6) ——  L: Velocity                        Error :B  —— (12)
(7) ——  W: Direction                    ErrorID :UW  —— (13)
```

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: ∏: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Torque	Commanded torque	Single-precision real number	↑	-1000.0 to 1000.0 [%]	Set the command torque. Set the ratio to the rated torque of the servo motor used in percentage.
(4)	TorqueRampFwd	Torque time constant in positive direction	Word [unsigned]	↑	0 to 65535 [ms]	Set the time taken for the torque to change from 0 to the torque limit setting value.
(5)	TorqueRampRev	Torque time constant in negative direction	Word [unsigned]	↑	0 to 65535 [ms]	Set the time taken for the torque to change from the torque limit setting value to 0.
(6)	Velocity	Limit velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Set the velocity limit value in the torque control mode.
(7)	Direction	Rotation direction	Word [signed]	↑	1, 2	Specify a rotation direction. MC_DIRECTION defined values can be used. Select one of the following two values. • mcPositiveDirection positive direction (1) • mcNegativeDirection negative direction (2)

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(8)	InTorque	Commanded torque reached	Bit	OFF	It indicates that the torque has reached the specified value.
(9)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(10)	Active	Controlling	Bit	OFF	It indicates that the FB is controlling the axis.
(11)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(12)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(13)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	669 steps	
Function description	This FB controls the specified axis with the specified torque. This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the mode of the axis changes to the torque control mode, Active turns ON. When the torque has reached the commanded torque, InTorque turns ON. Once InTorque turns ON when the torque has reached the commanded torque, InVelocity remains ON until Execute turns OFF or the control is aborted. The axis status (AxisStatus) of the AXIS_REF structure transits to ContinuousMotion. Abort the execution and switch the control by executing a new MC_TorqueControl or MC_MoveVelocity. MC_Stop is used to stop the operation. When the control is aborted, CommandAborted turns ON. When Execute turns OFF, CommandAborted turns OFF. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• This FB cannot be executed while the positioning control FB is in execution (AxisStatus is DiscreteMotion). • The relationship between the setting value of the commanded torque and the torque generation direction of the servo motor differs depending on the setting in the servo parameters, "Rotation direction selection/travel direction selection (PA14)" and "Function selection C-B POL reflection selection at torque control (PC29)". For details, refer to the instruction manual of the servo amplifier in use. • The rotation direction (Direction) of this FB indicates the direction when "0: Enabled" is set to the servo parameter "Function selection C-B POL reflection selection at torque control (PC29)."	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[When the FB is normally completed]

[When an error occurs]

2.9   MC_SetPosition (Current Position Change)

Name

MC_SetPosition+RD77

Overview

Item	Description
Function overview	Changes the current position (commanded position, feedback position) of the specified axis.
Symbol [Structured Ladder]	<table><tr><td colspan="3" align="center">MC_SetPosition+RD77</td></tr><tr><td>(1) —</td><td>DUT: Axis</td><td>Axis :DUT — (1)</td></tr><tr><td>(2) —</td><td>B: Execute</td><td>Done :B — (5)</td></tr><tr><td>(3) —</td><td>L: Position</td><td>Busy :B — (6)</td></tr><tr><td>(4) —</td><td>B: Relative</td><td>Error :B — (7)</td></tr><tr><td></td><td></td><td>ErrorID :UW — (8)</td></tr></table>
Symbol [Structured Text]	MC_SetPosition_RD77 (Axis, Execute, Position, Relative, Done, Busy, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)
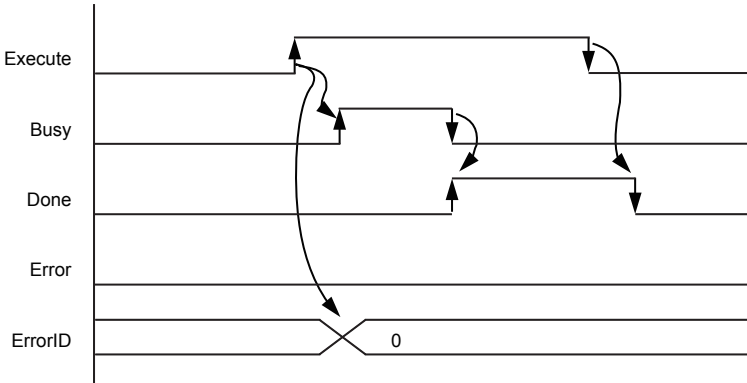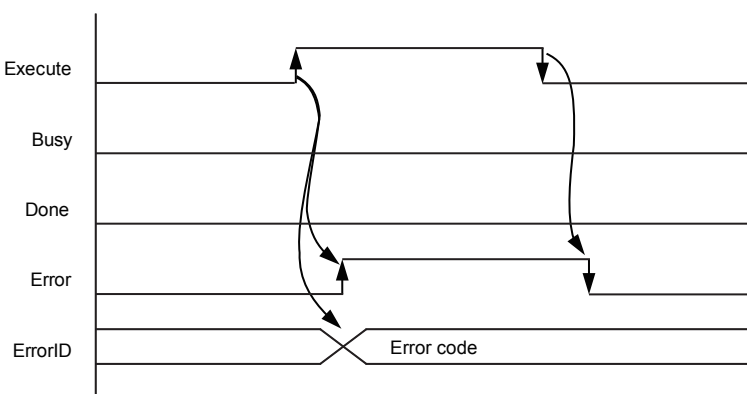
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Position	Commanded position	Double-precision real number	↑	☞ Positioning range on Page 7 Unit	Set the commanded position value.
(4)	Relative	Relative position selection	Bit	↑	ON, OFF	The relative position is set when Relative turns ON. The absolute position is set when Relative is OFF.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(5)	Done	Execution completion	Bit	OFF	It indicates that the reset is completed.
(6)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(7)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	469 steps	
Function description	This FB changes the current position of the specified axis. When Relative is ON, the current position is changed to the position obtained by the addition of the commanded position (relative position) and the current position. When Relative is OFF, the current position is changed to the commanded position (absolute position). This FB is executed when Execute turns ON, and Busy turns ON when the processing is normally started. When the processing is completed and the current position is changed, Done turns ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• Execute this FB when the axis status (AxisStatus) is Standstill. • When the unit is "degree" and Relative position selection (Relative) is ON (relative position), the specification range of Commanded position (Position) is -359.99999 to 359.99999.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

2.10 MC_SetOverride (Override Value Setting)

Name

MC_SetOverride+RD77

Overview

Item	Description
Function overview	Changes the commanded velocity of the specified axis.
Symbol [Structured Ladder]	 MC_SetOverride+RD77 (1) — DUT: Axis Axis :DUT — (1) (2) — B: Enable Enabled :B — (4) (3) — E: VelFactor Error :B — (5) ErrorID :UW — (6)
Symbol [Structured Text]	MC_SetOverride _RD77 (Axis, Enable, VelFactor, Enabled, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)
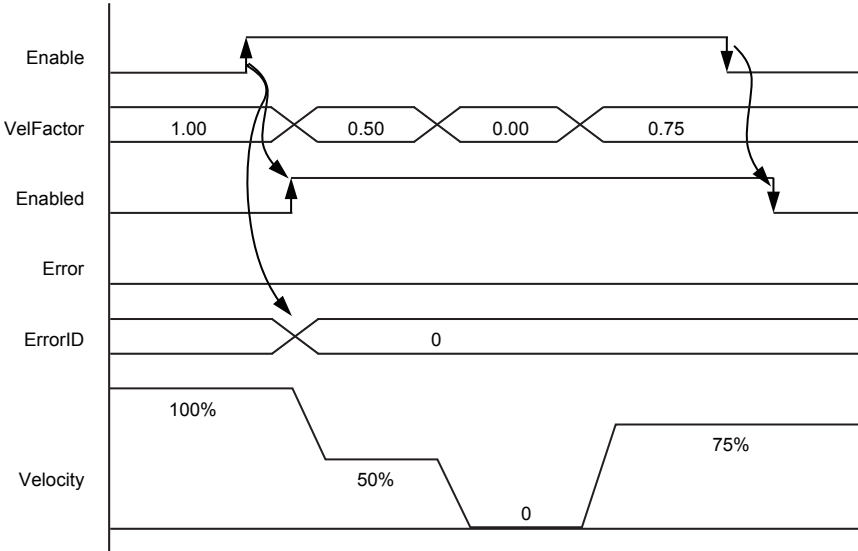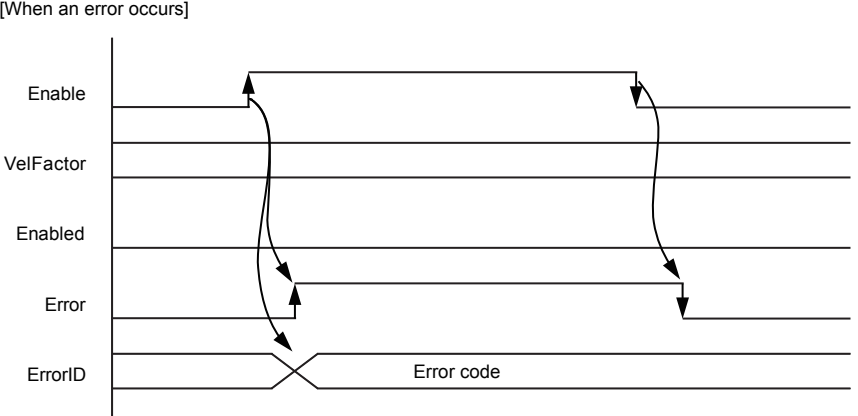
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	VelFactor	Velocity override factor	Single-precision real number	Π	0.00 to 3.00	While Enable is ON, values are always imported. Set the velocity override factor.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(4)	Enabled	Enabled	Bit	OFF	This device turns ON when the set override value is correct.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	143 steps	
Function description	This FB changes the commanded velocity of the specified axis. The commanded velocity is changed to the velocity obtained by the multiplication of the velocity in positioning by the override factor [0.00 (0%) to 3.00 (300%)]. The FB is executed when Enable turns ON. Enabled turns ON while the override factor is valid. If the override factor value is changed while Enable is ON, the new override factor is reflected. When Enable turns OFF, the last set override factor is held. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING. The initial value of the velocity override factor is 0.00. When 0.00 is set as the velocity override factor, the axis stops without changing the axis status to Standstill.	
Restrictions and precautions	—	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

2.11 MC_ReadParameter (Parameter Read)

Name

MC_ReadParameter+RD77

Overview

Item	Description
Function overview	Reads a parameter value of the specified axis in real type.

Symbol [Structured Ladder]	
	MC_ReadParameter+RD77
	
	(1) — DUT: Axis Axis :DUT — (1)
	(2) — B: Enable Valid :B — (4)
	(3) — W: ParameterNumber Error :B — (5)
	     ErrorID :UW — (6)
	     Value :L — (7)

Symbol [Structured Text]	MC_ReadParameter_RD77 (Axis, Enable, ParameterNumber, Valid, Error, ErrorID, Value)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)
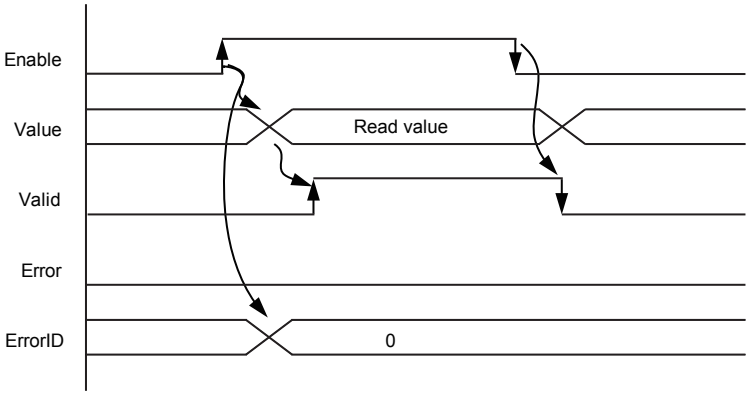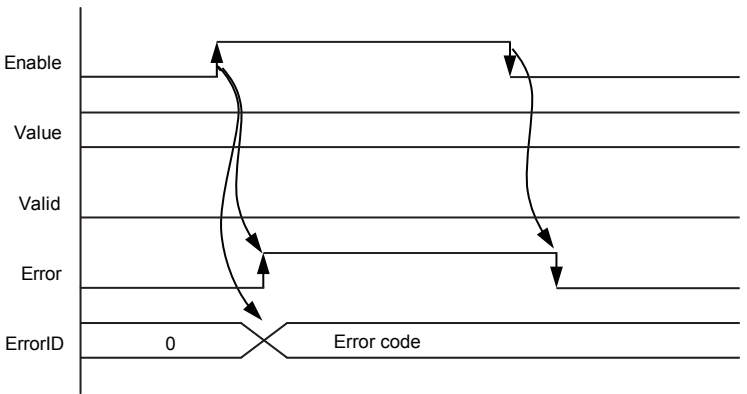
■Input labels (Load: ∏: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	ParameterNumber	Parameter No.	Word [signed]	↑	1 to 3, 9 to 11	Specify a parameter number.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(4)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(7)	Value	Read value	Double-precision real number	0	The value read from the specified parameter is output.

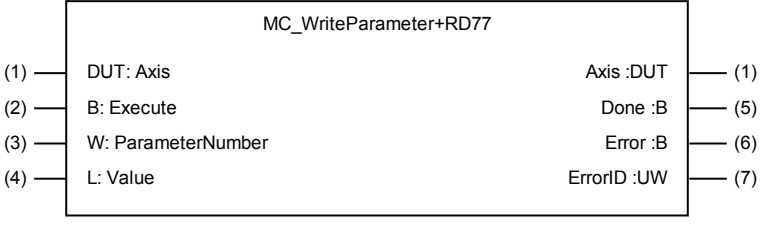# Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	350 steps	
Function description	This FB reads the value of the parameter defined with the parameter number of the specified axis in real type. This FB is executed when Enable turns ON, and the value of the specified parameter is read. Read data is always updated while Valid is ON. [Available parameter numbers] _(see table below)_ When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	—	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs] 	

Available parameter numbers:

Parameter No.	Name	Description
1	CommandedPosition	Specified position
2	SWLimitPos	Position of the positive software end switch
3	SWLimitNeg	Position of the negative software end switch
9	MaxVelocityAppl	Axis velocity limit value
10	ActualVelocity	Feedback velocity
11	CommandedVelocity	Specified velocity

2.12 MC_WriteParameter (Parameter Write)

Name

MC_WriteParameter+RD77

Overview

Item	Description
Function overview	Changes the real-type parameter value of the specified axis.
Symbol [Structured Ladder]	<table><tr><td colspan="2" align="center">MC_WriteParameter+RD77</td></tr><tr><td>(1) — DUT: Axis</td><td>Axis :DUT — (1)</td></tr><tr><td>(2) — B: Execute</td><td>Done :B — (5)</td></tr><tr><td>(3) — W: ParameterNumber</td><td>Error :B — (6)</td></tr><tr><td>(4) — L: Value</td><td>ErrorID :UW — (7)</td></tr></table>
Symbol [Structured Text]	MC_WriteParameter_RD77 (Axis, Execute, ParameterNumber, Value, Done, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	ParameterNumber	Parameter No.	Word [signed]	↑	9	Specify a parameter number.
(4)	Value	Setting value	Double-precision real number	↑	—	Specify a setting value of the specified parameter.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(5)	Done	Execution completion	Bit	OFF	It indicates that writing to the parameter is completed.
(6)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	233 steps	
Function description	This FB changes the real-type parameter value of the specified axis. This FB is executed when Execute turns ON and the specified parameter value is changed. Done turns ON when writing to the parameter is completed. [Available parameter numbers] When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	—	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

Table within Function description:

Parameter No.	Name	R/W	Description
9	MaxVelocityAppl	R/W	Axis velocity limit value

[When the FB is normally completed]

Execute	
Parameter write processing	
Done	
Error	
ErrorID	0

[When an error occurs]

Execute	
Parameter write processing	
Done	
Error	
ErrorID	Error code

2.13 MC_ReadActualPosition (Current Position Read)

Name

MC_ReadActualPosition+RD77
MC_ReadActualPosition+J4GFIO

Overview

Item	Description
Function overview	Reads the current position of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadActualPosition_RD77 (Axis, Enable, Valid, Error, ErrorID, Position, MachinePosition, RealPosition) MC_ReadActualPosition_J4GFIO (Axis, Enable, Valid, Error, ErrorID, Position, RealPosition)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	Position	Current feed value/ Commanded position	Double-precision real number	0	<MotionControl_RD77> The current feed value of the selected axis is returned. <MotionControl_J4GFIO> The commanded position of the selected axis is returned.
(7)	MachinePosition	Feed machine value	Double-precision real number	0	<MotionControl_RD77> The feed machine value of the selected axis is returned.
(8)	RealPosition	Current position	Double-precision real number	0	<MotionControl_RD77> The real current value of the selected axis is returned. <MotionControl_J4GFIO> The current position of the selected axis is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_ReadActualPosition+RD77	RD77GF, RD77MS
		MC_ReadActualPosition+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_ReadActualPosition+RD77		156 steps
	MC_ReadActualPosition+J4GFIO		164 steps
Function description	This FB reads the current position of the specified axis. When MotionControl_RD77 is used, this FB reads the current feed value, feed machine value, and real current value. When MotionControl_J4GFIO is used, this FB reads the commanded position and the current position. The unit of the read data is converted. The FB is executed when Enable turns ON, and the current position is read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	—		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2

2.14 MC_ReadActualVelocity (Current Velocity Read)

Name

MC_ReadActualVelocity+RD77

Overview

Item	Description
Function overview	Returns the axis feedrate of the specified axis.
Symbol [Structured Ladder]	 MC_ReadActualVelocity+RD77 (1) — DUT: Axis Axis :DUT — (1) (2) — B: Enable Valid :B — (3) Error :B — (4) ErrorID :UW — (5) Velocity :E — (6) MotorSpeed :E — (7)
Symbol [Structured Text]	MC_ReadActualVelocity_RD77 (Axis, Enable, Valid, Error, ErrorID, Velocity, MotorSpeed)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	Velocity	Current velocity	Single-precision real number	0	The axis feedrate of the selected axis is returned.
(7)	MotorSpeed	Motor speed	Single-precision real number	0	The servo motor speed is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	163 steps	
Function description	This FB reads the axis feedrate and motor speed of the specified axis. The unit of the read data is converted. This FB is executed when Enable turns ON, and the feedrate of the specified axis is read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	The output label "Velocity" reads the axis feedrate while the positioning control FB and MC_TorqueControl are in execution, and the speed during command while MC_MoveVelocity is in execution.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

2.15 MC_ReadActualTorque (Current Torque Read)

Name

MC_ReadActualTorque+RD77

Overview

Item	Description
Function overview	Reads the torque value of the specified axis.
Symbol [Structured Ladder]	 MC_ReadActualTorque+RD77 (1) — DUT: Axis Axis :DUT — (1) (2) — B: Enable Valid :B — (3) Error :B — (4) ErrorID :UW — (5) Torque :E — (6)
Symbol [Structured Text]	MC_ReadActualTorque_RD77 (Axis, Enable, Valid, Error, ErrorID, Torque)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	Torque	Current torque	Single-precision real number	0	The value of the torque during command of the selected axis is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	135 steps	
Function description	This FB reads the torque value of the specified axis. The FB is executed when Enable turns ON, and the torque of the specified axis is read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	This FB can be used only while MC_TorqueControl_RD77 is in execution.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs] 	

2.16 MC_ReadStatus (Status Read)

Name

MC_ReadStatus+RD77

MC_ReadStatus+J4GFIO

Overview

Item	Description
Function overview	Returns the detailed status of the status diagram of the specified axis.
Symbol [Structured Ladder]	

| Symbol [Structured Text] | MC_ReadStatus_RD77 (Axis, Enable, Valid, Error, ErrorID, ErrorStop, Disabled, Stopping, Homing, Standstill, DiscreteMotion, CoutinuousMotion, SynchronizedMotion) MC_ReadStatus_J4GFIO (Axis, Enable, Valid, Error, ErrorID, ErrorStop, Disabled, Stopping, Homing, Standstill, DiscreteMotion, CoutinuousMotion, SynchronizedMotion) |

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	ErrorStop	ErrorStop status	Bit	OFF	It indicates that the axis is in the ErrorStop status. (☞ Page 5 FB Status Diagram)
(7)	Disabled	Disabled status	Bit	OFF	It indicates that the axis is in the Disabled status. (☞ Page 5 FB Status Diagram)
(8)	Stopping	Stopping status	Bit	OFF	It indicates that the axis is in the Stopping status. (☞ Page 5 FB Status Diagram)
(9)	Homing	Homing status	Bit	OFF	It indicates that the axis is in the Homing status. (☞ Page 5 FB Status Diagram)
(10)	Standstill	Standstill status	Bit	OFF	It indicates that the axis is in the Standstill status. (☞ Page 5 FB Status Diagram)
(11)	DiscreteMotion	DiscreteMotion status	Bit	OFF	It indicates that the axis is in the DiscreteMotion status. (☞ Page 5 FB Status Diagram)
(12)	ContinuousMotion	ContinuousMotion status	Bit	OFF	It indicates that the axis is in the ContinuousMotion status. (☞ Page 5 FB Status Diagram)
(13)	SynchronizedMotion	SynchronizedMotion status	Bit	OFF	It indicates that the axis is in the SynchronizedMotion status. (☞ Page 5 FB Status Diagram)

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_ReadStatus+RD77	RD77GF, RD77MS
		MC_ReadStatus+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_ReadStatus+RD77		149 steps
	MC_ReadStatus+J4GFIO		197 steps
Function description	This FB reads the status of the specified axis. The FB is executed when Enable turns ON, and the status is consecutively read. When the status is normally read, any of the outputs that indicates a status turns ON. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_J4GFIO is used> • The output labels ContinuousMotion and SyncronizedMotion are always OFF.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs]		

2.17 MC_ReadAxisInfo (Axis Information Read)

Name

MC_ReadAxisInfo+RD77

MC_ReadAxisInfo+J4GFIO

Overview

Item	Description
Function overview	Reads the axis information of the specified axis.
Symbol [Structured Ladder]	 **MC_ReadAxisInfo+RD77** (1) — DUT: Axis ... Axis :DUT — (1) (2) — B: Enable ... Valid :B — (3) ... Error :B — (4) ... ErrorID :UW — (5) ... HomeAbsSwitch :B — (6) ... LimitSwitchPos :B — (7) ... LimitSwitchNeg :B — (8) ... CommunicationReady :B — (9) ... ReadyForPowerOn :B — (10) ... PowerOn :B — (11) ... IsHomed :B — (12) ... AxisWarning :B — (13) **MC_ReadAxisInfo+J4GFIO** (1) — DUT: Axis ... Axis :DUT — (1) (2) — B: Enable ... Valid :B — (3) ... Error :B — (4) ... ErrorID :UW — (5) ... HomeAbsSwitch :B — (6) ... LimitSwitchPos :B — (7) ... LimitSwitchNeg :B — (8) ... CommunicationReady :B — (9) ... ReadyForPowerOn :B — (10) ... PowerOn :B — (11) ... IsHomed :B — (12) ... AxisWarning :B — (13)
Symbol [Structured Text]	MC_ReadAxisInfo_RD77 (Axis, Enable, Valid, Error, ErrorID, HomeAbsSwitch, LimitSwitchPos, LimitSwitchNeg, CommuniationReady, ReadyForPowerOn, PowerOn, IsHomed, AxisWarning) MC_ReadAxisInfo_J4GFIO (Axis, Enable, Valid, Error, ErrorID, HomeAbsSwitch, LimitSwitchPos, LimitSwitchNeg, CommuniationReady, ReadyForPowerOn, PowerOn, IsHomed, AxisWarning)

Labels

■I/O label

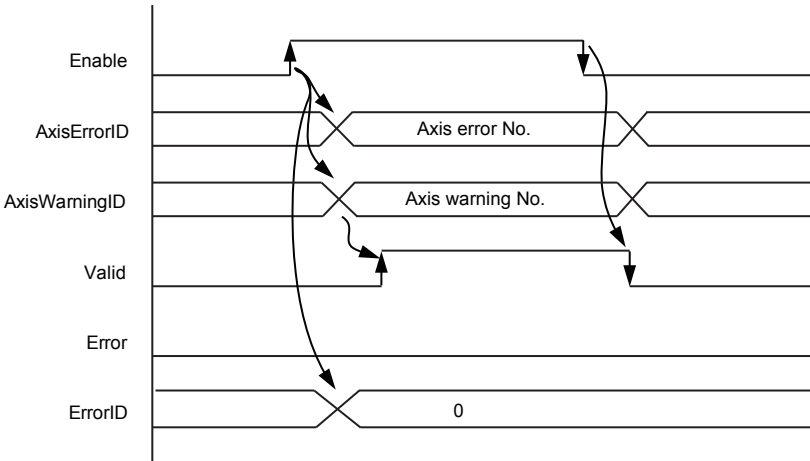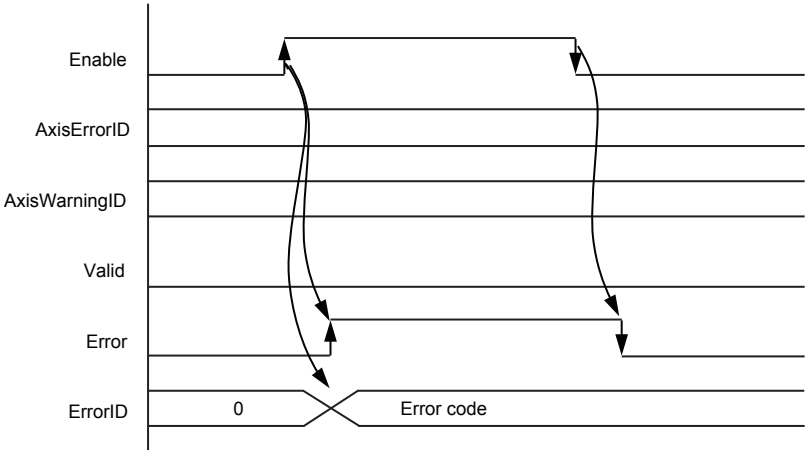| No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	HomeAbsSwitch	Near-point dog signal	Bit	OFF	It indicates the status of the near-point dog signal.
(7)	LimitSwitchPos	Positive limit signal	Bit	OFF	It indicates the status of the hardware stroke limit signal in the positive direction.
(8)	LimitSwitchNeg	Negative limit signal	Bit	OFF	It indicates the status of the hardware stroke limit signal in the negative direction.
(9)	CommunicationReady	Communication ready	Bit	OFF	It indicates the communication ready status.
(10)	ReadyForPowerOn	Ready for operation	Bit	OFF	It indicates the ready for operation status.
(11)	PowerOn	Operable	Bit	OFF	It indicates the operable status.
(12)	IsHomed	Home position valid	Bit	OFF	It indicates that the home position return is completed.
(13)	AxisWarning	Axis warning	Bit	OFF	It indicates the axis warning status.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_ReadAxisInfo+RD77	RD77GF, RD77MS
		MC_ReadAxisInfo+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_ReadAxisInfo+RD77		388 steps
	MC_ReadAxisInfo+J4GFIO		283 steps
Function description	This FB is executed when Enable turns ON, and the axis information of the specified axis is read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_J4GFIO is used> • When the positioning control FB is executed, updates of read data will temporarily stop. When the positioning control is started again, updates will also be restarted. • When this FB is used with "Function selection D-4 sensor input method selection (PD41)" of the servo parameter set to "0: Input from servo amplifier", use software version A3 or later of the servo amplifier MR-J4-GF. The positive limit signal (LimitSwitchPos) and the negative limit signal (LimitSwitchNeg) cannot be read with software version A2 or earlier.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs]		

2.18 MC_ReadAxisError (Axis Error Read)

Name

MC_ReadAxisError+RD77

MC_ReadAxisError+J4GFIO

Overview

Item	Description
Function overview	Reads the error number of the specified axis.
Symbol [Structured Ladder]	 **MC_ReadAxisError+RD77** (1) — DUT: Axis Axis :DUT — (1) (2) — B: Enable Valid :B — (3) Error :B — (4) ErrorID :UW — (5) AxisErrorID :UW — (6) AxisWarningID :UW — (7) **MC_ReadAxisError+J4GFIO** (1) — DUT: Axis Axis :DUT — (1) (2) — B: Enable Valid :B — (3) Error :B — (4) ErrorID :UW — (5) AxisErrorID :UW — (6) AxisWarningID :UW — (7)
Symbol [Structured Text]	MC_ReadAxisError_RD77 (Axis, Enable, Valid, Error, ErrorID, AxisErrorID, AxisWarningID) MC_ReadAxisError_J4GFIO (Axis, Enable, Valid, Error, ErrorID, AxisErrorID, AxisWarningID)

Labels

■I/O label

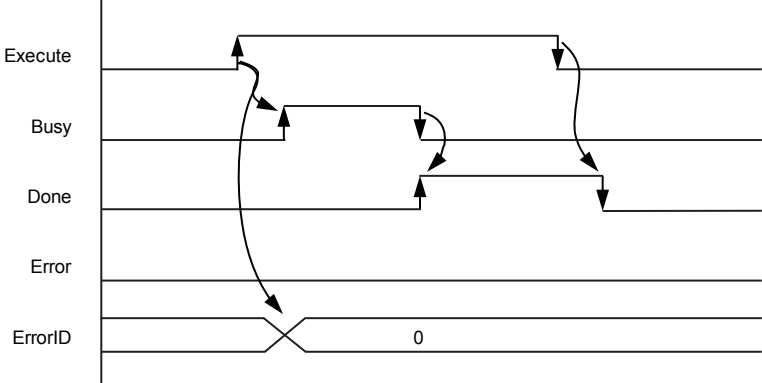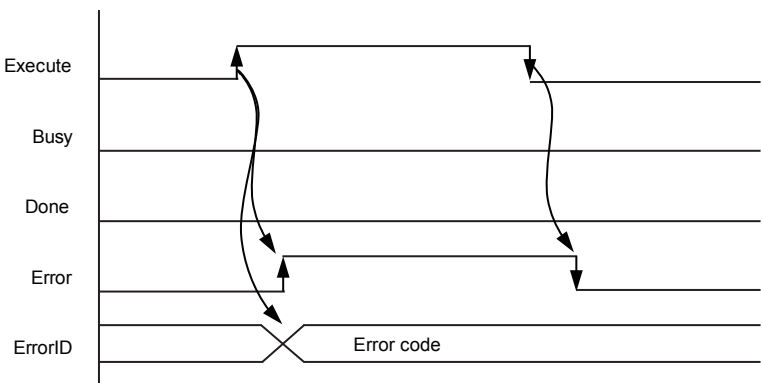| No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

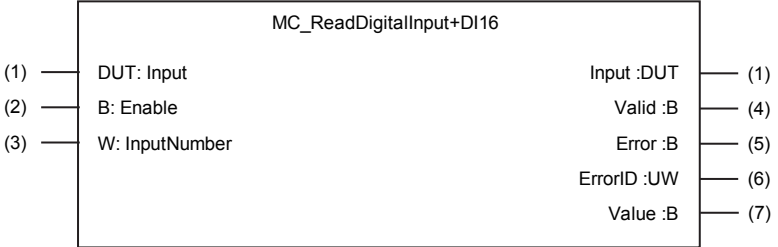| No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(4)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(6)	AxisErrorID	Axis error No.	Word [unsigned]	0	The error code of the axis is returned.
(7)	AxisWarningID	Axis warning No.	Word [unsigned]	0	The warning code of the axis is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_ReadAxisError+RD77	RD77GF, RD77MS
		MC_ReadAxisError+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MC_ReadAxisError+RD77		112 steps
	MC_ReadAxisError+J4GFIO		159 steps
Function description	This FB reads the error number and warning number of the specified axis. The FB is executed when Enable turns ON, and the error number and warning number of the specified axis are read. Read data is always updated while Valid is ON. When no error or warning has not occurred, 0 is returned. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	<When MotionControl_J4GFIO is used> • When an error and a warning simultaneously occur, this FB reads only an error number. • When the positioning control FB is executed, updates of read data will temporarily stop. When the positioning control is started again, updates will also be restarted.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2.19 MC_Reset (Axis Error Reset)

Name

MC_Reset+RD77

MC_Reset+J4GFIO

Overview

Item	Description
Function overview	Clears the error of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ Reset_RD77 (Axis, Execute, Done, Busy, Error, ErrorID) MC_ Reset_J4GFIO (Axis, Execute, Done, Busy, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(3)	Done	Execution completion	Bit	OFF	It indicates that the reset is completed.
(4)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MC_Reset+RD77	RD77GF, RD77MS
		MC_Reset+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU	MELSEC iQ-R series CPU	
	Applicable engineering tool	GX Works3	
Language	Structured Text		
Number of basic steps	MC_Reset+RD77	196 steps	
	MC_Reset+J4GFIO	295 steps	
Function description	This FB clears errors of the specified axis. When MotionControl_RD77 is used, this FB clears errors and warnings of the specified axis. The FB is executed when Execute turns ON, and Busy turns ON when the processing is started. Done turns ON when errors of the axis are cleared. If Execute is turned ON while the error cause of the axis still remains, the error is not cleared. In this case, Busy remains ON. Turn OFF Execute once to clear the error cause and turn ON Execute again. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	For how to eliminate error causes, refer to the user's manual of the Simple Motion module or the servo amplifier instruction manual.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs]		

2.20 MC_ReadDigitalInput (Digital Input Read)

Name

MC_ReadDigitalInput+DI16

Overview

Item	Description
Function overview	Reads the specified input number status of the input signal.
Symbol [Structured Ladder]	<table><tr><td colspan="2" align="center">MC_ReadDigitalInput+DI16</td></tr><tr><td>(1) — DUT: Input</td><td>Input :DUT — (1)</td></tr><tr><td>(2) — B: Enable</td><td>Valid :B — (4)</td></tr><tr><td>(3) — W: InputNumber</td><td>Error :B — (5)</td></tr><tr><td></td><td>ErrorID :UW — (6)</td></tr><tr><td></td><td>Value :B — (7)</td></tr></table>
Symbol [Structured Text]	MC_ReadDigitalInput_DI16 (Input, Enable, InputNumber, Valid, Error, ErrorID, Value)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Input	Input signal	MC_INPUT_REF_DI16	—	☞ Page 81 MC_INPUT_REF (Input Information)
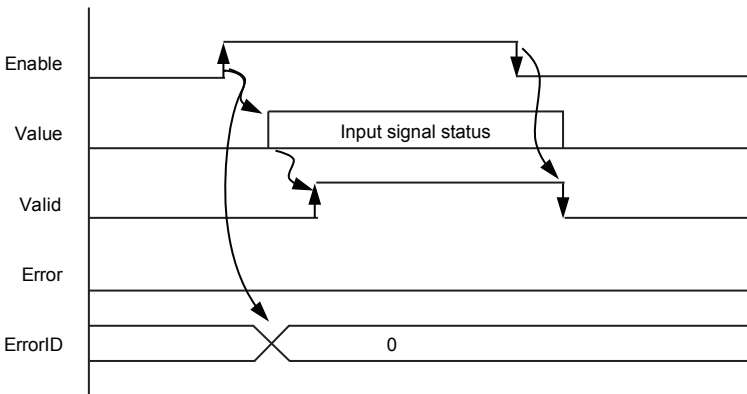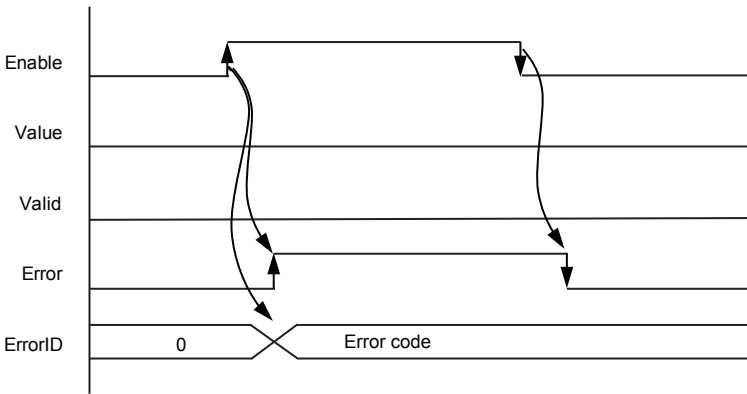
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	InputNumber	Input number	Word [signed]	↑	0 to 15	Specify an input number.

■Output labels

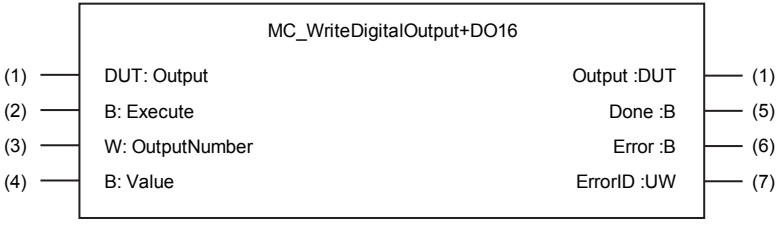| No.	Variable Name	Name	Data Type	Default Value	Description
(4)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(7)	Value	Read value	Bit	OFF	The value of the selected input signal is returned.

Function overview
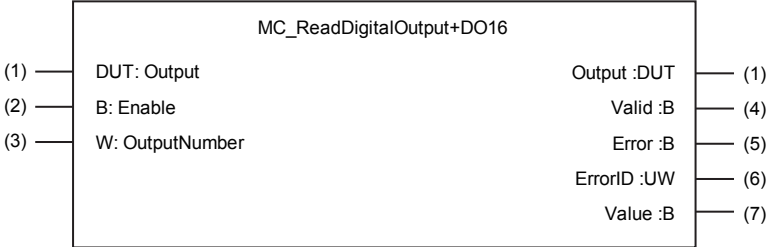
Item	Description	
Applicable hardware and software	Applicable module	Input module (16 points)
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	101 steps	
Function description	This FB reads the signal status of the specified input number of the input signal defined with MC_INPUT_REF. The FB is executed when Enable turns ON, and the input signal is consecutively read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	If the input signal is short, the operation may end before the execution cycle of the next FB starts.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

2.21   MC_ReadDigitalOutput (Digital Output Read)

Name

MC_ReadDigitalOutput+DO16

Overview

Item	Description
Function overview	Reads the status of the specified output number of the output signal.
Symbol [Structured Ladder]	<table><tr><td colspan="2" align="center">MC_ReadDigitalOutput+DO16</td></tr><tr><td>(1) — DUT: Output</td><td>Output :DUT — (1)</td></tr><tr><td>(2) — B: Enable</td><td>Valid :B — (4)</td></tr><tr><td>(3) — W: OutputNumber</td><td>Error :B — (5)</td></tr><tr><td></td><td>ErrorID :UW — (6)</td></tr><tr><td></td><td>Value :B — (7)</td></tr></table>
Symbol [Structured Text]	MC_ReadDigitalOutput_DO16 (Output, Enable, OutputNumber, Valid, Error, ErrorID, Value)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Output	Output signal	MC_OUTPUT_REF_DO16	—	☞ Page 81 MC_OUTPUT_REF (Output Information)
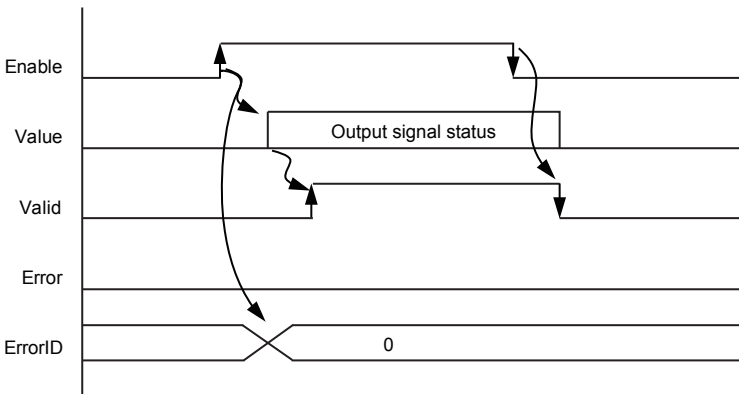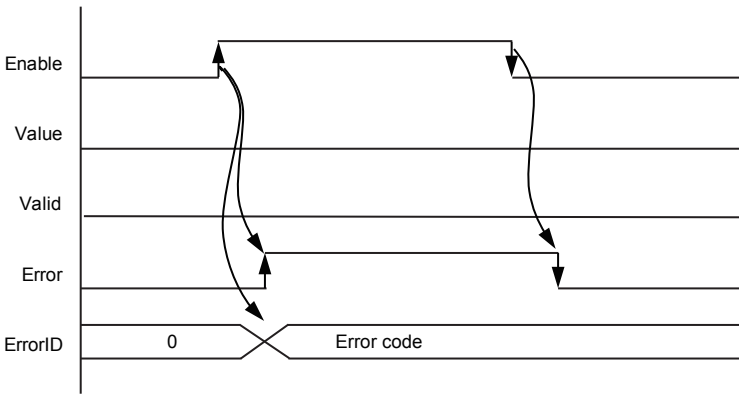
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Enable	Enable	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	OutputNumber	Output number	Word [signed]	↑	0 to 15	Specify an output number.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(4)	Valid	Output value valid	Bit	OFF	While this device is ON, the output value is valid.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(7)	Value	Read value	Bit	OFF	The value of the selected output signal is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	Output module (16 points)
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	101 steps	
Function description	This FB reads the signal status of the specified output number of the output signal defined with MC_OUTPUT_REF. The FB is executed when Enable turns ON, and the status is consecutively read. Read data is always updated while Valid is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	When the output signal is short, the operation may end before the execution cycle of the next FB starts.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs]	

2.22 MC_WriteDigitalOutput (Digital Output Write)

Name

MC_WriteDigitalOutput+DO16

Overview

Item	Description
Function overview	Changes the value of the specified output number of the output signal.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_WriteDigitalOutput_DO16 (Output, Execute, OutputNumber, Value, Done, Error, ErrorID)

Symbol [Structured Ladder] diagram:

```
              MC_WriteDigitalOutput+DO16
(1) ── DUT: Output                    Output :DUT ── (1)
(2) ── B: Execute                        Done :B  ── (5)
(3) ── W: OutputNumber                  Error :B  ── (6)
(4) ── B: Value                       ErrorID :UW ── (7)
```

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Output	Output signal	MC_OUTPUT_REF_DO16	—	☞ Page 81 MC_OUTPUT_REF (Output Information)
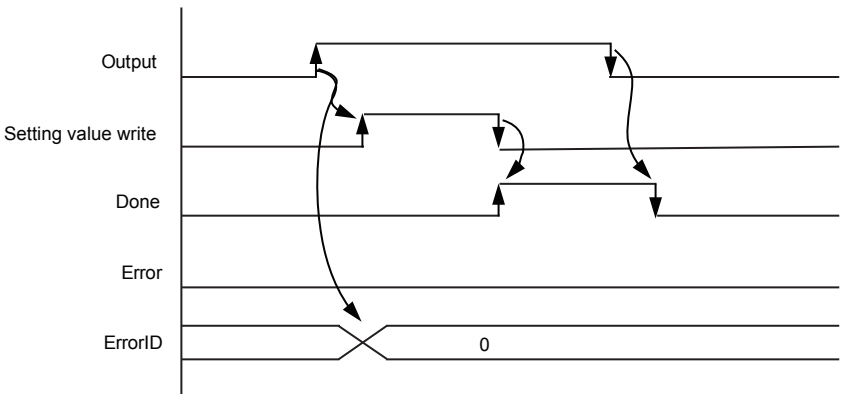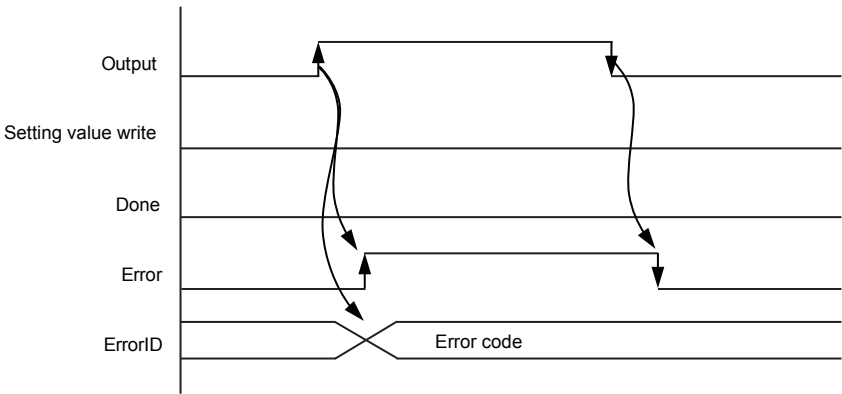
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	OutputNumber	Output number	Word [signed]	↑	0 to 15	Specify an output number.
(4)	Value	Setting value	Bit	↑	ON, OFF	Specify the value of the selected output signal.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(5)	Done	Execution completion	Bit	OFF	It indicates that writing of the output value is completed.
(6)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	Output module (16 points)
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	100 steps	
Function description	This FB changes the value of the specified output number of the output signal defined with MC_OUTPUT_REF. The FB is executed when Execute turns ON, and the data is written. Done turns ON, when writing of the value is completed. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	—	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[When the FB is normally completed] [When an error occurs] 	

2.23 MCv_ReadServoParameter (Servo Parameter Read)

Name

MCv_ReadServoParameter+RD77GF

MCv_ReadServoParameter+J4GFIO

Overview

Item	Description
Function overview	Reads the parameter value of the servo parameter number of the specified axis.
Symbol [Structured Ladder]	<table><tr><td colspan="2" align="center">MCv_ReadServoParameter+RD77GF</td></tr><tr><td>(1) — DUT: Axis (2) — B: Execute (3) — UW: ObjectIndex</td><td>Axis :DUT — (1) Done :B — (4) Error :B — (5) ErrorID :UW — (6) Value :UD — (7)</td></tr></table> <table><tr><td colspan="2" align="center">MCv_ReadServoParameter+J4GFIO</td></tr><tr><td>(1) — DUT: Axis (2) — B: Execute (3) — UW: ObjectIndex</td><td>Axis :DUT — (1) Done :B — (4) Error :B — (5) ErrorID :UW — (6) Value :UD — (7)</td></tr></table>
Symbol [Structured Text]	MCv_ReadServoParameter_RD77GF (Axis, Execute, ObjectIndex, Done, Error, ErrorID, Value) MCv_ReadServoParameter_J4GFIO (Axis, Execute, ObjectIndex, Done, Error, ErrorID, Value)

Labels

■I/O label

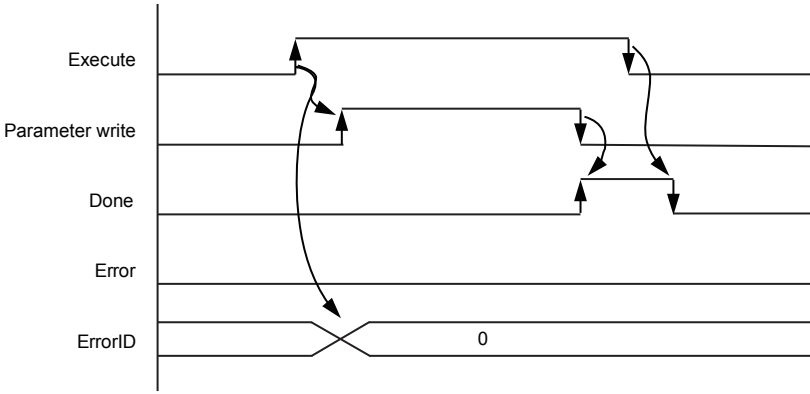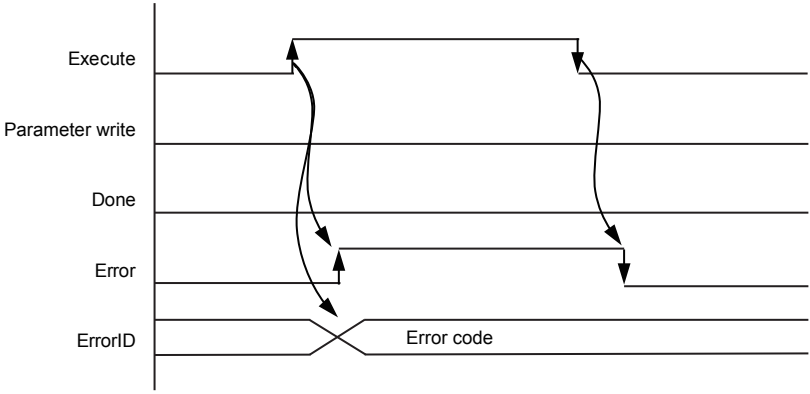| No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)
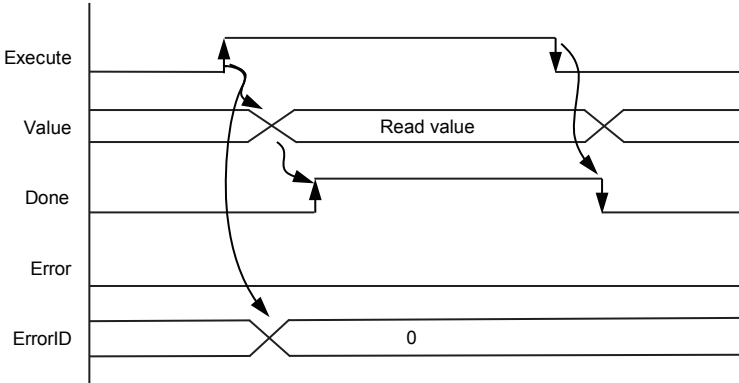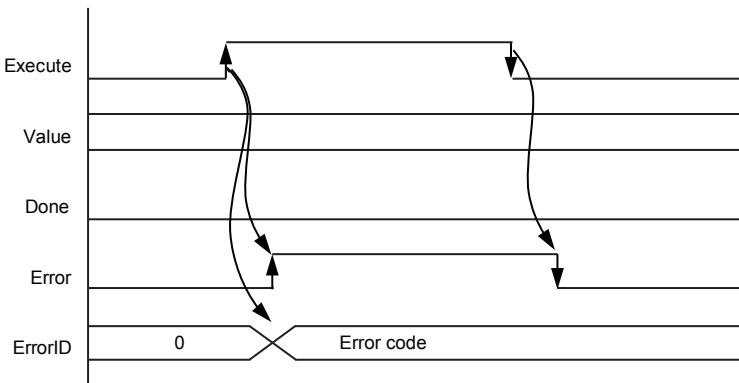
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	ObjectIndex	Object index	Word [unsigned]	↑	2001h to 25A0h	Specify an object index number of the servo parameter.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(4)	Done	Execution completion	Bit	OFF	While this device is ON, the output value is valid.
(5)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.
(7)	Value	Read value	Double word [unsigned]	0	The value read from the specified parameter is output.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MCv_ReadServoParameter+RD77GF	RD77GF
		MCv_ReadServoParameter+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MCv_ReadServoParameter+RD77GF		199 steps
	MCv_ReadServoParameter+J4GFIO		330 steps
Function description	This FB reads the parameter value of the specified servo parameter number of the axis. The FB is executed when Execute turns ON, and the specified parameter value is read. Done turns ON when reading of the parameter is completed. The read data is held while Done is ON. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.		
Restrictions and precautions	• Multiple parameters cannot be simultaneously read for one axis. • This FB cannot be executed while MCv_WriteServoParameter is being executed.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2.24 MCv_WriteServoParameter (Servo Parameter Write)

Name

MCv_WriteServoParameter+RD77GF

MCv_WriteServoParameter+J4GFIO

Overview

Item	Description
Function overview	Changes the parameter value of the servo parameter number of the specified axis.
Symbol [Structured Ladder]	MCv_WriteServoParameter+RD77GF (1) — DUT: Axis Axis :DUT — (1) (2) — B: Execute Done :B — (6) (3) — UW: ObjectIndex Error :B — (7) (4) — B: StoreParameter ErrorID :UW — (8) (5) — UD: Value MCv_WriteServoParameter+J4GFIO (1) — DUT: Axis Axis :DUT — (1) (2) — B: Execute Done :B — (6) (3) — UW: ObjectIndex Error :B — (7) (4) — B: StoreParameter ErrorID :UW — (8) (5) — UD: Value
Symbol [Structured Text]	MCv_WriteServoParameter_RD77GF (Axis, Execute, ObjectIndex, StoreParameter, Value, Done, Error, ErrorID) MCv_WriteServoParameter_J4GFIO (Axis, Execute, ObjectIndex, StoreParameter, Value, Done, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF AXIS_REF_J4GF	—	☞ Page 76 AXIS_REF (Axis information) ☞ Page 79 AXIS_REF_J4GF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	ObjectIndex	Object index	Word [unsigned]	↑	2001h to 25A0h	Specify an object index number of the servo parameter.
(4)	StoreParameter	ROM write selection	Bit	↑	ON, OFF	Select whether to write the parameter in a non-volatile memory.
(5)	Value	Setting value	Double word [unsigned]	↑	—	Specify a setting value of the specified parameter.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(6)	Done	Execution completion	Bit	OFF	It indicates that writing to the parameter is completed.
(7)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description		
Applicable hardware and software	Applicable module	MCv_WriteServoParameter+RD77GF	RD77GF
		MCv_WriteServoParameter+J4GFIO	RJ71GF11-T2, RJ71EN71, RD77GF
	Applicable CPU		MELSEC iQ-R series CPU
	Applicable engineering tool		GX Works3
Language	Structured Text		
Number of basic steps	MCv_WriteServoParameter+RD77GF		325 steps
	MCv_WriteServoParameter+J4GFIO		345 steps
Function description	This FB changes the parameter value of the servo parameter number of the specified axis. This FB is executed when Execute turns ON and the specified parameter value is changed. Done turns ON when writing to the parameter is completed. Turn ON StoreParameter to store the parameters in ROM. Refer to the following description in "StoreParameter". When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING. ■StoreParameter <When MotionControl_RD77 is used> • When StoreParameter is turned ON, all the changed parameters are stored in ROM. When changing multiple parameters, turn ON StoreParameter after the last parameter is changed. When the parameters are not stored in ROM, the data before change is restored at the next power-on. <When MotionControl_J4GFIO is used> • Specify StoreParameter for each parameter. The change of the parameter with Storeparameter ON is stored in ROM. When the parameters are not stored in ROM, the data before change is restored at the next power-on.		
Restrictions and precautions	• Multiple parameters cannot be simultaneously changed on one axis. • This FB cannot be executed while MCv_ReadServoParameter is being executed. <When MotionControl_RD77 is used> • When StoreParameter is turned ON, writing data takes time because all the changed parameters are stored in ROM. Do not turn off the power until writing of the data is completed (Done turns ON). • StoreParameter cannot be specified for multi-axis at the same time. Execute StoreParameter for each axis.		
FB compiling method	Macro type, subroutine type		
FB operation type	Pulsed execution (multiple scan execution type)		
Timing chart	[When the FB is normally completed] [When an error occurs] 		

2.25 MCv_Jog (JOG Operation)

Name

MCv_Jog+RD77

Overview

Item	Description
Function overview	Performs the JOG operation of the specified axis.
Symbol [Structured Ladder]	 **MCv_Jog+RD77** (1) — DUT: Axis — Axis :DUT — (1) (2) — B: JogForward — Done :B — (5) (3) — B: JogBackward — Busy :B — (6) (4) — L: Velocity — CommandAborted :B — (7) — Error :B — (8) — ErrorID :UW — (9)
Symbol [Structured Text]	MCv_Jog_RD77 (Axis, JogForward, JogBackward, Velocity, Done, Busy, CommnadAborted, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)
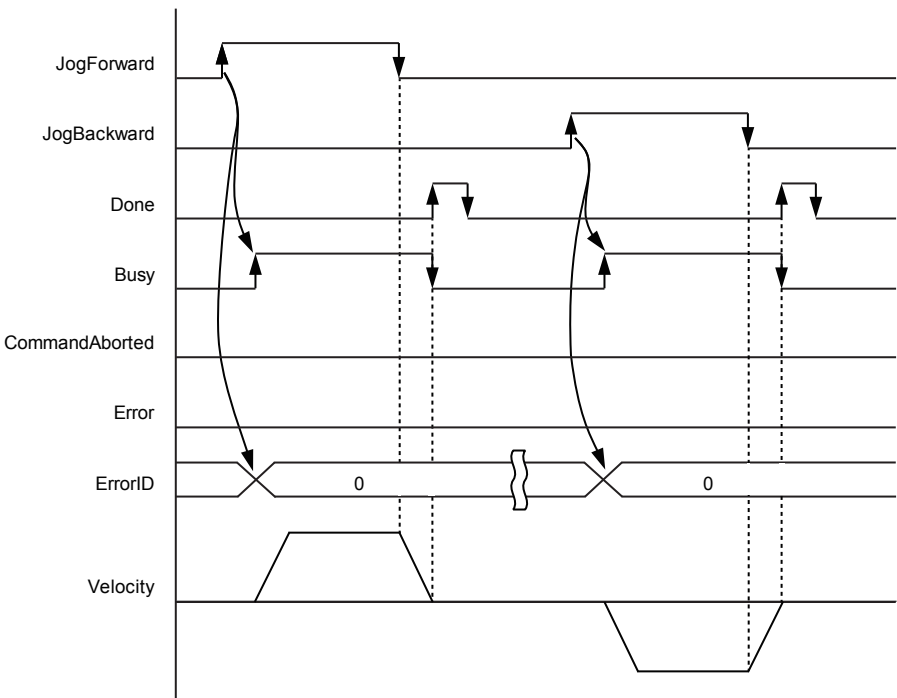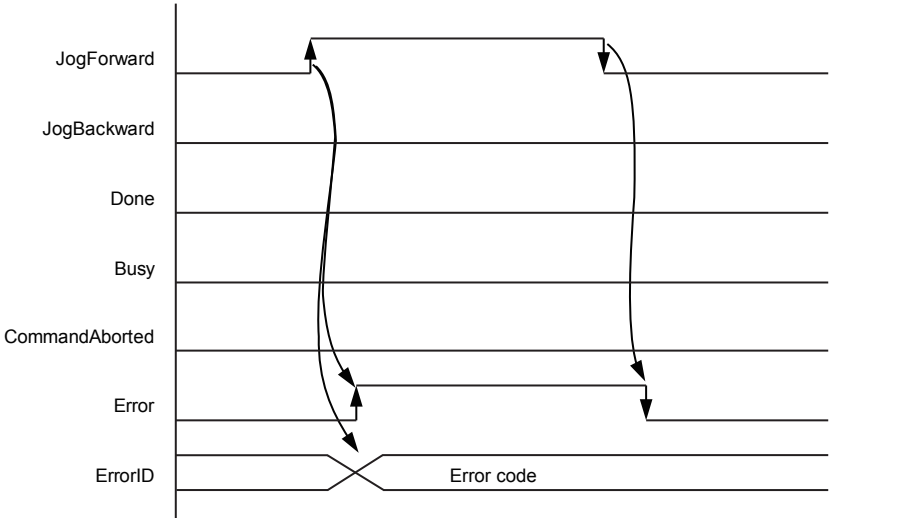
No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	JogForward	Forward rotation start	Bit	↑	ON, OFF	When ON, the axis starts to move in the positive direction. When OFF, the axis starts to decelerate to stop.
(3)	JogBackward	Reverse rotation start	Bit	↑	ON, OFF	When ON, the axis starts to move in the negative direction. When OFF, the axis starts to decelerate to stop.
(4)	Velocity	Velocity	Double-precision real number	↑	☞ Velocity command on Page 7 Unit	Specify the JOG speed.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(5)	Done	Execution completion	Bit	OFF	It turns ON for one scan when the operation has completed.
(6)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(7)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(8)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(9)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	620 steps	
Function description	This FB performs the JOG operation of the specified axis. While the forward rotation start (JogForward) or reverse rotation start (JogBackward) is ON, the axis moves in the specified direction and BUSY turns ON. If the forward rotation start or reverse rotation start is turned OFF, the axis decelerates to stop. When the axis completely stops, BUSY turns OFF and DONE turns ON for one scan. When both forward rotation start and reverse rotation start are turned ON simultaneously, the forward rotation start takes priority and the reverse rotation start is disabled. If MC_Stop is executed during movement, CommandAborted turns ON. The axis status (AxisStatus) of the AXIS_REF structure transits to ContinuousMotion during movement. When Done turns ON, the axis status transits to Standstill. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• This FB cannot be used in combination with the positioning control FB or continuous control FB. Use this FB independently. • Before executing this FB, set the JOG speed limit value, JOG operation acceleration time, and JOG operation deceleration time. • Although DONE turns ON for one scan by deceleration stop, the next start label is not imported until Done turns OFF. • While the axis is moving in the positive direction by the forward rotation start, the reverse rotation start is disabled. Conversely, while the axis is moving in the negative direction by the reverse rotation start, the forward rotation start is disabled. • If an error occurs while the axis is decelerating by the forward rotation start (reverse rotation start) OFF, Error turns ON for only one scan. • If MC_Stop is executed while the axis is decelerating by the forward rotation start (reverse rotation start) OFF, CommandAborted turns ON for only one scan.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[When the FB is normally completed] [When an error occurs]

2.26 MCv_Inch (Inching Operation)

Name

MCv_Inch+RD77

Overview

Item	Description
Function overview	Performs the inching operation of the specified axis.
Symbol [Structured Ladder]	 MCv_Inch+RD77 (1) — DUT: Axis Axis :DUT — (1) (2) — B: InchForward Done :B — (5) (3) — B: InchBackward Busy :B — (6) (4) — L: Distance Error :B — (7) ErrorID :UW — (8)
Symbol [Structured Text]	MCv_Inch_RD77 (Axis, InchForward, InchBackward, Distance, Done, Busy, Error, ErrorID)

Labels

■I/O label

No.	Variable Name	Name	Data Type	Setting Range	Description
(1)	Axis	Axis information	AXIS_REF	—	☞ Page 76 AXIS_REF (Axis information)

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable Name	Name	Data Type	Import	Setting Range	Description
(2)	InchForward	Forward rotation start	Bit	↑	ON, OFF	Start to move in the positive direction.
(3)	InchBackward	Reverse rotation start	Bit	↑	ON, OFF	Start to move in the negative direction.
(4)	Distance	Movement amount	Double-precision real number	↑	• 0.1 to 6553.5 (μm) • 0.00001 to 0.65535 (inch) • 0.00001 to 0.65535 (degree) • 1 to 65535 (pulse)	Specify the inching movement amount.

■Output labels

No.	Variable Name	Name	Data Type	Default Value	Description
(5)	Done	Execution completion	Bit	OFF	It turns ON when the movement has completed.
(6)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(7)	Error	Error	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]	0	The error code generated in the FB is returned.

Function overview

Item	Description	
Applicable hardware and software	Applicable module	RD77GF, RD77MS
	Applicable CPU	MELSEC iQ-R series CPU
	Applicable engineering tool	GX Works3
Language	Structured Text	
Number of basic steps	607 steps	
Function description	This FB performs the inching operation of the specified axis. When the forward rotation start (InchForward) or reverse rotation start (InchBackward) is turned ON, the axis starts to move in the specified direction, and BUSY turns ON. When the movement amount has been output, BUSY turns OFF and Done turns ON. If the forward rotation start or reverse rotation start is turned OFF, DONE turns OFF. When both forward rotation start and reverse rotation start are turned ON simultaneously, the forward rotation start takes priority and the reverse rotation start is disabled. The axis status (AxisStatus) of the AXIS_REF structure transits to ContinuousMotion during output. When Done turns ON, the axis status transits to Standstill. When an error has occurred in the FB, this FB turns ON Error and stores an error code in ErrorID. For details of error codes, refer to ☞ Page 84 TROUBLESHOOTING.	
Restrictions and precautions	• This FB cannot be used in combination with the positioning control FB or continuous control FB. Use this FB independently. • After this FB is executed, the next start label is not imported until Done turns OFF. • Although DONE turns ON after the movement amount has been output, an error may occur in the Simple Motion module when the specified movement amount is too large.	
FB compiling method	Macro type, subroutine type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[When the FB is normally completed] InchForward InchBackward Done Busy Error ErrorID 0 0 Distance [When an error occurs] InchForward InchBackward Done Busy Error ErrorID Error code

3 LIST OF STRUCTURES

The following tables list the structures used in each library.

MotionControl_RD77

Structure name	Description	Version
AXIS_REF	Axis information (MotionContro_RD77)	02C
MC_RD77	Library management data (MotionContro_RD77)	02C
MC_INPUT_REF	Input Information	00A
MC_OUTPUT_REF	Output Information	00A

MotionControl_J4GFIO

Structure name	Description	Version
AXIS_REF_J4GF	Axis information (MotionContro_J4GFIO)	01B
MC_J4GF	Library management data (MotionContro_J4GFIO)	01B

3.1 Axis Information Structure

AXIS_REF (Axis information)

Name

AXIS_REF

Labels

Label Name	Data Type	Access Type	Description
AxisNo	Word [unsigned]	Read/Write	Specifies the axis number of the control target.
StartIO	Word [unsigned]	Read/Write	Specifies the start I/O number of the Simple Motion module to be the control target. (First three digits of four digits (hexadecimal))
stMC_RD77	MC_RD77	Read only	For manufacturer setting

MC_RD77 (Library management data)

Name

MC_RD77

Labels

Label Name	Data Type	Access Type	Description
AxisStatus	Word [signed]	Read only	Outputs the status of the selected axis according to the PLCopen status diagram. [Status] 0: Disabled 1: ErrorStop 2: Stopping 3: Homing 4: Standstill 5: DiscreteMotion 6: ContinuousMotion 7: SynchronizedMotion
MotionOverride	Word [signed]	Read only	Stores the override status for control.
PositionUnitScaling	Double-precision real number	Read only	Stores a position scaling value.
VelocityUnitScaling	Double-precision real number	Read only	Stores a velocity scaling value.
IOAddress	Word [unsigned]	Read only	Stores the start I/O number of the Simple Motion module.
AxisNoOffset	Word [signed]	Read only	Stores the internal offset value corresponding to the axis number. This label is used to access a specific I/O signal.
AxisOffset	Double word [signed]	Read only	Stores the internal offset value corresponding to the axis number. [AxisNo: 1 to 16] Value = 0 [AxisNo: 17 to 32] Value = 1000000
AxisAddrOffset10	Double word [signed]	Read only	Stores the internal offset value corresponding to the axis number. This label is used to access a specific buffer memory address. [AxisNo: 1 to 16] Value = (AxisNo - 1) * 10 [AxisNo: 17 to 32] Value = (AxisNo - 17) * 10 + 1000000
AxisAddrOffset100	Double word [signed]	Read only	Stores the internal offset value corresponding to the axis number. This label is used to access a specific buffer memory address. [AxisNo: 1 to 16] Value = (AxisNo - 1) * 100 [AxisNo: 17 to 32] Value = (AxisNo - 17) * 100 + 1000000
AxisAddrOffset150	Double word [signed]	Read only	Stores the internal offset value corresponding to the axis number. This label is used to access a specific buffer memory address. [AxisNo: 1 to 16] Value = (AxisNo - 1) * 150 [AxisNo: 17 to 32] Value = (AxisNo - 17) * 150 + 1000000
AxisAddrOffset1000	Double word [signed]	Read only	Stores the internal offset value corresponding to the axis number. This label is used to access a specific buffer memory address. [AxisNo: 1 to 16] Value = (AxisNo - 1) * 1000 [AxisNo: 17 to 32] Value = (AxisNo - 17) * 1000 + 1000000
Pr9AccelerationT0Addr	Double word [signed]	Read only	Stores the buffer memory address of "Pr.9 Acceleration time 0" of the control target axis.
Pr90SpdTorqCtrlModeAddr	Double word [signed]	Read only	Stores the buffer memory address of "Pr.90 Operation setting for speed-torque control mode" of the control target axis.
Md20CurrentFeedAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.20 Current feed value" of the control target axis.
Md23AxisErrorNoAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.23 Axis error No." of the control target axis.

Label Name	Data Type	Access Type	Description
Md26OperationStatusAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.26 Axis operation status" of the control target axis.
Md28AxisFeedRateAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.28 Axis feedrate" of the control target axis.
Md31GeneralStatusAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.31 Status" of the control target axis.
Md32TargetValueAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.32 Target value" of the control target axis.
Md44PosDataNoExecAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.44 Positioning data No. being executed" of the control target axis.
Md101RealCurrentValueAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.101 Real current value" of the control target axis.
Md103MotorRotationSpdAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.103 Motor rotation speed" of the control target axis.
Md108ServoStatus1Addr	Double word [signed]	Read only	Stores the buffer memory address of "Md.108 Servo status1" of the control target axis.
Md119ServoStatus2Addr	Double word [signed]	Read only	Stores the buffer memory address of "Md.119 Servo status2" of the control target axis.
Md122SpeedInCommandAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.122 Speed during command" of the control target axis.
Md123TorqueInCommandAddr	Double word [signed]	Read only	Stores the buffer memory address of "Md.123 Torque during command" of the control target axis.
Cd3PositionDataStartAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.3 Positioning start No." of the control target axis.
Cd5ErrorResetReqAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.5 Axis error reset" of the control target axis.
Cd9NewCurrentValueAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.9 New current value" of the control target axis.
Cd10NewAccelerationAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.10 New acceleration time value" of the control target axis.
Cd13SpeedOverrideAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.13 Positioning operation speed override" of the control target axis.
Cd27AddrChangeAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.27 Target position change value (New address)" of the control target axis.
Cd138ModeSwitchReqAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.138 Control mode switching request" of the control target axis.
Cd143CommandTorqueAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.143 Command torque at torque control mode" of the control target axis.
Cd180AxisStopAddr	Double word [signed]	Read only	Stores the buffer memory address of "Cd.180 Axis stop" of the control target axis.
AxisUnitType	Word [signed]	Read only	Stores the unit setting of the control target axis.
AxisTotalCount	Word [unsigned]	Read only	Stores the maximum number of axes of the module.
MoveStartFeedValue	Double-precision real number (0..1)	Read only	Stores the current feed value at the execution of the FB.
PositionLimitNeg	Double-precision real number	Read only	Stores the positioning range (lower limit) of the absolute system.
PositionLimitPos	Double-precision real number	Read only	Stores the positioning range (upper limit) of the absolute system.
DistanceLimitNeg	Double-precision real number	Read only	Stores the positioning range (lower limit) of the incremental system.
DistanceLimitPos	Double-precision real number	Read only	Stores the positioning range (upper limit) of the incremental system.
VelocityLimitNeg	Double-precision real number	Read only	Stores the velocity command range (lower limit).
VelocityLimitPos	Double-precision real number	Read only	Stores the velocity command range (upper limit).

AXIS_REF_J4GF (Axis information)

Name

AXIS_REF_J4GF

Labels

Label Name	Data Type	Access Type	Description
AxisNo	Word [signed]	Read/Write	Specifies the axis number of the control target. [Setting range] 1 to 120
StartIO	Word [signed]	Read/Write	Specifies the start I/O number of the master module to be the control target. (First three digits of four digits (hexadecimal))
MasterModule	Word [signed]	Read/Write	Specifies the master module to be the control target. [MASTER_MODULE_REF] MasterRJ71GF: RJ71GF MasterRJ71EN_F: RJ71EN(CCIF) MasterRJ71EN_EF: RJ71EN(E+CCIF) MasterRD77GF: RD77GF
RemoteRegArrayNo	Word [signed]	Read/Write	Specifies the array element number of the specified structure "stRemoteReg" to the global label "G_stLinkIEF". [Setting range] 0 to 7
WaitTime	Word [unsigned]	Read/Write	Specifies the adjustment value of the transmission delay time. [Setting range] 0 to 60000 [ms]
LinkDeviceUse	Bit	Read/Write	Temporarily releases link devices used in the library. Use this label only when accessing the link devices with user-created programs. Access the link devices after LinkDeviceAccessible turns ON. To restart the library operation, turn OFF LinkDeviceUse.
LinkDeviceAccessible	Bit	Read only	Outputs the status of the access to the link devices in the library. ON: Accessible OFF: Inaccessible
stMC_J4GF	MC_J4GF	Read only	For manufacturer setting

MC_J4GF (Library management data)

Name

MC_J4GF

Labels

Label Name	Data Type	Description
AxisStatus	Word [signed]	Outputs the status of the selected axis according to the PLCopen status diagram. [Status] 0: Disabled 1: ErrorStop 2: Stopping 3: Homing 4: Standstill 5: DiscreteMotion 6: ContinuousMotion 7: SynchronizedMotion
PositionUnitScaling	Double-precision real number	Stores a position scaling value.
VelocityUnitScaling	Double-precision real number	Stores a velocity scaling value.
IOAddress	Word [signed]	Stores the start I/O number of the master module.
AxisUnitType	Word [signed]	Stores the unit setting of the control target axis.
AxisTotalCount	Word [signed]	Stores the maximum number of axes of the module.
PositionLimitNeg	Double-precision real number	Stores the positioning range (lower limit) of the absolute system.
PositionLimitPos	Double-precision real number	Stores the positioning range (upper limit) of the absolute system.
DistanceLimitNeg	Double-precision real number	Stores the positioning range (lower limit) of the incremental system.
DistanceLimitPos	Double-precision real number	Stores the positioning range (upper limit) of the incremental system.
VelocityLimitNeg	Double-precision real number	Stores the velocity command range (lower limit).
VelocityLimitPos	Double-precision real number	Stores the velocity command range (upper limit).
wInstCdTaskStat	Word [signed]	For manufacturer setting
wInstCdDataSize	Word [signed]	For manufacturer setting
u10InstCodeNo	Word [unsigned]/Bit string [16-bit] (0..9)	For manufacturer setting
u10InstCdRdWrDataLo	Word [unsigned]/Bit string [16-bit] (0..9)	For manufacturer setting
u10InstCdRdWrDataHi	Word [unsigned]/Bit string [16-bit] (0..9)	For manufacturer setting
uInstCdReplyCode	Word [unsigned]/Bit string [16-bit]	For manufacturer setting
wInstCdDataCount	Word [signed]	For manufacturer setting
wIdxUnitNo	Word [signed]	For manufacturer setting
wIdxRX0	Word [signed]	For manufacturer setting
wIdxRY0	Word [signed]	For manufacturer setting
wIdxRWr0	Word [signed]	For manufacturer setting
wIdxRWw0	Word [signed]	For manufacturer setting
bMonValid	Bit	For manufacturer setting
dMonCommandPosition	Double word [signed]	For manufacturer setting
dMonCurrentPosition	Double word [signed]	For manufacturer setting
bInstCdMonValid	Bit	For manufacturer setting
uInstCdMonErrorID	Word [unsigned]/Bit string [16-bit]	For manufacturer setting
bInstCdMonDog	Bit	For manufacturer setting
bInstCdMonFLS	Bit	For manufacturer setting
bInstCdMonRLS	Bit	For manufacturer setting
wAxisOperationStatus	Word [signed]	For manufacturer setting
wActiveAxis	Word [signed]	For manufacturer setting
uFbExecCount	Word [unsigned]/Bit string [16-bit]	For manufacturer setting
dLinkDelayTime	Double word [signed]	For manufacturer setting

3.2 MC_INPUT_REF (Input Information)

Name

MC_INPUT_REF_DI16

Labels

A device is assigned to this label in the global label. For details, refer to ☞ Page 86 PROJECT SETTING EXAMPLE.

Label Name	Data Type	Access Type	Description
DigitalInputs	Bit (0..15)	Read only	Stores the input signal status for 16 points.

3.3 MC_OUTPUT_REF (Output Information)

Name

MC_OUTPUT_REF_DO16

Labels

A device is assigned to this label in the global label. For details, refer to ☞ Page 86 PROJECT SETTING EXAMPLE.

Label Name	Data Type	Access Type	Description
DigitalOutputs	Bit (0..15)	Read/Write	Stores the output signal status for 16 points.

4 LIST OF GLOBAL LABELS

4.1 MC_DIRECTION (Direction Selection)

Name

MC_DIRECTION

Overview

This parameter is used to specify the travel direction in the absolute system of when the unit is "degree".

Labels

Label Name	Data Type	Access Type	Constant	Description
mcPositiveDirection	Word [signed]	Read only	1	Specifies the clockwise rotation in the absolute system.
mcNegativeDirection	Word [signed]	Read only	2	Specifies the counterclockwise rotation in the absolute system.
mcShortestWay	Word [signed]	Read only	3	Specifies the shortcut control.

4.2 MASTER_MODULE_REF (Master Module Selection)

Name

MASTER_MODULE_REF

Overview

This parameter is used to specify a master module.

Labels

Label Name	Data Type	Access Type	Constant	Description
MasterRJ71GF	Word [signed]	Read only	1	Specifies the network module RJ71GF.
MasterRJ71EN_F	Word [signed]	Read only	2	Specifies the information module RJ71EN (CCIEF).
MasterRJ71EN_EF	Word [signed]	Read only	3	Specifies the information module RJ71EN (E+CCIEF).
MasterRD77GF	Word [signed]	Read only	4	Specifies the Simple Motion module RD77GF.

MEMO

5 TROUBLESHOOTING

5.1 List of Error Codes

This section lists the error codes output in this library.

When the error code is 1200h or later, check the details in MC_ReadAxisError (Axis Error Read).

For the errors of the axis, refer to the error codes of the module or the slave device in use.

Error code (Hexadecimal)	Description	Remedy
1100	A value out of the range is set as an axis number.	Correct the axis number. MotionControl_RD77: 1 to 32 (RD77GF)/1 to 16 (RD77MS) MotionControl_J4GFIO: 1 to 120 * Even if the axis number is set within the range, the FB may not operate depending on the module in use or system configuration.
1101	A value out of the range is set as an I/O number.	Correct the input or output number to a value within 0 to 15.
1102	A value out of the range is set as a positioning data No.	Correct the positioning data No. to a value within 1 to 100.
1103	A value out of the range is set as a commanded position or travel distance.	Review and correct a value of the commanded position or travel distance.
1104	A value out of the range is set as a velocity.	Review and correct the velocity value.
1105	A value out of the range is set as an acceleration/deceleration time.	Review and correct a value of the acceleration/deceleration time.
1106	A value out of the range is set as a unit.	Correct the unit to mm, inch, or pulse.
1107	A value out of the range is set to a rotation direction.	Correct the rotation direction value to a value defined with MC_DIRECTION.
1108	A value out of the range is set as a commanded torque.	Review and correct the commanded torque value.
1109	A value out of the range is set as a velocity override factor.	Correct the velocity override factor to a value within 0.00 to 3.00.
110A	A value out of the range is set as a parameter number.	Review and correct the parameter number. MC_ReadParameter: 1 to 3, 9 to 11 MC_WriteParameter: 9
110B	A value out of the range is set as an object index.	Review and correct the object index number. Servo parameters: 2001h to 25A0h
110C	A value out of the range is set in MASTER_MODULE_REF (master module selection).	Set a value within the range of 1 to 4.
110D	The servo amplifier parameter setting cannot be referred to.	Set [PR.PA19] to "00ABh" or "10ABh".
1200	The READY signal is off.	Eliminate the error of the controller or servo amplifier and execute the FB again.
1201	The power of the servo amplifier is OFF or the servo amplifier is not connected.	Check if the power of the servo amplifier is ON or a communication cable is connected to the servo amplifier.
1202	An error occurred.	Eliminate the error and execute the FB again.
1203	The positioning cannot be started.	Execute the FB again after the control in execution is completed or turning OFF the start signal.
1204	The axis is in the Stopping status or the stop command of the axis is ON.	Execute the FB again after changing the axis status to Standstill or turning OFF the stop command.
1205	Reading or writing the parameter failed.	Check if the parameter number or object index is correct or the setting data is within the range.
1206	Another FB is executing the instruction code.	Check the completion of the FB executing the instruction code, and then execute the target FB.
1207	Access to the link devices is disabled.	Turn OFF the link device use flag (LinkDeviceUse) of the AXIS_REF structure, and execute the target FB.
1300	A warning occurred.	Eliminate the warning cause.

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6 PROJECT SETTING EXAMPLE

6.1 Library Registration Procedure

1. Start GX Works3, select [Project] ⇨ [New], and select a type. Display the Element Selection window.
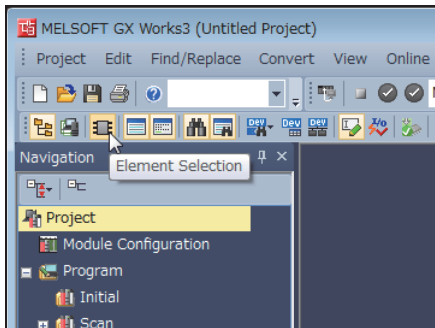
2. Select the Library tag, and select "Register Library..." of the "Register to Library List" icon.
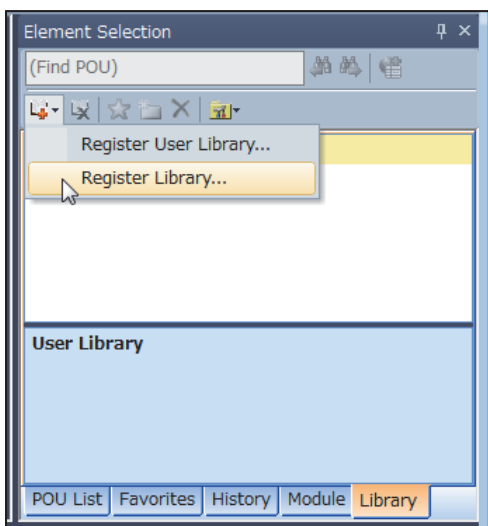
3. The following dialog box appears. Click the [OK] button.
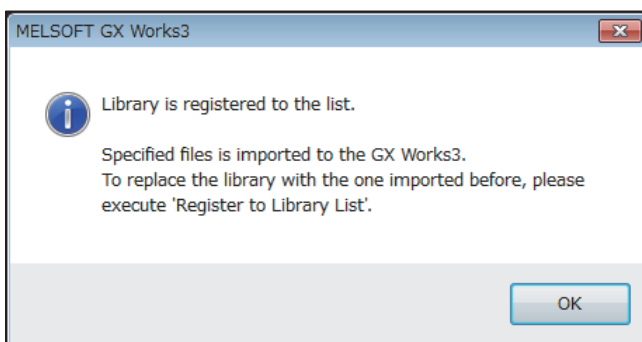
4. The "Register Library to Library List" window appears. Select "MotionControl_****.mslm" and click the [Open] button.

5. Imported FBs are displayed in the Element Selection window.
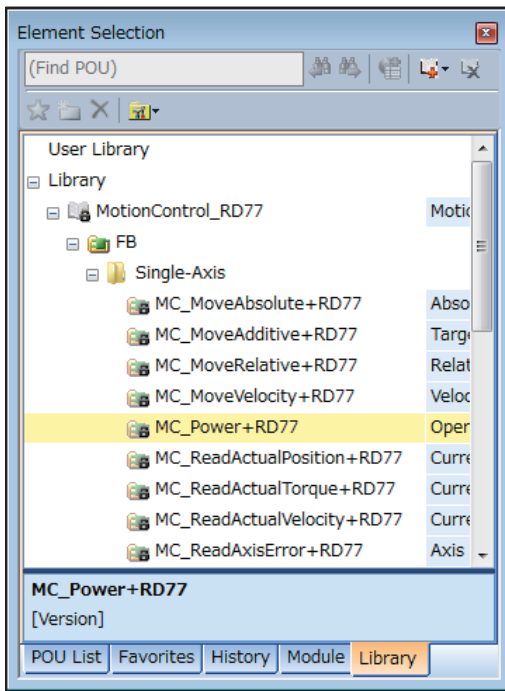
6. Select an FB in the Element Selection window and drag and drop it into the work window. The FB is added in the Navigation window.

7. Open "Property" of the FB added in the Navigation window, and set "Macro Type" for FB Type.

*When the library version is 1.02C or later, "Subroutine Type" can also be set for FB Type.

6.2 Library Update Procedure

1. Library element update procedure

For details of the library element update procedure, refer to the following.

📖GX Works3 Operating Manual

Precautions

Each FB in the library is created using "Macro Type". When an FB using "Subroutine Type" is used in a project, first change the type of the FB to "Macro Type", then set the type of the FB back to "Subroutine Type" after updating the library. When library elements in a project cannot be updated, first delete the library elements (FBs, structures) in the Navigation window, then drag and drop the new version of the FB onto the Navigation window. To update any library element, said element must first be deleted in the Navigation window and then re-added as shown above.

2. Project replacement method

• Changes from Versions 1.01B to 1.03D to Version 1.04E

Change	Replacement method
AxisNo (a member of the AXIS_REF) and StartIO have been changed to the word [unsigned] data type.	Corrects the variable data type of the I/O number and the axis number to the word [unsigned] data type, or uses type change instruction to correct parts with an incorrect data type to a matching data type.

• Changes from Version 1.00A to 1.01B

Change	Replacement method
The AXIS_REF_RD77 structure has been changed to the AXIS_REF structure.	The AXIS_REF_RD77 structure specified as the data type of the global label has been changed to the AXIS_REF structure.
HeadAddress (a member of the AXIS_REF_RD77 structure) has been changed to StartIO (a member of the AXIS_REF structure).	Change HeadAddress to StartIO in the program.

• Replacement of global labels

Change the AXIS_REF_RD77 to AXIS_REF.
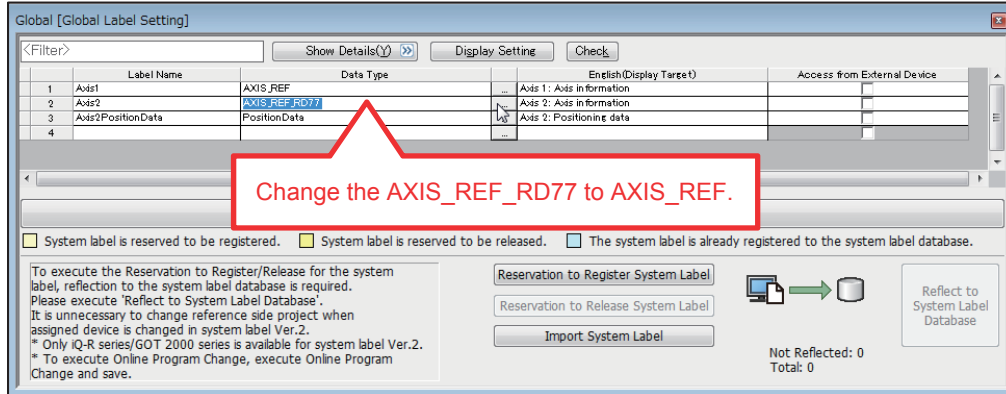
6.3 Digital I/O Setting Example

1. Add a module. (when adding an input module)
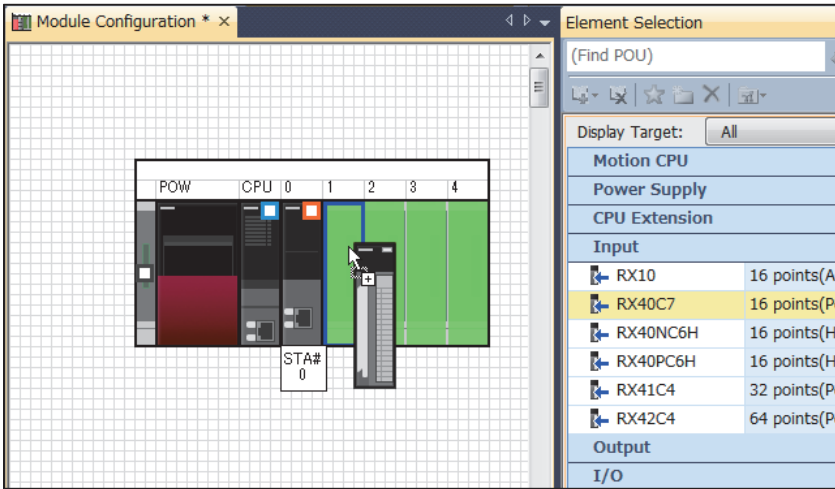
2. Drag and drop the FB for reading digital inputs into the program.
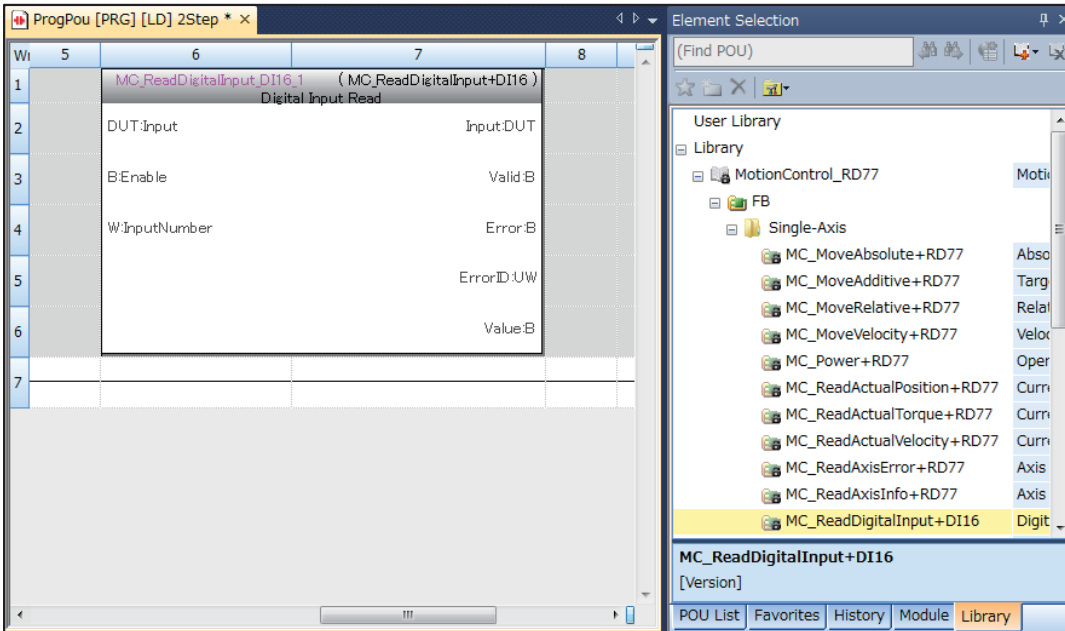
3. Set global labels. Input a label name (DigitalInput) and select MC_INPUT_REF_DI16 in "Data Type".
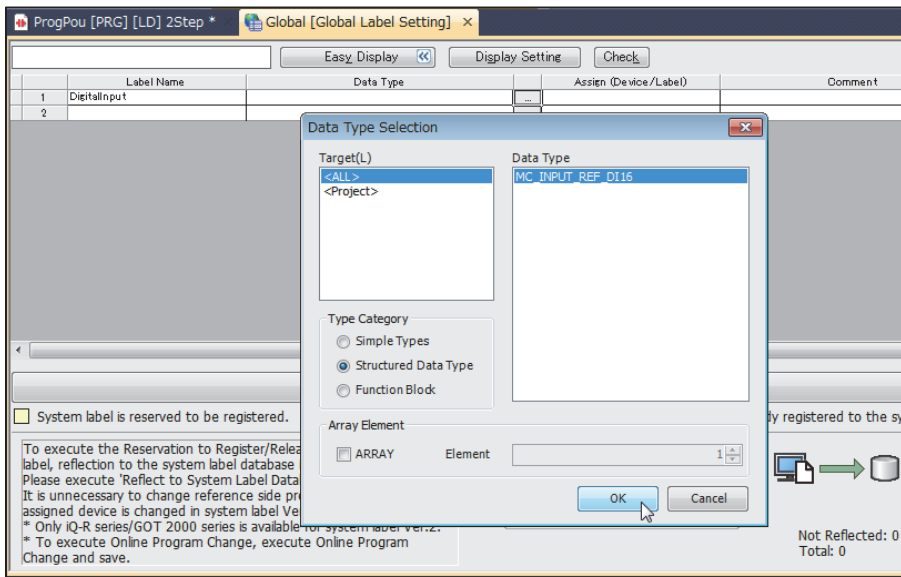
4. Set the I/O address mounted on the device.

(Example) X40
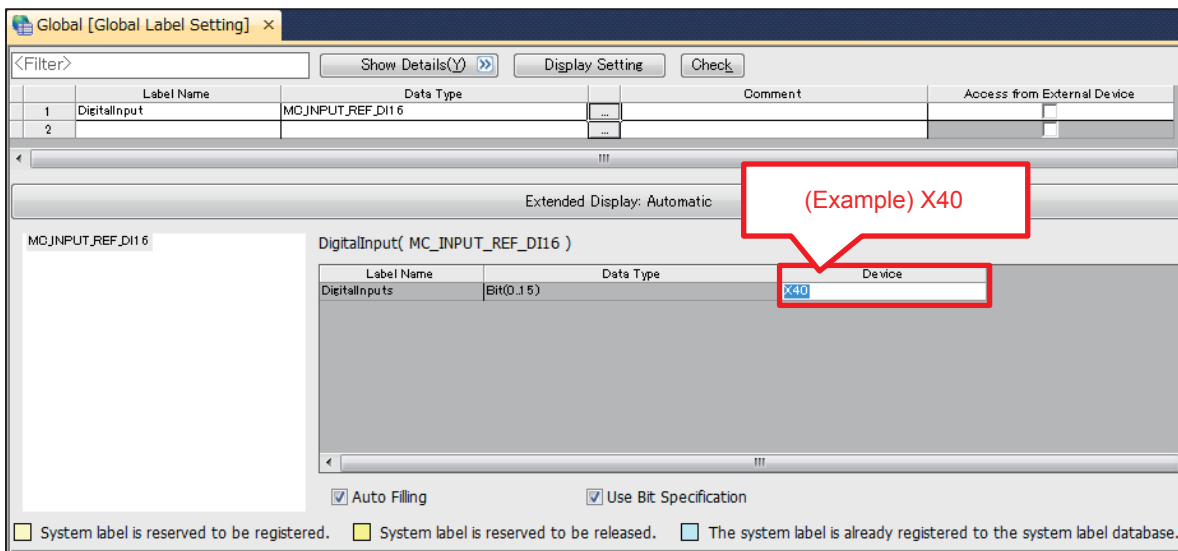
5. Set input/outputs of a program.

Defined global label
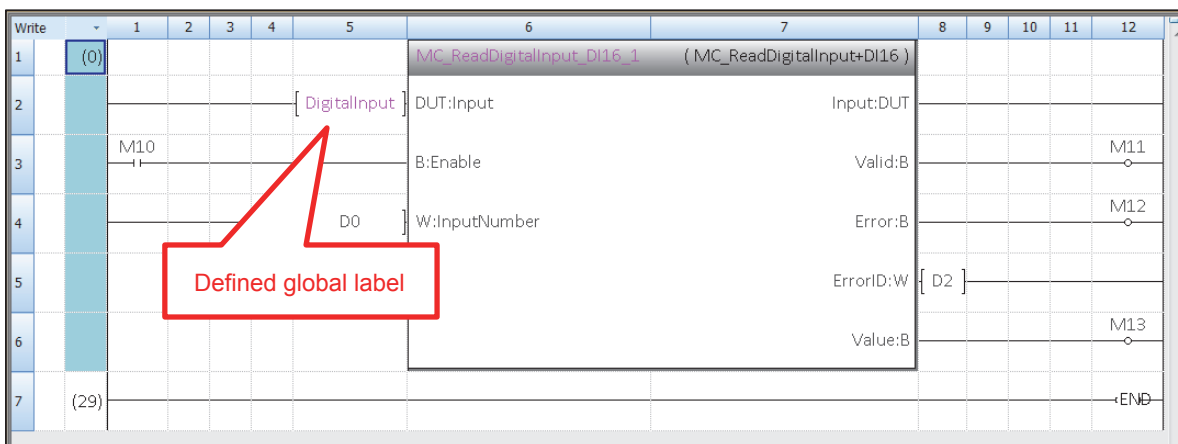
6.4 Setting Example of the CC-Link IE Field Network Master/Local Module

This section describes an example for setting a system in which the CC-Link IE Field Network master/local module RJ71GF11-T2 and the CC-Link IE Field Network compatible servo amplifier MR-J4-GF are connected.

1. Add modules.

Set a CPU module (RnCPU), and add the network module RJ71GF11-T2.

When using an information module, add the RJ71EN71 (CCIEF) or RJ71EN71 (E+CCIEF).

When using the RnENCPU as the CPU module, add _RJ71EN71 (CCIEF) or _RJ71EN71 (E+IEF) as a CPU extension module.
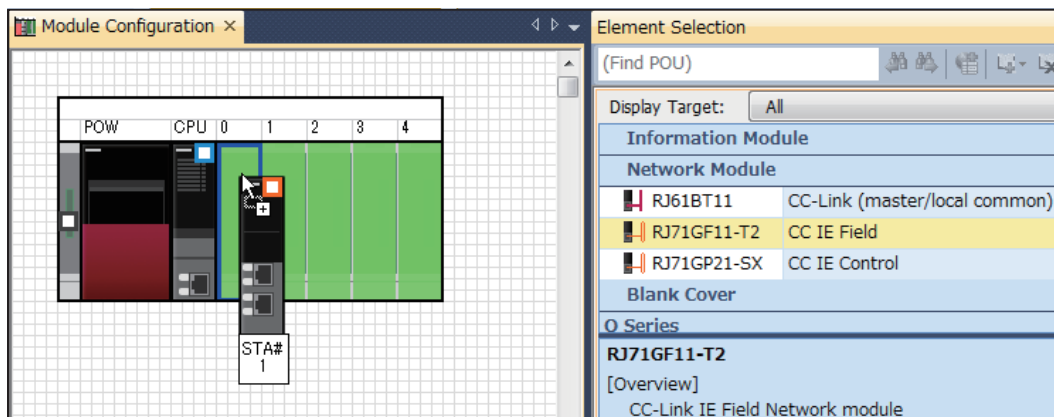
2. Set the network configuration.

🖱 [Navigation] window ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Module Parameter] ⇨ [Basic Settings] ⇨ [Network Configuration Settings]

• Setting example with the network module RJ71GF11-T2

Add the MR-J4-GF. Set "Asynchronous" for "Network Synchronous Communication" and "IO Mode" for "Station-specific mode setting".

Do not assign the same link devices for multiple stations.
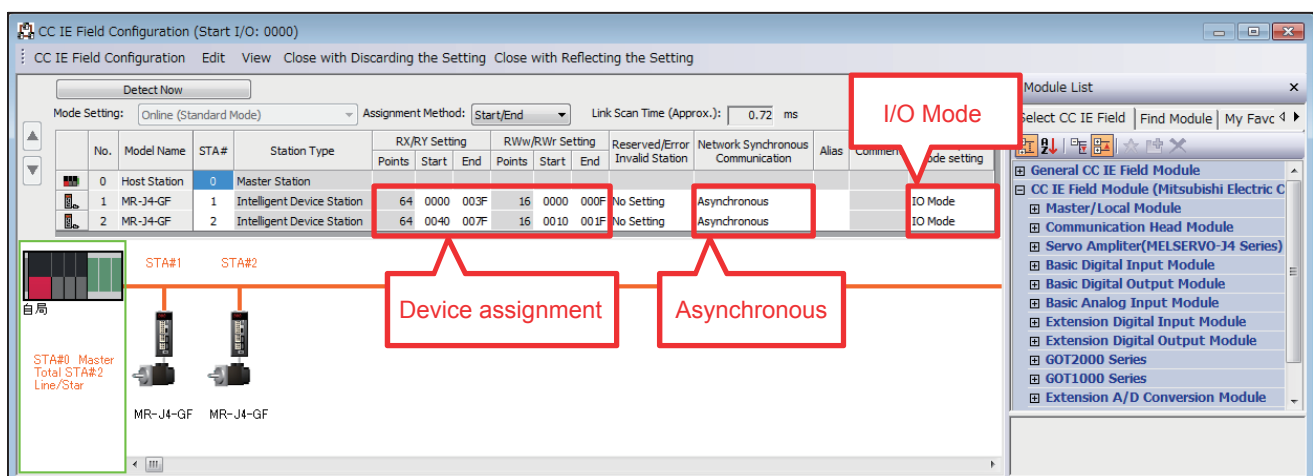
Restriction🤚

When both MotionControl_RD77 and MotionControl_J4GFIO are used on the Simple Motion module RD77GF, define axes (stations) to be used in the MotionControl_J4GFIO first and then axes (stations) to be used in the MotionControl_RD77.

• Setting example for using the Simple Motion module RD77GF

Define the axes to be used in the MotionControl_J4GFIO ("I/O mode" for MR-J4-GF) first and then the axes to be used in the MotionControl_RD77 ("Motion mode" for MR-J4-GF).
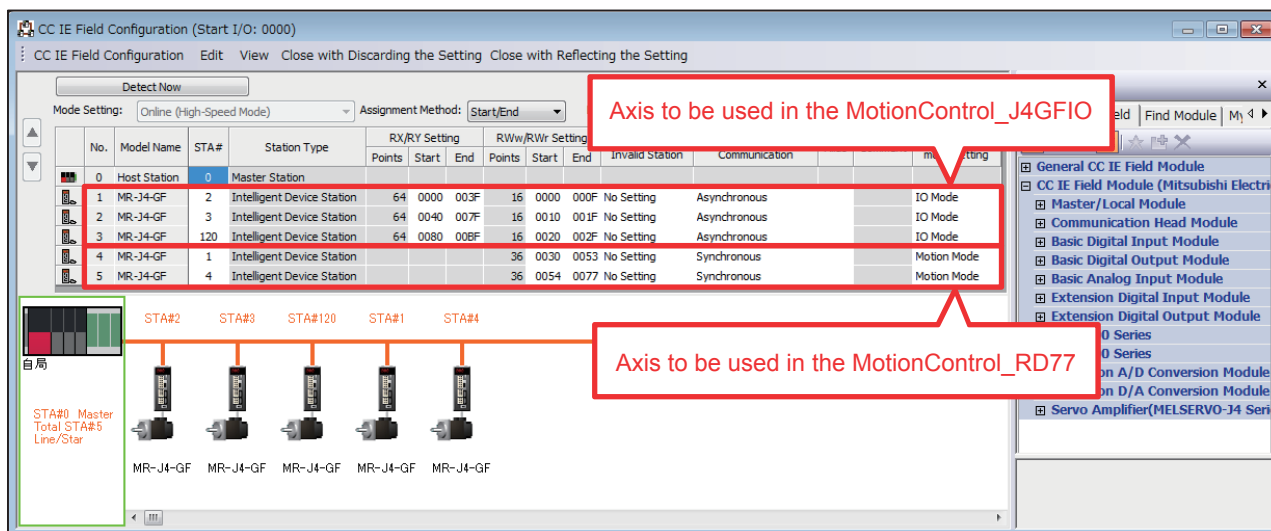
3. Configure the refresh setting.

👉 [Navigation] window ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Module Parameter] ⇨ [Basic Settings] ⇨ [Refresh Setting]

• Setting example with the network module RJ71GF11-T2

In the following example, RX/RY device areas are assigned to B device areas, and RWw/RWr device areas are assigned to W device areas.

Although this setting can be changed according to the usage, change the assignment of global labels described in Step 4 according to the actual refresh setting.

(Example)
RX0 to RX7F: B0 to B7F
RY0 to RY7F: B80 to B0FF
RWr0 to RWr01F: W0 to W1F
RWw0 to RWw1F: W20 to W3F

Restriction

When both MotionControl_RD77 and MotionControl_J4GFIO are used on the Simple Motion module RD77GF, do not configure the refresh setting on the axes (stations) to be used in the MotionControl_RD77. Doing so causes an error in the Simple Motion module RD77GF.

• Setting example for using the Simple Motion module RD77GF

Configure the refresh setting except for the link device assignment to the axes to be used in the MotionControl_RD77 ("Motion mode" for MR-J4-GF).

No.	Link Side						CPU Side				
	Device Name	Points	Start	End			Target	Device Name	Points	Start	End
–	SB	512	00000	001FF	⬌		Specify Devic	SB	512	00000	001FF
–	SW	512	00000	001FF	⬌		Specify Devic	SW	512	00000	001FF
1	RX	192	00000	000BF	⬌		Specify Devic	B	192	00000	000BF
2	RY	192	00000	000BF	⬌		Specify Devic	B	192	000C0	0017F
3	RWr	48	00000	0002F	⬌		Specify Devic	W	48	00000	0002F
4	RWw	48	00000	0002F	⬌		Specify Devic	W	48	00030	0005F
5					⬌						

Assign only axis to be used in the "MR-J4-GF I/O mode".

4. Set global labels.

Set the information specified in the refresh setting for global labels.

• Definition of the structure

Define the devices in the refresh setting in the structure. The number of array elements of each label data type is equal to the number of "Points" of each devices set in the refresh setting.

Structure name: stRemoteReg

Label Name	Data Type	Remarks
bnRX	Bit (0..n)	n: Number of RX device points - 1. In the example of Step 3, n = 127.
bnRY	Bit (0..n)	n: Number of RY device points - 1. In the example of Step 3, n = 127.
unRWr	Word [unsigned] (0..n)	n: Number of RWr device points - 1. In the example of Step 3, n = 31.
unRWw	Word [unsigned] (0..n)	n: Number of RWw device points - 1. In the example of Step 3, n = 31.

• Definition of global labels

Define global labels using the structure set above.

This library operates using the data refreshed in the global label "G_stLinkIEF".

Correctly assign devices used for data refresh. Otherwise, FBs do not properly operate.
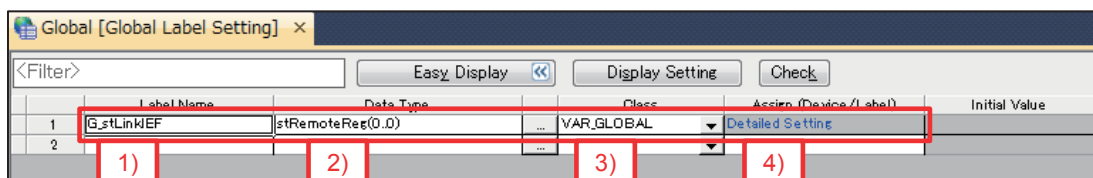
1) Set "G_stLinkIEF" as the label name in the global label settings.

2) Select the structure "stRemoteReg" as the data type and set array elements.

To make a definition with one module, set the number of array elements to "1".
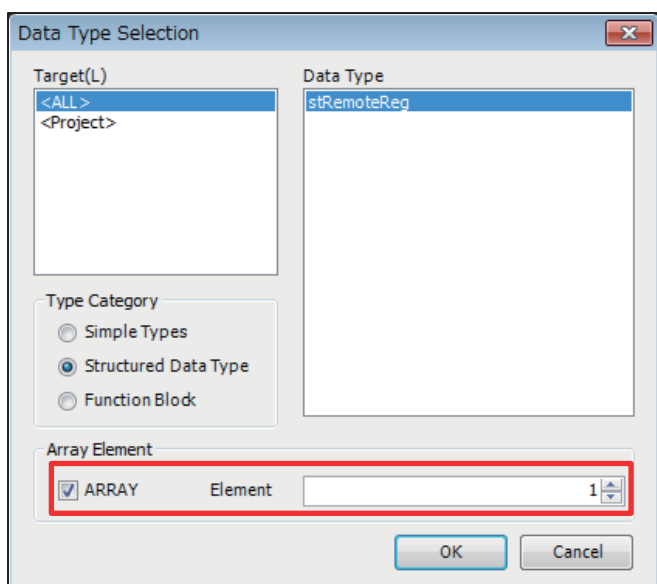
3) Select "VAR_GLOBAL" as the class.

4) Assign devices according to the refresh setting.
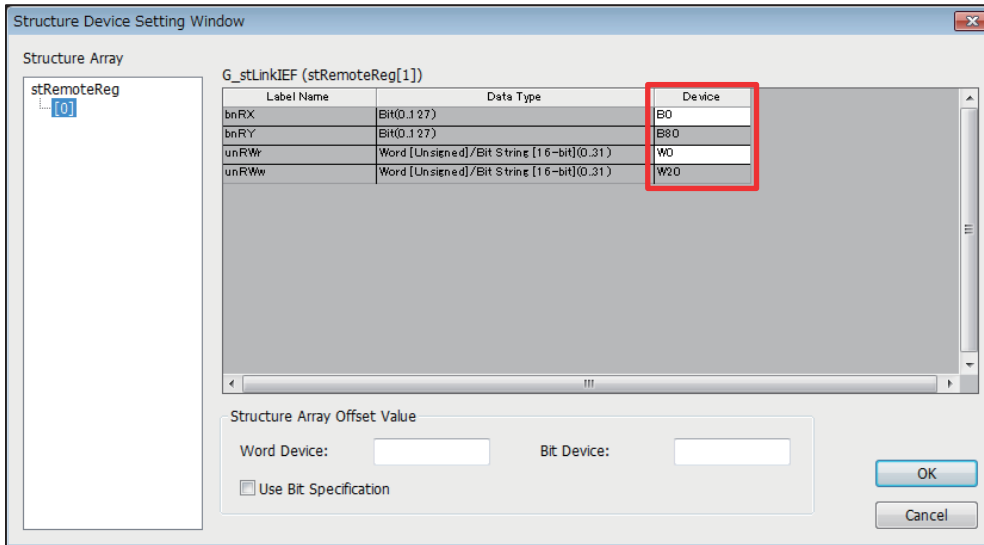
6.5 Combinations with iQ Monozukuri products or Motion module RD78G(H)

Confirm the following items when using this library together with iQ Monozukuri products (CONVERTING, PACKAGING) or Motion module RD78G(H).

1. Combinations with iQ Monozukuri products (CONVERTING, PACKAGING)

For iQ Monozukuri products, use the following versions.

Use the AXIS_REF in this library for the AXIS_REF structure included with the product.

Product	Version
iQ Monozukuri CONVERTING	1.011M(12) or later
iQ Monozukuri PACKAGING (for MELSEC IQ-R)	1.005F(06) or later

2. Combinations with the Motion module RD78G(H) library (MotionControl_RD78_***.mslm)

This library can be used simultaneously with the Motion module RD78G(H) library.

Use the AXIS_REF in this library for the AXIS_REF structure.

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6 PROJECT SETTING EXAMPLE
6.5 Combinations with iQ Monozukuri products or Motion module RD78G(H)

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