MITSUBISHI ELECTRIC

Programmable Controller

MELSEC Q series

PLCopen Motion Control Function Block Reference

-MR-JE-C

PLCopen motion control

CONTENTS

INSTRUCTION INDEX 63

1 OVERVIEW

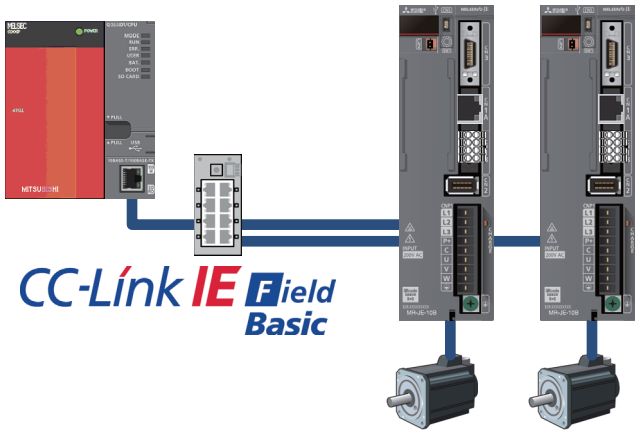
1.1 Introduction

This function block (FB) library is used in a system in which the CC-Link IE Field Network Basic compatible MELSEC-Q series QnUDVCPU module and the MR-JE-C servo amplifier are connected.
The FBs included in this library operate in the environment in which the profile mode is set as the control mode of the servo amplifier MR-JE-C.
For the profile mode setting, refer to the instruction manual of the servo amplifier in use.

1.2 Applicable Hardware and Software

Applicable hardware and software	Description
CPU module	MELSEC-Q series CPU module Q**UDVCPU (First five digits of the serial No. are "18112" or later) * Q06UDVCPU or later is recommended.
Slave unit	CC-Link IE Field Network Basic compatible MELSERVO-JE servo amplifier MR-JE-C
Engineering software	MELSOFT GX Works2 of version 1.560J or later

1.3 System Configuration Example



1.4 Relevant Manuals

- MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL [SH030257]
- MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL (CC-Link IE Field Network Basic) [SH030256]
- MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL (PROFILE MODE) [SH030254]
- MELSERVO-JE Servo amplifier INSTRUCTION MANUAL (TROUBLE SHOOTING) [SH030166]
- QCPU User's Manual (Hardware Design, Maintenance and Inspection) [SH080483]
- QnUCPU User's Manual (Function Explanation, Program Fundamentals) [SH080807]
- GX Works2 Version1 Operating Manual (Common) [SH080779]

1.5 Notes

This manual describes functions of the function blocks.

This manual does not include the information on restrictions for using CPU modules and the combination.

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 points 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.

MEMO

2 FUNCTION DESCRIPTION

2.1 Program

This FB library includes the sample programs which can be used in the configuration described in "Page 3 System Configuration Example".
Each FB operation can be checked with the sample programs.

Program configuration

File name	Description	Model	Engineering environment
MotionControl_JEC_FBs_Q.gxw	FBD, ST program	QnUDVCPU	MELSOFT GX Works2

List of programs

Program name	Description	Execution type	Description method
Sample/PrgAxis1	Each FB execution program axis 1	Scan	FBD
Sample/PrgAxis2	Each FB execution program axis 2	Scan	FBD

FB/FUN

FB name	Description	Execution type	Description method
CCIEFBasicStart	Start of cyclic communication of the specified axis	Scan	FBD

Structure

Program name	Description
stRemoteRegBasic	Device definition of the refresh setting used in the FB library

Global label

Label name	Description
G_stLinkBasic	Refresh data information used in the FB library
Axis1	Axis 1 information
Axis2	Axis 2 information

Servo amplifier MR-JE-C parameter

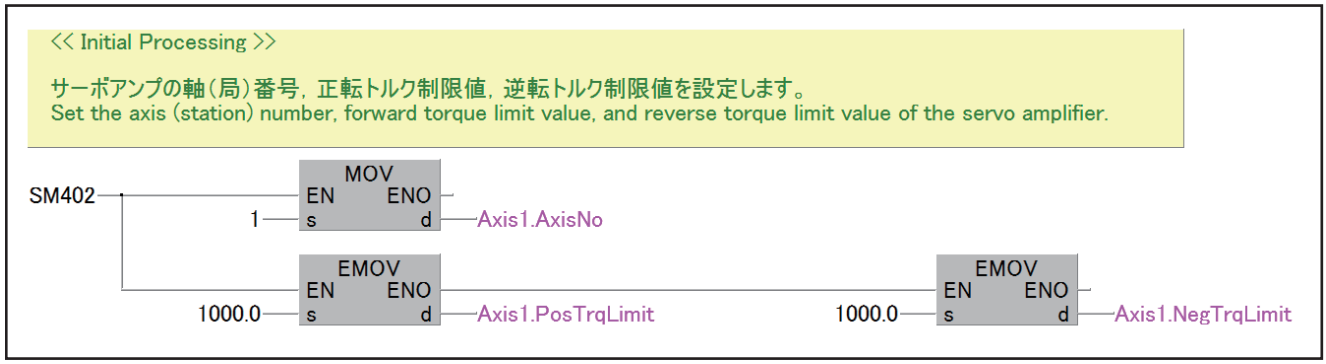
Set the following parameters to the servo amplifier in advance.
This sample program is designed not to use the input signals of the servo amplifier. Configure the settings according to safety measures required for system operation.

Parameter	Setting detail	Axis 1	Axis 2
PA01: Operation mode	Profile mode	1009	1009
PD01: I/O signal automatic on selection 1	Forced stop (automatic on) Forward rotation stroke end (automatic on) Reverse rotation stroke end (automatic on)	1C00	1C00

2.2 Program Details (Sample/PrgAxis1)

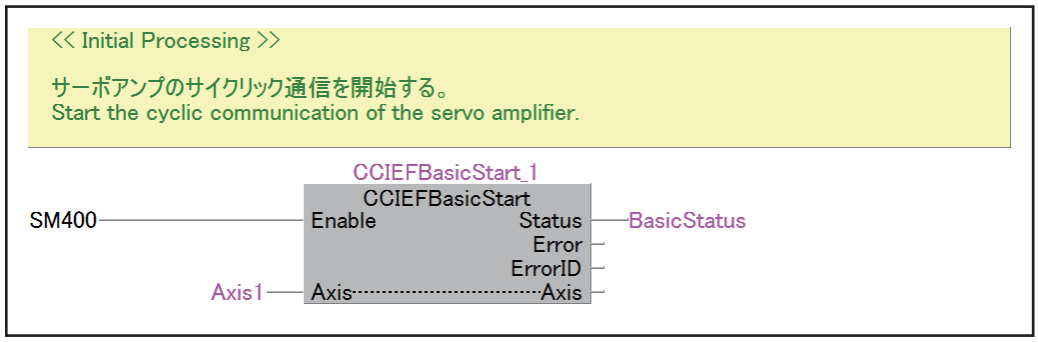
1. Configure the initial setting for using the FB library.

When the CPU module is switched from STOP to RUN, the axis information (Axis1) is set.



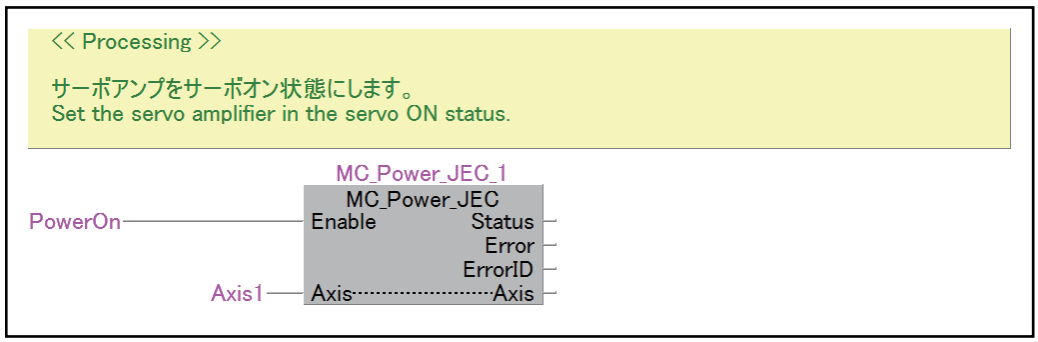
2. Start the cyclic communication of the servo amplifier.

When the CPU module is switched from STOP to RUN, the communication with the specified axis is started.



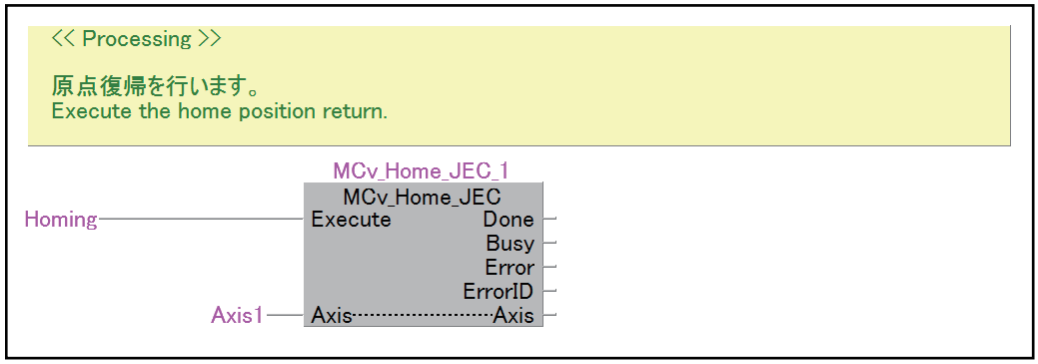
3. Set the servo amplifier in the servo ON status.

When the PowerOn label is turned ON, the specified axis is set in the servo ON status.



4. Execute the home position return.

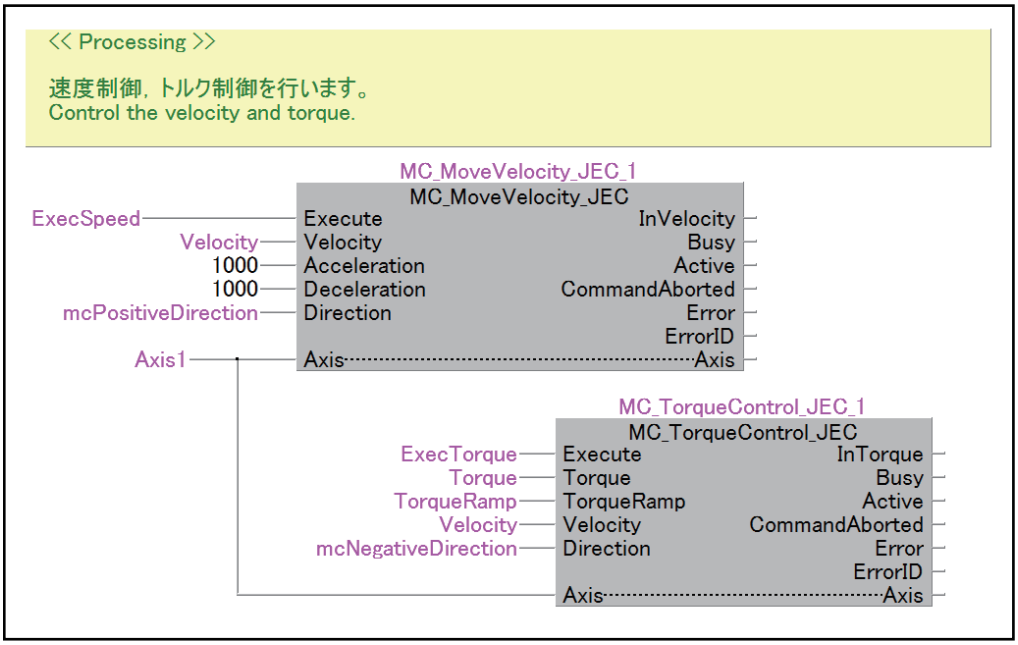
When the Homing label is turned ON, the home position return is executed.



5. Control the velocity and torque.

When the ExecSpeed label is turned ON, the velocity is controlled.

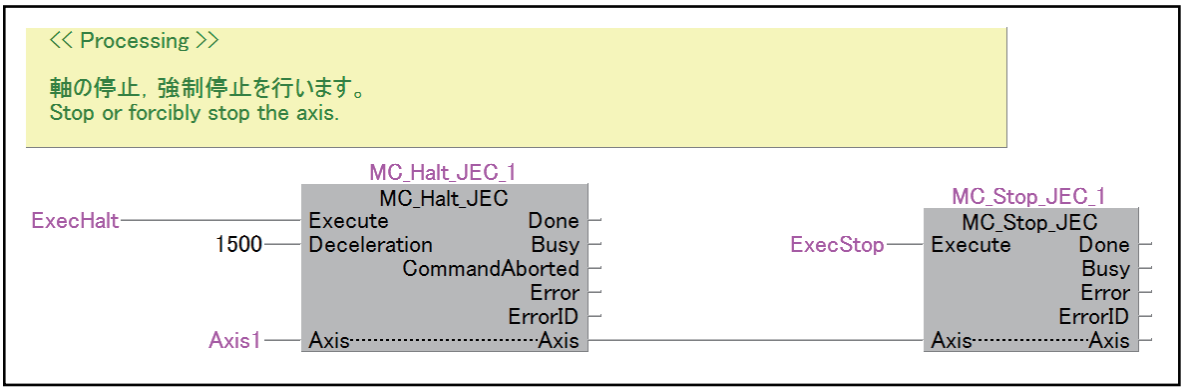
When the ExecTorque label is turned ON, the torque is controlled.



6. Stop or forcibly stop the axis.

When the ExecHalt label is turned ON, the specified axis is stopped.

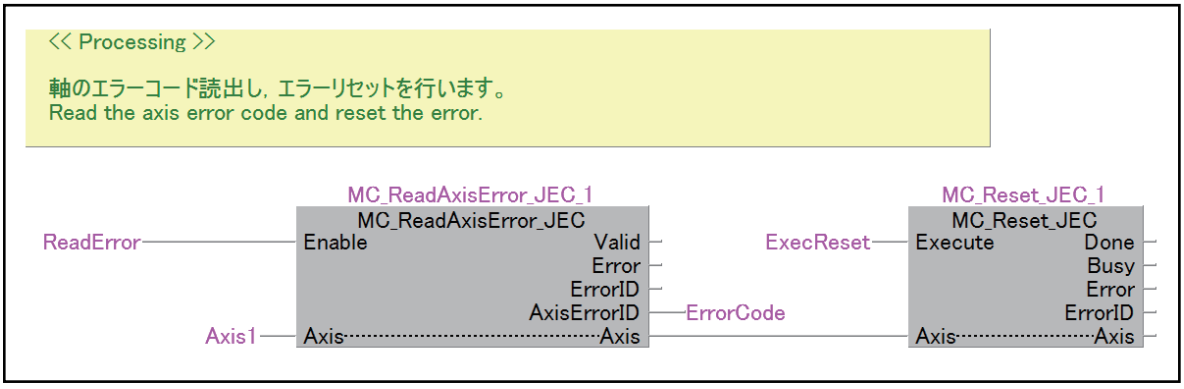
When the ExecStop label is turned ON, the specified axis is forcibly stopped.



7. Read the axis error code and reset the error.

When the ReadError label is turned ON, the alarm of the servo amplifiers is read.

When the ExecReset label is turned ON, the error is reset. Reset the error after the error cause is eliminated.

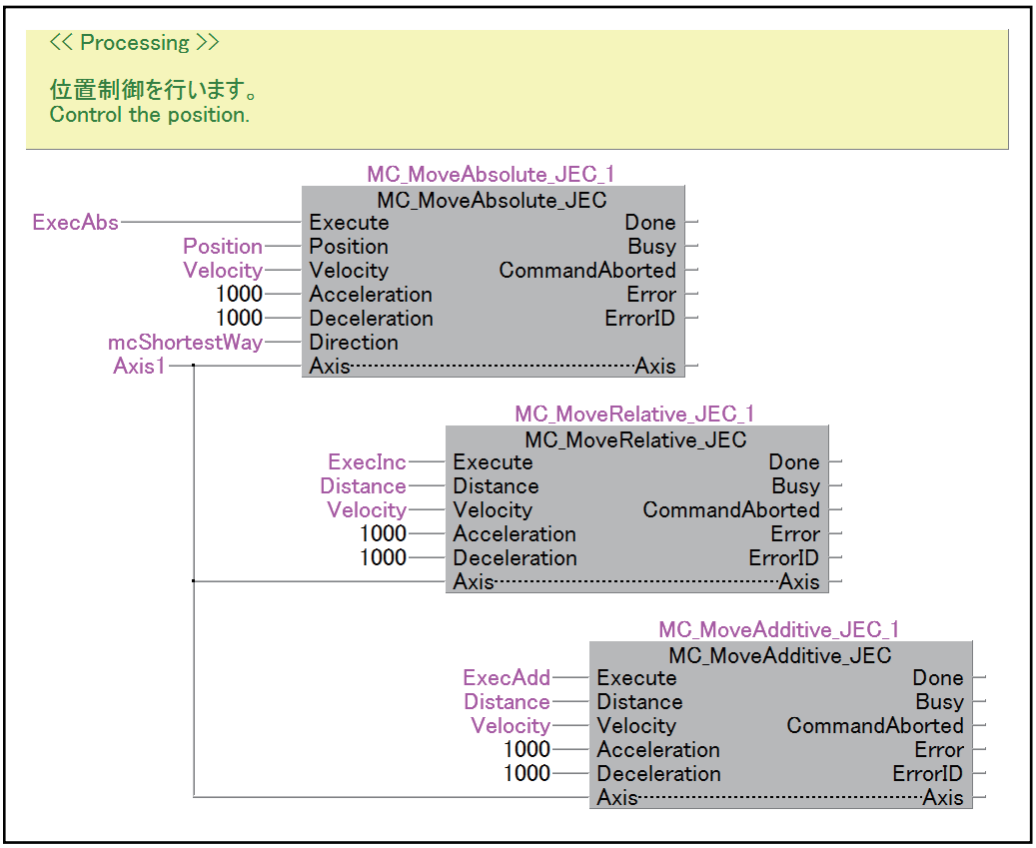


8. Perform the position control.

When the ExecAbs label is turned ON, the absolute value positioning is performed.

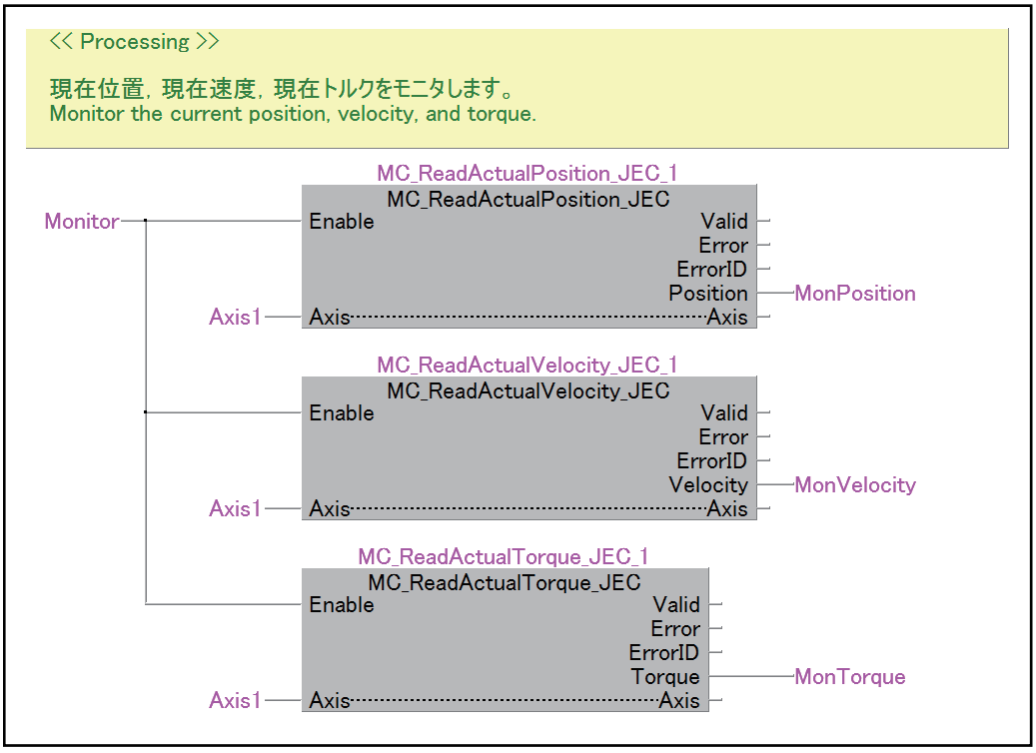
When the ExecInc label is turned ON, the relative value positioning is performed.

When the ExecAdd label is turned ON, the commanded position is changed.



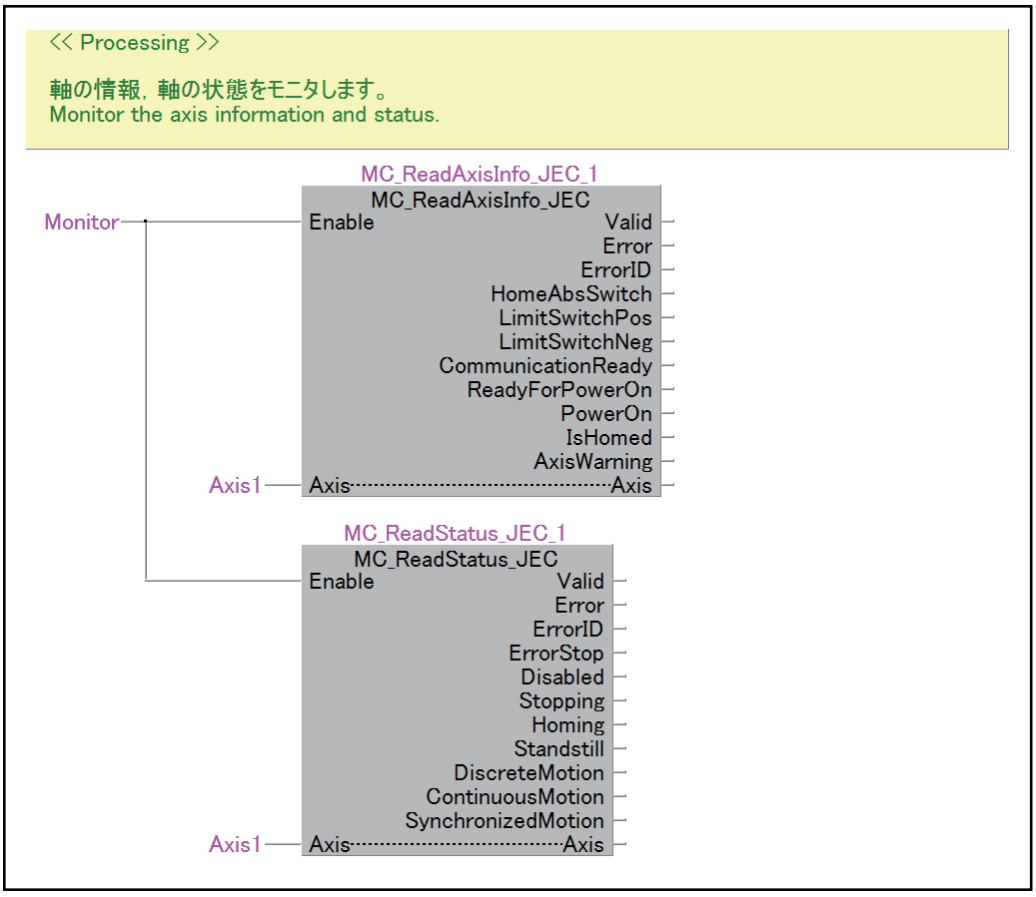
9. Monitor the current position, velocity, and torque.

When the Monitor label is turned ON, monitoring the current position, velocity, and torque is started.



10. Monitor the axis information and status.

When the Monitor label is turned ON, monitoring the axis information and status is started.

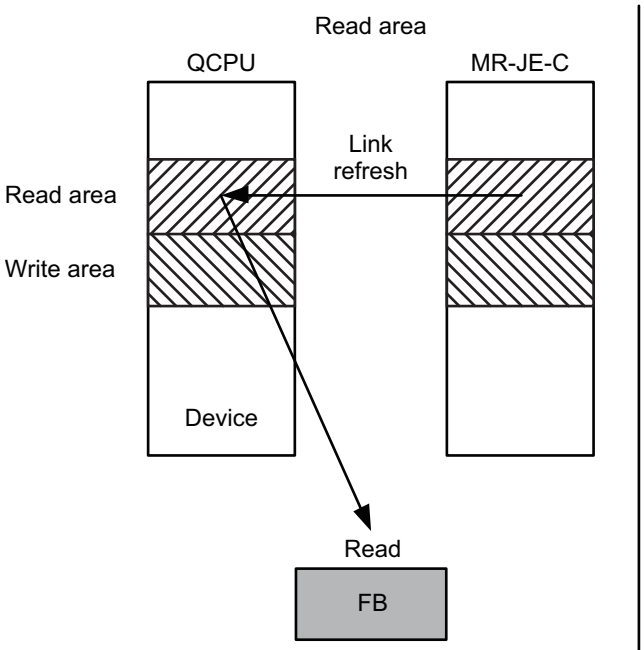


2.3 FB Operation

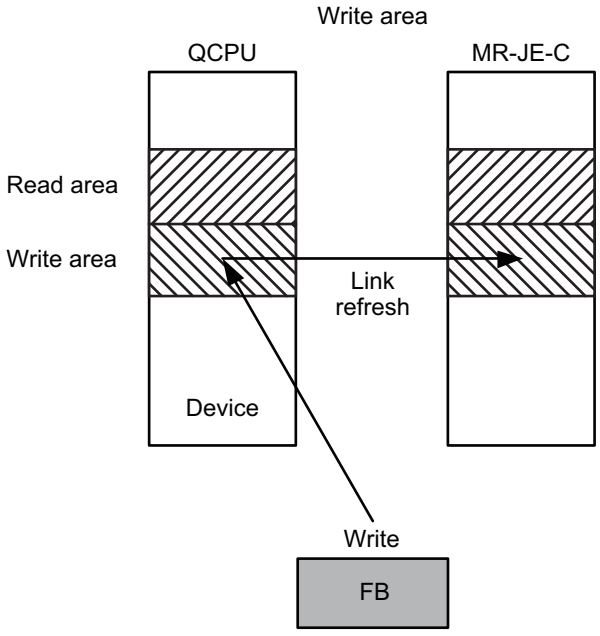
Data communication method

To control the devices connected with CC-Link IE Field Network Basic, the control information is transmitted to and received from the connected devices though the RX/RY/RWr/RWw register. The FBs described in this manual execute reference and updating of the device specified in the link refresh setting.

Defining the contents that the customer sets in the link refresh setting to the global label enables the FBs to access the device specified in the link refresh setting. The data is exchanged between the QCPU and the MR-JE-C in the fixed cycle by using the set device.



FB reads the data after the global labels related to RX and RWr are set.



FB writes the data after the global labels related to RY and RWw are set.

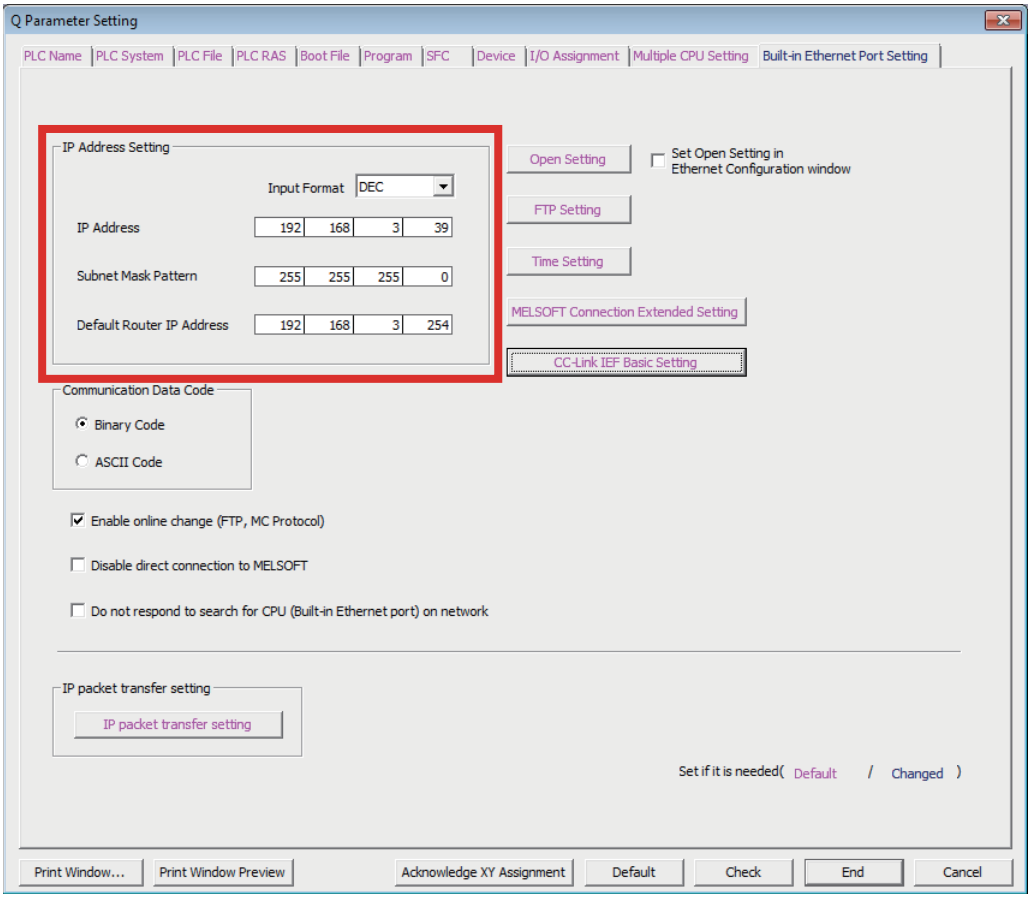
CC-Link IE Field Network Basic setting

This section describes the setting method of the system in which the CC-Link IE Field Network Basic compatible CPU module (QnUDVCPU) and the MR-JE-C servo amplifier are connected.

1. Set the IP address of the CPU module (QnUDVCPU).

[Navigation] window ⇨ [Parameter] ⇨ [PLC Parameter]

Select the "Built-in Ethernet Port Setting" tab on the "Q Parameter Setting" window, and set the IP address.

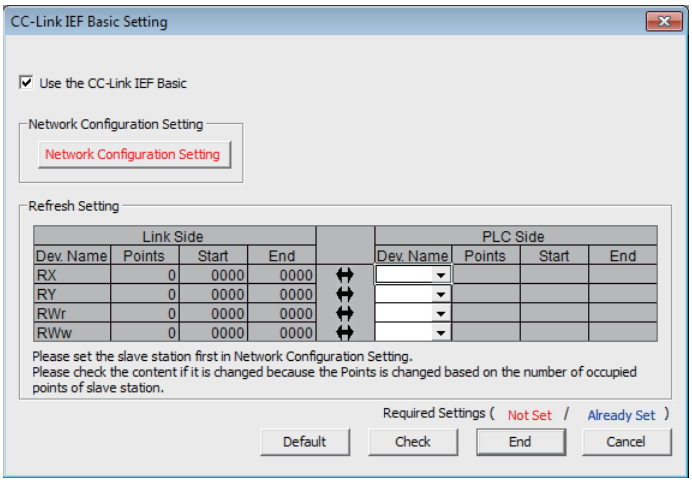


2. Configure the settings of CC-Link IE Field Network Basic.

[Navigation] window ⇨ [Parameter] ⇨ [PLC Parameter]

Select "CC-Link IEF Basic Setting" in the "Built-in Ethernet Port Setting" tab on the "Q Parameter Setting" window.

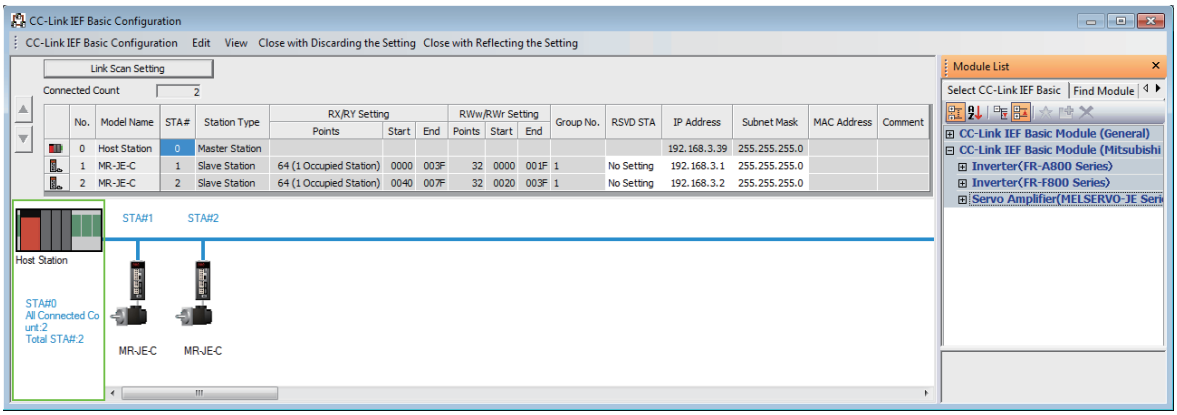
- Select "Use the CC-Link IEF Basic" on the "CC-Link IEF Basic Setting" window.



- Configure the network setting.

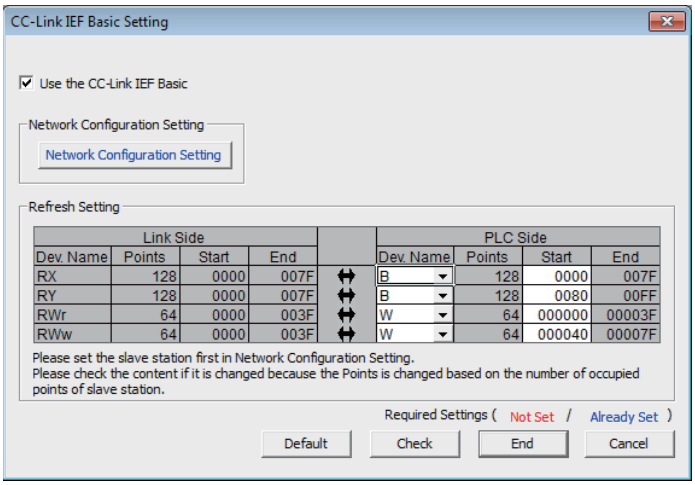
Select "Network Configuration Setting" on the "CC-Link IEF Basic Setting" window.

Add the MR-JE-C.



- Configure the refresh setting.

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



3. Set the global label.

Set the information specified in the refresh setting to the global label.

• Structure definition

Define the devices specified 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: stRemoteRegBasic

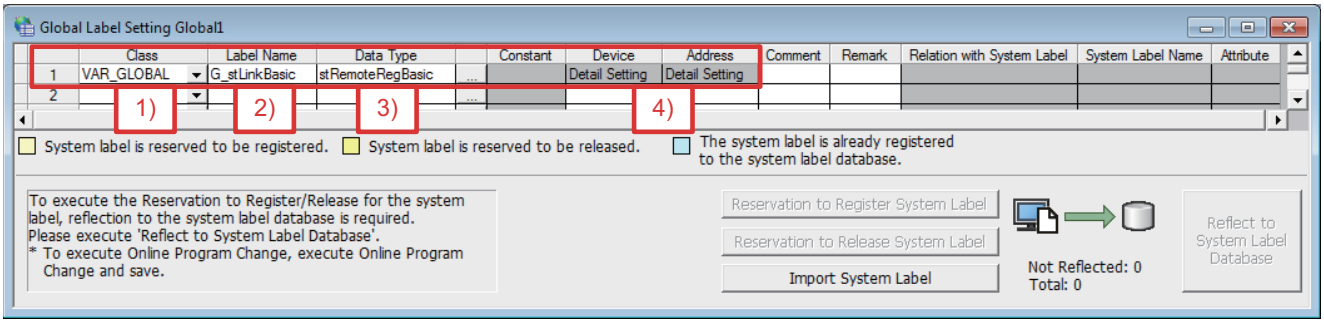
Label name	Data type	Remark
bnRX	Bit (0..n)	n is "Number of RX device points - 1". In the example of Step 2, n is "127".
bnRY	Bit (0..n)	n is "Number of RY device points - 1". In the example of Step 2, n is "127".
unRWr	Word [unsigned] (0..n)	n is "Number of RWr device points - 1". In the example of Step 2, n is "63".
unRWw	Word [unsigned] (0..n)	n is "Number of RWw device points - 1". In the example of Step 2, n is "63".

• Global label definition

Define the global label by using the structure set above.

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

Correctly assign the device used for data refresh. Otherwise, the FBs do not properly operate.



1) Select "VAR_GLOBAL" in "Class".

2) Set "G_stLinkBasic" in "Label Name".

3) Select the structure "stRemoteRegBasic" in "Data Type".

4) Assign the device according to the refresh setting.

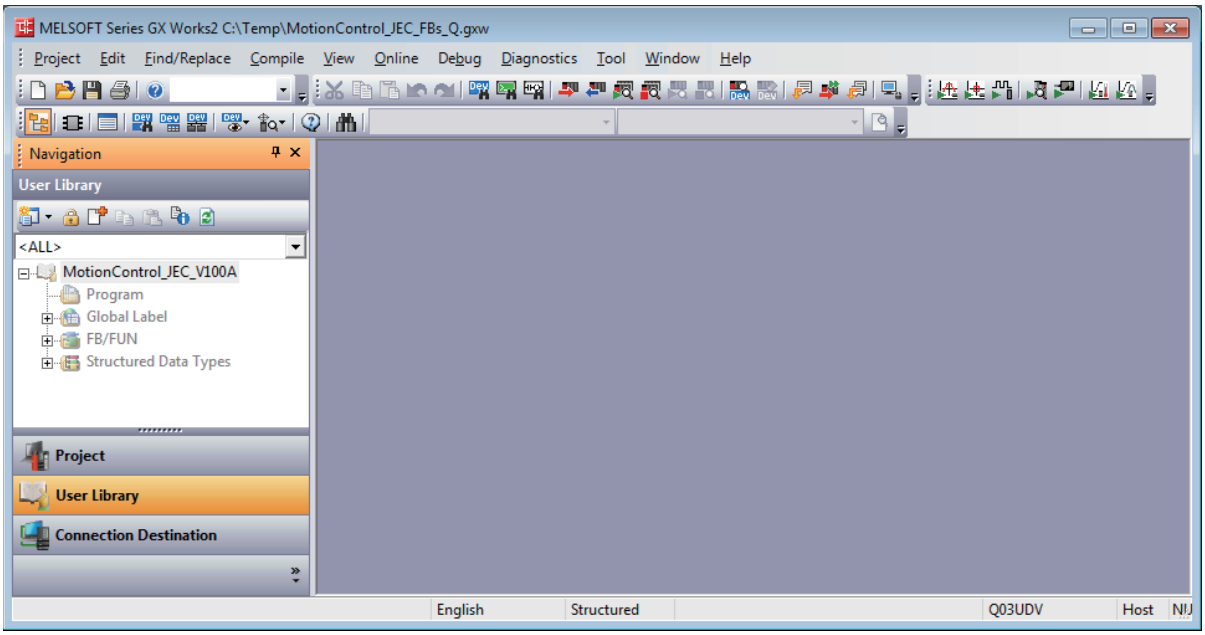
2.4 How to Use FB Library

To use the FB library of the sample project in other programs, output the FB library and import it to other project. The following shows the procedure.

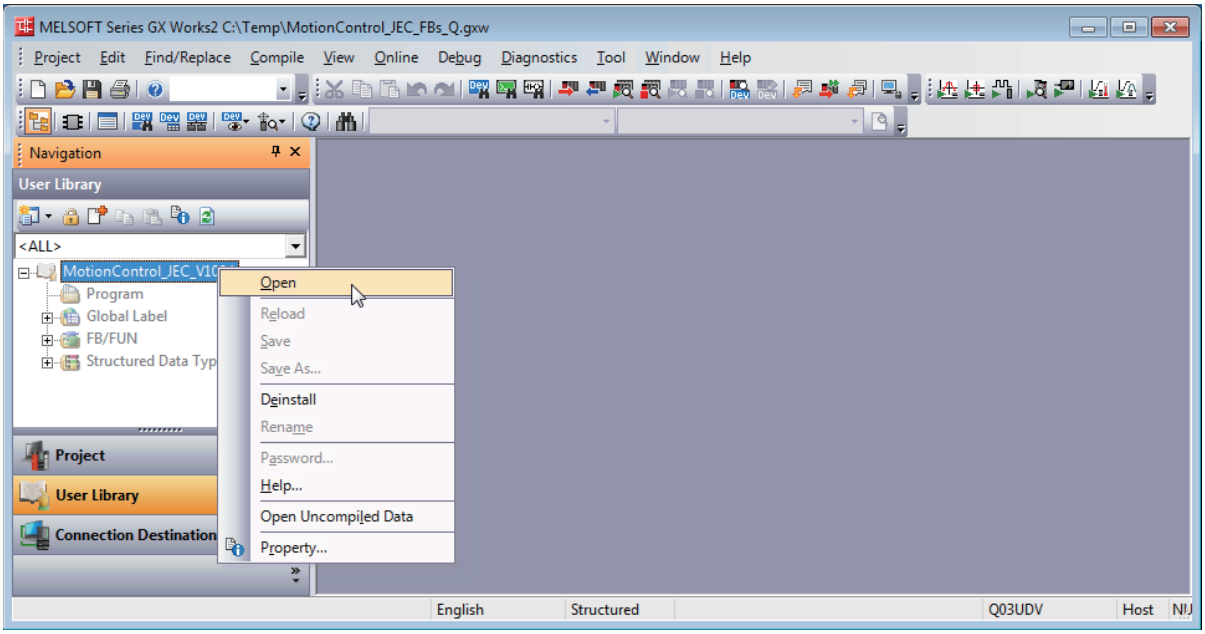
Saving the user library

1. Open the project (MotionControl_JEC_FBs_Q.gxw).

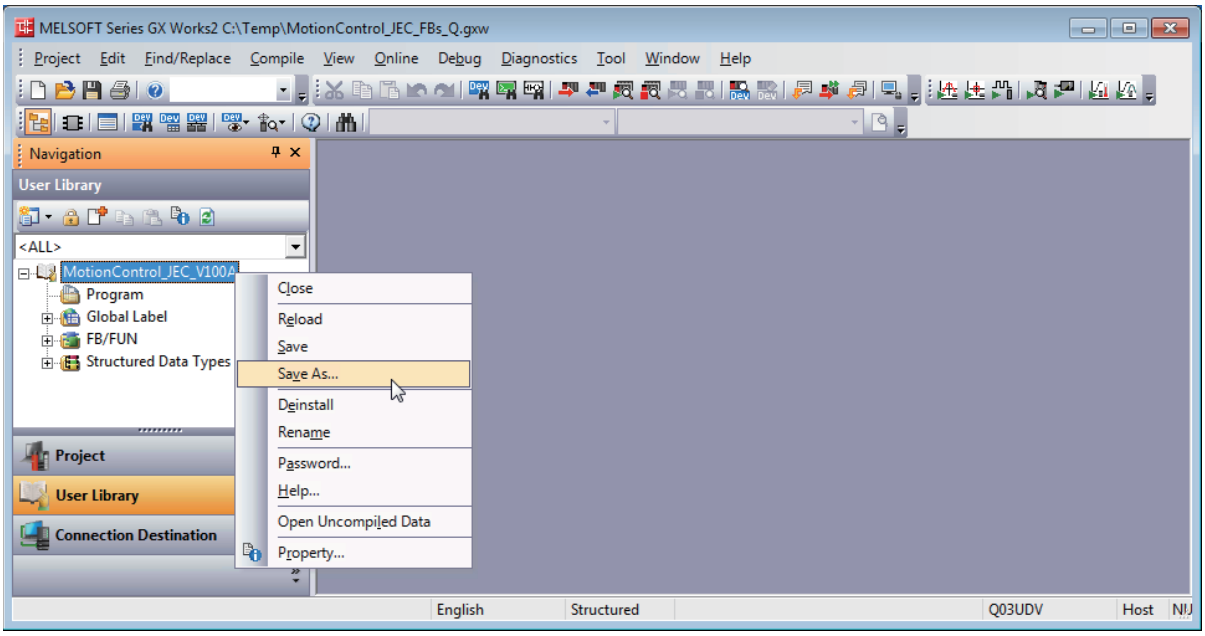
Select "User Library" in "Navigation".



2. Select the library (MotionControl_JEC_V100A). Right-click the library and select "Open" from the menu.

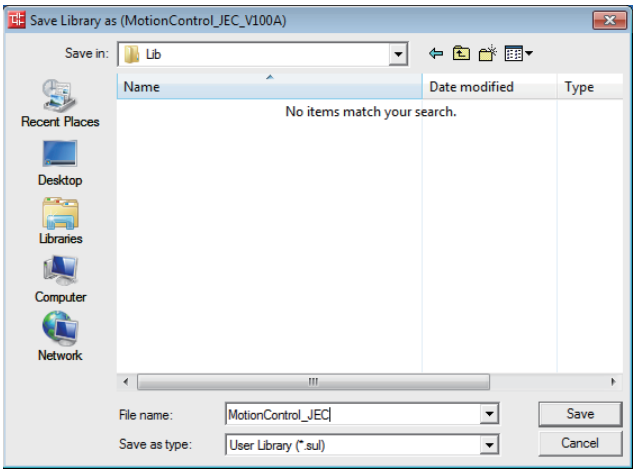


3. After the library became editable, right-click the library and select "Save as" from the menu.

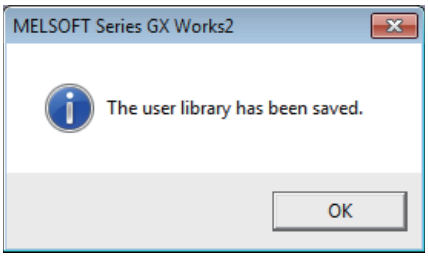


4. Enter the library file name and click the [Save] button.

In the following example, the library is named "MotionControl_JEC".



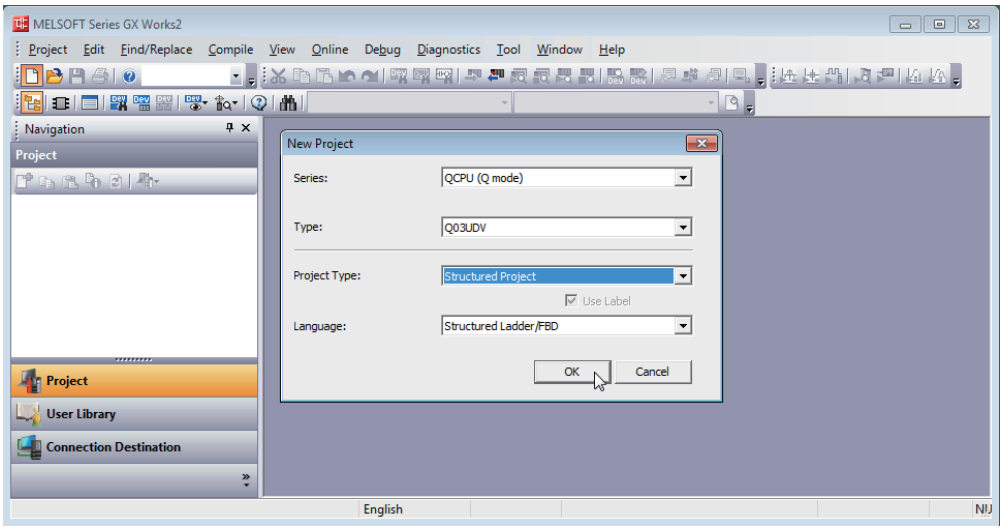
After the library has been saved, the following dialog box appears.



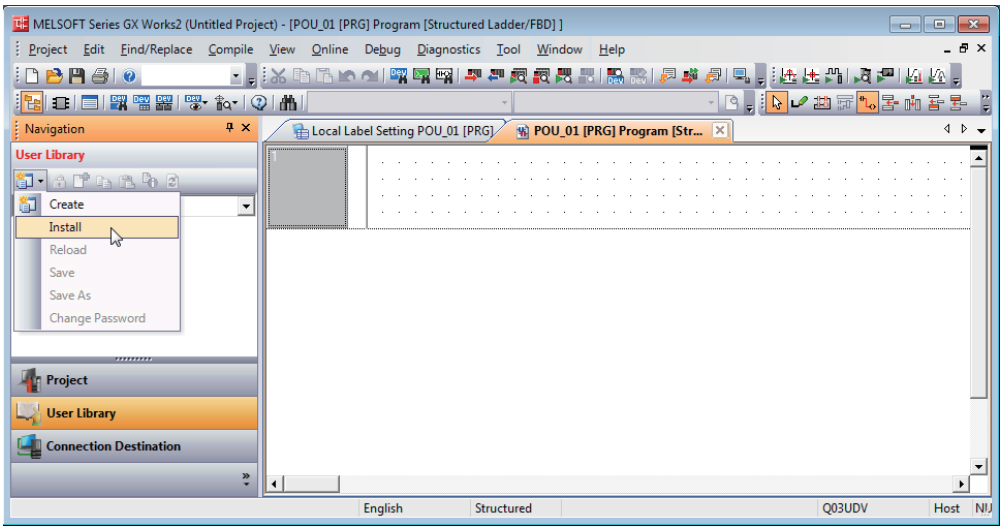
Installing the user library

1. Create a new project with the following setting.

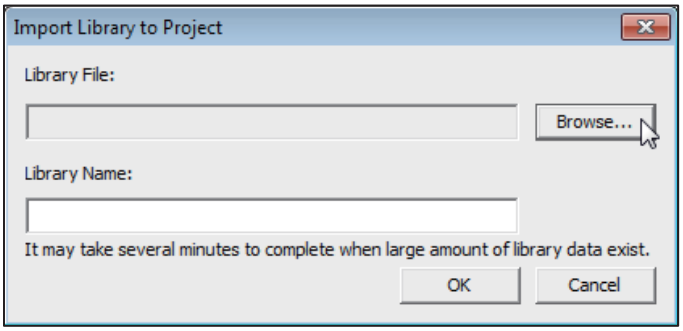
Type: the model when the library is saved, Project Type: Structured Project, Language: Structured Ladder/FBD



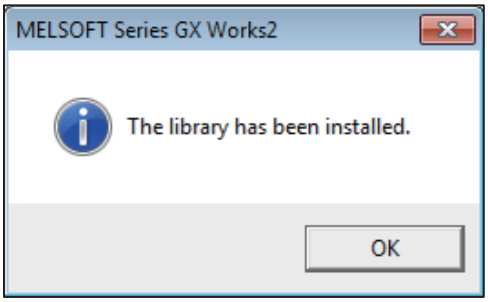
2. Select "User Library" in "Navigation", and select "Install" from the library menu.

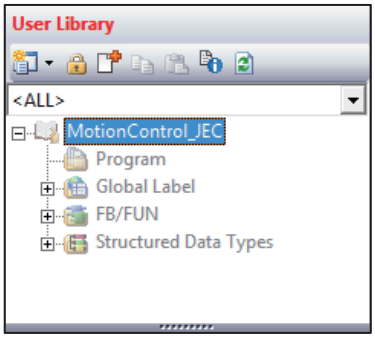


Select the saved library in the following dialog.

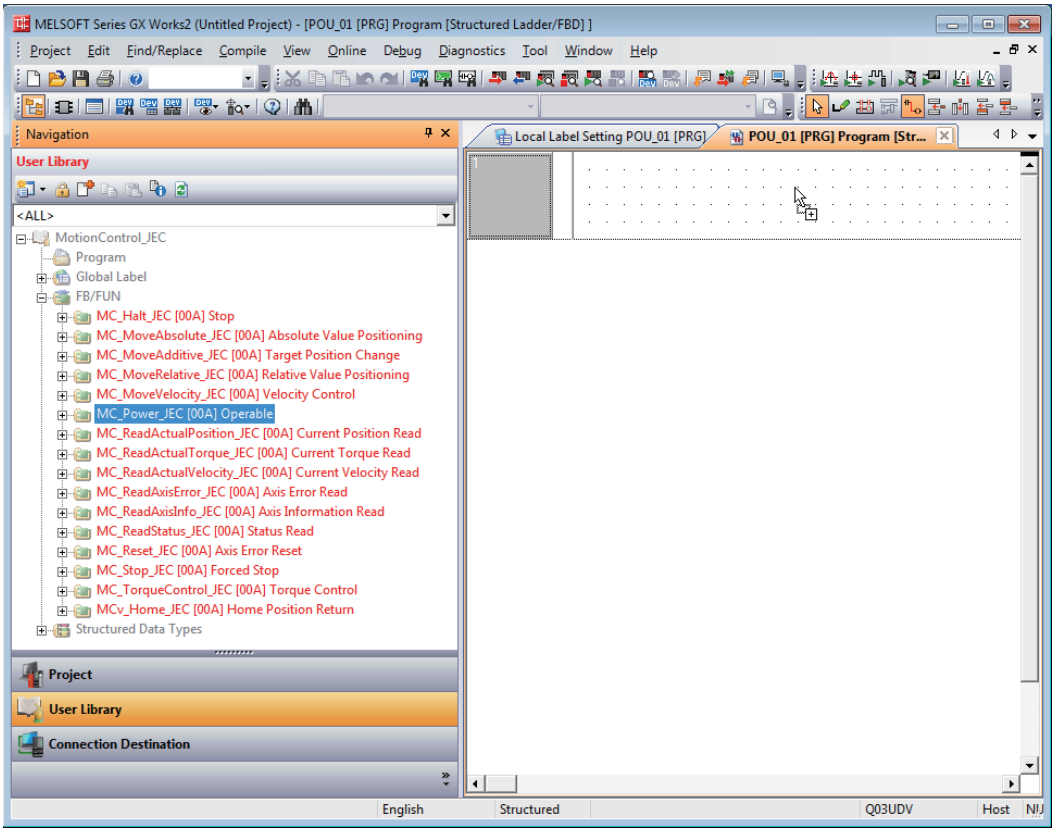


When the library has been installed normally, the following message appears and the library appears on the tree.

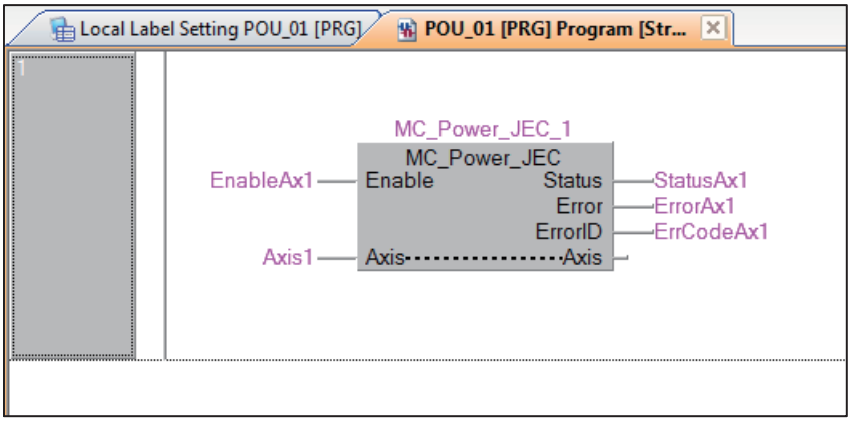




3. Expand the "FB/FUN" tree under "User Library", and add an FB to the program by dragging and dropping it.



Add the I/O label definition. If necessary, add the conditions such as the interlock or others.



3 FB LIBRARY

3.1 Function Overview of the FB Library

List of FBs

The following table lists the FBs used in the MELSEC-Q series QnUDVCPU module.

Point

This library controls up to 16 stations of the servo amplifier MR-JE-C.
The MR-JE-C uses the default mapping of the cyclic communication in the profile mode.
For details, refer to the instruction manual of the servo amplifier in use.

MotionControl_JEC

Item	Description	Version
MC_Power_JEC	Operation possible	00A
MCv_Home_JEC	Home position return	00A
MC_Stop_JEC	Forced stop	00A
MC_Halt_JEC	Stop	00A
MC_MoveAbsolute_JEC	Absolute value positioning	00A
MC_MoveRelative_JEC	Relative value positioning	00A
MC_MoveAdditive_JEC	Commanded position change	00A
MC_MoveVelocity_JEC	Velocity control	00A
MC_TorqueControl_JEC	Torque control	00A
MC_ReadActualPosition_JEC	Current position read	00A
MC_ReadActualVelocity_JEC	Current velocity read	00A
MC_ReadActualTorque_JEC	Current torque read	00A
MC_ReadStatus_JEC	Status read	00A
MC_ReadAxisInfo_JEC	Axis information read	00A
MC_ReadAxisError_JEC	Axis error read	00A
MC_Reset_JEC	Axis error reset	00A

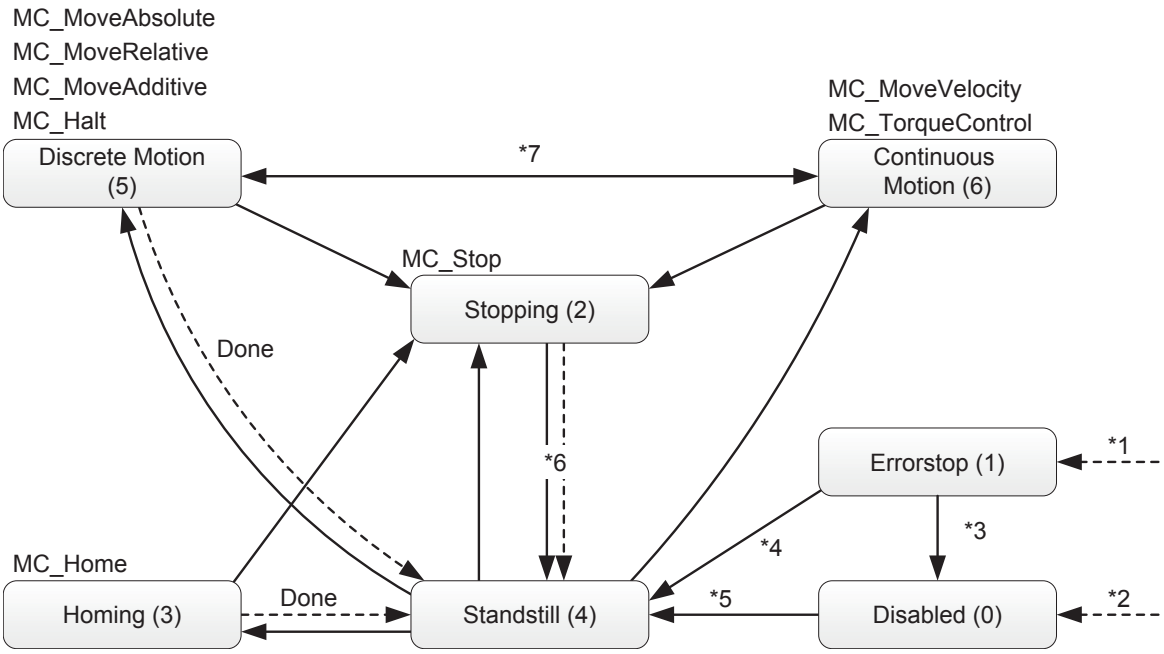
Restrictions and precautions

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 23 Details of the FB Library. • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • 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. • The FB cannot be used in an interrupt program. • 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. • The number of FB steps in a program varies depending on the CPU model to be used and I/O definitions. • A duplicated coil warning may occur during compilation. However, the warning does not generate any problems. • Set a circuit for each input label in an FB. • When two or more FBs are used, be careful not to repeatedly specify and simultaneously start an axis. • 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). • 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 23 Details of the FB Library. • The FBs controls 16 slave stations. Set a station number of the servo amplifier within the setting range. • The FBs control the servo amplifier MR-JE-C in the profile mode of the control mode. Set the parameter (PA01) of the servo amplifier to the profile mode. Use the default mapping for the cyclic communication.

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.



*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.
*7 In the zero velocity status. For zero velocity status, refer to the instruction manual of the servo amplifier in use.

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 the 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, MC_MoveAdditive, or MC_Halt 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.

Unit

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

Item	Description
Control unit	degree, pulse
Positioning range	• -360000 to 360000 ($\times 10^{-3}$ degree) • -999999 to 999999 (pulse)
Velocity command	0.00 to 167772.15 (r/min) Set a value within the permissible speed of the servo motor.
Acceleration/ deceleration time	Position control 0 to 20000 (ms) Velocity control 0 to 50000 (ms)

Point

- Select degree or pulse as the control unit with the parameter (PT01) of the servo amplifier.
- For the real-type data, when a value whose number of decimal places exceeds the number of significant digits is input in each unit, the value is rounded off.

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

Link device

The following table lists the link devices accessed by this FB library.

The devices marked with ○ in the FB library are referred and updated. Set the devices which are not used by the FB library as needed. n in the device No. indicates the value set by the station number setting.

Master station → Servo amplifier (RYn)			Servo amplifier → Master station (RXn)		
Device No.	**Device name**	**Access**	**Device No.**	**Device name**	**Access**
RY(n+3)F	Cyclic communication ready command	—	RX(n+3)F	Cyclic communication ready	○

Master station → Servo amplifier (RWwn)			Servo amplifier → Master station (RWrn)		
Device No.	**Device name**	**Access**	**Device No.**	**Device name**	**Access**
RWwn00	Control mode	○	RWrn00	Control mode display	○
RWwn01	Control command	○	RWrn01	—	—
RWwn02	Control input 1	—	RWrn02	Control status	○
RWwn03	Control input 2	○	RWrn03	Current position (command unit)	○
RWwn04	Control input 3	—	RWrn04		
RWwn05	Position command (pp)	○	RWrn05	Current velocity	○
RWwn06			RWrn06		
RWwn07	Velocity command (pv)	○	RWrn07	Droop pulse	—
RWwn08			RWrn08		
RWwn09	Velocity limit value (tq)	○	RWrn09	Current torque	○
RWwn0A			RWrn0A	Control output 1	○
RWwn0B	Torque command (tq)	○	RWrn0B	Control output 2	○
RWwn0C	Command velocity (pp)	○	RWrn0C	Control output 3	—
RWwn0D			RWrn0D	Alarm No.	○
RWwn0E	Acceleration time constant (pp, pv)	○	RWrn0E	Touch probe function status	—
RWwn0F			RWrn0F	Touch probe 1 Position latched on the rising edge	—
RWwn10	Deceleration time constant (pp, pv)	○	RWrn10		
RWwn11			RWrn11	Touch probe 1 Position latched on the falling edge	—
RWwn12	Torque command change amount (per 1 sec) (tq)	○	RWrn12		
RWwn13			RWrn13	Input device status 1	○
RWwn14	Torque limit value (positive)	○	RWrn14		
RWwn15	Torque limit value (negative)	○	RWrn15	—	—
RWwn16	—	—	RWrn16	—	—
RWwn17	Touch probe function setting	—	RWrn17	—	—
RWwn18	Positioning operation setting	○	RWrn18	—	—
RWwn19	Control input 5	○	RWrn19	—	—
RWwn1A	—	—	RWwn1A	—	—
RWwn1B	—	—	RWwn1B	—	—
RWwn1C	—	—	RWwn1C	—	—
RWwn1D	—	—	RWwn1D	—	—
RWwn1E	—	—	RWwn1E	—	—
RWwn1F	—	—	RWwn1F	—	—

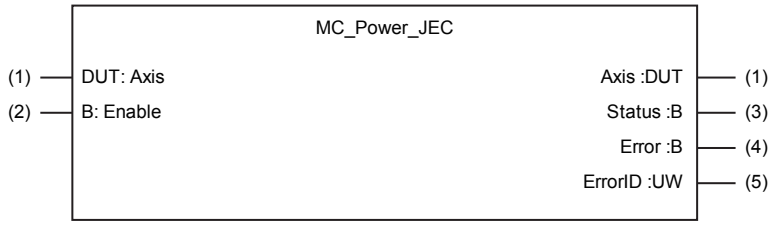
3.2 Details of the FB Library

MC_Power (Operation Possible)

Name

MC_Power_JEC

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_JEC (Axis, Enable, Status, Error, ErrorID)

Labels

■I/O label

No.	Variable name	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

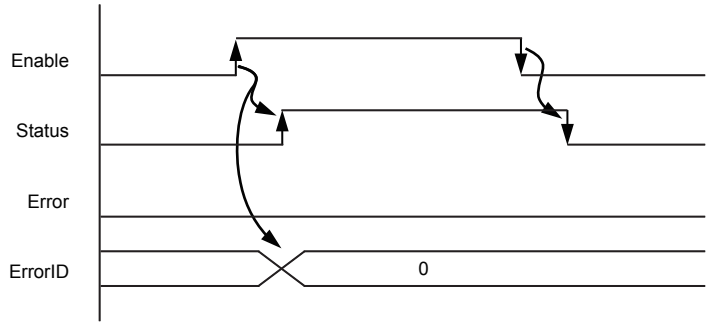
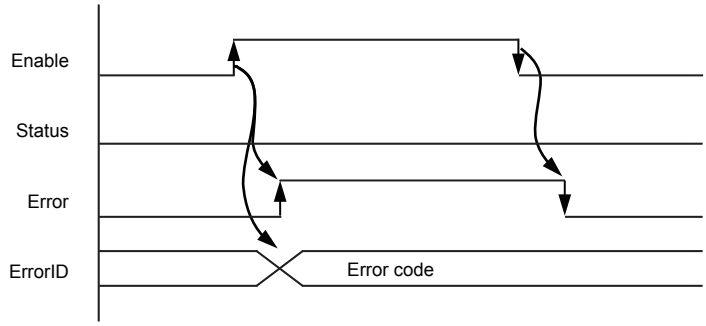
■Input labels (Load: Π: Always, ↑: Only at start)

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

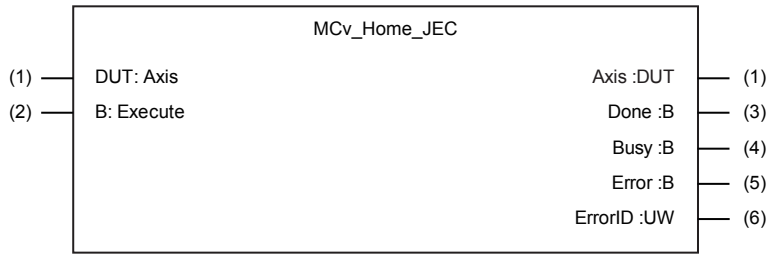
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	518 steps	
Function description	This FB initializes the information of the specified axis and switches the axis status to Operable. While Enable is ON, the specified axis is in the servo ON status. The display of the servo amplifier changes to "d**", and Status turns ON. The axis status transits from Disabled to Standstill. When the power of the servo amplifier is shut off, the axis status transits to ErrorStop. For the axis status, refer to ☞ Page 20 FB status diagram. 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 61 Troubleshooting.	
Restrictions and precautions	Before executing this FB, set the axis number (AxisNo) of the AXIS_REF structure.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MCv_Home (Home Position Return)

Name

MCv_Home_JEC

Overview

Item	Description
Function overview	Executes the home position return of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MCv_Home_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

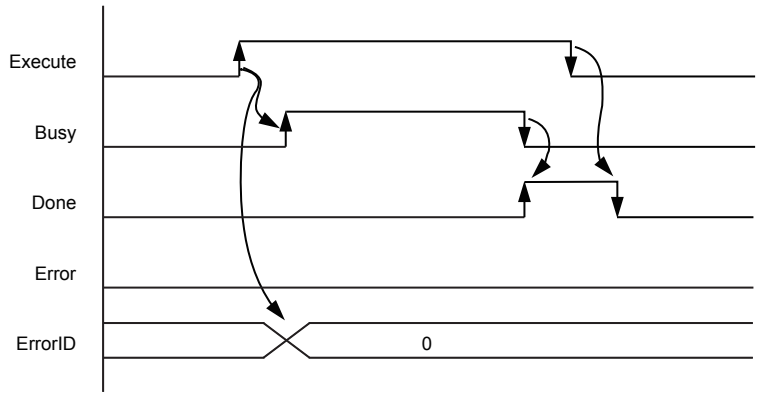
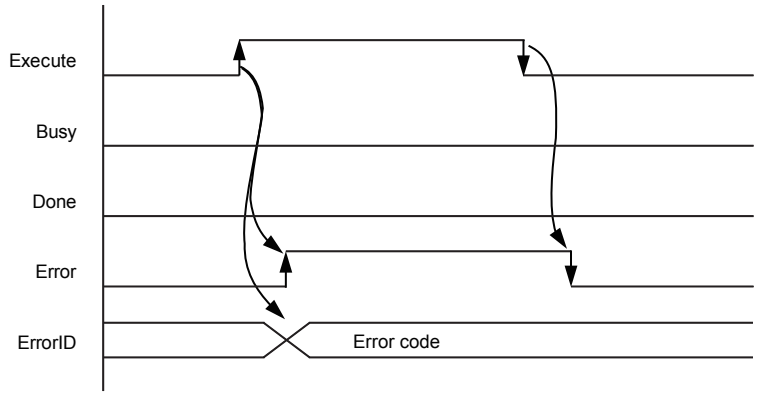
■Input labels (Load: Π: Always, ↑: Only at start)

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

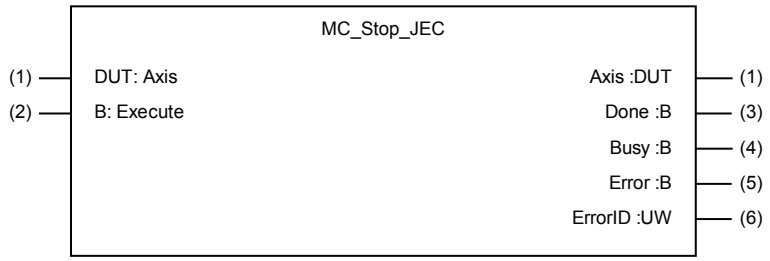
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	869 steps	
Function description	This FB executes home position return of the specified axis based on the set home position return parameters. 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. Axis status: When the FB is started with the axis in the Standstill status, the status changes to Standstill when the processing 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 61 Troubleshooting.	
Restrictions and precautions	Set home position parameters with an engineering tool in advance.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_Stop (Forced Stop)

Name

MC_Stop_JEC

Overview

Item	Description
Function overview	Forcibly stops the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_Stop_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

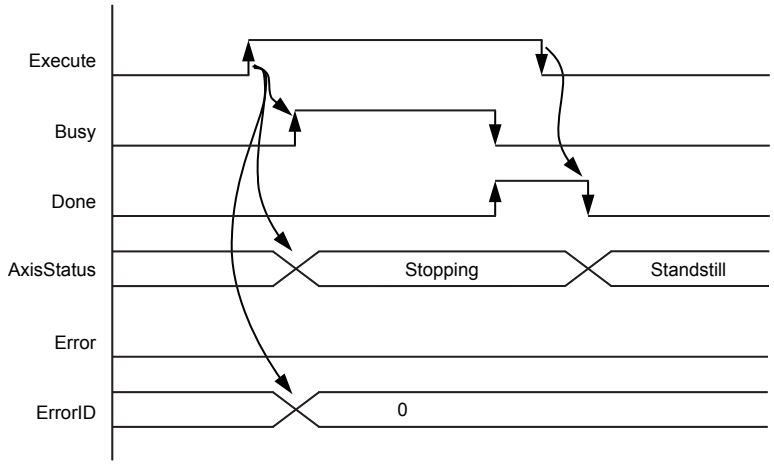
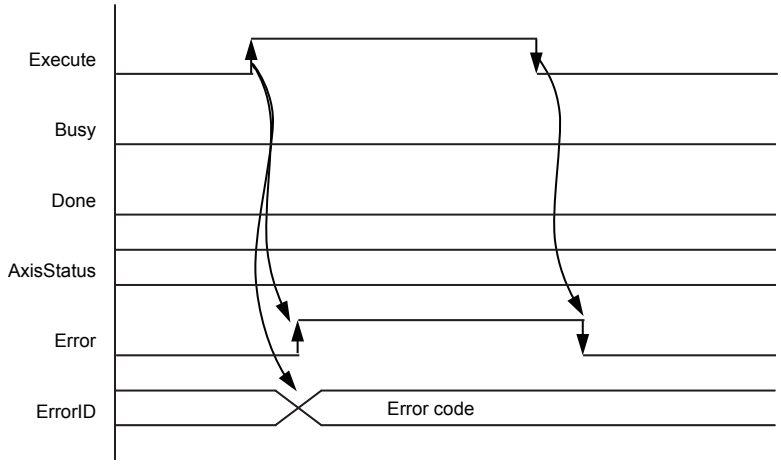
■Input labels (Load: Π: Always, ↑: Only at start)

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 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

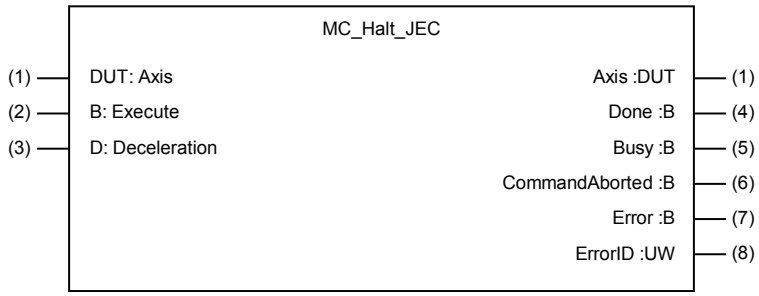
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	436 steps	
Function description	This FB stops the control of the specified axis and changes the axis status to Stopping. This FB aborts the 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. When the servo amplifier decelerates to stop, the status changes to the Switch On Disable status. In the torque control, the status immediately changes to the Switch On Disable status and the servo amplifier stops by using a dynamic brake. The axis status 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 61 Troubleshooting.	
Restrictions and precautions	The deceleration time follows the setting of the forced stop deceleration time constant (PC51) of the servo amplifier parameter.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_Halt (Stop)

Name

MC_Halt_JEC

Overview

Item	Description
Function overview	Stops the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_Halt_JEC (Axis, Execute, Deceleration, Done, Busy, CommandAborted, Error, ErrorID)

Labels

■I/O label

No.	Variable name	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

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

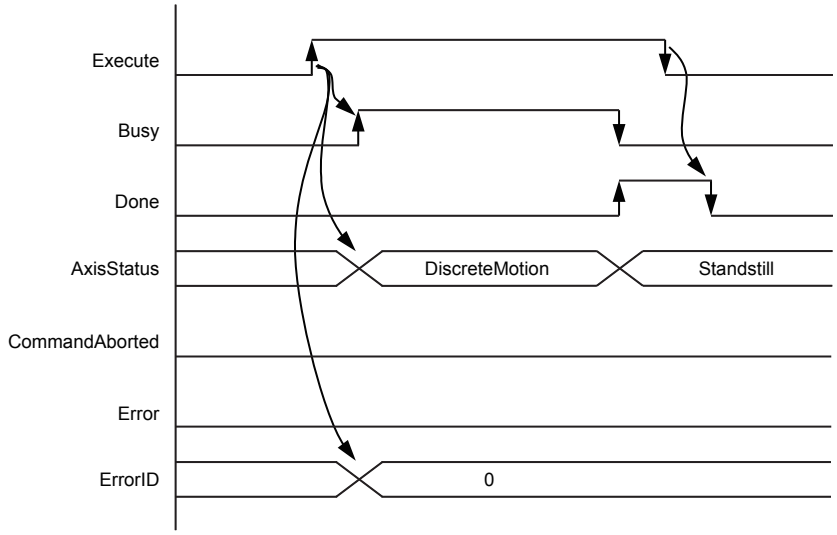
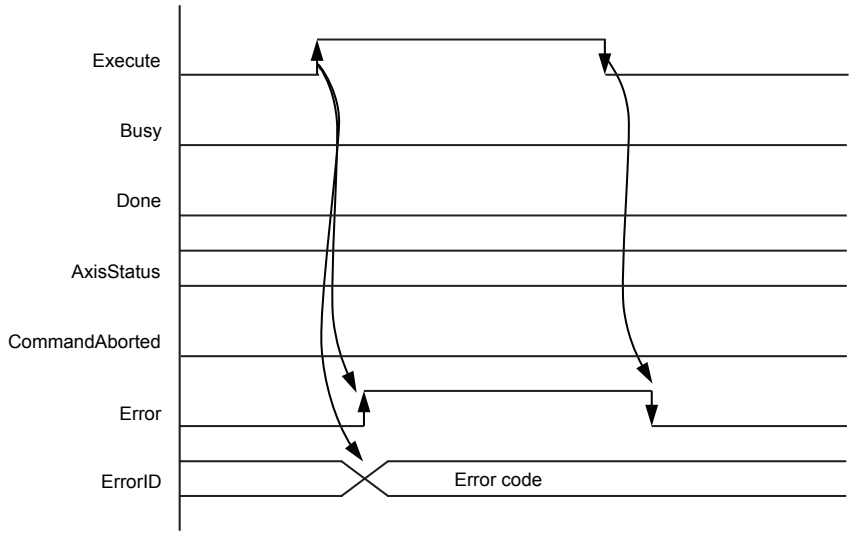
No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Deceleration	Deceleration time	Double word [signed]	↑	☞ Acceleration/ deceleration time on "Page 21 Unit"	The time taken for the servo motor to stop from the rated speed is set.

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	Done	Execution completion	Bit	OFF	It indicates that the velocity has reached 0.
(5)	Busy	Executing	Bit	OFF	It indicates that the velocity is decreasing to 0.
(6)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another FB has aborted the execution of the FB.
(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 CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	592 steps	
Function description	This FB stops the control of the specified axis. 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. The axis status is in the DiscreteMotion status after Execute turns ON until the axis velocity reaches 0. The axis status transits to Standstill when Done turns ON. When the continuous control FB is executed while this FB is in execution, the operation varies depending on the control which was performed before the execution of this FB. When the home position return control or the position control was performed before the execution of this FB, an error occurs in the continuous control FB, and the stop operation continues. When the velocity control or the torque control was performed before the execution of this FB, CommandAborted turns ON in this FB, and the control is switched to the continuous control FB after a deceleration stop. When Execute is turned OFF while this FB is in execution, the stop operation continues. Another MC_Halt cannot be executed. 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 61 Troubleshooting.	
Restrictions and precautions	• Deceleration time of the input label is valid only in the velocity control. At the home position return, the axis stops following the setting of "Home position return acceleration time constant (PT61)" or "Home position return deceleration time constant (PT62)" depending on the setting of "Home position return deceleration time constant selection (PT60)" of the servo amplifier parameter. In the execution of the positioning control FB, the deceleration time specified with the positioning control FB in execution is applied. In the torque control, the axis decelerates to stop with the torque slope specified with the torque control. • While this FB is in execution, the home position return and the positioning control FB cannot be executed. • This FB cannot be executed when the positioning control FB has completed positioning.	
FB operation type	Pulsed execution (multiple scan execution type)	

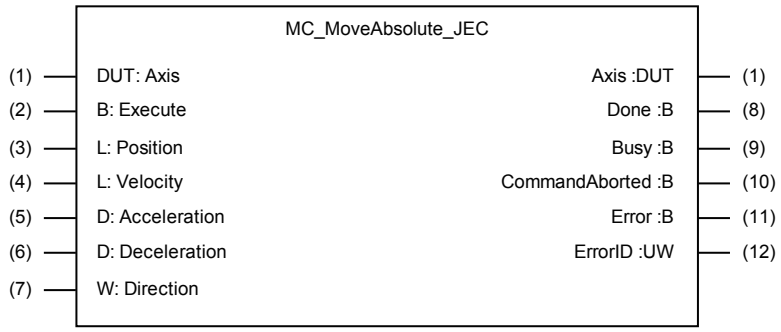
Item	Description
Timing chart	[Normal completion]  [Error completion] 

MC_MoveAbsolute (Absolute Value Positioning)

Name

MC_MoveAbsolute_JEC

Overview

Item	Description
Function overview	Specifies the commanded absolute position of the specified axis and executes positioning.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_MoveAbsolute_JEC (Axis, Execute, 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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

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

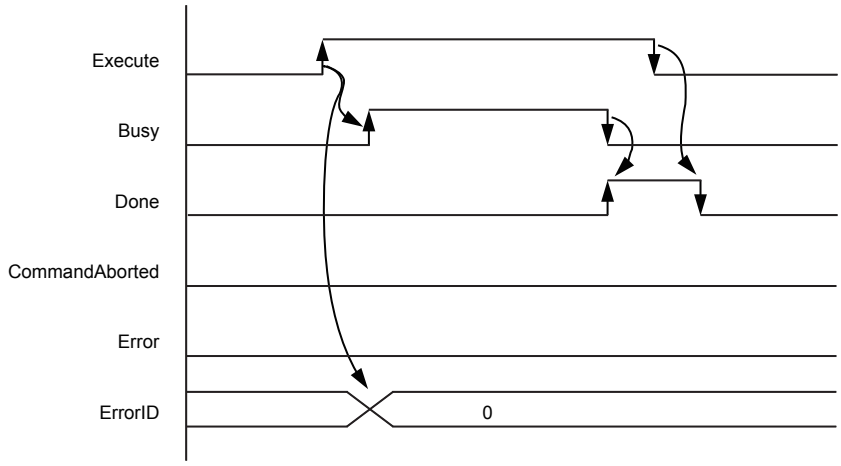
No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Position	Commanded position	Double-precision real number	↑	☞ Positioning range on "Page 21 Unit"	The commanded absolute position is set.
(4)	Velocity	Velocity	Double-precision real number	↑	☞ Velocity command on "Page 21 Unit"	The velocity command value is set.
(5)	Acceleration	Acceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to reach the rated speed is set.
(6)	Deceleration	Deceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to stop from the rated speed is set.
(7)	Direction	Rotation direction	Word [signed]	↑	1, 2, 3, 4	☞ Page 60 MC_DIRECTION (Direction Selection)

■Output labels

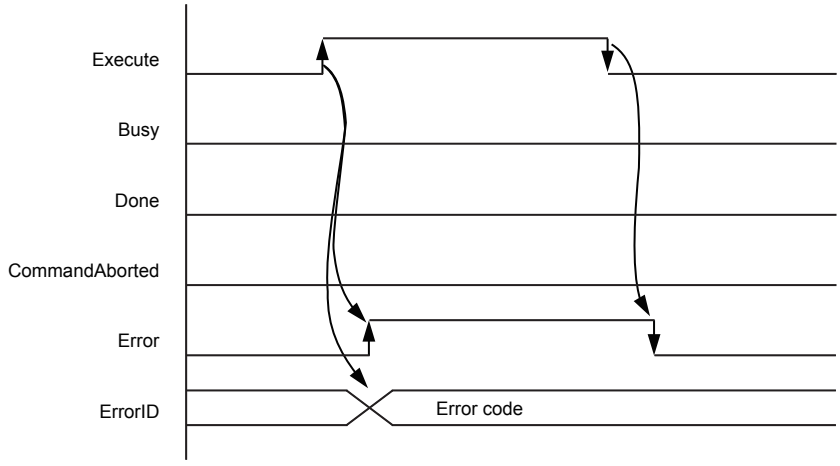
No.	Variable name	Name	Data type	Default value	Description
(8)	Done	Execution completion	Bit	OFF	It indicates that the axis has reached the commanded position.
(9)	Busy	Executing	Bit	OFF	It indicates that the FB is in execution.
(10)	CommandAborted	Abortion of execution	Bit	OFF	It indicates that another 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 CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	1245 steps	
Function description	This FB executes positioning of the specified axis to the commanded 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 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 61 Troubleshooting.	
Restrictions and precautions	• Before executing this FB, set the torque limit value (PositiveTorqueLimit, NegativeTorqueLimit) of the AXIS_REF structure. • When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • When turning OFF an execution command (Execute) after turning it ON, be sure to turn it OFF while Executing (Busy) is ON. • When the unit is degree, and another MC_MoveAbsolute is executed while this FB is in execution, Direction becomes invalid, and the rotation direction in execution is used. • This FB cannot be executed while a positioning warning (alarm number: F4) is occurring in the servo amplifier. • When another positioning control FB is executed with an execution completion (Done) of this FB, do not turn ON the execution command (Execute) of the another FB to be executed, and turn OFF the execution command (Execute) of the executed FB in the same scan. Otherwise, an error occurs in the another FB to be executed.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]	



[Error completion]

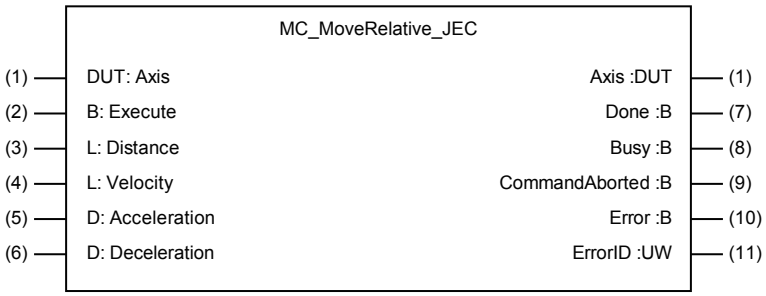


MC_MoveRelative (Relative Value Positioning)

Name

MC_MoveRelative_JEC

Overview

Item	Description
Function overview	Moves an axis for the specified distance from the current position.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_MoveRelative_JEC (Axis, Execute, 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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

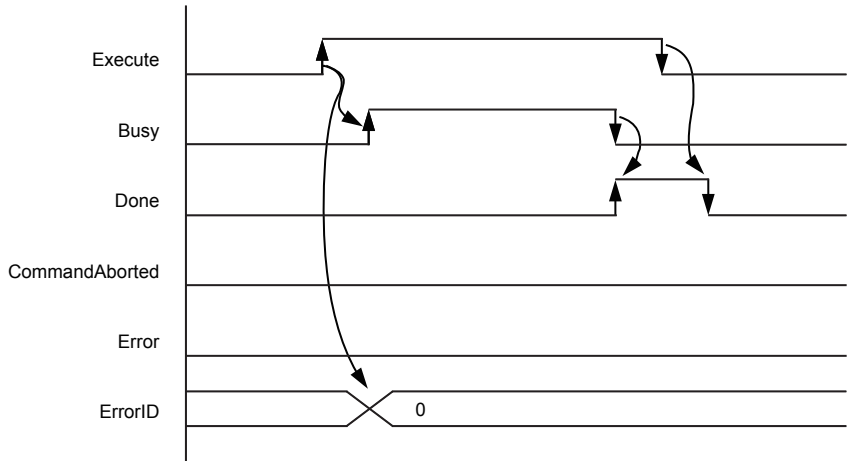
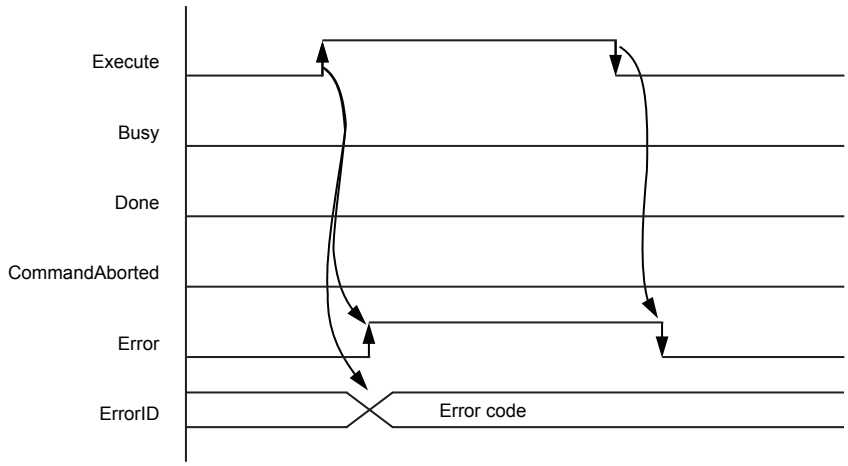
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Distance	Travel distance	Double-precision real number	↑	☞ Positioning range on "Page 21 Unit"	The travel distance is set.
(4)	Velocity	Velocity	Double-precision real number	↑	☞ Velocity command on "Page 21 Unit"	The velocity command value is set.
(5)	Acceleration	Acceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to reach the rated speed is set.
(6)	Deceleration	Deceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to stop from the rated speed is set.

■Output labels

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

Function overview

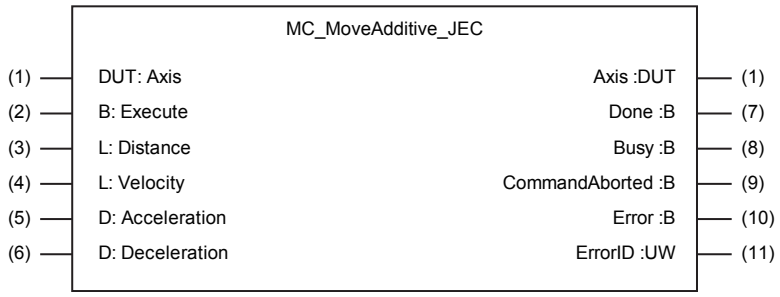
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	1174 steps	
Function description	This FB moves the specified axis for the specified distance from the set value. This FB is executed when Execute 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 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 61 Troubleshooting.	
Restrictions and precautions	• Before executing this FB, set the torque limit value (PositiveTorqueLimit, NegativeTorqueLimit) of the AXIS_REF structure. • When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • When turning OFF an execution command (Execute) after turning it ON, be sure to turn it OFF while Executing (Busy) is ON. • This FB cannot be executed while a positioning warning (alarm number: F4) is occurring in the servo amplifier. • This FB cannot be used to control the axis of which the unit is set as degree. • This FB cannot be executed while the positioning control FB is in execution (AxisStatus is DiscreteMotion). • When another positioning control FB is executed with an execution completion (Done) of this FB, do not turn ON the execution command (Execute) of the another FB to be executed, and turn OFF the execution command (Execute) of the executed FB in the same scan. Otherwise, an error occurs in the another FB to be executed.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_MoveAdditive (Commanded Position Change)

Name

MC_MoveAdditive_JEC

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]	
Symbol [Structured Text]	MC_MoveAddtive_JEC (Axis, Execute, 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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

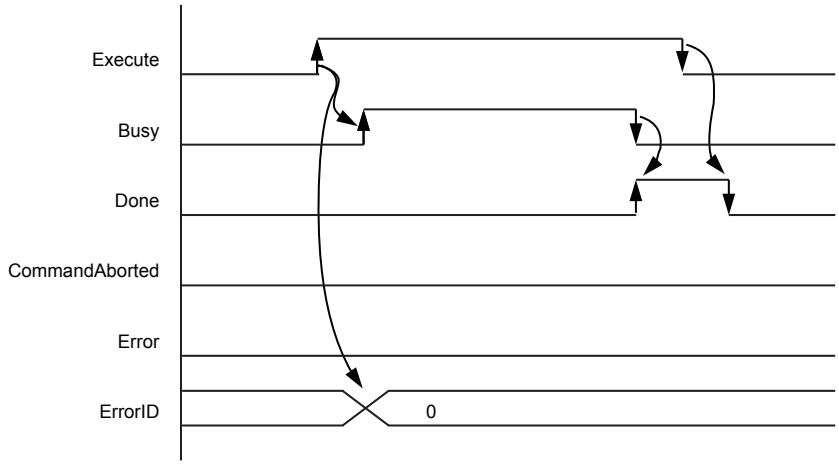
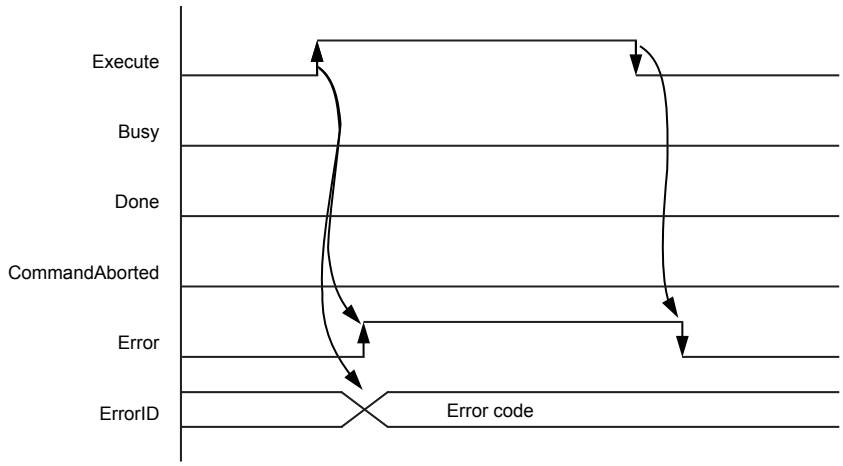
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Distance	Travel distance	Double-precision real number	↑	☞ Positioning range on "Page 21 Unit"	The travel distance of the relative position is set.
(4)	Velocity	Commanded velocity	Double-precision real number	↑	☞ Velocity command on "Page 21 Unit"	The velocity command value is set.
(5)	Acceleration	Acceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to reach the rated speed is set.
(6)	Deceleration	Deceleration time	Double word [signed]	↑	0 to 20000 (ms)	The time taken for the servo motor to stop from the rated speed is set.

■Output labels

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

Function overview

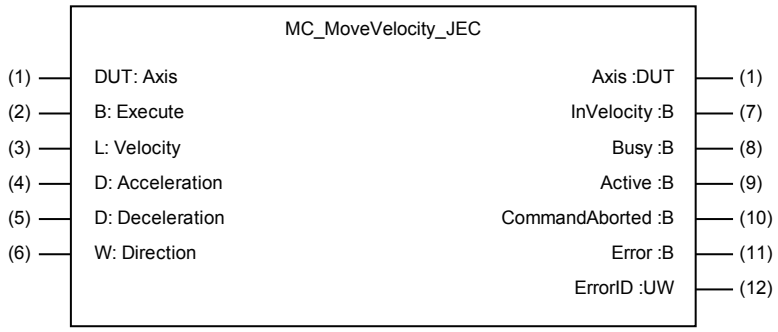
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	1188 steps	
Function description	This FB adds the specified relative position in the previous positioning command of the specified axis and 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 during positioning control is DiscreteMotion. This FB can be used when the axis status is Standstill or DiscreteMotion. It 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 61 Troubleshooting.	
Restrictions and precautions	• Before executing this FB, set the torque limit value (PositiveTorqueLimit, NegativeTorqueLimit) of the AXIS_REF structure. • When executing this FB while the continuous control FB is in execution (AxisStatus is ContinuousMotion), execute this FB with the axis stopped. • When turning OFF an execution command (Execute) after turning it ON, be sure to turn it OFF while Executing (Busy) is ON. • This FB cannot be executed when a positioning warning (alarm number: F4) is occurring in the servo amplifier. • This FB cannot be used to control the axis of which the unit is set as degree. • When another positioning control FB is executed with an execution completion (Done) of this FB, do not turn ON the execution command (Execute) of the another FB to be executed, and turn OFF the execution command (Execute) of the executed FB in the same scan. Otherwise, an error occurs in the another FB to be executed.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_MoveVelocity (Velocity Control)

Name

MC_MoveVelocity_JEC

Overview

Item	Description
Function overview	Controls the velocity of the specified axis to the commanded velocity.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_MoveVelocity_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

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

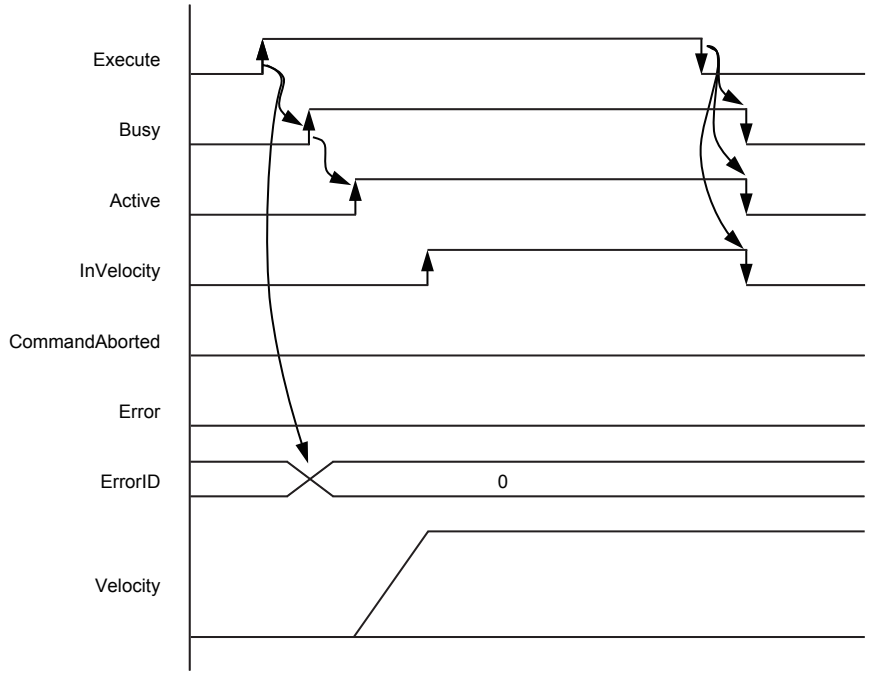
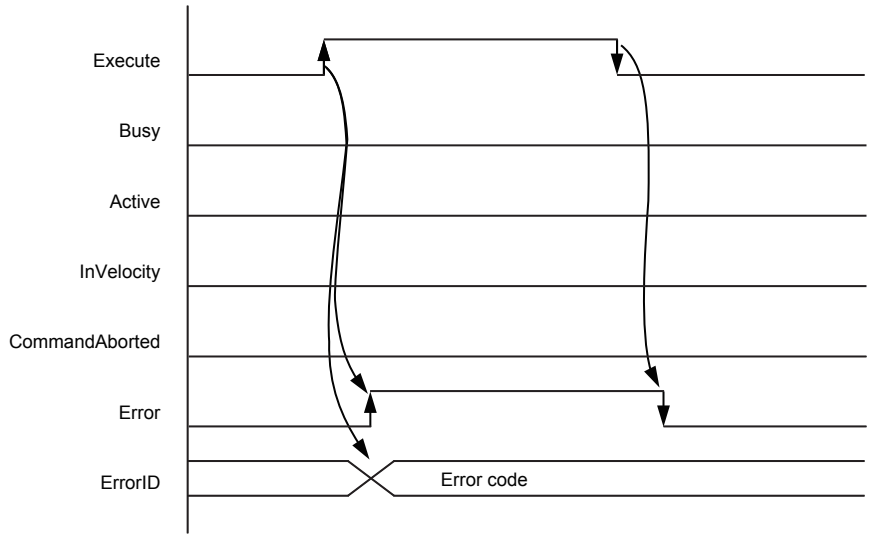
No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Velocity	Commanded velocity	Double-precision real number	↑	☞ Velocity command on "Page 21 Unit"	The velocity command value is set. It can be specified with a sign.
(4)	Acceleration	Acceleration time	Double word [signed]	↑	0 to 50000 (ms)	The time taken for the servo motor to reach the rated speed is set.
(5)	Deceleration	Deceleration time	Double word [signed]	↑	0 to 50000 (ms)	The time taken for the servo motor to stop from the rated speed is set.
(6)	Direction	Rotation direction	Word [signed]	↑	1, 2	The rotation direction is specified. 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 CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	986 steps	
Function description	This FB controls the velocity of the specified axis to the commanded 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 actual rotation direction depends on the sign specified with the commanded velocity (Velocity) and the setting of the rotation direction (Direction). The axis status transits to ContinuousMotion. Abort the execution of the FB and switch the control by executing another MC_MoveVelocity or MC_TorqueControl. To stop the operation, use MC_Halt. 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 61 Troubleshooting.	
Restrictions and precautions	• Before executing this FB, set the torque limit value (PositiveTorqueLimit, NegativeTorqueLimit) of the AXIS_REF structure. • When the positioning control FB is in execution (AxisStatus is DiscreteMotion), execute this FB with the axis stopped. • When the mode is switched from the velocity control mode to the torque control mode, the servo motor speed may momentarily fluctuate. Thus, it is recommended switching the mode from the velocity control mode to the torque control mode after the servo motor is stopped.	
FB operation type	Pulsed execution (multiple scan execution type)	

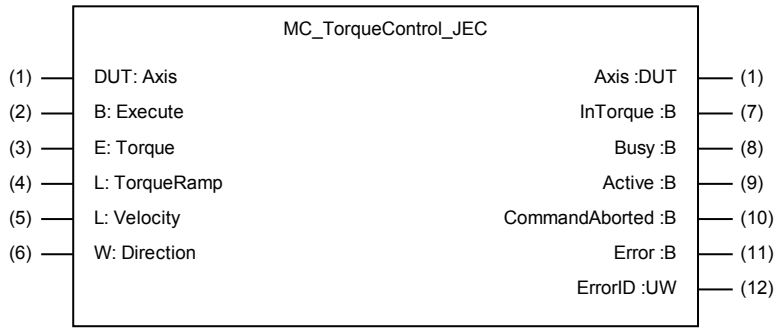
Item	Description
Timing chart	[Normal completion]  [Error completion] 

MC_TorqueControl (Torque Control)

Name

MC_TorqueControl_JEC

Overview

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

Labels

■I/O label

No.	Variable name	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

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

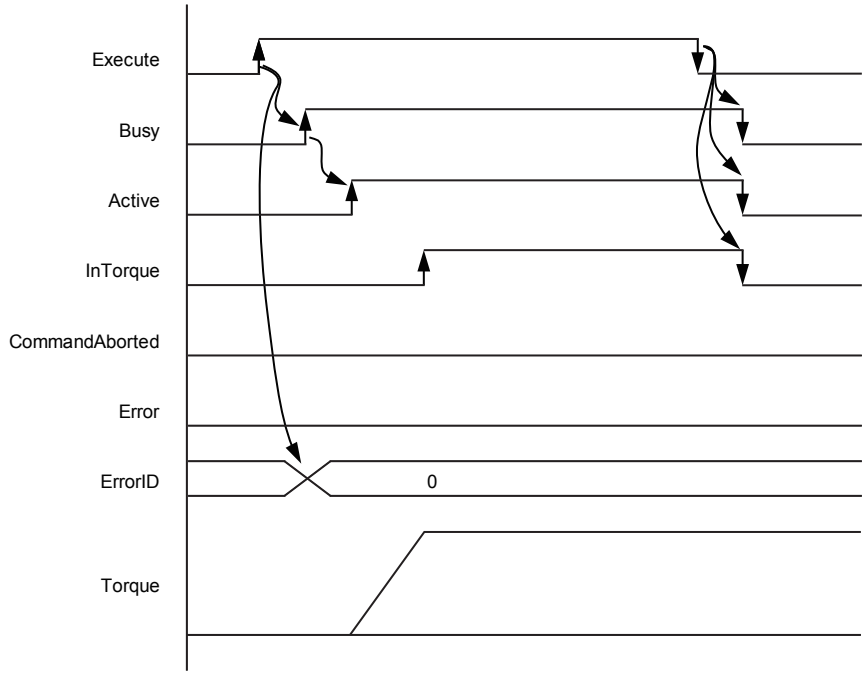
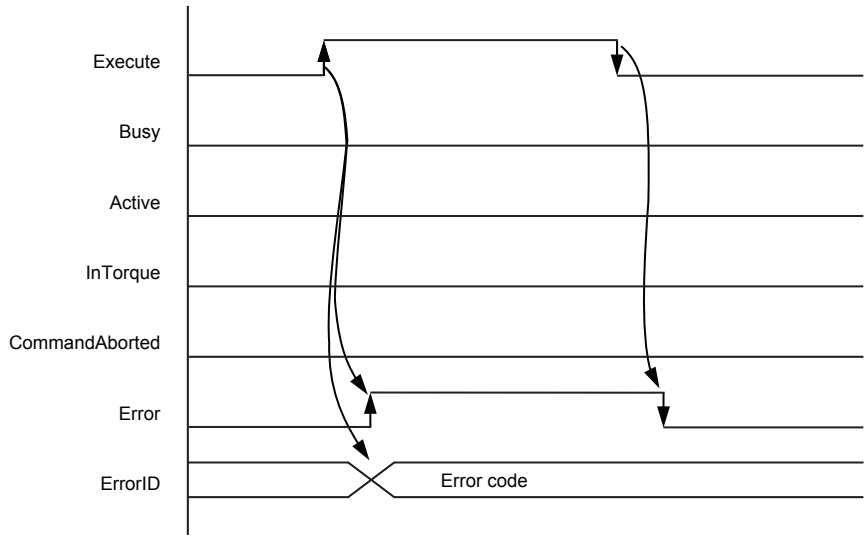
No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	Execute	Execution command	Bit	↑	ON, OFF	ON: The FB is executed.
(3)	Torque	Commanded torque	Single-precision real number	↑	-1000.0 to 1000.0 [%]	The command torque is set. Set the ratio to the rated torque of the servo motor to be used in percentage.
(4)	TorqueRamp	Torque slope	Double-precision real number	↑	0.0 to 1000000.0 [%/s]	The slope of the torque command is set in percentage per second.
(5)	Velocity	Limit velocity	Double-precision real number	↑	☞ Velocity command on "Page 21 Unit"	The velocity limit value in the torque control mode is set.
(6)	Direction	Rotation direction	Word [signed]	↑	1, 2	The rotation direction is specified. MC_DIRECTION definition 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)	InTorque	Commanded torque reached	Bit	OFF	It indicates that the torque 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 CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	1001 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 of the axis has reached the commanded torque, InTorque turns ON. Once InTorque turns ON when the torque has reached the commanded torque, InTorque remains ON until Execute turns OFF or the control is aborted. The axis status transits to ContinuousMotion. Abort the execution and switch the control by executing another MC_TorqueControl or MC_MoveVelocity. To stop the operation, use MC_Halt. 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 61 Troubleshooting.	
Restrictions and precautions	• Before executing this FB, set the torque limit value (PositiveTorqueLimit, NegativeTorqueLimit) of the AXIS_REF structure. • When the positioning control FB is in execution (AxisStatus is DiscreteMotion), execute this FB with the axis stopped.	
FB operation type	Pulsed execution (multiple scan execution type)	

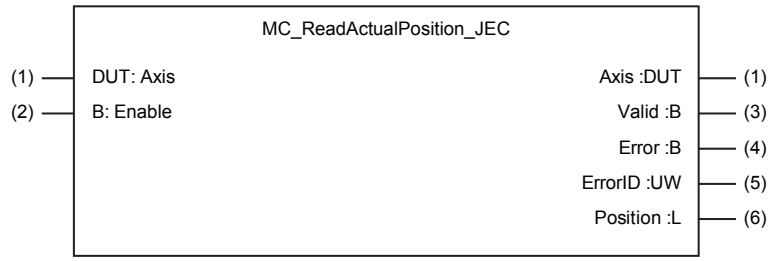
Item	Description
Timing chart	[Normal completion]  [Error completion] 

MC_ReadActualPosition (Current Position Read)

Name

MC_ReadActualPosition_JEC

Overview

Item	Description
Function overview	Reads the current position of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadActualPosition_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

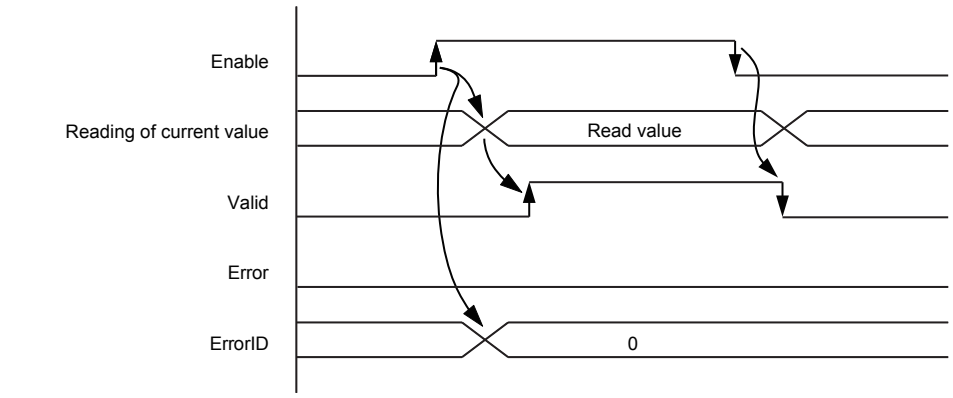
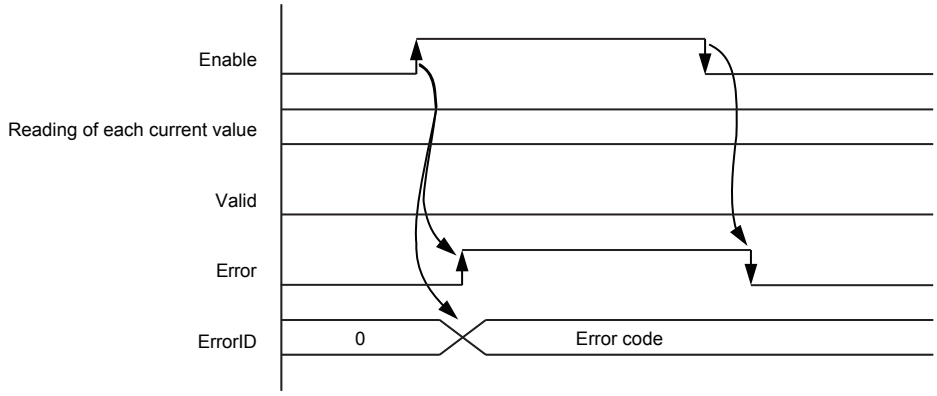
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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	Double-precision real number	0	The current position of the specified axis is returned. ($\times 10^{-3}$ degree, pulse)

Function overview

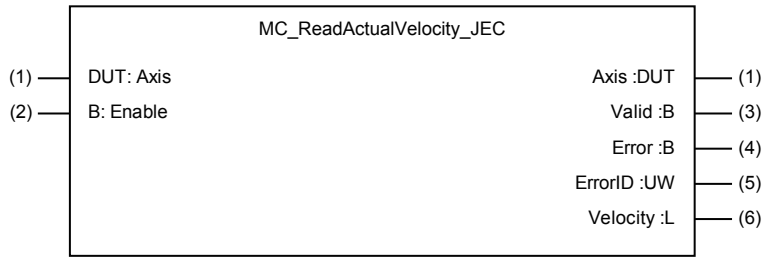
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	150 steps	
Function description	This FB reads the current position of the specified axis. The FB is executed when Enable turns ON, and the 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 61 Troubleshooting.	
Restrictions and precautions	—	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_ReadActualVelocity (Current Velocity Read)

Name

MC_ReadActualVelocity_JEC

Overview

Item	Description
Function overview	Returns the current velocity of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadActualVelocity_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

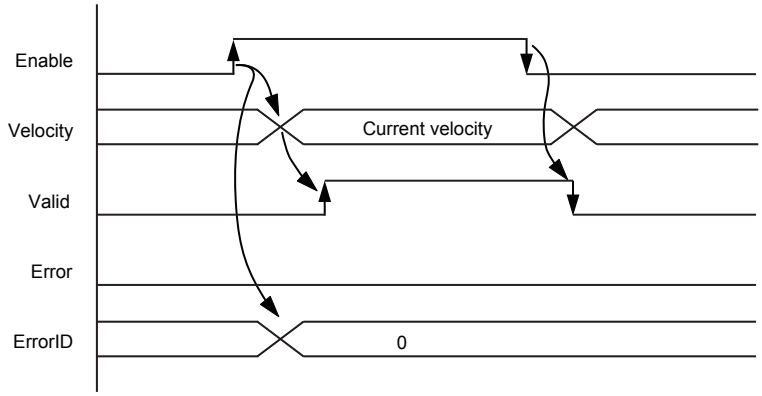
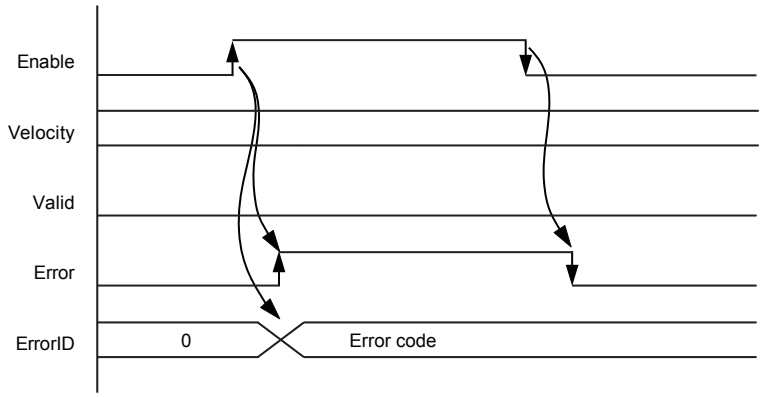
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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	Double-precision real number	0	The current velocity of the specified axis is returned (r/min).

Function overview

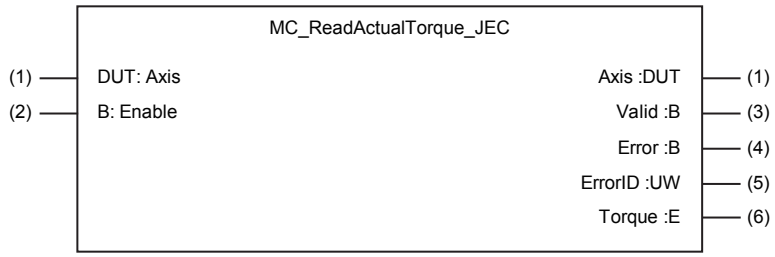
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	157 steps	
Function description	This FB reads the current velocity of the specified axis. This FB is executed when Enable turns ON, and the velocity 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 61 Troubleshooting.	
Restrictions and precautions	—	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_ReadActualTorque (Current Torque Read)

Name

MC_ReadActualTorque_JEC

Overview

Item	Description
Function overview	Reads the current torque of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadActualTorque_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

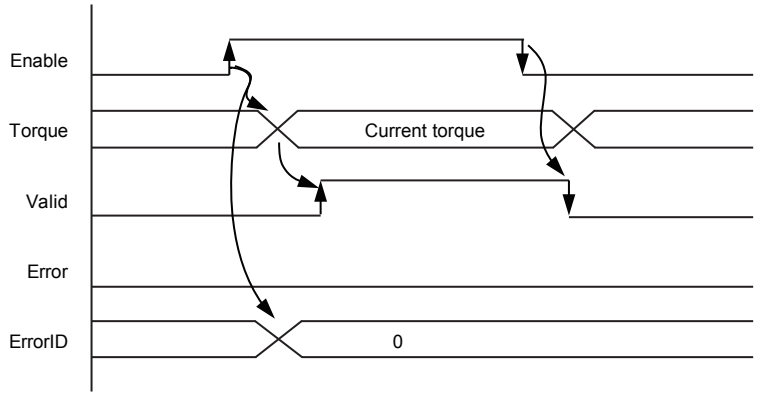
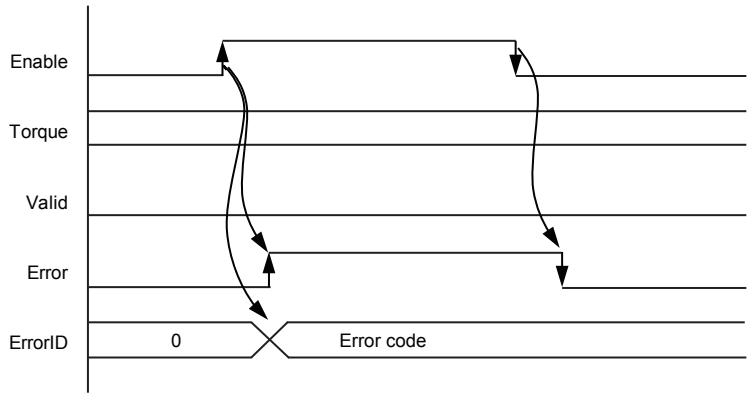
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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 current torque of the specified axis is returned.

Function overview

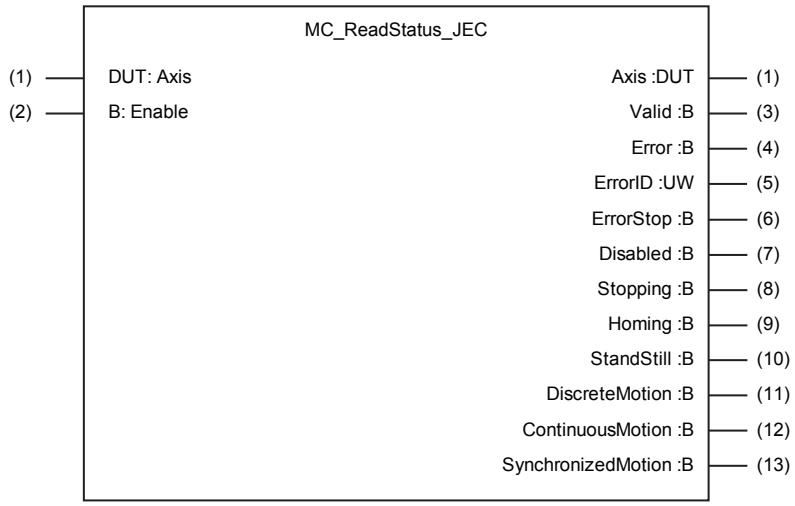
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	113 steps	
Function description	This FB reads the current torque of the specified axis. The FB is executed when Enable turns ON, and the torque 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 61 Troubleshooting.	
Restrictions and precautions	—	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

MC_ReadStatus (Status Read)

Name

MC_ReadStatus_JEC

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_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

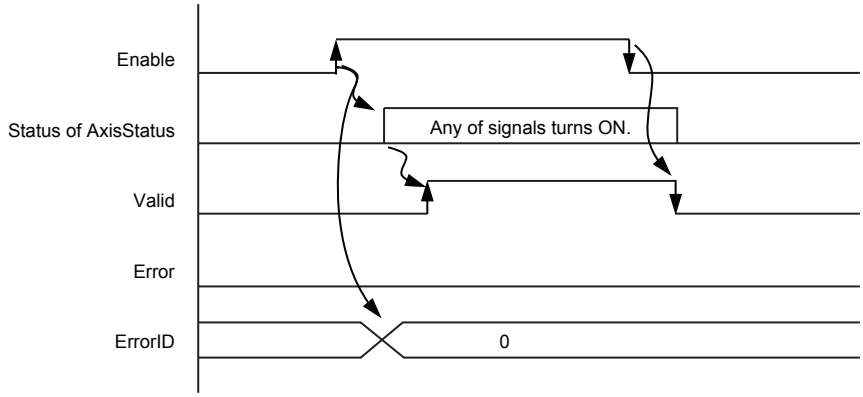
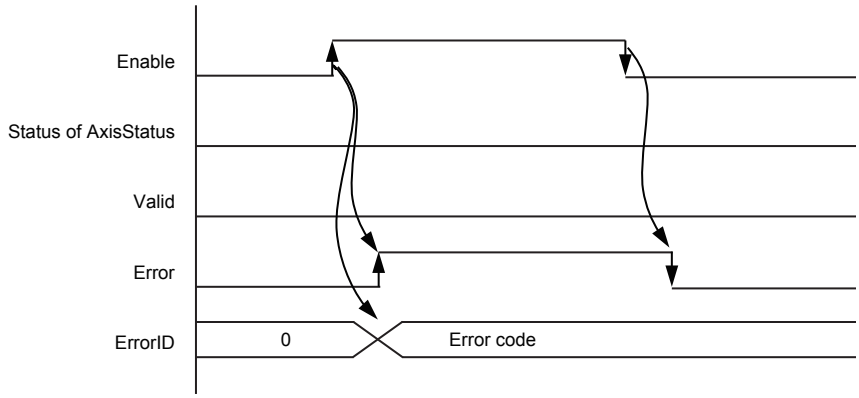
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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. Refer to ☞ Page 20 FB status diagram.
(7)	Disabled	Disabled status	Bit	OFF	It indicates that the axis is in the Disabled status. Refer to ☞ Page 20 FB status diagram.
(8)	Stopping	Stopping status	Bit	OFF	It indicates that the axis is in the Stopping status. Refer to ☞ Page 20 FB status diagram.
(9)	Homing	Homing status	Bit	OFF	It indicates that the axis is in the Homing status. Refer to ☞ Page 20 FB status diagram.
(10)	Standstill	StandStill status	Bit	OFF	It indicates that the axis is in the Standstill status. Refer to ☞ Page 20 FB status diagram.
(11)	DiscreteMotion	DiscreteMotion status	Bit	OFF	It indicates that the axis is in the DiscreteMotion status. Refer to ☞ Page 20 FB status diagram.
(12)	ContinuousMotion	ContinuousMotion status	Bit	OFF	It indicates that the axis is in the ContinuousMotion status. Refer to ☞ Page 20 FB status diagram.
(13)	SynchronizedMotion	SynchronizedMotion status	Bit	OFF	It indicates that the axis is in the SynchronizedMotion status.

Function overview

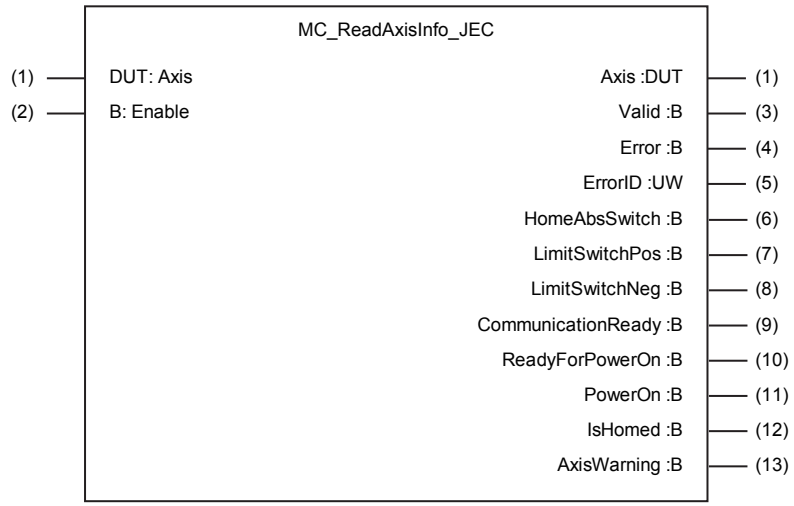
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	416 steps	
Function description	This FB reads the status of the specified axis. The FB is executed when Enable turns ON, and the status is consecutively read. When the status is normally read, one of the output labels turns ON and indicates the status. 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 61 Troubleshooting.	
Restrictions and precautions	• The output label SyncronizedMotion is always OFF.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

MC_ReadAxisInfo (Axis Information Read)

Name

MC_ReadAxisInfo_JEC

Overview

Item	Description
Function overview	Reads the axis information of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadAxisInfo_JEC (Axis, Enable, Valid, Error, ErrorID, HomeAbsSwitch, LimitSwitchPos, LimitSwitchNeg, CommunicationReady, ReadyForPowerOn, PowerOn, IsHomed, AxisWarning)

Labels

■I/O label

No.	Variable name	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

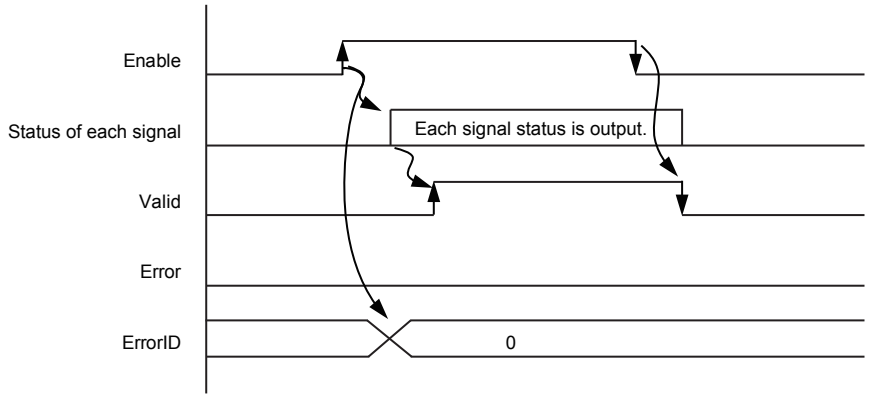
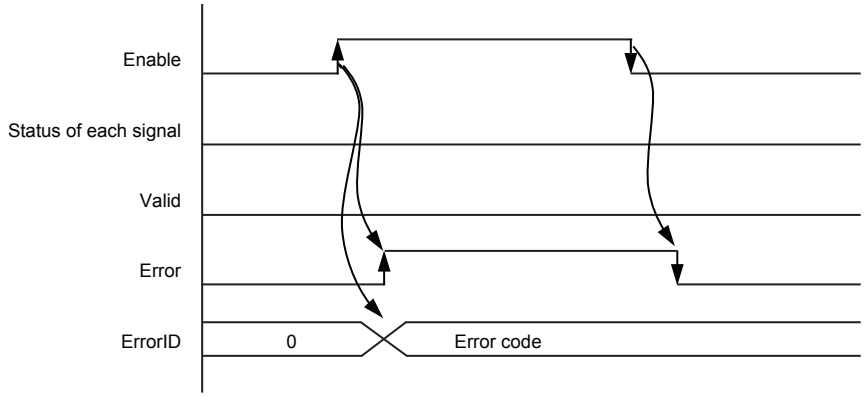
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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	Proximity dog signal	Bit	OFF	It indicates the status of the proximity 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

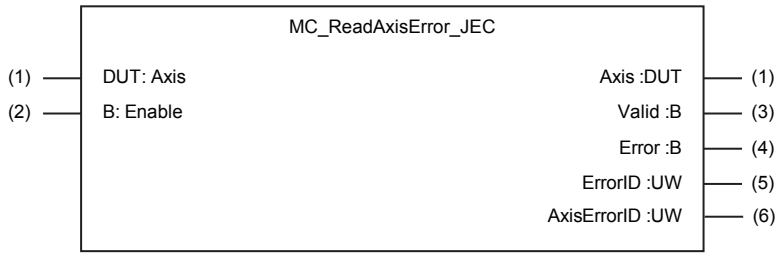
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	235 steps	
Function description	This FB is executed when Enable turns ON, and the axis information of the specified axis is read. Read data 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 61 Troubleshooting.	
Restrictions and precautions	The status of Control input 5 (Control DI5: bit 11) is output to Proximity dog signal (HomeAbsSwitch).	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

MC_ReadAxisError (Axis Error Read)

Name

MC_ReadAxisError_JEC

Overview

Item	Description
Function overview	Reads the error number of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ReadAxisError_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

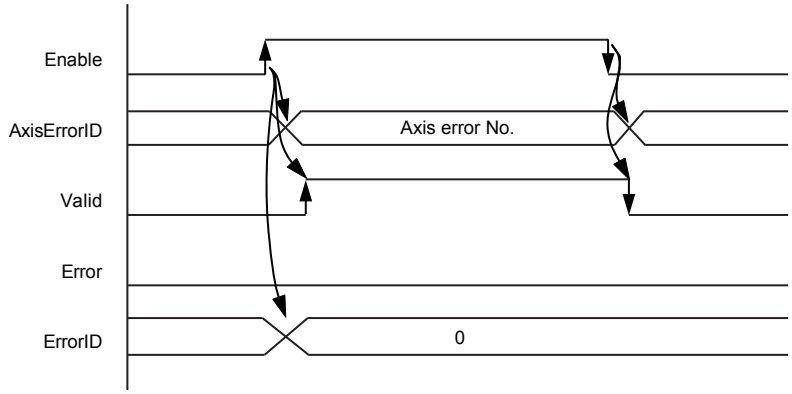
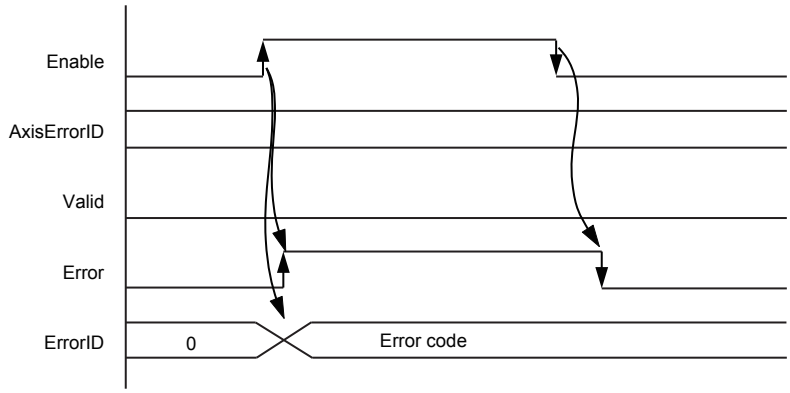
■Input labels (Load: Π: Always, ↑: Only at start)

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	During 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.

Function overview

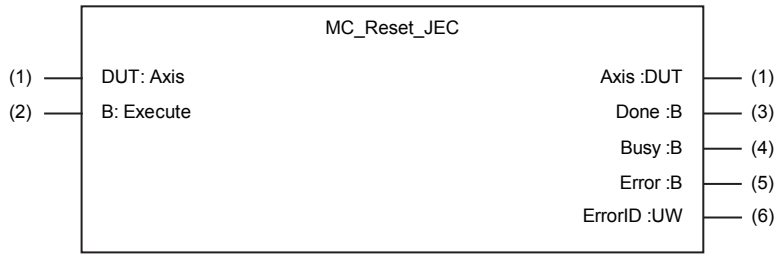
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	103 steps	
Function description	This FB reads the error number of the specified axis. The FB is executed when Enable turns ON, and the error number of the specified axis is read. Read data is always updated while Valid is ON. When no error has 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 61 Troubleshooting.	
Restrictions and precautions	—	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

MC_Reset (Axis Error Reset)

Name

MC_Reset_JEC

Overview

Item	Description
Function overview	Clears the error of the specified axis.
Symbol [Structured Ladder]	
Symbol [Structured Text]	MC_ Reset_JEC (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_JEC	—	☞ Page 59 AXIS_REF_JEC (Axis information)

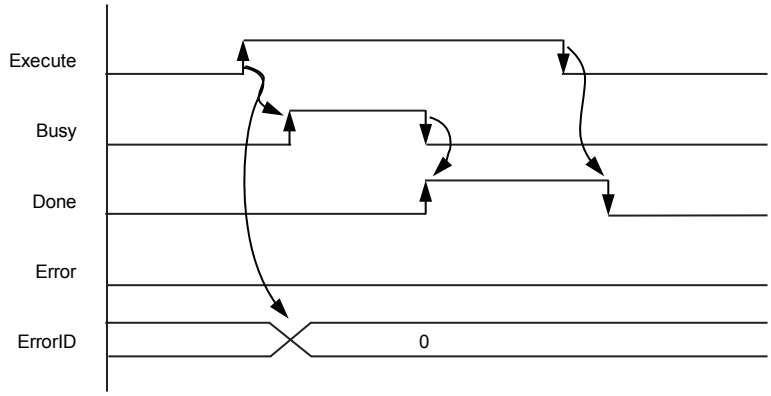
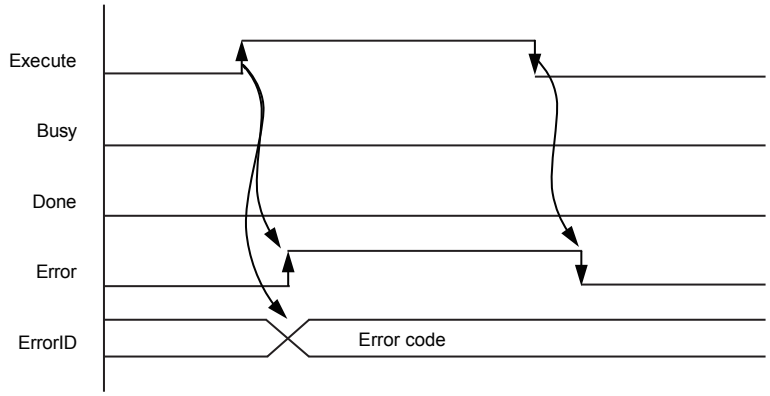
■Input labels (Load: Π: Always, ↑: Only at start)

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 CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	228 steps	
Function description	This FB clears an error (alarm) 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 the error of the axis is 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 and turn ON it after clearing the error cause. 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 61 Troubleshooting.	
Restrictions and precautions	For how to eliminate error causes, refer to the instruction manual of the servo amplifier in use.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

3.3 List of Structures

The following table lists the structures used in each library.

Structure name	Description	Version
AXIS_REF_JEC	Axis information (MotionControl_JEC)	00A

AXIS_REF_JEC (Axis information)

Name

AXIS_REF_JEC

Labels

Label name	Data type	Access Type	Description
AxisNo	Word [signed]	Read/Write	The axis number of the control target is specified. [Setting range] 1 to 16
PosTrqLimit	Single-precision real number	Read/Write	Forward torque limit value is specified. [Setting range] 0 to 1000.0 [%]
NegTrqLimit	Single-precision real number	Read/Write	Reverse torque limit value is specified. [Setting range] 0 to 1000.0 [%]
WaitTime	Word [unsigned]	Read/Write	The adjustment value of the transmission delay time is specified. [Setting range] 0 to 30000 (ms)
FbExecCount	Word [signed]	Read only	Function block execution counter

3.4 List of Global Labels

MC_DIRECTION (Direction Selection)

Name

MC_DIRECTION_JEC

Overview

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

Labels

Label name	Data type	Access Type	Constant	Description
mcPositiveDirection	Word [signed]	Read only	1	The axis rotates and moves in the address increasing direction regardless of the position data sign.
mcNegativeDirection	Word [signed]	Read only	2	The axis rotates and moves in the address decreasing direction regardless of the position data sign.
mcShortestWay	Word [signed]	Read only	3	The axis rotates and moves from the current position to the commanded position by taking a shortcut in a direction of shorter distance. If the distance from the current position to the commanded position is the same in the CCW direction and the CW direction, the axis rotates and moves in the CCW direction.
mcCurrentDirection	Word [signed]	Read only	4	The axis rotates and moves to the commanded position in the direction specified with the position data sign.

3.5 Troubleshooting

List of error codes

Error code (Hexadecimal)	Description	Remedy
1100	A value out of the range is set as an axis number.	Correct the axis number. 1 to 16 * Even if the axis number is set within the range, the FB may not operate depending on the system configuration.
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.
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.
110E	A value out of the range is set as the forward torque limit value or the reverse torque limit value.	Review the torque limit value.
1202	An error occurred.	Eliminate the error and execute the FB again.
1203	The FB cannot be executed.	Execute the control FB again after the control in execution is completed. Do not execute another MC_Halt while MC_Halt is in execution.
1204	The axis is in the Stopping status.	Execute the FB again after changing the axis status to StandStill.

MEMO

INSTRUCTION INDEX

M

MEMO

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
May 2017	BCN-B62005-824-A	First edition

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MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN