MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-F series

MELSEC iQ-F
PLCopen Motion Control FB Reference

SAFETY PRECAUTIONS

(Read these precautions before use.)

Before using the products described under "Relevant products", please read this manual and the relevant manuals carefully and pay full attention to safety to handle the products correctly.

This manual classifies the safety precautions into two categories: [⚠ WARNING] and [⚠ CAUTION].

⚠ **WARNING**	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ **CAUTION**	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Depending on the circumstances, procedures indicated by [⚠ CAUTION] may also cause severe injury.

It is important to follow all precautions for personal safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-F series programmable controllers.
This manual describes the module function blocks for the relevant products listed below.
It should be read and understood before attempting to install or use the module.
Always forward it to the end user.

Target module

- FX5S CPU module
- FX5UJ CPU module
- FX5U CPU module
- FX5UC CPU modules
- FX5-ENET
- FX5-SSC-G

Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed, without a notice, for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please consult your local Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.

CONTENTS

RELEVANT MANUALS

Manual name	Description
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) <SH-082452ENG>	Details of hardware of the CPU module, including I/O specifications, wiring, installation, and maintenance
MELSEC iQ-F FX5 User's Manual (Application) <JY997D55401>	Basic knowledge about programming, functions of the CPU module, devices/labels, and parameter settings
MELSEC iQ-F FX5 Programming Manual (Program Design) <JY997D55701>	Program specifications (ladder, ST, FBD/LD, and SFC programs) and labels
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) <JY997D55801>	Specifications of the instructions and functions that can be used in programs
MELSEC iQ-F FX5 User's Manual (Communication) <SH-082625ENG>	Descriptions of the communication function of the built-in CPU module and the Ethernet module
MELSEC iQ-F FX5 Ethernet Module User's Manual <SH-082026ENG>	Description of the Ethernet module
MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Startup) <IB-0300251ENG>	Specifications, procedures before operation, system configuration, wiring, and operation examples of the motion module and simple motion module
MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application) <IB-0300253ENG>	Functions, parameter settings, I/O signals, buffer memory, programming, and troubleshooting of the motion module and simple motion module
MELSEC iQ-F FX5 Motion Module User's Manual (CC-Link IE TSN) <IB-0300568ENG>	Functions, parameter settings, troubleshooting, and buffer memory of CC-Link IE TSN
CC-Link IE Field Network Basic Reference Manual <SH-081684ENG>	Specifications, procedures before operation, system configuration, programming, functions, parameter settings, and troubleshooting of CC-Link IE Field Network Basic
GX Works3 Operating Manual <SH-081215ENG>	Explanation of system configuration, parameter settings, and online operations of GX Works3
MR-J5-G/MR-J5W-G User's Manual (Introduction) <SH-030294ENG>	Explanation of specifications, function list, and maintenance and inspection of the servo amplifiers
MR-J5D-G User's Manual (Introduction) <IB-0300538ENG>	Explanation of specifications, function list, and maintenance and inspection of the servo amplifiers
MR-J5 User's Manual (Hardware) <SH-030298ENG>	Details of wiring, installation and maintenance, and hardware of the servo amplifiers
MR-J5 User's Manual (Function) <SH-030300ENG>	Explanation of control mode, monitoring function, positioning mode of the servo amplifiers
MR-J5-G/MR-J5W-G User's Manual (Communication Function) <SH-030302ENG>	Description of communications with the servo amplifiers using CC-Link IE TSN/CC-Link IE Field Network Basic
MR-J5-G/MR-J5W-G User's Manual (Parameters) <SH-030308ENG>	Explanation of servo parameters for the servo amplifiers
MR-J5-G/MR-J5W-G User's Manual (Object Dictionary) <SH-030304ENG>	Description of object dictionary necessary for the servo amplifiers to be used for CC-Link IE TSN/CC-Link IE Field Network Basic communications
MR-J5 User's Manual (Troubleshooting) <SH-030312ENG>	Explanation of troubleshooting of the servo amplifiers
MR-JET-G User's Manual (Introduction) <IB-0300448ENG>	Explanation of specifications, function list, and maintenance and inspection of the servo amplifiers
MR-JET User's Manual (Hardware) <IB-0300453ENG>	Details of hardware of the servo amplifiers, including wiring, installation, and maintenance
MR-JET User's Manual (Function) <IB-0300458ENG>	Explanation of control mode, monitoring function, network function, and positioning mode of the servo amplifiers
MR-JET-G User's Manual (Communication Function) <IB-0300463ENG>	Description of communications with the servo amplifiers using CC-Link IE TSN/CC-Link IE Field Network Basic
MR-JET-G User's Manual (Parameters) <IB-0300478ENG>	Explanation of servo parameters for the servo amplifiers
MR-JET-G User's Manual (Object Dictionary) <IB-0300468ENG>	Description of object dictionary necessary for the servo amplifiers to be used for CC-Link IE TSN/CC-Link IE Field Network Basic communications
MR-JET User's Manual (Troubleshooting) <IB-0300483ENG>	Explanation of troubleshooting of the servo amplifiers

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Absolute value positioning	This positioning method sets positioning data using an absolute value from the home position. (Absolute system)
Buffer memory	Memory in an intelligent function module to store data such as buffer memory setting values and monitor values.
CC-Link IE Field Network Basic	CC-Link IE Field Network Basic is an FA network using the standard Ethernet. Data are communicated periodically (cyclic transmission) between the master station and remote stations using link devices.
CC-Link IE TSN	CC-Link IE TSN is a high-speed (1Gbps) and large-capacity open field network that is based on Ethernet (1000BASE-T).
Device station	A station that performs cyclic transmission with the master station of CC-Link IE TSN. This station exchanges I/O signals in units of bits and I/O data in units of words.
GAP	Free area for adjusting the mapping position of an object
Homing	A type of control that establishes the starting position for positioning control (home position) and performs positioning in relation to that point. This function is used when returning a machine system not in the home position to the home position, such as when the system is powered on and after positioning operation stops.
Interpolation control	Control in which multiple axes work together such as linear interpolation and circular interpolation. Axes to be cooperated are specified in an axes group.
Link device	A device (RX, RY, RWr, or RWw) in a CPU module
Master station	A station that controls the entire network. Only one master station can be used in a network.
Motion control station	A station that is a target of motion control. Cyclic transmission is performed using a link device in the motion control area.
Relative value positioning	This positioning method sets positioning data using a relative value from the current command position. (Incremental system)
Remote station	A station that performs cyclic transmission with the master station on CC-Link IE Field Network Basic. This station exchanges I/O signals in units of bits and I/O data in units of words.
Servo amplifier	A device responsible for servo motor control
Standard station	A station that is not the target of motion control. Cyclic transmission is performed using a link device in the common area.
Target position change	This function changes, in any timing, the target position during positioning to the newly specified target position.
Torque control	This function increases the torque up to the command torque, and continues operation with the command torque until a stop instruction is executed.
Velocity control	This function accelerates the speed up to the command speed, and continues operation at the command speed until a stop instruction is executed.

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
Axis operation FB	A generic term for MCv_Home_[Type], MC_MoveAbsolute_[Type], MC_MoveRelative_[Type], MC_Additive_[Type], MC_Halt_[Type], MC_MoveVelocity_[Type], and MC_TorqueControl_[Type]
Continuous control FB	A generic term for MC_MoveVelocity_[Type] and MC_TorqueControl_[Type]
Device	A generic term for devices (X, Y, M, D, or others) in a CPU module
Engineering tool	A generic term for GX Works3 and MR Configurator2
Ethernet module	An FX5-ENET Ethernet module (hereinafter referred to as FX5-ENET)
Ethernet-equipped module	A generic term for the following modules when the Ethernet communication function is used: FX5 CPU module, FX5-ENET
FB	An abbreviation for "Function Block". A function block is created from a ladder block repeatedly used in a sequence program so that it can be used as a component in a sequence program. Using FBs helps to develop programs more efficiently, reduce mistakes, and improve quality of programs.
FX5 CPU module	A generic term for the FX5S CPU module, FX5UJ CPU module, FX5U CPU module, and FX5UC CPU module
FX5-SSC-G	A generic term for the FX5-40SSC-G and FX5-80SSC-G motion modules
Interpolation control FB	A generic term for MCv_MoveCircularInterpolateAbsolute_[Type], MCv_MoveCircularInterpolateRelative_[Type], MCv_MoveLinearInterpolateAbsolute_[Type], and MCv_MoveLinearInterpolateRelative_[Type]
Manual control FB	A generic term for MCv_Jog_[Type] and MCv_Inch_[Type]
Model	A generic term that indicates the following meanings, depending on the model name of the master module used: • FX5CPU = FX5CPUEN_F • FX5-ENET = FX5ENET_F • FX5-SSC-G (standard station) = FX5SSCG_SS_F • FX5-SSC-G (motion control station) = FX5SSCG_MCS_F
MR-J5-G	A generic term for the following servo amplifiers. □□ are numerical values indicating the capacity. MR-J5-□G_, MR-J5W□-□G_, MR-J5D□-□G_
MR-JET-G	A generic term for MR-JET-□□G servo amplifiers. □□ are numerical values indicating the capacity.
Multi-axis control FB	A generic term for MC_AddAxisToGroup_[Type], MC_RemoveAxisFromGroup_[Type], MC_UngroupAllAxes_[Type], MC_GroupEnable_[Type], MC_GroupDisable_[Type], MC_GroupReset_[Type], MC_GroupStop_[Type], MC_GroupSetOverride_[Type], MCv_MoveCircularInterpolateAbsolute_[Type], MCv_MoveCircularInterpolateRelative_[Type], MCv_MoveLinearInterpolateAbsolute_[Type], and MCv_MoveLinearInterpolateRelative_[Type]
Object read/write FB	A generic term for MCv_ReadMultiObject_Model, MCv_WriteMultiObject_Model, and MCv_ChangeMapping_Model
Position control	A generic term for absolute positioning, relative positioning, and target position change
Positioning control FB	A generic term for MC_MoveAbsolute_[Type], MC_MoveRelative_[Type], MC_Additive_[Type], and MC_Halt_[Type]
Single axis control FB	A generic term for MCv_Home_[Type], MC_Stop_[Type], MC_MoveAbsolute_[Type], MC_MoveRelative_[Type], MC_Additive_[Type], MC_Halt_[Type], MC_MoveVelocity_[Type], MC_TorqueControl_[Type], MC_Reset_[Type], MC_SetPosition_[Type], MC_SetOverride_[Type], MCv_Jog_[Type], and MCv_Inch_[Type]
SLMP	An abbreviation for SeamLess Message Protocol. This protocol is used to access an SLMP-compatible device or a programmable controller connected to an SLMP-compatible device from an external device.
Type	A generic term that indicates the following meanings, depending on the type of connection with the servo amplifier: • CC-Link IEF Basic = CCLinkIEFBasic_F • CC-Link IE TSN (standard station) = CCLinkIETSN_SS_F • CC-Link IE TSN (motion control station) = CCLinkIETSN_MCS_F

1 OVERVIEW

The function blocks in this reference manual mean the FB libraries for using MELSEC iQ-F series FX5 and MELSERVO MR-J5-G and MR-JET-G by connecting them via CC-Link IE Field Network Basic or CC-Link IE TSN.

1.1 Features

This section describes the features of this function.

Controlling multiple axes

Multiple axes can be controlled by communicating with servo amplifiers through CC-Link IE Field Network Basic communications or CC-Link IE TSN communications.

Shortening programming time

The Motion Control FB specifications standardized by PLCopen are supported to help create programs without having to consider the communication interface with servo amplifiers.

1.2 FB Library

FB library types

The types of FB libraries are as follows.

FB library	Feature
For CC-Link IEF Basic	For CC-Link IE Field Network Basic communications, axes can be controlled using the standard Ethernet. Because basic axis control FB are equipped, system construction can be performed easily.
For CC-Link IE TSN (standard station)	Axes can be controlled via high-speed communications using CC-Link IE TSN. Because basic axis control FB are equipped, system construction can be performed easily.
For CC-Link IE TSN (motion control station)	Axes can be controlled via high-speed communications using CC-Link IE TSN. Linear interpolation control and circular interpolation control can be performed using the interpolation control FB, in addition to the basic axis control FB.

Differences in FB libraries

The following table lists the main differences in the FB libraries by type.

○: Supported, ×: Not supported

Item	For CC-Link IEF Basic	For CC-Link IE TSN (standard station)	For CC-Link IE TSN (motion control station)
mslm file name	MotionControl_CCLinkIEFBasic_F	MotionControl_CCLinkIETSN_SS_F	MotionControl_CCLinkIETSN_MCS_F
Master module	FX5 CPU module, FX5-ENET	FX5-SSC-G	FX5-SSC-G
Servo amplifier	MR-J5-G*1, MR-JET-G	MR-J5-G, MR-JET-G	MR-J5-G, MR-JET-G
Communication type	CC-Link IE Field Network Basic, SLMP	CC-Link IE TSN, SLMP	CC-Link IE TSN, SLMP
Maximum number of controlled axes	16 axes	16 axes	32 axes
Position control FB	○	○	○
Velocity control FB	○	○	○
Torque control FB	○	○	○
JOG operation FB	×*2	×*2	○
Inching operation FB	×*2	×*2	○
Interpolation control FB	×	×	○

*1 The multi-axis servo amplifiers are not supported.

*2 Equivalent functions can be realized by using another FB. (☞ Page 259 OPERATION EXAMPLES)

List of FB libraries

The following table lists the FB libraries in this reference manual.

Point

To use these FB libraries, set the parameters using the engineering tool. (☞ Page 49 Parameter Settings)

○: Supported, —: Not supported

Name	Description	Type		
		For CC-Link IEF Basic	For CC-Link IE TSN (standard station)	For CC-Link IE TSN (motion control station)
MC_Power_[Type] (Operation Possible)	Switches the status of the servo amplifier for the specified axis to the operable state.	○	○	×
MCv_AllPower_CCLinkIETSN_MCS_F (Operation of All Axes Possible)	Switches the status of all axes to the operable state.	×	×	○
MCv_State_CCLinkIETSN_MCS_F (Axis Status Transition)	Transitions AxisStatus (axis status) of the specified axis.	×	×	○
MCv_GroupState_CCLinkIETSN_MCS_F (Axes Group Status Transition)	Transitions AxesGroupStatus (axes group status) of the specified axes group.	×	×	○
MCv_Home_[Type] (Homing)	Executes the homing of the specified axis.	○	○	○
MC_Stop_[Type] (Forced Stop)	Forcibly stops the specified axis.	○	○	○
MC_Halt_[Type] (Stop)	Stops the specified axis.	○	○	×
MC_MoveAbsolute_[Type] (Absolute Positioning)	Specifies the target absolute position of the specified axis and executes positioning.	○	○	○
MC_MoveRelative_[Type] (Relative Positioning)	Moves the specified distance from the current position.	○	○	○
MC_MoveAdditive_[Type] (Target Position Change)	Adds a specified relative position in the previous positioning command of the specified axis and executes positioning.	○	○	○
MC_MoveVelocity_[Type] (Velocity Control)	Controls the speed of the specified axis to the target speed.	○	○	○
MC_TorqueControl_[Type] (Torque Control)	Controls the specified axis with the specified torque.	○	○	○
MC_Reset_[Type] (Axis Error Reset)	Clears the error of the specified axis.	○	○	○
MCv_ReadMultiObject_Model (Multiple Object Read)	Reads multiple objects from the servo amplifiers.	○	○	○
MCv_WriteMultiObject_Model (Multiple Object Write)	Writes multiple objects of the servo amplifiers.	○	○	○
MCv_ChangeMapping_Model (Mapping Change)	Changes the mapping of the servo amplifier that communicates via CC-Link IE Field Network Basic.	○	×*1	×*2
MC_SetPosition_CCLinkIETSN_MCS_F (Current Position Change)	Changes the current position (command position, actual position) of the specified axis.	×	×	○
MC_SetOverride_[Type] (Override Value Setting)	Executes the change in target speed of the specified axis.	×	○	○
MCv_Jog_CCLinkIETSN_MCS_F (JOG Operation)	Performs JOG operation of the specified axis.	×	×	○
MCv_Inch_CCLinkIETSN_MCS_F (Inching Operation)	Performs inching operation of the specified axis.	×	×	○
MC_AddAxisToGroup_CCLinkIETSN_MCS_F (Add Axis)	Adds the specified axis as a configuration axis of the axes group.	×	×	○
MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F (Delete Axis)	Deletes the specified axis from the configuration axes of the axes group.	×	×	○
MC_UngroupAllAxes_CCLinkIETSN_MCS_F (Ungroup Axes)	Deletes all configuration axes of the axes group.	×	×	○
MC_GroupEnable_CCLinkIETSN_MCS_F (Enable Axes Group)	Transitions the status of the specified axes group to enable the axes group.	×	×	○
MC_GroupDisable_CCLinkIETSN_MCS_F (Disable Axes Group)	Transitions the status of the specified axes group to disable the axes group.	×	×	○

Name	Description	Type		
		For CC-Link IEF Basic	For CC-Link IE TSN (standard station)	For CC-Link IE TSN (motion control station)
MC_GroupReset_CCLinkIETSN_MCS_F (Axes Group Error Reset)	Clears errors and warnings on the configuration axes of the axes group.	×	×	○
MC_GroupStop_CCLinkIETSN_MCS_F (Axes Group Forced Stop)	Forcibly stops the configuration axes of the specified axes group.	×	×	○
MC_GroupSetOverride_CCLinkIETSN_MCS_F (Override Axes Group Value Setting)	Executes the change in target speed of the specified axes group.	×	×	○
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Circular Interpolation Control)	Sets the end point and auxiliary point of the absolute position and executes positioning based on circular interpolation of two axes using the specified axes group.	×	×	○
MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Circular Interpolation Control)	Sets the relative position to the end point and auxiliary point from the current position when starting and executes positioning based on circular interpolation of two axes using the specified axes group.	×	×	○
MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Linear Interpolation Control)	Specifies the target position based on the absolute position for the specified axes group and executes positioning by linear interpolation control.	×	×	○
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Linear Interpolation Control)	Specifies the movement amount based on the relative position of the specified axes group and executes positioning by linear interpolation control.	×	×	○

*1 Mapping can be changed using GX Works3. For details, refer to the user's manual (CC-Link IE TSN) of the module used.

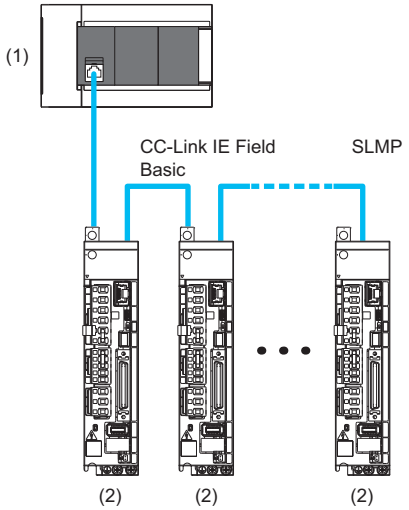
*2 For link devices, mapping cannot be changed because it is placed in the motion control area.

1.3 System Configuration

The following figure shows an example of system configuration for using the FB libraries in this reference manual.

System configuration with the FX5 CPU module

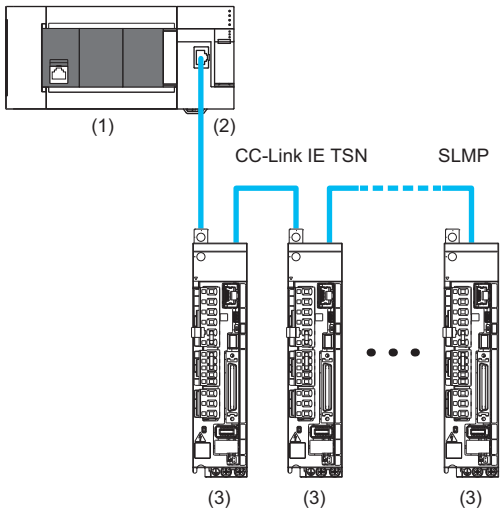
The following figure shows a system configuration example of an FB library for CC-Link IEF Basic.



(1) FX5 CPU module
(2) Servo amplifier

System configuration with the FX5-SSC-G

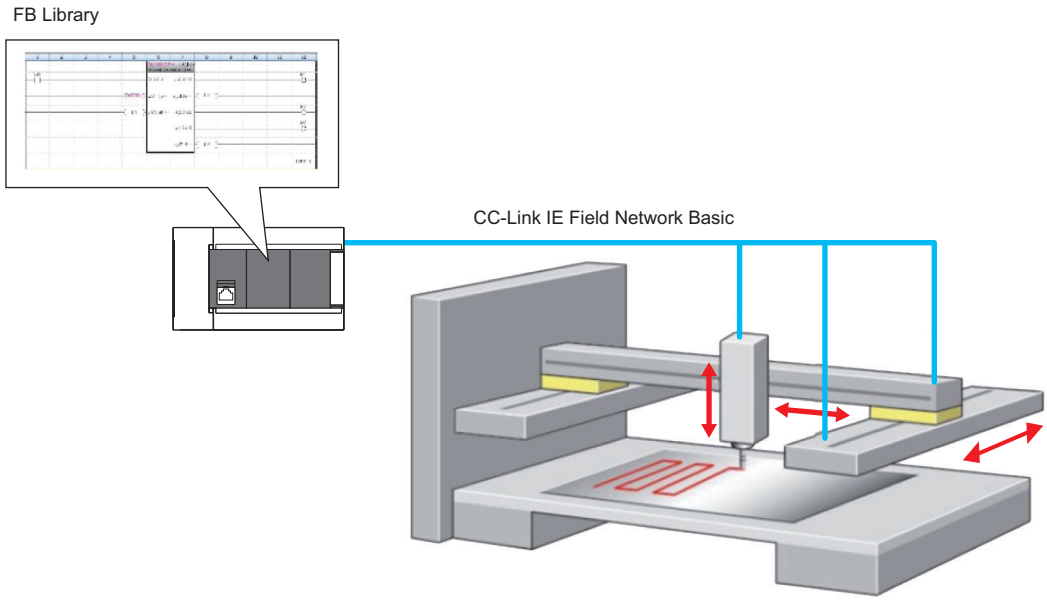
The following figure shows a system configuration example of an FB library for CC-Link IE TSN (standard station) and CC-Link IE TSN (motion control station).



(1) CPU module
(2) Motion module
(3) Servo amplifier

Application example

The following figure shows an application example in sealing equipment. Three servo amplifiers are used and positioning is controlled with FB.



2 SPECIFICATIONS

This chapter describes the common specifications of the FB libraries in this reference manual.

2.1 FB Library Specifications

The following table lists the FB libraries in this reference manual.

For CC-Link IEF Basic

Item		Description
Ethernet-equipped module*1		FX5 CPU module, FX5-ENET
Servo amplifier*2		MR-J5-G, MR-JET-G
Communication type		CC-Link IE Field Network Basic, SLMP*5
Network topology		Line topology, star topology (Line topology and star topology can be mixed.)
Maximum number of controlled axes*3	FX5S CPU module FX5UJ CPU module	8 axes
	FX5U CPU module FX5UC CPU module	16 axes
Unit*4	Control unit	Degree*6, pulse
	Positioning range	-360000 to 360000 [$\times 10^{-3}$degree]*7 -2147483648 to 2147483647 [pulse]
	Speed command	[Pr.PT01.1] = Encoder unit Velocity control • [Pr.PA01.1] = Rotary servo motor • [Pr.PA01.1] = Direct drive motor*10 -2147483648 to 2147483647 [$\times 10^{-2}$r/min]*7 • [Pr.PA01.1] = Linear servo motor -2147483648 to 2147483647 [$\times 10^{-2}$mm/s]*7 Absolute positioning, relative positioning, target position change, and torque control • [Pr.PA01.1] = Rotary servo motor • [Pr.PA01.1] = Direct drive motor*10 0 to 4294967295 [$\times 10^{-2}$r/min]*7*8 • [Pr.PA01.1] = Linear servo motor 0 to 4294967295 [$\times 10^{-2}$mm/s]*7*8 Set a value not greater than the maximum speed of the servo motor used.
	Acceleration/deceleration time	[Pr.PT01.1] = Encoder unit*9 Position control: 0 to 20000 [ms] Velocity control: 0 to 50000 [ms]
	Torque	-32768 to 32767 [$\times 10^{-1}$%]*7 Set a value not greater than the maximum torque of the servo motor used.

*1 FB libraries for CC-Link IEF Basic and CC-Link IE TSN (standard station/motion control station) can be used at the same time, as each FB library is separate.

*2 The multi-axis servo amplifiers are not supported.

*3 The actual number of controlled axes may be less than the described value, depending on the number of steps of the CPU module and on the label capacity. The maximum number of controlled axes when the FX5-ENET is used depends on the number of controlled axes of the CPU used.

*4 Set the units to be used in the servo parameters [Pr. PT01: Command mode selection] and [Pr. PA01: Operation mode].

*5 The FX5-ENET does not support SLMP clients, however, SLMP communications can be performed by socket communications in FBs.

*6 "degree" cannot be set in the linear servo motors. For restrictions on setting "degree", refer to the user's manual for the servo amplifier used.

*7 Set 0 to 2147483647 in decimal without any changes. For 2147483648 to 4294967295, set a value converted into hexadecimal in the FB.

*8 A value set in the servo amplifier is an exponentiation value of the value set in the FB.
For example, when the speed command is [$\times 10^{-2}$r/min], the value input to the FB = 100000 and the speed command to the servo amplifier = 1000.00 [r/min].

*9 Acceleration time taken by a servo motor to reach the rated speed. The rated speed can be checked with [Motor rated speed (Obj. 2D28H)].

*10 The MR-JET-G does not support direct drive motors.

For CC-Link IE TSN (standard station)

Item		Description
CPU module		FX5U CPU module, FX5UC CPU module
CC-Link IE TSN module*1		FX5-SSC-G*4
Servo amplifier		MR-J5-G, MR-JET-G
Communication type		CC-Link IE TSN, SLMP
Network topology		Line topology, star topology (Line topology and star topology can be mixed.)
Maximum number of controlled axes*2	FX5-SSC-G	16 axes
Unit*3	Control unit	degree*5, pulse
	Positioning range	-360000 to 360000 [$\times 10^{-3}$degree]*5 -2147483648 to 2147483647 [pulse]
	Speed command	[Pr.PT01.1] = Encoder unit Velocity control • [Pr.PA01.1] = Rotary servo motor • [Pr.PA01.1] = Direct drive motor*7 -2147483648 to 2147483647 [$\times 10^{-2}$r/min]*6 • [Pr.PA01.1] = Linear servo motor -2147483648 to 2147483647 [$\times 10^{-2}$mm/s]*6 Absolute positioning, relative positioning, target position change, and torque control • [Pr.PA01.1] = Rotary servo motor • [Pr.PA01.1] = Direct drive motor*7 0 to 4294967295 [$\times 10^{-2}$r/min]*6*8 • [Pr.PA01.1] = Linear servo motor 0 to 4294967295 [$\times 10^{-2}$mm/s]*6*8 Set a value not greater than the maximum speed of the servo motor used.
	Acceleration/deceleration time	[Pr.PT01.1] = Encoder unit • Position control: 0 to 20000 [ms]*9 • Velocity control: 0 to 50000 [ms]*9
	Torque	-32768 to 32767 [$\times 10^{-1}$%]*6 Set a value not greater than the maximum torque of the servo motor used.

*1 FB libraries for CC-Link IEF Basic and CC-Link IE TSN (standard station/motion control station) can be used at the same time, as each FB library is separate.

*2 The actual number of controlled axes may be less than the described value depending on the number of steps of the CPU module and on the label capacity.

*3 Set the units to be used in the servo parameters [Pr. PT01: Command mode selection] and [Pr. PA01: Operation mode].

*4 When a standard station is used, only one unit of the FX5-SSC-G can be controlled using the FB in this reference manual. Use a motion control station to control multiple modules.

*5 "degree" cannot be set in the linear servo motors. For restrictions on setting "degree", refer to the user's manual for the servo amplifier used.

*6 For the servo amplifier, an exponentiation value of the value set in the FB is used. For example, when the speed command value [$\times 10^{-2}$r/min] is input, the value will be as follows.
A value input to the FB = 100000, the speed command to the servo amplifier = 1000.00 [r/min]

*7 The MR-JET-G does not support direct drive motors.

*8 Set 0 to 2147483647 in decimal without any changes. For 2147483648 to 4294967295, set a value converted into hexadecimal in the FB.

*9 Acceleration time taken by a servo motor to reach the rated speed from. The rated speed can be checked with [Motor rated speed (Obj. 2D28H)].

For CC-Link IE TSN (motion control station)

Item		Description
CPU module		FX5U CPU module, FX5UC CPU module
Motion module[*1]		FX5-SSC-G
Servo amplifier		MR-J5-G, MR-JET-G
Communication type		CC-Link IE TSN, SLMP
Network topology		Line topology, star topology (Line topology and star topology can be mixed.)
Maximum number of controlled axes[*2]	FX5-40SSC-G	4 axes
	FX5-80SSC-G	8 axes
Unit[*3]	Control unit	mm, inch, degree, pulse
	Positioning range	Absolute positioning, current value change • -2147483648 to 2147483647 [$\times10^{-1}$μm][*4] • -2147483648 to 2147483647 [$\times10^{-5}$inch][*4] • 0 to 35999999 [$\times10^{-5}$degree][*4] • -2147483648 to 2147483647 [pulse] Relative positioning, target position change • -2147483648 to 2147483647 [$\times10^{-1}$μm][*4] • -2147483648 to 2147483647 [$\times10^{-5}$inch][*4] • -2147483648 to 2147483647 [$\times10^{-5}$degree][*4] • -2147483648 to 2147483647 [pulse]
	Speed command	Absolute positioning, relative positioning, target position change, and JOG operation • 1 to 2000000000 [$\times10^{-2}$mm/min][*4] • 1 to 2000000000 [$\times10^{-3}$inch/min][*4] • 1 to 2000000000 [$\times10^{-3}$degree/min][*4][*5] • 1 to 2000000000 [pulse/s] Velocity control • -2000000000 to 2000000000 [$\times10^{-2}$mm/min][*4] • -2000000000 to 2000000000 [$\times10^{-3}$inch/min][*4] • -2000000000 to 2000000000 [$\times10^{-3}$degree/min][*4][*5] • -1000000000 to 1000000000 [pulse/s] Torque control • 0 to 2000000000 [$\times10^{-2}$mm/min][*4] • 0 to 2000000000 [$\times10^{-3}$inch/min][*4] • 0 to 2000000000 [$\times10^{-3}$degree/min][*4][*5] • 0 to 1000000000 [pulse/s]
	Acceleration/deceleration time	Absolute positioning, relative positioning, and target position change • 1 to 8388608 [ms] Velocity control • 0 to 65535 [ms]
	Torque	-10000 to 10000 [$\times 10^{-1}$%][*5]

*1 FB libraries for CC-Link IEF Basic and CC-Link IE TSN (standard station/motion control station) can be used at the same time, as each FB library is separate.

*2 This indicates the maximum number of controlled axes per motion module. When CC-Link IE TSN (motion control station) is used, up to four motion modules can be installed, so up to 32 axes can be controlled. However, the actual number of controlled axes may be less than the described value depending on the number of steps of the CPU module and on the label capacity.

*3 Set the unit to be used in "[Pr.1] Unit setting" of the motion module. Set "[Pr.1] Unit setting" before turning on "[Cd.190] PLC READY".

*4 For the motion module, an exponentiation value of the value set in the FB is used.
For example, when the speed command value [$\times 10^{-2}$mm/min] is input, the value will be as follows.
A value input to the FB = 2000000, the speed command to the motion module = 20000.00mm/min

*5 When "[Pr.83] Speed control 10 × multiplier setting for degree axis" of the motion module is enabled, the speed specification range becomes 10 times greater.
Position control or JOG operation: 1 to 2000000000 [$\times10^{-2}$degree/min]
Velocity control: -2000000000 to 2000000000 [$\times10^{-2}$degree/min]
Torque control: 0 to 2000000000 [$\times10^{-2}$degree/min]

Project performance values

The following table lists the performance values in the project data of the FB libraries.

FB library	Performance values*2*3	
For CC-Link IEF Basic*4	Minimum scan time (ms)	2.441
	Maximum scan time (ms)	5.021
	Number of steps in a project*1	14.69K steps
	Label capacity of a project*1	2.03K points [Word]
	Latch label capacity of a project*1	0K points [Word]
For CC-Link IE TSN standard station*4	Minimum scan time (ms)	3.160
	Maximum scan time (ms)	5.630
	Number of steps in a project*1	14.60K steps
	Label capacity of a project*1	1.86K points [Word]
	Latch label capacity of a project*1	0K points [Word]
For CC-Link IE TSN motion control station*5	Minimum scan time (ms)	5.427
	Maximum scan time (ms)	9.240
	Number of steps in a project*1	24.11K steps
	Label capacity of a project*1	9.01K points [Word]
	Latch label capacity of a project*1	0K points [Word]

*1 Total value of the programs used in the following operation examples.
☞ Page 259 OPERATION EXAMPLES

*2 Measured with the program capacity set to 128K steps.

*3 The standard area is used for labels.

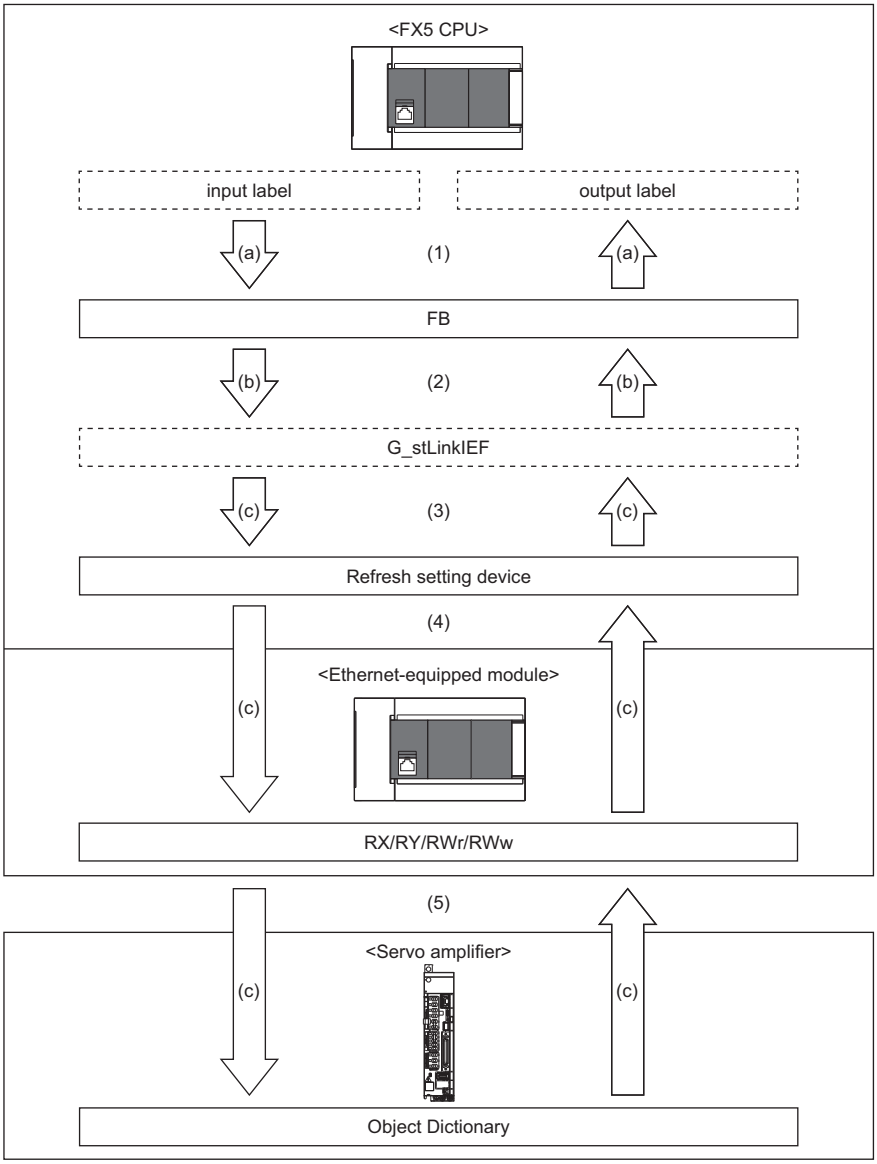
*4 Performance values for the programs used in the following operation examples.
☞ Page 259 Positioning Operation
☞ Page 268 Object Read and Write

*5 Performance values for the programs used in the following operation examples.
☞ Page 273 Positioning Operation (Sealing Device)
☞ Page 268 Object Read and Write

2.2 FB Library Correlations

The following figure shows the correlations of the FB libraries.

For CC-Link IEF Basic



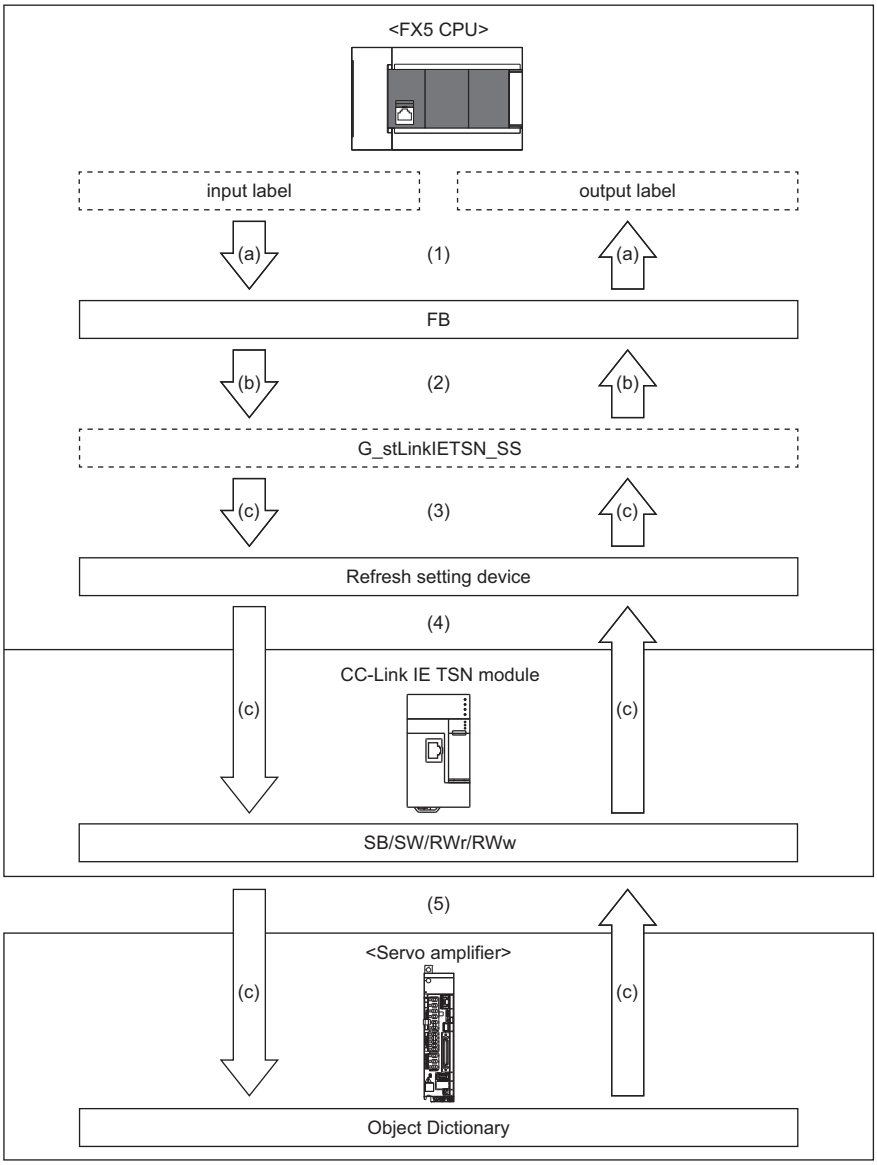
(1) User-created program processing
(2) FB processing
(3) Global label definition (device assignment)*1
(4) Link refresh*2
(5) CC-Link IE Field Network Basic

(a) Data processing by user
(b) Data processing by FB
(c) Data processing performed by other than users and FB

*1 For details on the setting method, refer to the following.
☞ Page 53 Global label settings

*2 For details on the setting method, refer to the following.
☞ Page 52 Refresh parameter settings

For CC-Link IE TSN (standard station)



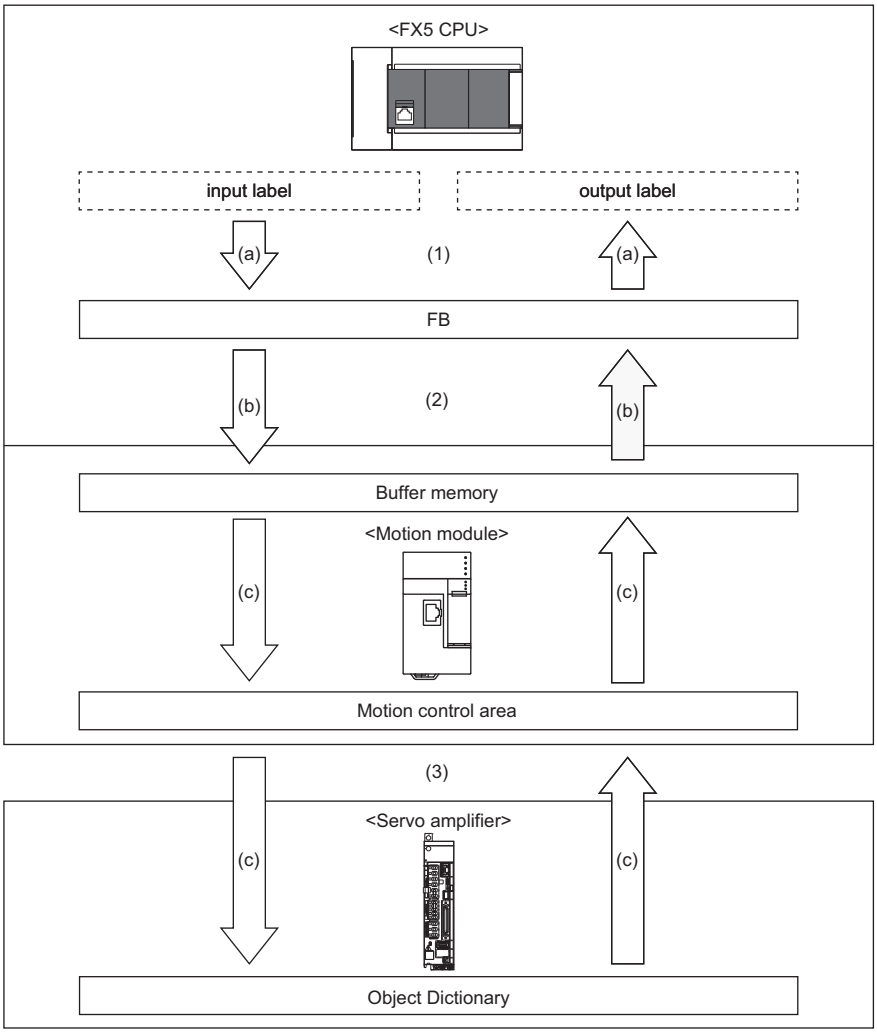
(1) User-created program processing
(2) FB processing
(3) Global label definition (device assignment)*1
(4) Link refresh*2
(5) CC-Link IE TSN

(a) Data processing by user
(b) Data processing by FB
(c) Data processing performed by other than users and FB

*1 For details on the setting method, refer to the following.
☞ Page 53 Global label settings

*2 For details on the setting method, refer to the following.
☞ Page 52 Refresh parameter settings

For CC-Link IE TSN (motion control station)



(1) User-created program processing
(2) FB processing
(3) CC-Link IE TSN

(a) Data processing by user
(b) Data processing by FB
(c) Data processing performed by other than users and FB

2.3 List of Global Labels

The following table lists the global labels used for the FB libraries.

For CC-Link IEF Basic

Name	Description
MC_DIRECTION_CCLinkIEFBasic_F	Used to specify the travel direction in absolute positioning, velocity control, and torque control.
MASTER_MODULE_REF_CCLinkIEFBasic_F	Used to specify the master module to be controlled.
OBJECT_RW_FX5ENET	Used to shared information of the object read/write FBs. (For the FX5-ENET)
Global	Defined by the user according to their usage environment.

MC_DIRECTION_CCLinkIEFBasic_F

The data cannot be changed by the user.

Label name	Name	Data type	Class	Constant	Description
mcPositiveDirection	Address increase direction	Word [signed]	VAR_GLOBAL_CONSTANT	0080H	Travels by rotating in the address increase direction regardless of the sign of the position data.
mcNegativeDirection	Address decrease direction	Word [signed]	VAR_GLOBAL_CONSTANT	0040H	Travels by rotating in the address decrease direction regardless of the sign of the position data.
mcShortestWay	Shortcut	Word [signed]	VAR_GLOBAL_CONSTANT	00C0H	Travels by rotating and shortcutting in the direction of the shortest distance from the current position to the target position. In addition, travels by rotating in the CCW direction when the distance from the current position to the target position is the same both in the CCW direction and in the CW direction.
mcCurrentDirection	Position data sign direction	Word [signed]	VAR_GLOBAL_CONSTANT	0000H	Travels by rotating in the direction specified by the sign of the position data to the target position.

MASTER_MODULE_REF_CCLinkIEFBasic_F

The data cannot be changed by the user.

Label name	Name	Data type	Class	Constant	Description
MasterFX5CPUEN	FX5 CPU	Word [signed]	VAR_GLOBAL_CONSTANT	1	Specifies the FX5 CPU module for the master module.
MasterFX5ENET	FX5-ENET	Word [signed]	VAR_GLOBAL_CONSTANT	2	Specifies the FX5-ENET for the master module.

OBJECT_RW_FX5ENET

This global label is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Class	Description
ObjectRW	For manufacturer setting	Bit (0..31)	VAR_GLOBAL	—

Global

The global labels should be defined by the user according to their usage environment.

Label name	Name	Data type	Class	Description
Axis_CCLinkIEFBasic*2	Axis information	AXIS_REF_CC LinkIEFBasic_F (1..n)*1	VAR_GLOBAL	Stores axis information. Change the number of elements for the array according to the number of axes.
G_stLinkIEF	Link device	stRemoteReg*1	VAR_GLOBAL	Stores link device information exchanged in communications with servo amplifiers.

*1 For details on the structure, refer to the following.
☞ Page 30 List of Structures

*2 Can be changed to any name.

For CC-Link IE TSN (standard station)

Name	Description
MC_DIRECTION_CCLinkIETSN_SS_F	Used to specify the travel direction in absolute positioning, velocity control, and torque control.
OBJECT_RW_FX5SSCG_SS	Used to shared information of the object read/write FBs.
Global	Defined by the user according to their usage environment.

MC_DIRECTION_CCLinkIETSN_SS_F

The data cannot be changed by the user.

Label name	Name	Data type	Class	Constant	Description
mcPositiveDirection_CCLinkIETSN_SS_F	Address increase direction	Word [signed]	VAR_GLOBAL_CONSTANT	0080H	Travels by rotating in the address increase direction regardless of the sign of the position data.
mcNegativeDirection_CCLinkIETSN_SS_F	Address decrease direction	Word [signed]	VAR_GLOBAL_CONSTANT	0040H	Travels by rotating in the address decrease direction regardless of the sign of the position data.
mcShortestWay_CCLinkIETSN_SS_F	Shortcut	Word [signed]	VAR_GLOBAL_CONSTANT	00C0H	Travels by rotating and shortcutting in the direction of the shortest distance from the current position to the target position. In addition, travels by rotating in the CCW direction when the distance from the current position to the target position is the same both in the CCW direction and in the CW direction.
mcCurrentDirection_CCLinkIETSN_SS_F	Position data sign direction	Word [signed]	VAR_GLOBAL_CONSTANT	0000H	Travels by rotating in the direction specified by the sign of the position data to the target position.

OBJECT_RW_FX5SSCG_SS

This global label is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Class	Description
ObjectRW_FX5SSCG_SS	For manufacturer setting	Bit (0..31)	VAR_GLOBAL	—

Global

The global labels should be defined by the user according to their usage environment.

Label name	Name	Data type	Class	Description
Axis_CCLinkIETSN_SS*2	Axis information	AXIS_REF_CCLinkIETSN_SS_F (1..n)*1	VAR_GLOBAL	Stores axis information. Change the number of elements for the array according to the number of axes.
G_stLinkIETSN_SS	Link device	stRemoteReg_CCLinkIETSN_SS_F*1	VAR_GLOBAL	Stores link device information exchanged in communications with servo amplifiers.

*1 For details on the structure, refer to the following.
☞ Page 30 List of Structures

*2 Can be changed to any name.

For CC-Link IE TSN (motion control station)

Name	Description
MC_DIRECTION_CCLinkIETSN_MCS_F	Used to specify the travel direction in absolute positioning, velocity control, torque control, and absolute value linear interpolation control.
MC_CIRC_PATHCHOICE_CCLinkIETSN_MCS_F	Used to specify the travel direction in absolute value circular interpolation control and relative value circular interpolation control.
OBJECT_RW_FX5SSCG_MCS	Used to shared information of the object read/write FBs.
AXESGROUP_USE_CCLinkIETSN_MCS_F	Used to shared information of the multi-axis control FBs.
Global	Defined by the user according to their usage environment.

MC_DIRECTION_CCLinkIETSN_MCS_F

The data cannot be changed by the user.

Label name	Name	Data type	Class	Constant	Description
mcPositiveDirection_CCLinkIETSN_MCS_F	Clockwise	Word [signed]	VAR_GLOBAL_CONSTANT	1	Specify clockwise.
mcNegativeDirection_CCLinkIETSN_MCS_F	Anticlockwise	Word [signed]	VAR_GLOBAL_CONSTANT	2	Specify anticlockwise.
mcShortestWay_CCLinkIETSN_MCS_F	Shortcut	Word [signed]	VAR_GLOBAL_CONSTANT	0	Specify the shortest distance.

MC_CIRC_PATHCHOICE_CCLinkIETSN_MCS_F

The data cannot be changed by the user.

Label name	Name	Data type	Class	Constant	Description
mcCW_CCLinkIETSN_MCS_F	Clockwise	Word [signed]	VAR_GLOBAL_CONSTANT	1	Specify clockwise.
mcCCW_CCLinkIETSN_MCS_F	Anticlockwise	Word [signed]	VAR_GLOBAL_CONSTANT	2	Specify anticlockwise.

OBJECT_RW_FX5SSCG_MCS

This global label is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Class	Description
ObjectRW_FX5SSCG_MCS	For manufacturer setting	Bit (0..31)	VAR_GLOBAL	—

AXESGROUP_USE_CCLinkIETSN_MCS_F

This global label is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Class	Description
AxesGroupUse_CCLinkIETSN_MCS_F	For manufacturer setting	Word [signed] (1..16)	VAR_GLOBAL	—

Global

The global labels should be defined by the user according to their usage environment.

Label name	Name	Data type	Class	Description
Axis_CCLinkIETSN_MCS*2*3	Axis information	AXIS_REF_CCLinkIETSN_MCS_F (1..n)*1	VAR_GLOBAL	Stores axis information. Change the number of elements for the array according to the number of axes.
AxesGroup_CCLinkIETSN_MCS*2*3	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F (1..n)*1*4	VAR_GLOBAL	Stores axes group information. Change the number of elements for the array element according to the number of axes groups.

*1 For details on the structure, refer to the following.
☞ Page 30 List of Structures

*2 Be sure to set the axes described below.
☞ Page 67 Simple motion module settings

*3 The name can be changed to any name.

*4 The maximum number of axes groups that can be set depends on the number of steps of the CPU module and on the label capacity.

2.4 List of Structures

The following table lists the structures used for the FB libraries.

For CC-Link IEF Basic

Name	Description
AXIS_REF_CCLinkIEFBasic_F	Axis information
MC_Setting_CCLinkIEFBasic_F	Stores the member for servo amplifier setting.
MC_Monitor_CCLinkIEFBasic_F	Stores the member for servo amplifier monitoring.
MC_SystemArea_CCLinkIEFBasic_F	Stores the member for system area, "manufacturer setting".
stRemoteReg	Stores link device information exchanged in communications with servo amplifiers. Defined by the user according to their usage environment.

AXIS_REF_CCLinkIEFBasic_F

This structure is used for various settings and monitoring during FB control.

Label name	Name	Data type	Description
Setting	Setting information	MC_Setting_CCLinkIEFBasic_F	Stores the member for servo amplifier setting.
Monitor	Monitoring information	MC_Monitor_CCLinkIEFBasic_F	Stores the member for servo amplifier monitoring.
SystemArea	System area	MC_SystemArea_CCLinkIEFBasic_F	Stores the member for system area, "manufacturer setting".

MC_Setting_CCLinkIEFBasic_F

This structure used as a setting area for data used for FB control. Data can be written to and read from this area.

Label name	Name	Data type	Description
AxisNo	Axis number	Word [signed]	Specifies the axis number of the axis to be controlled. FX5U CPU module, FX5UC CPU module: 1 to 16 FX5S CPU module, FX5UJ CPU module: 1 to 8
MasterModule	Master module specification	Word [signed]	Specifies the master module to be controlled. The definition MASTER_MODULE_REF_CCLinkIEFBasic_F can be used. If a value out of the range is set, operation is performed with the value set as FX5 CPU module.
StartIO	Module number	Word [signed]	Specify the module number of the FX5-ENET when it is specified for the master module. This is ignored regardless of the setting value when the FX5 CPU module is used. FX5U CPU module, FX5UC CPU module: 01H to 10H FX5S CPU module, FX5UJ CPU module: 01H to 08H

MC_Monitor_CCLinkIEFBasic_F

This structure is used as a monitoring area for the axis to be controlled. This area is read-only.

Label name	Name	Data type	Description
AxisStatus	Axis status	Word [signed]	Outputs the status of the selected axis based on the PLCopen state transition.

MC_SystemArea_CCLinkIEFBasic_F

This structure is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Description
uFbExecCount	For manufacturer setting	Word [unsigned]/bit string [16 bits]	—
uWaitTime	For manufacturer setting	Word [unsigned]/bit string [16 bits]	—

stRemoteReg

This information should be defined by the user according to their usage environment.

Label name	Name	Data type	Description
bnRX	RX information	Bit (0..n)*1	Stores information of RX.
bnRY	RY information	Bit (0..n)*1	Stores information of RY.
unRWr	RWr information	Word [unsigned]/bit string [16 bits] (0..n)*1	Stores information of RWr.
unRWw	RWw information	Word [unsigned]/bit string [16 bits] (0..n)*1	Stores information of RWw.

*1 Define a number of array elements equal to the number of points of link devices according to the usage environment. For details, refer to the following.

☞ Page 49 Parameter Settings

For CC-Link IE TSN (standard station)

Name	Description
AXIS_REF_CCLinkIETSN_SS_F	Axis information
MC_Setting_CCLinkIETSN_SS_F	Stores the member for servo amplifier setting.
MC_Monitor_CCLinkIETSN_SS_F	Stores the member for servo amplifier monitoring.
MC_SystemArea_CCLinkIETSN_SS_F	Stores the member for system area, "manufacturer setting".
stRemoteReg_CCLinkIETSN_SS_F	Stores link device information exchanged in communications with servo amplifiers. Defined by the user according to their usage environment.

AXIS_REF_CCLinkIETSN_SS_F

This structure is used for various settings and monitoring during FB control.

Label name	Name	Data type	Description
Setting	Setting information	MC_Setting_CCLinkIETSN_SS_F	Stores the member for servo amplifier setting.
Monitor	Monitoring information	MC_Monitor_CCLinkIETSN_SS_F	Stores the member for servo amplifier monitoring.
SystemArea	System area	MC_SystemArea_CCLinkIETSN_SS_F	Stores the member for system area, "manufacturer setting".

MC_Setting_CCLinkIETSN_SS_F

This structure used as a setting area for data used for FB control. Data can be written to and read from this area.

Label name	Name	Data type	Description
AxisNo	Axis number	Word [signed]	Specifies the axis number of the axis to be controlled. FX5-SSC-G: 1 to 16
StationNo	Station number	Word [signed]	Specifies the station number of the CC-Link IE TSN module to be controlled. When a multi-axis servo amplifier is used, specify the station number of the CC-Link IE TSN module to which the axis is connected. FX5-SSC-G: 1 to 16

MC_Monitor_CCLinkIETSN_SS_F

This structure is used as a monitoring area for the axis to be controlled. This area is read-only.

Label name	Name	Data type	Description
AxisStatus	Axis status	Word [signed]	Outputs the status of the selected axis based on the PLCopen state transition.

MC_SystemArea_CCLinkIETSN_SS_F

This structure is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type	Description
uFbExecCount	For manufacturer setting	Word [unsigned]/bit string [16 bits]	—
uWaitTime	For manufacturer setting	Word [unsigned]/bit string [16 bits]	—

stRemoteReg_CCLinkIETSN_SS_F

This information should be defined by the user according to their usage environment.

Label name	Name	Data type	Description
bnSB	SB information	Bit (0..287)	Stores information of SB.
unSW	SW information	Word [unsigned]/bit string [16 bits] (0..1207)	Stores information of SW.
unRWr	RWr information	Word [unsigned]/bit string [16 bits] (0..n)*1	Stores information of RWr.
unRWw	RWw information	Word [unsigned]/bit string [16 bits] (0..n)*1	Stores information of RWw.

*1 Define a number of array elements equal to the number of points of link devices according to the usage environment. For details, refer to the following.

☞ Page 49 Parameter Settings

For CC-Link IE TSN (motion control station)

Name	Description
AXIS_REF_CCLinkIETSN_MCS_F	Axis information
MC_Setting_CCLinkIETSN_MCS_F	Stores the member for motion module setting.
MC_Monitor_CCLinkIETSN_MCS_F	Stores the member for motion module monitoring.
MC_SystemArea_CCLinkIETSN_MCS_F	Stores the member for system area, "manufacturer setting".
AXES_GROUP_REF_CCLinkIETSN_MCS_F	Axes group information
MC_AxesGroupMonitor_CCLinkIETSN_MCS_F	Stores the member for motion module monitoring (for axes group control).

AXIS_REF_CCLinkIETSN_MCS_F

This structure is used for various settings and monitoring during FB control.

Label name	Name	Data type	Description
Setting	Setting information	MC_Setting_CCLinkIETSN_MCS_F	Stores the member for motion module setting.
Monitor	Monitoring information	MC_Monitor_CCLinkIETSN_MCS_F	Stores the member for motion module monitoring.
SystemArea	System area	MC_SystemArea_CCLinkIETSN_MCS_F	Stores the member for system area, "manufacturer setting".

MC_Setting_CCLinkIETSN_MCS_F

This structure used as a setting area for data used for FB control. Data can be written to and read from this area.

Label name	Name	Data type	Description
AxisNo	Axis number	Word [signed]	Specifies the axis number of the axis to be controlled. FX5-40SSC-G: 1 to 4 FX5-80SSC-G: 1 to 8
StartIO	Module number	Word [signed]	Specifies the module number of the motion module to be controlled. FX5U CPU module, FX5UC CPU module: 01H to 10H

MC_Monitor_CCLinkIETSN_MCS_F

This structure is used as a monitoring area for the axis to be controlled. This area is read-only.

Label name	Name	Data type	Description
AxisStatus	Axis status	Word [signed]	Outputs the status of the selected axis based on the PLCopen state transition.
UseInGroup	In use in axes group	Bit	Outputs whether in use in the axes group or not used. • FALSE: Not used • TRUE: In use

MC_SystemArea_CCLinkIETSN_MCS_F

This structure is set only by the manufacturer. Do not allow access by any user program.

Label name	Name	Data type
AxisUnitType	For manufacturer setting	Word [signed]
AxisTotalCount	For manufacturer setting	Word [unsigned]/bit string [16 bits]
uFbExecCount	For manufacturer setting	Word [unsigned]/bit string [16 bits]
d2MoveStartFeedValue	For manufacturer setting	Double word [signed] (0..1)
dAxisAddrOffset10	For manufacturer setting	Double word [signed]
dAxisAddrOffset100	For manufacturer setting	Double word [signed]
dAxisAddrOffset150	For manufacturer setting	Double word [signed]
dAxisAddrOffset1000	For manufacturer setting	Double word [signed]
dPr9AccelerationT0Addr	For manufacturer setting	Double word [signed]
dMd20CurrentFeedAddr	For manufacturer setting	Double word [signed]
dMd26OperationStatusAddr	For manufacturer setting	Double word [signed]
dMd28AxisFeedRateAddr	For manufacturer setting	Double word [signed]
dMd31GeneralStatusAddr	For manufacturer setting	Double word [signed]
dMd32TargetValueAddr	For manufacturer setting	Double word [signed]
dMd108ServoStatus1Addr	For manufacturer setting	Double word [signed]
dMd122SpeedInCommandAddr	For manufacturer setting	Double word [signed]
dMd123TorqueInCommandAddr	For manufacturer setting	Double word [signed]
dCd3PositionDataStartAddr	For manufacturer setting	Double word [signed]
dCd5ErrorResetReqAddr	For manufacturer setting	Double word [signed]
dCd9NewCurrentValueAddr	For manufacturer setting	Double word [signed]
dCd10NewAccelerationAddr	For manufacturer setting	Double word [signed]
dCd13SpeedOverrideAddr	For manufacturer setting	Double word [signed]
dCd27AddrChangeAddr	For manufacturer setting	Double word [signed]
dCd40AbsDirectionAddr	For manufacturer setting	Double word [signed]
dCd138ModeSwitchReqAddr	For manufacturer setting	Double word [signed]
dCd143CommandTorqueAddr	For manufacturer setting	Double word [signed]
dCd180AxisStopAddr	For manufacturer setting	Double word [signed]
dCd184PositioningStartAddr	For manufacturer setting	Double word [signed]
dDa1PositionIDStartAddr	For manufacturer setting	Double word [signed]
dDa20InterpolationAxisAddr	For manufacturer setting	Double word [signed]
uFBControlFlg	For manufacturer setting	Word [unsigned]/bit string [16 bits]

AXES_GROUP_REF_CCLinkIETSN_MCS_F

This structure is used for various settings and monitoring during axes group control.

Label name	Name	Data type	Description
AxesGroupMonitor	Axes group monitoring information	MC_AxesGroupMonitor_CCLinkIETSN_MCS_F	Stores the member for motion module monitoring. (For axes group control)
AxesGroupSystemArea	Axes group system area	MC_SystemArea_CCLinkIETSN_MCS_F (1..4)	Stores the member for system area, "manufacturer setting". (For axes group control)

MC_AxesGroupMonitor_CCLinkIETSN_MCS_F

This structure is used as a monitoring area for the axes group. This area is read-only.

Label name	Name	Data type	Description
AxesGroupStatus	Axes group status	Word [signed]	Outputs the status of the selected axes group based on the PLCopen state transition.
AxesGroupNum	Axes group configuration axis number	Word [signed] (1..4)	Stores axes group configuration axis number. FX5-40SSC-G: 1 to 4 FX5-80SSC-G: 1 to 8 The first element is considered to be the reference axis.
StartIO	Module number	Word [signed]	Stores the module number of the motion module to be controlled. FX5U CPU module, FX5UC CPU module: 01H to 10H

2.5 Link Devices

The following tables list the link devices accessed using the FB libraries.

For CC-Link IE TSN (motion control station), mapping cannot be changed because the link device is placed in the motion control area.

○: Can be changed, ×: Cannot be changed

For CC-Link IEF Basic

■RY/RX mapping

Master station → servo amplifier (RY)				Servo amplifier → master station (RX)			
Device No.	Name		Mapping	Device No.	Name		Mapping
RY0 to RY3E	Cannot be used.	—	×	RX0 to RX3D	Cannot be used.	—	×
				RX3E	For manufacturer setting	—	×
RY3F	Cyclic communication ready command	CSR	×	RX3F	Cyclic communication ready	SSR	×

■RWw/RWr mapping

Master station → servo amplifier (RWw)				Servo amplifier → master station (RWr)			
Device No.	Index	Name	Mapping	Device No.	Index	Name	Mapping
RWw0	6060H	Modes of operation	×	RWr0	6061H	Mode of operation on display	×
RWw1	6040H	Controlword	×	RWr1	6041H	Statusword	×
RWw2	2D01H	Control DI 1	○	RWr2	2D11H	Status DO 1	×
RWw3	2D02H	Control DI 2	×	RWr3	2D12H	Status DO 2	×
RWw4	2D03H	Control DI 3	○	RWr4	2D13H	Status DO 3	○
RWw5	2D05H	Control DI 5	○	RWr5	0000H	—	○
RWw6	607AH	Target position	×	RWr6	6064H	Position actual value	○
RWw7				RWr7			
RWw8	60FFH	Target velocity	×	RWr8	606CH	Velocity actual value	×
RWw9				RWr9			
RWwA	2D20H	Velocity limit value	×	RWrA	60F4H	Following error actual value	○
RWwB				RWrB			
RWwC	6071H	Target torque	×	RWrC	6077H	Torque actual value	×
RWwD	0000H	—	○	RWrD	0000H	—	○
RWwE	6081H	Profile Velocity	×	RWrE	2A41H	Current alarm	○
RWwF				RWrF			
RWw10	6083H	Profile acceleration	×	RWr10	60B9H	Touch probe status	○
RWw11				RWr11	0000H	—	○
RWw12	6084H	Profile deceleration	×	RWr12	60BAH	Touch probe 1 positive edge	○
RWw13				RWr13			○
RWw14	6087H	Torque slope	×	RWr14	60BCH	Touch probe 1 negative edge	○
RWw15				RWr15			○
RWw16	60F2H	Positioning option code	×	RWr16	60BCH	Touch probe 2 positive edge	○
RWw17	60B8H	Touch probe function	○	RWr17			○
RWw18	0000H	—	○	RWr18	60BDH	Touch probe 2 negative edge	○
RWw19	0000H	—	○	RWr19			○
RWw1A	0000H	—	○	RWr1A	0000H	—	○
RWw1B	0000H	—	○	RWr1B	0000H	—	○
RWw1C	0000H	—	○	RWr1C	0000H	—	○
RWw1D	0000H	—	○	RWr1D	0000H	—	○
RWw1E	0000H	—	○	RWr1E	0000H	—	○
RWw1F	0000H	—	○	RWr1F	0000H	—	○

Point

For the mapping change FB, refer to the following.

☞ Page 165 MCv_ChangeMapping_Model (Mapping Change)

For CC-Link IE TSN (standard station)

■RWw/RWr mapping

Master station → servo amplifier (RWwn)				Servo amplifier → master station (RWrn)			
Device No.	**Index**	**Name**	**Mapping**	**Device No.**	**Index**	**Name**	**Mapping**
RWw0	6060H	Modes of operation	×	RWr0	6061H	Mode of operation on display	×
RWw1	6040H	Controlword	×	RWr1	6041H	Statusword	×
RWw2	607AH	Target position	×	RWr2	6064H	Position actual value	○
RWw3				RWr3			
RWw4	60FFH	Target velocity	×	RWr4	606CH	Velocity actual value	×
RWw5				RWr5			
RWw6	2D20H	Velocity limit value	×	RWr6	60F4H	Following error actual value	○
RWw7				RWr7			
RWw8	6071H	Target torque	×	RWr8	6077H	Torque actual value	×
RWw9	6081H	Profile velocity	×	RWr9	2D11H	Status DO 1	×
RWwA				RWrA	2D12H	Status DO 2	×
RWwB	6083H	Profile acceleration	×	RWrB	2D13H	Status DO 3	○
RWwC				RWrC	2D14H	Status DO 4	○
RWwD	6084H	Profile deceleration	×	RWrD	2D15H	Status DO 5	○
RWwE				RWrE	0000H	—	○
RWwF	6087H	Torque slope	×	RWrF	0000H	—	○
RWw10				RWr10	0000H	—	○
RWw11	2D01H	Control DI 1	○	RWr11	0000H	—	○
RWw12	2D02H	Control DI 2	×	RWr12	0000H	—	○
RWw13	2D03H	Control DI 3	○	RWr13	0000H	—	○
RWw14	2D04H	Control DI 4	○	RWr14	0000H	—	○
RWw15	2D07H*1	Control DI 7	×	RWr15	0000H	—	○
RWw16	2DB0H*1	Speed override	×	RWr16	0000H	—	○
RWw17	60F2H*1	Positioning option code	×	RWr17	0000H	—	○

*1 Because the default mapping is open, perform mapping via the procedure described in the parameter settings for MC_MoveAbsolute_[Type] and MC_SetOverride_[Type]. Mapping can be changed if the relevant FB is not used.

Point

For the mapping change FB, refer to the following.

☞ Page 165 MCv_ChangeMapping_Model (Mapping Change)

2.6 List of Buffer Memory Addresses

The following table lists buffer memory accessed via CC-Link IE TSN (motion control station) of this FB library. Do not change the setting values in the user program. If they are changed, the FB may no longer operate normally.
"n" indicates the axis number -1.

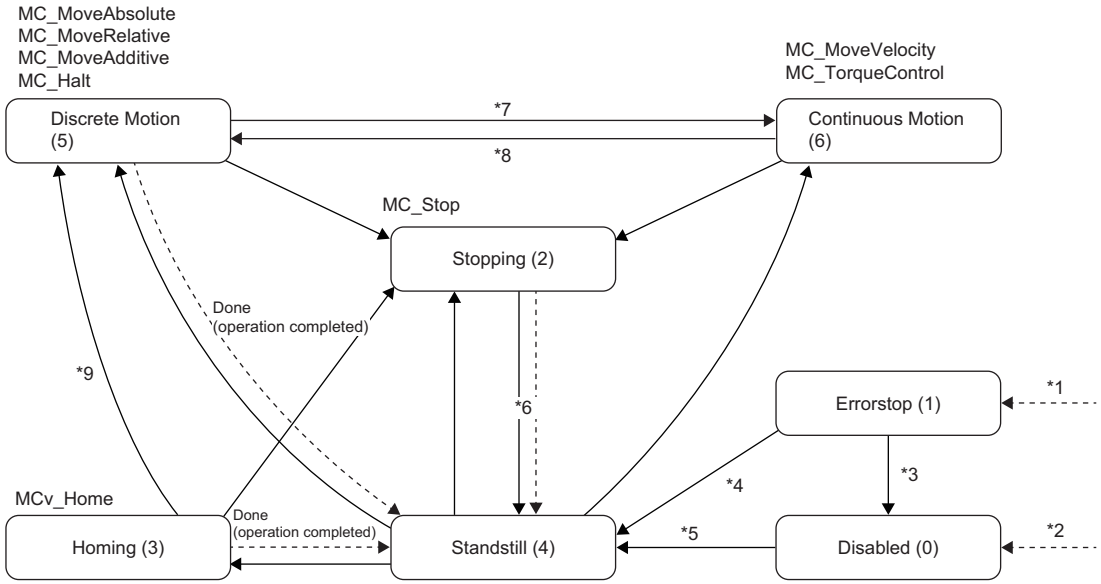
Parameter (FX5-SSC-G)	Buffer memory address	Acquisition cycle
[Pr.141] IP address	58024+32n 58025+32n	When the power is turned on/when the CPU module is reset
[Pr.1] Unit setting	0+150n	"[Cd.190] PLC READY" OFF → ON
[Pr.9] Acceleration time 0	12+150n 13+150n	Next time each control starts
[Pr.10] Deceleration time 0	14+150n 15+150n	Next time each control starts
[Pr.41] Circular interpolation error allowable range	60+150n 61+150n	Next time each control starts
[Pr.90] Operation setting for speed-torque control mode	68+150n	"[Cd.190] PLC READY" OFF → ON
[Md.59] Module information	31332	When the power is turned on
[Md.140] Module status	31500	b0 (Ready) • "[Cd.190] PLC READY" OFF → ON b1 (Flag for synchronization) • When the power is turned on/when the CPU module is reset
[Md.141] BUSY	31501	When starting
[Md.20] Current feed value	2400+100n 2401+100n	Operation cycle
[Md.21] Machine feed value	2402+100n 2403+100n	Operation cycle
[Md.26] Axis operating status	2409+100n	Real time
[Md.28] Axis speed command	2412+100n 2413+100n	Operation cycle
[Md.31] Status	2417+100n	Real time
[Md.32] Set value	2418+100n 2419+100n	Real time
[Md.108] Servo status 1	2477+100n	Operation cycle
[Md.109] Regenerative load rate/arbitrary data monitoring output 1	2478+100n	Operation cycle
[Md.119] Servo status 2	2476+100n	Operation cycle
[Md.122] Speed while command is being issued	2492+100n 2493+100n	Operation cycle
[Md.123] Torque while command is being issued	2494+100n	Operation cycle
[Cd.191] All axes servo ON	5951	Operation cycle
[Cd.3] Positioning start number	4300+100n	When starting
[Cd.5] Axis error reset	4302+100n	16.0ms
[Cd.9] New current value	4306+100n 4307+100n	When requested
[Cd.10] New acceleration time	4308+100n 4309+100n	When requested
[Cd.11] New deceleration time	4310+100n 4311+100n	When requested
[Cd.12] Enable/disable the new acceleration/deceleration time at speed change	4312+100n	When requested
[Cd.13] Positioning operation speed override	4313+100n	Operation cycle
[Cd.14] New speed value	4314+100n 4315+100n	When requested
[Cd.15] Speed change request	4316+100n	Operation cycle
[Cd.16] Inching travel distance	4317+100n	When starting
[Cd.17] JOG speed	4318+100n 4319+100n	When starting

Parameter (FX5-SSC-G)	Buffer memory address	Acquisition cycle
[Cd.27] Target position change value (address)	4334+100n 4335+100n	When requested
[Cd.28] Target position change value (speed)	4336+100n 4337+100n	When requested
[Cd.29] Target position change request flag	4338+100n 4339+100n	Operation cycle
[Cd.40] ABS direction setting when degree is used	4350+100n	When starting
[Cd.100] Servo off command	4351+100n	Operation cycle
[Cd.138] Control mode change request	4374+100n	Operation cycle
[Cd.139] When control mode specification is requested (mode change)	4375+100n	When requested (mode change)
[Cd.140] Command speed in velocity control mode	4376+100n 4377+100n	Operation cycle (in velocity control mode)
[Cd.141] Acceleration time in velocity control mode	4378+100n	When requested (mode change)
[Cd.142] Deceleration time in velocity control mode	4379+100n	When requested (mode change)
[Cd.143] Command torque in torque control mode	4380+100n	Operation cycle (in torque control mode)
[Cd.144] Torque time constant in torque control mode (positive direction)	4381+100n	When requested (mode change)
[Cd.145] Torque time constant in torque control mode (negative direction)	4382+100n	When requested (mode change)
[Cd.146] Speed limit value in torque control mode	4384+100n 4385+100n	Operation cycle (in torque control mode)
[Cd.180] Axis stop	30100+10n	Operation cycle
[Cd.181] Start forward rotation JOG	30101+10n	Operation cycle
[Cd.182] Start reverse rotation JOG	30102+10n	Operation cycle
[Cd.184] Start positioning	30104+10n	Operation cycle
[Da.1] Operation pattern (positioning data No.100)	6990+1000n	—
[Da.2] Control method (positioning data No.100)		—
[Da.3] Acceleration time number (positioning data No.100)		—
[Da.4] Deceleration time number (positioning data No.100)		—
[Da.6] Positioning address/travel distance (positioning data No.100)	6996+1000n 6997+1000n	—
[Da.7] Circular address (positioning data No.100)	6998+1000n 6999+1000n	—
[Da.8] Command speed (positioning data No.100)	6994+1000n 6995+1000n	—
[Da.20] Interpolation target axis number 1 (positioning data No.100)	71990+1000n 71991+1000n	—
[Da.21] Interpolation target axis number 2 (positioning data No.100)		—
[Da.22] Interpolation target axis number 3 (positioning data No.100)		—

2.7 State Transition Diagram

For CC-Link IEF Basic and CC-Link IE TSN (standard station)

The following figure shows the state transition of an FB library.
An axis is in any of the defined states. A solid line arrow in the state transition diagram indicates a state transition by FB activation. A dashed line arrow indicates a transition brought on by the ending of a command for an axis or by the system.



*1 When an error occurs in an axis, a transition is made from any state.
*2 A transition is made when Enable for MC_Power = OFF, and there is no error in an axis.
*3 A transition is made when MC_Reset is executed and Status for MC_Power = OFF.
*4 A transition is made when MC_Reset is executed, Enable for MC_Power = ON, and Status for MC_Power = ON.
*5 A transition is made when Enable for MC_Power = ON, and Status for MC_Power = ON.
*6 A transition is made when Done for MC_Stop = ON and Execute for MC_Stop = OFF.
*7 Transition is possible only when ContinuousMotion changes to DiscreteMotion by MC_Halt.
*8 The type of control being executed (position/velocity/torque control) can be switched to another type, such as torque control → position control, only when the speed is zero. When the speed is not zero, if the type of control is switched between position control and another type of control, an error occurs. For the zero speed, refer to the following.
MR-J5-G/MR-J5W-G User's Manual (Parameters)
MR-JET-G User's Manual (Parameters)
*9 When MC_Halt has been executed during Homing. (This stops homing.)

Status	Description
Disabled	Shows the initial state of the axis. Enable for MC_Power is off, and no error occurred. The state remains when cyclic transmission ready (RX3F) is off in CC-Link IEF Basic communications or when a data link error has occurred in CC-Link IE TSN (standard station).
ErrorStop	The state transitions to this state when an error occurs. The state remains in this state while an error is continuing.
Stopping	The state transitions to this state when MC_Stop is executed. While Execute for MC_Stop is ON, the state remains to be Stopping.
Homing	Indicates that homing is being executed.
Standstill	Indicates that MC_Power is ON, and no error occurred.
DiscreteMotion	Indicates that the positioning control FB is being executed. The state transitions to this state when MC_MoveAbsolute, MC_MoveRelative, MC_MoveAdditive, or MC_Halt is executed.
ContinuousMotion	Indicates that the continuous control FB is being executed. The state transitions to this state when MC_MoveVelocity and MC_TorqueControl are executed.

The following table lists the FB libraries executable in each state. Set items such as interlocking according to your system and the expected operation.

○: Executable, ×: Not executable

FB Library	Disabled (0)	ErrorStop (1)	Stopping (2)	Homing (3)	Standstill (4)	DiscreteMotion (5)		ContinuousMotion (6)
						Other than Halt	Halt	
MC_Power_CCLinkIEFBasic_F MC_Power_CCLinkIETSN_SS_F	○*1	○*1	○*1	○*1	○*1	○*1	○*1	○*1
MCv_Home_CCLinkIEFBasic_F MCv_Home_CCLinkIETSN_SS_F	×	×	×	×	○	×	×	×
MC_Stop_CCLinkIEFBasic_F MC_Stop_CCLinkIETSN_SS_F	×	×	○	○*6	○	○*6	○*6	○*6
MC_Halt_CCLinkIEFBasic_F MC_Halt_CCLinkIETSN_SS_F	×	×	×	○*6	○*7	○*6	×*3	○*6
MC_MoveAbsolute_CCLinkIEFBasic_F MC_MoveAbsolute_CCLinkIETSN_SS_F	×	×	×	×	○	○*6	×	○*2*6
MC_MoveRelative_CCLinkIEFBasic_F MC_MoveRelative_CCLinkIETSN_SS_F	×	×	×	×	○	×	×	○*2*6
MC_MoveAdditive_CCLinkIEFBasic_F MC_MoveAdditive_CCLinkIETSN_SS_F	×	×	×	×	○	○*6	×	○*2*6
MC_MoveVelocity_CCLinkIEFBasic_F MC_MoveVelocity_CCLinkIETSN_SS_F	×	×	×	×	○	×	○*4*6	○*6
MC_TorqueControl_CCLinkIEFBasic_F MC_TorqueControl_CCLinkIETSN_SS_F	×	×	×	×	○	×	○*4*6	○*6
MC_Reset_CCLinkIEFBasic_F MC_Reset_CCLinkIETSN_SS_F	○	○	○	○	○	○	○	○
MCv_ReadMultiObject_FX5CPUEN_F MCv_ReadMultiObject_FX5ENET_F MCv_ReadMultiObject_FX5SSCG_SS_F	○	○	○	○	○	○	○	○
MCv_WriteMultiObject_FX5CPUEN_F MCv_WriteMultiObject_FX5ENET_F MCv_WriteMultiObject_FX5SSCG_SS_F	○	○	○	○	○	○	○	○
MCv_ChangeMapping_FX5CPUEN_F MCv_ChangeMapping_FX5ENET_F MCv_ChangeMapping_FX5SSCG_SS_F	○*5	×	×	×	×	×	×	×
MC_SetOverride_CCLinkIEFBasic_F MC_SetOverride_CCLinkIETSN_SS_F	○	○	○	○	○	○	○	○

*1 When using this FB library (except for FBs that can be executed in Disabled status), always execute MC_Power_CCLinkIEFBasic_F and MC_Power_CCLinkIETSN_SS_F.

*2 Executable when the speed is zero. Whether the speed is zero can be checked with the S_ZSP (bit 3 of [Status DO 2 (Obj.2D12H)]) that is mapped on the link device.

*3 While MC_Halt_CCLinkIEFBasic_F and MC_Halt_CCLinkIETSN_SS_F are being executed, MC_Halt_CCLinkIEFBasic_F and MC_Halt_CCLinkIETSN_SS_F cannot be executed again.

*4 Executable only when Halt is executed while the continuous control FB is being executed.

*5 To change the mapping, CC-Link IE Field Network Basic communications must be stopped (by turning RY3F off), so execution is possible only in the Disabled state.

*6 When a new FB is executed, CommandAborted (execution aborted) turns on for the FB running in each state, and control is aborted.

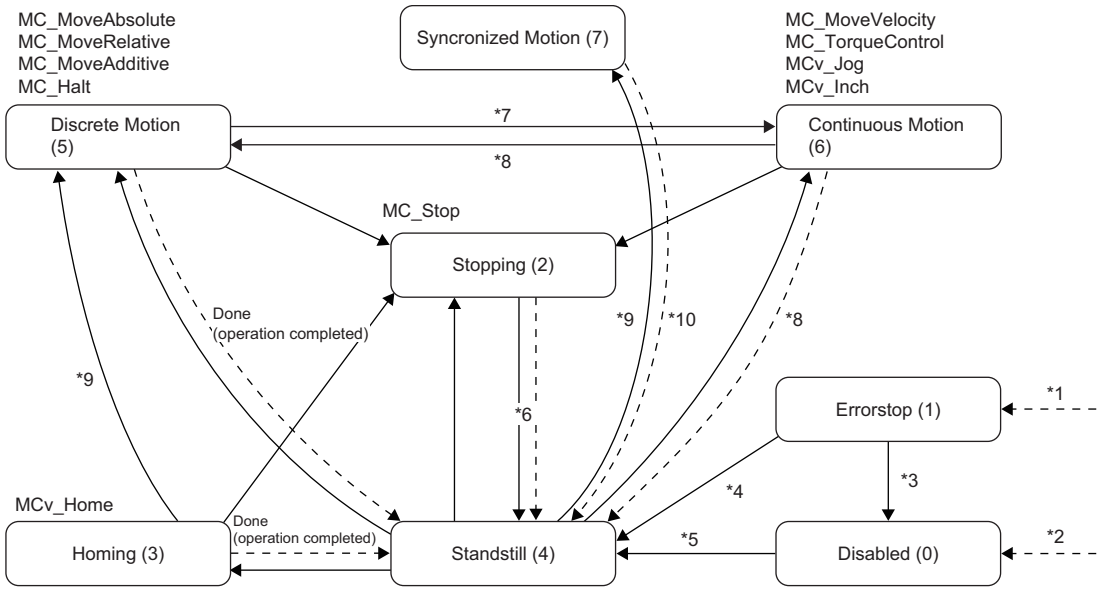
*7 When position control has been completed, MC_Halt_CCLinkIEFBasic_F and MC_Halt_CCLinkIETSN_SS_F cannot be executed.

For CC-Link IE TSN (motion control station)

The following figure shows the state transition of an FB library.
An axis is in any of the defined states. A solid line arrow in the state transition diagram indicates a state transition by FB activation. A dashed line arrow indicates a transition brought on by the ending of a command for an axis or by the system.

Axis status transition

The axis status transitions in MCv_State_CCLinkIETSN_MCS_F.



*1 When an error occurs in an axis, a transition is made from any state.
*2 A transition is made when Enable for MCv_AllPower = OFF, and there is no error in an axis.
*3 A transition is made when MC_Reset is executed and Status for MCv_AllPower = OFF.
*4 A transition is made when MC_Reset is executed, Enable for MCv_AllPower = ON, and Status for MCv_AllPower = ON.
*5 A transition is made when Enable for MCv_AllPower = ON, and Status for MCv_AllPower = ON.
*6 A transition is made when Done for MC_Stop = ON and Execute for MC_Stop = OFF.
*7 Transitions are possible when the axis is in the stop state.
*8 A transition is made when Busy for MCv_Jog changes from ON to OFF or when Busy for MCv_Inch changes from ON to OFF.
*9 A transition is made when the status of the axes group that is being used as the configuration axis becomes GroupMoving.
*10 A transition is made when the status of the axes group that is being used as the configuration axis becomes GroupStandby or GroupDisabled.

Status	Description
Disabled	Shows the initial state of the axis. Enable for MCv_AllPower is off, and no error has occurred. The state remains if the servo amplifier is powered off, the servo amplifier is not connected, or Programmable controller ready ([Cd.190]) is off.
ErrorStop	The state transitions to this state when an error occurs. The state remains in this state while an error is continuing.
Stopping	The state transitions to this state when MC_Stop is executed. While Execute for MC_Stop is ON, the state remains to be Stopping.
Homing	Indicates that homing is being executed.
Standstill	Indicates that MCv_AllPower is ON, and no error occurred.
DiscreteMotion	Indicates that the positioning control FB is being executed. The state transitions to this state when MC_MoveAbsolute, MC_MoveRelative, or MC_MoveAdditive is executed.
ContinuousMotion	Indicates that the continuous control FB or manual control FB is being executed. The state transitions to this state when MC_MoveVelocity, MC_TorqueControl, MCv_Jog, or MCv_Inch is executed.
SynchronizedMotion	Indicates that the interpolation control FB is being executed. The state transitions to this state when MCv_MoveCircularInterpolateAbsolute, MCv_MoveCircularInterpolateRelative, MCv_MoveLinearInterpolateAbsolute, or MCv_MoveLinearInterpolateRelative is executed.

The following table lists the FB libraries executable in each state. Set items such as interlocking according to your system and the expected operation.

○: Executable, ×: Not executable

FB library	Disabled (0)	ErrorStop (1)	Stopping (2)	Homing (3)	Standstill (4)	Discrete Motion (5)	ContinuousMotion (6)		Synchronized Motion (7)
							Continuous control	Other than continuous control	
MCv_AllPower_CCLinkIETSN_MCS_F	○*1	○*1	○*1	○*1	○*1	○*1	○*1	○*1	○*1
MCv_State_CCLinkIETSN_MCS_F	○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2	○*2
MCv_GroupState_CCLinkIETSN_MCS_F	○*3	○*3	○*3	○*3	○*3	○*3	○*3	○*3	○*3
MCv_Home_CCLinkIETSN_MCS_F	×	×	×	×	○	×	×	×	×
MC_Stop_CCLinkIETSN_MCS_F	×	×	○	○*4	○	○*4	○*4	○*4	×
MC_MoveAbsolute_CCLinkIETSN_MCS_F	×	×	×	×	○	○*4	○*4*5	×	×
MC_MoveRelative_CCLinkIETSN_MCS_F	×	×	×	×	○	○*4	○*4*5	×	×
MC_MoveAdditive_CCLinkIETSN_MCS_F	×	×	×	×	○	○*4	○*4*5	×	×
MC_MoveVelocity_CCLinkIETSN_MCS_F	×	×	×	×	○	×	○*4	×	×
MC_TorqueControl_CCLinkIETSN_MCS_F	×	×	×	×	○	×	○*4	×	×
MC_Reset_CCLinkIETSN_MCS_F	○	○	○	○	○	○	○	○	×
MCv_ReadMultiObject_FX5SSCG_MCS_F	○	○	○	○	○	○	○	○	○
MCv_WriteMultiObject_FX5SSCG_MCS_F	○	○	○	○	○	○	○	○	○
MC_SetPosition_CCLinkIETSN_MCS_F	×	×	×	×	○	×	×	×	×
MC_SetOverride_CCLinkIETSN_MCS_F	○	○	○	○	○	○	○	○	×
MCv_Jog_CCLinkIETSN_MCS_F	×	×	×	×	○	×	×	×	×
MCv_Inch_CCLinkIETSN_MCS_F	×	×	×	×	○	×	×	×	×

*1 When using this FB library (except for FBs that can be executed in Disabled status), always execute MCv_AllPower_CCLinkIETSN_MCS_F.

*2 When using this FB library (except for object read/write FBs), always execute MCv_State_CCLinkIETSN_MCS_F.

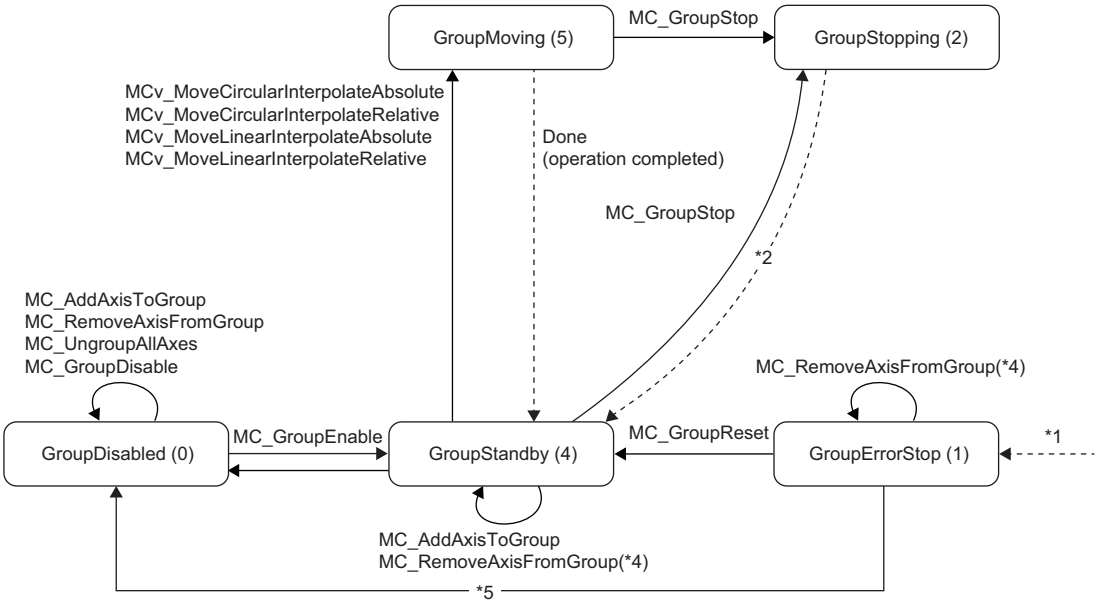
*3 When using a multi-axis control FB, always execute MCv_GroupState_CCLinkIETSN_MCS_F.

*4 When a new FB is executed, CommandAborted (execution aborted) turns on for the FB running in each state, and control is aborted.

*5 Executable when the speed is zero.

Axes group status transition

The axes group status transitions in MCv_GroupState_CCLinkIETSN_MCS_F.



*1 The status transitions when a motion module error occurs in the axes group or a configuration axis of the axes group while the axes group status is something other than GroupDisabled.
*2 A transition is made when Done for MC_GroupStop = ON and Execute for MC_GroupStop = OFF.
*3 A transition is made when the last axis is deleted from the axes group.
*4 A transition is made when the axes group is not empty.
*5 A transition is made when MC_GroupDisable is executed, the last axis is deleted from the axes group by executing MC_RemoveAxisFromGroup, or MC_UngroupAllAxes is executed.

Status	Enable/ disable axes group	Description
GroupDisabled	Disable	MC_GroupReset, MC_GroupStop, MC_GroupSetOverride, and interpolation control FB cannot be executed during this state.
GroupErrorStop	Enable	A state where the axes group has decelerated and stopped or is in a stopped state due to an error. The state remains in this state while an error is continuing.
GroupStopping		The state transitions to this state when MC_GroupStop is executed. While Execute for MC_GroupStop is ON, the state remains to be GroupStopping.
GroupStandby		A state where the axes group is stopped.
GroupMoving		Indicates that the interpolation control FB is being executed. The state transitions to this state when MCv_MoveCircularInterpolateAbsolute, MCv_MoveCircularInterpolateRelative, MCv_MoveLinearInterpolateAbsolute, or MCv_MoveLinearInterpolateRelative is executed.

The following table lists the FB libraries executable in each state. Set items such as interlocking according to your system and the expected operation. Note that even when ○ is shown in the table below, some of the FB libraries may not be executable depending on the status of the axis. Please check the relation between the axis status and axes group status as well.
(☞ Page 47 Relationship between axis status and axes group status)
○: Executable, ×: Not executable

FB library	GroupDisabled (0)	GroupErrorStop (1)	GroupStopping (2)	GroupStandby (4)	GroupMoving (5)
MC_AddAxisToGroup_CCLinkIETSN_MCS_F	○	×	×	○	×
MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F	○	○	×	○	×
MC_UngroupAllAxes_CCLinkIETSN_MCS_F	○	○	×	○	×
MC_GroupEnable_CCLinkIETSN_MCS_F	○	×	×	×	×
MC_GroupDisable_CCLinkIETSN_MCS_F	○	○	×	○	×
MC_GroupReset_CCLinkIETSN_MCS_F	×	○	○	○	○
MC_GroupStop_CCLinkIETSN_MCS_F	×	×	○	○	○*1
MC_GroupSetOverride_CCLinkIETSN_MCS_F	×	○	○	○	○
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F	×	×	×	○	×
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F	×	×	×	○	×
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F	×	×	×	○	×
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F	×	×	×	○	×

*1 When a new FB is executed, CommandAborted (execution aborted) turns on for the FB running in each state, and control is aborted.

Relationship between axis status and axes group status

- Single axis control FBs can be executed only when the status of the axes group that is used as the configuration axis is GroupDisabled. If a single axis control FB is executed when the axes group status is other than GroupDisabled, a 1203H error occurs on the executed FB.
- When all configuration axes of the axes group are in the Standstill status, the axes group status can transition to the GroupStandby status.

The following table shows a list of multi-axis control FBs that are executable in each axis status.

○: Executable, ×: Not executable

FB library	Disabled (0)	ErrorStop (1)	Stopping (2)	Homing (3)	Standstill (4)	Discrete Motion (5)	Continuous Motion (6)	Synchronized Motion (7)
MC_AddAxisToGroup_CCLinkIETSN_MCS_F	○*1	○*1	○*1	○*1	○	○*1	○*1	×
MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F	○*1	○	○*1	○*1	○	○*1	○*1	×
MC_UngroupAllAxes_CCLinkIETSN_MCS_F	○*1	○	○*1	○*1	○	○*1	○*1	×
MC_GroupEnable_CCLinkIETSN_MCS_F	×	×	×	×	○	×	×	×
MC_GroupDisable_CCLinkIETSN_MCS_F	○	○	○	○	○	○	○	×
MC_GroupReset_CCLinkIETSN_MCS_F	×	○*3	×	×	○*2	×	×	○
MC_GroupStop_CCLinkIETSN_MCS_F	×	×	×	×	○*2	×	×	○
MC_GroupSetOverride_CCLinkIETSN_MCS_F	×	○*3	×	×	○*2	×	×	○
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F	×	×	×	×	○*2	×	×	×
MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F	×	×	×	×	○*2	×	×	×
MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F	×	×	×	×	○*2	×	×	×
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F	×	×	×	×	○*2	×	×	×

*1 Executable when the axes group is disabled.
*2 Executable when the axes group is enabled.
*3 Executable when the axes group is enabled and Enable for MCv_AllPower = ON.

The following table shows the axes group status and axis status after an event occurs when the axes group is enabled. When the axes group is disabled, the axes group status is GroupDisabled, and the configuration axis status is not influenced by the axes group status.

Event	Axes group status after the event occurs	Axis status after the event occurs
Execute the interpolation control FB	GroupMoving	SynchronizedMotion
No operation in any configuration axes, execution of interpolation control FB completed, or addition of a configuration axis to an axes group	GroupStandby	Standstill
Stop an axes group (execute MC_GroupStop)	GroupStopping	Axis with which the interpolation control FB is being executed: SynchronizedMotion Other axes: Standstill
An error occurred on a configuration axis of an axes group	GroupErrorStop	Axis on which an error has occurred: ErrorStop Other axes: SynchronizedMotion
Delete some configuration axes from an axes group	GroupStandby/GroupErrorStop (the state at event occurrence remains)	Axis on which an error has occurred: ErrorStop Other axes: Standstill
Delete all configuration axes from an axes group	GroupDisabled	Axis on which an error has occurred: ErrorStop Other axes: Standstill
Disable an axes group	GroupDisabled	Axis on which an error has occurred: ErrorStop Other axes: Standstill
Clear errors on configuration axes	GroupStandby (when the error has been cleared normally)	Standstill
	GroupErrorStop (when the error has not been cleared normally)	Axis on which an error has occurred: ErrorStop Other axes: Standstill
Change the command speed for an axes group (execute MC_GroupSetOverride)	No change from before the event occurs.	No change from before the event occurs.

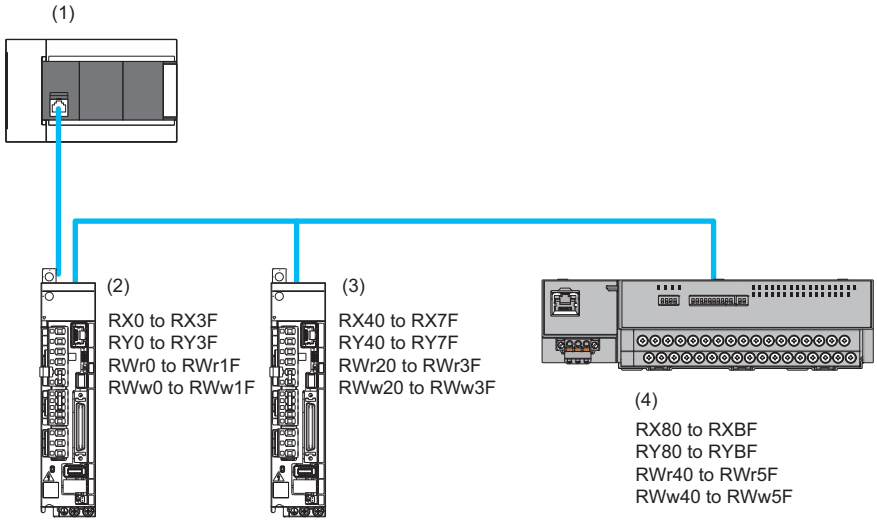
2.8 Parameter Settings

For CC-Link IEF Basic

CC-Link IE Field Network Basic settings

This section describes the setting method for connecting an Ethernet-equipped module and servo amplifiers using GX Works3 through CC-Link IE Field Network Basic.

The example below shows the setting method in a system configuration of two servo amplifiers (station numbers 1 and 2) and one AC input module (station number 3) connected together.



(1) FX5U CPU module (station number 0, master station)
(2) Servo amplifier (station number 1, axis 1)
(3) Servo amplifier (station number 2, axis 2)
(4) AC input module (station number 3)

• Link device and global label (G_stLinkIEF) assignment examples

Station No.	Link device (RX)	Refresh target device (M)	Global label (bnRX)
1	RX0 to RX3F	M0 to M63	bnRX [0] to bnRX [63]
2	RX40 to RX7F	M64 to M127	bnRX [64] to bnRX [127]
3	RX80 to RXBF	M128 to M191	bnRX [128] to bnRX [191]

Station No.	Link device (RY)	Refresh target device (M)	Global label (bnRY)
1	RY0 to RY3F	M192 to M255	bnRY [0] to bnRY [63]
2	RY40 to RY7F	M256 to M319	bnRY [64] to bnRY [127]
3	RY80 to RYBF	M320 to M383	bnRY [128] to bnRY [191]

Station No.	Link device (RWr)	Refresh target device (R)	Global label (unRWr)
1	RWr0 to RWr1F	R0 to R31	unRWr [0] to unRWr [31]
2	RWr20 to RWr3F	R32 to R63	unRWr [32] to unRWr [63]
3	RWr40 to RWr5F	R64 to R95	unRWr [64] to unRWr [95]

Station No.	Link device (RWw)	Refresh target device (R)	Global label (unRWw)
1	RWw0 to RWw1F	R96 to R127	unRWw [0] to unRWw [31]
2	RWw20 to RWw3F	R128 to R159	unRWw [32] to unRWw [63]
3	RWw40 to RWw5F	R160 to R191	unRWw [64] to unRWw [95]

Adding a module

■CPU module

A module does not need to be added when using a CPU module only.

■FX5-ENET

1. Open the "Module Configuration" window.

[Navigation window] ⇨ [Module Configuration]

2. Mount the FX5-ENET to the CPU module.

[Element Selection] ⇨ [Information Module] ⇨ [FX5-ENET]. Drag and drop the FX5-ENET next to the CPU module.

3. Set the parameters.

[Edit] ⇨ [Parameter] ⇨ [Fix]

4. Check the parameters.

[Tool] ⇨ [Check Parameter]

Network configuration settings

For items other than "CC-Link IEF Basic Setting", such as "IP Address" refer to the following.

CC-Link IE Field Network Basic Reference Manual

■CPU module

1. Open the Ethernet port setting window.

[Navigation window] ⇨ [Parameter] ⇨ CPU module ⇨ [Module Parameter] ⇨ [Ethernet port]

2. Set [To Use or Not to Use CC-Link IEF Basic Setting] to "Enable".

[Basic Settings] ⇨ [CC-Link IEF Basic Setting] ⇨ [To Use or Not to Use CC-Link IEF Basic Setting]

3. Open the network configuration window.

[CC-Link IEF Basic Setting] ⇨ [Network Configuration Settings] ⇨ [Detailed Settings]

4. Add servo amplifiers.

Select a servo amplifier to be used in "Module List", and drag and drop it to the network map or the list of stations.

■FX5-ENET

1. Open the module parameter setting window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [FX5-ENET]

2. Set the station-based block data assurance setting to "Enable".

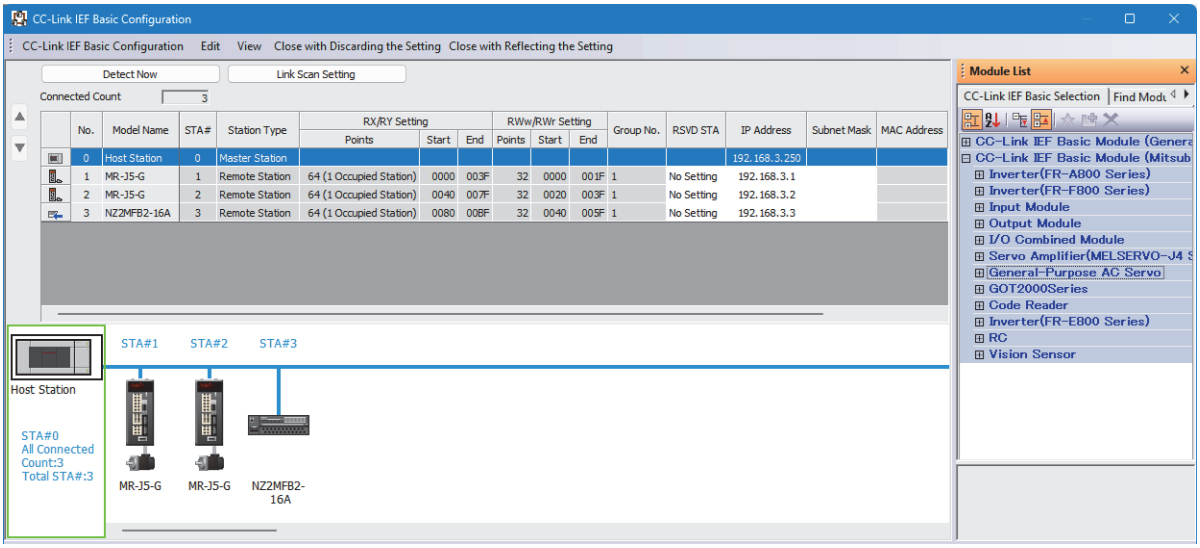
[Basic Settings] ⇨ [CC-Link IEF Basic Setting] ⇨ [Station-based Block Data Assurance]

3. Open the network configuration window.

[CC-Link IEF Basic Setting] ⇨ [Network Configuration Settings] ⇨ [Detailed Settings]

4. Add servo amplifiers.

Select a servo amplifier to be used in "Module List", and drag and drop it to the network map or the list of stations.



Restriction

Set the target stations (servo amplifiers) to be controlled by this library left-aligned, starting with station number 1. If the target stations are set with another station put in between, FB cannot access link devices correctly and fails to operate correctly. This restriction is only for parameter settings. There are no restrictions on the order of actual connections.

Refresh parameter settings

■CPU module

1. Open the Ethernet port setting window.

[Navigation window] ⇨ [Parameter] ⇨ CPU module ⇨ [Module Parameter] ⇨ [Ethernet port]

2. Open the refresh setting window.

[Basic Settings] ⇨ [CC-Link IEF Basic Setting] ⇨ [Refresh Settings] ⇨ [Detailed Settings]

3. Specify the devices to be assigned to RX/RY and RWw/RWr.*1*2

■FX5-ENET

1. Open the module parameter setting window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Ethernet module name

2. Open the network configuration window.

[Basic Settings] ⇨ [CC-Link IEF Basic Setting] ⇨ [Refresh Settings] ⇨ [Detailed Settings]

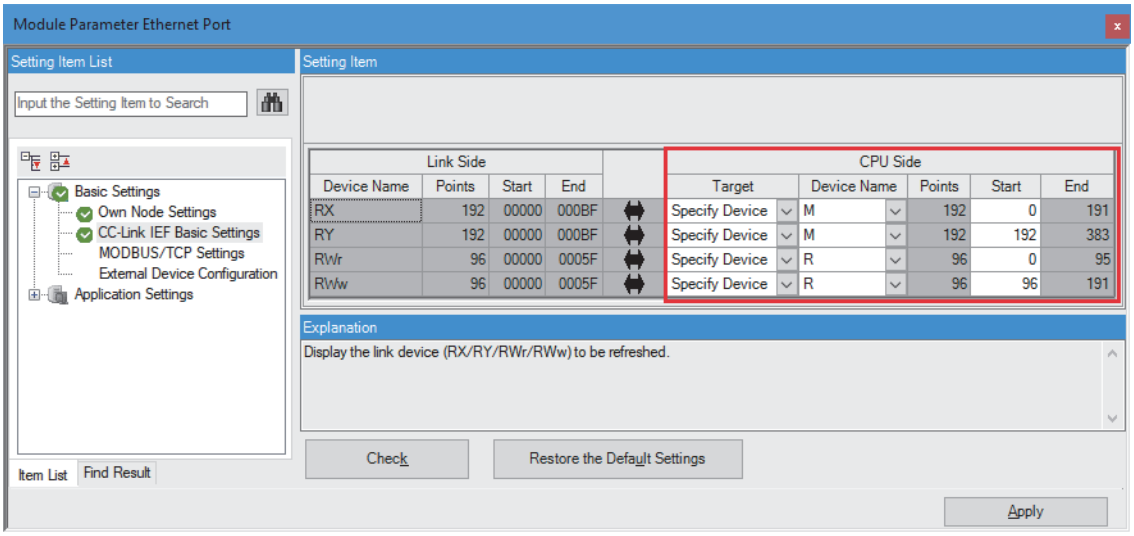
3. Specify the devices to be assigned to RX/RY and RWw/RWr.*1*2

*1 If necessary, change the device settings or change the device to be assigned so that the refresh target device has link points equal to or more than those on the link side.

*2 If necessary, change the latch range setting or change the device to be assigned so that the refresh target device is not latch set.

The following shows a setting example.

- RX0 to RXBF ⇔ M0 to M191 (192 points)
- RY0 to RYBF ⇔ M192 to M383 (192 points)
- RWr0 to RWr5F ⇔ R0 to R95 (96 points)
- RWw0 to RWw5F ⇔ R96 to R191 (96 points)



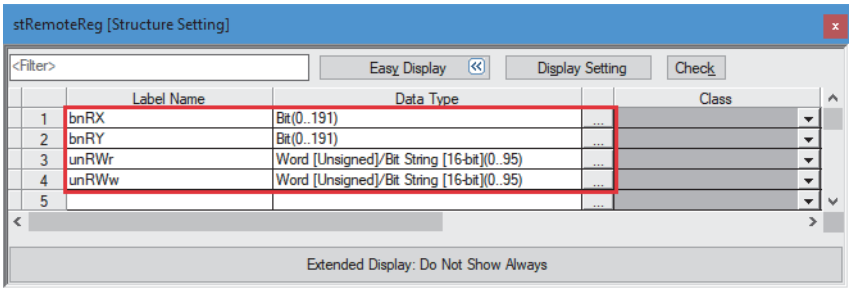
Global label settings

1. Define the structure.

[Navigation window] ⇨ [Label] ⇨ Right-click ⇨ [Add New Data]

According to the refresh settings (☞ Page 52 Refresh parameter settings), define the stRemoteReg structure.

- Data Type: Structure
- Data Name: stRemoteReg
- bnRX, bnRY = 192 points
- unRWr, unRWw = 96 points



Point

For the number of array elements in each label, set the corresponding number of device points in the refresh settings. (If a station, such as an I/O module, which the FB libraries do not control, exists, define the structure according to the entire refresh settings including that station.)

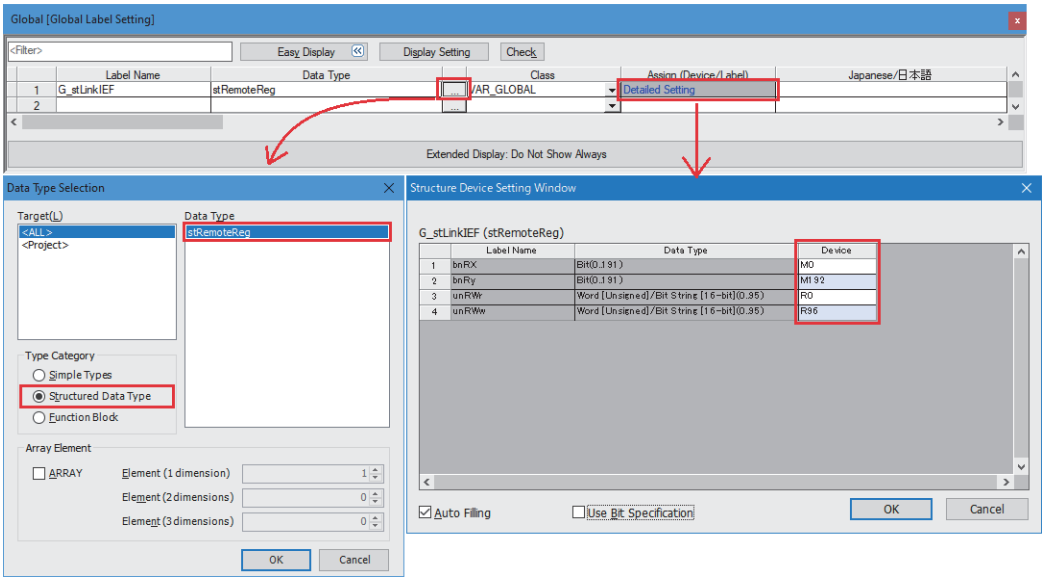
2. Set the global label.

[Navigation window] ⇨ [Label] ⇨ [Global Label] ⇨ [Global]

Set the global label by using the structure defined in step 1, as follows.

- Label Name: G_stLinkIEF
- Data Type: stRemoteReg
- Class: VAR_GLOBAL
- Assign (Device/Label)*1: bnRX = M0, bnRY = M192, unRWr = R0, unRWw = R96

*1 If devices are entered for bnRX and unRWr with the [Auto Filling] checkbox selected and the [Use Bit Specification] checkbox unselected, other devices are entered automatically according to the number of elements.



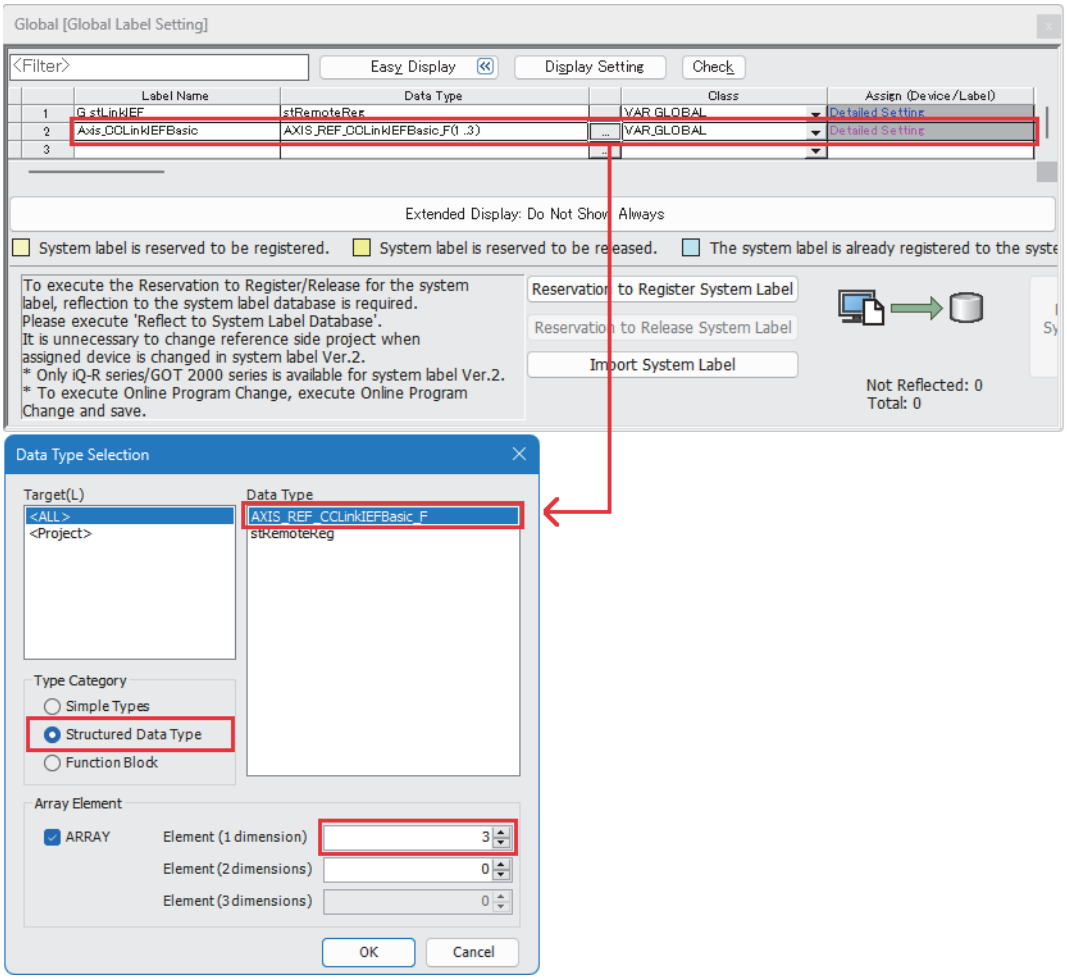
Point

The FB library operates by using the data refreshed to the global label "G_stLinkIEF". Therefore, assign the refresh data correctly. If the settings are made incorrectly, FB does not function correctly.

3. Set the axis information to the global label according to the number of axes to be used.

- Label name: Axis_CCLinkIEFBasic
- Data type[*1]: Select AXIS_REF_CCLinkIEFBasic_F and set 2, which is the number of axes, for the number of elements (1 dimension).
- Class: VAR_GLOBAL

*1 In the setting example, the number of elements for data type starts from 1, to match the index of the array and the axis number.



When setting axis information in this example, set Setting (setting information) for the member as shown below.

Item		Setting (Setting information)		
		AxisNo (Axis number)	MasterModule (Master module specification)	StartIO (Module number)
Axis 1	Axis_CCLinkIEFBasic [1]	1	MasterFX5CPUEN	0
Axis 2	Axis_CCLinkIEFBasic [2]	2	MasterFX5CPUEN	0

Servo amplifier setting

Use MR Configurator2 to set the servo parameters.

For the other settings of the servo amplifiers, refer to the manuals for the servo amplifiers used.

1. Set a network.

Set the servo parameter [Pr. PN13.0-3 Network protocol setting] to "0004H: CC-Link IEF Basic".

2. Set an operation mode.*1

Set the servo parameter [Pr.PA01.0 Control mode selection] to "0: Network standard mode".

3. Set default mapping.*1

Set the servo parameter [Pr. PN22.0 Default mapping mode selection] to "0".

4. Set an ON condition of the INP output signal.*2

Set the servo parameter [Pr. PD13.2 INP output signal ON condition selection] to "1: Within the in-position range and at the completion of command output".

5. Set an output range and filtering time of in-position 2.*3

Adjust [Pr.PC70 In-position 2 output range] and [Pr.PC71 In-position 2 output filter time] of the servo parameters to prevent In-position 2 from turning off due to overshoot, vibration, or oscillation when the axis is in the stop (Standstill) state.

*1 Since the initial value is 0, it is usually not necessary to set it.

*2 For the initial value of "0: Within the in-position range", the FB cannot correctly determine the stop state due to Halt, so it will not operate correctly when trying to operate the axis anew.

*3 Because the FB determines that the status is stop when the in-position 2 is on, it will not operate correctly if the in-position 2 is turned off.

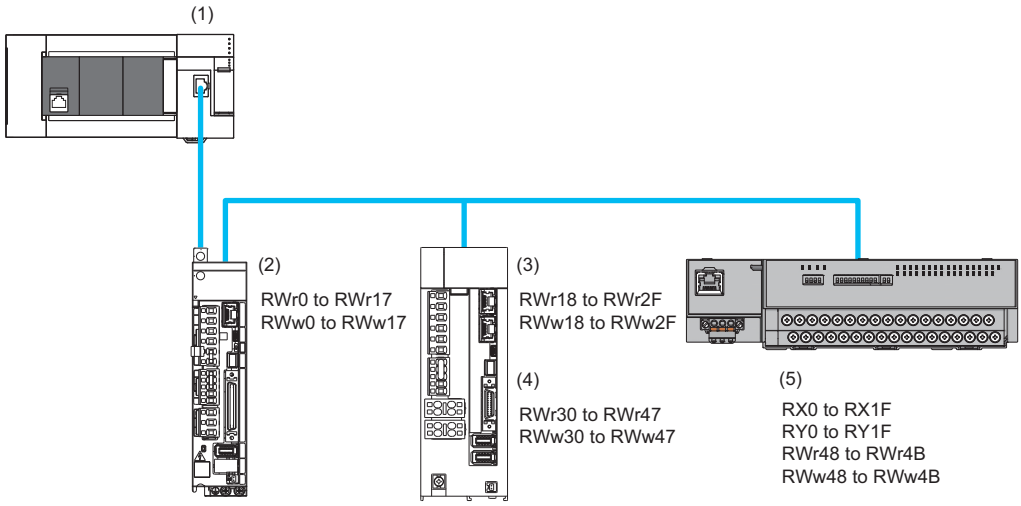
CC-Link IE TSN (standard station)

CC-Link IE TSN settings

This section describes the setting method for connecting a standard station and servo amplifiers using GX Works3 through CC-Link IE TSN.

The example below shows a system configuration consisting of one MR-J5-G (axis 1) (station number 1), one MR-J5W2-G (axis 2, axis 3) (station number 2), and one DC input module (station number 3) connected to the FX5-40SSC-G as the master station.

When a module other than the FX5-40SSC-G is used as the master station, replace the module name and label name according to the module used.



(1) FX5-40SSC-G (station number 0: master station)
(2) MR-J5-G (station number 1: axis 1)
(3) MR-J5W2-G (station number 2: axis 2)
(4) MR-J5W2-G (station number 2: axis 3)
(5) DC input module (station number 3)

- SB (link special relay) and global label (G_stLinkIETSN_SS) assignment examples

Station No.	SB (link special relay)	Refresh target device (M)	Global label (bnSB)
0	SB0000 to SB011F	M0 to M287	bnSB [0] to bnSB [287]

- SW (link special register) and global label (G_stLinkIETSN_SS) assignment examples

Station No.	SW (link special register)	Refresh target device (M)	Global label (unSW)
0	SW0000 to SB04B7	R0 to R1207	unSW [0] to unSW [1207]

• Link device and global label (G_stLinkIETSN_SS) assignment examples

In this example, RX/RY refresh settings not used by the FB have been omitted.

Station No.	Link device (RX)	Refresh target device	Global label
1	None	None	None
2	None	None	None
—	None	None	None
3	RX0 to RX1F	None	None

Station No.	Link device (RY)	Refresh target device	Global label
1	None	None	None
2	None	None	None
—	None	None	None
3	RY0 to RY1F	None	None

Station No.	Link device (RWr)	Refresh target device (R)	Global label (unRWr)
1	RWr0 to RWr17	R1208 to R1231	unRWr [0] to unRWr [23]
2	RWr18 to RWr2F	R1232 to R1255	unRWr [24] to unRWr [47]
—	RWr30 to RWr47	R1256 to R1279	unRWr [48] to unRWr [71]
3	RWr48 to RWr4B	R1280 to R1283	unRWr[72] to unRWr [75]

Station No.	Link device (RWw)	Refresh target device (R)	Global label (unRWw)
1	RWw0 to RWw17	R1284 to R1307	unRWw [0] to unRWw [23]
2	RWw18 to RWw2F	R1308 to R1331	unRWw [24] to unRWw [47]
—	RWw30 to RWw47	R1332 to R1355	unRWw [48] to unRWw [71]
3	RWw48 to RWw4B	R1356 to R1359	unRWw [72] to unRWw [75]

Adding a module

1. Open the "Module Configuration" window.

Navigation window ⇨ [Module Configuration]

2. Mount the FX5-40SSC-G(S) to the CPU module.

Element Selection window ⇨ [Motion Module] ⇨ [FX5-40SSC-G(S)]. Drag and drop the FX5-40SSC-G(S) next to the CPU module.

3. Set the parameters.

[Edit] ⇨ [Parameter] ⇨ [Fix]

4. Check the parameters.

[Tool] ⇨ [Check Parameter]

Network configuration settings

For items other than "Network Configuration Settings", such as "IP Address", refer to the following.

MELSEC iQ-F FX5 Motion Module User's Manual (CC-Link IE TSN)

1. Open the module parameter setting window.

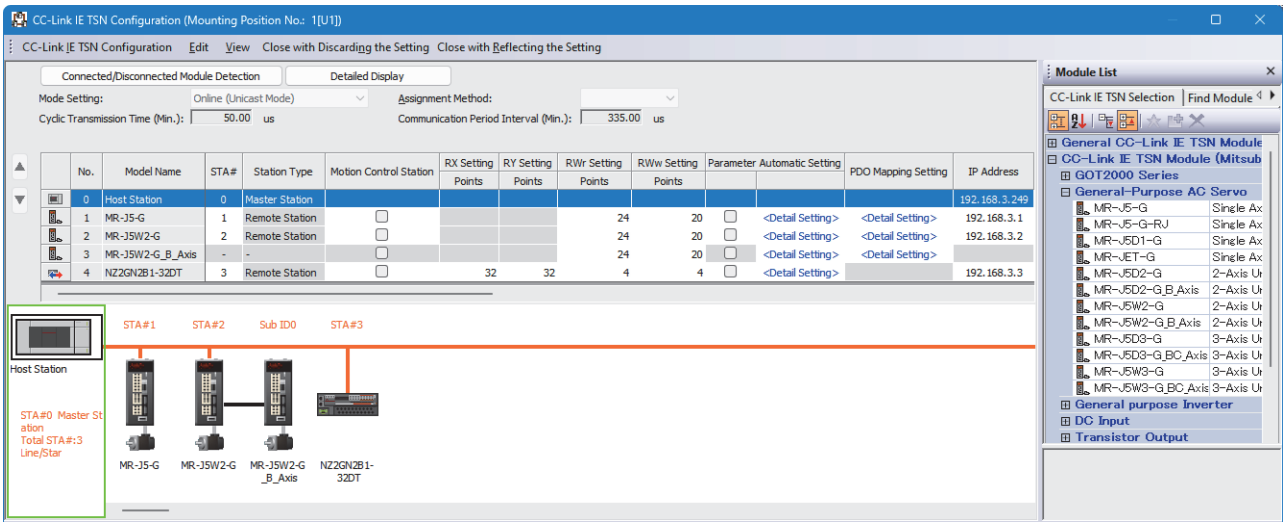
Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Module Parameter (Network)]

2. Open the network configuration window.

[Basic Settings] ⇨ [Network Configuration Settings] ⇨ "Detailed Setting"

3. Add a device station.

Select MR-J5-G and MR-J5W2-G in "Module List", and individually drag and drop them to the network map or the list of stations.



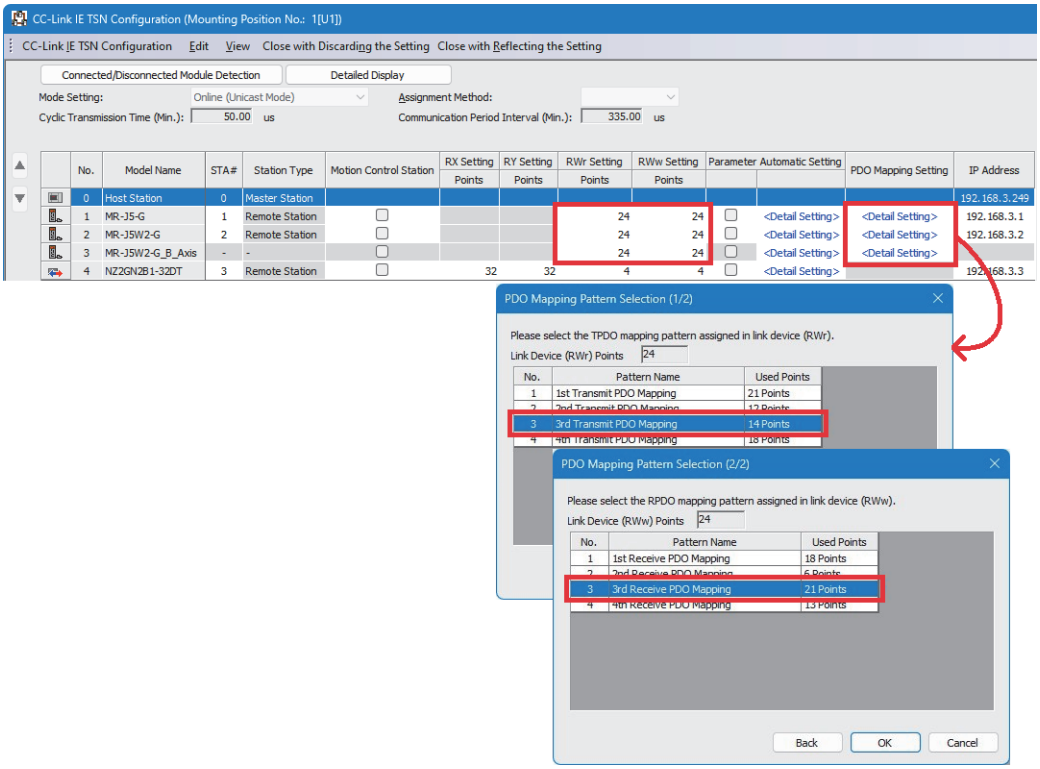
4. Assign the link device.

Set the number of points for "RWr Setting" and "RWw Setting" to 24 points for each axis.

5. Set PDO mapping.

[CC-Link IE TSN Configuration] ⇨ [PDO Mapping Setting] ⇨ "Detail Setting"

In PDO mapping pattern selection, select [3rd Transmit PDO Mapping] for RWr and [3rd Receive PDO Mapping] for RWw.



Restriction

- Set the target stations (servo amplifiers) to be controlled by this FB library for the number of axes to be used starting sequentially from station number 1, then set stations other than the target stations. If stations are set without following this order, the FB cannot access link devices correctly and fails to operate correctly. This restriction is only for parameter settings. There are no restrictions on the order of actual connections.
- Set the communication cycle interval setting in basic setting to 500μs or more.
- For the station-based block data assurance in application setting, set "Enable" (default).

Refresh parameter settings

1. Open the module parameter setting window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module name ⇨ [Module Parameter (Network)]

2. Open the network configuration window.

[Basic Setting] ⇨ [Refresh Settings] ⇨ "Detailed Settings"

3. Specify the devices to be assigned to SB/SW and RWw/RWr. *1*2*3

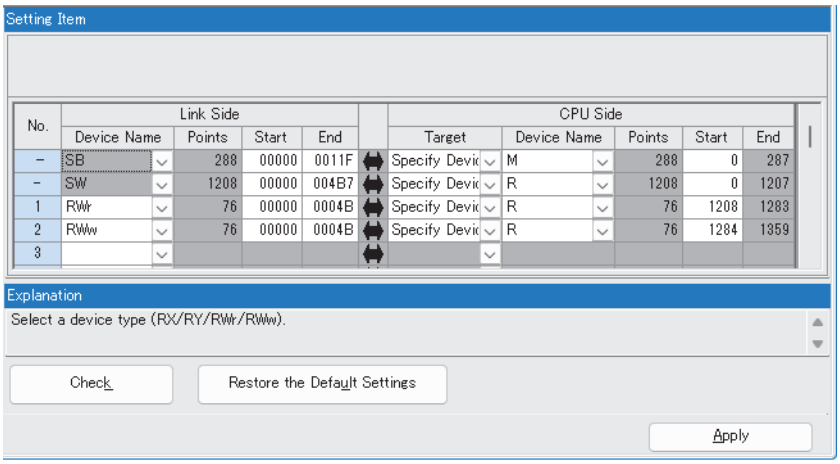
*1 If necessary, change the device settings or change the device to be assigned so that the refresh target device has link points equal to or more than those on the link side.

*2 If necessary, change the latch range setting or change the device to be assigned so that the refresh target device is not latch set.

*3 For SB (link special relay) and SW (link special register), set all points to the refresh range.

The following shows a setting example.

- SB0000 to SB011F ⇔ M0 to M287 (288 points)
- SW0000 to SW04B7 ⇔ R0 to R1207 (1208 points)
- RWr0000 to RWr004B ⇔ R1208 to R1283 (76 points)
- RWw0000 to RWw004B ⇔ R1284 to R1359 (76 points)



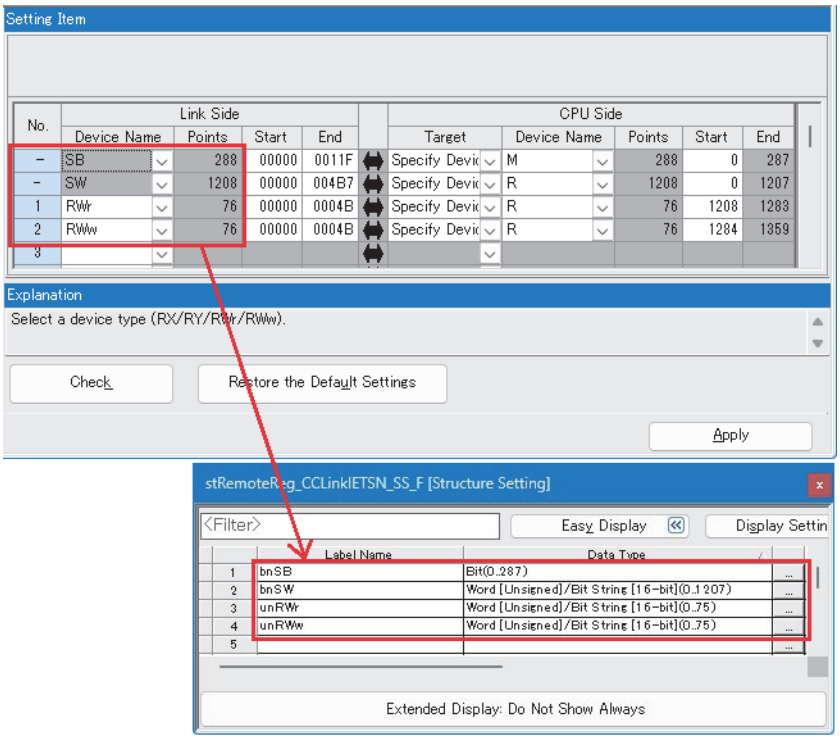
Global label settings

1. Define the structure.

Navigation window ⇨ [Label] ⇨ Right-click ⇨ [Add New Data]

According to the refresh settings (☞ Page 52 Refresh parameter settings), define the stRemoteReg_CCLinkIETSN_SS_F structure.

- Data Type: Structure
- Data Name: stRemoteReg_CCLinkIETSN_SS_F
- SB = 288 points, SW = 1208 points
- RWr, RWw = 76 points



Point

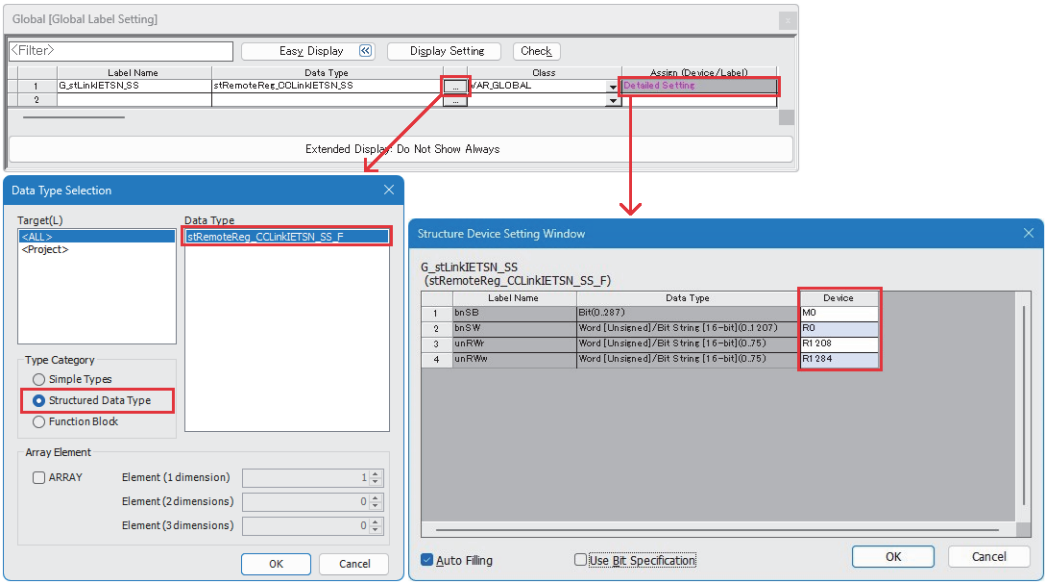
For the number of array elements in each label, set the corresponding number of device points in the refresh settings. (If a station, such as an I/O module, which the FB libraries do not control, exists, define the structure according to the entire refresh settings including that station.)

2. Set the global label by using the structure defined in step 1.

Navigation window ⇨ [Label] ⇨ [Global Label] ⇨ [Global]

- Label Name: G_stLinkIETSN_SS
- Data Type: stRemoteReg_CCLinkIETSN_SS
- Class: VAR_GLOBAL
- Assign (Device/Label)*1: bnSB = M0, unSW = R0, unRWr = R1208, unRWw = R1284

*1 If devices are entered for bnSB and unSW with the [Auto Filling] checkbox selected and the [Use Bit Specification] checkbox unselected, other devices are entered automatically according to the number of elements.



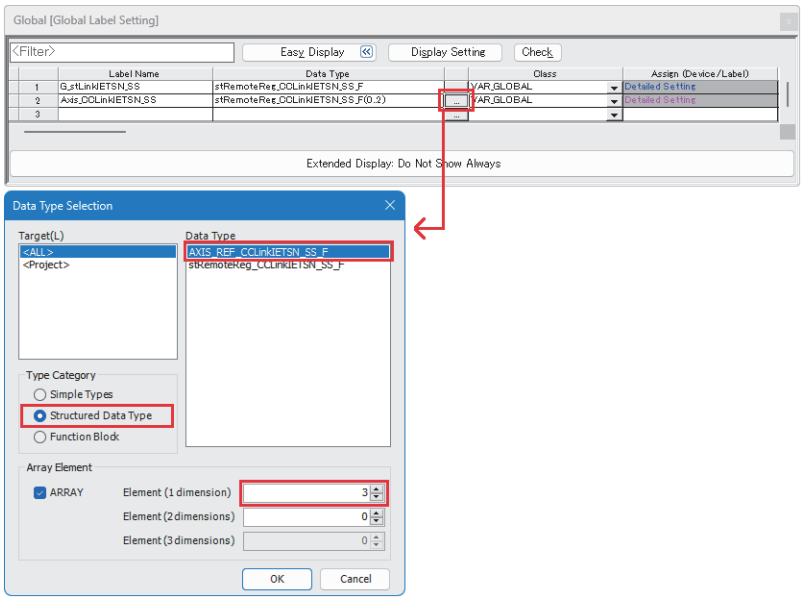
Point

The FB library operates by using the data refreshed to the global label "G_stLinkIETSN_SS". Therefore, assign the refresh data correctly. If the settings are made incorrectly, FB does not function correctly.

3. Set the axis information to the global label according to the number of axes to be used.

- Label Name: Axis_CCLinkIETSN_SS
- Data Type[*1]: Select AXIS_REF_CCLinkIETSN_SS_F and set 3, which is the number of axes, to the number of elements (1 dimension).
- Class: VAR_GLOBAL

*1 In the setting example, the number of elements for data type starts from 1, to match the index of the array and the axis number.



When setting axis information in this example, set Setting (setting information) for the member as shown below.

Item		Setting (Setting information)	
		AxisNo (Axis number)	StationNo (Station number)
Axis 1	Axis_CCLinkIETSN_SS [1]	1	1
Axis 2	Axis_CCLinkIETSN_SS [2]	2	2
Axis 3	Axis_CCLinkIETSN_SS [3]	3	2

Servo amplifier setting

Use parameter automatic setting in the network configuration setting of GX Works3 or use MR Configurator2 to set the servo parameters.

For the other settings of the servo amplifiers, refer to the manuals for the servo amplifiers used.

1. Set a network. *1

Set the servo parameter [Pr. PN13.0-3: Network protocol setting] to "0000H: CC-Link IE TSN".

2. Set an operation mode. *1

Set the servo parameter [Pr.PA01.0: Control mode selection] to "0: Network standard mode".

3. Set an ON condition of the INP output signal. *2

Set the servo parameter [Pr. PD13.2: INP output signal ON condition selection] to "1: Within the in-position range and at the completion of command output".

4. Set the output range and filtering time of in-position 2. *3

Adjust [Pr.PC70: In-position 2 output range] and [Pr.PC71: In-position 2 output filter time] of the servo parameters to prevent In-position 2 from turning off due to overshoot, vibration, or oscillation when the axis is in the stop (Standstill) state.

*1 Since the initial value is 0, it is usually not necessary to set it.

*2 For the initial value of "0: Within the in-position range", the FB cannot correctly determine the stop state due to Halt, so it will not operate correctly when trying to operate the axis anew.

*3 Because the FB determines that the status is stop when the in-position 2 is on, it will not operate correctly if the in-position 2 is turned off.

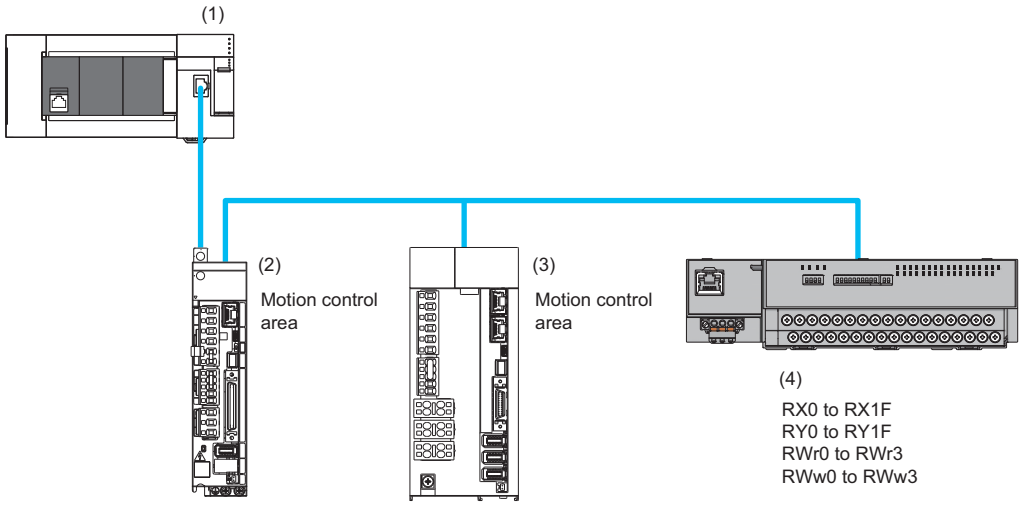
CC-Link IE TSN (motion control station)

CC-Link IE TSN settings

This section describes the setting method for connecting a motion control station and servo amplifiers using GX Works3 through CC-Link IE TSN.

The example below shows a system configuration of one MR-J5-G (axis 1) (station number 1), one MR-J5W3-G (axis 2, axis 3, axis 4) (station number 2), and one DC input module (station number 3) connected together with the FX5-80SSC-G as the master station.

When a module other than the FX5-80SSC-G is used as the master station, replace the module name and label name according to the module used.



(1) FX5-80SSC-G (station number 0: master station)
(2) MR-J5-G (station number 1: axis 1)
(3) MR-J5W3-G (station number 2: axis 2, axis 3, and axis 4)
(4) DC input module (station number 3)

Point

Link devices of the station operating in the motion control station do not need to be set, as they are automatically assigned to the motion control area. Refresh settings for station number 3 have been omitted from this example, because it is not controlled by the FB.

Adding a module

Add a module.

1. Open the "Module Configuration" window.

Navigation window ⇨ [Module Configuration]

2. Mount the FX5-80SSC-G(S) to the CPU module.

Element Selection window ⇨ [Motion Module] ⇨ [FX5-80SSC-G(S)]. Drag and drop the FX5-80SSC-G(S) next to the CPU module.

3. Set the parameters.

[Edit] ⇨ [Parameter] ⇨ [Fix]

4. Check the parameters.

[Tool] ⇨ [Check Parameter]

Network configuration settings

For items other than "Network Configuration Settings", such as "IP Address", refer to the following.

MELSEC iQ-F FX5 Motion Module User's Manual (CC-Link IE TSN)

1. Open the module parameter setting window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Module Parameter (Network)]

2. Open the network configuration window.

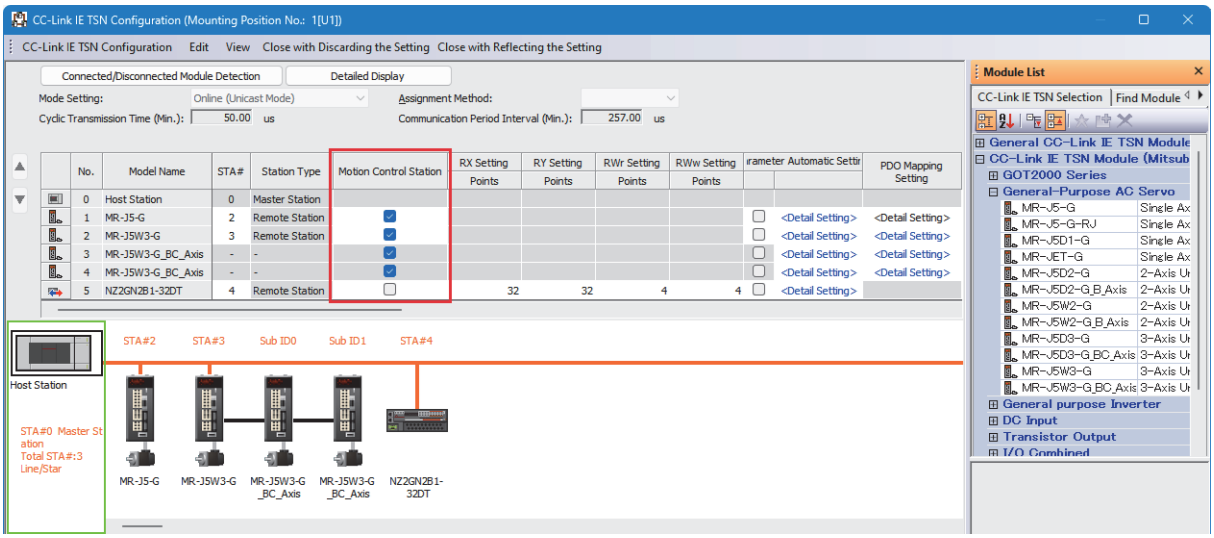
[Basic Settings] ⇨ [Network Configuration Settings] ⇨ "Detailed Setting"

3. Add a device station.

Select MR-J5-G and MR-J5W3-G in "Module List", and individually drag and drop them to the network map or the list of stations.

4. Set a motion control station.

Select the "Motion Control Station" checkbox for the station to be controlled by the FB.



Restriction

- For the communication period setting for the station to be controlled by the FB, set "Basic Period" (default).
- Before setting the simple motion module, update the module parameter (network) with [Apply].
- When positioning is completed in a period of time less than "Communication Period Setting" set in the module parameter setting for the motion module, set "[Pr.40] Positioning complete signal output time" for the motion module to a value greater than "Communication Period Setting". Since the initial value of "[Pr.40] Positioning complete signal output time" is 300ms, it is usually not necessary to set it.

Simple motion module settings

For items other than [Pr.141: IP address specification] and [Pr.142: Multidrop number], refer to the following.

MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

1. Open the Simple motion module setting window.

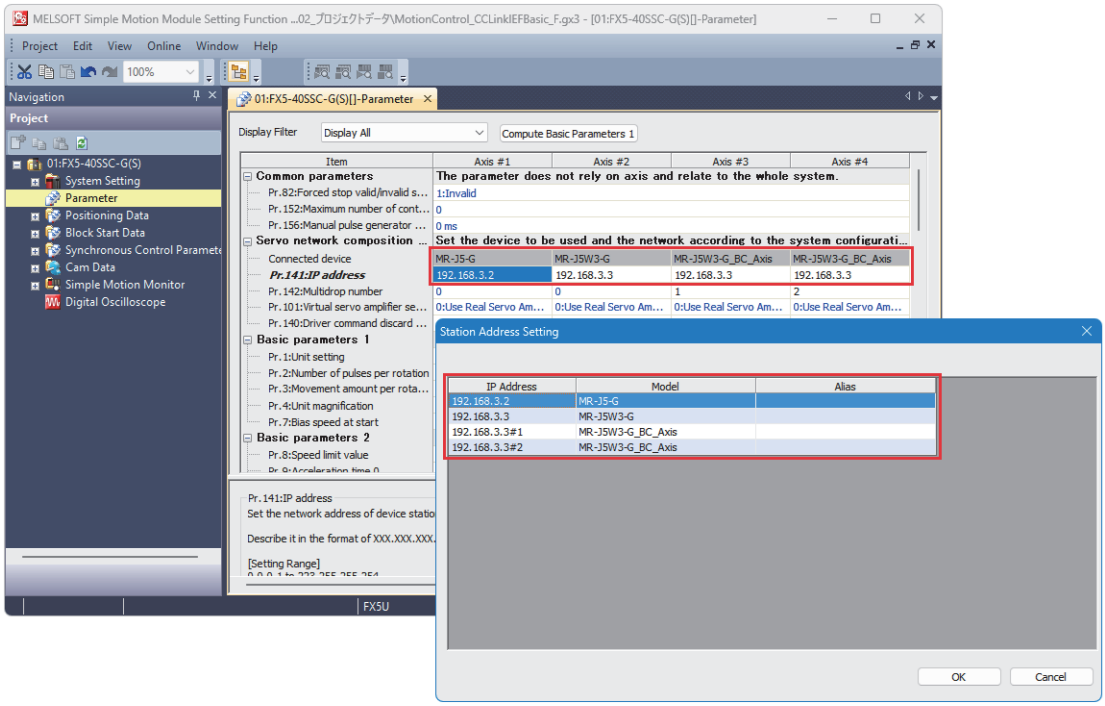
Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Simple Motion Module Setting (Module Extended Parameter)]

2. Open the Station address setting window.

[Parameter] ⇨ [Servo network composition parameters] ⇨ [Pr.141: IP address specification] ⇨ [...]

3. Configure axis settings.

The IP address of the station set as the motion control station within the network configuration is displayed. Select the IP address of each axis and set [Pr.141: IP address specification] and [Pr.142: Multidrop number].



Restriction

Be sure to set the axes set in step 3 in Axis_CCLinkIETSN_MCS.

Global label settings

1. Set the global label.

Navigation window ⇨ [Label] ⇨ [Global Label] ⇨ [Global]

Set the axis information to the global label according to the number of axes to be used.

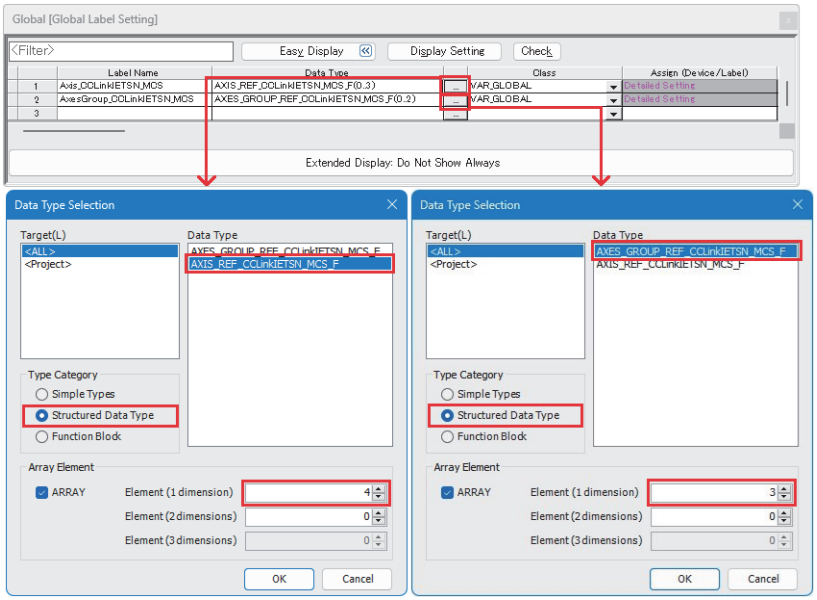
- Label Name: Axis_CCLinkIETSN_MCS
- Data Type: Select AXIS_REF_CCLinkIETSN_MCS_F and set 4, which is the number of axes, to the number of elements (1 dimension). *1
- Class: VAR_GLOBAL

*1 In the setting example, the number of elements for data type starts from 1, to match the index of the array and the axis number.

Set the axes group information to the global label according to the number of axes groups to be used.

- Label Name: AxesGroup_CCLinkIETSN_MCS
- Data Type: Select AXES_GROUP_REF_CCLinkIETSN_MCS_F and set 3, which is the number of axes groups, to the number of elements (1 dimension). *2
- Class: VAR_GLOBAL

*2 In the setting example, the number of elements for data type starts from 1, to match the index of the array and the axes group number. An example where three axes groups are used in total is described.



When setting axis information in this example, set Setting (setting information) for the member as shown below.

Item		Setting (Setting information)	
		AxisNo (Axis number)	StationNo (Station number)
Axis 1	Axis_CCLinkIETSN_MCS[1]	1	1
Axis 2	Axis_CCLinkIETSN_MCS[2]	2	1
Axis 3	Axis_CCLinkIETSN_MCS[3]	3	1
Axis 4	Axis_CCLinkIETSN_MCS[4]	4	1

Servo amplifier setting

For details on the servo amplifier setting, refer to the following.

MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

To set the servo parameters, use parameter automatic setting in the network configuration setting of GX Works3 or use MR Configurator2.

For the other settings of the servo amplifiers, refer to the manuals for the servo amplifiers used.

2.9 FB Operation

Execute execution type and Enable execution type

This FB library includes the function blocks executed when Execute is input, as well as those executed when Enable is input. The basic operation of each FB is described below.

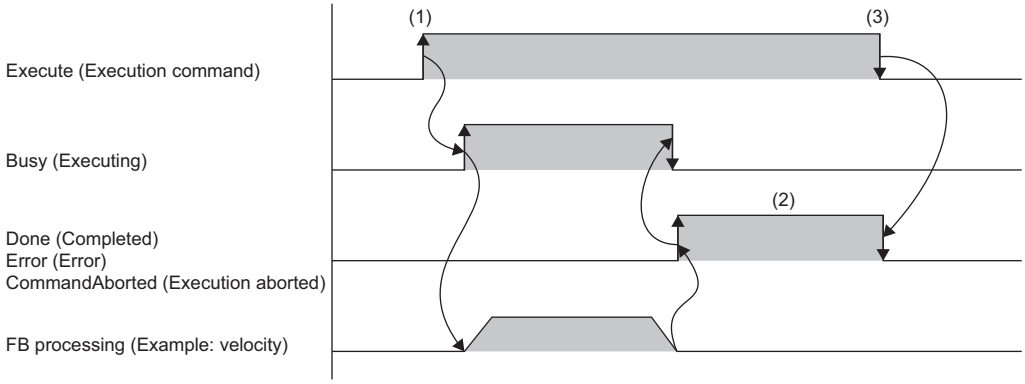
Restriction

When MotionControl_CCLinkIEFBasic_F (for CC-Link IEF Basic communications) version 1.03 or earlier is used, the execution command (Execute) cannot be used for the pulse execution type. Specifications may differ according to the FB. For details, refer to the specifications of each FB.

Basic operation of the Execute execution type

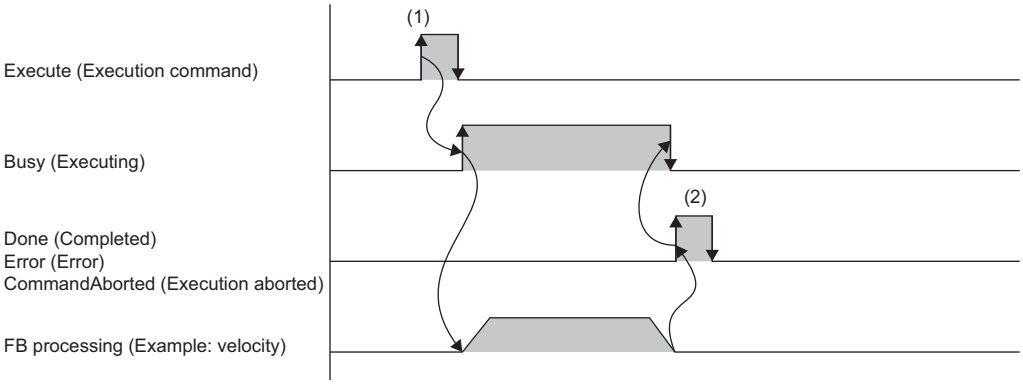
- Execute type FBs read input parameters at the Execute rising edge and start operation. Once operation starts, it continues until completed, even if Execute is set to FALSE.
- When operation starts, only one of the Busy, Done, Error, or CommandAborted outputs becomes TRUE.
- Done, Error, and CommandAborted are reset at the falling edge of Execute. Busy is not impacted.
- When the execution command (Execute) is used with the pulse execution type, the output at operation completion is in a pulse form.
- If the input parameters are changed during operation, the change is reflected by starting up (restarting) Execute again.
- If Execute is started up again (restarted) before the operation completes, the output returns the results of the operation that started up again.
- If an error occurs when the FB starts up, Busy (executing) does not become TRUE but Error (error) becomes TRUE. If an error occurs while the FB is operating, Busy (executing) becomes FALSE and Error (error) becomes TRUE.

■Holding Execute during operation



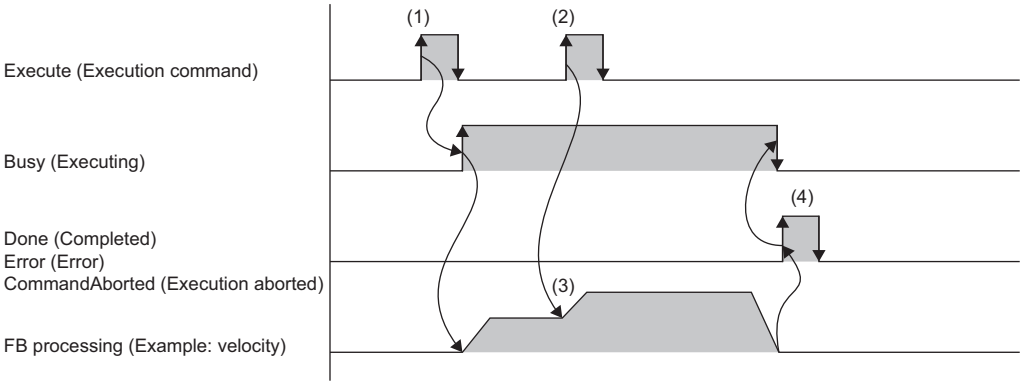
(1) Start execution at the rising edge
(2) Held while Execute = ON
(3) Reset the output label at the falling edge

■Execute OFF during operation (pulse execution type)



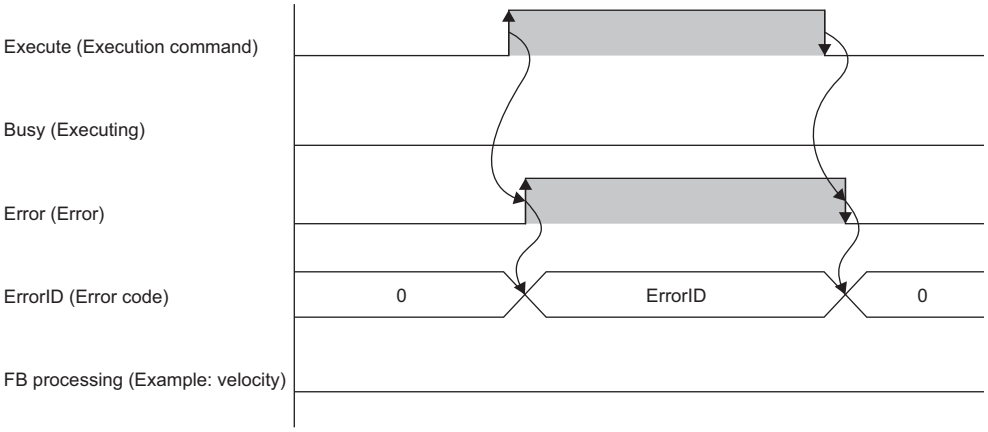
(1) Start execution at the rising edge
(2) While Execute = OFF, only one scan is ON

■Execute OFF → ON (execute again) during operation

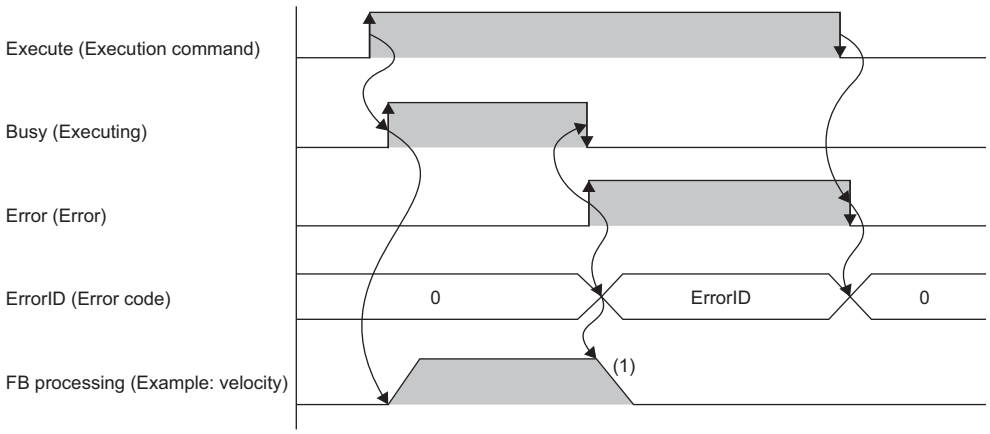


(1) Start execution at the rising edge
(2) Restart with Execute = OFF → ON during operation (load input label, execute)
(3) Operate with the input label setting at restart
(4) The output label returns the results of restarting.

■Error while starting up



■Error during operation

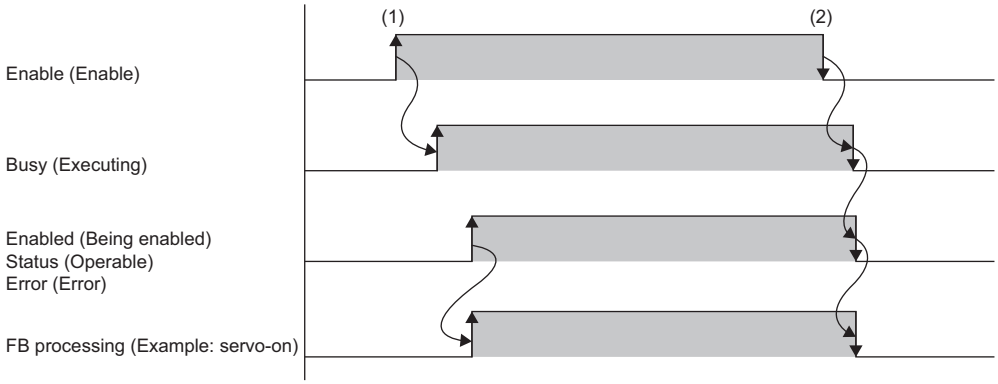


(1) Stop the axes when an error occurs

Basic operation of Enable execution type

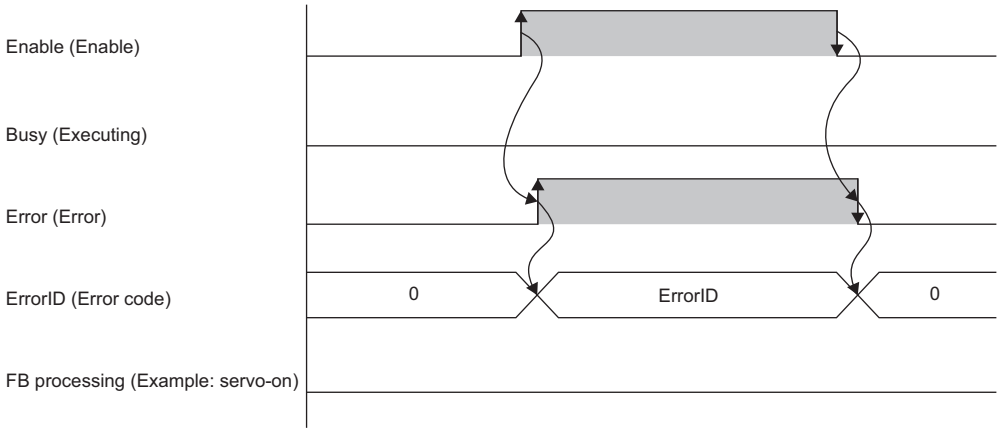
- Enable type FBs always read input parameters and execute operations repeatedly while Enable is TRUE.
- After operation starts, Busy becomes TRUE.
- Only one of Enabled/Status and Error outputs becomes TRUE.
- If an error occurs when the FB starts up, Busy (executing) does not become TRUE but Error (error) becomes TRUE. If an error occurs while the FB is operating, Busy (executing) becomes FALSE and Error (error) becomes TRUE.

■Enable ON → OFF

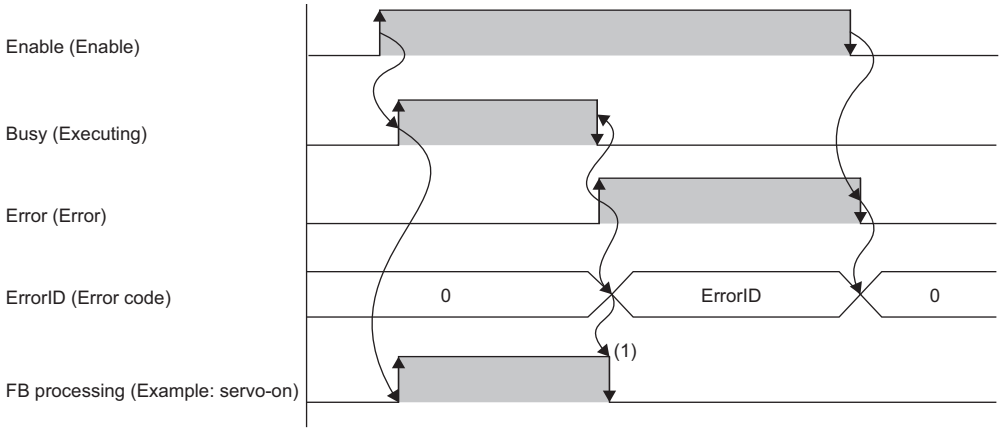


(1) Start execution at the rising edge
(2) Reset the output label at the falling edge

■Error while starting up



■Error during operation



(1) Servo OFF when an error occurs

2.10 Precautions

Before using the FB libraries in this reference manual, check the following precautions.

For precautions specific to each FB, refer to "Precautions" in FB LIBRARY DETAILS.

Description
The FBs in this reference manual do not include the error recovery processing. Prepare the error recovery processing separately to suit the user's system and the expected operation.
The FBs do not detect an alarm or warning that occurs in servo amplifiers. Separately create the alarm and warning monitoring processing for the servo amplifiers used. For alarms and warnings that occurred in the servo amplifiers, refer to the user's manual for the servo amplifiers used.
The FB cannot be used in an interrupt program. When referring to the output labels of the FB from an interrupt program, use a DI/EI instruction before and after the FB execution in a state where interruption is prohibited to prevent data inconsistency.
If the FB is used in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, the processing for turning off an execution command (such as Execute and Enable) cannot be executed and normal operation is not possible. Always use the FB in a program that is capable of turning off the execution command.
The number of steps of the FB embedded in a program depends on the CPU module used and the input/output definitions.
Although a double coil warning may occur during compilation, it does not cause any problem when using the FB.
The FB requires the configuration of a ladder block for every input label.
To use more than one FB, care must be taken to avoid duplication of the target axis to prevent more than one program for the target axis from starting at the same time.
Set the input label before turning on an execution command. Also, do not change Axis (axis information) or AxesGroup (axes group information) until the FB processing is completed.
For the memory/device settings of the CPU parameters, change the capacities to the capacities required to use the FB libraries. Change the latch range so that the device assigned to link device is not latch set. Otherwise, an error may occur in GX Works3.
FB does not execute a range check for input labels. If an incorrect value is set, due to such a cause as access to another label, the CPU module can stop with an error. Check that the setting value is correct.
For an FB with Axis (axis information) in the I/O label, set Setting (setting information) for the following item structure members in advance before executing the FB. For details on each item, refer to the following MC_Setting_[Type]. ☞ Page 30 List of Structures
Because AxisStatus (axis status) of Axis (axis information) is updated by the communication data received from the servo amplifier, there may be a delay of one scan or more after FB is executed until it is updated. When interlocking between FBs, use the output labels of the FBs.
For an FB with an I/O label, be sure to set the same label for input and output. If only input is set, the FB will not operate normally.
Adjust [Pr.PC70 In-position 2 output range] and [Pr.PC71 In-position 2 output filter time] of the servo parameters to prevent In-position 2 from turning off due to overshoot, vibration, or oscillation when the axis is in the stop (Standstill) state. This precaution does not apply to the FBs for CC-Link IE TSN (motion control station).
If the FB terminated with an error, turn off the execution condition of the FB that terminated with an error before executing a new FB. If the execution condition of the FB that terminated with an error remains on, the termination processing will not be performed and the newly executed FB will not operate normally.
When executing the object reading FB using FX5-ENET, make sure that the module READY (Un\G34b0) is on before the execution.
While the FB is being executed, do not perform the online change.
Regarding the performance values of each FB, the time required to complete FB processing fluctuates depending on the time required to process programs other than the target FB. Refer to the performance values as a guide for processing time.
To use this FB library, the user needs to create some structure and global labels. For details, refer to the following. ☞ Page 25 List of Global Labels ☞ Page 30 List of Structures
Do not change any link device or buffer memory used within this FB library outside the FB library.
Do not execute the FB in a state where "[Cd.183] Execution prohibition flag" of the motion module is on.
Do not change the operating status of the CPU module to the STOP state while the FB is being executed.
For details on how to update the FB library, refer to the following manual. GX Works3 Operating Manual When updating manually, delete the library elements (FB, global label, structure) in the Navigation window and then re-register from the Element Selection window. The version of library elements can be checked from Properties in the Navigation window.
When using the simple CPU communication function while the FB is being executed, the execution interval set in simple CPU communication setting or time required to complete communications may be extended.

3 DETAILS OF FB LIBRARIES

3.1 MC_Power_[Type] (Operation Possible)

Target modules by type are shown below.

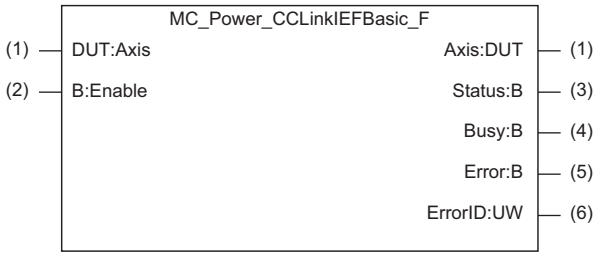
Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)

When the FX5-SSC-G (motion control station) is used, refer to the following.

☞ Page 171 MCv_AllPower_CCLinkIETSN_MCS_F (Operation of All Axes Possible)

Overview

This FB switches the status of the servo amplifier for the specified axis to the operable state. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	While Enable input is on, axis control is enabled.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Status	Operable	Bit	OFF	The on state indicates the operable state.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

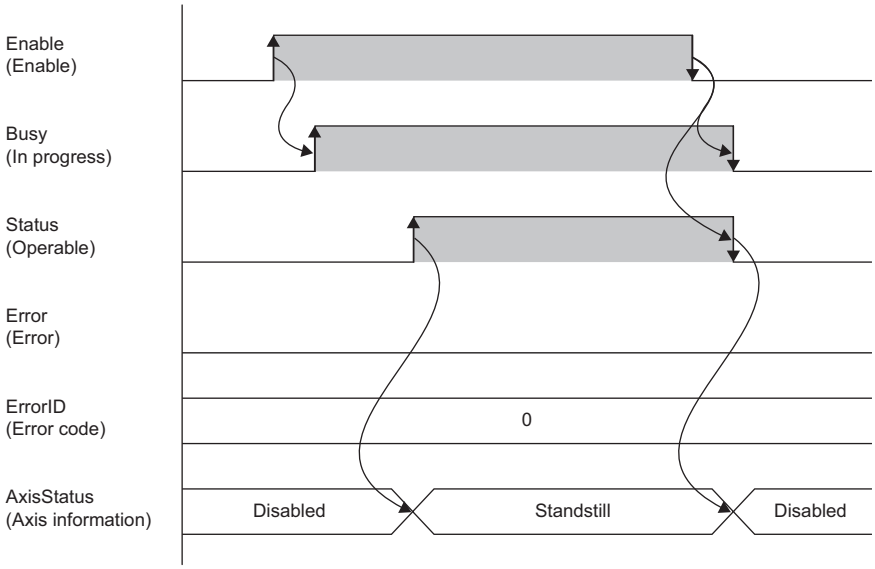
Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 969 steps ■FX5-SSC-G (standard station) 1053 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.03K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.03K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

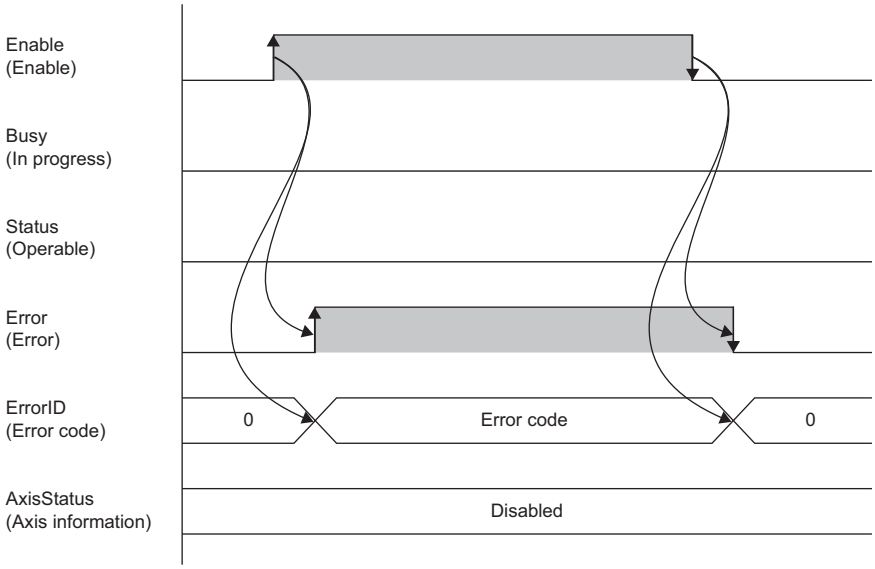
- This FB initializes the information of the axis selected at the rising edge of Enable (enable) and switches to the servo on state. When the process starts normally, Busy (executing) turns on. When the status is switched to the servo on state completely, Status (operable) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions from Disabled to Standstill. (☞ Page 41 State Transition Diagram)
- Turning Enable off switches the status of the axis to the servo off state, and Status turns off. The AxisStatus (axis status) of Axis transitions from Standstill to Disabled. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 77 Error code)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- During the period from the rising edge of Enable (enable) until Status (operable) turns on, AxisStatus (axis status) of Axis (axis information) may become Discrete Motion.
- Before using this FB library (except for FBs that can be executed in the Disabled state), always execute this FB to check that Status (operable) is on. This FB initializes the axis information and switches to the servo on state.
- Use only one instance of this FB for one axis. If multiple instances are used for one axis, whether to operate may not be controlled normally.
- For the FX5 CPU module and FX5-ENET, start CC-Link IE Field Network Basic communications (turn on RY3F) before executing this FB.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	331ms	1.62ms	551 scans
FX5UJ CPU module	Axis 1	326ms	1.07ms	706 scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	329ms	0.95ms	586 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5U CPU module, FX5UC CPU module	Axis 1	329ms	1.57ms	261 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.

Error code

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

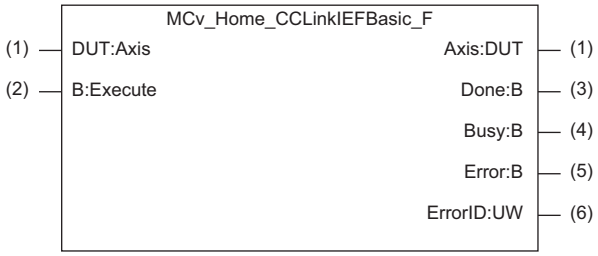
3.2 MCv_Home_Type (Homing)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB executes homing on the specified axis. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	Indicates that homing is completed successfully.
(4)	Busy	Executing	Bit	OFF	The on state indicates that homing is being executed.
(5)	CommandAborted	Execution aborted	Bit	OFF	Indicates that execution is aborted by another FB.
(6)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

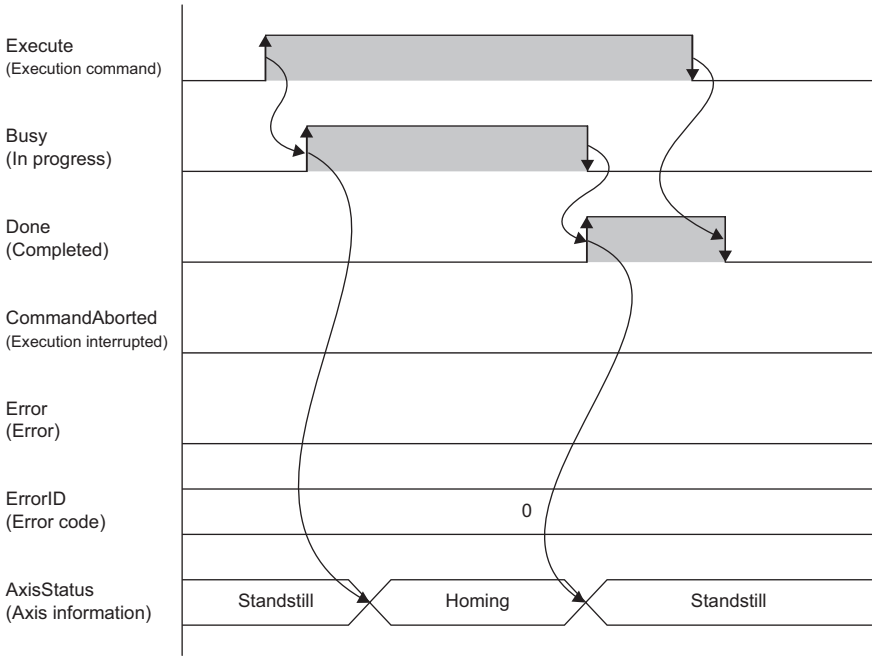
Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1359 steps ■FX5-SSC-G (standard station) 1400 steps ■FX5-SSC-G (motion control station) 689 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.04K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.04K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.08K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

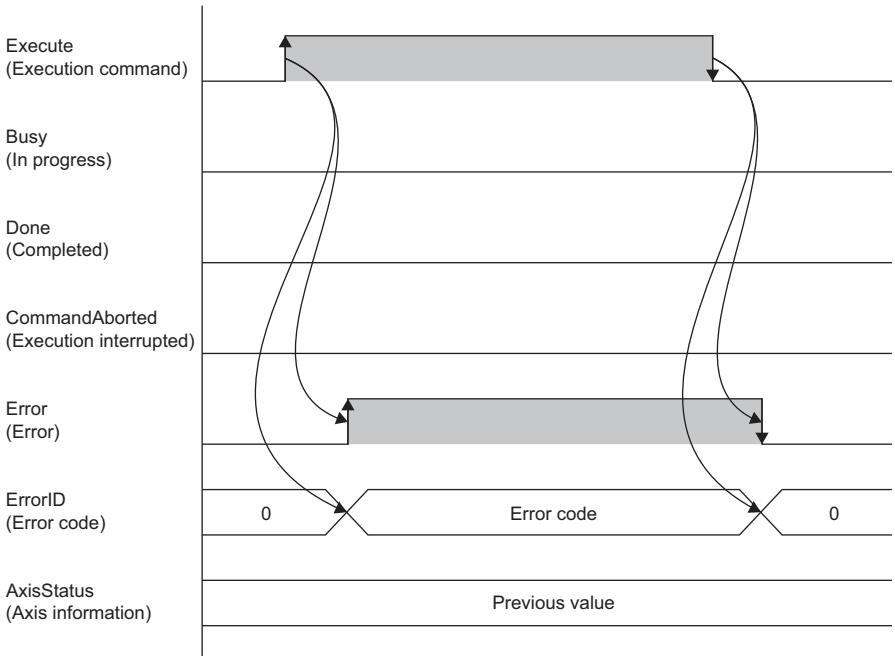
- When Execute (execution command) is turned on, this FB executes homing on the specified axis according to the set parameters for homing. Busy (executing) is turned on during homing, and the AxisStatus (axis status) of Axis (axis information) transitions from Standstill to Homing. When the process is completed successfully, Busy turns off and Done (completed) turns on, and at the same time, the AxisStatus returns from Homing to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 83 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- The parameters for homing must be set in advance to the servo amplifiers with MR Configurator2.

Parameter settings

To execute this FB, the parameters that correspond to objects such as the [Homing method (Obj.6098H)] object must be set to the servo amplifiers. For details, refer to the following.

📖MR-J5 User's Manual (Function)

📖MR-JET User's Manual (Function)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

When changing the home position address with FX5-SSC-G (motion control station), set "[Pr.45] Home position address" of the motion module.

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	41.9ms	1.84ms	42 scans
FX5UJ CPU module	Axis 1	39.2ms	1.28ms	54 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	38.1ms	1.42ms	35 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of performing homing for the first time, with the settings of OPR method (Method 37: Homing on current position).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	34.8ms	2.13ms	20 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of performing homing for the first time, with the settings of OPR method (Method 37: Homing on current position).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

Module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	52.8ms	2.11ms	32 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of performing homing for the first time, with the settings of OPR method (Method 37: Homing on current position).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F and MCv_State_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. • If a warning occurs in the servo amplifier, remove the cause of the warning, and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion station)

Version	Date	Description
00A	July 2024	Newly created

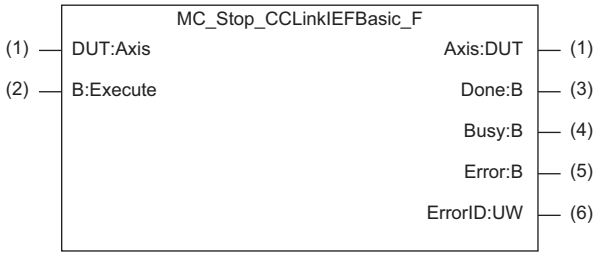
3.3 MC_Stop_Type (Forced Stop)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB forcibly stops the specified axis. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	■FX5-SSC-G (motion control station) • The on state indicates that the speed has reached zero. ■Other than FX5-SSC-G (motion control station) • The on state indicates that the speed has reached zero.
(4)	Busy	Executing	Bit	OFF	■FX5-SSC-G (motion control station) • The on state indicates that the speed is decreasing to zero. ■Other than FX5-SSC-G (motion control station) • The on state indicates that the speed is decreasing to zero.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 848 steps ■FX5-SSC-G (standard station) 890 steps ■FX5-SSC-G (motion control station) 617 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.03K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.03K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.08K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

■FX5-SSC-G (motion control station)

- When Execute (execution command) is turned on, this FB forcibly stops controlling the selected axis, and aborts the axis operation FB being executed. Busy (executing) is turned on during stop processing, and the AxisStatus (axis status) of AXIS (axis information) transitions to Stopping. (☞ Page 41 State Transition Diagram) When the axis speed reaches 0, Busy (executing) turns off, and Done (completed) turns on.
- While Execute (execution command) is turned on or while the speed has not yet reached 0, the Stopping state is held for the AxisStatus (axis status). When Done (completed) is on and Execute (execution command) is turned off, the AxisStatus (axis status) transitions to Standstill.
- For deceleration and stopping, the deceleration time specified in the FB being executed is applied. However, when the following FBs are being executed, the deceleration time below is applied.
  - MC_TorqueControl_[Type]: Stop immediately
  - MCv_Jog_CCLinkIETSN_MCS_F: "[Pr.33] JOG operation deceleration time selection" of the motion module
  - MCv_Home_[Type]: [Homing acceleration (Obj. 609AH)] setting for servo amplifier
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 90 Error codes)

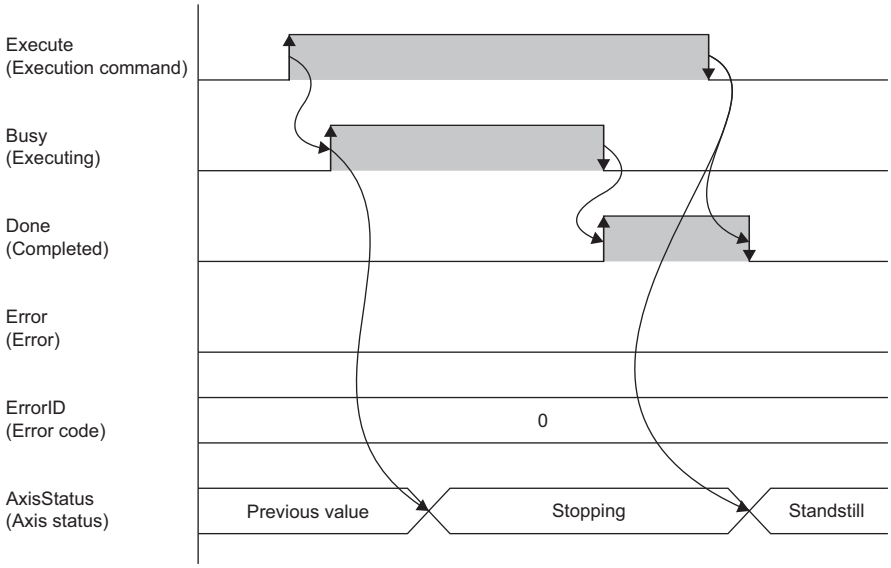
■Other than FX5-SSC-G (motion control station)

- When Execute (execution command) is turned on, this FB forcibly stops controlling the selected axis, and aborts the axis operation FB being executed. Busy (executing) is turned on during stop processing, and the AxisStatus (axis status) of Axis (axis information) transitions to Stopping. (☞ Page 41 State Transition Diagram) After that, when the axis stops (the speed reaches zero), Done (completed) turns on, and the status of the servo amplifier becomes Switch On Disabled (servo off). AxisStatus then becomes Disabled.
- While Execute (execution command) is turned on or while the speed has not yet reached zero, the Stopping state is held for the AxisStatus (axis status). When Done (completed) is on and Execute (execution command) is turned off, the AxisStatus (axis status) transitions to Disabled. If an operable FB is being executed, the status transitions to Disabled then to Standstill. (☞ Page 41 State Transition Diagram)
- The axis is decelerated and stopped according to the settings of [Quick stop deceleration (Obj.6085H)]. However, only for torque control, the Switch On Disabled state arises immediately, and the axis stops through dynamic braking.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 90 Error codes)

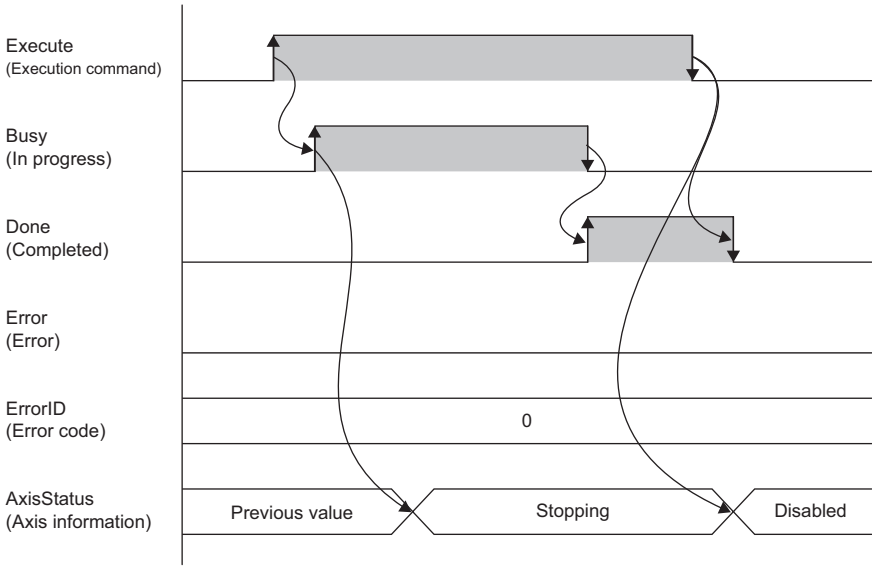
Timing chart of I/O signals

■Completed successfully

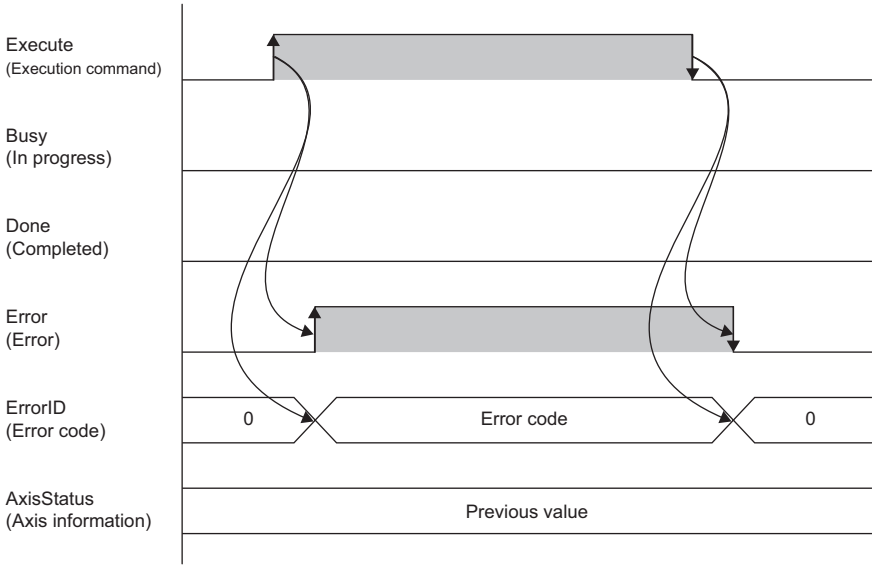
• FX5-SSC-G (motion control station)



• FX5-SSC-G (other than motion control station)



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- Use only one instance of this FB for one axis. If multiple instances are used for one axis, forced stop may not be controlled normally.
- When FX5-SSC-G (motion control station) is used, the selected axis decelerates and stops if this FB is executed. To stop immediately, refer to the following.

MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

Parameter settings

FX5-SSC-G (motion control station)

To execute this FB, set "[Pr.39] Stop group 3 rapid stop selection" of the motion module to "0: Normal deceleration stop". *1

*1 Since the initial value is 0, it is usually not necessary to set it.

Other than FX5-SSC-G (motion control station)

To execute this FB, the parameters that correspond to objects such as the [Quick stop deceleration (Obj.6085H)] object must be set to the servo amplifiers. For details, refer to the following.

MR-J5 User's Manual (Function)
MR-JET User's Manual (Function)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	98.4ms	1.80ms	112 scans
FX5UJ CPU module	Axis 1	96.5ms	1.45ms	143 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	96.5ms	1.62ms	99 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing forced stop with the forced stop time and deceleration time constant (100ms) set during operation at the operating speed (1000r/min).
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	99.3ms	2.03ms	61 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing forced stop with the forced stop time and deceleration time constant (100ms) set during operation at the operating speed (1000r/min).
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	90.7ms	2.06ms	52 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing a forced stop, with the setting deceleration time (100ms) during the operation equivalent to the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), and operating speed (1000r/min).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, and MC_MoveVelocity_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the servo amplifier. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	Execute the operable FB to enable operation, then execute the FB again. ■FX5-SSC-G (motion control station) • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

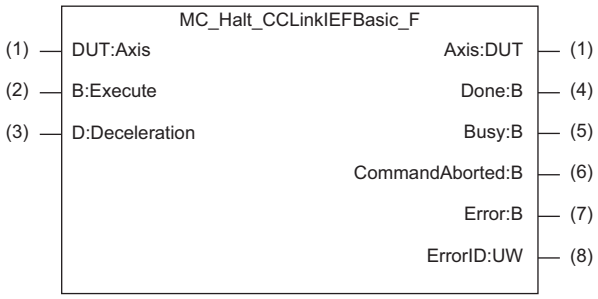
3.4 MC_Halt_Type (Stop)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)

Overview

This FB stops the specified axis. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time to be taken by the servo motor to stop rotation from the rated rotation speed.

Output labels

No.	Label	Name	Data type	Default value	Description
(4)	Done	Completed	Bit	OFF	Indicates that the speed reached zero.
(5)	Busy	Executing	Bit	OFF	Indicates that the speed is decreasing to zero.
(6)	CommandAborted	Execution aborted	Bit	OFF	Indicates that execution is aborted by another FB.
(7)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 977 steps ■FX5-SSC-G (standard station) 1011 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.04K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.04K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

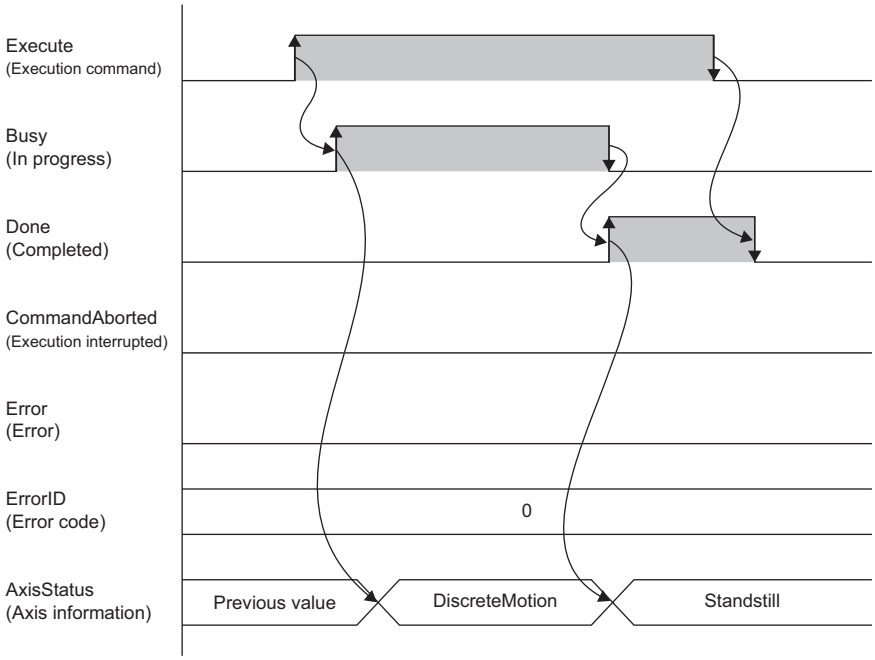
- When Execute (execution command) is turned on, this FB controls speed of the specified axis at the set speed. When processing starts normally, Busy (executing) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions to DiscreteMotion. (☞ Page 41 State Transition Diagram)
- When the speed reached zero, Busy (executing) turns off, Done (completed) turns on, and the AxisStatus transitions to Standstill. (☞ Page 41 State Transition Diagram)
- When the continuous control FB is executed while this FB is being executed, operation depends on the control before this FB is executed.

Control before FB execution	Operation
Position control or homing control	An error occurs in the continuous control FB and the FB stops operation.
Velocity control or torque control	The control of this FB is switched to the continuous control FB when CommandAborted (execution aborted) turns on after deceleration stop.

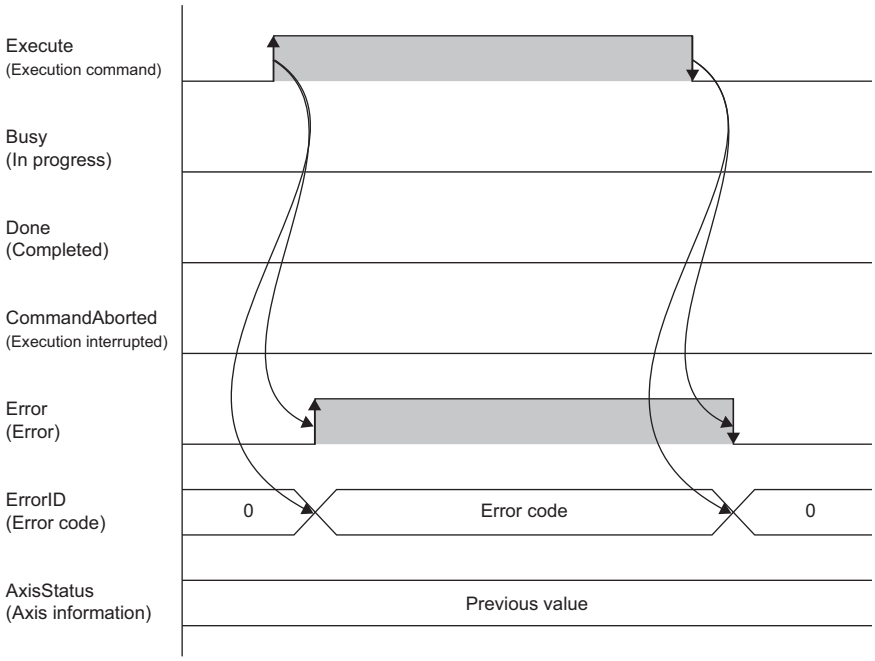
- When Execute is turned off while this FB is operating, the stop operation continues.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 96 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- The deceleration time input label is enabled only when executing velocity control. When executing positioning control, the deceleration time specified for the positioning control FB being executed is applied. For homing, the axis decelerates and stops according to the setting of [Homing acceleration (Obj.609AH)]. For torque control, the axis decelerates and stops based on the torque change amount set in [Torque slope (Obj.6087H)].
- While this FB is being executed, a new instance of MC_Halt_[Type] cannot be executed.
- While this FB is being executed, homing or positioning control FB cannot be executed.
- When the position control has been completed, this FB cannot be executed.

Parameter settings

To execute this FB, the parameters that correspond to objects such as the [Halt option code (Obj.605DH)] object must be set to the servo amplifiers. For details, refer to the following.

📖MR-J5 User's Manual (Function)

📖MR-JET User's Manual (Function)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	517ms	1.73ms	614 scans
FX5UJ CPU module	Axis 1	515ms	1.39ms	803 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	515ms	1.69ms	517 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing stop with the deceleration time (1500ms) set during operation at the operating speed (1000r/min).
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	513ms	2.18ms	315 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing stop with the deceleration time (1500ms) set during operation at the operating speed (1000r/min).
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	An error occurred in the servo amplifier.	Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	• When the position control has been completed, this FB cannot be executed. • While MC_Halt is being executed, do not execute another instance of MC_Halt. • Execute the operable FB to enable operation, then execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

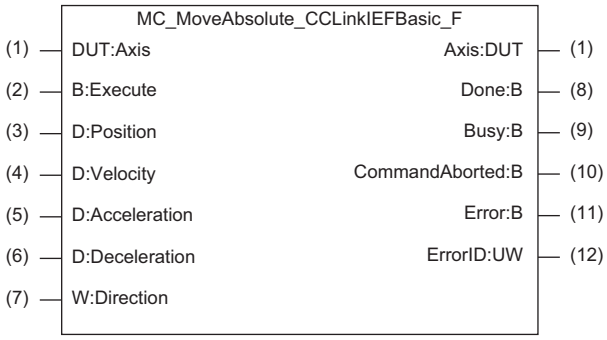
3.5 MC_MoveAbsolute_Type (Absolute Positioning)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB sets the target position based on the absolute position for the specified axis and executes positioning. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Position	Target position	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Specify the target position based on the absolute position.
(4)	Velocity	Velocity	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the speed command value.
(5)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to reach the rated rotation speed.
(6)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to stop rotation from the rated rotation speed.
(7)	Direction	Rotation direction	Word [signed]	Only when FB starts up	Page 25 List of Global Labels	Specify the rotation direction.

Output labels

No.	Label	Name	Data type	Default value	Description
(8)	Done	Completed	Bit	OFF	The on state indicates that the axis reached the target position.
(9)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(10)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(11)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(12)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

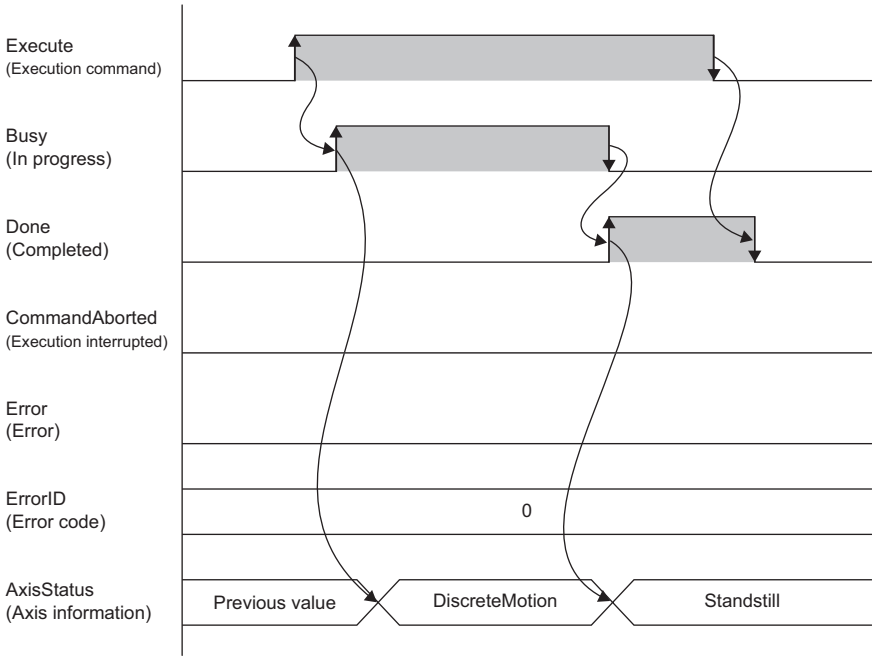
Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1561 steps ■FX5-SSC-G (standard station) 1595 steps ■FX5-SSC-G (motion control station) 1467 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.07K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.15K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

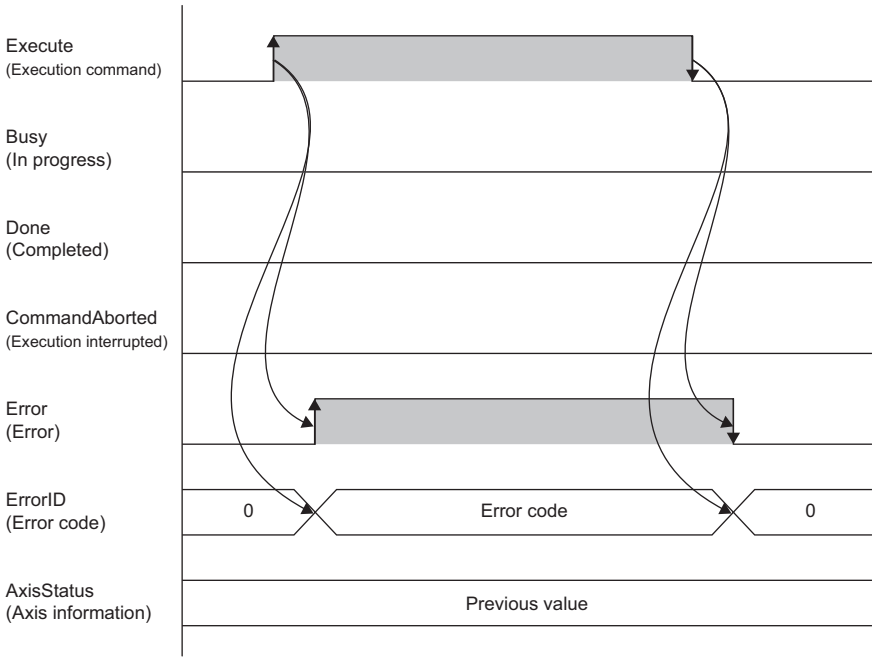
- When Execute (execution command) is turned on, this FB positions the specified axis in the target position set based on the absolute position. While absolute positioning is being executed, Busy (executing) turns on, and AxisStatus (axis status) of Axis (axis information) transitions to DiscreteMotion. When the axis is positioned completely, Busy turns off, Done (completed) turns on, and the AxisStatus transitions to Standstill. (☞ Page 41 State Transition Diagram)
- Direction (rotation direction) is enabled only when the control unit is degree. It is ignored when the control unit is other than degree.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 105 Error codes)
- Except for the FX5-SSC-G (motion control station), the actual rotation direction of the servo motor can be changed using the servo parameter [Pr.PA14_Travel direction selection].

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- To turn on and then turn off Execute (execution command), turn it off after Busy (executing) turns on.
- If MC_MoveAbsolute_[Type] is executed when the control unit is degree and this FB is operating, Direction (rotation direction) is disabled and the active rotation direction is transferred.

■FX5-SSC-G (motion control station)

- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- If this FB is executed in a state where "[Cd.183] Execution prohibition flag" of the motion module is turned on, starting is received (prefetching start), and positioning starts when "[Cd.183] Execution prohibition flag" is turned off. When canceling positioning control for which start has been received, use MC_Stop_CCLinkIETSN_MCS_F.

■Other than FX5-SSC-G (motion control station)

- Because this FB does not check the range of input labels, even if a value out of the range is set and executed, Error (error) does not turn on and Done (completed) turns on without executing positioning. In this case, [AL. 0F4_Positioning warning] will occur in the servo amplifier, so turn Execute off once, remove the cause of the warning, and then turn Execute on again.

Parameter settings

FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station)

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

FX5-SSC-G (standard station)

To use this FB, add mapping. Not doing so will disable Direction (rotation direction) of the input label.

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

■Adding mapping

Add [Positioning option code (Obj.60F2H: 00H)] to mapping by using GX Works3.

1. Open the module parameter setting window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Module Parameter (Network)]

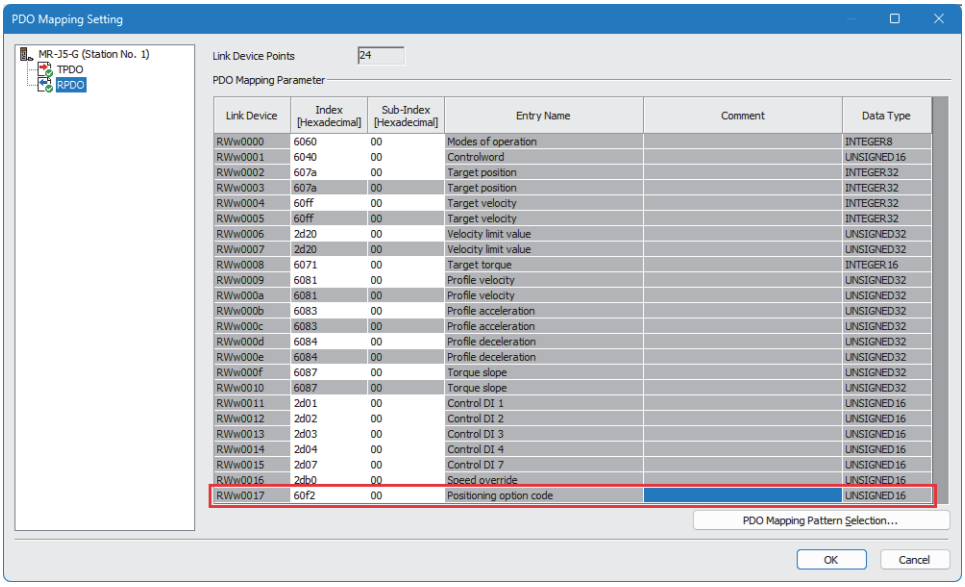
2. Open the network configuration window.

[Basic Settings] ⇨ [Network Configuration Settings] ⇨ "Detailed Setting"

3. Set PDO mapping.

[CC-Link IE TSN Configuration] ⇨ [PDO Mapping Setting] ⇨ "Detail Setting"

Select RPDO in the [PDO Mapping Setting] window and set 60f2 for Index and 00 for Subindex in PDO mapping parameter RWw0017. If nothing has been assigned to RWw0015 and RWw0016, assign 2byte GAP (Index = 0000, Subindex = 00) to each.



Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	2375ms	1.71ms	2527 scans
FX5UJ CPU module	Axis 1	2373ms	1.40ms	3255 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	2388ms	1.56ms	2129 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing absolute positioning immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2377ms	2.14ms	1349 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing absolute positioning immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2306ms	2.18ms	1283 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing absolute positioning immediately after homing, with the settings of the current position (0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target position (equivalent to 30 rotations of the motor axis), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_Home_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. • If a warning occurs in the servo amplifier, remove the cause of the warning, and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.
1209H	■FX5-SSC-G (motion control station) Overflow or underflow occurred to the travel distance value for the target position.	■FX5-SSC-G (motion control station) Execute again after adjusting the Position (target position) value.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

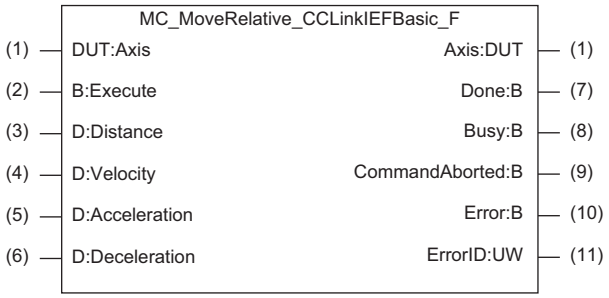
3.6 MC_MoveRelative_Type (Relative Positioning)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB moves the specified axis the set distance from its current command position. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Distance	Travel distance	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the travel distance.
(4)	Velocity	Velocity	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the speed command value.
(5)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to reach the rated rotation speed.
(6)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to stop rotation from the rated rotation speed.

Output labels

No.	Label	Name	Data type	Default value	Description
(7)	Done	Completed	Bit	OFF	The on state indicates that the axis reached the target position.
(8)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(9)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(10)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(11)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1532 steps ■FX5-SSC-G (standard station) 1566 steps ■FX5-SSC-G (motion control station) 1483 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.13K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

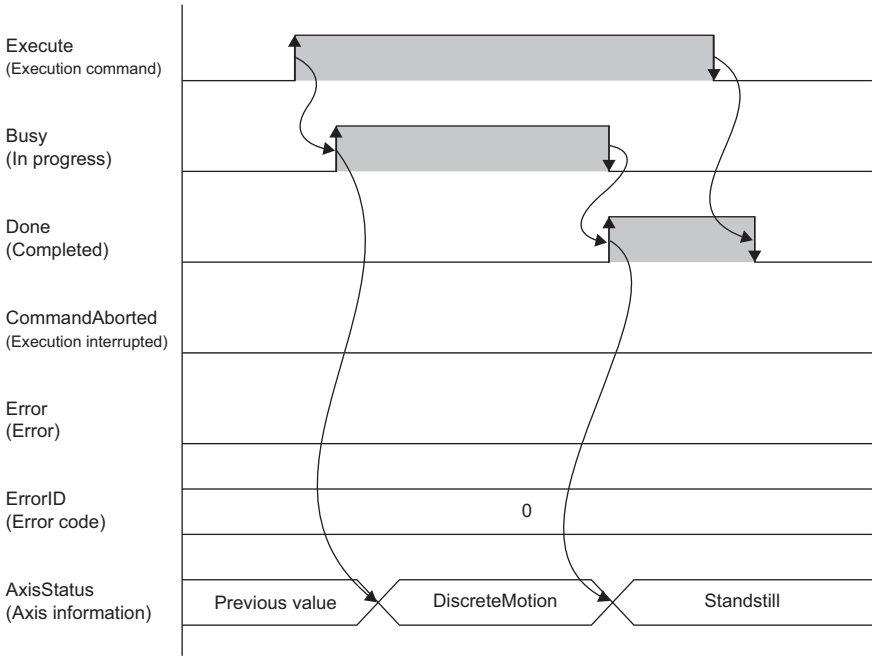
- When Execute (execution command) is turned on, this FB moves the specified axis the specified distance from its current command position. While relative positioning is being executed, Busy (executing) turns on, and AxisStatus (axis status) of Axis (axis information) transitions to DiscreteMotion. When the axis is positioned completely, Busy turns off, Done (completed) turns on, and the AxisStatus transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 113 Error codes)
- The travel direction of the FX5-SSC-G (motion control station) is determined by the sign of Distance (travel distance). For details, refer to the following.

MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

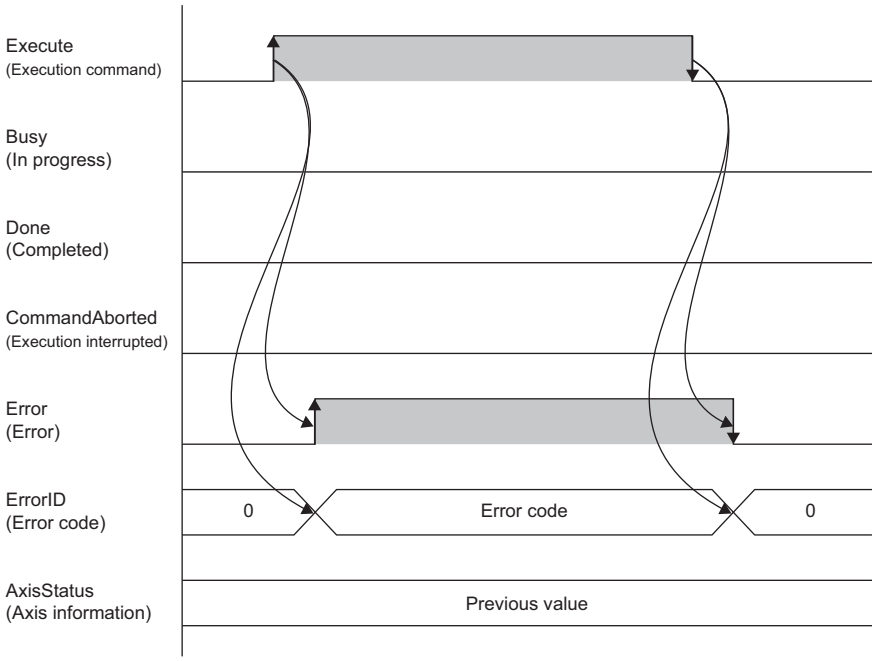
- Except for the FX5-SSC-G (motion control station), the actual rotation direction of the servo motor can be changed using the servo parameter [Pr.PA14_Travel direction selection].

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- To turn on and then turn off Execute (execution command), turn it off after Busy (executing) turns on.

■FX5-SSC-G (motion control station)

- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- If this FB is executed during automatic deceleration under position control, a warning deceleration/stop speed change (warning code: 0D50H) may occur.

■Other than FX5-SSC-G (motion control station)

- Because this FB does not check the range of input labels, even if a value out of the range is set and executed, Error (error) does not turn on and Done (completed) turns on without executing positioning. In this case, [AL. 0F4_Positioning warning] will occur in the servo amplifier, so turn Execute off once, remove the cause of the warning, and then turn Execute on again.
- This FB cannot be used to control an axis with the unit set to degree.
- This FB cannot be executed while the positioning control FB is being executed.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	2374ms	1.72ms	2551 scans
FX5UJ CPU module	Axis 1	2371ms	1.41ms	3287 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	2386ms	1.60ms	2141 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing relative positioning immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2373ms	2.06ms	1360 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing relative positioning immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2307ms	2.18ms	1284 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing relative positioning immediately after homing, with the settings of the current position (0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target position (equivalent to 30 rotations of the motor axis), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_Home_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. • If a warning occurs in the servo amplifier, remove the cause of the warning, and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.
1209H	■FX5-SSC-G (motion control station) Overflow or underflow occurred in the travel distance value.	■FX5-SSC-G (motion control station) Adjust the value set for Distance (travel distance), then execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

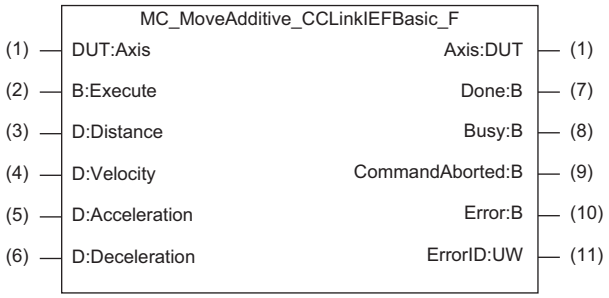
3.7 MC_MoveAdditive_Type (Target Position Change)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB adds the set relative position to the positioning command for the position just before the specified axis and executes positioning. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Distance	Travel distance	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the travel distance based on the relative position.
(4)	Velocity	Velocity	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the speed command value.
(5)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to reach the rated rotation speed.
(6)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to stop rotation from the rated rotation speed.

Output labels

No.	Label	Name	Data type	Default value	Description
(7)	Done	Completed	Bit	OFF	The on state indicates that the axis reached the target position.
(8)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(9)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(10)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(11)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1536 steps ■FX5-SSC-G (standard station) 1570 steps ■FX5-SSC-G (motion control station) 1226 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.13K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

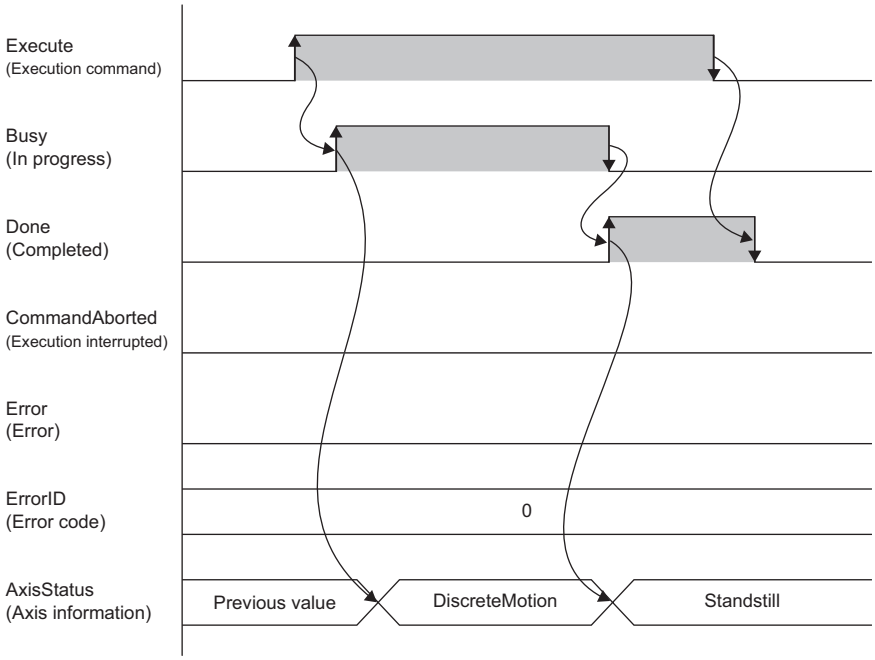
- When Execute (execution command) is turned on, this FB adds the set relative position to the positioning command for the position just before the specified axis and executes positioning. While positioning is being executed, Busy (executing) turns on, and AxisStatus (axis status) of Axis (axis information) transitions to DiscreteMotion. When the axis is positioned completely, Busy turns off, Done (completed) turns on, and the AxisStatus transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 121 Error codes)
- The travel direction of the FX5-SSC-G (motion control station) is determined by the sign of Distance (travel distance). For details, refer to the following.

MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

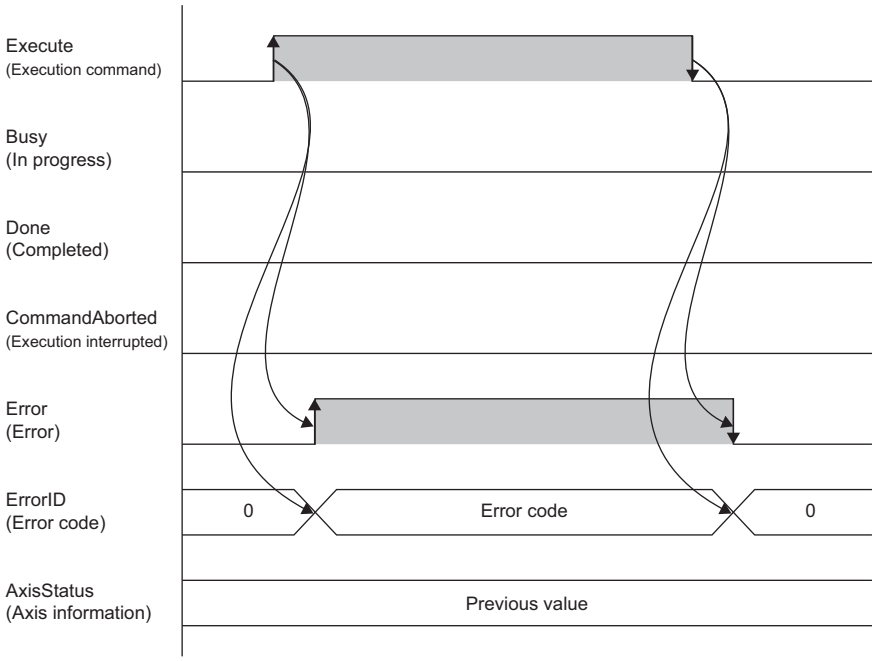
- Except for the FX5-SSC-G (motion control station), the actual rotation direction of the servo motor can be changed using the servo parameter [Pr.PA14_Travel direction selection].

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- To turn on and then turn off Execute (execution command), turn it off after Busy (executing) turns on.

■FX5-SSC-G (motion control station)

- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.

■Other than FX5-SSC-G (motion control station)

- Because this FB does not check the range of input labels, even if a value out of the range is set and executed, Error (error) does not turn on and Done (completed) turns on without executing positioning. In this case, a positioning warning (alarm number: F4) will occur in the servo amplifier, so turn Execute off once, remove the cause of the alarm, and then turn Execute on again.
- This FB cannot be used to control an axis with the control unit set to degree.
- If executing this FB during the positioning control, ensure that the value of Distance (travel distance) or Position (target position) from the most recently executed FB has been reflected in [Target position (Obj. 607AH)] mapped to the link device, then execute the FB. If the FB is executed before the reflection, the positioning will be executed based on the current value with the specified relative position added, regardless of the most recent positioning command.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	2373ms	1.70ms	2554 scans
FX5UJ CPU module	Axis 1	2370ms	1.41ms	3286 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	2380ms	1.54ms	2140 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing target position change immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2374ms	2.07ms	1360 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing relative positioning immediately after homing, with the settings of the current position (0 pulses), number of command input pulses per rotation (10000 pulses/rev), target position (300000 pulses), target speed (1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type and MCv_Home_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	2307ms	2.07ms	1325 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of changing the target position immediately after homing, with the settings of the current position (0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target position (equivalent to 30 rotations of the motor axis), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_Home_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. • If a warning occurs in the servo amplifier, remove the cause of the warning, and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.
1209H	■FX5-SSC-G (motion control station) Overflow or underflow occurred in the travel distance value.	■FX5-SSC-G (motion control station) Adjust the value set for Distance (travel distance), then execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

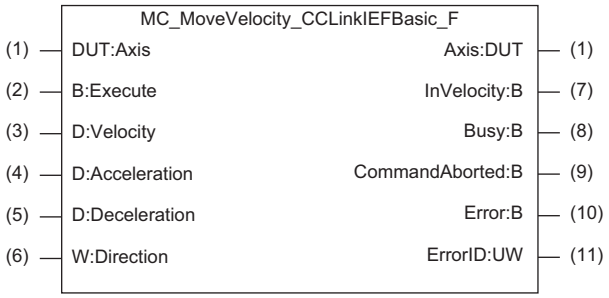
3.8 MC_MoveVelocity_Type (Velocity Control)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB controls speed of the specified axis at the set speed. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Velocity	Target speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the speed command value. A value can be set as signed.
(4)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to reach the rated rotation speed.
(5)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	■FX5-SSC-G (motion control station) • Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module. ■Other than FX5-SSC-G (motion control station) • Set the time to be taken by the servo motor to stop rotation from the rated rotation speed.
(6)	Direction	Rotation direction	Word [signed]	Only when FB starts up	Page 25 List of Global Labels	Specify the rotation direction. Select from the following two types of MC_DIRECTION_[Type] definitions. • mcPositiveDirection positive direction • mcNegativeDirection negative direction

Output labels

No.	Label	Name	Data type	Default value	Description
(7)	InVelocity	Target speed reached	Bit	OFF	Indicates that the specified speed was reached.
(8)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(9)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(10)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(11)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C5 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C5 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1449 steps ■FX5-SSC-G (standard station) 1460 steps ■FX5-SSC-G (motion control station) 843 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.07K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.07K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.10K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- When Execute (execution command) is turned on, this FB executes velocity control on the specified axis at the set speed. When processing starts normally, Busy (executing) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions to ContinuousMotion. When the axis operates in velocity control mode and the target speed is reached within the time set in Acceleration (acceleration time) or Deceleration (deceleration time), InVelocity (target speed reached) turns on. Busy and InVelocity are held until control is aborted. (☞ Page 41 State Transition Diagram)
- For the actual rotation direction, the operation is as follows depending on the combination of Velocity (target speed) and Direction (rotation direction).

Velocity (target speed)	Direction (rotation direction)	
	mcPositiveDirection	mcNegativeDirection
Positive value	Forward rotation	Reverse rotation
Negative value	Reverse rotation	Forward rotation

- When a new instance of MC_MoveVelocity_[Type] or MC_TorqueControl_[Type] is executed, the current execution is aborted to switch control.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 129 Error codes)

■FX5-SSC-G (motion control station)

- To stop the operation, MC_Stop_CCLinkIETSN_MCS_F is used. When the operation is aborted, CommandAborted (execution aborted) turns on. Note that CommandAborted (execution interrupted) is turned off by turning off Execute (execution command).

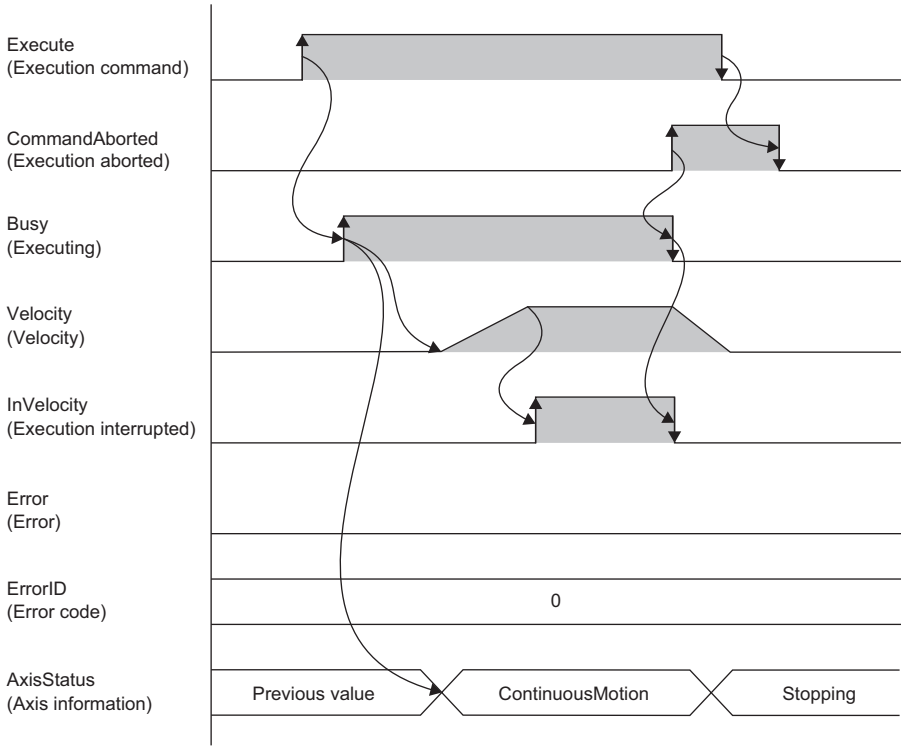
■Other than FX5-SSC-G (motion control station)

- To stop the operation, MC_Halt_[Type] is used. When the operation is aborted, CommandAborted (execution aborted) turns on. Note that CommandAborted is turned off by turning off Execute.
- Regarding the rotation direction of this FB, these examples assume that the servo parameter [Pr. PA14_Travel direction selection] is set to "0: Positioning address increasing CCW rotation" (initial value).

Timing chart of I/O signals

■Completed successfully

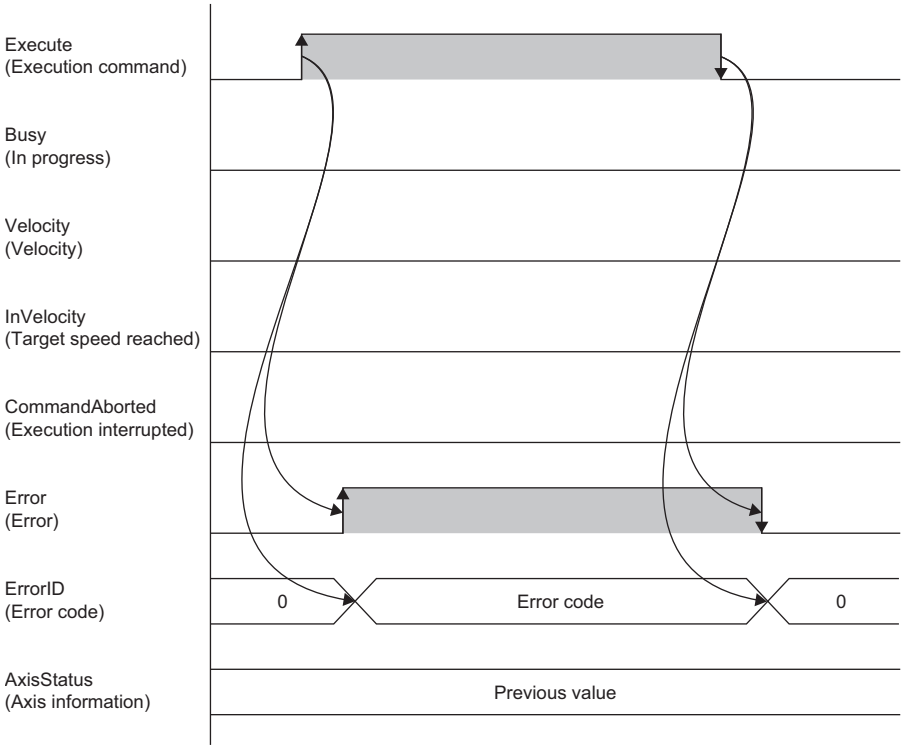
If MC_Stop_[Type] is executed while this FB is being executed, the operation is as follows.



Velocity (velocity) can be checked as follows.

- FX5-SSC-G (motion control station): "[Md.122] Speed during command" of the motion module
- Other than FX5-SSC-G (motion control station): [Velocity actual value (Obj. 606CH)] of the servo amplifier

■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- When switching the mode from the velocity control mode to the torque control mode, the motor speed may fluctuate momentarily. Therefore, it is recommended to switch the mode from the velocity control mode to the torque control mode after stopping the motor.

■FX5-SSC-G motion control station

- If a new MC_MoveVelocity_CCLinkIETSN_MCS_F is executed while this FB is being executed (AxisStatus (axis status) of Axis (axis information) is ContinuousMotion.), Acceleration (acceleration time) and Deceleration (deceleration time) are not loaded.

■Other than FX5-SSC-G (motion control station)

- This FB cannot be used for multi-axis servo amplifiers.
- InVelocity (target speed reached) turns on when the following condition is satisfied:

Velocity (target speed) - $\alpha^{*1} \leq$ Velocity actual value (current speed) $\leq$ Velocity (target speed) + α^{*1}

*1 α: Velocity (target speed) $\times$ 0.05 + 2000 [$\times 10^{-2}$r/min]

If InVelocity (target speed reached) does not turn on even after the specified time (acceleration time or deceleration time) has elapsed, check Velocity actual value (current speed) and the values input to the input labels of this FB. For Velocity actual value (current speed), refer to the following.

☞ Page 37 Link Devices

Parameter settings

FX5-SSC-G (motion control station)

For details on the parameter settings required to use this FB, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Other than FX5-SSC-G (motion control station)

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	504ms	1.67ms	575 scans
FX5UJ CPU module	Axis 1	503ms	1.45ms	757 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	504ms	1.50ms	492 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing speed time for the first time, with the settings of the target speed (1000r/min) and acceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	504ms	1.93ms	307 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing speed time for the first time, with the settings of the target speed (1000r/min) and acceleration time (1500ms).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	512ms	2.08ms	306 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing speed control for the first time, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target speed (equivalent to 1000r/min), and acceleration time (1500ms).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_Home_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1201H	■FX5-SSC-G (motion control station) • The servo amplifier is powered off or the servo amplifier is not connected.	■FX5-SSC-G (motion control station) • Check that the servo amplifier is powered on. • Check that the servo amplifier and communication cable are connected.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. ■FX5 CPU module, FX5-ENET • Use the servo amplifier with firmware version C5 or later.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	November 2021	Added firmware version determination for servo amplifiers
02A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

3.9 MC_TorqueControl_Type (Torque Control)

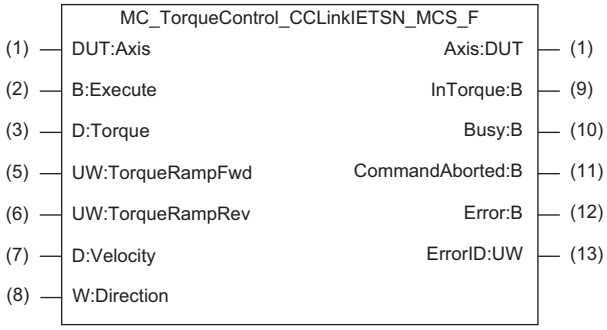
Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

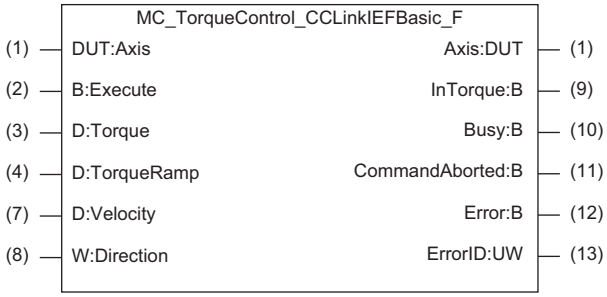
Overview

This FB executes torque control on the specified axis with the set torque.

For FX5-SSC-G (motion control station)



For other than FX5-SSC-G (motion control station)



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Torque	Target control	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the specified torque. Set the ratio against the rated torque of the servo motor used in units of percent.
(4)	TorqueRamp [Other than FX5-SSC-G (motion control station)]	Torque change amount	Double word [signed]	Only when FB starts up	0 to 10000000 [$\times 10^{-1}$%/s]	Set the torque variation amount per one second of torque command in increments of 0.1%/s. When 0 is set, the torque command is input in steps.
(5)	TorqueRampFwd [FX5-SSC-G (motion control station)]	Positive direction torque time constant	Word [unsigned]/bit string [16 bits]	Only when FB starts up	0 to 65535 [ms]	Set the time for the torque to become the value set in "[Pr.17] Torque limit setting value" for the motion module from 0.
(6)	TorqueRampRev [FX5-SSC-G (motion control station)]	Negative direction torque time constant	Word [unsigned]/bit string [16 bits]	Only when FB starts up	0 to 65535 [ms]	Set the time for the torque to become 0 from the value set in "[Pr.17] Torque limit setting value" for the motion module.
(7)	Velocity	Speed limit	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the speed limit value in torque control mode.
(8)	Direction	Rotation direction	Word [signed]	Only when FB starts up	Page 25 List of Global Labels	Specify the rotation direction. Select from the following two types of MC_DIRECTION_[Type] definitions. • mcPositiveDirection positive direction • mcNegativeDirection negative direction

Output labels

No.	Label	Name	Data type	Default value	Description
(9)	InTorque	Target torque reached	Bit	OFF	Indicates that the specified torque was reached.
(10)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(11)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(12)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(13)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C5 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C5 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 1384 steps ■FX5-SSC-G (standard station) 1395 steps ■FX5-SSC-G (motion control station) 888 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.05K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.06K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.11K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- When Execute (execution command) is turned on, this FB controls torque on the specified axis with the set torque. When processing starts normally, Busy (executing) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions to ContinuousMotion. When the axis operates in the torque control mode and the target torque is reached, InTorque (target torque reached) turns on. Busy (executing) and InTorque are held until control is aborted. (☞ Page 41 State Transition Diagram)
- For the actual rotation direction, the operation is as follows depending on the combination of Torque (target torque) and Direction (rotation direction). In the example, the servo parameter [Pr. PC29.3_Torque POL reflection selection] is set to "1: Disabled" (initial value) and [Pr. PA14_Travel direction selection] is set to "0: Positioning address increasing CCW rotation" (initial value).

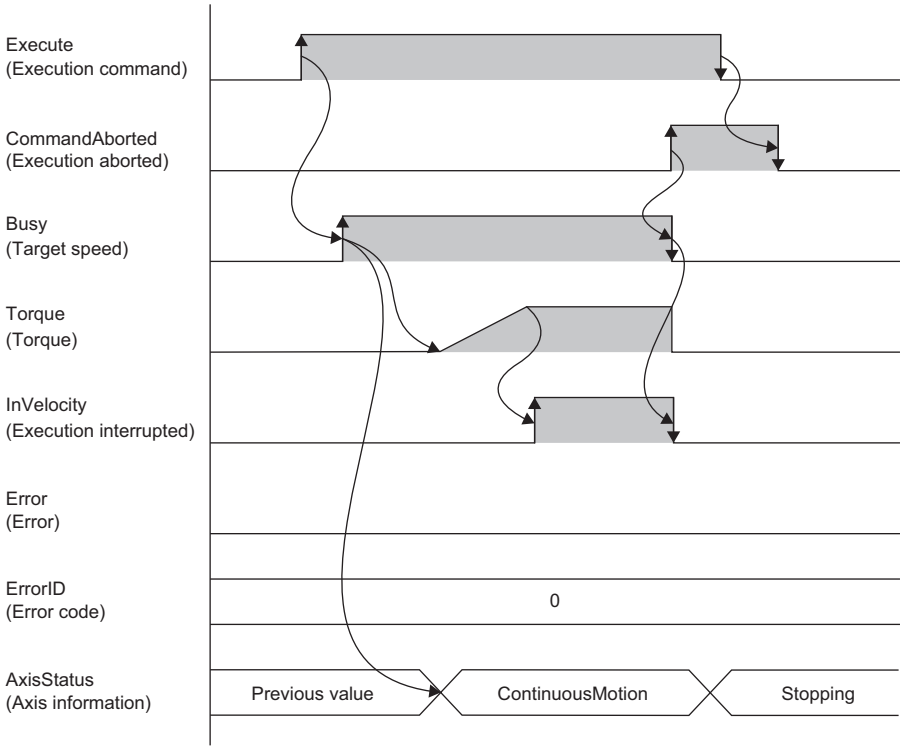
Torque (target torque)	Direction (rotation direction)	
	mcPositiveDirection	mcNegativeDirection
Positive value	Forward rotation	Reverse rotation
Negative value	Reverse rotation	Forward rotation

- When a new instance of MC_MoveVelocity_[Type] or MC_TorqueControl_[Type] is executed, the current execution is aborted to switch control.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 138 Error codes)
- To stop the operation of the FX5-SSC-G (motion control station), MC_Stop_CCLinkIETSN_MCS_F is used. When the operation is aborted, CommandAborted (execution aborted) turns on. Note that CommandAborted (execution interrupted) is turned off by turning off Execute (execution command).
- To stop the operation of a device other than the FX5-SSC-G (motion control station), MC_Halt_[Type] is used. When the operation is aborted, CommandAborted (execution aborted) turns on. Note that CommandAborted is turned off by turning off Execute.

Timing chart of I/O signals

■Completed successfully

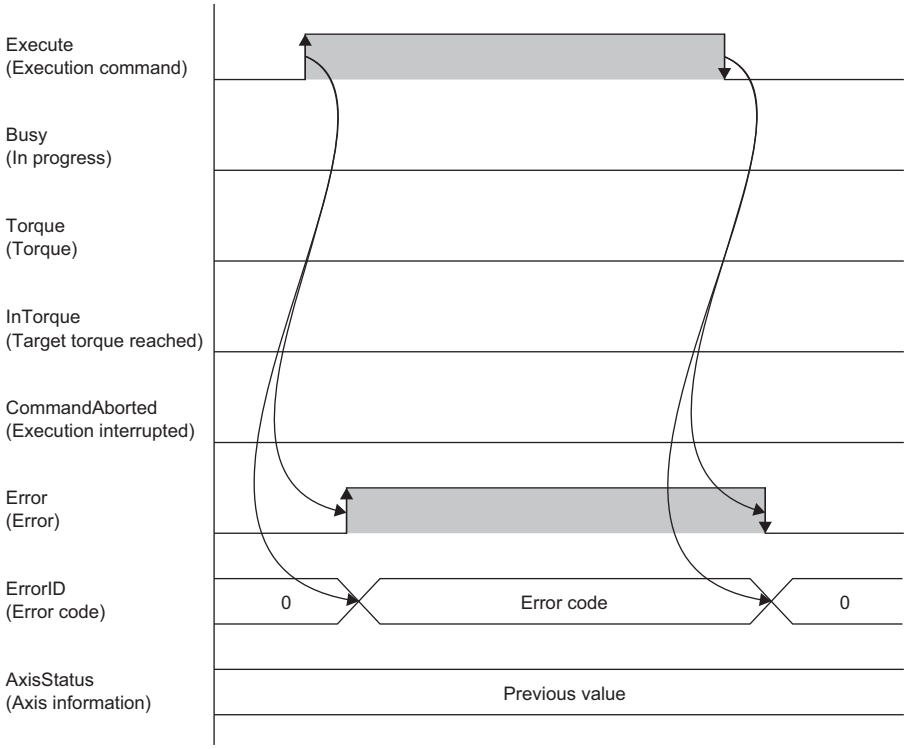
If MC_Stop_[Type] is executed while this FB is being executed, the operation is as follows.



Torque (torque) can be checked as follows.

- FX5-SSC-G (motion control station): "[Md.109] Arbitrary data monitoring output 1" of the motion module
- Other than FX5-SSC-G (motion control station): [Torque actual value (Obj. 6077H)] of the servo amplifier

■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- If a new MC_TorqueControl_CCLinkIETSN_MCS_F is executed while this FB is being executed (AxisStatus (axis status) of Axis (axis information) is ContinuousMotion.) on the FX5-SSC-G motion control station, positive direction torque time constant (TorqueRampFwd) and negative direction torque time constant (TorqueRampRev) are not loaded.
- For devices other than the FX5-SSC-G (motion control station), this FB cannot be used with multi-axis servo amplifiers.

Parameter settings

FX5-SSC-G (motion control station)

To use this FB, configure simple motion module settings. Not doing so will disable TorqueRampFwd (positive direction torque time constant)/TorqueRampRev (negative direction torque time constant) of the input label and InTorque (target torque reached) of the output label.

For details on other required parameter settings, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

■Simple motion module settings

The following shows an example using axis 1. When using an axis other than axis 1, configure similar settings for the axis to be used.

1. Open the Simple motion module setting window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Simple Motion Module Setting (Module Extended Parameter)]

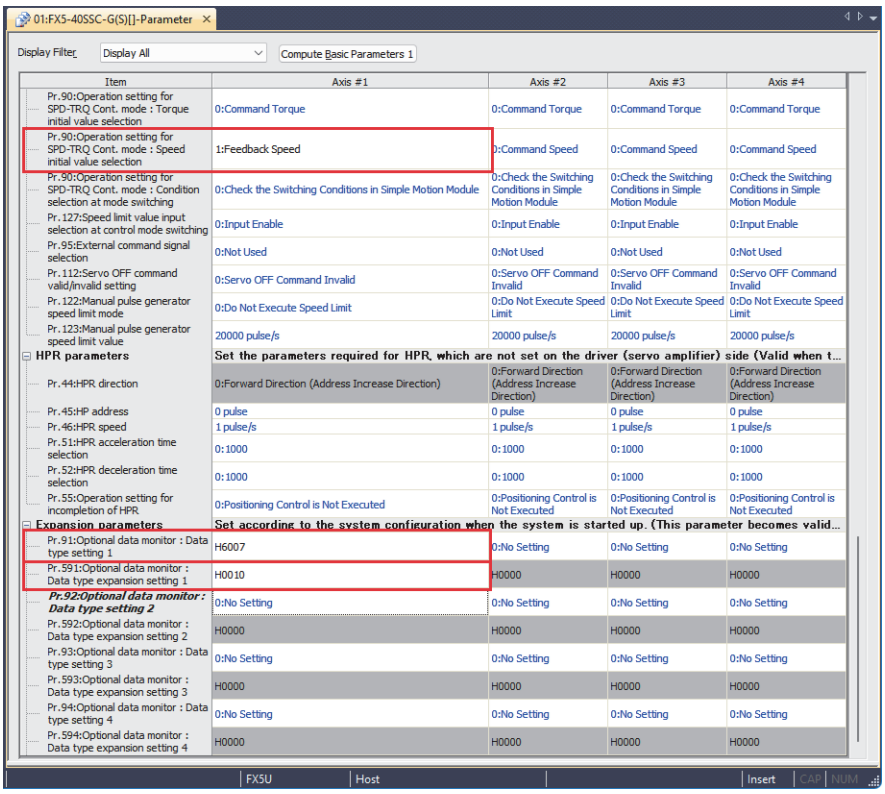
2. Set the initial value for the torque.

Set "Pr.90: Operation setting for speed-torque control mode: Torque initial value selection" to "1: Feedback torque".

3. Set an arbitrary data monitor.

To use arbitrary data monitor output 1, set to Pr.91, Pr.591.

- Set "Pr.91: Optional data monitor: Data type setting 1" to "H6077" (Torque actual value).
- Set "Pr.591: Optional data monitor: Data type expansion setting 1" to "H0010" (subindex: 00H, size 1 [Word]).



Other than FX5-SSC-G (motion control station)

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	17.6ms	1.47ms	14 scans
FX5UJ CPU module	Axis 1	15.1ms	1.18ms	17 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	16.7ms	1.33ms	13 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing torque control for the first time, with the settings of the target torque (0.1%) and torque change amount (100%/s).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	13.3ms	1.99ms	9 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing torque control for the first time, with the settings of the target torque (0.1%) and torque change amount (100%/s).
*4 This refers to the performance value in combination with MC_Power_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	14.9ms	2.03ms	9 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing torque control for the first time, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), target torque (0.1%), positive direction torque time constant (1000ms), negative direction torque time constant (1000ms), and speed limit (210000000 pulses/s).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_Home_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1201H	■FX5-SSC-G (motion control station) • The servo amplifier is powered off or the servo amplifier is not connected.	■FX5-SSC-G (motion control station) • Check that the servo amplifier is powered on. • Check that the servo amplifier and communication cable are connected.
1202H	■FX5-SSC-G (motion control station) • An error occurred in the motion module. ■Other than FX5-SSC-G (motion control station) • An error occurred in the servo amplifier.	■FX5-SSC-G (motion control station) • Clear the error in the motion module, and execute the FB again. ■Other than FX5-SSC-G (motion control station) • Clear the error in the servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again. ■Other than FX5-SSC-G (motion control station) • For the axis operation FB, execute it again after the active control operation is completed. • Execute the operable FB to enable operation, then execute the FB again. ■FX5 CPU module, FX5-ENET • Use the servo amplifier with firmware version C5 or later.
1204H	The axis is in the Stopping state.	Change the status of the axis to the StandStill state, and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	November 2021	Added firmware version determination for servo amplifiers
02A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

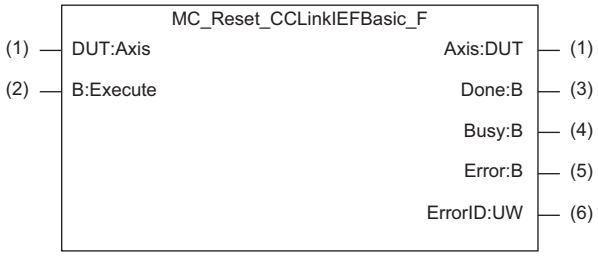
3.10 MC_Reset_Type (Axis Error Reset)

Target modules by type are shown below.

Type	Module
CCLinkIEFBasic_F	FX5 CPU module, FX5-ENET
CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

This FB clears the error in the specified axis. For the following FB, an example with Type: CCLinkIEFBasic_F is shown.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 30 AXIS_REF_CCLinkIEFBasic_F Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that reset is completed.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C5 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

Item	Description
Number of steps	■FX5 CPU module, FX5-ENET 770 steps ■FX5-SSC-G (standard station) 811 steps ■FX5-SSC-G (motion control station) 449 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module, FX5-ENET • Label: 0.03K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.04K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.07K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

■FX5-SSC-G (motion control station)

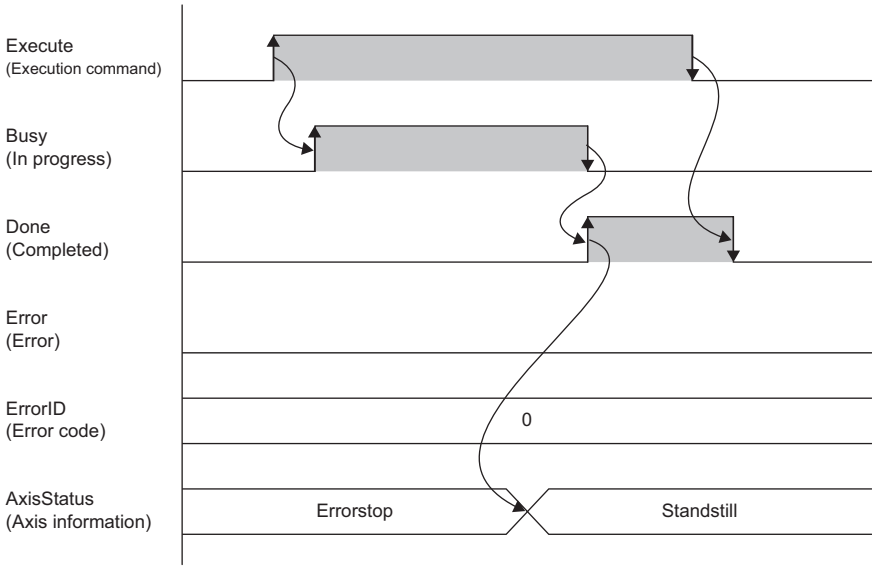
- When Execute (execution command) is turned on, this FB clears errors and warnings on both the motion module side and servo amplifier side of the specified axis. When the process for clearing errors and warnings starts, Busy (executing) turns on. When the process for clearing errors and warnings is completed, Busy (executing) turns off, Done (completed) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions from Errorstop according to the following conditions.
  - If MCv_AllPower_CCLinkIETSN_MCS_F is being executed: Standstill
  - If MCv_AllPower_CCLinkIETSN_MCS_F is not being executed: Disabled
- Even if Execute (execution command) is turned on while the cause of the error or warning in the axis remains, the error or warning will not be cleared, and Busy (executing) will remain on. To try to clear errors again, turn off Execute (execution command) temporarily, clear the cause of the error or warning, and then turn on Execute (execution command) again.
- When "[Pr.82] Forced stop valid/invalid selection" is set to "2: Valid (Buffer memory)", errors and warnings detected on the servo amplifier side are not cleared while "[Cd.158] Forced stop input" of the motion module is set to "0: Forced stop ON (Forced stop)", even by turning on Execute (execution command). In this case, Busy (executing) remains turned on. Turn off Execute (execution command) temporarily, set "[Cd.158] Forced stop input" to "1: Forced stop OFF (Forced stop release)", then turn on Execute (execution command) again.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 145 Error codes)

■Other than FX5-SSC-G (motion control station)

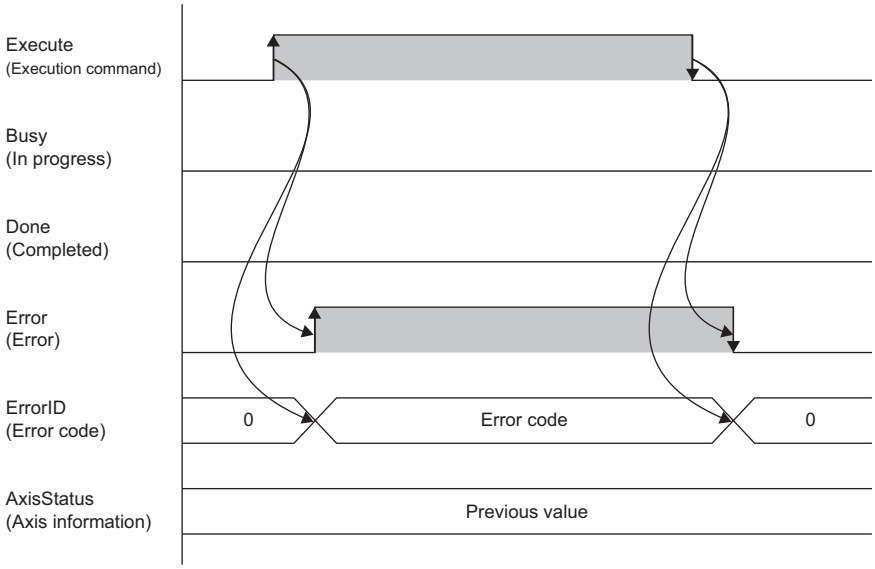
- When Execute (execution command) is turned on, this FB clears the error (alarm, warning) in the specified axis. When this FB starts clearing the error, Busy (executing) turns on, and when the error is cleared completely, Busy turns off, Done (completed) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions from Errorstop according to the following conditions. (☞ Page 41 State Transition Diagram)
  - If an operable FB is being executed: Standstill
  - If an operable FB is not being executed: Disabled
- Even if Execute is turned on while the cause of the error in the axis remains, the error will not be cleared, and Busy will remain turned on. To try to clear errors again, turn off Execute once, clear the cause of the error, and then turn on Execute again.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 145 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)

■FX5-SSC-G (motion control station)

- For details on how to clear the cause of an error or warning that occurred on the motion module, refer to the following.

📖 User's manual for the motion module

📖 User's manual for the servo amplifier

- In this FB, if the error cannot be cleared, Busy (executing) remains turned on and Done (completed) does not turn on. Create separate time-out processing for when errors cannot be cleared. Refer to "Processing Time" in the following manual to set the timeout time.

📖MELSEC iQ-F FX5 Motion Module User's Manual (CC-Link IE TSN)

■Other than FX5-SSC-G (motion control station)

- For details on how to clear an error cause, refer to the manuals for the servo amplifiers used.
- In this FB, if the error cannot be cleared, Busy (executing) remains turned on and Done (completed) does not turn on. Create separate time-out processing for when errors cannot be cleared. Refer to "Processing Time" in the following manuals to set the timeout time.

📖CC-Link IE Field Network Basic Reference Manual

📖User's manual (CC-Link IE TSN) of the module to be used

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	19.5ms	1.40ms	16 scans
FX5UJ CPU module	Axis 1	20.2ms	1.08ms	20 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	21.2ms	1.31ms	14 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing an axis error reset while an error is occurring.
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	14.1ms	1.90ms	8 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing an axis error reset while an error is occurring.
*4 This refers to the performance value in combination with MC_Power_Type and MC_MoveVelocity_Type required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	29.9ms	1.97ms	13 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing an axis error reset while an error is occurring.
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, and MC_MoveVelocity_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5 CPU module, FX5-ENET, FX5-SSC-G (motion control station) • The READY signal is off. ■FX5-SSC-G (standard station) • A data link error has occurred.	■FX5 CPU module, FX5-ENET • Turn on the cyclic communication ready command (RY3F). • Clear the error in the Ethernet-equipped module, and execute the FB again. ■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1203H	■FX5-SSC-G (motion control station) • The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

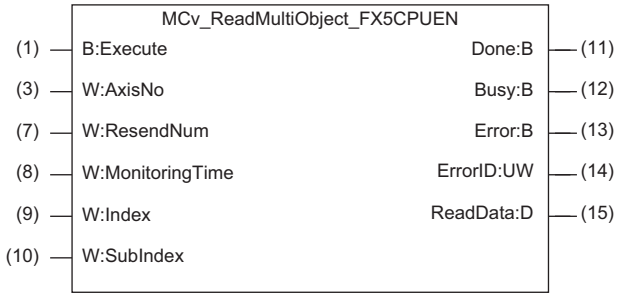
3.11 MCv_ReadMultiObject_Model (Multiple Object Read)

Name	Module
MCv_ReadMultiObject_FX5CPUEN	FX5 CPU module
MCv_ReadMultiObject_FX5ENET	FX5-ENET
MCv_ReadMultiObject_FX5SSCG_SS_F	FX5-SSC-G (standard station)
MCv_ReadMultiObject_FX5SSCG_MCS_F	FX5-SSC-G (motion control station)

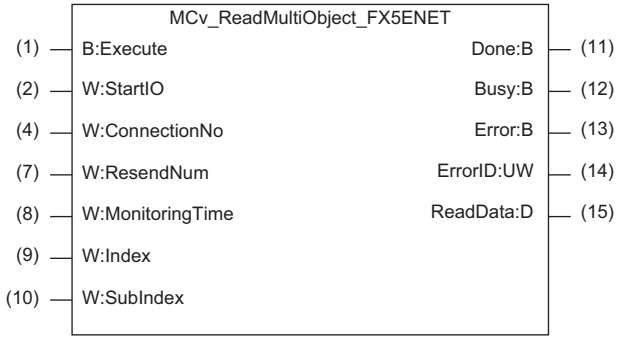
Overview

This FB reads multiple objects from the servo amplifiers.

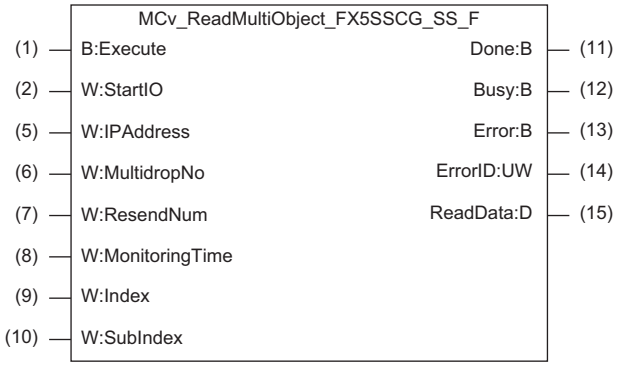
- FX5 CPU module



- FX5-ENET



- FX5-SSC-G (standard station), FX5-SSC-G (motion control station)



Labels

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(1)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(2)	StartIO [Other than FX5 CPU module]	Module number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specifies the master module number. ■FX5UJ CPU module 01H to 08H ■FX5U CPU module, FX5UC CPU module 01H to 10H
(3)	AxisNo [FX5 CPU module]	Axis number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specifies the axis number of the axis to be controlled. ■FX5S CPU module, FX5UJ CPU module 1 to 8 [axis] ■FX5U CPU module, FX5UC CPU module 1 to 16 [axis]
(4)	ConnectionNo [FX5-ENET]	Connection number	Word [signed]	Only when FB starts up	1 to 32	Specifies the axis number of the axis to be controlled.
(5)	IPAddress [FX5-SSC-G (standard station), FX5-SSC-G (motion control station)]	IP Address	Word [signed] (0..3)	Only when FB starts up	0.0.0.1 to 223.255.255.254	Specifies the IP address of the axis to be controlled. ■Input example (when the address is 192.168.3.1) [3] = 192 [2] = 168 [1] = 3 [0] = 1
(6)	MultidropNo [FX5-SSC-G (standard station), FX5-SSC-G (motion control station)]	Multi-drop number	Word [signed]	Only when FB starts up	0 to 2	Specifies the multi-drop number of the axis to be controlled. Specify 0 when there is no multi-drop number.
(7)	ResendNum	Number of resends	Word [signed]	Only when FB starts up	0 to 15 [time]	Set the number of resends for SLMP frame transmission.
(8)	MonitoringTime	Arrival monitoring time	Word [signed]	Only when FB starts up	1 to 32767 [second]	Set the arrival monitoring time for SLMP frame transmission.
(9)	Index	Index number	Word [signed] (0..31)	Always	0000H to FFFFH*1	Set the index number of the object using an array of 32 elements. An array for which 0 is specified is ignored.
(10)	SubIndex	Subindex number	Word [signed] (0..31)	Always	0 to 255*1	Set the subindex number of the object using an array of 32 elements.

*1 For details on the object dictionary, refer to the following.
MR-J5-G/MR-J5W-G User's Manual (Object Dictionary)
MR-JET-G User's Manual (Object Dictionary)

Output labels

No.	Label	Name	Data type	Default value	Description
(11)	Done	Completed	Bit	OFF	The on state indicates that reading has been completed.
(12)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(13)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(14)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(15)	ReadData	Read data storage destination	Double word [signed] (0..31)	0	Stores the data of the object using an array of 32 elements. If the size of the object is less than 4 bytes, the sign-extended value is stored.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

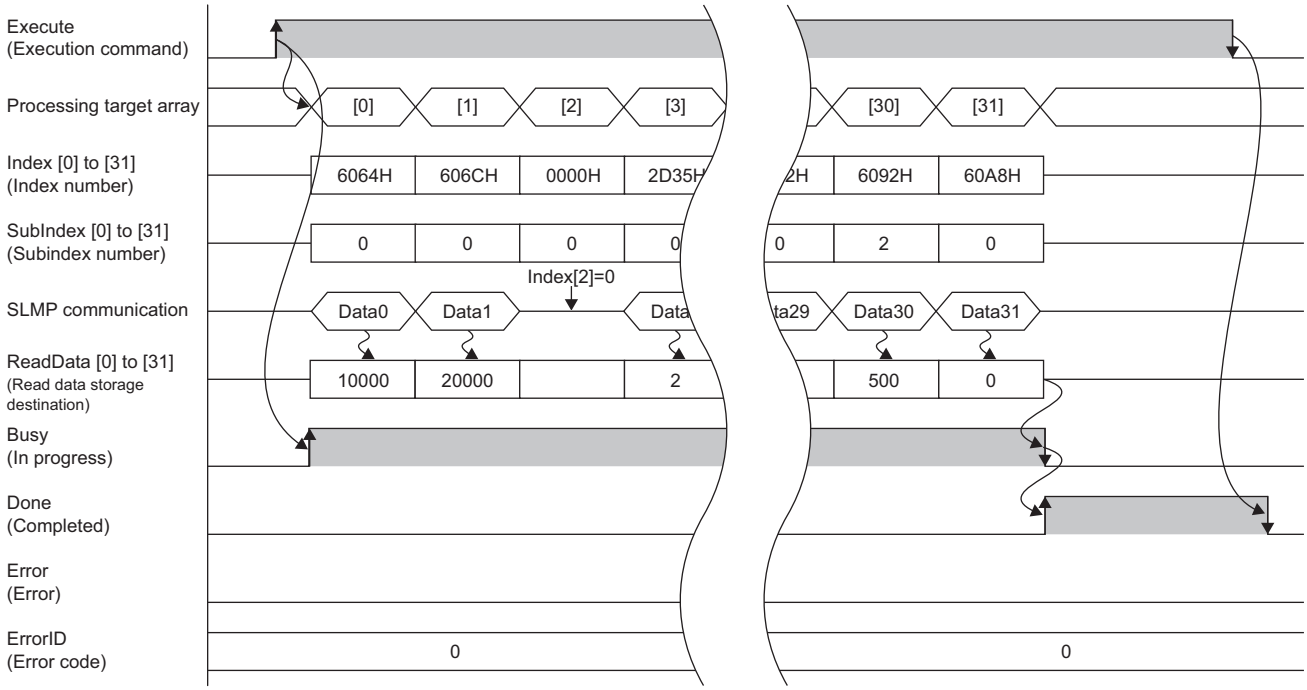
Item	Description
Number of steps	■FX5 CPU module 863 steps ■FX5-ENET 1346 steps ■FX5-SSC-G (standard station) 878 steps ■FX5-SSC-G (motion control station) 878 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module • Label: 0.20K points (Word) • Latch label: 0K points (Word) ■FX5-ENET • Label: 0.20K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.19K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.19K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

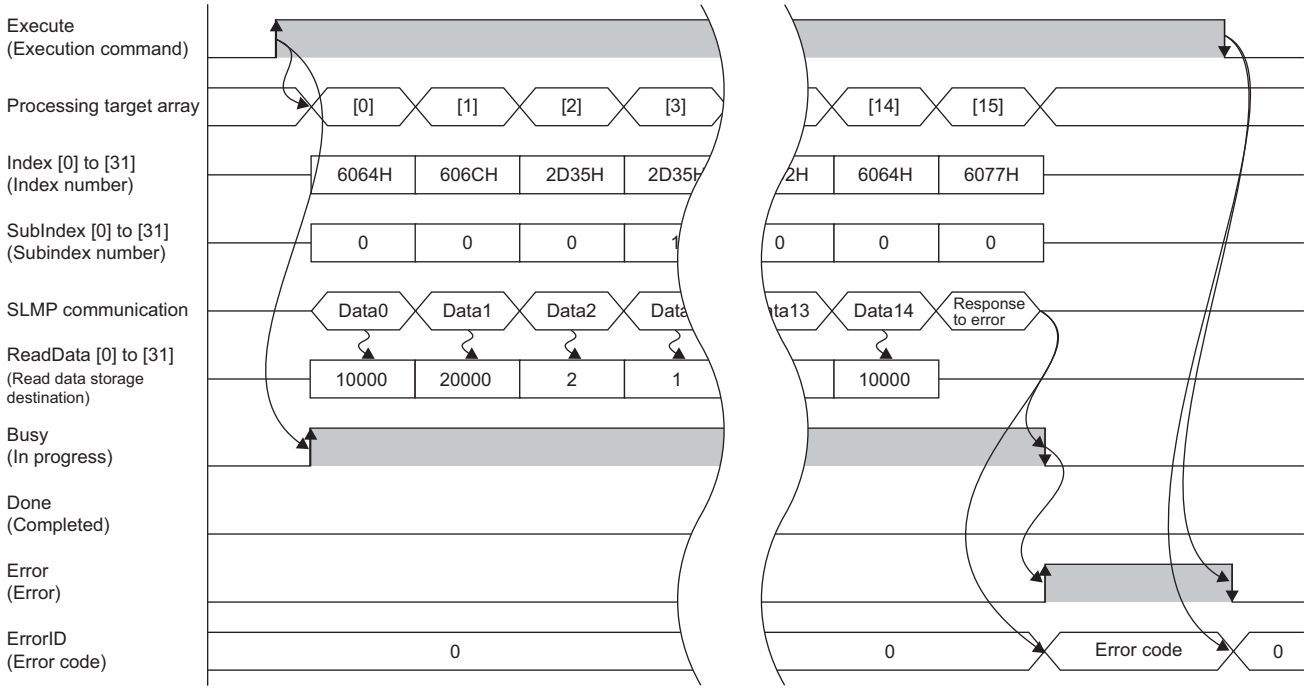
- When Execute (execution command) is turned on, this FB reads multiple objects from the selected servo amplifier. This FB reads 32 objects through SLMP communications according to the data set in the arrays of Index (index number) and SubIndex (subindex number). An array with 0 specified for Index is ignored, and read processing is not performed. In this state, the storage destination ReadData (read data storage destination) is an undefined value.
- During read processing, Busy (executing) turns on, and objects are read in order from the beginning of the array. When all the reads are completed successfully, the read data is stored in ReadData (read data storage destination), Busy is turned off, and Done (completed) turns on.
- If an error occurs in the FB, the FB stops reading, turns Error (error) on, and stores the error code in ErrorID (error code). (For example, if an error occurs in the read processing for Index [15], the FB does not read the remaining Indexes [16] to [31].) (☞ Page 154 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses the following instructions.

Module	Instruction
FX5 CPU module	SLMPSND instruction*1*4
FX5-ENET	GP.SOCSND instruction, GP.SOCRCV instruction*2
FX5-SSC-G (standard station)	GP.SLMPSND instruction*3
FX5-SSC-G (motion control station)	GP.SLMPSND instruction*3

*1 Timing when communications start varies depending on the conditions with which the SP.SLMPSND instructions are executed. If the SP.SLMPSND instruction is executed independently, communications start immediately. If multiple SP.SLMPSND instructions are executed at the same time, communications by the SP.SLMPSND instruction executed earlier are completed, and then communications by the SP.SLMPSND instruction executed later start. Therefore, do not turn off the execution condition of the SP.SLMPSND instruction of this FB or the user program until communications are completed.

*2 This FB and the GP.SOCSND instruction or the GP.SOCRCV instruction cannot be executed at the same time using the same connection number. Release the interlock if they are executed at the same time because communications cannot be performed normally.

*3 This FB uses channel 2 for its own station. If multiple FBs are executed at the same time, the interlock is released within the FB. After communication by the first FB that was executed is completed, the FB executed later starts communication. If the GP.SLMPSND instruction is executed at the same time as this FB using the same channel, communications cannot be performed normally, so release the interlock by using a user program.

*4 If the object read/write FB is executed for each of multiple axes, turn on the execution condition of the FB while maintaining two or more scan intervals between each execution.

- Do not change while this FB is being executed because this FB uses the following special registers.

Module	Special register
FX5 CPU module	• SD11126 (diagnostic information display request) • SD11127 (diagnostic request information) • SD11131 (IP address [lower]) • SD11132 (IP address [upper])
FX5-ENET	SD412 (one-second counter)

Parameter settings

SLMP communication settings can be used with FX5 CPU module and FX5-ENET. There are no parameters specific to this FB for FX5-SSC-G (standard station) and FX5-SSC-G (motion control station).

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

SLMP communication setting

Since the object read/write FB reads/writes servo amplifier objects through SLMP, perform the SLMP communication setting.

■CPU module

1. Open the Ethernet port setting window.

[Navigation window] ⇨ [Parameter] ⇨ CPU module ⇨ [Module Parameter] ⇨ [Ethernet port]

2. Set the communication data code to "Binary".*1

[Basic Settings] ⇨ [Own Node Settings] ⇨ [Communication Data Code]

*1 Since the initial value of the communication data code is "binary", it is usually not necessary to set it.

■FX5-ENET

1. Open the Ethernet port setting window.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Ethernet module name

2. Open the Ethernet configuration (built-in Ethernet port) window.

[Basic Settings] ⇨ [External Device Configuration] ⇨ "Detailed Setting"

3. Add UDP connection devices.

Add the same number of the UDP connection devices as the number of the servo amplifiers controlled by the object reading FB.

4. Set a port number for an Ethernet-equipped module and IP addresses and port numbers for the UDP connection devices (axis 1 and axis 2).

Connection number	Programmable controller	Sensor/Device	
	Port No.*1	IP Address	Port No.
1	2000	192.168.3.1	5010
2	2001	192.168.3.2	5010

*1 Can be changed within the setting range of the Ethernet-equipped module.

Performance values

FX5 CPU module, FX5-ENET

CPU module	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	271ms	1.59ms	476 scans
FX5UJ CPU module	Axis 1	264ms	1.13ms	618 scans
FX5U CPU module*1*2 FX5UC CPU module*1*2	Axis 1	279ms	0.80ms	593 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object read processing for 32 objects (Index: 6064H, SubIndex: 0H).

FX5-SSC-G (standard station)

CPU module*1*2	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	397ms	1.70ms	318 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object read processing for 32 objects (Index: 6064H, SubIndex: 0H).

FX5-SSC-G (motion control station)

CPU module*1*2	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5U CPU module FX5UC CPU module	Axis 1	317ms	1.02ms	620 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object read processing for 32 objects (Index: 6064H, SubIndex: 0H).

Error codes

Error code	Description	Action
■FX5-ENET Error code for socket communications function instruction, error code when SLMP communications ended with an error ■Other than FX5-ENET Error code for SLMP frame sending instruction	■FX5 CPU module, FX5-ENET Refer to the following. MELSEC iQ-F FX5 User's Manual (Communication) For error codes other than those described, refer to the user's manual (Communication Function) for the servo amplifier to be used. ■FX5-SSC-G (standard station), FX5-SSC-G (motion control station) For 1000H to 3FFFH and D000H to DFFFH, refer to the following. MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application) For 4000H to 4FFFH, refer to the following. MELSEC iQ-F FX5 User's Manual (Application) For error codes other than those described, refer to the user's manual (Communication Function volume) for the servo amplifier to be used.	
1208H	■FX5-ENET Response to a request has not been received.	■FX5-ENET • Correct the arrival monitoring time. • Check if the connection cable is disconnected. • Set the port number on the servo amplifier side of the connection to be used to 5010.

For other error codes, refer to the following.

MELSEC iQ-F FX5 User's Manual (Communication)

MR-J5-G/MR-J5W-G User's Manual (Communication Function)

MR-JET-G User's Manual (Communication Function)

Version upgrade history

FX5 CPU module

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-ENET

Version	Date	Description
00A	October 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

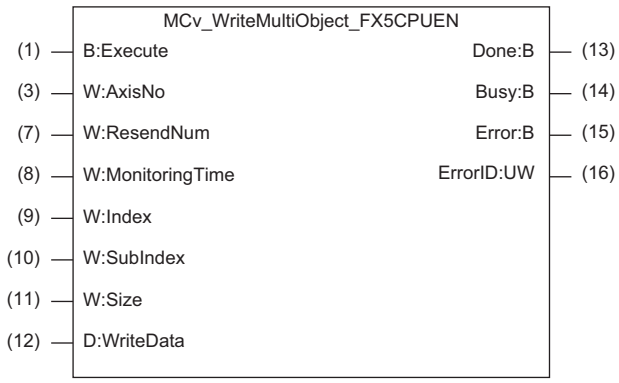
3.12 MCv_WriteMultiObject_Model (Multiple Object Write)

Name	Module
MCv_WriteMultiObject_FX5CPUEN	FX5 CPU module
MCv_WriteMultiObject_FX5ENET	FX5-ENET
MCv_WriteMultiObject_FX5SSCG_SS_F	FX5-SSC-G (standard station)
MCv_WriteMultiObject_FX5SSCG_MCS_F	FX5-SSC-G (motion control station)

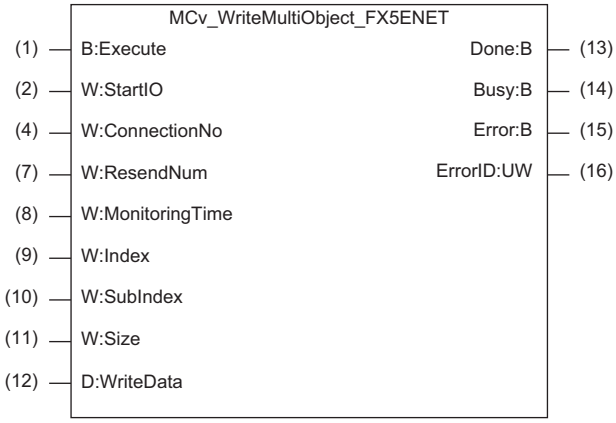
Overview

This FB writes multiple objects of the servo amplifiers.

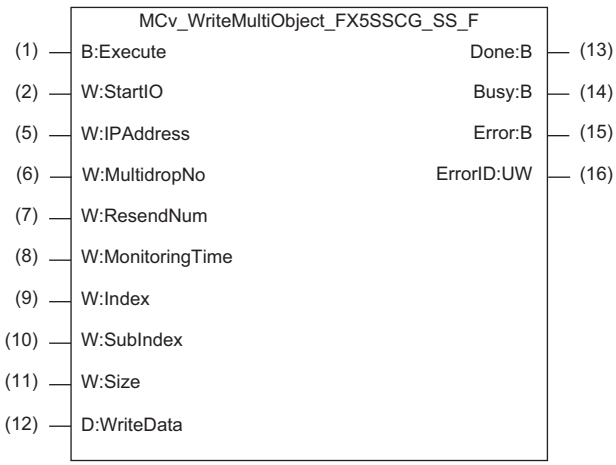
- FX5 CPU module



- FX5-ENET



- FX5-SSC-G (standard station), FX5-SSC-G (motion control station)



Labels

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(1)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(2)	StartIO [Other than FX5 CPU module]	Module number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specify the module number of the master module. ■FX5UJ CPU module 01H to 08H ■FX5U CPU module, FX5UC CPU module 01H to 10H
(3)	AxisNo [FX5 CPU module]	Axis number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specifies the axis number of the axis to be controlled. ■FX5S CPU module, FX5UJ CPU module 1 to 8 [axis] ■FX5U CPU module, FX5UC CPU module 1 to 16 [axis]
(4)	ConnectionNo [FX5-ENET]	Connection number	Word [signed]	Only when FB starts up	1 to 32	Specifies the axis number of the axis to be controlled.
(5)	IPAddress [FX5-SSC-G (standard station), FX5-SSC-G (motion control station)]	IP Address	Word [signed] (0..3)	Only when FB starts up	0.0.0.1 to 223.255.255.254	Specifies the IP address of the axis to be controlled. ■Input example: When the address is 192.168.3.1 [3] = 192, [2] = 168, [1] = 3, [0] = 1
(6)	MultidropNo [FX5-SSC-G (standard station), FX5-SSC-G (motion control station)]	Multi-drop number	Word [signed]	Only when FB starts up	0 to 2	Specifies the multi-drop number of the axis to be controlled. Specify 0 when there is no multi-drop number.
(7)	ResendNum	Number of resends	Word [signed]	Only when FB starts up	0 to 15 [time]	Set the number of resends for SLMP frame transmission.
(8)	MonitoringTime	Arrival monitoring time	Word [signed]	Only when FB starts up	1 to 32767 [second]	Set the arrival monitoring time for SLMP frame transmission.
(9)	Index	Index number	Word [signed] (0..31)	Always	0000H to FFFFH*1	Set the index number of the object using an array of 32 elements. An array for which 0 is specified is ignored.
(10)	SubIndex	Subindex number	Word [signed] (0..31)	Always	1 to 255*1	Set the subindex number of the object using an array of 32 elements.
(11)	Size	Data size	Word [signed] (0..31)	Always	1 to 4 [bytes]	Set the data size of the object using an array of 32 elements.
(12)	WriteData	Write data storage destination	Double word [signed] (0..31)	Always	—	Stores the data of the object using an array of 32 elements.

*1 For details on the object dictionary, refer to the following.
MR-J5-G/MR-J5W-G User's Manual (Object Dictionary)
MR-JET-G User's Manual (Object Dictionary)

Output labels

No.	Label	Name	Data type	Default value	Description
(13)	Done	Completed	Bit	OFF	The on state indicates that writing has been completed.
(14)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(15)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(16)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

■CC-Link IEF Basic

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

■CC-Link IE TSN

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-JET-G	D8 or later	MR Configurator2 1.145B or later
MR-J5-G	D8 or later	MR Configurator2 1.145B or later

Basic specifications

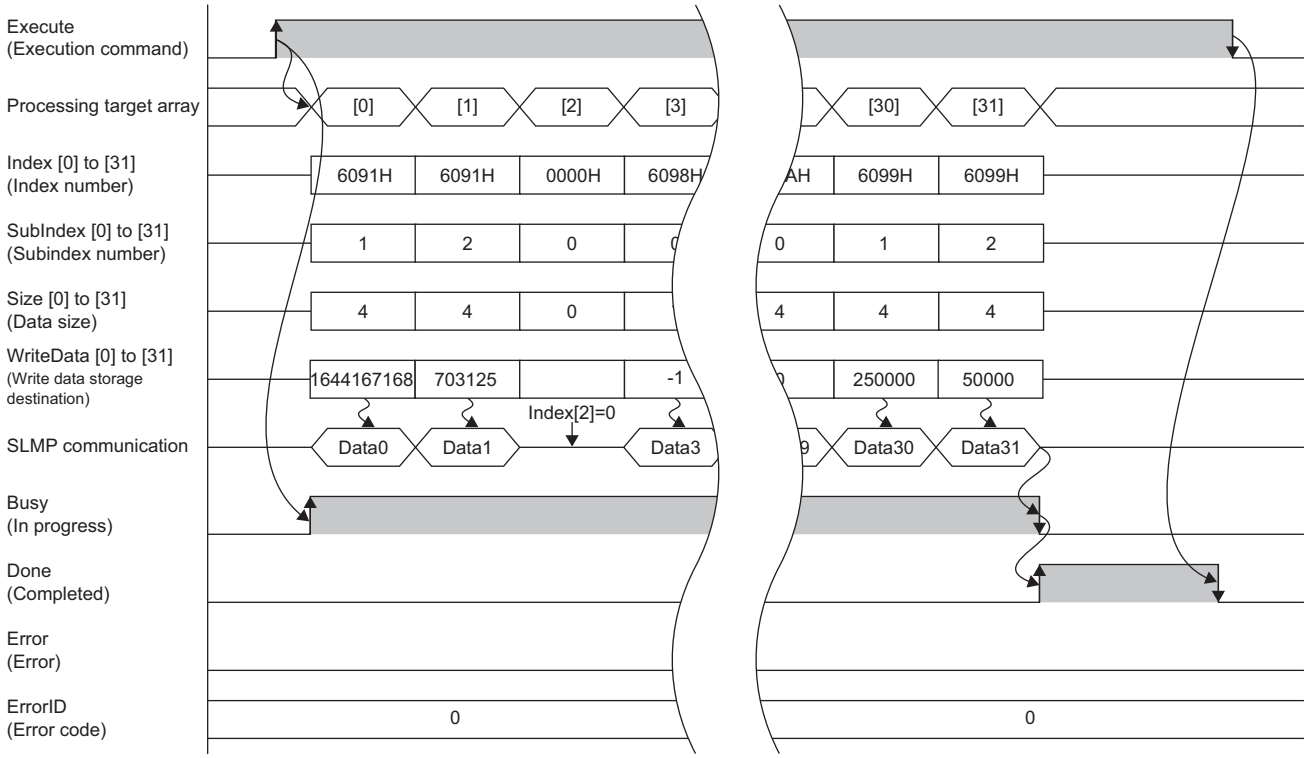
Item	Description
Number of steps	■FX5 CPU module 801 steps ■FX5-ENET 1278 steps ■FX5-SSC-G (standard station) 821 steps ■FX5-SSC-G (motion control station) 821 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module • Label: 0.23K points (Word) • Latch label: 0K points (Word) ■FX5-ENET • Label: 0.24K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (standard station) • Label: 0.22K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.22K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

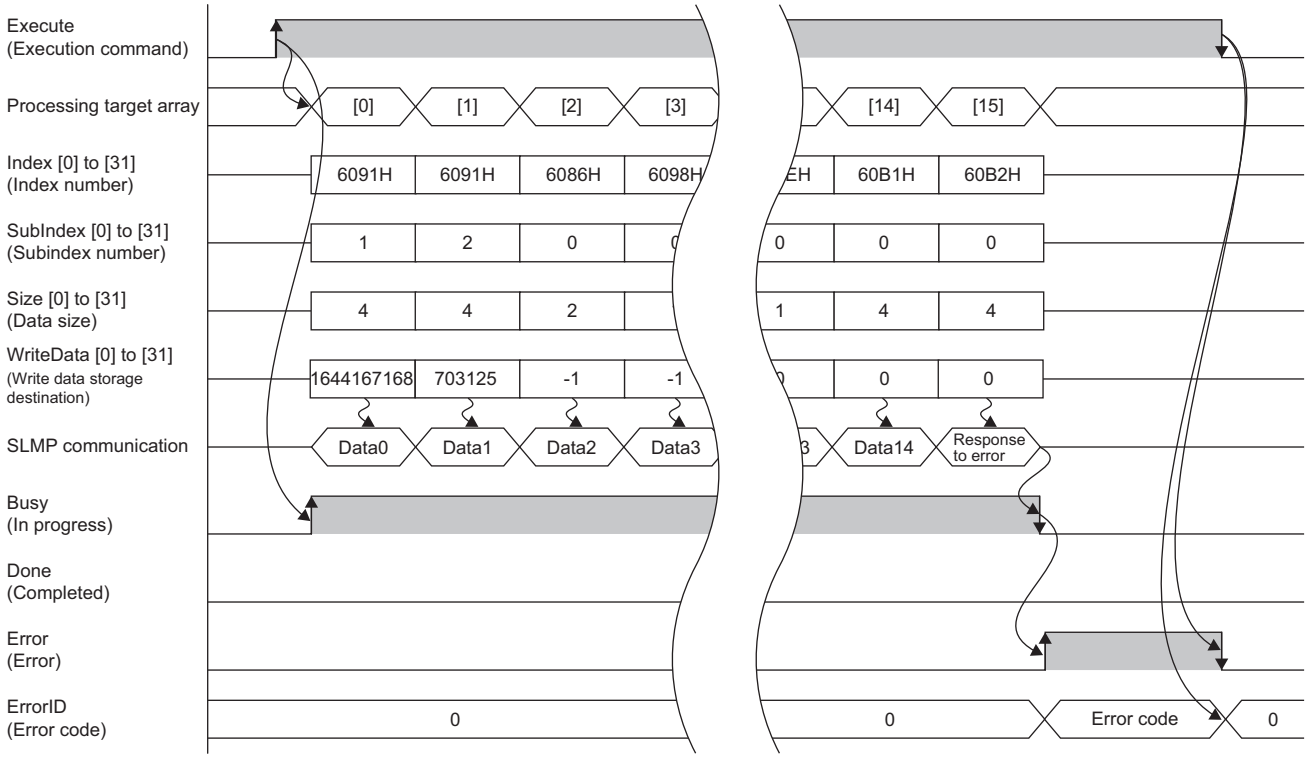
- When Execute (execution command) is turned on, this FB writes multiple objects to the selected servo amplifier. This FB writes 32 objects through SLMP communications according to the data set in the arrays of Index (index number), SubIndex (subindex number), Size (data size), and WriteData (write data storage destination). An array with 0 specified for Index is ignored, and write processing is not performed.
- During write processing, Busy (executing) turns on, and when the processing is completed successfully, Busy turns off and Done (completed) turns on.
- If an error occurs in the FB, the FB stops write processing, turns Error (error) on, and stores the error code in ErrorID (error code). (For example, if an error occurs in the write processing for Index [15], the FB does not write the remaining Indexes [16] to [31].) (☞ Page 164 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses the following instructions.

Module	Instruction
FX5 CPU module	SLMPSND instruction*1*4
FX5-ENET	GP.SOCSND instruction, GP.SOCRCV instruction*2
FX5-SSC-G (standard station)	GP.SLMPSND instruction*3
FX5-SSC-G (motion control station)	GP.SLMPSND instruction*3

*1 Timing when communications start varies depending on the conditions with which the SP.SLMPSND instructions are executed. If the SP.SLMPSND instruction is executed independently, communications start immediately. If multiple SP.SLMPSND instructions are executed at the same time, communications by the SP.SLMPSND instruction executed earlier are completed, and then communications by the SP.SLMPSND instruction executed later start. Therefore, do not turn off the execution condition of the SP.SLMPSND instruction of this FB or the user program until communications are completed.

*2 This FB and the GP.SOCSND instruction or the GP.SOCRCV instruction cannot be executed at the same time using the same connection number. Release the interlock if they are executed at the same time because communications cannot be performed normally.

*3 This FB uses channel 2 for its own station. If multiple FBs are executed at the same time, the interlock is released within the FB. After communication by the first FB that was executed is completed, the FB executed later starts communication. If the GP.SLMPSND instruction is executed at the same time as this FB using the same channel, communications cannot be performed normally, so release the interlock by using a user program.

*4 If the object read/write FB is executed for each of multiple axes, turn on the execution condition of the FB while maintaining two or more scan intervals between each execution.

- Do not change while this FB is being executed because this FB uses the following special registers.

Module	Special register
FX5 CPU module	• SD11126 (diagnostic information display request) • SD11127 (diagnostic request information) • SD11131 (IP address [lower]) • SD11132 (IP address [upper])
FX5-ENET	SD412 (one-second counter)

Parameter settings

- For details on the parameter settings required for the object read/write FB, refer to the following.

☞ Page 153 Parameter settings

- For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5 CPU, FX5-ENET

CPU module	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	279ms	1.44ms	471 scans
FX5UJ CPU module	Axis 1	271ms	1.20ms	606 scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	279ms	0.83ms	602 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object write processing for 32 objects (Index: 607EH, SubIndex: 0H, Size: 1H).

FX5-SSC-G (standard station)

CPU module	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	405ms	1.69ms	320 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object write processing for 32 objects (Index: 607EH, SubIndex: 0H, Size: 1H).

FX5-SSC-G (motion control station)

CPU module	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	307ms	1.04ms	605 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing the multiple object write processing for 32 objects (Index: 607EH, SubIndex: 0H, Size: 1H).

Error codes

Error code	Description	Action
■FX5-ENET Error code for socket communications function instruction, error code when SLMP communications ended with an error ■Other than FX5-ENET Error code for SLMP frame sending instruction	■FX5 CPU, FX5-ENET Refer to the following. For error codes other than those described, refer to the manual for the servo amplifier used. 📖MELSEC iQ-F FX5 User's Manual (Communication) ■FX5-SSC-G (standard station), FX5-SSC-G (motion control station) Refer to the following. For error codes other than those described, refer to the manual for the servo amplifier used. • 1000H to 3FFFH and D000H to DFFFH error codes 📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application) • 4000H to 4FFFH error codes 📖 MELSEC iQ-F FX5 User's Manual (Application)	
1208H	■FX5-ENET Response to a request has not been received.	■FX5-ENET • Correct the arrival monitoring time. • Check if the connection cable is disconnected. • Set the port number on the servo amplifier side of the connection to be used to 5010.

For other error codes, refer to the following.

📖MELSEC iQ-F FX5 User's Manual (Communication)

📖MR-J5-G/MR-J5W-G User's Manual (Communication Function)

📖MR-JET-G User's Manual (Communication Function)

Version upgrade history

FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

FX5-SSC-G (standard station)

Version	Date	Description
00A	July 2024	Newly created

FX5-SSC-G (motion control station)

Version	Date	Description
00A	July 2024	Newly created

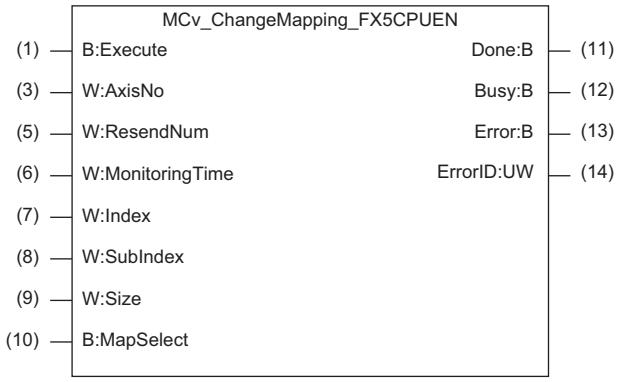
3.13 MCv_ChangeMapping_Model (Mapping Change)

Name	Module
MCv_ChangeMapping_FX5CPUEN	FX5 CPU module
MCv_ChangeMapping_FX5ENET	FX5-ENET

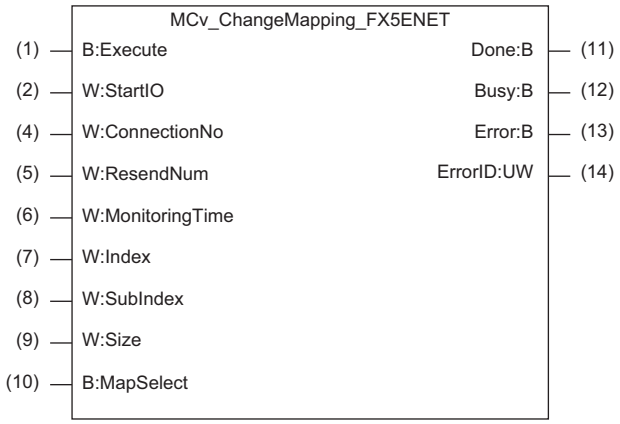
Overview

This FB changes the mapping of the servo amplifier.

- FX5 CPU module



- FX5-ENET



Labels

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(1)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(2)	StartIO [Other than FX5 CPU module]	Module number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specifies the master module number. ■FX5UJ CPU module 01H to 08H ■FX5U CPU module, FX5UC CPU module 01H to 10H
(3)	AxisNo [FX5 CPU module]	Axis number	Word [signed]	Only when FB starts up	The setting range varies depending on the CPU modules.	Specifies the axis number of the axis to be controlled. ■FX5S CPU module, FX5UJ CPU module 1 to 8 [axis] ■FX5U CPU module, FX5UC CPU module 1 to 16 [axis]
(4)	ConnectionNo [FX5-ENET]	Connection number	Word [signed]	Only when FB starts up	1 to 32	Specifies the axis number of the axis to be controlled.
(5)	ResendNum	Number of resends	Word [signed]	Only when FB starts up	0 to 15 [time]	Set the number of resends for SLMP frame transmission.
(6)	MonitoringTime	Arrival monitoring time	Word [signed]	Only when FB starts up	1 to 32767 [second]	Set the arrival monitoring time for SLMP frame transmission.
(7)	Index	Index number	Word [signed] (0..31)	Always	0000H to FFFFH*1	Set the index number of the object to be mapped using an array of 32 elements.
(8)	SubIndex	Subindex number	Word [signed] (0..31)	Always	1 to 255*1	Set the subindex number of the object to be mapped using an array of 32 elements.
(9)	Size	Data size	Word [signed] (0..31)	Always	1 to 4 [bytes]	Set the object data size of the object to be mapped using an array of 32 elements.
(10)	MapSwitch	Map switching	Bit	Only when FB starts up	ON, OFF	Switches mapping change targets. OFF: [1st Transmit PDO Mapping (Obj.1A00H)] ON: [1st Receive PDO Mapping (Obj.1600H)]

*1 For details on the object dictionary, refer to the following.
MR-J5-G/MR-J5W-G User's Manual (Object Dictionary)
MR-JET-G User's Manual (Object Dictionary)

Output labels

No.	Label	Name	Data type	Default value	Description
(11)	Done	Completed	Bit	OFF	The on state indicates that mapping change has been completed.
(12)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(13)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(14)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5S CPU module	1.000 or later	GX Works3 Version 1.080J or later
FX5UJ CPU module	1.002 or later	GX Works3 Version 1.070Y or later
FX5U CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5UC CPU module	1.220 or later	GX Works3 Version 1.070Y or later
FX5-ENET	1.100 or later	GX Works3 Version 1.070Y or later
MR-J5-G	C0 or later	MR Configurator2 Version 1.125F or later
MR-JET-G	C0 or later	MR Configurator2 Version 1.125F or later

Basic specifications

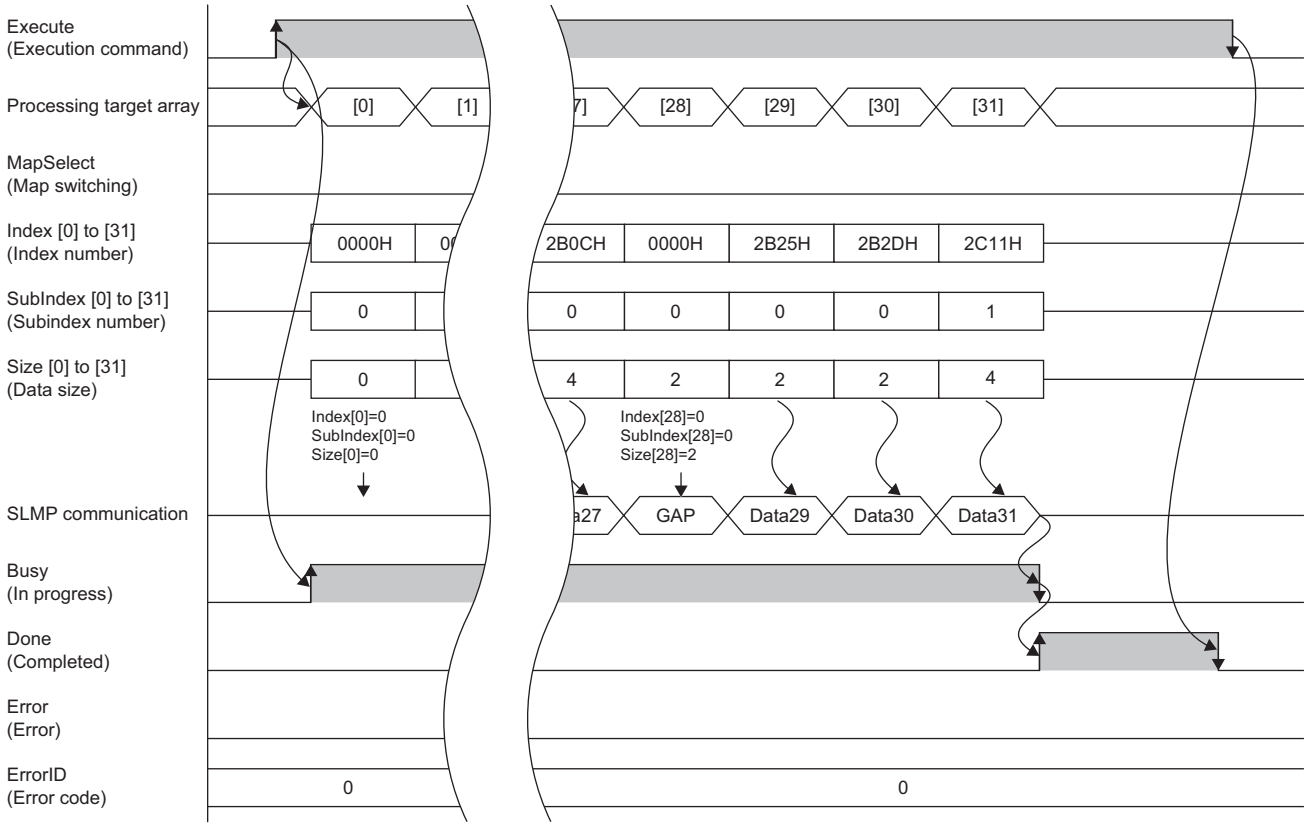
Item	Description
Number of steps	■FX5 CPU module 977 steps ■FX5-ENET 1506 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	■FX5 CPU module • Label: 0.17K points (Word) • Latch label: 0K points (Word) ■FX5-ENET • Label: 0.19K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

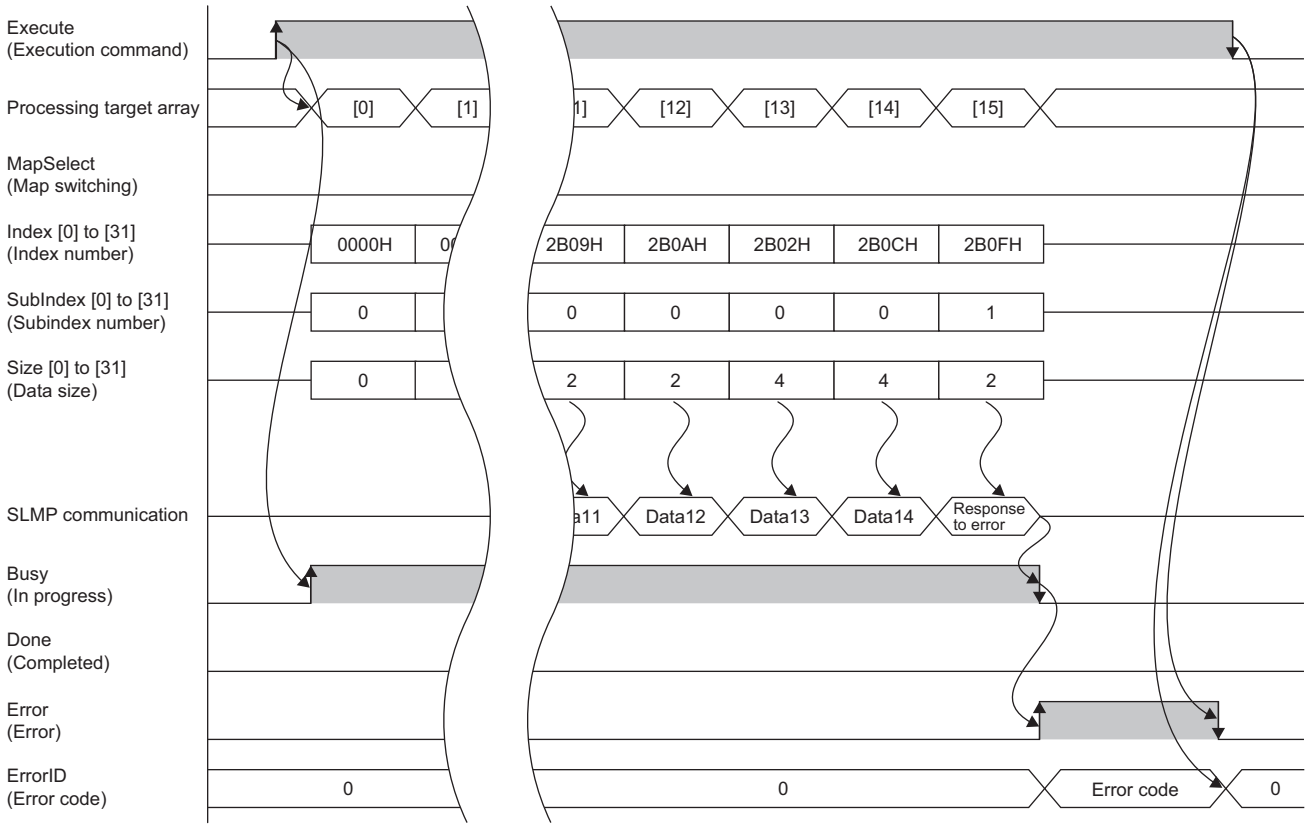
- When Execute (execution command) is turned on, this FB changes the mapping of the selected servo amplifier. This FB changes the mapping of up to 32 objects through SLMP communications according to the data set in the arrays of Index (index number), SubIndex (subindex number), and Size (data size). To insert GAP, set 0 for Index and SubIndex and specify the size of GAP in Size (data size). To not change the mapping, set 0 for Index, SubIndex, and Size.
- To add a new object to the servo amplifier mapping, expand the total number of objects mapped by the FB.
- To redo the mapping, power on the servo amplifier again to restore the default mapping.
- During change, Busy (executing) turns on, and when the process is completed successfully, Busy turns off, and Done (completed) turns on.
- If an error occurs in the FB, the FB stops mapping change, turns Error (error) on, and stores the error code in ErrorID (error code). (If an error occurs in Index [15], the FB does not execute mapping change on the remaining Indexes [16] to [31].) (☞ Page 170 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- The total size of the objects to be mapped should be no more than 64 bytes.
- Before executing the FB, stop CC-Link IE Field Network Basic communications for the target axis (turn off RY3F). To resume communications, start CC-Link IE Field Network Basic communications (turn on RY3F) after Done (completed) turns on for this FB.
- The backup power cannot retain the mapping data. Set the mapping data again every time the servo amplifiers are powered on again.
- This FB uses the following instructions.

Module	Instruction
FX5 CPU module	SLMPSND instruction*1*3
FX5-ENET	GP.SOCSND instruction, GP.SOCRCV instruction*2

*1 Timing when communications start varies depending on the conditions with which the SP.SLMPSND instructions are executed. If the SP.SLMPSND instruction is executed independently, communications start immediately. If multiple SP.SLMPSND instructions are executed at the same time, communications by the SP.SLMPSND instruction executed earlier are completed, and then communications by the SP.SLMPSND instruction executed later start. Therefore, do not turn off the execution condition of the SP.SLMPSND instruction of this FB or the user program until communications are completed.

*2 This FB and the GP.SOCSND instruction or the GP.SOCRCV instruction cannot be executed at the same time using the same connection number. Release the interlock if they are executed at the same time because communications cannot be performed normally.

*3 If the object read/write FB is executed for each of multiple axes, turn on the execution condition of the FB while maintaining two or more scan intervals between each execution.

- Do not change while this FB is being executed because this FB uses the following special registers.

Module	Special register
FX5 CPU module	• SD11126 (diagnostic information display request) • SD11127 (diagnostic request information) • SD11131 (IP address [lower]) • SD11132 (IP address [upper])
FX5-ENET	SD412 (one-second counter)

Parameter settings

- For details on the parameter settings required for the object read/write FB, refer to the following.

☞ Page 153 Parameter settings

- For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3	Processing time	Maximum scan time	Number of scans
FX5S CPU module	Axis 1	221ms	1.64ms	384 scans
FX5UJ CPU module	Axis 1	229ms	1.19ms	516 scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	253ms	0.81ms	509 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 This is the result of executing mapping change for 32 objects (Index: 2A42H, SubIndex: 0H, Size: 2H).

Error codes

Error code	Description	Action
1208H	■FX5-ENET Response to a request has not been received.	■FX5-ENET • Correct the arrival monitoring time. • Check if the connection cable is disconnected. • Set the port number on the servo amplifier side of the connection to be used to 5010.

For other error codes, refer to the following.

MELSEC iQ-F FX5 User's Manual (Communication)

MR-J5-G/MR-J5W-G User's Manual (Communication Function)

MR-JET-G User's Manual (Communication Function)

Version upgrade history

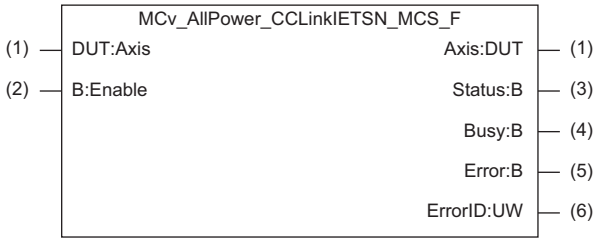
FX5 CPU module, FX5-ENET

Version	Date	Description
00A	April 2021	Newly created
01A	July 2024	Improved so that operation continues even when Execute (execution command) is turned off while the FB is operating

3.14 MCv_AllPower_CCLinkIETSN_MCS_F (Operation of All Axes Possible)

Overview

Switches the status of all axes to the operable state.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	While Enable input is on, axis control is enabled.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Status	Operable	Bit	OFF	The on state indicates that all axes are in the operable state.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

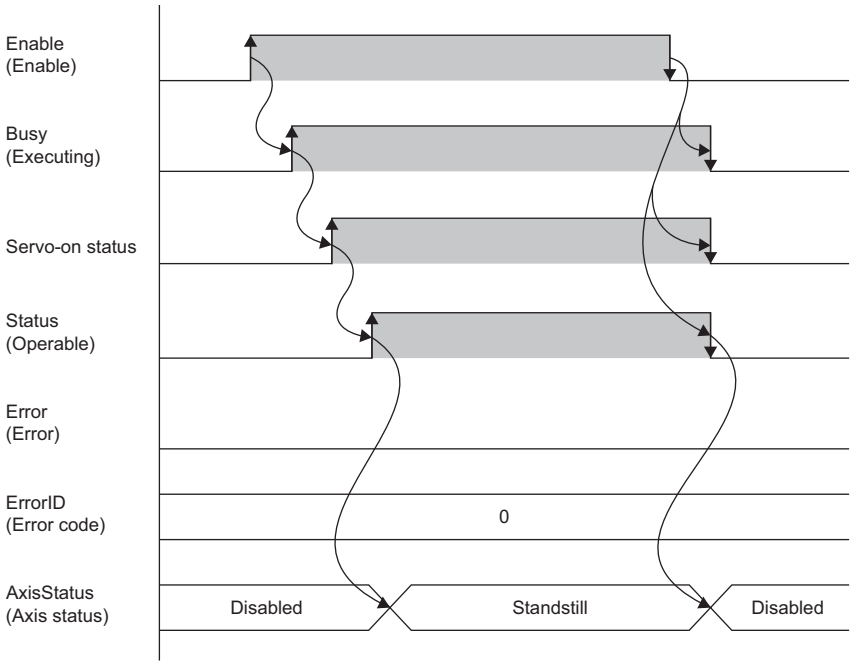
Item	Description
Number of steps	1246 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.18K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

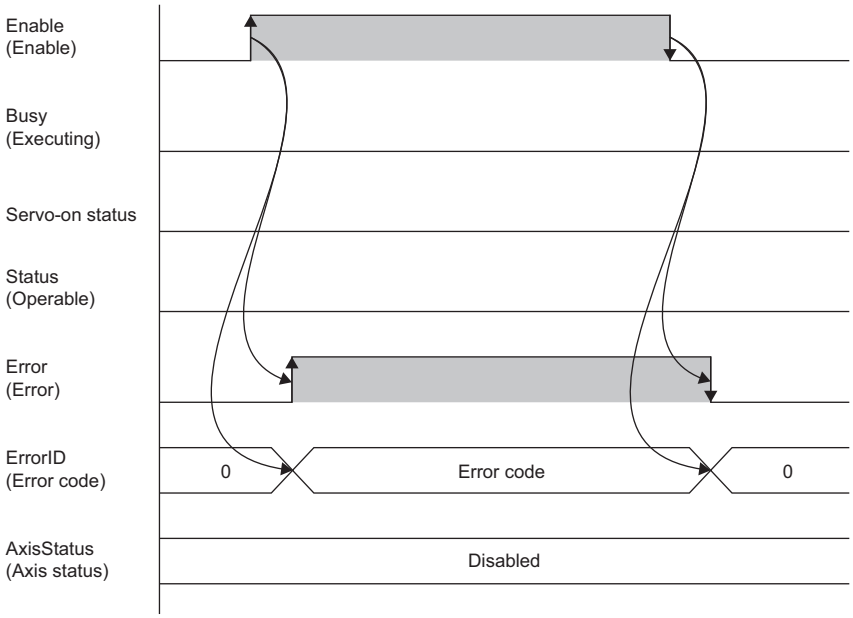
- This FB initializes the information of the axis selected at the rising edge of Enable (enable) and switches to the servo on state. When the process starts normally, Busy (executing) turns on. When the status of all axes is switched to the servo on state completely, Status (operable) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions from Disabled to Standstill. (☞ Page 41 State Transition Diagram)
- If Status does not turn on, check ErrorID (error code) in MCv_State_CCLinkIETSN_MCS_F for each axis or check AxisStatus of Axis.
- Turning Enable off stops control of all axes, switches the status to servo off state, and turns off Busy and Status. The AxisStatus (axis status) of Axis transitions from Standstill to Disabled. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID. (☞ Page 174 Error code)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- Before using this FB library (except for FBs that can be executed in the Disabled state), always execute this FB to check that Status (operable) is on. This FB initializes the axis information and switches to the servo on state.
- Use only one instance of this FB for one module. If multiple instances are used for one module, whether to operate may not be controlled normally.
- Before executing this FB, turn on "[Cd.190] PLC READY" of the motion module.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	322ms	1.92ms	319 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

Error code

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.

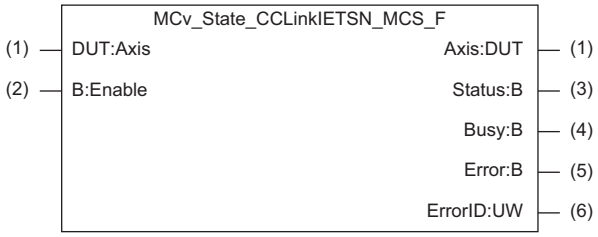
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.15 MCv_State_CCLinkIETSN_MCS_F (Axis Status Transition)

Overview

Transitions AxisStatus (axis status) of the specified axis.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	Transitions AxisStatus (axis status) while the Enable input is on.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Status	Transition possible	Bit	OFF	The on state indicates a state where transition is possible.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

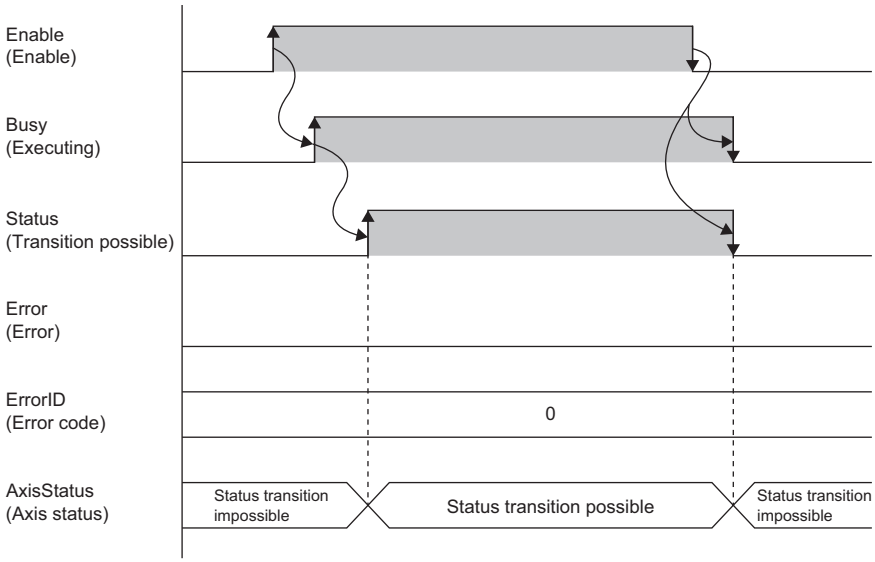
Item	Description
Number of steps	777 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.08K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

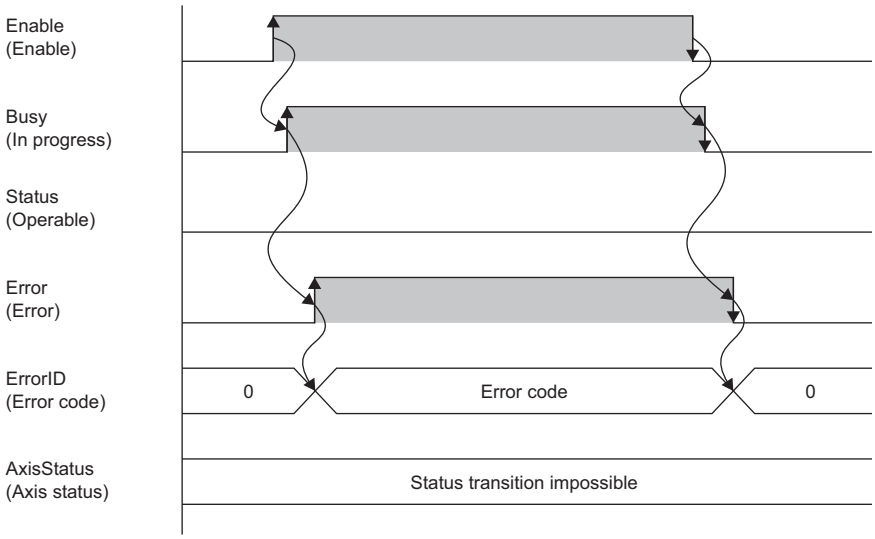
- Transitions AxisStatus (axis status) of the specified Axis (axis information). (☞ Page 41 State Transition Diagram)
- When the processing starts, Busy (executing) turns on, and when status transition becomes possible, Status (transition possible) turns on and the status transitions.
- Turning Enable (enable) off turns Status off.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID. (☞ Page 174 Error code)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- Before using this FB library (except for object read/write FBs), always execute this FB. This FB is used to transition the axis status.
- Use only one instance of this FB for one axis. If multiple instances are used for one axis, a status transition may not be executed normally.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	1.04ms	1.63ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing servo on for the first time.
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1201H	• The servo amplifier is powered off. • The servo amplifier is not connected.	• Check that the servo amplifier is powered on. • Check that the servo amplifier and communication cable are connected.

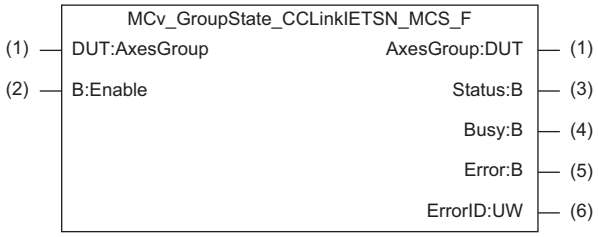
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.16 MCv_GroupState_CCLinkIETSN_MCS_F (Axes Group Status Transition)

Overview

Transitions AxesGroupStatus (axes group status) of the specified axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	Transitions AxesGroupStatus (axes group status) while the Enable input is on.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Status	Transition possible	Bit	OFF	The on state indicates a state where transition is possible.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

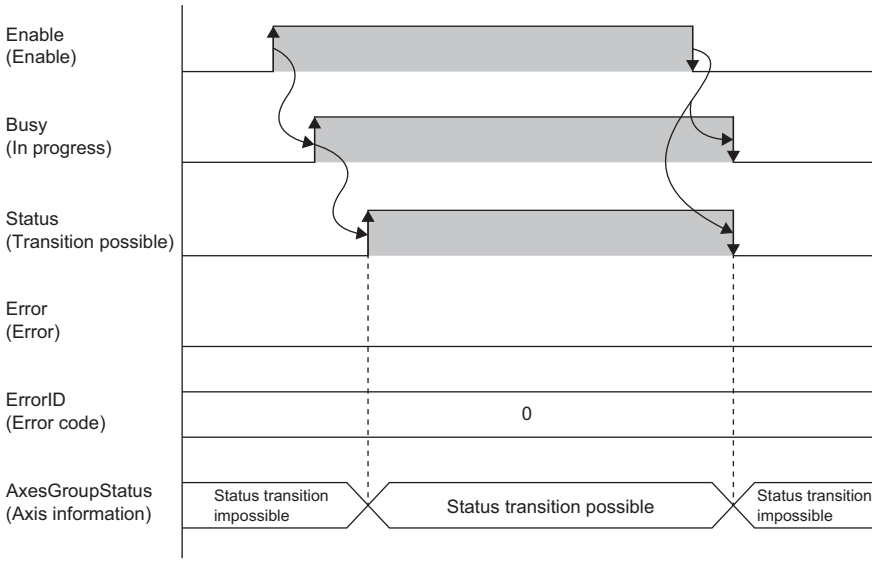
Item	Description
Number of steps	447 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. 📖 GX Works3 Operating Manual
Points of labels used	• Label: 0.25K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. 📖 GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- Transitions AxesGroupStatus (axes group status) of the specified AxesGroup (axes group information). (☞ Page 41 State Transition Diagram)
- When the processing starts, Busy (executing) turns on, and when status transition becomes possible, Status (transition possible) turns on and the status transitions.
- Turning Enable (enable) off turns Status off.

Timing chart of I/O signals

■Completed successfully



Precautions

- Before executing a multi-axis control FB, be sure to execute this FB. This FB is used to transition the axes group status.
- Use only one instance of this FB for one axes group. If multiple instances are used for one axes group, a status transition may not be executed normally.
- If Enable (enable) is operated while the axes group status is other than "GroupDisabled(0)", a status transition may not be executed normally.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	2.68ms	3.06ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing 2-axis absolute value linear interpolation control.
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, MC_GroupEnable_CCLinkIETSN_MCS_F, and MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
—	—	—

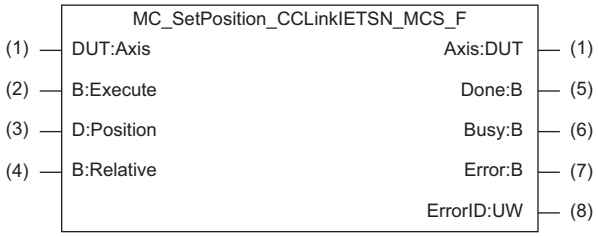
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.17 MC_SetPosition_CCLinkIETSN_MCS_F (Current Position Change)

Overview

Changes the current position (command position, actual position) of the specified axis.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Position	Target position	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the value for the position to be changed. The specification method can be switched using Relative (relative position specification).
(4)	Relative	Relative position specification	Bit	Only when FB starts up	ON, OFF	Switches the target position (Position) specification method. • On: Relative position (distance) • Off: Absolute position

Output labels

No.	Label	Name	Data type	Default value	Description
(5)	Done	Completed	Bit	OFF	The on state indicates that the current position change has been completed.
(6)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(7)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

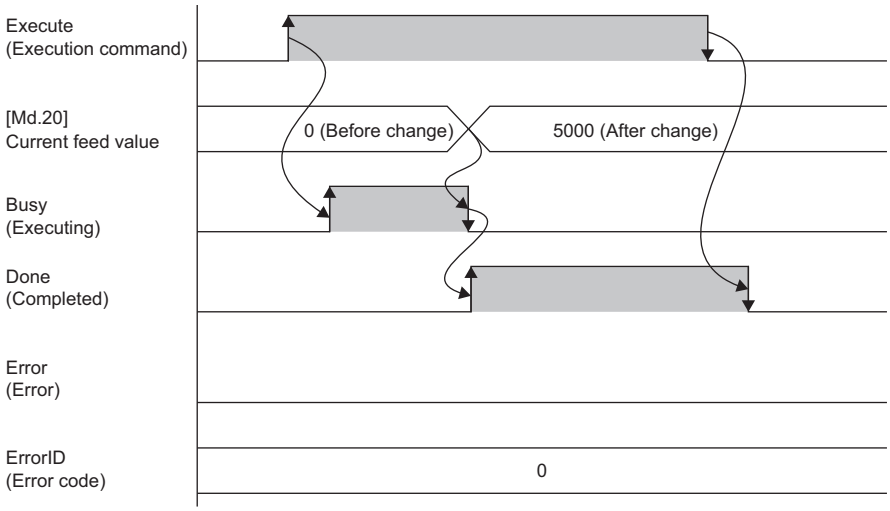
Item	Description
Number of steps	791 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.09K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

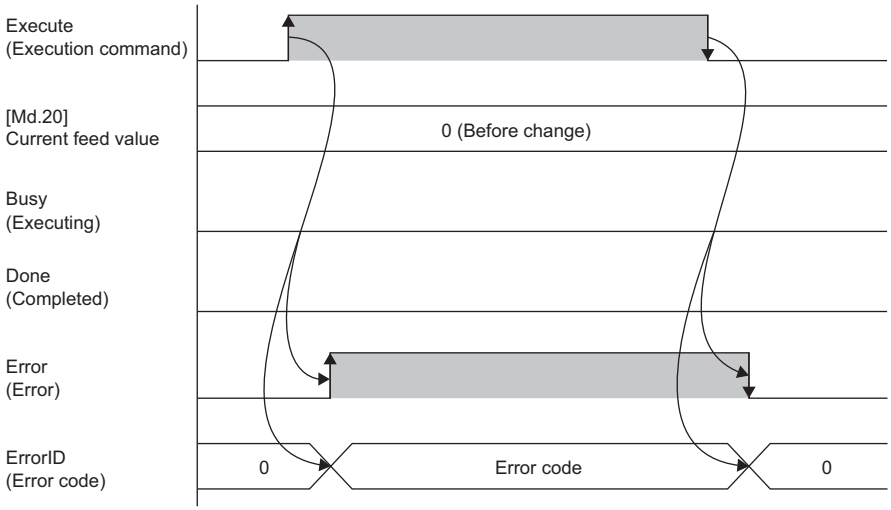
- When Execute (execution command) is turned on, this FB changes the current position of the specified axis. When the processing starts normally, Busy (executing) turns on. When the current position change is completed successfully, Busy (executing) turns off, and Done (completed) turns on.
- When Relative (relative position specification) is turned on (relative positioning) for the current position specification method, the position is changed to the position where Position (target position) was added to the current position.
- When Relative (relative position specification) is turned off (absolute positioning) for the current position specification method, the current position is changed to Position (target position).
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID. (☞ Page 174 Error code)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- When degree (unit) is used and Relative (relative position specification) is turned on (relative position), the target position (Position) specification range is -35999999 to 35999999.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	5.39ms	1.89ms	3 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing a current value change with the settings of current feed value (50000 pulses), relative position specification (relative position), and target position (0 pulses).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F and MCv_State_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the Standstill state, and execute the FB again.
1209H	Overflow or underflow (sign reversal) occurred on the changed current position value.	Execute again after adjusting the Position (target position) value.

Version upgrade history

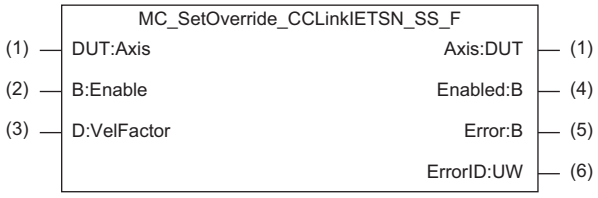
Version	Date	Description
00A	July 2024	Newly created

3.18 MC_SetOverride_[Type] (Override Value Setting)

Name	Module
MC_SetOverride_CCLinkIETSN_SS_F	FX5-SSC-G (standard station)
MC_SetOverride_CCLinkIETSN_MCS_F	FX5-SSC-G (motion control station)

Overview

Executes the change in target speed of the specified axis.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_[Type]	—	Page 32 AXIS_REF_CCLinkIETSN_SS_F Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	When the value is on, the FB is executed.
(3)	VelFactor	Velocity override coefficient	Double word [signed]	Always	The setting range varies depending on the target modules.	Set the velocity override coefficient. ■FX5-SSC-G (standard station) 0 to 360 [%] ■FX5-SSC-G (motion control station) 0 to 300 [%]

Output labels

No.	Label	Name	Data type	Default value	Description
(4)	Enabled	Enabled	Bit	OFF	The on state indicates that the override coefficient has been set successfully.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

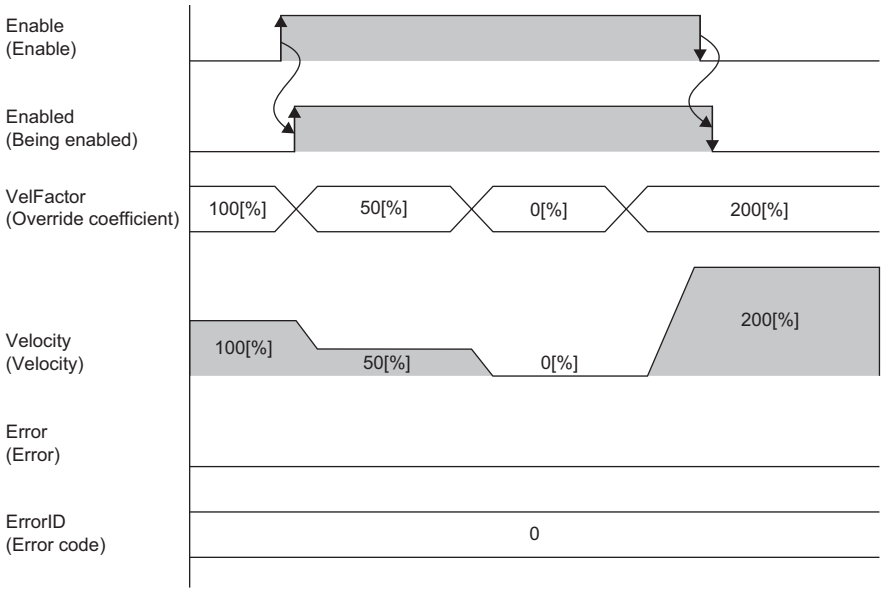
Item	Description
Number of steps	■FX5-SSC-G (standard station) 500 steps ■FX5-SSC-G (motion control station) 432 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. 📖 GX Works3 Operating Manual
Points of labels used	■FX5-SSC-G (standard station) • Label: 0.03K points (Word) • Latch label: 0K points (Word) ■FX5-SSC-G (motion control station) • Label: 0.08K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. 📖 GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- Changes the target speed of the specified axis to the speed during current position determination × VelFactor (override coefficient) [%] speed.
- When the override coefficient is successfully set while Enable (enable) is on, Enabled (enabled) turns on.
- When the VelFactor (override coefficient) value is changed while Enable (enable) is on, the new override coefficient value is reflected.
- When Enable (enable) is turned off, the override coefficient that was set last is held.
- When changing the speed by using this FB during position control, if a sufficient distance for making the change cannot be secured, operation is performed at a speed where the change is possible.
- If 0 is set for VelFactor (override coefficient), the AxisStatus (axis status) of Axis (axis information) does not transition to the Standstill state.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 195 Error codes)

Timing chart of I/O signals

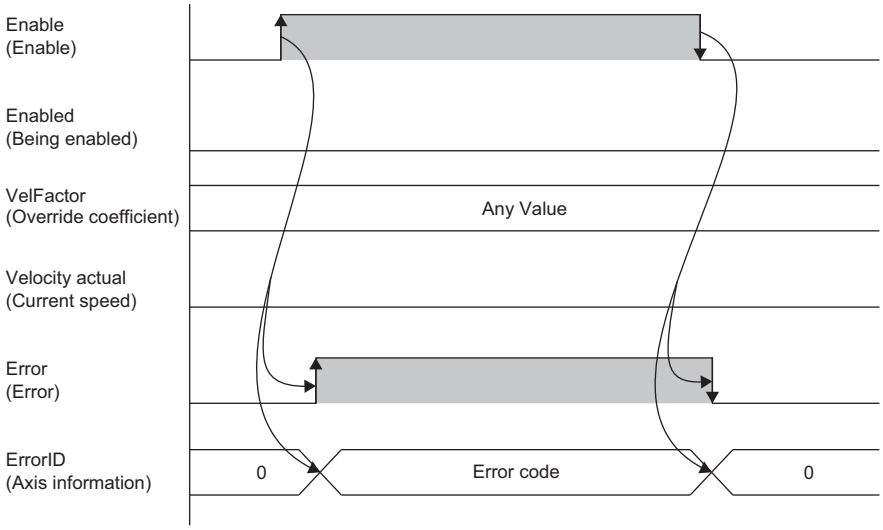
■Completed successfully



Velocity (velocity) can be checked as follows.

- FX5-SSC-G (motion control station): "[Md.28] Axis speed command" of the motion module
- Other than FX5-SSC-G (motion control station): [Velocity actual value (Obj. 606Ch)] of the servo amplifier

■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)

■FX5-SSC-G (standard station)

- The speed with which MC_MoveVelocity_[Type] or MC_TorqueControl_[Type] is being executed cannot be changed using this FB.
- The speed cannot be changed by using this FB during deceleration executed via MC_Stop_[Type] or positioning control FB. The override coefficient becomes enabled after deceleration and stop.
- If the speed to which VelFactor (override coefficient) is applied exceeds the maximum speed of the servo motor being used, the speed is limited to the maximum speed of the servo motor.
- If a value outside of the setting range is set for VelFactor (velocity override coefficient), the previous setting is held.

■FX5-SSC-G (motion control station)

- The speed with which MC_MoveVelocity_CCLinkIETSN_MCS_F, MC_TorqueControl_CCLinkIETSN_MCS_F, or MCv_Home_CCLinkIETSN_MCS_F is being executed cannot be changed using this FB.
- The speed cannot be changed by using this FB during deceleration that was executed via MC_Stop_CCLinkIETSN_MCS_F or positioning control FB. The warning "deceleration/stop speed change" occurs in the motion module, and the override coefficient becomes enabled after deceleration and stop.
- If the speed to which VelFactor (override coefficient) is applied is equal to or greater than "[Pr.8] Speed limit value" of the motion module, a warning "speed limit value over" occurs on the motion module, and the speed is controlled by "[Pr.8] Speed limit value".
- While Enable (enable) is on, VelFactor (velocity override coefficient) can always be changed including during operation. However, the interval for changing the value should be set to at least 10ms. If the value is changed to a shorter interval, the motion module cannot follow the change, and the command may not be executed normally.
- If a value outside of the setting range is set for VelFactor (velocity override coefficient), a warning "illegal override value" occurs in the motion module, and the override coefficient is controlled as 300[%].
- If the axis specified using this FB is the reference axis of an axes group, the override coefficient at the point when Enable (enable) of this FB is turned off is reflected in the speed of the interpolation control FB, unless the override coefficient is changed by MC_GroupSetOverride_CCLinkIETSN_MCS_F.

Parameter settings

FX5-SSC-G (standard station)

To use this FB, add mapping and configure servo parameter settings.

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

■Adding mapping

Use GX Works3 to add [Control DI 7 (Obj. 2D07H: 00H)] and [Speed override (Obj. 2DB0H: 00H)] to mapping.

1. Open the module parameter setting window.

Navigation window ⇨ [Parameter] ⇨ [Module Information] ⇨ Target module ⇨ [Module Parameter (Network)]

2. Open the network configuration window.

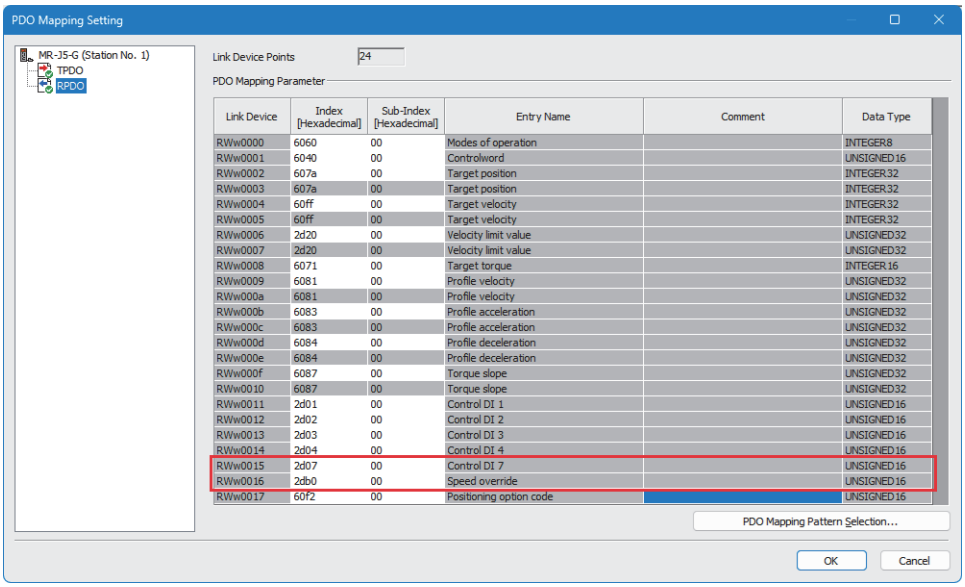
[Basic Settings] ⇨ [Network Configuration Settings] ⇨ "Detailed Setting"

3. Set PDO mapping.

[CC-Link IE TSN Configuration] ⇨ [PDO Mapping Setting] ⇨ "Detail Setting"

Select RPDO in the [PDO Mapping Setting] window and set the following in the PDO mapping parameters.

- For RWw0015, Index = 2D07, Subindex = 00
- For RWw0016, Index = 2DB0, Subindex = 00



■Servo amplifier setting

Use MR Configurator2 to set the following servo parameters.

- Set [Pr.PT38.1 Override selection] to "3: The override function is enabled".

FX5-SSC-G (motion control station)

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

FX5-SSC-G (standard station)

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	0.89ms	2.04ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of changing the command speed, with the settings of the current command speed (1000r/min) and velocity override coefficient (50%).
*4 This refers to the performance value in combination with MC_Power_CCLinkIETSN_SS_F, MCv_Home_CCLinkIETSN_SS_F, and MC_MoveAbsolute_CCLinkIETSN_SS_F required for the measurement of this FB.

FX5-SSC-G (motion control station)

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	1.57ms	2.04ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of changing the command speed, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), current command speed (equivalent to 1000r/min), and velocity override coefficient (50%).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, and MC_MoveAbsolute_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	■FX5-SSC-G (motion control station) The READY signal is off. ■FX5-SSC-G (standard station) A data link error has occurred.	■FX5-SSC-G (motion control station) • Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again. ■FX5-SSC-G (standard station) • Check the cause of data link stop (SW0049) or data link status of each station (SW00B0 to 00B7), remove the cause of the data link error, then execute again.
1203H	■FX5-SSC-G (motion control station) The FB is in the execution disabled state.	■FX5-SSC-G (motion control station) When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.

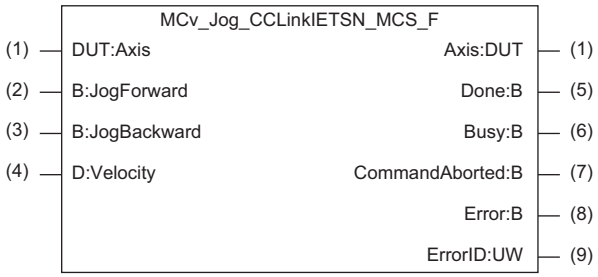
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.19 MCv_Jog_CCLinkIETSN_MCS_F (JOG Operation)

Overview

Executes JOG operation of the specified axis.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	JogForward	Forward run JOG command	Bit	Always	ON, OFF	Turning this on starts travel in the positive direction. Turning this off starts deceleration to stop.
(3)	JogBackward	Reverse run JOG command	Bit	Always	ON, OFF	Turning this on starts travel in the negative direction. Turning this off starts deceleration to stop.
(4)	Velocity	JOG speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the JOG speed.

Output labels

No.	Label	Name	Data type	Default value	Description
(5)	Done	Completed	Bit	OFF	When deceleration and stop are completed, only one scan is turned on.
(6)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(7)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(8)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(9)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

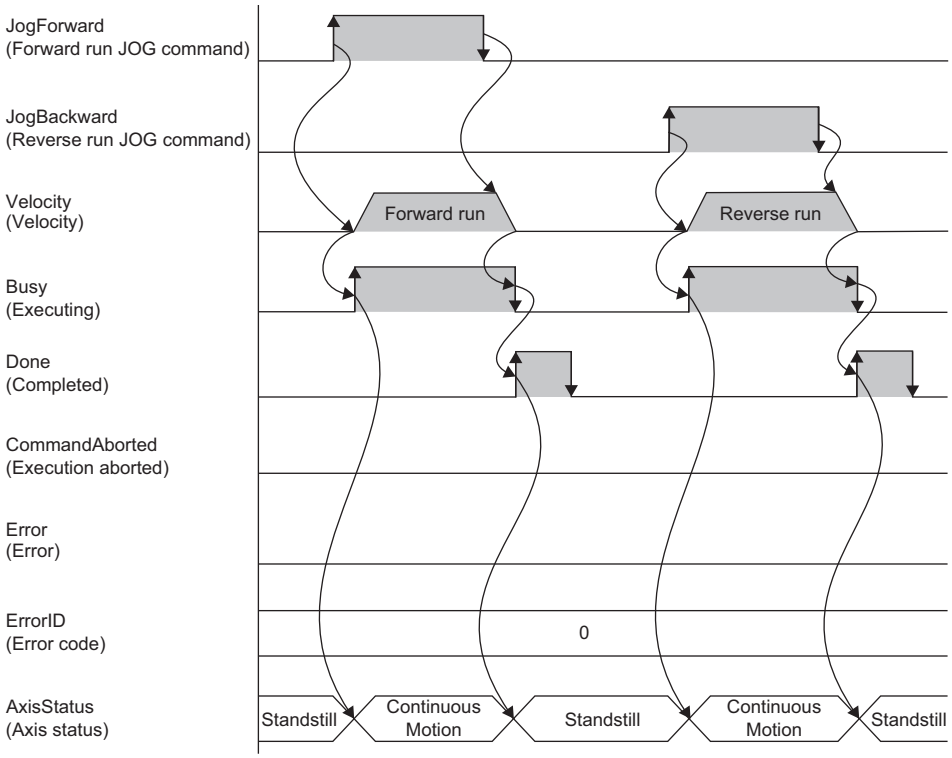
Item	Description
Number of steps	920 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.09K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- The JOG operation is performed for the specified axis while JogForward (forward run JOG command) or JogBackward (reverse run JOG command) is turned on. When processing starts normally, Busy (executing) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions to ContinuousMotion. Turning off JogForward (forward run JOG command) or JogBackward (reverse run JOG command) causes deceleration and stop. When the speed reaches zero, Busy (in progress) turns off, Done (completed) turns on for one scan, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If MC_Stop_CCLinkIETSN_MCS_F is executed while this FB is being executed, CommandAborted (execution aborted) turns on and the axis decelerates and stops. CommandAborted (execution interrupted) is turned off by turning off JogForward (forward run JOG command) or JogBackward (reverse run JOG command). If MC_Stop_CCLinkIETSN_MCS_F is executed during deceleration caused by turning off JogForward (forward run JOG command) or JogBackward (reverse run JOG command), CommandAborted (execution aborted) is turned on only for one scan.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). If an error occurs during deceleration caused by turning off JogForward (forward run JOG command) or JogBackward (reverse run JOG command), Error (error) is turned on only for one scan. (☞ Page 191 Error codes)

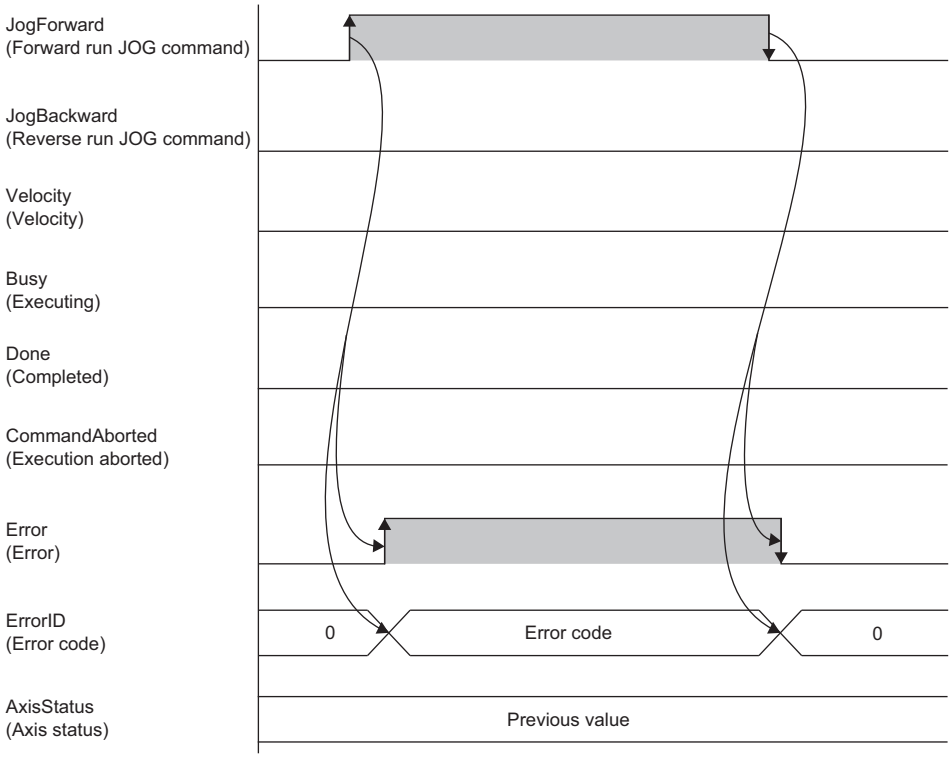
Timing chart of I/O signals

■Completed successfully



Velocity (velocity) can be checked in "[Md.28] Axis speed command" of the motion module.

■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- If JogForward (forward run JOG command) and JogBackward (reverse run JOG command) are turned on at the same time, JogForward (forward run JOG command) is prioritized, and JogBackward (reverse run JOG command) is disabled. The JogBackward (reverse run JOG command) or JogForward (forward run JOG command) that was newly turned on during JOG operation is also disabled.
- When the speed reaches zero, Done (completed) is turned on for one scan. However, the next input label is not loaded until Done (completed) turns off.
- When performing JOG operation near the upper or lower limit, use the hardware stroke limit function. If the hardware stroke limit function is not used, the workpiece may exceed the movement range, causing an accident.

Parameter settings

For details on the parameter settings required to use this FB, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	1010ms	1.88ms	327 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 This is the result of executing forward run JOG operation for 0.5 seconds, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), and JOG speed (20000 pulses/s).

*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F and MCv_State_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the Standstill state, and execute the FB again.

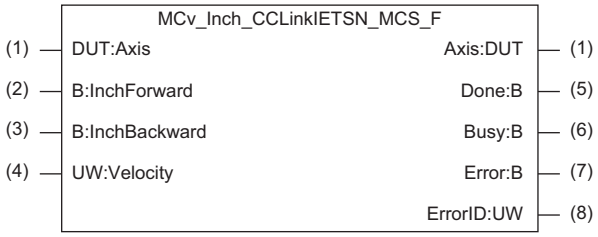
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.20 MCv_Inch_CCLinkIETSN_MCS_F (Inching Operation)

Overview

Performs inching operation of the specified axis.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	InchForward	Forward run inching command	Bit	Always	ON, OFF	Turning this on starts travel in the positive direction.
(3)	InchBackward	Reverse run inching command	Bit	Always	ON, OFF	Turning this on starts travel in the negative direction.
(4)	Distance	Travel distance	Word [unsigned]/bit string [16 bits]	Only when FB starts up	1 to 65535	Set the inching travel distance. Depending on the unit setting for [Pr.1] of the motion module, the following setting units are used. • mm: [$\times 10^{-1}$ μm] • inch: [$\times 10^{-5}$ inch] • degree: [$\times 10^{-5}$ degree] • pulse: [pulse]

Output labels

No.	Label	Name	Data type	Default value	Description
(5)	Done	Completed	Bit	OFF	The on state indicates that movement has been completed.
(6)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(7)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

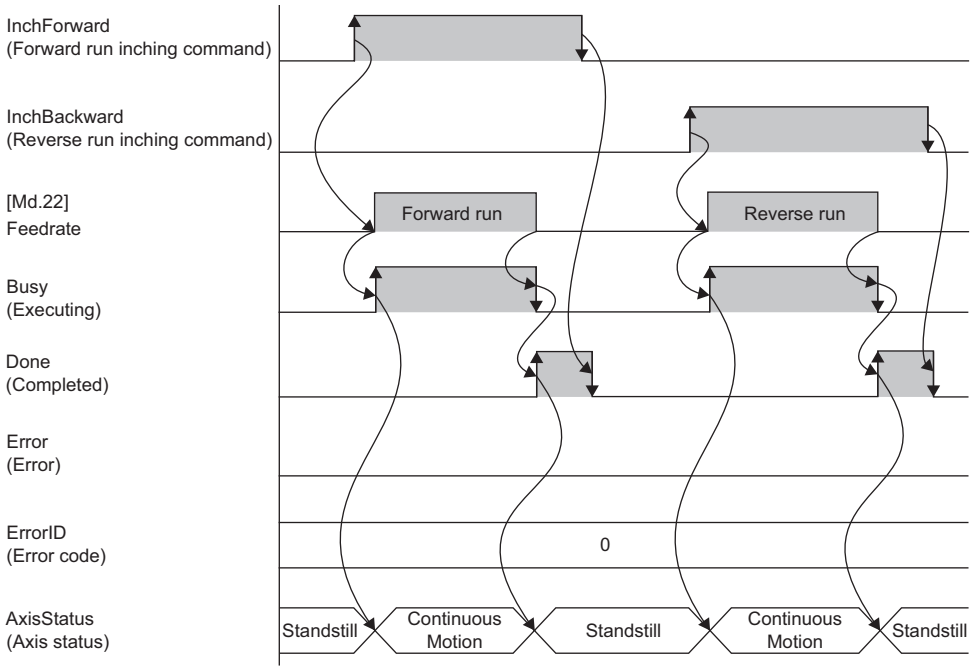
Item	Description
Number of steps	864 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.09K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

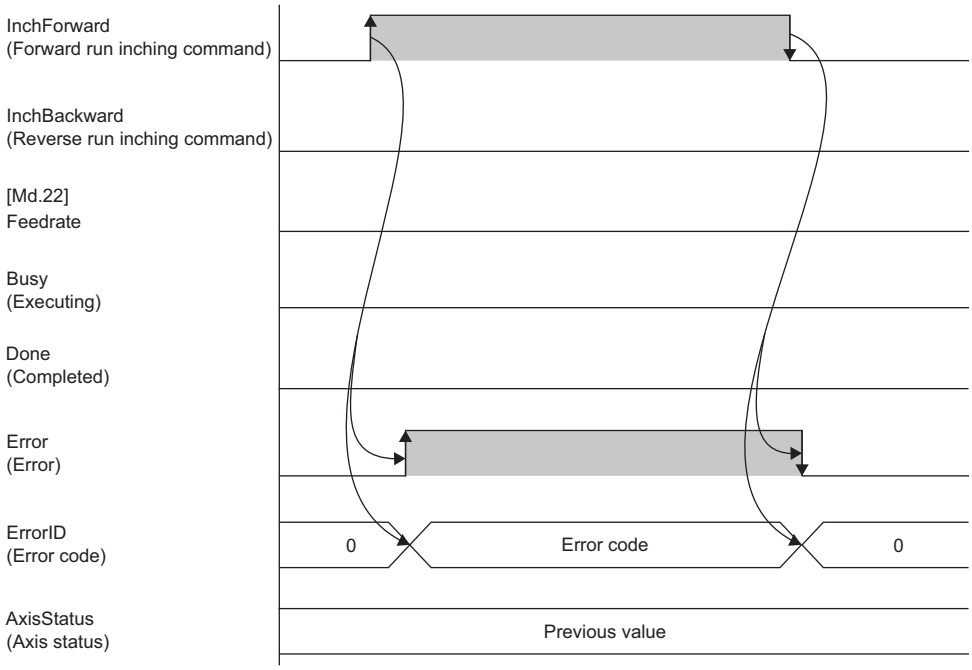
- The inching operation is performed for the specified axis when InchForward (forward run inching command) or InchBackward (reverse run inching command) is turned on. When processing starts normally, Busy (executing) turns on, and the AxisStatus (axis status) of Axis (axis information) transitions to ContinuousMotion. When the movement set in Distance (travel distance) is completed, Busy (executing) turns off, Done (completed) turns on, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- If InchForward (forward run inching command) and InchBackward (reverse run inching command) are turned on at the same time, InchForward (forward run inching command) is prioritized, and InchBackward (reverse run inching command) is disabled. If InchForward (forward run inching command) or InchBackward (reverse run inching command) is newly turned on during an inching operation, it is disabled as well.
- After this FB is executed, the next input label is not loaded until Done (completed) turns off.
- When Distance (travel distance) does not satisfy the setting condition (the setting value is high), an error may occur in the motion module. For details, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

Parameter settings

For details on the parameter settings required to use this FB, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1	5.52ms	1.91ms	3 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing a forward run inching operation, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), and travel distance (10 pulses).
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F and MCv_State_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • When UseInGroup of Axis (axis information) is turned on, disable the axes group and execute the FB again.
1204H	The axis is in the Stopping state.	Change the status of the axis to the Standstill state, and execute the FB again.
1103H	A value out of the range is specified for the movement amount.	Adjust the value set for Distance (travel distance). Correct the range to 1 to 65535, and try again.

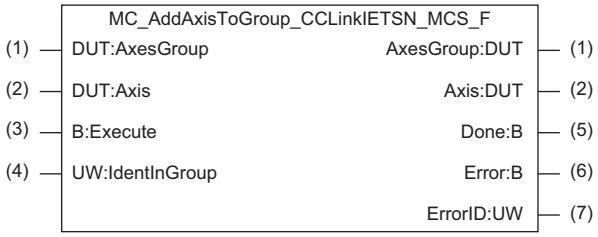
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.21 MC_AddAxisToGroup_CCLinkIETSN_MCS_F (Add Axis)

Overview

Adds the specified axis as a configuration axis of the axes group.



Labels

I/O labels

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F
(2)	Axis	Axis information	AXIS_REF_CCLinkIETSN_MCS_F	—	Page 34 AXIS_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(3)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(4)	IdentInGroup	Axis identifier	Word [unsigned]/bit string [16 bits]	Only when FB starts up	1 to 4	Specifies the number for identification within the axes group of the axis to be added. The axis to be set to 1 should be the reference axis of the axes group.

Output labels

No.	Label	Name	Data type	Default value	Description
(5)	Done	Completed	Bit	OFF	The on state indicates that the specified axis has been added to the axes group.
(6)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

Item	Description
Number of steps	870 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.32K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (one scan execution type)

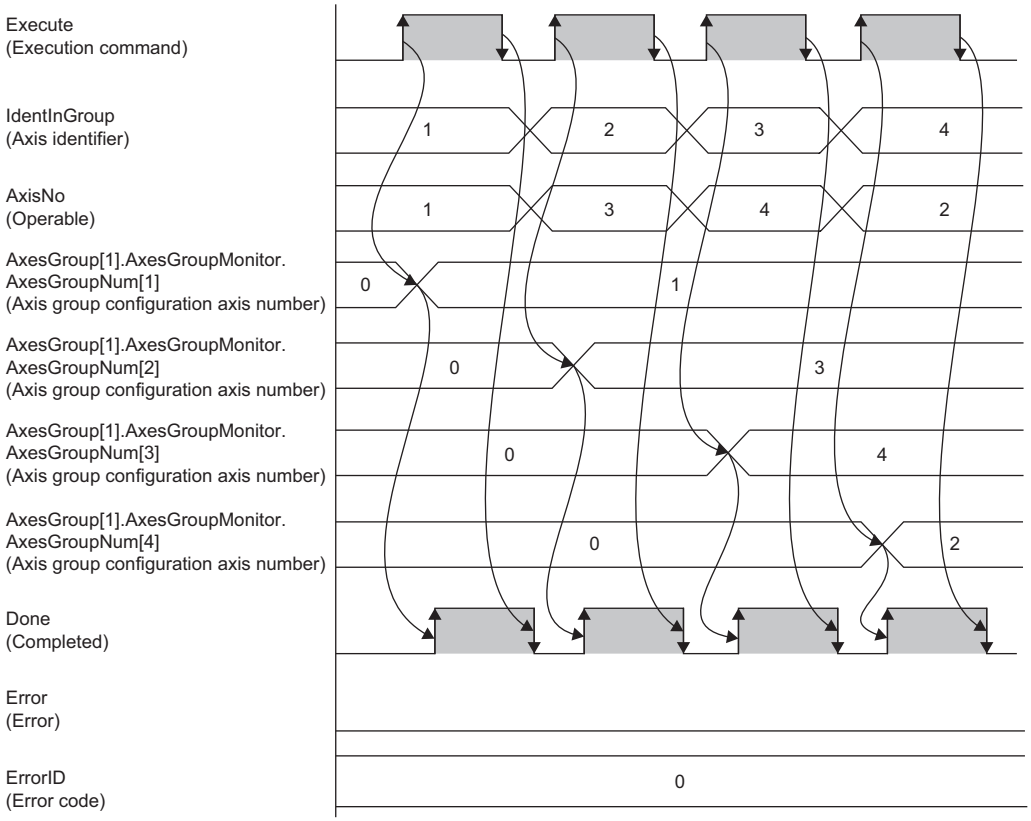
Function description

- When Execute (execution command) is turned on, this FB adds the specified axis as a configuration axis of the axes group. After the process is completed, Done (completed) turns on.
- When the same IdentInGroup (axis identifier) is specified for the specified axes group, the axis specified later is overwritten as a configuration axis of the axes group.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

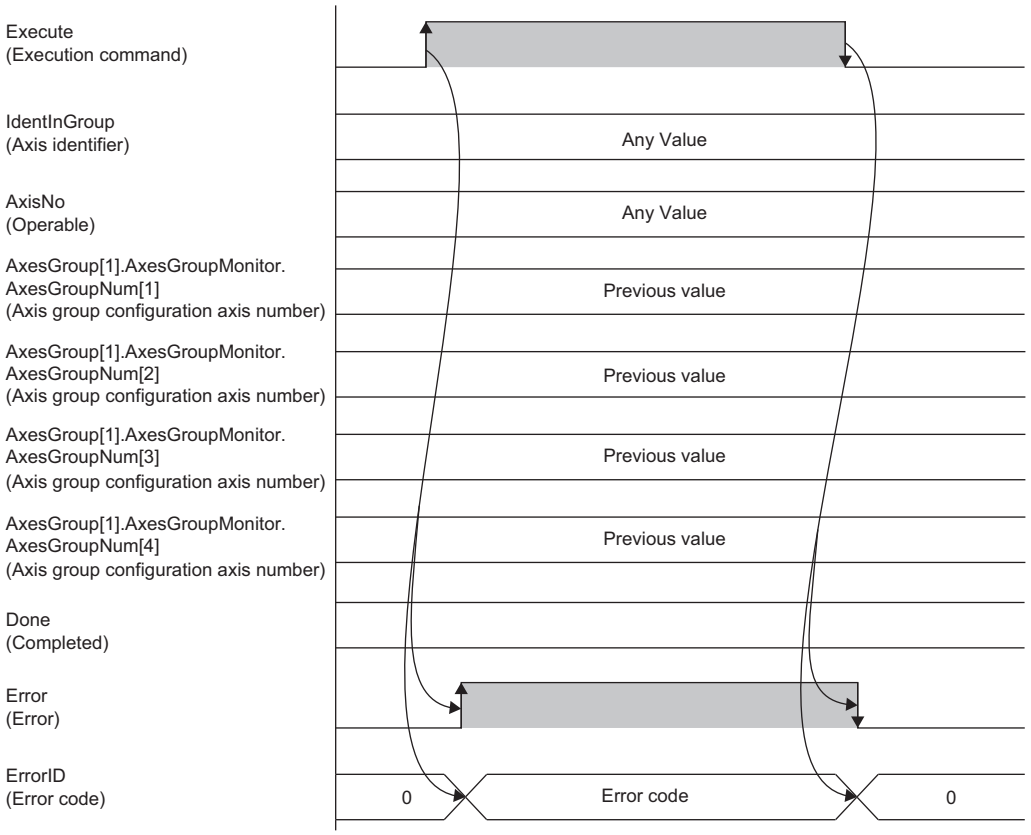
Timing chart of I/O signals

■Completed successfully

When adding axis 1 as the reference axis and axes 2 to 4 as interpolation axes to axes group 1 (AxesGroup[1])



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- When adding specified axes to an axes group, set left-aligned IdentInGroup (axis identifier) numbers, starting with the lower numbers.
- Configure settings so that the module number of the configuration axis of the axes group is the same.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1/Axes group 1	1.47ms	2.04ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of adding the servo amplifier of axis 1 to axes group 1.
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, and MCv_GroupState_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1202H	The axes group is in the GroupErrorStop state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute it again after the active control operation is completed. • Execute MC_GroupDisable_CCLinkIETSN_MCS_F and turn off UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group.
1204H	The axis is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.
120AH	The module number of the specified axis is different from the module number of the configuration axis of the axes group.	The module number of the specified axis must be the same as the module number of the configuration axis of the axes group.

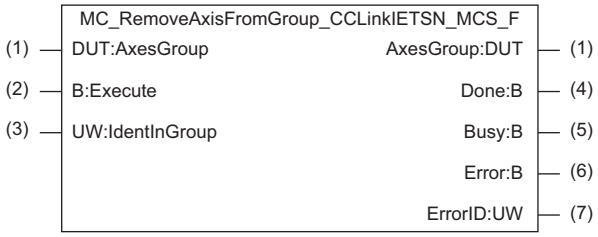
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.22 MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F (Delete Axis)

Overview

Deletes the specified axis from the configuration axes of the axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	IdentInGroup	Axis identifier	Word [unsigned]/bit string [16 bits]	Only when FB starts up	1 to 4	Specifies the number for identification within the axes group of the axis to be deleted.

Output labels

No.	Label	Name	Data type	Default value	Description
(4)	Done	Completed	Bit	OFF	The on state indicates that the specified axis has been added to the axes group.
(5)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(6)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

Item	Description
Number of steps	856 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.27K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

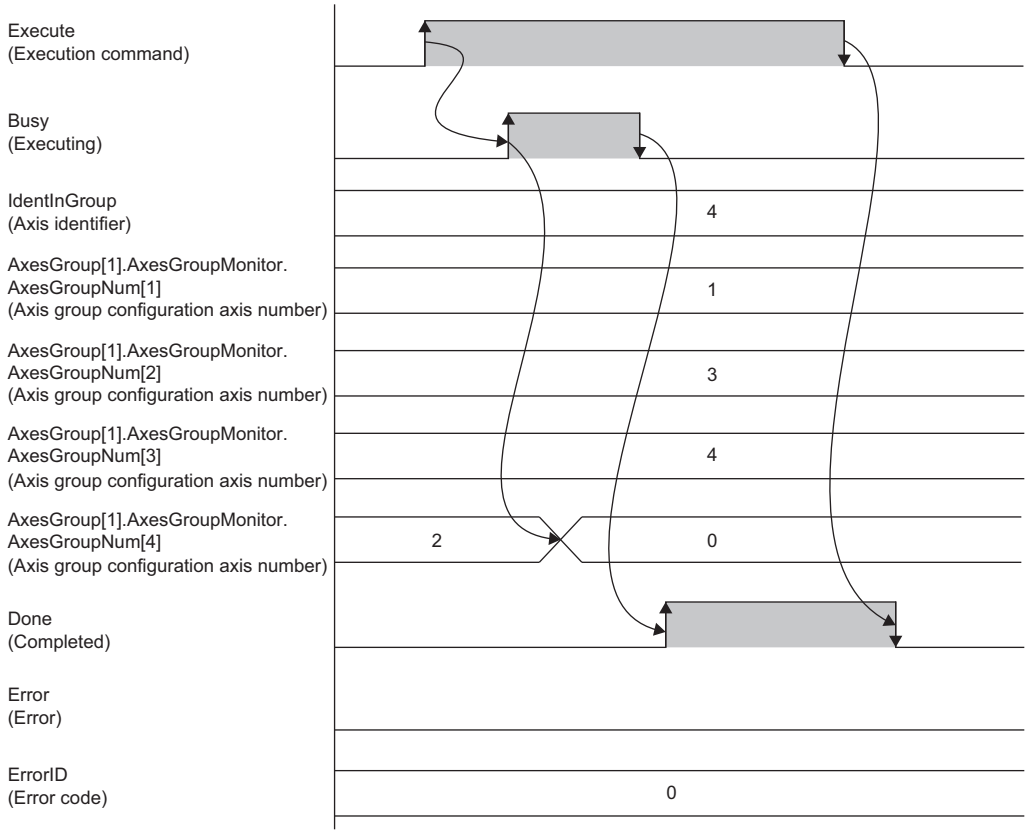
Function description

- When Execute (execution command) is turned on, this FB deletes an axis from the specified axes group. When the process starts normally, Busy (executing) turns on. When the process is completed, Busy (executing) turns off and Done (completed) turns on.
- When all axes are deleted from the axes group, AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupDisabled. When all axes are deleted from the axes group during deceleration and stop caused by an error occurring in the axes group, the status transitions to GroupDisabled after the stopping process is completed.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

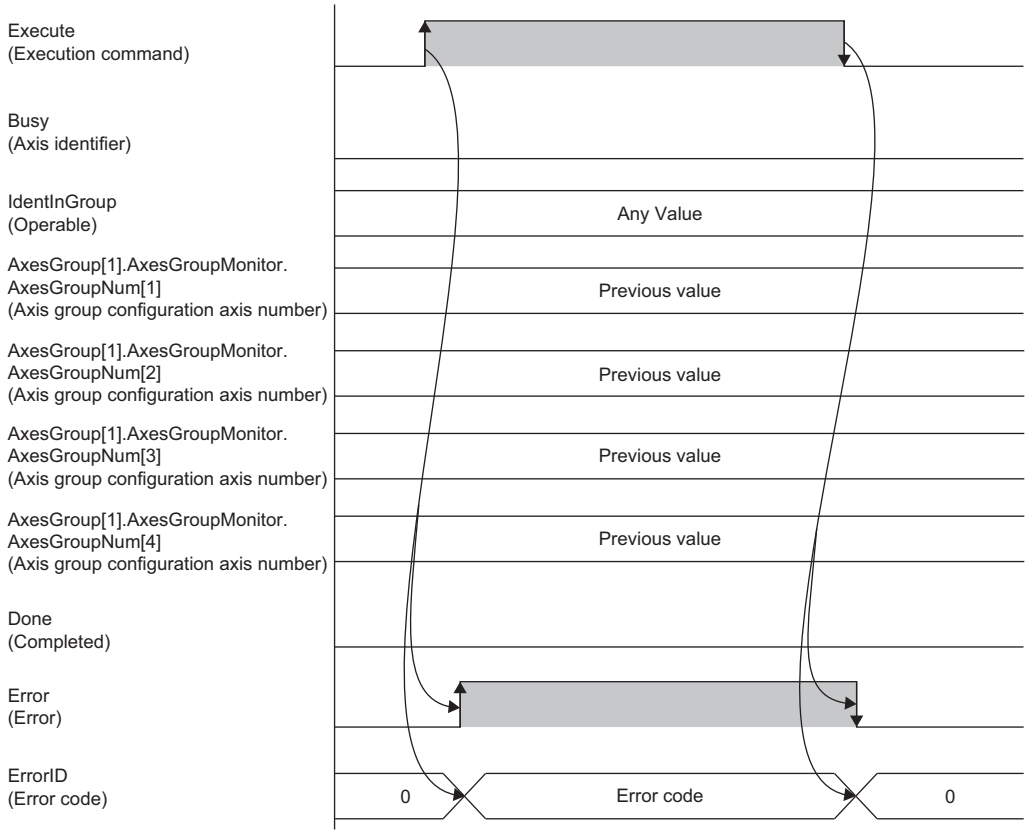
Timing chart of I/O signals

■Completed successfully

When axis identifier 4 (axis 2) has been deleted from axes group 1



■Completed with an error



Precautions

For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axis 1/Axes group 1	1.68ms	2.16ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of deleting the servo amplifier of axis 1 from axes group 1.
*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, and MC_AddAxisToGroup_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1203H	The FB is in the execution disabled state.	Execute it again after the active control operation is completed.
1204H	The axis is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

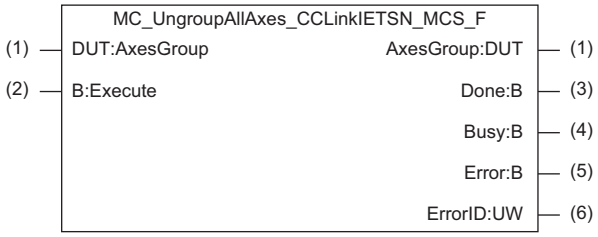
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.23 MC_UngroupAllAxes_CCLinkIETSN_MCS_F (Ungroup Axes)

Overview

Deletes all configuration axes of the axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that all axes have been deleted from the axes group.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

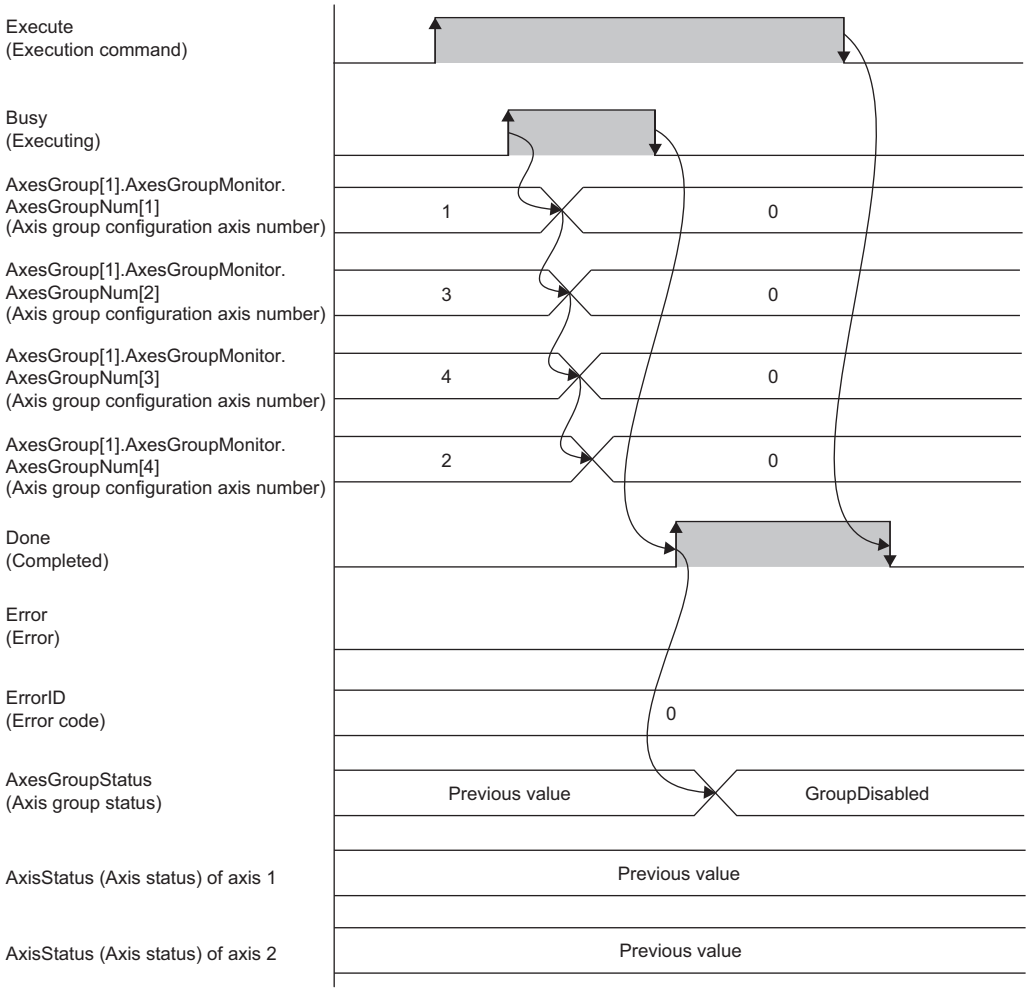
Item	Description
Number of steps	809 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.72K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

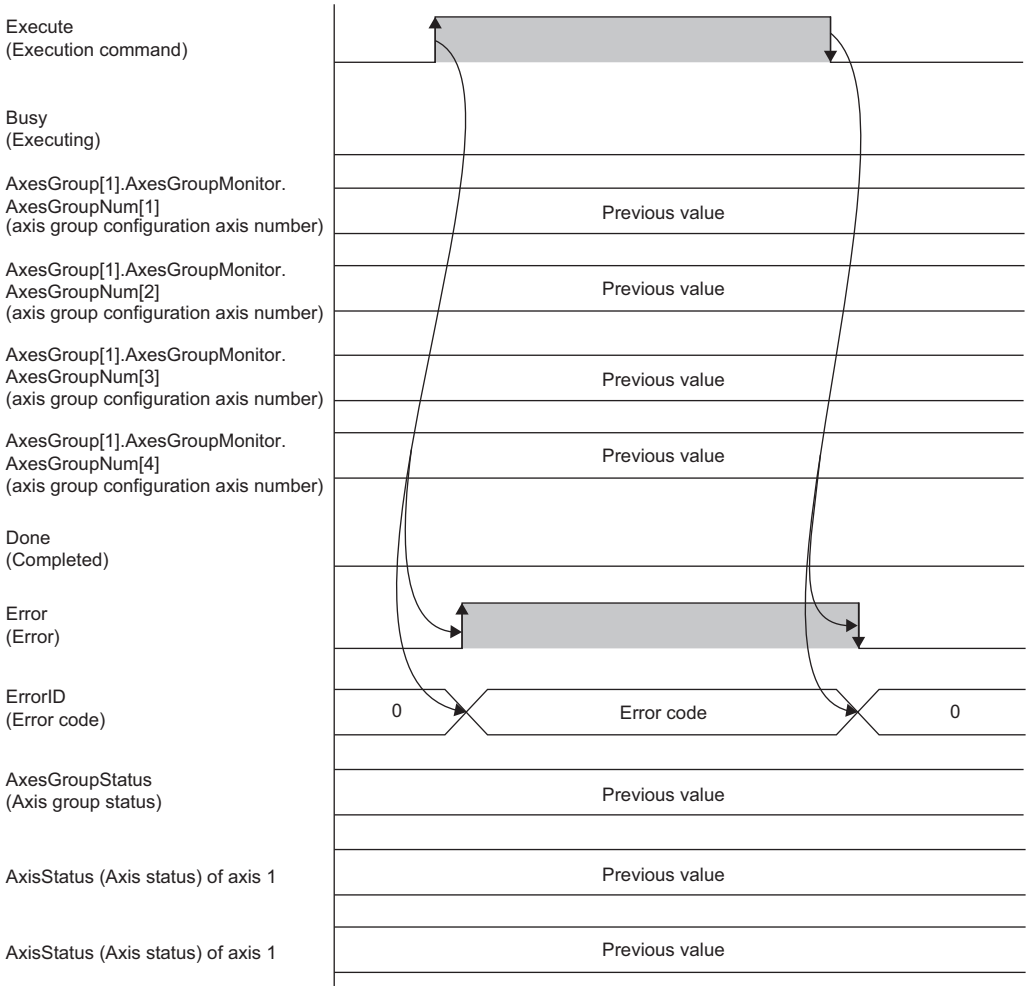
- When Execute (execution command) is turned on, this FB deletes all axes from the specified axes group. When the process starts normally, Busy (executing) turns on. When the process is completed, Busy (executing) turns off, Done (completed) turns on, and the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupDisabled. When this FB is executed during deceleration and stop caused by an error occurring in the axes group, the status transitions to GroupDisabled after the stopping process is completed.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	2.01ms	2.50ms	1 scan

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 Measured in a state where two configuration axes exist in axes group 1.

*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, and MC_AddAxisToGroup_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1203H	The FB is in the execution disabled state.	Execute it again after the active control operation is completed.
1204H	The axis is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

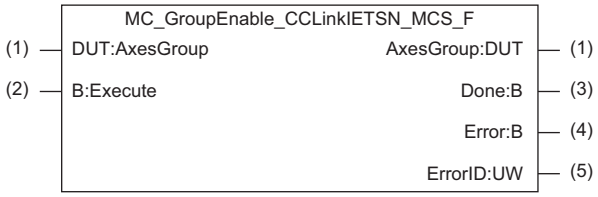
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.24 MC_GroupEnable_CCLinkIETSN_MCS_F (Enable Axes Group)

Overview

Transitions the status of the specified axes group to enable the axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that the axes group has been enabled.
(4)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(5)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

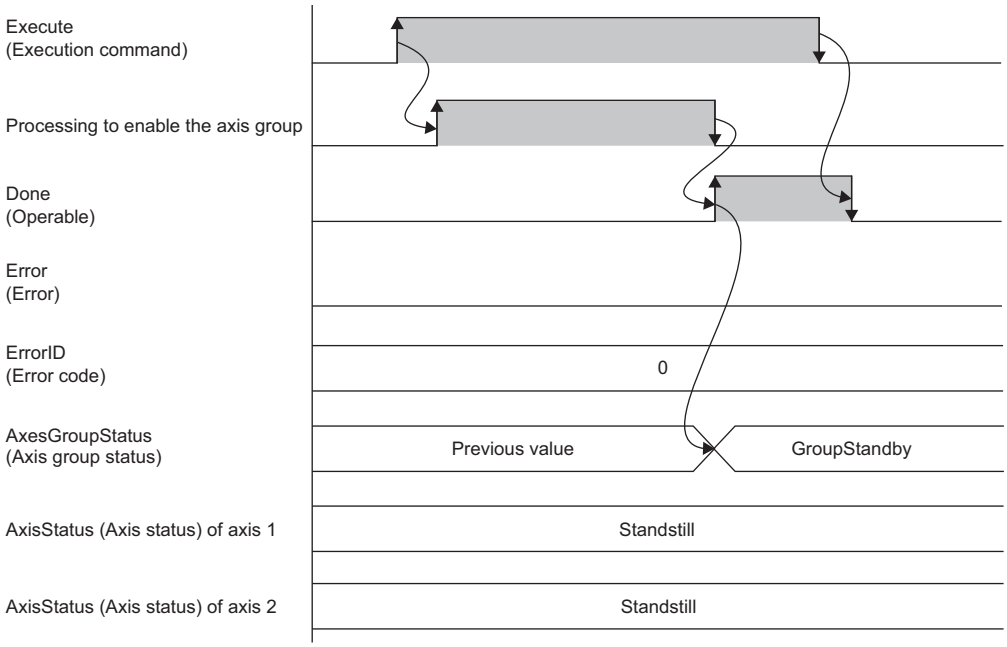
Item	Description
Number of steps	853 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.25K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (one scan execution type)

Function description

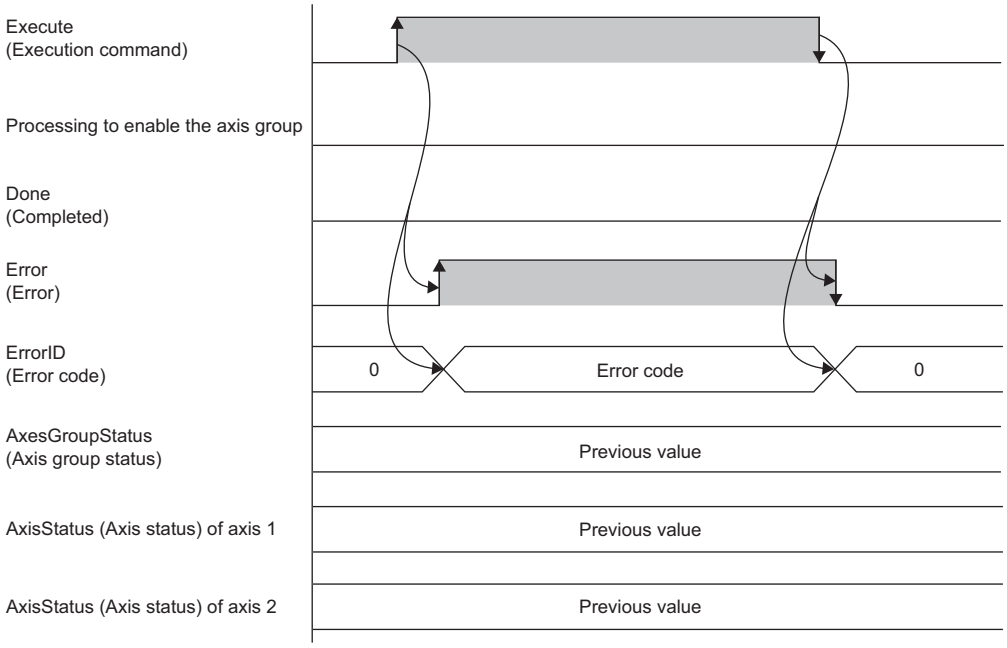
- When Execute (execution command) is turned on, this FB transitions the status of the specified axes group to enable axes group control. When the process is completed, Done (completed) turns on and the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions from GroupDisabled to GroupStandby. (☞ Page 41 State Transition Diagram)
- When AxesGroupStatus (axes group status) transitions to GroupStandby, UseInGroup (in use in axes group) of Axis (axis information) of the configuration axis turns on. However, as UseInGroup (in use in axes group) of Axis (axis information) is updated by MCv_State_CCLinkIETSN_MCS_F, there is a one scan delay in updating after the FB is executed.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- Before executing this FB, execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F to set the configuration axis to the axes group.
- This FB can be executed only when UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes is turned off.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	2.62ms	3.11ms	1 scan

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 Measured in a state where two configuration axes exist in axes group 1.

*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, and MC_AddAxisToGroup_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Change the axis status of all configuration axes of the axes group to the Standstill state, and execute the FB again. • Execute MC_GroupDisable_CCLinkIETSN_MCS_F and turn off UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F to set the configuration axes to the axes group. • Execute it again after the active control operation is completed.
1204H	The axis is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

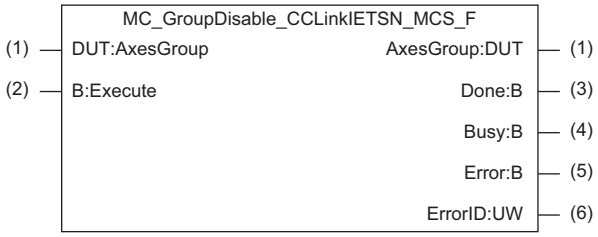
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.25 MC_GroupDisable_CCLinkIETSN_MCS_F (Disable Axes Group)

Overview

Transitions the status of the specified axes group to disable the axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that the axes group has been disabled.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

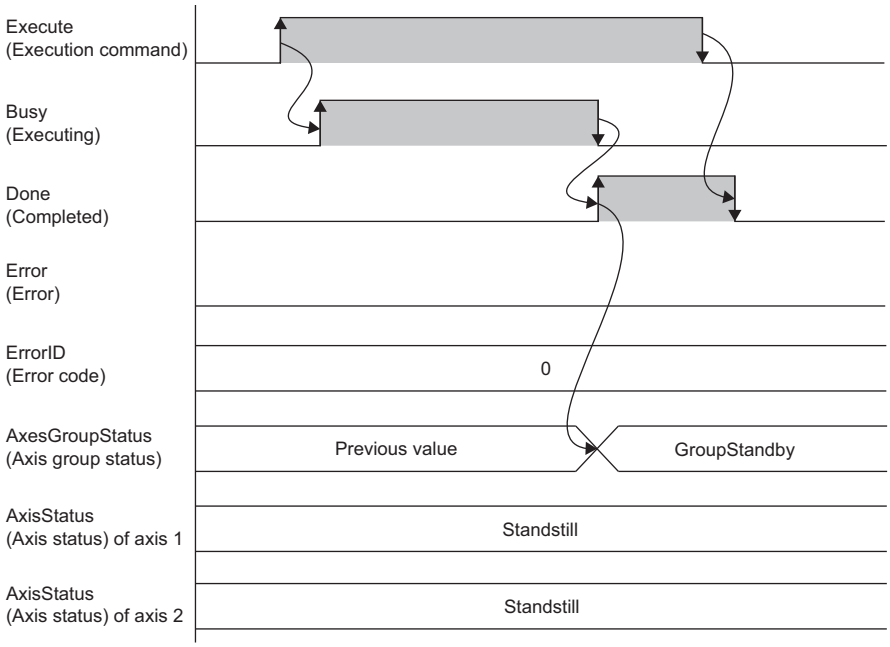
Item	Description
Number of steps	807 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.27K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

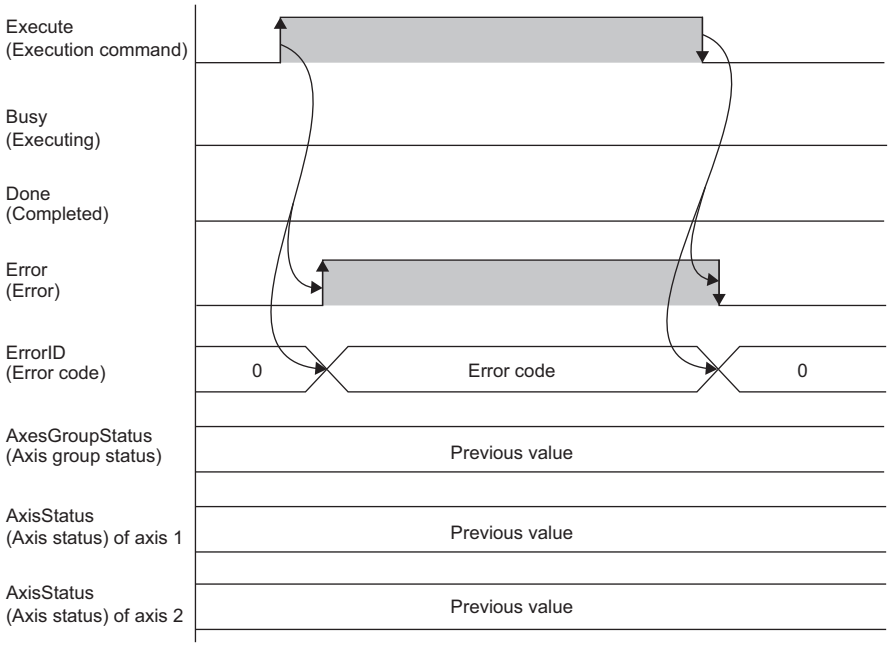
- When Execute (execution command) is turned on, this FB transitions the status of the specified axes group to disable axes group control.
- When the process starts normally, Busy (executing) turns on. When the process is completed, Busy (executing) turns off, Done (completed) turns on, and the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupDisabled. When this FB is executed during deceleration and stop caused by an error occurring in the specified axes group, the status transitions to GroupDisabled after the stopping process is completed. (☞ Page 41 State Transition Diagram)
- When AxesGroupStatus (axes group status) transitions to GroupDisabled, UseInGroup (in use in axes group) of Axis (axis information) of the configuration axis turns off. However, as UseInGroup (in use in axes group) of Axis (axis information) is updated by MCv_State_CCLinkIETSN_MCS_F, there is a one scan delay in updating after the FB is executed.
- If this FB is executed on an axes group for which axes group control has already been disabled, Done (completed) turns on, and the operation ends.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- If this FB is executed during an axis operation, a 1203H error occurs in this FB and the operation to stop the axis is not performed. For the procedure to stop, refer to the following.

☞ Page 225 MC_GroupStop_CCLinkIETSN_MCS_F (Axes Group Forced Stop)

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	2.22ms	2.70ms	1 scan

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 Measured in a state where two configuration axes exist in axes group 1.

*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, and MC_GroupEnable_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1203H	The FB is in the execution disabled state.	Execute it again after the active control operation is completed.
1204H	The axis is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

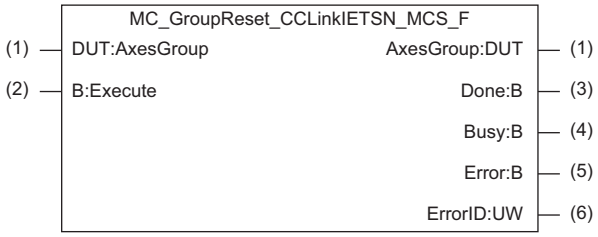
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.26 MC_GroupReset_CCLinkIETSN_MCS_F (Axes Group Error Reset)

Overview

Clears errors and warnings on the configuration axes of the axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that a reset has been completed for all axes of the axes group.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

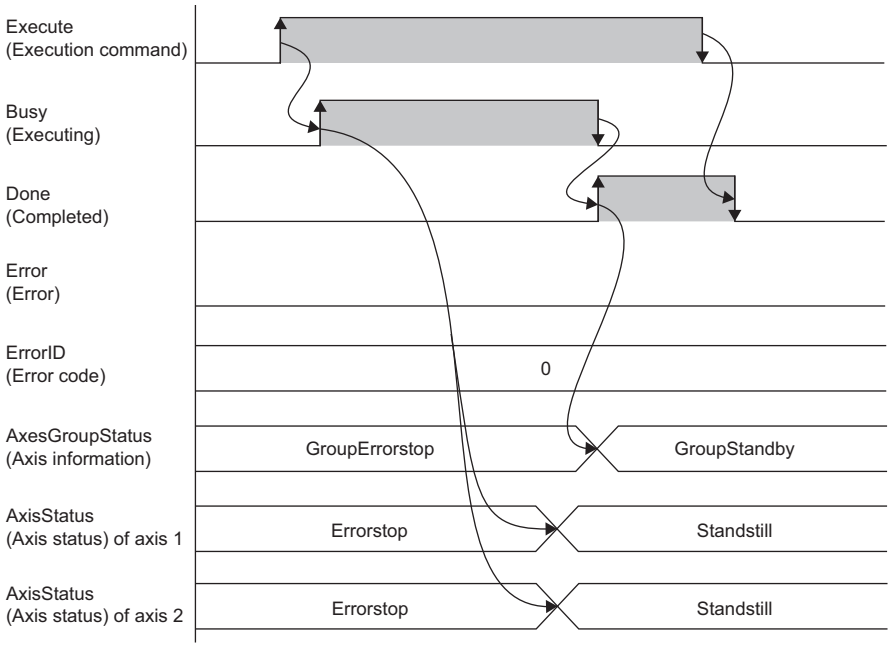
Item	Description
Number of steps	781 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.25K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

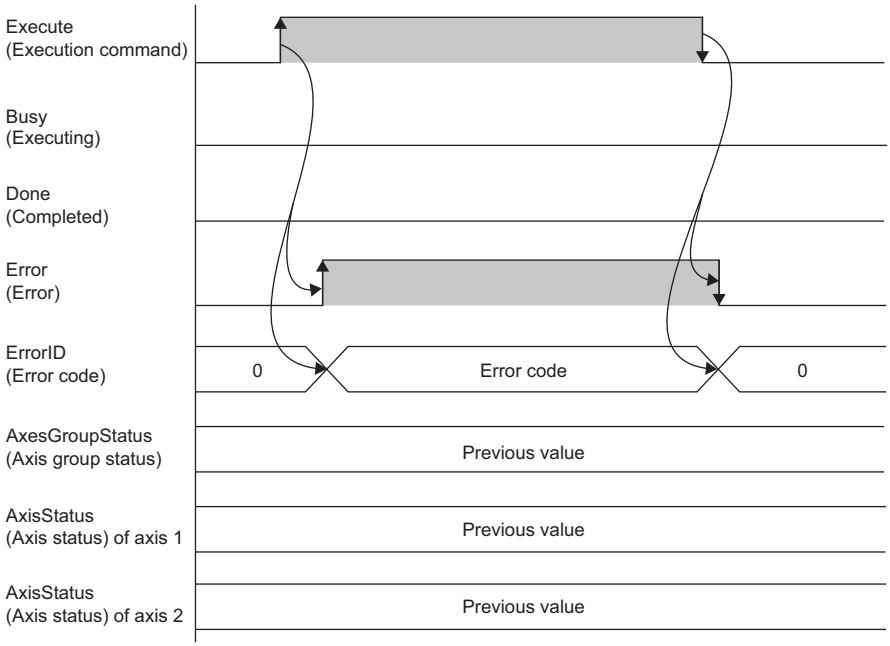
- When Execute (execution command) is turned on, this FB clears errors and warnings on both the motion module side and servo amplifier side of the configuration axis of the axes group.
- When the process for clearing errors and warnings starts, Busy (executing) turns on. When errors and warnings are cleared completely, Busy (executing) turns off, Done (completed) turns on, the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupStandby, and AxisStatus (axis status) of Axis (axis information) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- Even if Execute (execution command) is turned on while the cause of the error or warning in the axis remains, the error or warning will not be cleared, and Busy (executing) will remain on. In this case, the error status of the axis can be checked by whether the AxesGroupStatus (axes group status) of AxesGroup (axes group information) is GroupErrorStop. To try to clear errors again, turn off Execute (execution command) temporarily, clear the cause of the error or warning, and then turn on Execute (execution command) again.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- For details on how to clear the cause of an error or warning, refer to the user's manuals for the motion modules or servo amplifiers used.
- In this FB, if the error or warning cannot be cleared, Busy (executing) remains turned on and Done (completed) does not turn on. If an error or warning has not been cleared, referring to the following and create a time-out processing program.

📖MELSEC iQ-F FX5 Motion Module User's Manual (CC-Link IE TSN)

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	36.8ms	3.95ms	7 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 Measured in a state where two configuration axes exist in axes group 1.

*4 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, MC_GroupEnable_CCLinkIETSN_MCS_F, and MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F to set the configuration axes to the axes group.

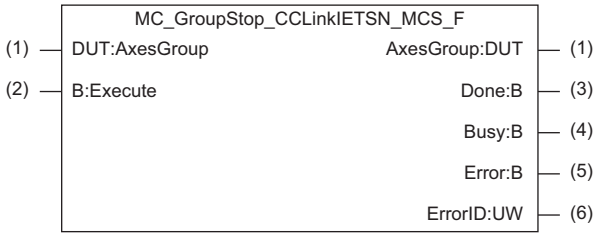
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.27 MC_GroupStop_CCLinkIETSN_MCS_F (Axes Group Forced Stop)

Overview

Forcibly stops the configuration axes of the specified axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input label

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.

Output labels

No.	Label	Name	Data type	Default value	Description
(3)	Done	Completed	Bit	OFF	The on state indicates that the speed has reached zero.
(4)	Busy	Executing	Bit	OFF	The on state indicates that the speed is decreasing to zero.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

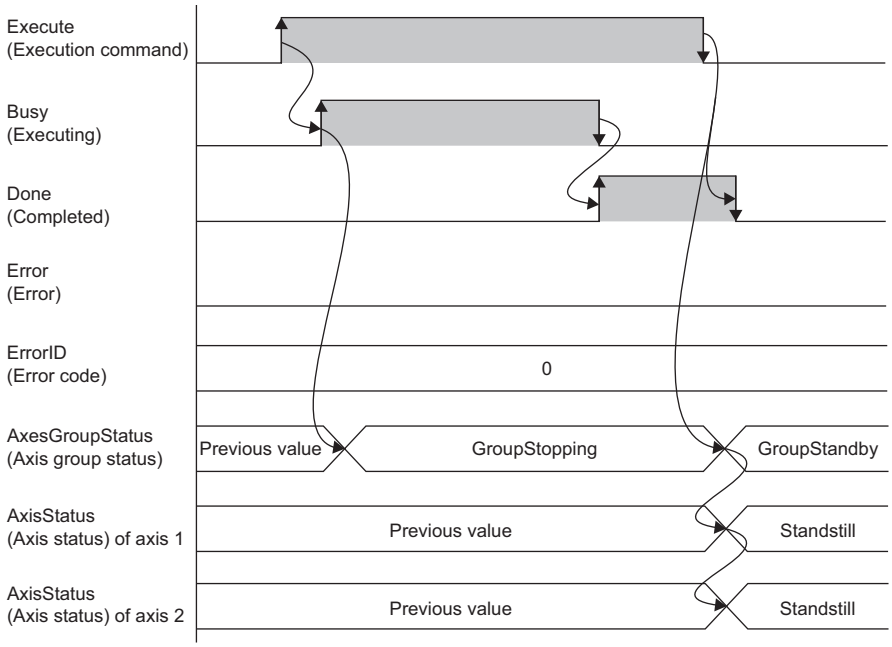
Item	Description
Number of steps	928 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.27K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

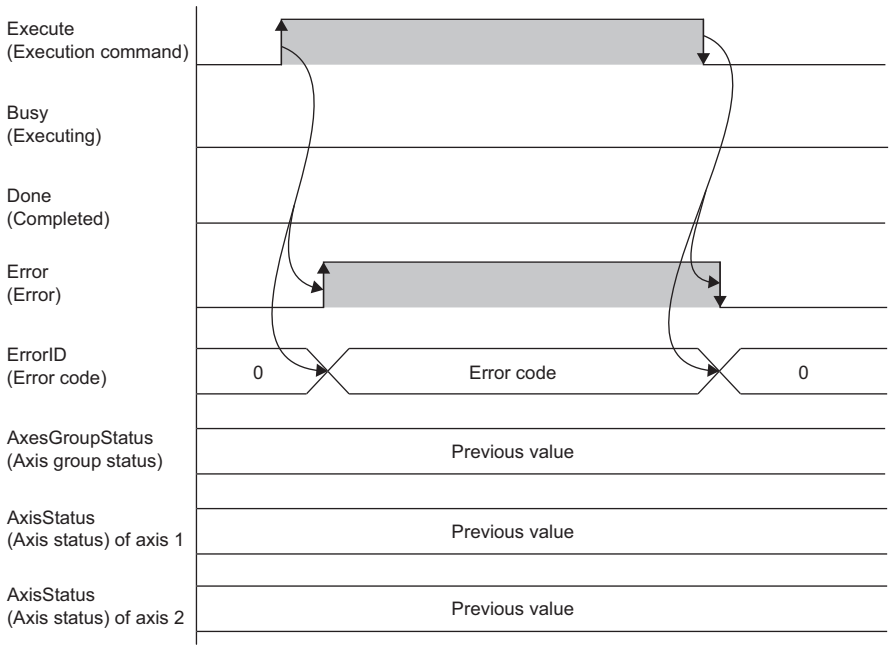
- When Execute (execution command) is turned on, this FB forcibly stops controlling the axes group, and aborts the interpolation control FB being executed. The axes group decelerates to stop along the path of the operation immediately before.
- Busy (executing) is turned on during stop processing, and the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupStopping. AxisStatus (axis status) of Axis (axis information) remains in SynchronizedMotion. When the axis speed reaches 0, Busy (executing) turns off, and Done (completed) turns on. (☞ Page 41 State Transition Diagram)
- While Execute (execution command) is turned on or while the speed has not yet reached 0, the GroupStopping state is held for the AxesGroupStatus (axes group status). When Done (completed) is on and Execute (execution command) is turned off, the AxesGroupStatus (axes group status) transitions to GroupStandby and the AxisStatus (axis status) transitions to Standstill.
- For deceleration time for stopping, the deceleration time specified in the FB being executed is applied.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- Use only one instance of this FB for one axes group. If multiple instances are used for one axes group, a forced stop may not be controlled normally.
- All configuration axes of the axes group decelerate and stop if this FB is executed. To stop immediately, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

Parameter settings

To execute this FB, set "[Pr.39] Stop group 3 rapid stop selection" of the motion module to "0: Normal deceleration stop". (Since the initial value is 0, it is usually not necessary to set it.)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	43.5ms	3.83ms	12 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 This is the result of executing a forced stop, with the setting deceleration time 0 (100ms) during the operation equivalent to the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), and operating speed (1000r/min).

*4 Measured in a state where two configuration axes exist in axes group 1.

*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, MC_GroupEnable_CCLinkIETSN_MCS_F, and MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F to set the configuration axes to the axes group.

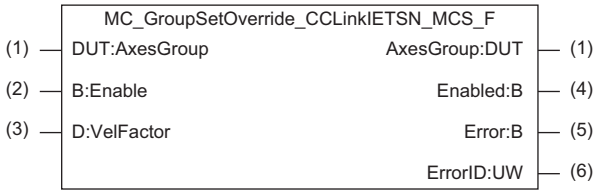
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.28 MC_GroupSetOverride_CCLinkIETSN_MCS_F (Override Axes Group Value Setting)

Overview

Executes the change in target speed of the specified axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Enable	Enable	Bit	Always	ON, OFF	When the value is on, the FB is executed.
(3)	VelFactor	Velocity override coefficient	Double word [signed]	Always	0 to 300 [%]	Set the velocity override coefficient.

Output labels

No.	Label	Name	Data type	Default value	Description
(4)	Enabled	Enabled	Bit	OFF	The on state indicates that the override coefficient has been set successfully.
(5)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

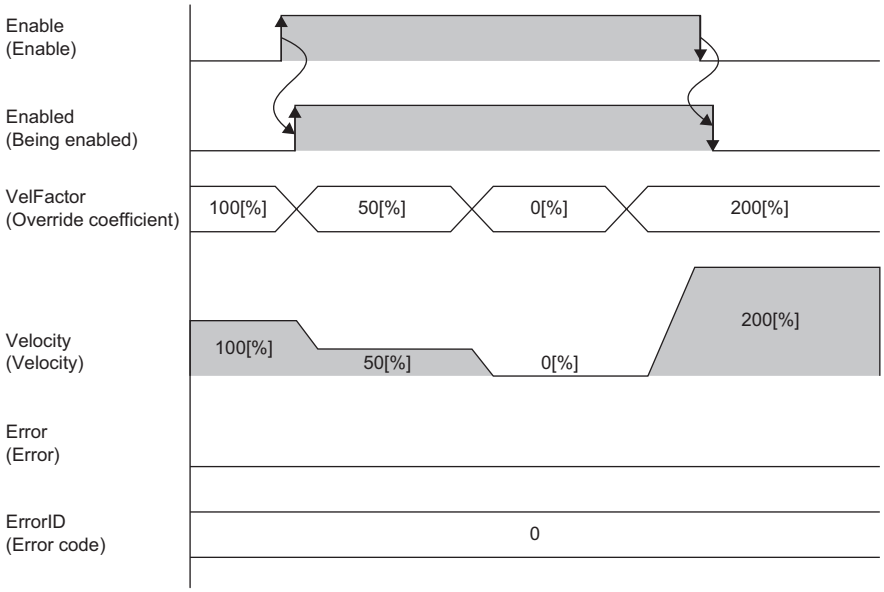
Item	Description
Number of steps	556 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.25K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	As-needed execution type

Function description

- This FB changes the target speed of the specified axes group to the speed calculated by multiplying the current interpolation control speed by the VelFactor (override coefficient) [%].
- When the override coefficient is successfully set while Enable (enable) is on, Enabled (enabled) turns on.
- When the VelFactor (override coefficient) value is changed while Enable (enable) is on, the new override coefficient value is reflected.
- When Enable (enable) is turned off, the override coefficient that was set last is held.
- When changing the speed using this FB during position control, if a sufficient distance for making a change cannot be secured, operation is performed at a speed where change is possible.
- If 0 is set for VelFactor (override coefficient), the AxesGroupStatus (axes group status) of AxesGroup (axes group information) does not transition to the GroupStandby status.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

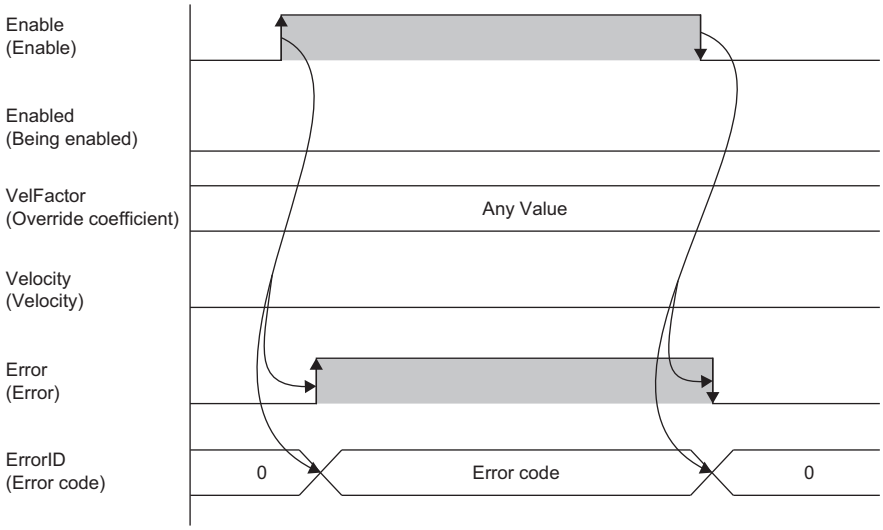
Timing chart of I/O signals

■Completed successfully



Velocity (velocity) can be checked in "[Md.28] Axis speed command" of the motion module.

■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- The speed cannot be changed using this FB during deceleration by MC_GroupStop_CCLinkIETSN_MCS_F or interpolation control FB. The warning "deceleration/stop speed change" occurs in the motion module, and the override coefficient becomes enabled after deceleration and stop.
- If the speed to which VelFactor (override coefficient) is applied is equal to or greater than "[Pr.8] Speed limit value" of the motion module, a warning "speed limit value over" occurs in the motion module, and the speed is controlled by "[Pr.8] Speed limit value".
- While Enable (enable) is on, VelFactor (velocity override coefficient) can always be changed including during operation. However, when changing the value, the interval of change should be set to at least 10ms. If the value is changed to a shorter interval, the motion module cannot follow the change, and the command may not be executed normally.
- If a value outside of the setting range is set for VelFactor (velocity override coefficient), a warning "illegal override value" occurs in the motion module, and the override coefficient is controlled as 300[%].
- The override coefficient at the point when Enable (enable) of this FB is turned off is reflected in the speed of the positioning control FB, unless the override coefficient is changed by MC_SetOverride_[Type]. However, the override coefficient is reflected only to the reference axis of the axes group specified by this FB.

Parameter settings

There are no parameter settings specific to this FB. For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	3.01ms	3.50ms	1 scan

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of changing the command speed, with the settings of the number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), equivalent of the operating speed (1000r/min), and velocity override coefficient (50%).
*4 Measured in a state where two configuration axes exist in axes group 1.
*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, MC_GroupEnable_CCLinkIETSN_MCS_F, and MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F to set the configuration axes to the axes group.

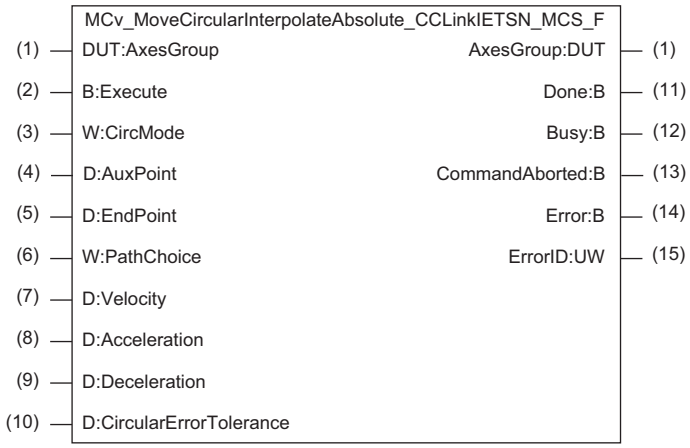
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.29 MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Circular Interpolation Control)

Overview

This FB sets the end point and auxiliary point of the absolute position and executes positioning based on circular interpolation of two axes using the specified axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	CircMode	Circular interpolation mode	Word [signed]	Only when FB starts up	0 to 1	• 0: Boundary point specification • 1: Center point specification
(4)	AuxPoint	Auxiliary point	Double word [signed] (0..1)	Only when FB starts up	• -2147483648 to 2147483647 [$\times 10^{-1}$μm] • -2147483648 to 2147483647 [$\times 10^{-5}$inch] • -2147483648 to 2147483647 [pulse]	Specify the absolute position of the auxiliary point.
(5)	EndPoint	End point	Double word [signed] (0..1)	Only when FB starts up	• -2147483648 to 2147483647 [$\times 10^{-1}$μm] • -2147483648 to 2147483647 [$\times 10^{-5}$inch] • -2147483648 to 2147483647 [pulse]	Specify the absolute position of the end point.
(6)	PathChoice	Path choice	Word [signed]	Only when FB starts up	Page 28 MC_CIRC_PATHCHOICE_CCLinkIETSN_MCS_F	Set the rotation direction.*1
(7)	Velocity	Target speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the command speed (composite speed of two axes).
(8)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0.
(9)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module.
(10)	CircularErrorTolerance	Circular interpolation error tolerance	Double word [signed]	Only when FB starts up	• 0 to 100000 [$\times 10^{-1}$μm] • 0 to 100000 [$\times 10^{-5}$inch] • 0 to 100000 [pulse]	Set the circular interpolation error allowable range.*1

*1 The input is ignored when CircMode (circular interpolation mode) is set to "0: Boundary point specification".

Output labels

No.	Label	Name	Data type	Default value	Description
(11)	Done	Completed	Bit	OFF	The on state indicates that all axes reached the specified end position.
(12)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(13)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(14)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(15)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

Item	Description
Number of steps	1287 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.31K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- When Execute (execution command) is turned on, this FB executes positioning with circular interpolation of two axes using the specified axes group.
- Busy (executing) turns on during interpolation control, the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupMoving, and the AxisStatus (axis status) of Axis (axis information) transitions to SynchronizedMotion. When interpolation control is completed, Busy (executing) turns off, Done (completed) turns on, the AxesGroupStatus (axes group status) transitions to GroupStandby, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs on even one axis during interpolation control, all axes will decelerate and stop.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

■When "0: Boundary point specification" is selected for CircMode (circular interpolation mode)

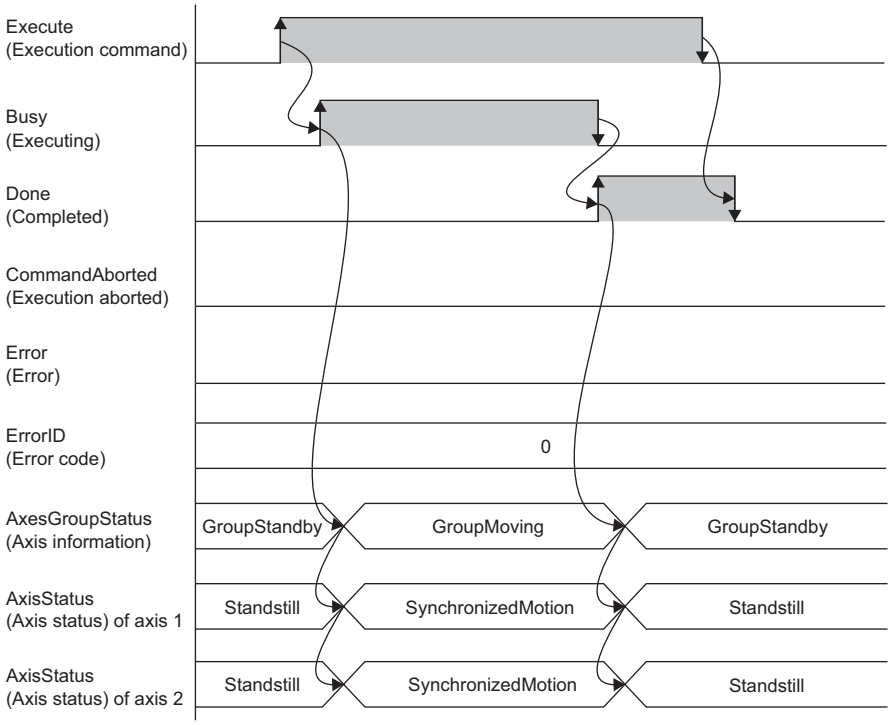
- Positioning is executed along a circular trajectory that goes from the current stop position (start point address) to the address (end point address) specified in EndPoint (end point) by way of the address specified in AuxPoint (auxiliary point).

■When "1: Center point specification" is selected for CircMode (circular interpolation mode)

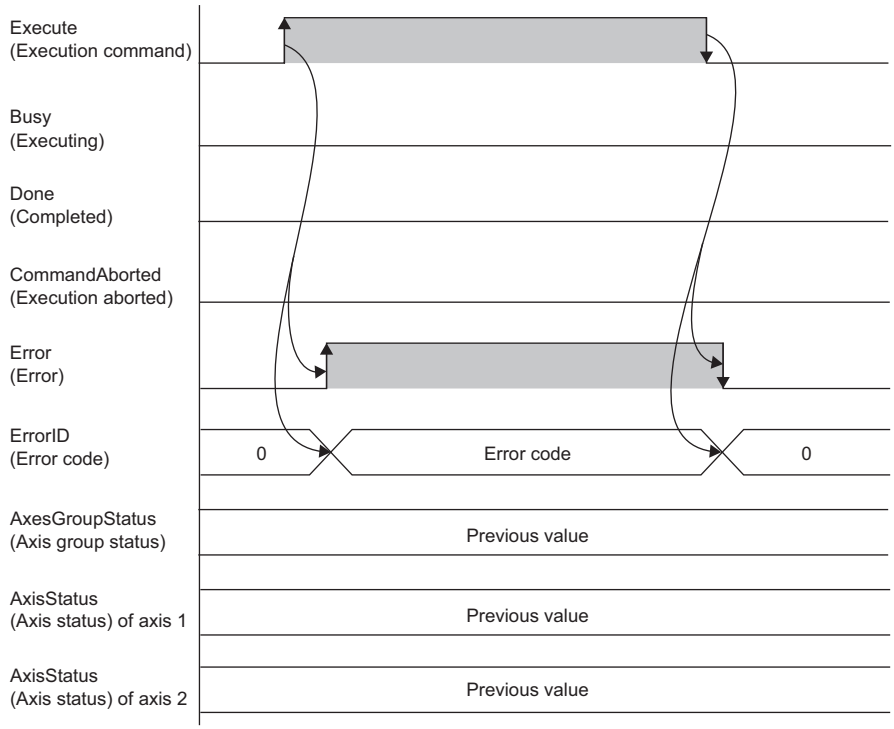
- Positioning is executed along a circular trajectory that uses the radius calculated from the address of the start point and the address of the center point specified in AuxPoint (auxiliary point), from the current stop position (start point address) to the address (end point address) specified in EndPoint (end point). Note that true circle positioning is possible by setting the same address for EndPoint (end point) and the start point.
- There may be an error between the end point address calculated from the start point and center point addresses, as well as the end point address specified in EndPoint (end point). If the error is equal to or smaller than the value specified in CircularErrorTolerance (circular interpolation error tolerance), circular interpolation is performed to the specified end point address while correcting the error. If the error is larger than the value specified in CircularErrorTolerance (circular interpolation error tolerance), an error occurs on the motion module, and operation does not start.
- If an error occurs between the radius (start point radius) calculated from the start point and center point addresses and the radius (end point radius) calculated from the end point and center point addresses, the composite speed is as shown below, different from the speed specified in Velocity (target speed).
  - When the start point radius is larger than the end point radius: The closer to the end point address, the slower the speed compared to cases with no error.
  - When the start point radius is smaller than the end point radius: The closer to the end point address, the faster the speed compared to cases with no error.

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- This FB cannot be used when different control units are used for the reference axis and interpolation axes. However, [mm] and [inch] can be used together. When [mm] and [inch] are used together, the unit set for the reference axis is used as the unit for the speed during control.
- The combination of interpolation axes cannot be changed during interpolation control.
- When there are three or more configuration axes in the specified axes group, this FB uses axes with axis identifiers 1 and 2 of the axes group.
- In the following cases, this FB causes an error in the motion module and operation cannot be started.

When the control unit is set to degree
When the radius is over 536870912 (2^{29})
When start point address = AuxPoint (auxiliary point)
When EndPoint (end point) = AuxPoint (auxiliary point)
When the following conditions are met while "0: Boundary point specification" is set for CircMode (circular interpolation mode)
- When the center point address is outside the range of -2147483648 (-2^{31}) to 2147483647 ($2^{31}-1$)
- When start point address = EndPoint (end point)
- When start point address, AuxPoint (auxiliary point), and EndPoint (end point) are on a straight line

Parameter settings

To execute this FB, set "[Pr.20] Interpolation speed designation method" of the motion module to "0: Composite speed".
For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	2267ms	3.34ms	768 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing absolute value circular interpolation control immediately after homing, with the settings of the current position (0 pulses, 0 pulses), number of command input pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), circular interpolation mode (boundary point specification), auxiliary point (50000000 pulses, 30000000 pulses), end point (100000000 pulses, 0 pulses), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 Measured in a state where two configuration axes exist in axes group 1.
*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, and MC_GroupEnable_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F, set two or more configuration axes for the axes group, then execute it again.
1204H	The axes group is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.
1A6FH	A value out of the range is specified for Path choice.	Correct the value for Path choice. Correct the range to 1 to 2, and try again.

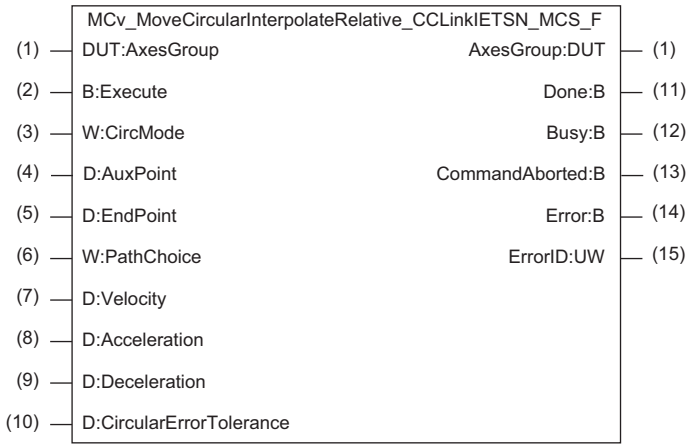
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.30 MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Circular Interpolation Control)

Overview

This FB sets the relative position to the end point and auxiliary point from the current position when starting and executes positioning based on circular interpolation of two axes using the specified axes group.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	CircMode	Circular interpolation mode	Word [signed]	Only when FB starts up	0 to 1	• 0: Boundary point specification • 1: Center point specification
(4)	AuxPoint	Auxiliary point	Double word [signed] (0..1)	Only when FB starts up	• -2147483648 to 2147483647 [$\times 10^{-1}$μm] • -2147483648 to 2147483647 [$\times 10^{-5}$inch] • -2147483648 to 2147483647 [pulse]	Set the travel distance from the start point to the auxiliary point.
(5)	EndPoint	End point	Double word [signed] (0..1)	Only when FB starts up	• -2147483648 to 2147483647 [$\times 10^{-1}$μm] • -2147483648 to 2147483647 [$\times 10^{-5}$inch] • -2147483648 to 2147483647 [pulse]	Set the travel distance from the start point to the end point.
(6)	PathChoice	Path choice	Word [signed]	Only when FB starts up	Page 28 MC_CIRC_PATHCHOICE_CCLinkIETSN_MCS_F	Set the rotation direction.*1
(7)	Velocity	Target speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the command speed (composite speed of two axes).
(8)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0.
(9)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module.
(10)	CircularErrorTolerance	Circular interpolation error tolerance	Double word [signed]	Only when FB starts up	• 0 to 100000 [$\times 10^{-1}$μm] • 0 to 100000 [$\times 10^{-5}$inch] • 0 to 100000 [pulse]	Set the circular interpolation error allowable range.*1

*1 The input is ignored when CircMode (circular interpolation mode) is set to "0: Boundary point specification".

Output labels

No.	Label	Name	Data type	Default value	Description
(11)	Done	Completed	Bit	OFF	The on state indicates that all axes reached the specified end position.
(12)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(13)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(14)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(15)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

Item	Description
Number of steps	1287 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.31K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

- When Execute (execution command) is turned on, this FB executes positioning with circular interpolation of two axes using the specified axes group.
- Busy (executing) turns on during interpolation control, the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupMoving, and the AxisStatus (axis status) of Axis (axis information) transitions to SynchronizedMotion. When interpolation control is completed, Busy (executing) turns off, Done (completed) turns on, the AxesGroupStatus (axes group status) transitions to GroupStandby, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs on even one axis during interpolation control, all axes will decelerate and stop.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

■When "0: Boundary point specification" is selected for CircMode (circular interpolation mode)

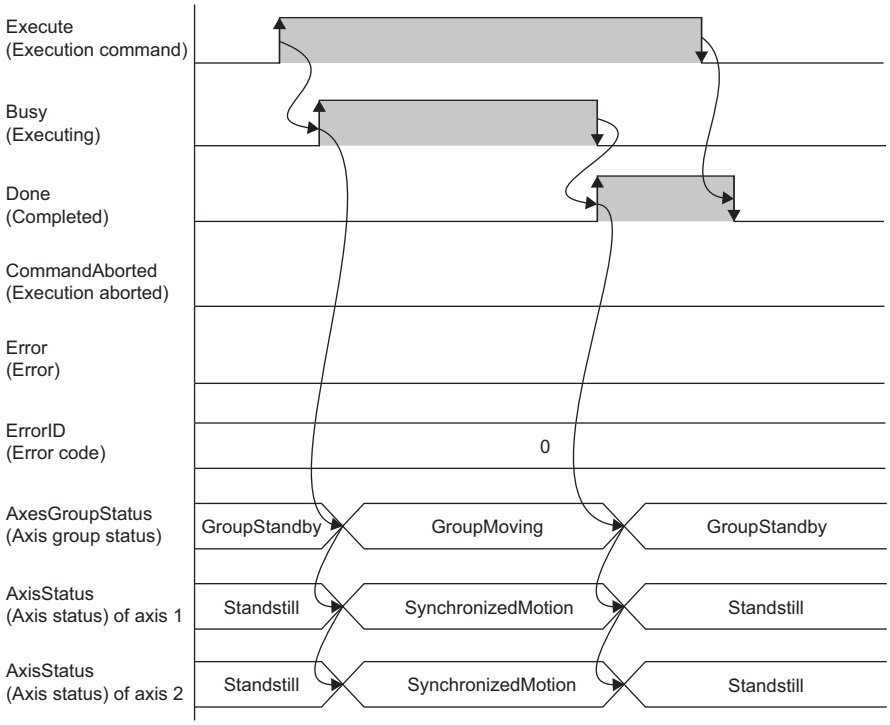
- Positioning is executed along a circular trajectory that goes from the current stop position (start point address) to the address (end point address) specified in EndPoint (end point) by way of the address of the travel distance specified in AuxPoint (auxiliary point).

■When "1: Center point specification" is selected for CircMode (circular interpolation mode)

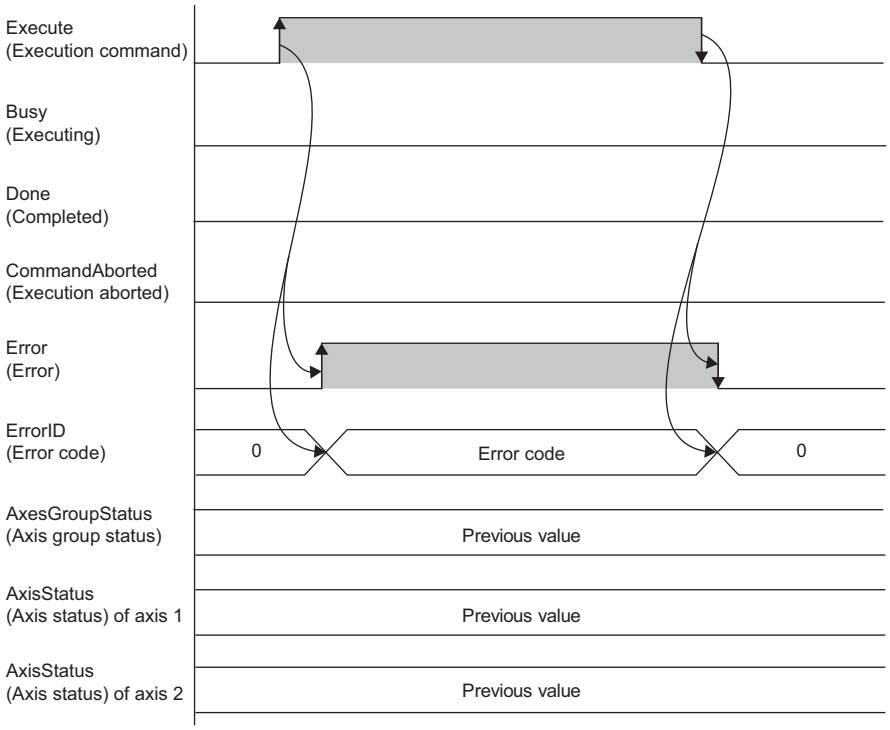
- Positioning is executed along a circular trajectory that uses the radius calculated from the address of the start point and the address of the center point specified in AuxPoint (auxiliary point), from the current stop position (start point address) to the address of the travel distance (end point address) specified in EndPoint (end point). Note that true circle positioning is possible by setting 0 for EndPoint (end point).
- There may be an error between the end point address calculated from the start point and center point addresses, as well as the end point address specified in EndPoint (end point). If the error is equal to or smaller than the value specified in CircularErrorTolerance (circular interpolation error tolerance), circular interpolation is performed to the specified end point address while correcting the error. If the error is larger than the value specified in CircularErrorTolerance (circular interpolation error tolerance), an error occurs in the motion module, and operation does not start.
- If an error occurs between the radius (start point radius) calculated from the start point and center point addresses and the radius (end point radius) calculated from the end point and center point addresses, the composite speed is as shown below, different from the speed specified in Velocity (target speed).
  - When the start point radius is larger than the end point radius: The closer to the end point address, the slower the speed compared to cases with no error.
  - When the start point radius is smaller than the end point radius: The closer to the end point address, the faster the speed compared to cases with no error.

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- This FB cannot be used when different control units are used for the reference axis and interpolation axes. However, [mm] and [inch] can be used together. When [mm] and [inch] are used together, the unit set for the reference axis is used as the unit for the speed during control.
- The combination of interpolation axes cannot be changed during interpolation control.
- When there are three or more configuration axes in the specified axes group, this FB uses axes with axis identifiers 1 and 2 of the axes group.
- In the following cases, this FB causes an error in the motion module and operation cannot be started.

When the control unit is set to degree
When the radius is over 536870912 (2^{29})
When start point address = AuxPoint (auxiliary point)
When EndPoint (end point) = AuxPoint (auxiliary point)
When AuxPoint (auxiliary point) is outside the range of -2147483648 (-231) and 2147483647 (231-1)
When EndPoint (end point) is outside the range of -2147483648 (-231) and 2147483647 (231-1)
When the following conditions are met while "0: Boundary point specification" is set for CircMode (circular interpolation mode)
- When the center point address is outside the range of -2147483648 (-2^{31}) to 2147483647 (2^{31}-1)
- When start point address = EndPoint (end point)
- When start point address, AuxPoint (auxiliary point), and EndPoint (end point) are on a straight line

Parameter settings

To execute this FB, set "[Pr.20] Interpolation speed designation method" of the motion module to "0: Composite speed".
For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	2264ms	3.34ms	768 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing relative value circular interpolation control immediately after homing, with the settings of the current position (0 pulses, 0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), circular interpolation mode (boundary point specification), auxiliary point (50000000 pulses, 30000000 pulses), end point (100000000 pulses, 0 pulses), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 Measured in a state where two configuration axes exist in axes group 1.
*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, and MC_GroupEnable_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F, set two or more configuration axes for the axes group, then execute it again.
1204H	The axes group is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.
1A6FH	A value out of the range is specified for Path choice.	Correct the value for Path choice. Correct the range to 1 to 2, and try again.

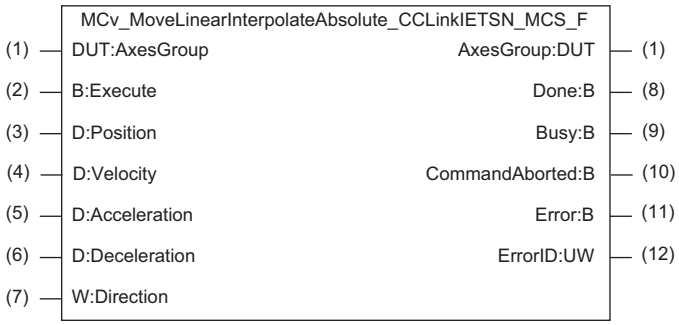
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.31 MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Linear Interpolation Control)

Overview

This FB specifies the target position based on the absolute position for the specified axes group and executes positioning by linear interpolation control.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Position	Target position	Double word [signed] (0..3)	Only when FB starts up	Page 18 FB Library Specifications	Specify the target position based on the absolute position. Set a value for each axis to be used for linear interpolation control.
(4)	Velocity	Target speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the command speed.
(5)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0.
(6)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module.
(7)	Direction	Rotation direction	Word [signed]	Only when FB starts up	Page 25 List of Global Labels	Specify the rotation direction.

Output labels

No.	Label	Name	Data type	Default value	Description
(8)	Done	Completed	Bit	OFF	The on state indicates that all axes reached the specified end position.
(9)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(10)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(11)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(12)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

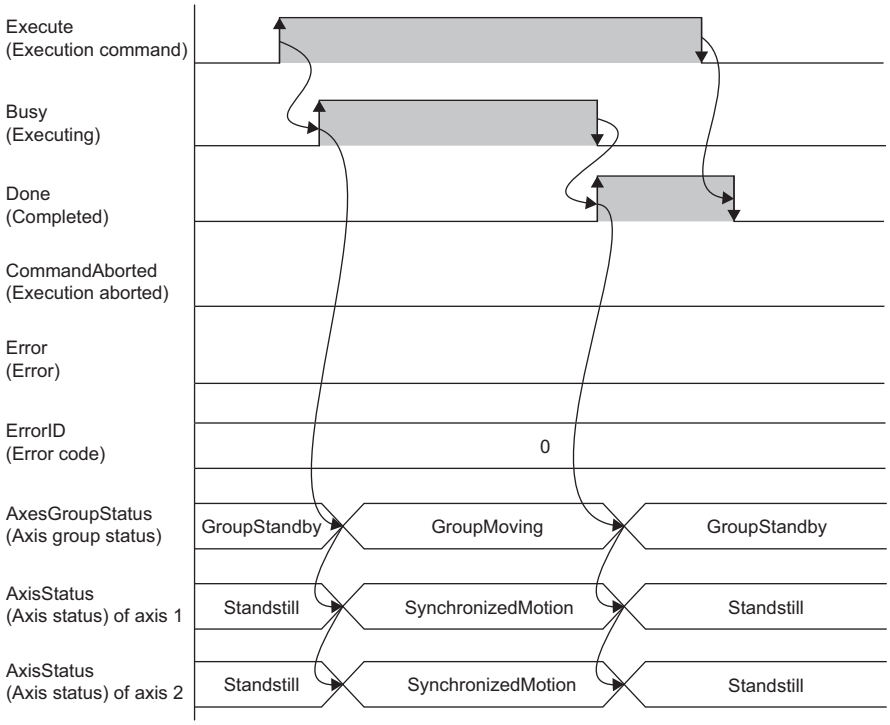
Item	Description
Number of steps	1369 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.31K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

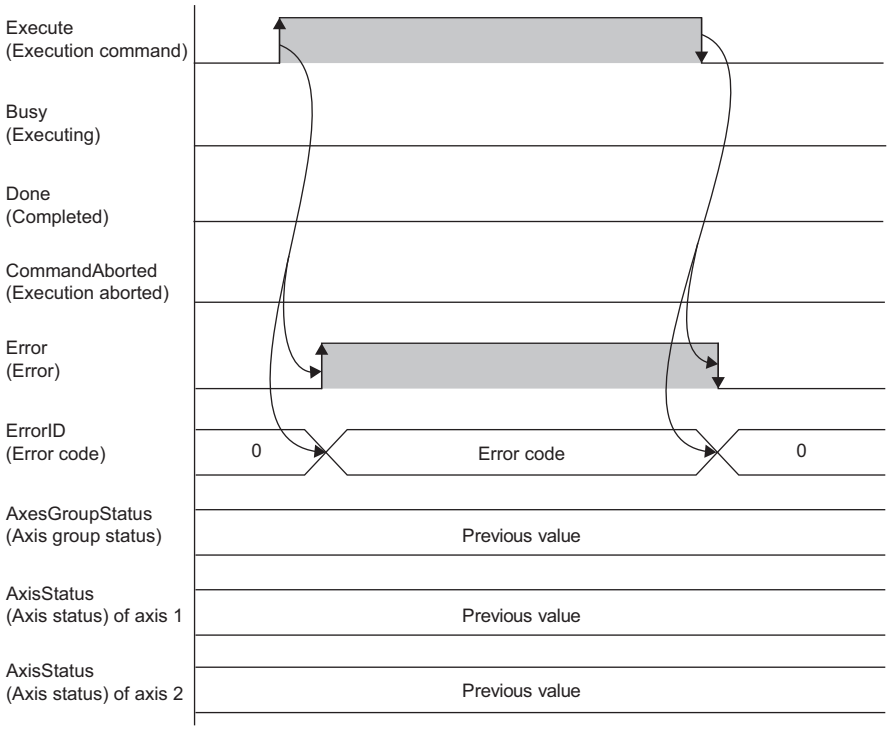
- When Execute (execution command) is turned on, this FB uses the specified axes group to execute positioning along a linear trajectory from the current stop position (start point address) to the end point address specified in Position (target position).
- Interpolation control is performed for the number of configuration axes of the specified axes group. Interpolation control can be performed on a maximum of four axes.
- Busy (executing) turns on during interpolation control, the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupMoving, and the AxisStatus (axis status) of Axis (axis information) transitions to SynchronizedMotion. When interpolation control is completed, Busy (executing) turns off, Done (completed) turns on, the AxesGroupStatus (axes group status) transitions to GroupStandby, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs on even one axis during interpolation control, all axes will decelerate and stop.
- Direction (rotation direction) is enabled only when the control unit is degree. It is ignored when the control unit is other than degree.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- When different units are used for the reference axis and interpolation axes, or during 4-axis linear interpolation control, "0: Composite speed" cannot be set in "[Pr.20] Interpolation speed designation method". Note that this does not apply when both [mm] and [inch] are used in 2 to 3-axis interpolation control.
- When different units are used for the reference axis and interpolation axes or both [mm] and [inch] are used together, the unit set for the reference axis is used as the unit for the speed during control.
- When "1: Reference axis speed" is selected for "[Pr.20] Interpolation speed designation method", configure the settings so that the long axis side is the reference axis.
- When "0: Composite speed" is selected for "[Pr.20] Interpolation speed designation method", if the travel distance of each axis exceeds 1073741824 (= 2^{30}) then an error occurs in the motion module and positioning cannot be started.
- The combination of interpolation axes cannot be changed during interpolation control.

Parameter settings

To use this FB, "[Pr.20] Interpolation speed designation method" needs to be set before turning on "[Cd.190] PLC READY". For details, refer to the following.

📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)

For details on the common parameter settings, refer to the following.

☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	1342ms	3.41ms	443 scans

*1 Measured with the program capacity set to 128K steps.

*2 The standard area is used for labels.

*3 This is the result of executing 2-axis absolute value linear interpolation control immediately after homing, with the settings of the current position (0 pulses, 0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target position (50000000 pulses, 30000000 pulses), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).

*4 Measured in a state where two configuration axes exist in axes group 1.

*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, and MC_GroupEnable_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F, set two or more configuration axes for the axes group, then execute it again.
1204H	The axes group is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

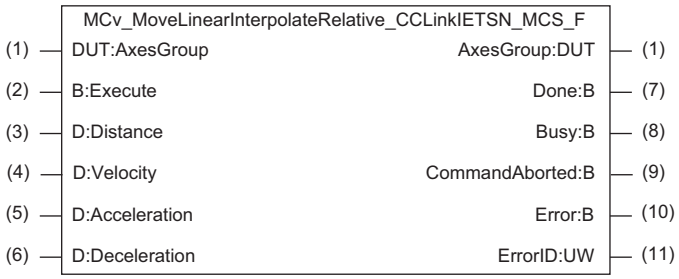
Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

3.32 MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Linear Interpolation Control)

Overview

This FB specifies the movement amount based on the relative position of the specified axes group and executes positioning by linear interpolation control.



Labels

I/O label

No.	Label	Name	Data type	Setting range	Description
(1)	AxesGroup	Axes group information	AXES_GROUP_REF_CCLinkIETSN_MCS_F	—	Page 35 AXES_GROUP_REF_CCLinkIETSN_MCS_F

Input labels

No.	Label	Name	Data type	Acquisition	Setting range	Description
(2)	Execute	Execution command	Bit	Only when FB starts up	ON, OFF	When the value is on, the FB is executed.
(3)	Distance	Travel distance	Double word [signed] (0..3)	Only when FB starts up	Page 18 FB Library Specifications	Set the travel distance. Set a value for each axis to be used for linear interpolation control.
(4)	Velocity	Target speed	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the command speed.
(5)	Acceleration	Acceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become the value set in "[Pr.8] Speed limit value" for the motion module from 0.
(6)	Deceleration	Deceleration time	Double word [signed]	Only when FB starts up	Page 18 FB Library Specifications	Set the time for the speed to become 0 from the value set in "[Pr.8] Speed limit value" for the motion module.

Output labels

No.	Label	Name	Data type	Default value	Description
(7)	Done	Completed	Bit	OFF	The on state indicates that all axes reached the specified end position.
(8)	Busy	Executing	Bit	OFF	The on state indicates that the FB is operating.
(9)	CommandAborted	Execution aborted	Bit	OFF	The on state indicates that execution is aborted by another FB.
(10)	Error	Error	Bit	OFF	The on state indicates that an error has occurred in the FB.
(11)	ErrorID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.

Global labels

Refer to the following.

☞ Page 25 List of Global Labels

Function details

Applicable hardware and software

Module	Firmware version	Engineering tool
FX5U CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5UC CPU module	1.290 or later	GX Works3 Version 1.096A or later
FX5-SSC-G	1.002 or later	GX Works3 Version 1.096A or later
MR-J5-G	D8 or later	MR Configurator2 Version 1.145B or later
MR-JET-G	D8 or later	MR Configurator2 Version 1.145B or later

Basic specifications

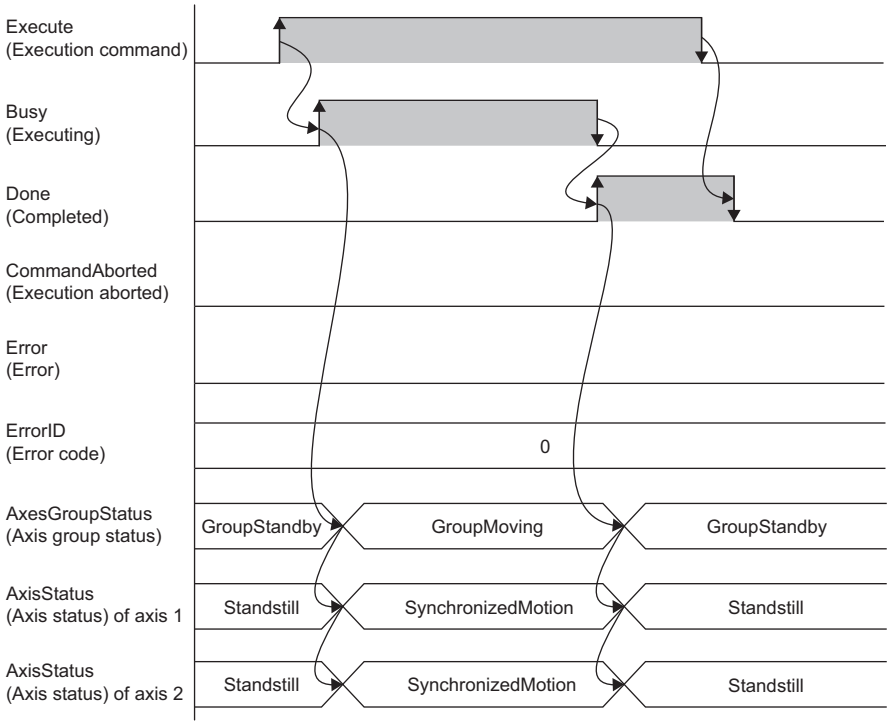
Item	Description
Number of steps	1352 steps The number of steps of the FB embedded in a program depends on the input/output definitions and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	• Label: 0.30K points (Word) • Latch label: 0K points (Word) The points of labels embedded in a program depend on the devices specified for arguments and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	• Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

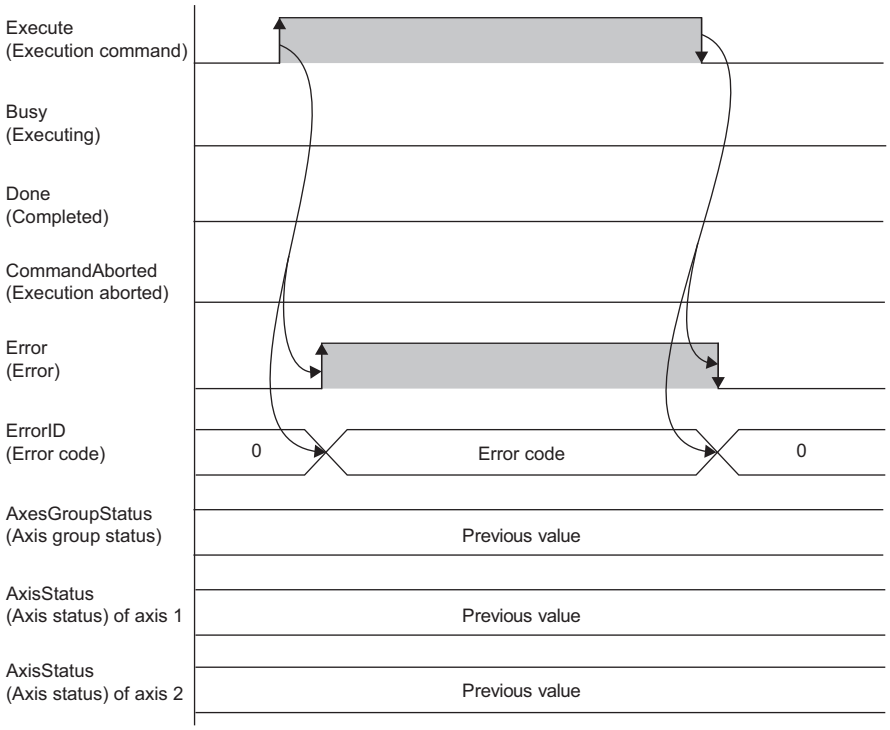
- When Execute (execution command) is turned on, this FB uses the specified axes group to execute positioning along a linear trajectory from the current stop position (start point address) to the distance specified in Distance (travel distance).
- The travel direction is determined by the sign of Distance (travel distance) for each axis.
  - When the travel distance is positive: Positioning towards the positive direction (address increase direction)
  - When the travel distance is negative: Positioning towards the negative direction (address decrease direction)
- Interpolation control is performed for the number of configuration axes of the specified axes group. Interpolation control can be performed on a maximum of four axes.
- Busy (executing) turns on during interpolation control, the AxesGroupStatus (axes group status) of AxesGroup (axes group information) transitions to GroupMoving, and the AxisStatus (axis status) of Axis (axis information) transitions to SynchronizedMotion. When interpolation control is completed, Busy (executing) turns off, Done (completed) turns on, the AxesGroupStatus (axes group status) transitions to GroupStandby, and the AxisStatus (axis status) transitions to Standstill. (☞ Page 41 State Transition Diagram)
- If an error occurs on even one axis during interpolation control, all axes will decelerate and stop.
- If an error occurs in the FB, the FB turns on Error (error), and stores the error code in ErrorID (error code). (☞ Page 199 Error codes)

Timing chart of I/O signals

■Completed successfully



■Completed with an error



Precautions

- For the state where this FB can be executed, check the state transition diagram. (☞ Page 41 State Transition Diagram)
- This FB uses positioning data No.100 (1 point). Do not use the relevant positioning data number when using a different positioning data number in the user's system.
- When different units are used for the reference axis and interpolation axes, or during 4-axis linear interpolation control, "0: Composite speed" cannot be set in "[Pr.20] Interpolation speed designation method". Note that this does not apply when both [mm] and [inch] are used in 2 to 3-axis interpolation control.
- When different units are used for the reference axis and interpolation axes or both [mm] and [inch] are used together, the unit set for the reference axis is used as the unit for the speed during control.
- When "1: Reference axis speed" is selected for "[Pr.20] Interpolation speed designation method", configure the settings so that the long axis side is the reference axis.
- When "0: Composite speed" is selected for "[Pr.20] Interpolation speed designation method", if the travel distance of each axis exceeds 1073741824 (= 2^{30}) then an error occurs in the motion module and positioning cannot be started.
- The combination of interpolation axes cannot be changed during interpolation control.

Parameter settings

To use this FB, "[Pr.20] Interpolation speed designation method" needs to be set before turning on "[Cd.190] PLC READY".
For details, refer to the following.
📖MELSEC iQ-F FX5 Motion Module/Simple Motion Module User's Manual (Application)
For details on the common parameter settings, refer to the following.
☞ Page 49 Parameter Settings

Performance values

CPU module	Measurement condition*3*4*5	Processing time	Maximum scan time	Number of scans
FX5U CPU module*1*2, FX5UC CPU module*1*2	Axes group 1	1342ms	3.41ms	443 scans

*1 Measured with the program capacity set to 128K steps.
*2 The standard area is used for labels.
*3 This is the result of executing 2-axis relative value linear interpolation control immediately after homing, with the settings of the current position (0 pulses, 0 pulses), number of pulses per rotation (4194304 pulses/rev), travel distance per rotation (4194304 pulses/rev), speed limit value (210000000 pulses/s), target position (50000000 pulses, 30000000 pulses), target speed (equivalent to 1000r/min), acceleration time (1500ms), and deceleration time (1500ms).
*4 Measured in a state where two configuration axes exist in axes group 1.
*5 This refers to the performance value in combination with MCv_AllPower_CCLinkIETSN_MCS_F, MCv_State_CCLinkIETSN_MCS_F, MCv_GroupState_CCLinkIETSN_MCS_F, MCv_Home_CCLinkIETSN_MCS_F, MC_AddAxisToGroup_CCLinkIETSN_MCS_F, and MC_GroupEnable_CCLinkIETSN_MCS_F required for the measurement of this FB.

Error codes

Error code	Description	Action
1200H	The READY signal is off.	• Turn on "[Cd.190] PLC READY" of the motion module. • Clear the error in the controller or servo amplifier, and execute the FB again.
1202H	An error occurred in the motion module.	Clear the error in the motion module, and execute the FB again.
1203H	The FB is in the execution disabled state.	• Execute the operable FB to enable operation, then execute the FB again. • Execute it again after the active control operation is completed. • Execute MC_GroupEnable_CCLinkIETSN_MCS_F to turn on UseInGroup (in use in axes group) of Axis (axis information) for all configuration axes of the axes group, then execute it again. • Execute MC_AddAxisToGroup_CCLinkIETSN_MCS_F, set two or more configuration axes for the axes group, then execute it again.
1204H	The axes group is in the GroupStopping state.	Change the status of the axes group to the GroupStandby state, and execute the FB again.

Version upgrade history

Version	Date	Description
00A	July 2024	Newly created

4 OPERATION EXAMPLES

4.1 Positioning Operation

This section describes the usage procedure for the positioning operation on three servo motor axes using FBs for CC-Link IEF Basic or CC-Link IE TSN (standard station) by taking an unloader as an example.
In this operation, the following FBs are used.

FB	Reference
MC_Power_Type (Operation Possible)	Page 74
MCv_Home_Type (Homing)	Page 78
MC_Stop_Type (Forced Stop)	Page 84
MC_Halt_Type (Stop)	Page 91
MC_MoveAbsolute_Type (Absolute Positioning)	Page 97
MC_MoveRelative_Type (Relative Positioning)	Page 106
MC_MoveAdditive_Type (Target Position Change)	Page 114
MC_MoveVelocity_Type (Velocity Control)*1	Page 122
MC_TorqueControl_Type (Torque Control)*1	Page 130
MC_Reset_Type (Axis Error Reset)	Page 139
MC_SetOverride_Type (Override Value Setting)*2	Page 186

*1 The FB can be used with the servo amplifier with firmware version C5 or later.
*2 Can be used only with CC-Link IE TSN (standard station).

Overview

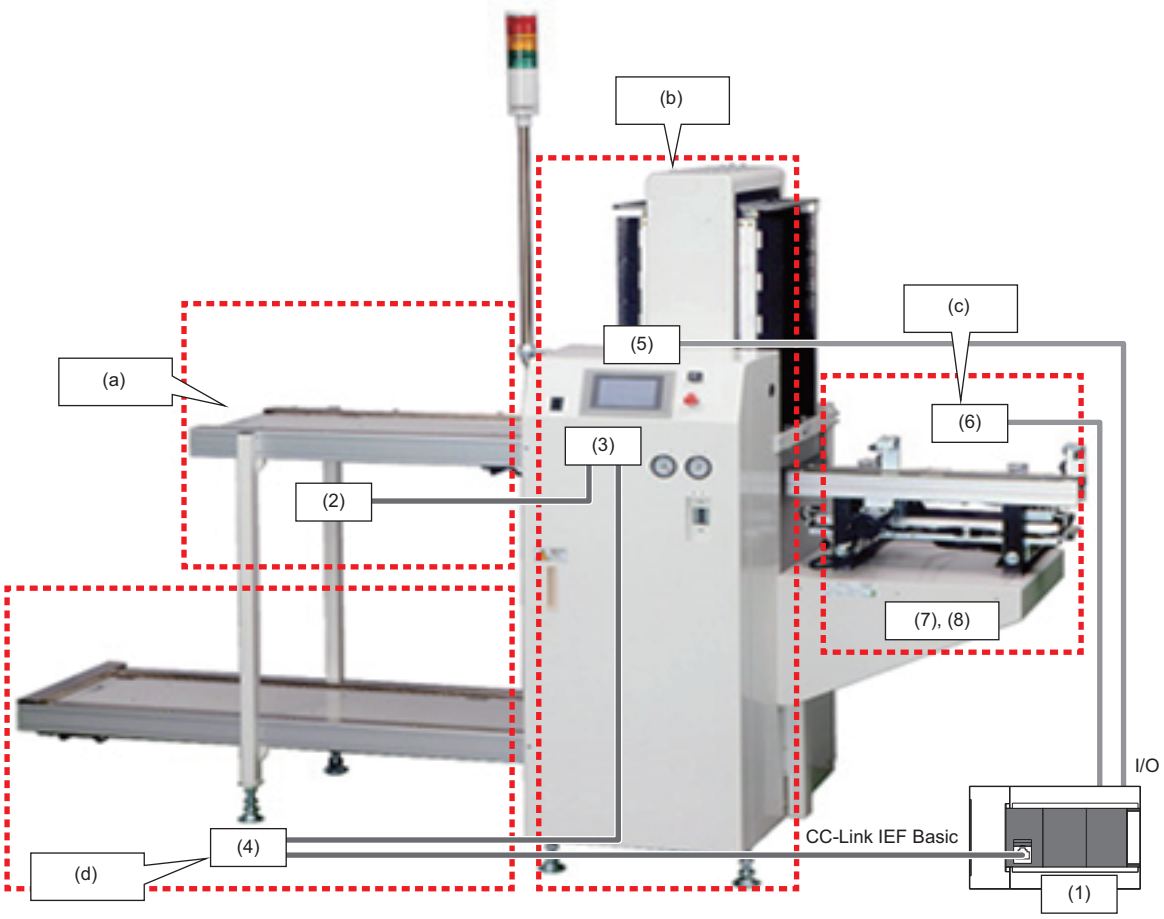
This application example shows the operation of an unloader for surface mounting lines to load and unload a magazine rack and printed circuit boards into a magazine rack by using this FB library. Three axes are controlled by communicating with three servo amplifiers.

Sample program

For how to obtain the sample program, please consult your local Mitsubishi representative.
In the sample programs, only the circuits required to operate each function are described, and such a circuit as an interlock for safety is not included. Add such a circuit as an interlock according to the customer's device.

System configuration

The system configuration of CC-Link IE Field Network Basic is shown below.



(a) Magazine rack loading conveyor
(b) Magazine rack mount section
(c) Printed circuit board loading conveyor
(d) Magazine rack unloading conveyor

No.	Device	Description	Device assignment	Station number
(1)	FX5U CPU module	Programmable controller	—	Master station
(2)	Servo amplifier (axis 1)	Drives the magazine rack loading conveyor.	—	1
(3)	Servo amplifier (axis 2)	Moves the magazine rack mount section up and down.	—	2
(4)	Servo amplifier (axis 3)	Drives the magazine rack unloading conveyor.	—	3
(5)	Sensor 1	Sensor for detecting a magazine rack in the mount section	X0	—
(6)	Sensor 2	Sensor for detecting printed circuit boards on the printed circuit board conveyors	X1	—
(7)	Cylinder (output)	Printed circuit board storage request signal (CPU module → cylinder)	Y0	—
(8)	Cylinder (input)	Printed circuit board storage completion signal (Cylinder → CPU module)	X2	—

System operation

The following describes the system operation in this operation example. For the configuration of the overall program, refer to the following.

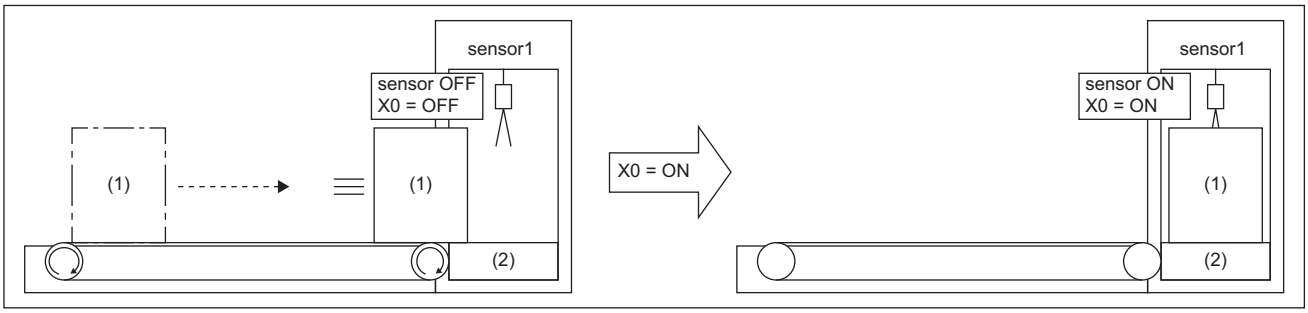
☞ Page 266 Programming

■Loading a magazine rack (axis 1)

Velocity control is executed on the servo amplifier for axis 1 (magazine rack loading conveyor) to transfer a magazine rack. Axis 1 is stopped by detection of the magazine rack mounted into the magazine rack mount section (sensor 1 turned on).

FB to be used	Control details
MC_MoveVelocity_[Type]	Mounts the magazine rack into the magazine rack mount section using the loading conveyor.
MC_Halt_[Type]	Stops the loading conveyor when the magazine rack is mounted completely.

• Example of loading the magazine rack



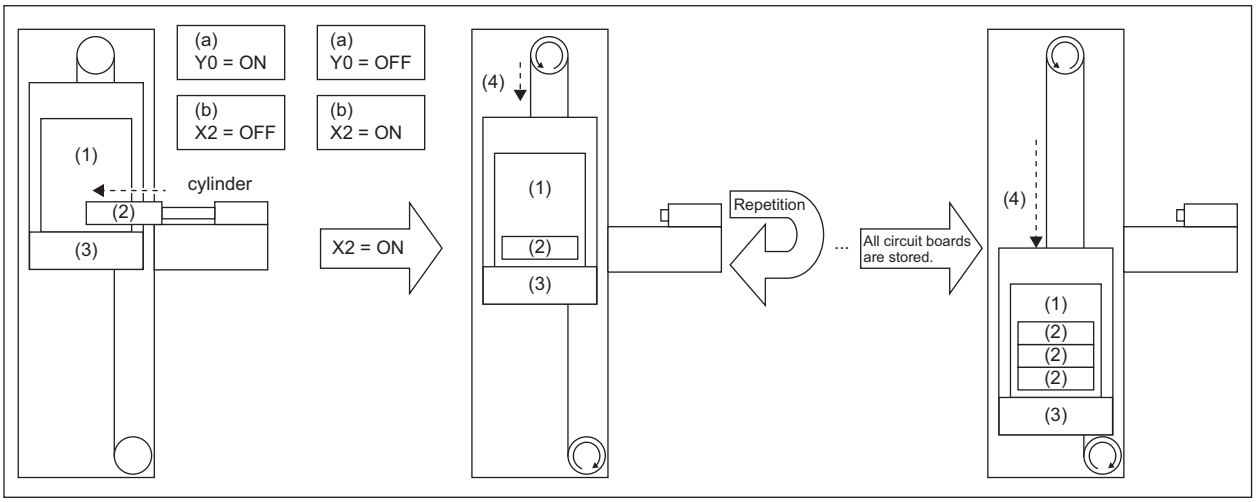
(1) Magazine rack
(2) Magazine rack mount section

(1) Command speed
(2) Acceleration time
(3) Deceleration and stop when sensor 1 is turned on
(4) Deceleration time

■Storing printed circuit boards (axis 2)

When the storage request signal is turned on, the cylinder stores a printed circuit board into the magazine rack. After the cylinder operation is completed and the storage completion signal is turned on, the magazine rack mount section is moved down by executing relative positioning to axis 2 of the servo amplifier. This operation is repeated, and when all the printed circuit boards are stored, the magazine rack mount section is moved down to the unloading position.
(Printed circuit board detection and cylinder control are not included in this program.)

FB to be used	Control details
None	Stores printed circuit boards into a magazine rack with the cylinder.
MC_MoveRelative_[Type]	Moves down the magazine rack when the printed circuit board is stored completely. (fixed-distance descent)



(1) Magazine rack
(2) Printed circuit board
(3) Magazine rack mount section
(4) Relative positioning

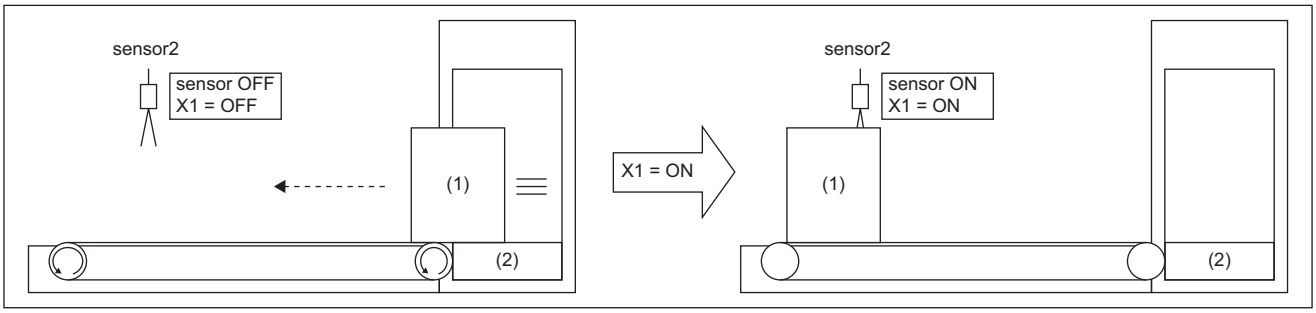
(a) Storage request signal
(b) Storage completion signal

■Unloading the magazine rack (axis 3)

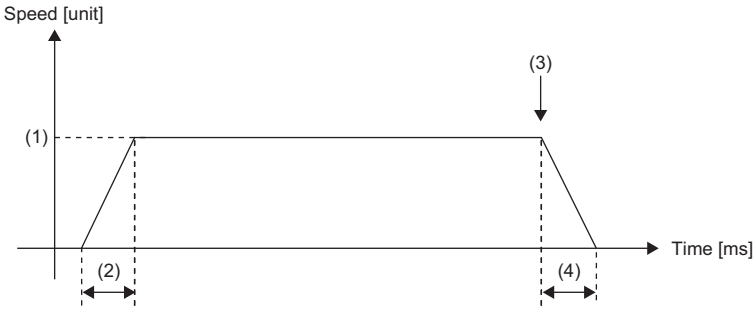
A velocity control command is sent to the servo amplifier for axis 3 (magazine unloading conveyor) to unload the magazine rack.

Axis 3 is stopped at magazine rack detection sensor ON.

FB to be used	Control details
MC_MoveVelocity_[Type]	Unloads the magazine rack when it is filled up.
MC_Halt_[Type]	Stops unloading operation when the magazine rack is unloaded completely.



(1) Magazine rack
(2) Magazine rack mount section

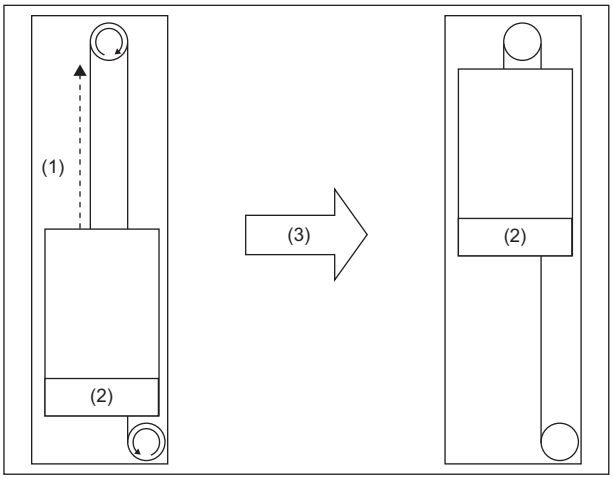


(1) Command speed
(2) Acceleration time
(3) Deceleration and stop when sensor 2 is turned on
(4) Deceleration time

■Returning the magazine rack mount section (axis 2)

The magazine rack mount section is returned to the position in which the magazine rack can be loaded.

FB to be used	Control details
MC_MoveAbsolute_[Type]	When the magazine rack unloading operation stops, moves the mount section into a position in which a magazine rack can be mounted.



(1) Absolute positioning
(2) Magazine rack mount section
(3) Completion of moving the mount section to the position in which the magazine rack can be mounted

Process flow

The following describes a process flow from the wiring and parameter settings of the master station module and the servo amplifiers to the use of FBs.

1. FB library registration

Register the FB library. For the operating procedure, refer to the following.

GX Works3 Operating Manual

2. Servo amplifier setting

Set the servo parameters. (☞ Page 49 Parameter Settings)

3. Wiring

For details on the wiring method, refer to the manual for the servo amplifier used.

4. CPU module setting

Set the CPU module parameters. (☞ Page 49 Parameter Settings)

5. Creation of structures and global labels

Create structures and global labels. (☞ Page 49 Parameter Settings)

6. Programming

Create programs. (☞ Page 266 Programming)

Programming

Program configuration

The following describes the program configuration of the sample program used in this operation example.

1. Device initial setting

Sets initial values relating to manual operation and automatic operation.

Execution conditions	FB to be used
Automatically executed during CPU RUN	None

2. Preparation for operation

Transitions the status of the device to the operable state. (When a program for CC-Link IEF Basic is used, the cyclic communication ready command (RY(n+3)F) is turned on.)

Checks the execution status for manual operation (homing, JOG operation, inching operation) or automatic operation of each axis.

If all the operations are in not executed state with the operation start OFF → ON, this program starts operation with the specified operation mode and axis number. (The axis number is not used for the automatic operation.)

If all the operations are in not executed state with the operation start OFF, this program sets the execution number to 0 (not executed).

Execution conditions	FB to be used
CyclicCom is turned on.	MC_Power_[Type]

3. Manual operation

Creates programs for the following operations to be performed manually for purposes such as maintenance.

In the sample program, only axis 1 is controlled. Other axes can also be controlled by switching the axis number.

Set the number of the target axis in OperationAxisNo, and execute the following operations.

Operation	Execution conditions	FB to be used
(1) Homing	OperationMode is set to HomeMode, and StartOperation is turned from off to on.	MCv_Home_[Type]
(2) JOG operation	OperationMode is set to JOGMode, and StartOperation is turned from off to on. • Forward rotation: JOG_InchingForward is turned from off to on. • Reverse rotation: JOG_InchingReversal is turned from off to on.	MC_MoveVelocity_[Type] MC_Halt_[Type]
(3) Inching operation	OperationMode is set to InchingMode, and StartOperation is turned from off to on. • Forward rotation: JOG_InchingForward is turned from off to on. • Reverse rotation: JOG_InchingReversal is turned from off to on.	MC_MoveRelative_[Type]
(4) Clear errors	OperationMode is set to NotMode, and StartOperation is turned from off to on. StartReset is turned from off to on.	MC_MoveReset_[Type]
(5) Forced stop	OperationMode is set to NotMode, and StartOperation is turned from off to on. ForcedStop is turned from off to on.	MC_Stop_[Type]
(6) Override value setting*1	OperationMode is set to NotMode, and StartOperation is turned from off to on. An override coefficient is set to VelFactor, and SetOverride is turned on (always updated while turned on).	MC_SetOverride_[Type]

*1 Only programs for CC-Link IE TSN (standard station) can be used.

4. Automatic operation

This program is for performing automatic operations.

OperationMode is set to AutoMode and turn StartOperation from off to on.

Operation behavior	Execution conditions	FB to be used
(1)Loading a magazine rack (axis 1)	Stops when Sensor1 is turned on.	MC_MoveVelocity_[Type] MC_Halt_[Type]
(2)Storing printed circuit boards (axis 2)	By turning StorageRequest from off to on, the magazine rack is moved down by one step. When it reaches the position set in FinalPosition, it is moved down to the unloading position.	MC_MoveRelative_[Type]
(3)Unloading the magazine rack (axis 3)	The process is automatically executed after the magazine rack moves down to the unloading position and stops when Sensor2 is turned on.	MC_MoveVelocity_[Type] MC_Halt_[Type]
(4)Returning the magazine rack mount section (axis 2)	Automatically executed when loading has been completed	MC_MoveAbsolute_[Type]

5. Target position change

Changes the target position during execution of relative positioning.

Execution conditions	FB to be used
OperationAxisNo is set to the number of the target axis, OperationMode is set to NotMode, and StartOperation is turned from off to on. • Relative positioning: Turn StartMoveRel from off to on • Target position change: Turn StartMoveAdd from off to on	MC_MoveRelative_[Type] MC_MoveAdditive_[Type]

6. Torque control

Executes torque control and pause operation.

Execution conditions	FB to be used
OperationAxisNo is set to the number of the target axis, OperationMode is set to NotMode, and StartOperation is turned from off to on. • Torque control: Turn StartTorque1 from off to on • Target torque change: Turn StartTorque2 from off to on • Pause: Turn StartHalt from off to on	MC_TorqueControl_[Type] MC_Halt_[Type]

4.2 Object Read and Write

This section describes how to change the servo amplifier mapping and read and write objects.
In this operation, the following FBs are used.

FB	Reference
MCv_ReadMultiObject_Model (Multiple Object Read)	Page 146
MCv_WriteMultiObject_Model (Multiple Object Write)	Page 156
MCv_ChangeMapping_Model (Mapping Change)*1	Page 165

*1 Only the FB library for CC-Link IEF Basic can be used.

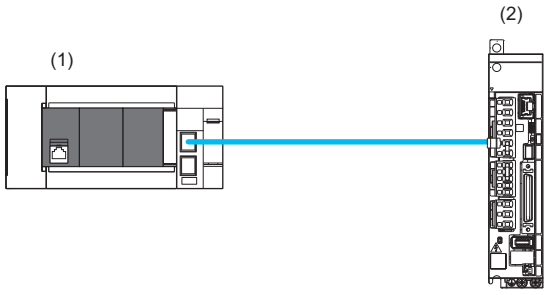
Overview

This operation changes the servo amplifier mapping, sets the electronic gear, and reads the current value by using this FB library.

Sample program

For how to obtain the sample program, please consult your local Mitsubishi representative.
In the sample programs, only the circuits required to operate each function are described, and such a circuit as an interlock for safety is not included. Add such a circuit as an interlock according to the customer's device.

System configuration



(1) FX5-ENET (master station)
(2) Servo amplifier

This system configuration is an example with CC-Link IE Field Network Basic (FX5-ENET). The method to specify the target servo amplifier differs according to the communication type and master module, as described below.

Communication type	Master module	Servo amplifier specification method
CC-Link IE Field Network Basic	FX5U CPU module	Axis number: 1
	FX5-ENET	Module number: 1 Connection number: 1
CC-Link IE TSN	FX5-SSC-G	Module number: 1 IP address: 192.168.3.1 Multi-drop number: 0

System operation

The following describes the system operation in this operation example. For the configuration of the overall program, refer to the following.

☞ Page 272 Programming

■Mapping change

Use the mapping change FB to add objects to the default mapping of servo amplifiers.

For the MR-JET-G, mapping with firmware version "C4" or later, which supports touch probe, is described.

• Mapping before/after change

○: Can be changed, ×: Cannot be changed, —: Not assigned

Link device	Before change				After change			Category
	Object name	Index	Sub	Mapping	Object name	Index	Sub	
RWr0	Mode of operation on display	6061H	0	×	No change			Default mapping
	—	—	—	×				
RWr1	Statusword	6041H	0	×				
RWr2	Status DO1	2D11H	0	×				
RWr3	Status DO2	2D12H	0	×				
RWr4	Status DO3	2D13H	0	○				
RWr5	—	—	—	○				
RWr6 RWr7	Position actual value	6064H	0	○				
RWr8 RWr9	Velocity actual value	606CH	0	×				
RWrA RWrB	Following error actual value	60F4H	0	○				
RWrC	Torque actual value	6077H	0	×				
RWrD	—	—	—	○				
RWrE RWrF	Current alarm	2A41H	0	○				
RWr10	Touch probe status	60B9H	0	○				
RWr11	—	—	—	○				
RWr12 RWr13	Touch probe 1 positive edge	60BAH	0	○				
RWr14 RWr15	Touch probe 1 negative edge	60BBH	0	○				
RWr16 RWr17	Touch probe 2 positive edge	60BCH	0	○				
RWr18 RWr19	Touch probe 2 negative edge	60BDH	0	○				
RWr1A	—	—	—	○	Effective load ratio	2B09H	0	Additional mapping
RWr1B	—	—	—	○	Peak load ratio	2B0AH	0	
RWr1C	—	—	—	○	Servo motor speed	2B02H	0	
RWr1D	—	—	—	○				
RWr1E	—	—	—	○	No change			No mapping
RWr1F	—	—	—	○				

■Input label setting

• Set the mapping change targets.

Input labels	Description
MapSelect	
OFF	Sets the mapping change target to [1st Transmit PDO Mapping (Obj.1A00H)].

• Set Index, SubIndex, and Size.

Category	Mapping measure object	Input labels				Description
		Array	Index	SubIndex	Size	
Default mapping	Mode of operation on display	0 to 18	0000H	0	0	This is the initial object placement. Automatically set by the servo amplifier when powered on. To not change from the default, set all input labels to 0.
	—					
	Statusword					
	Status DO 1					
	Status DO 2					
	Status DO 3					
	—					
	Position actual value					
	Velocity actual value					
	Following error actual value					
	Torque actual value					
	—					
	Current alarm					
	Touch probe status					
	—					
	Touch probe 1 positive edge					
	Touch probe 1 negative edge					
	Touch probe 2 positive edge					
	Touch probe 2 negative edge					
Additional mapping	Effective load ratio	19	2B09H	0	2	Sets an object to be newly added.
	Peak load ratio	20	2B0AH	0	2	
	Servo motor speed	21	2B02H	0	4	
No mapping	—	22 to 31	0000H	0	0	Does not change the mapping. Sets all input labels to 0.

■Servo amplifier information write

Write the servo amplifier information by setting the following on the input label of the multiple object write FB.

(1): OPR method = -1 (dog type homing (back end detection phase Z reference value))

(2): OPR speed = 200.00 [r/min]

No.	Mapping measure object	Input labels				
		Array number	Index	SubIndex	Size	WriteData
(1)	Homing method	0	6098H	0H	1	-1
(2)	Speed during search for switch	1	6099H	1H	4	20000
—	None	2 to 31	0000H	0H	0	0

■Servo amplifier information read

Mapping measure object	Input labels			Output labels
	Array number	Index	SubIndex	WriteData
Position actual value	0	6064H	0H	Current position
Velocity actual value	1	606CH	0H	Current speed
Torque actual value	2	6077H	0H	Current torque
None	3 to 31	0000H	0H	—

Process flow

The following describes a process flow from the wiring and parameter settings of the master station module and the servo amplifiers to the use of FBs.

1. FB library registration

Register the FB library. For the operating procedure, refer to the following.

GX Works3 Operating Manual

2. Servo amplifier setting

Set the servo parameters. (☞ Page 49 Parameter Settings)

3. Wiring

For details on the wiring method, refer to the manual for the servo amplifier used.

4. CPU module setting

Set the CPU module parameters. (☞ Page 49 Parameter Settings)

5. Creation of structures and global labels

Create structures and global labels. (☞ Page 49 Parameter Settings)

6. Programming

Create programs. (☞ Page 272 Programming)

Programming

Program configuration

The following describes the program configuration of the sample program used in this operation example.

1. Device initial setting

CC-Link IEF Basic: Sets the axis number of the external device.

CC-Link IE TSN (standard station/motion control station): Sets the module number, IP address, and multi-drop number of the external device.

2. Mapping change

Sets the monitor information (the index number, subindex number, and data size of the object) in the mapping [1st Transmit PDO Mapping (Obj.1A00H)].

Mapping change is available only for CC-Link IEF Basic.

Execution conditions	FB to be used
StartChangeMap is turned on.	MCv_ChangeMapping_Model

3. Servo amplifier information write

Writes the OPR method and OPR speed to [Homing method (Obj. 6098H: 00H)] and [Speed during search for switch (Obj. 6099H: 01H)].

Sets the index number, subindex number, data size, and write data of the object during write.

Execution conditions	FB to be used
StartServoAmpDataWrite is turned on.	MCv_WriteMultiObject_Model

4. Servo amplifier information read

Reads the current position, current speed, and current torque from [Position actual value (Obj.6064H: 00H)], [Velocity actual value (Obj.606CH: 00H)], and [Torque actual value (Obj.6077H: 00H)].

During read, this program sets the object index number and subindex number.

Execution conditions	FB to be used
StartServoAmpDataRead is turned on.	MCv_ReadMultiObject_Model

4.3 Positioning Operation (Sealing Device)

This section describes the usage procedure for the positioning operation on three servo motor axes using CC-Link IE TSN (motion control station) by taking a sealing device as an example.

In this operation, the following FBs are used.

FB	Reference
MCv_AllPower_CCLinkIETSN_MCS_F (Operation of All Axes Possible)	Page 171
MCv_State_CCLinkIETSN_MCS_F (Axis Status Transition)	Page 175
MCv_GroupState_CCLinkIETSN_MCS_F (Axes Group Status Transition)	Page 179
MCv_Home_CCLinkIETSN_MCS_F (Homing)	Page 78
MC_Stop_CCLinkIETSN_MCS_F (Forced Stop)	Page 84
MC_MoveAbsolute_CCLinkIETSN_MCS_F (Absolute Positioning)	Page 97
MC_MoveRelative_CCLinkIETSN_MCS_F (Relative Positioning)	Page 106
MC_MoveAdditive_CCLinkIETSN_MCS_F (Target Position Change)	Page 114
MC_MoveVelocity_CCLinkIETSN_MCS_F (Velocity Control)	Page 122
MC_TorqueControl_CCLinkIETSN_MCS_F (Torque Control)	Page 130
MC_Reset_CCLinkIETSN_MCS_F (Axis Error Reset)	Page 139
MC_SetPosition_CCLinkIETSN_MCS_F (Current Position Change)	Page 182
MC_SetOverride_CCLinkIETSN_MCS_F (Override Value Setting)	Page 186
MCv_Jog_CCLinkIETSN_MCS_F (JOG Operation)	Page 192
MCv_Inch_CCLinkIETSN_MCS_F (Inching Operation)	Page 196
MC_AddAxisToGroup_CCLinkIETSN_MCS_F (Add Axis)	Page 200
MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F (Delete Axis)	Page 204
MC_UngroupAllAxes_CCLinkIETSN_MCS_F (Ungroup Axes)	Page 208
MC_GroupEnable_CCLinkIETSN_MCS_F (Enable Axes Group)	Page 213
MC_GroupDisable_CCLinkIETSN_MCS_F (Disable Axes Group)	Page 217
MC_GroupReset_CCLinkIETSN_MCS_F (Axes Group Error Reset)	Page 221
MC_GroupStop_CCLinkIETSN_MCS_F (Axes Group Forced Stop)	Page 225
MC_GroupSetOverride_CCLinkIETSN_MCS_F (Override Axes Group Value Setting)	Page 229
MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Circular Interpolation Control)	Page 233
MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Circular Interpolation Control)	Page 240
MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F (Absolute Value Linear Interpolation Control)	Page 247
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F (Relative Value Linear Interpolation Control)	Page 253

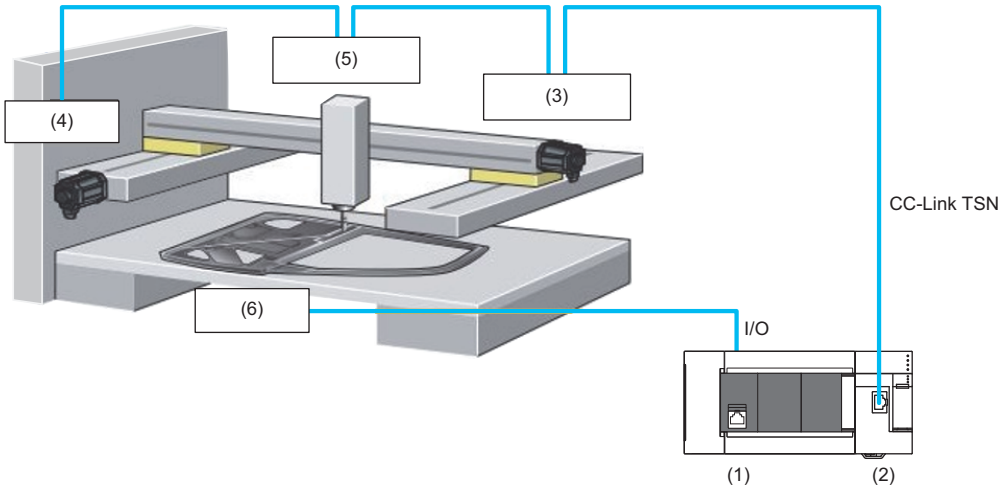
Overview

Apply a sealing agent in a linear direction, slant direction, and to a curved section with a sealing device by using this FB library. The motion module communicates with three servo amplifiers and controls three axes.

Sample program

For how to obtain the sample program, please consult your local Mitsubishi representative.
In the sample programs, only the circuits required to operate each function are described, and such a circuit as an interlock for safety is not included. Add such a circuit as an interlock according to the customer's device.

System configuration



No.	Device	Description	Device assignment	Station number
(1)	FX5U CPU module	Programmable controller	—	Master station
(2)	FX5-40SSC-G	Motion module	—	Master station
(3)	Servo amplifier (axis 1)	X-axis	—	1
(4)	Servo amplifier (axis 2)	Y-axis	—	2
(5)	Servo amplifier (axis 3)	Moves the sealing agent application nozzle up and down.	—	3
(6)	Sensor 1	Sensor for detecting workpieces	X0	—

System operation

The following describes the operation of the automatic operation in this operation example. For the configuration of the overall program, refer to the following.

☞ Page 280 Programming

■Adding axis 1 and axis 2 to the axes group (first time only)

Add axis 1 and axis 2 as configuration axes of the axes group.

FB to be used	Control details
MC_AddAxisToGroup_CCLinkIETSN_MCS_F	Adds axis 1 and axis 2 to the axes group.

■Enabling the axes group (first time only)

Enable the axes group that has axis 1 and axis 2 as configuration axes.

FB to be used	Control details
MC_GroupEnable_CCLinkIETSN_MCS_F	Enables the axes group.

■Checking the loading of workpieces

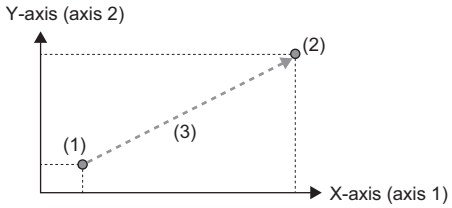
Check that the workpiece has been loaded to the sealing agent application position by checking that the sensor for detecting workpieces is turned on. No FB is used.

■Moving to the application start position (axis 1, axis 2)

Absolute value linear interpolation control is executed on the servo amplifier of axis 1 and axis 2 by turning on the sensor for detecting workpieces, and the sealing agent application nozzle is moved to the application start position.

FB to be used	Control details
MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F	Moves the sealing agent application nozzle to the application start position.

- Example of moving to the application start position



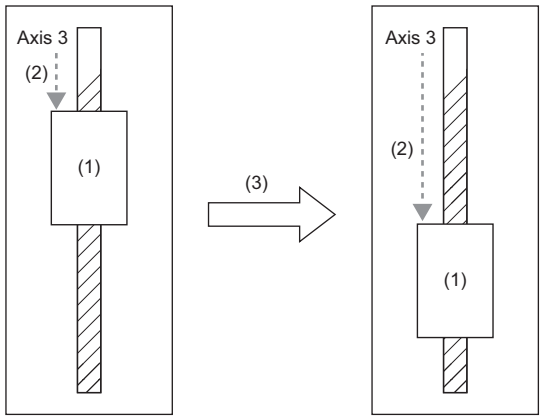
(1) Current value
(2) Application start position
(3) Absolute value linear interpolation

■Moving the sealing agent application nozzle down (axis 3)

Executes relative positioning on the servo amplifier of axis 3, and moves the sealing agent application nozzle down.

FB to be used	Control details
MC_MoveRelative_CCLinkIETSN_MCS_F	Moves the sealing agent application nozzle down.

• Example of moving the sealing agent application nozzle down



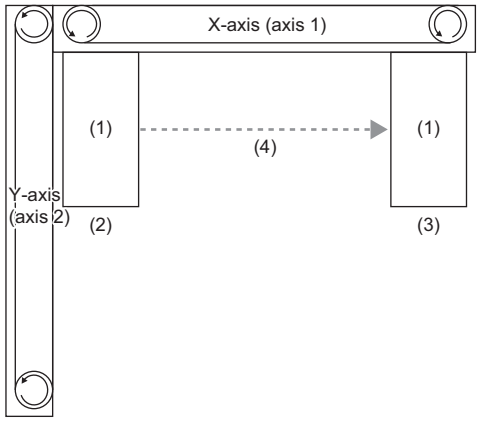
(1) Nozzle
(2) Relative positioning
(3) Arrival at application start position

■Applying the sealing agent in a linear direction (axis 1, axis 2)

Execute relative value linear interpolation control positioning on the servo amplifier of axis 1 and axis 2, and apply the sealing agent in a linear direction.

FB to be used	Control details
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F	Applies the sealing agent in a linear direction.

• Example of applying the sealing agent in a linear direction



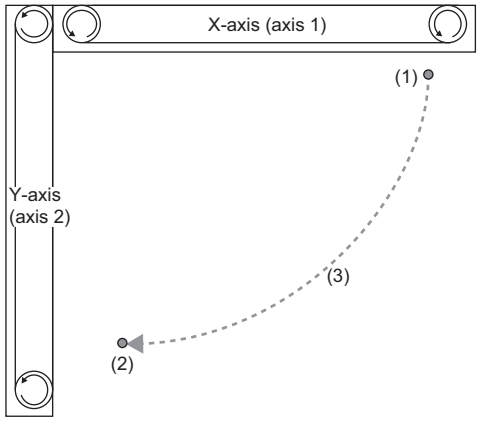
(1) Nozzle
(2) Current value
(3) End position of linear direction application
(4) Relative value linear interpolation

■Applying the sealing agent to the curved section (axis 1, axis 2)

Execute relative value circular interpolation control on the servo amplifier of axis 1 and axis 2, and apply the sealing agent to the curved section.

FB to be used	Control details
MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F	Applies the sealing agent to the curved section.

- Example of applying the sealing agent to the curved section



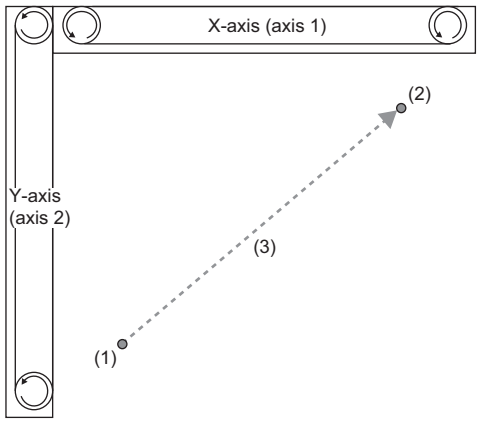
(1) Current value
(2) Application end position for curved section
(3) Relative value circular interpolation

■Applying the sealing agent in a slant direction (axis 1, axis 2)

Execute relative value linear interpolation control on the servo amplifier of axis 1 and axis 2, and apply the sealing agent in a slant direction.

FB to be used	Control details
MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F	Applies the sealing agent in a slant direction.

- Example of applying the sealing agent in a slant direction



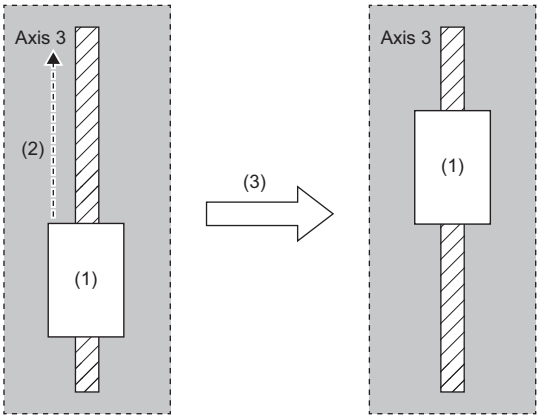
(1) Current value
(2) End position of slant direction application
(3) Relative value linear interpolation

■Returning the sealing agent application nozzle (axis 3)

Execute absolute positioning on the servo amplifier of axis 3, and return the sealing agent application nozzle to its original position.

FB to be used	Control details
MC_MoveAbsolute_CCLinkIETSN_MCS_F	Moves the sealing agent application nozzle up.

• Example of moving the sealing agent application nozzle up



(1) Nozzle
(2) Absolute positioning
(3) Arrival at the original position

■Stopping all axes

Stop control of the servo amplifier of axis 1, axis 2, and axis 3.

FB to be used	Control details
MC_GroupStop_CCLinkIETSN_MCS_F	Stops control of axis 1 and axis 2.
MC_Stop_CCLinkIETSN_MCS_F	Stops control of axis 3.

■Clearing errors on all axes

Clear errors and warnings on the servo amplifier of axis 1, axis 2, and axis 3.

FB to be used	Control details
MC_GroupReset_CCLinkIETSN_MCS_F	Clears errors and warnings on axis 1 and axis 2.
MC_Reset_CCLinkIETSN_MCS_F	Clears errors and warnings on axis 3.

■Clearing the axes group

Delete the configuration axes from the axes group, and disable the axes group.

FB to be used	Control details
MC_UngroupAllAxes_CCLinkIETSN_MCS_F	Deletes the configuration axes from the axes group and disables the axes group.

Process flow

The following describes a process flow from the wiring and parameter settings of the master station module and the servo amplifiers to the use of FBs.

1. FB library registration

Register the FB library. For the operating procedure, refer to the following.

📖 GX Works3 Operating Manual

2. Servo amplifier setting

Set the servo parameters. (☞ Page 49 Parameter Settings)

3. Wiring

For details on the wiring method, refer to the manual for the servo amplifier used.

4. CPU module setting

Set the CPU module parameters. (☞ Page 49 Parameter Settings)

5. Creation of structures and global labels

Create structures and global labels. (☞ Page 49 Parameter Settings)

6. Programming

Create programs. (☞ Page 272 Programming)

Programming

Program configuration

The following describes the program configuration of the sample program used in this operation example.

1. Device initial setting

Sets initial values relating to manual operation and automatic operation.

Execution conditions	FB to be used
Automatically executed during CPU RUN	None

2. Preparation for operation

This program transitions the status of the device to the operable state.

When bMCSReadyCommand (motion control ready command) is turned on, preparations for operation (1) to (3) are executed sequentially.

When turning it off, provide at least 100ms of off time, because "[Cd.190] PLC READY" will be turned from on to off.

Preparation for operation	FB to be used
(1) Turn on "[Cd.190] PLC READY".	—
(2) Enable the transition of axis status and axes group status.	MCv_State_CCLinkIETSN_MCS_F MCv_GroupState_CCLinkIETSN_MCS_F
(3) Transition the status of the device to the operable state.	MCv_AllPower_CCLinkIETSN_MCS_F

3. Manual operation

Creates programs for the following operations to be performed manually for purposes such as maintenance.

When a single axis control FB is used, specify an axis number in uOperationAxisNo (operation axis number) and perform operations in accordance with manual operations (1) to (9).

When a multi-axis control FB is used, perform operation in accordance with manual operations (10) to (13).

Operation	Execution conditions	FB to be used
(1) Homing	uOperationMode (operation mode) is set to "c_u HomeMode (homing mode)", and bStartOperation (operation start) is turned from off to on.	MCv_Home_CCLinkIETSN_MCS_F
(2) Target position change	uOperationMode (operation mode) is set to "c_uMoveAdditiveMode (target position change mode)", and bStartOperation (operation start) is turned from off to on.	MC_MoveAdditive_CCLinkIETSN_MCS_F
(3) Velocity control	uOperationMode (operation mode) is set to "c_uMoveVelocityMode (velocity control mode)", and bStartOperation (operation start) is turned from off to on.	MC_MoveVelocity_CCLinkIETSN_MCS_F
(4) Torque control	uOperationMode (operation mode) is set to "c_uTorqueControlMode (torque control mode)", and bStartOperation (operation start) is turned from off to on.	MC_TorqueControl_CCLinkIETSN_MCS_F
(5) Current position change	uOperationMode (operation mode) is set to "c_uSetPositionMode (current position change mode)", and bStartOperation (operation start) is turned from off to on.	MC_SetPosition_CCLinkIETSN_MCS_F
(6) JOG operation	uOperationMode (operation mode) is set to "c_uJOGMode (JOG operation mode)", and bStartOperation (operation start) is turned from off to on. • Forward rotation: Turn G_bJOG_InchingForward (forward run JOG/inching start input signal) from off to on. • Reverse rotation: Turn G_bJOG_InchingReversal (reverse run JOG/inching start input signal) from off to on.	MCv_Jog_CCLinkIETSN_MCS_F
(7) Inching operation	uOperationMode (operation mode) is set to "c_uInchingMode (inching operation mode)", and bStartOperation (operation start) is turned from off to on. • Forward rotation: Turn G_bJOG_InchingForward (forward run JOG/inching start input signal) from off to on. • Reverse rotation: Turn G_bJOG_InchingReversal (reverse run JOG/inching start input signal) from off to on.	MCv_Inch_CCLinkIETSN_MCS_F
(8) Clear errors	uOperationMode (operation mode) is set to "c_uNotMode (no mode)", and bStartOperation (operation start) is turned from off to on. G_bStartReset (axis error reset input signal) is turned from off to on.	MC_Reset_CCLinkIETSN_MCS_F
(9) Axis stop	uOperationMode (operation mode) is set to "c_uNotMode (no mode)", and bStartOperation (operation start) is turned from off to on. G_bStop (axis stop input signal) is turned from off to on.	MC_Stop_CCLinkIETSN_MCS_F

Operation	Execution conditions	FB to be used
(10) Override value setting	uOperationMode (operation mode) is set to "c_uNotMode (no mode)", and bStartOperation (operation start) is turned from off to on. An override coefficient is set for dVelFactor (velocity override coefficient), and bSetOverride (override value setting input signal) is turned from off to on (always updated while turned on).	MC_SetOverride_CCLinkIETSN_MCS_F
(11) Clear axes group errors	G_bGroupStartReset (axes group error reset input signal)	MC_GroupReset_CCLinkIETSN_MCS_F
(12) Stop axes group	G_bGroupStop (axes group stop input signal) is turned from off to on.	MC_GroupStop_CCLinkIETSN_MCS_F
(13) Override axes group value setting	An override coefficient is set for dGroupVelFactor (axes group velocity override coefficient), and bGroupSetOverride (axes group override value setting input signal) is turned from off to on (always updated while turned on).	MC_GroupSetOverride_CCLinkIETSN_MCS_F

4. Automatic operation

This program is for performing automatic operations.

Set uOperationMode (operation mode) to "c_uAutoMode (automatic operation mode)", and turn bStartOperation (operation start) from off to on. Automatic operations (3) to (9) are repeated while bStartOperation is turned on.

Operation	Execution conditions	FB to be used
(1) Add axis 1 and axis 2 to the axes group. (Execute this only the first time.)	Automatically executed when automatic operation is executed for the first time	MC_AddAxisToGroup_CCLinkIETSN_MCS_F
(2) Enable the axes group. (Execute this only the first time.)	Automatically executed after axis 1 and axis 2 are added to the axes group	MC_GroupEnable_CCLinkIETSN_MCS_F
(3) Check the loading of the workpiece.	Automatically executed after the axes group is enabled	—
(4) Move the sealing agent application nozzle to the application start position.	Automatically executed when the sensor for detecting workpieces (X1) is turned on	MCv_MoveLinearInterpolateAbsolute_CCLinkIETSN_MCS_F
(5) Move down the sealing agent application nozzle.	Automatically executed after the sealing agent application nozzle reaches the application start position	MC_MoveRelative_CCLinkIETSN_MCS_F
(6) Apply the sealing agent in a linear direction.	Automatically executed after the sealing agent application nozzle has finished moving down	MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F
(7) Apply the sealing agent to the curved section.	Automatically executed after application of the sealing agent in the linear direction is complete	MCv_MoveCircularInterpolateRelative_CCLinkIETSN_MCS_F
(8) Apply the sealing agent in a slant direction.	Automatically executed after application of the sealing agent to the curved section is complete	MCv_MoveLinearInterpolateRelative_CCLinkIETSN_MCS_F
(9) Return the sealing agent application nozzle.	Automatically executed after application of the sealing agent in the slant direction is complete	MC_MoveAbsolute_CCLinkIETSN_MCS_F
(10) Stop all axes	G_bAutoStop (automatic stop input signal) is turned from off to on.	• Axis 1, axis 2 MC_GroupStop_CCLinkIETSN_MCS_F • Axis 3 MC_Stop_CCLinkIETSN_MCS_F
(11) Clear errors on all axes	G_bAutoStartReset (automatic error reset input signal) is turned from off to on.	• Axis 1, axis 2 MC_GroupReset_CCLinkIETSN_MCS_F • Axis 3 MC_Reset _CCLinkIETSN_MCS_F
(12) Clear axes group	• When bStartOperation (operation start) is turned from on to off after the return of the sealing agent application nozzle is completed • After all axes stop • After all axes error reset is completed	MC_UngroupAllAxes_CCLinkIETSN_MCS_F

5. Absolute value circular interpolation control

This program is for executing absolute value circular interpolation control.

Set uOperationMode (operation mode) to "c_uCirIntAbsMode (absolute value circular interpolation control mode)", and turn bStartOperation (operation start) from off to on.

Operation	Execution conditions	FB to be used
(1) Before starting control, add axes to the axes group and enable the axes group.	—	MC_AddAxisToGroup_CCLinkIETSN_MCS_F MC_GroupEnable_CCLinkIETSN_MCS_F
(2) Perform absolute value circular interpolation control.	Set [Md.20] Current feed value for the start point address and [Md.20] Current feed value + 10000 for the center point.	MCv_MoveCircularInterpolateAbsolute_CCLinkIETSN_MCS_F
(3) After control is completed, disable the axes group for which control has been completed and delete the axes.	—	MC_GroupDisable_CCLinkIETSN_MCS_F MC_RemoveAxisFromGroup_CCLinkIETSN_MCS_F

INSTRUCTION INDEX

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REVISIONS

Revision date	Revision	Description
June 2021	A	First edition
October 2021	B	■Added target devices FX5-ENET, MR-J5-G ■Added or modified parts RELEVANT MANUALS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Chapter 1, 2, 3, 4
November 2021	C	■Added or modified parts Section 1.2, 2.5, 3.8, 3.9, 4.1
April 2022	D	■Added or modified parts RELEVANT MANUALS, Section 2.1, 2.4, Chapter 3
July 2023	E	■Added or modified parts RELEVANT MANUALS, Section 2.7, 3.11, 3.12, 3.13
October 2023	F	■Added or modified parts RELEVANT MANUALS, TRADEMARKS
July 2024	G	■Added functions FBs for CC-Link IE TSN (standard station) and CC-Link IE TSN (motion module station) ■Added or modified parts RELEVANT MANUALS, TERMS, GENERIC TERMS AND ABBREVIATIONS, Chapter 1, 2, 3, 4

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