MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-F series

MELSEC iQ-F FX2N-20GM/10GM Replacement Function Block Reference

SAFETY PRECAUTIONS

(Read these precautions before use.)

Before using this product, please read this reference and the relevant manuals introduced in this reference carefully and pay full attention to safety in order to handle the product correctly.

Precautions shown in this reference are only for this product. For safety precautions on the programmable controller system, refer to the user's manual (hardware) of the CPU module to be used.

This reference 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.

Store this reference in a safe place so that it can be read whenever necessary. Always forward it to the end user.

INTRODUCTION

Thank you for purchasing the MELSEC iQ-F series.
This reference describes the module FBs for the applicable modules listed below.
Before using this product, please read this reference and the manuals of relevant products carefully and develop familiarity with the specifications to handle the product correctly.
Please make sure that the end users read this reference.

Applicable modules

- FX5UJ
- FX5U
- FX5UC

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 reference, 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 reference content, specification etc. may be changed without a notice for improvement.
- The information in this reference has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please contact the nearest Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this reference.

CONTENTS

INSTRUCTION INDEX **117**

RELEVANT MANUALS

Manual name	Description
MELSEC iQ-F FX5 User's Manual (Startup) [JY997D58201]	Performance specifications, procedures before operation, and troubleshooting of the CPU module.
MELSEC iQ-F FX5 User's Manual (Application) [JY997D55401]	Basic knowledge required for program design, functions of the CPU module, devices/labels, and descriptions of parameters.
MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) [SH-081805ENG]	Details of the positioning module.
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/ Function Blocks) [JY997D55801]	Specifications of instructions and functions that can be used in programs.
MELSEC iQ-F FX5 Programming Manual (Program Design) [JY997D55701]	Specifications of ladders, ST, FBD/LD, and other programs and labels.
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online function operations of GX Works3.

TERMS

Unless otherwise specified, this reference uses the following terms.

Terms	Description
Engineering tool	A tool for configuring settings and performing programming, debugging, and maintenance for programmable controllers.
FX5	A generic term for FX5UJ, FX5U, and FX5UC PLCs.
FX5 CPU module	A generic term for FX5UJ CPU module, FX5U CPU module, and FX5UC CPU module.
FX5U CPU module	A generic term for FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS, FX5U-64MR/ES, FX5U-64MT/ES, FX5U-64MT/ESS, FX5U-80MR/ES, FX5U-80MT/ES, FX5U-80MT/ESS, FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS, FX5U-64MR/DS, FX5U-64MT/DS, FX5U-64MT/DSS, FX5U-80MR/DS, FX5U-80MT/DS, and FX5U-80MT/DSS.
FX5UC CPU module	A generic term for FX5UC-32MT/D, FX5UC-32MT/DSS, FX5UC-64MT/D, FX5UC-64MT/DSS, FX5UC-96MT/D, FX5UC-96MT/DSS, FX5UC-32MT/DS-TS, and FX5UC-32MT/DSS-TS.
M code	Numbers from 0 to 65535 that can be set for each positioning data (format). Using the M codes, the supplementary work (such as clamping, drill rotation, and tool change) corresponding to the code number can be instructed.
Md	The abbreviation for the monitor data in the buffer memory address.
Module label	A character string indicating the memory (such as I/O signals and buffer memory areas) which each module individually defines. It is automatically generated by GX Works3 from the module to be used, and can be used as a global label.

GENERIC TERM/ABBREVIATION

Unless otherwise specified, this reference uses the following generic term and abbreviation.

Generic term/abbreviation	Description
FB	FB is the abbreviation for Function Block. The FB is a generalized circuit block that is repeatedly used in a sequence program and designed to be diverted in the sequence program. This improves the efficiency of the program development and reduces the programming errors, resulting in the improvement in the program quality.

1 OVERVIEW

The FBs in this reference are the FB libraries for using the positioning function module FX2N-20GM function for the MELSEC iQ-F series FX5UJ, FX5U, and FX5UC CPU.

1.1 FB List

The following table lists the FB libraries in this reference.

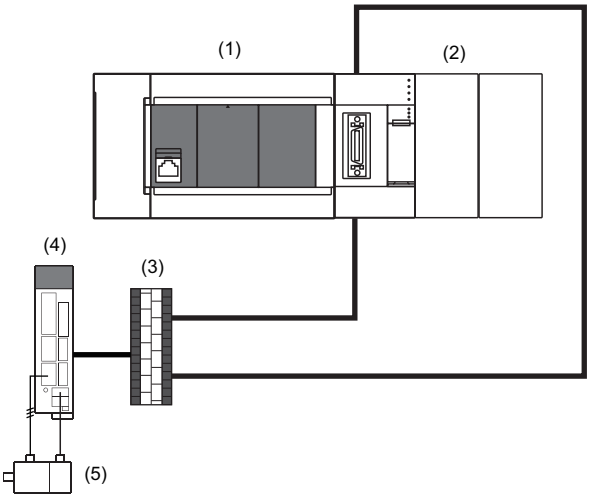
Point

Note that this reference does not describe the FB version information which is displayed such as "_00A" at the end of FB name.

○: Necessary, —: Unnecessary

Name	Description	Parameter setting necessity
M+FX5PG_DRV_F (High-speed positioning)	Sets and starts the high-speed positioning.	—
M+FX5PG_LIN_F (Linear interpolation positioning)	Sets and starts the linear interpolation positioning.	—
M+FX5PG_CW_F (Circular interpolation (clockwise))	Sets and starts the center-designated circular interpolation positioning.	—
M+FX5PG_CCW_F (Circular interpolation (counterclockwise))	Sets and starts the center-designated circular interpolation positioning.	—
M+FX5PG_CHK_F (Servo end check)	Performs the servo end check.	—
M+FX5PG_DRVZ_F (Machine home position return)	Starts the near-point dog type home position return.	—
M+FX5PG_SETR_F (Electric home position setting)	Sets the electric home position.	—
M+FX5PG_DRVR_F (Electric home position return)	Performs the electric home position return.	—
M+FX5PG_INT_F (Interrupt stop (Ignoring remaining distance))	Starts an interrupt stop.	—
M+FX5PG_SINT_F (Interrupt fixed feeding (First level speed))	Starts an interrupt fixed feeding.	—
M+FX5PG_MOVC_F (Movement amount correction)	Corrects the movement amount.	—
M+FX5PG_CNTC_F (Center position correction)	Corrects the center position.	—
M+FX5PG_CANC_F (Correction cancel)	Cancels the movement amount correction.	—
M+FX5PG_SET_F (Current value change)	Changes the current value.	—

1.2 System Configuration Example



No.	Device	
(1)	Programmable controller programmed using the module FB	FX5UJ, FX5U, FX5UC CPU
(2)	Positioning module	FX5-20PG-P, FX5-20PG-D
(3)	Terminal block	
(4)	Servo amplifier	
(5)	Motor	

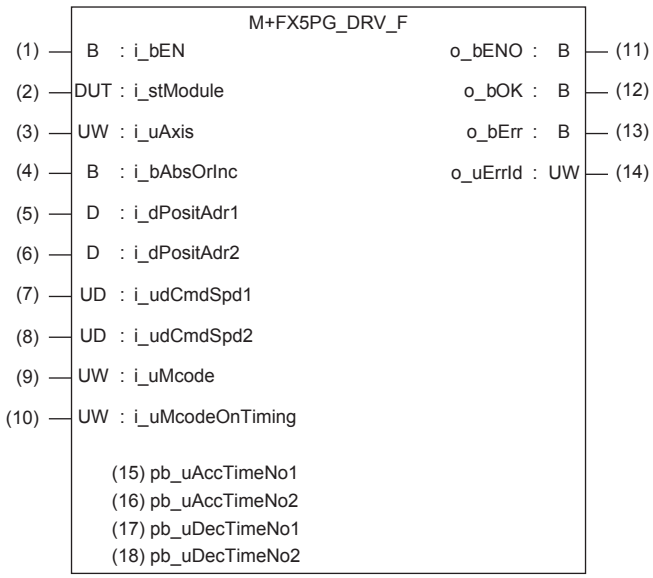
2 DETAILS OF THE FB LIBRARY

2.1 M+FX5PG_DRV_F (High-speed Positioning)

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the high-speed positioning starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_bAbsOrInc	Absolute/ relative selection	Bit	ON: The relative method is specified. OFF: The absolute method is specified.	Specify the absolute or relative method.
(5)	i_dPositAdr1	Da.6: Positioning address (axis 1)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(6)	i_dPositAdr2	Da.6: Positioning address (axis 2)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.
(7)	i_udCmdSpd1	Da.8: Command speed (axis 1)	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(8)	i_udCmdSpd2	Da.8: Command speed (axis 2)	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(9)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code[*1] for the control method.
(10)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode[*2] 2: AFTER mode[*2]	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(11)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(12)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(13)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(14)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(15)	pb_uAccTimeNo1	Da.3: Acceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(16)	pb_uAccTimeNo2	Da.3: Acceleration time No. (axis 2)	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(17)	pb_uDecTimeNo1	Da.4: Deceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(18)	pb_uDecTimeNo2	Da.4: Deceleration time No. (axis 2)	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

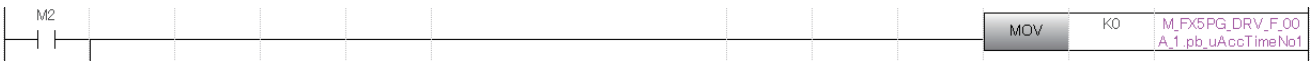
Item	Description
Programming language	Ladder
Number of steps	974 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.06K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the high-speed positioning is started only when all of the following conditions are satisfied.

· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

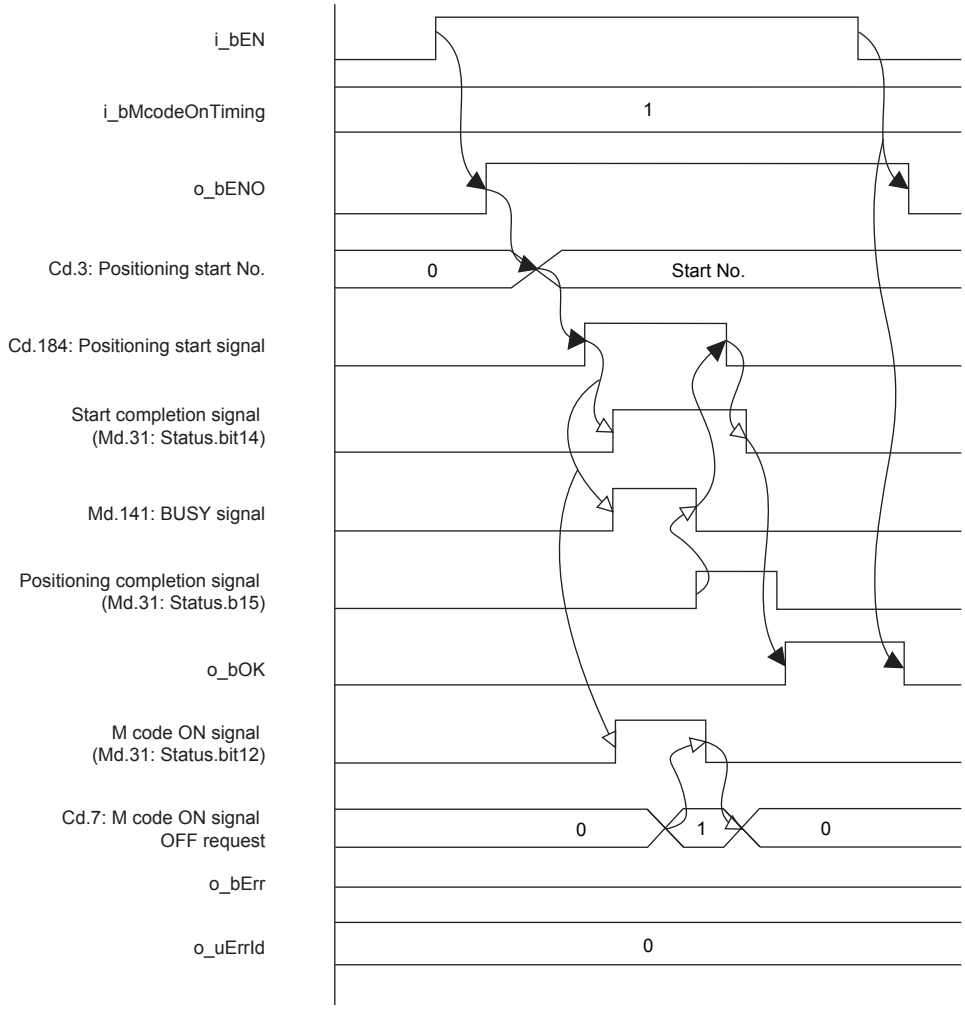
- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 18 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 18 Error code.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (axis 1) (M_FX5PG_DRV_F_00A_1.pb_uAccTimeNo1) and set the acceleration time of positioning.



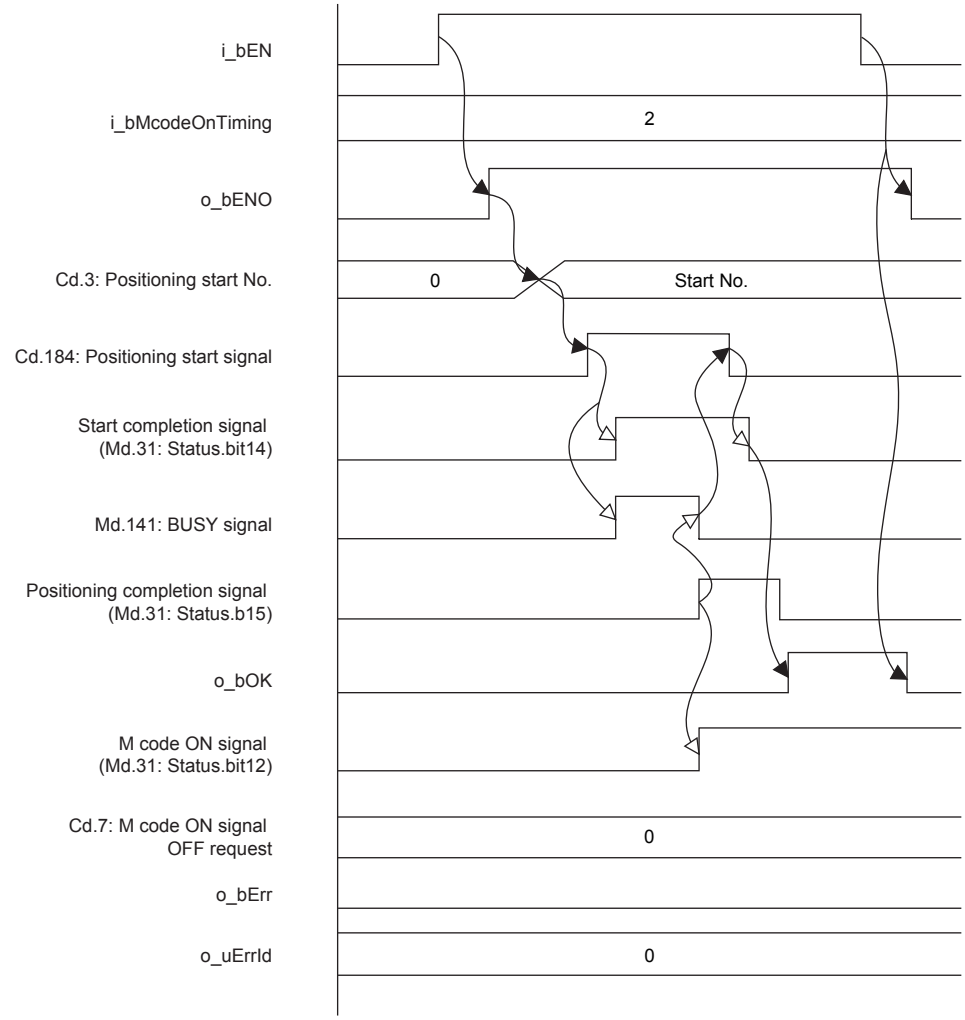
Timing chart of I/O signals

■For normal completion

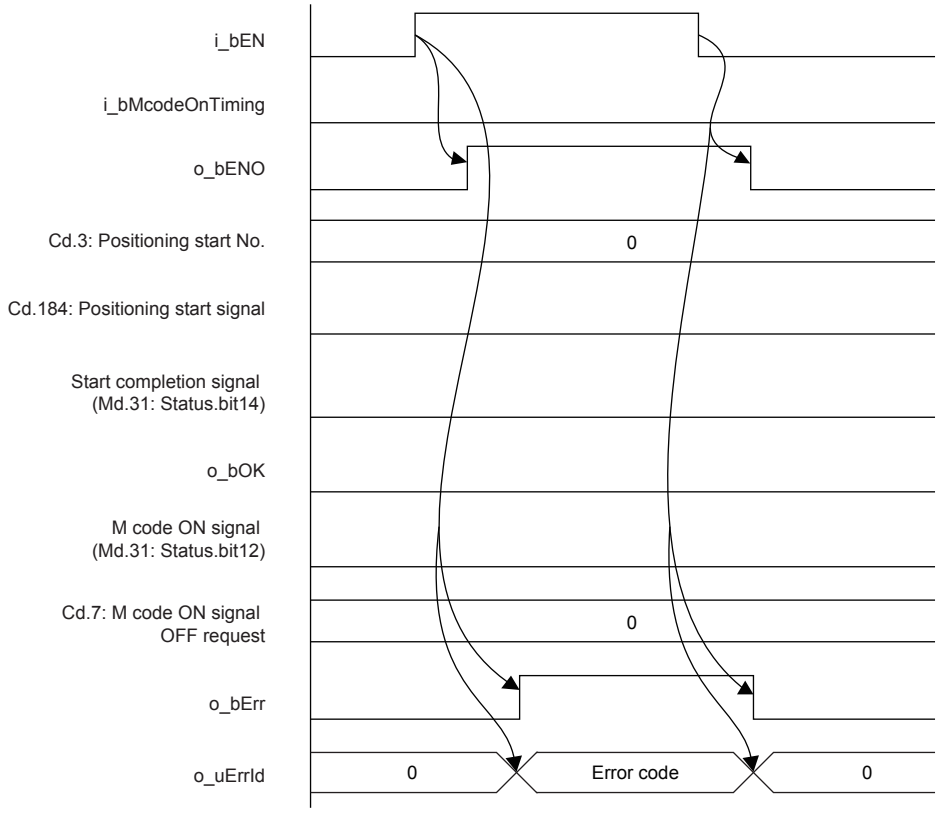
• When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the WITH mode



■For error completion



Restrictions and precautions

- This FB sets "01H: Axis linear control (ABS)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is off and "02H: Axis linear control (INC)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is on.
- ☞ Page 60 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))This FB sets "No. 599 (Positioning data No.)" in [Cd.3] Positioning start No. to set "No. 600 (Positioning data No.)" for the FBs that use the interrupt stop of ☞ Page 67 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed)).
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 94 M+FX5PG_DRV_F (High-speed Positioning).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed (axis 1): K100 Da.8: Command speed (axis 2): K0 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.670 ms	15999 scans
FX5U, FX5UC*1*2	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed (axis 1): K100 Da.8: Command speed (axis 2): K0 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.400 ms	18297 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

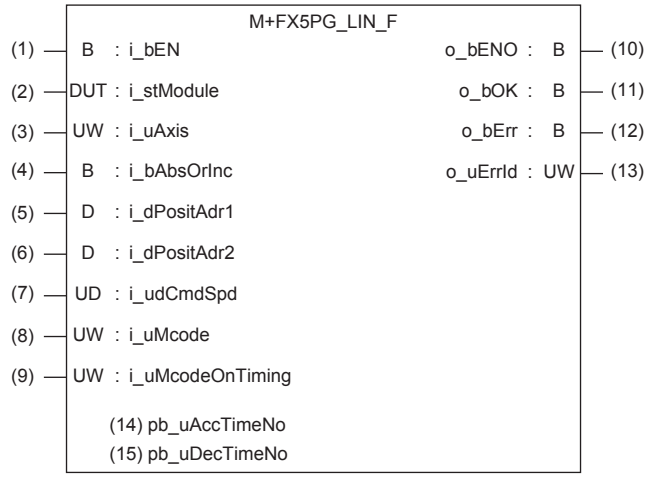
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.2 M+FX5PG_LIN_F (Linear Interpolation Positioning)

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the linear interpolation positioning starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_bAbsOrInc	Absolute/ relative selection	Bit	ON: The relative method is specified. OFF: The absolute method is specified.	Specify the relative/absolute method.
(5)	i_dPositAdr1	Da.6: Positioning address (axis 1)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(6)	i_dPositAdr2	Da.6: Positioning address (axis 2)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.
(7)	i_udCmdSpd	Da.8: Command speed	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(8)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code*1 for the control method.
(9)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode*2 2: AFTER mode*2	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(13)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(14)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(15)	pb_uDecTimeNo	Da.4: Deceleration time No.	Word [Unsigned]/Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	662 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.05K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the linear interpolation positioning is started only when all of the following conditions are satisfied.

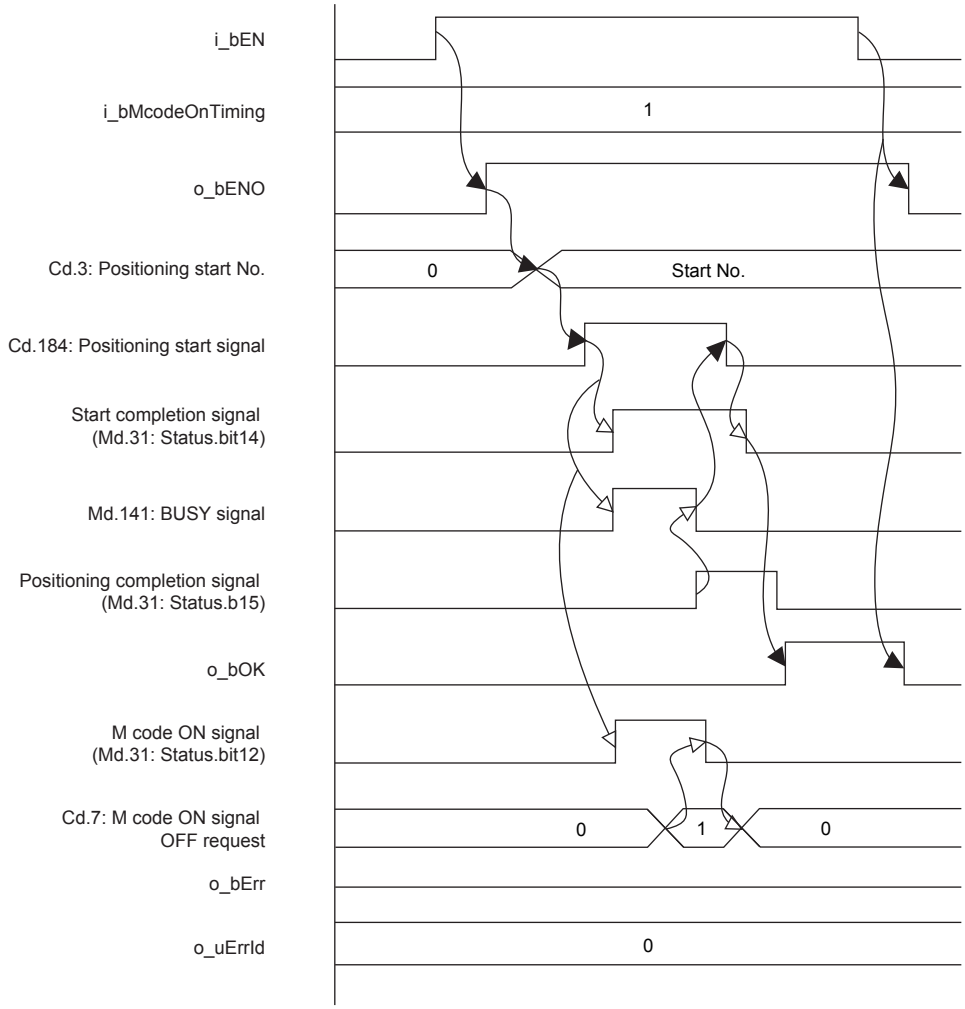
· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 26 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 26 Error code.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (M_FX5PG_LIN_F_00A_1.pb_uAccTimeNo) and set the acceleration time of positioning.

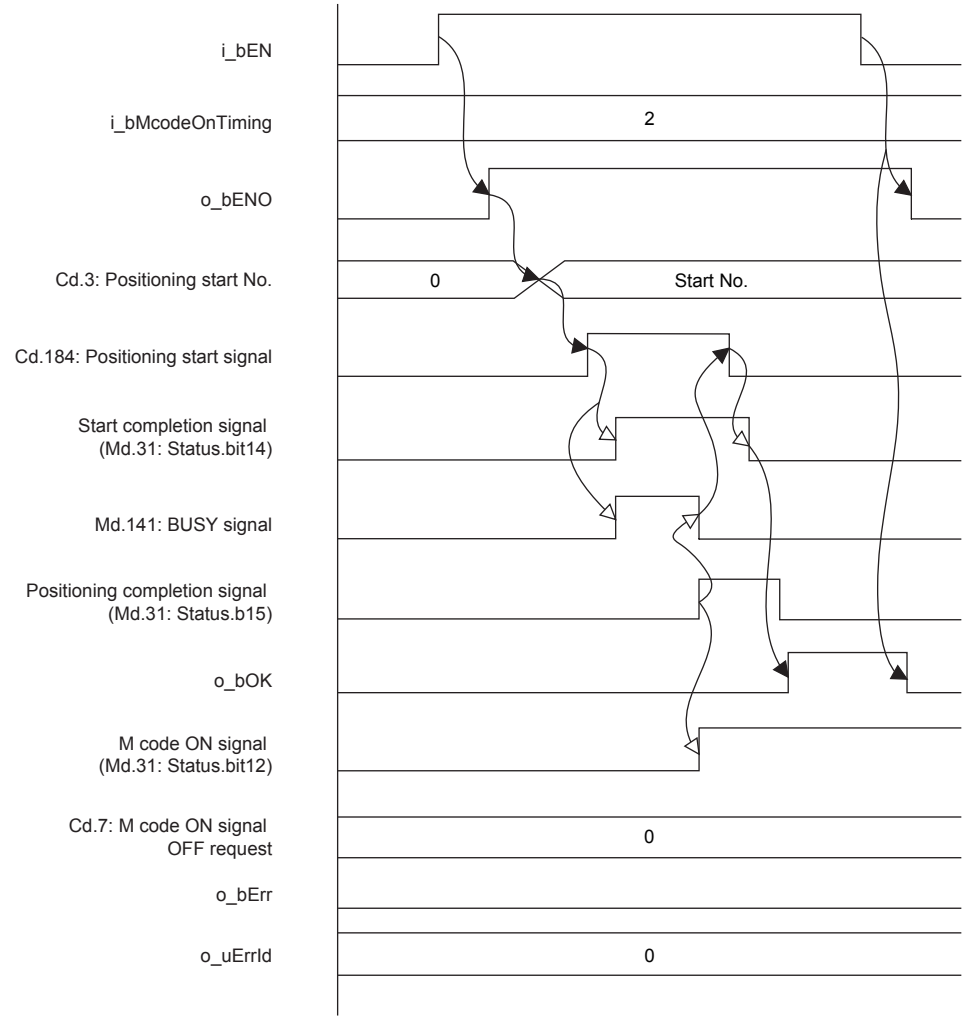
Timing chart of I/O signals

■For normal completion

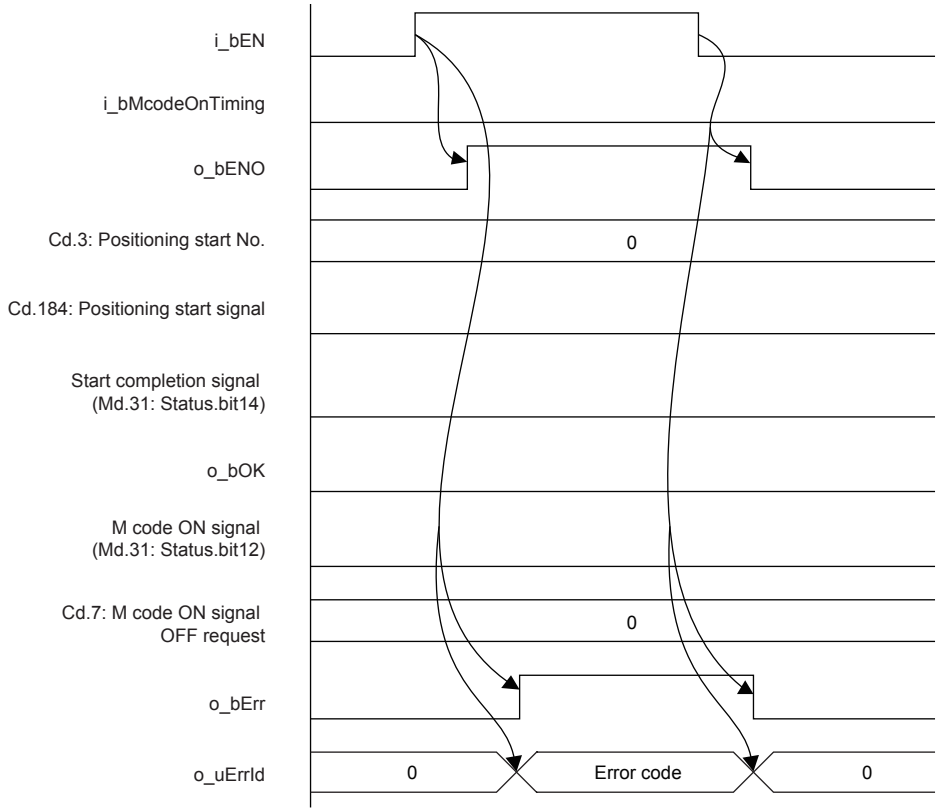
- When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the WITH mode



■For error completion



Restrictions and precautions

- This FB sets "01H: Axis linear control (ABS)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is off and "02H: Axis linear control (INC)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is on.
- This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis).
- ☞ Page 60 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))This FB sets "No. 599 (Positioning data No.)" in [Cd.3] Positioning start No. to set "No. 600 (Positioning data No.)" for the FBs that use the interrupt stop of ☞ Page 67 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed)). Even if a value is set in "No. 600 (Positioning data No.)" or "No. 599 (Positioning data No.)", it is overwritten after executing this FB.
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 98 M+FX5PG_LIN_F (Linear Interpolation Positioning).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1, 2 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K1000 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.800 ms	12137 scans
FX5U, FX5UC*1*2	Axis 1, 2 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K1000 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.570 ms	13866 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

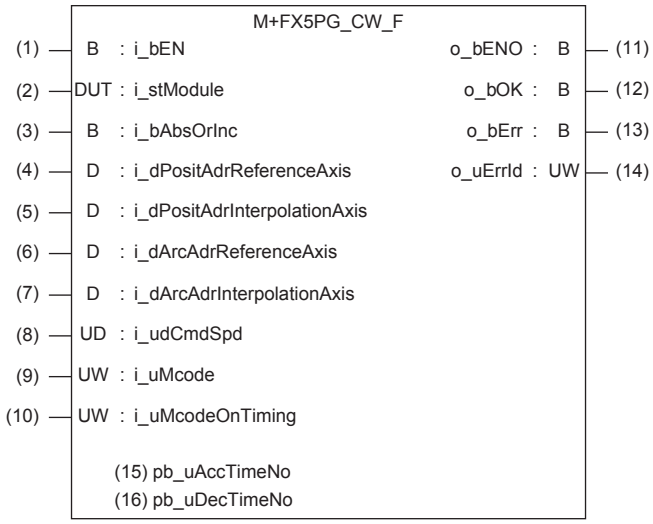
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.3 M+FX5PG_CW_F (Circular Interpolation (Clockwise))

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the center-designated circular interpolation positioning (clockwise) starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_bAbsOrInc	Absolute/relative selection	Bit	ON: The relative method is specified. OFF: The absolute method is specified.	Specify the absolute or relative method.
(4)	i_dPositAdrReferenceAxis	Da.6: Positioning address (reference axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(5)	i_dPositAdrInterpolationAxis	Da.6: Positioning address (interpolation axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.
(6)	i_dArcAdrReferenceAxis	Da7: Circular address (reference axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, pulse, $\times 10^{-5}$ inch) ■Pr.1: For the unit setting 2 Not used (Set 0.)	Use this label only for the circular interpolation control. For the sub point designation, set the sub point address. For the center point designation, set the circular center point address.
(7)	i_dArcAdrInterpolationAxis	Da7: Circular address (interpolation axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, pulse, $\times 10^{-5}$ inch) ■Pr.1: For the unit setting 2 Not used (Set 0.)	Use this label only for the circular interpolation control. For the sub point designation, set the sub point address. For the center point designation, set the circular center point address.
(8)	i_udCmdSpd	Da.8: Command speed	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(9)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code*1 for the control method.
(10)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode*2 2: AFTER mode*2	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(11)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(12)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(13)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(14)	o_uErrId	Error code	Word [Unsigned]/ Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(15)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(16)	pb_uDecTimeNo	Da.4: Deceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	662 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.05K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the center-designated circular interpolation positioning (clockwise) is started only when all of the following conditions are satisfied.

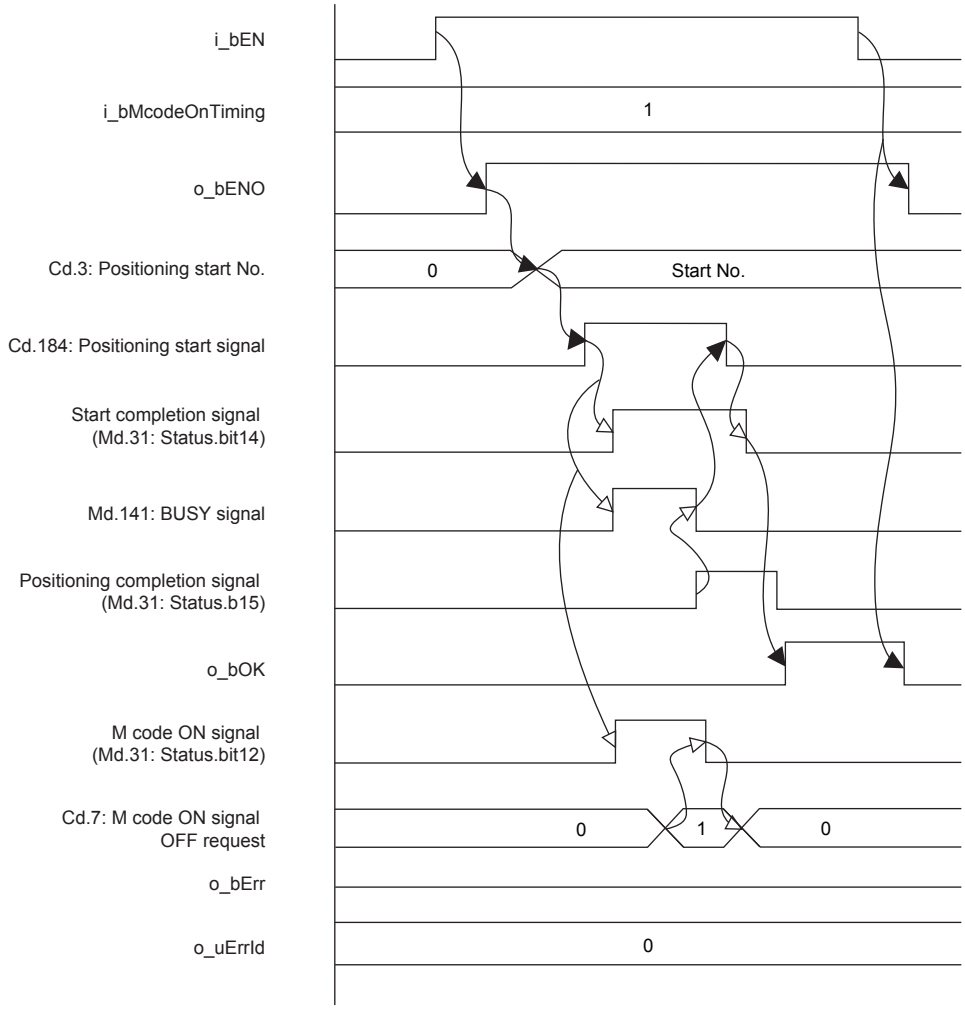
· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 34 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (M_FX5PG_CW_F_00A_1.pb_uAccTimeNo) and set the acceleration time of positioning.

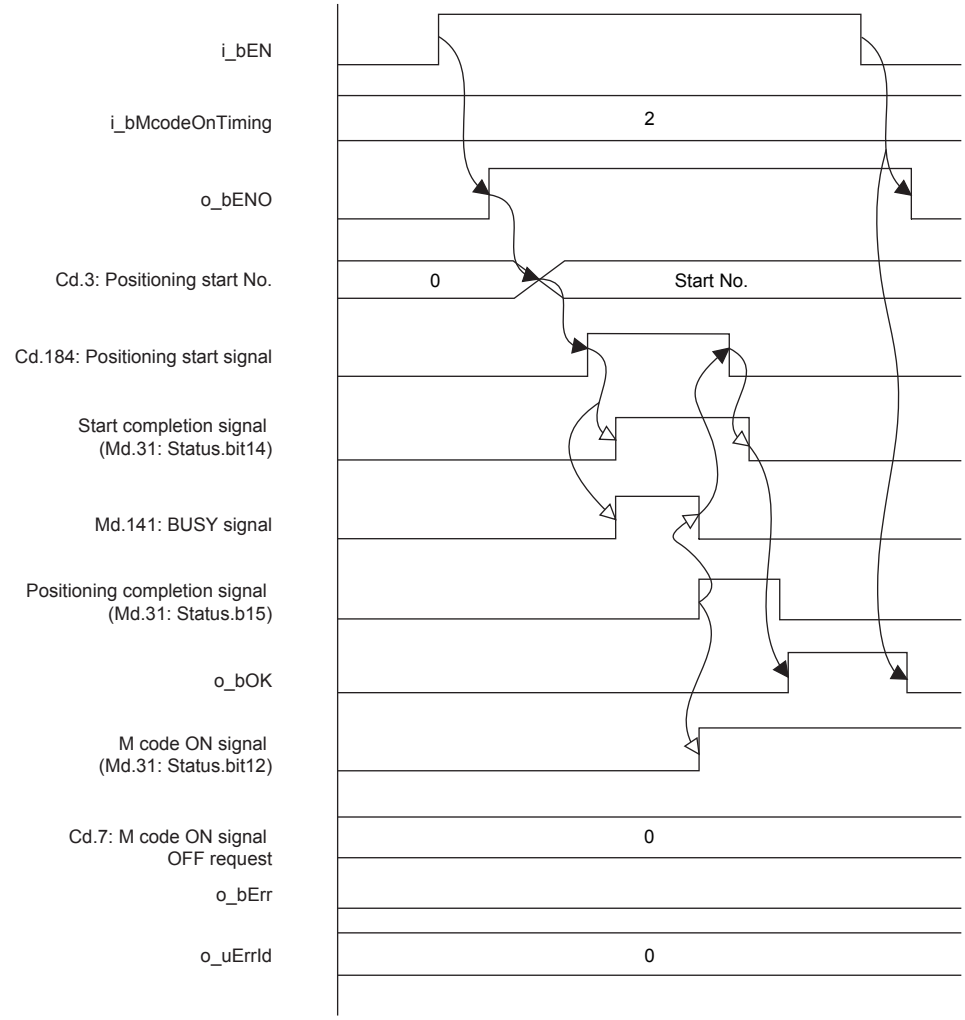
Timing chart of I/O signals

■For normal completion

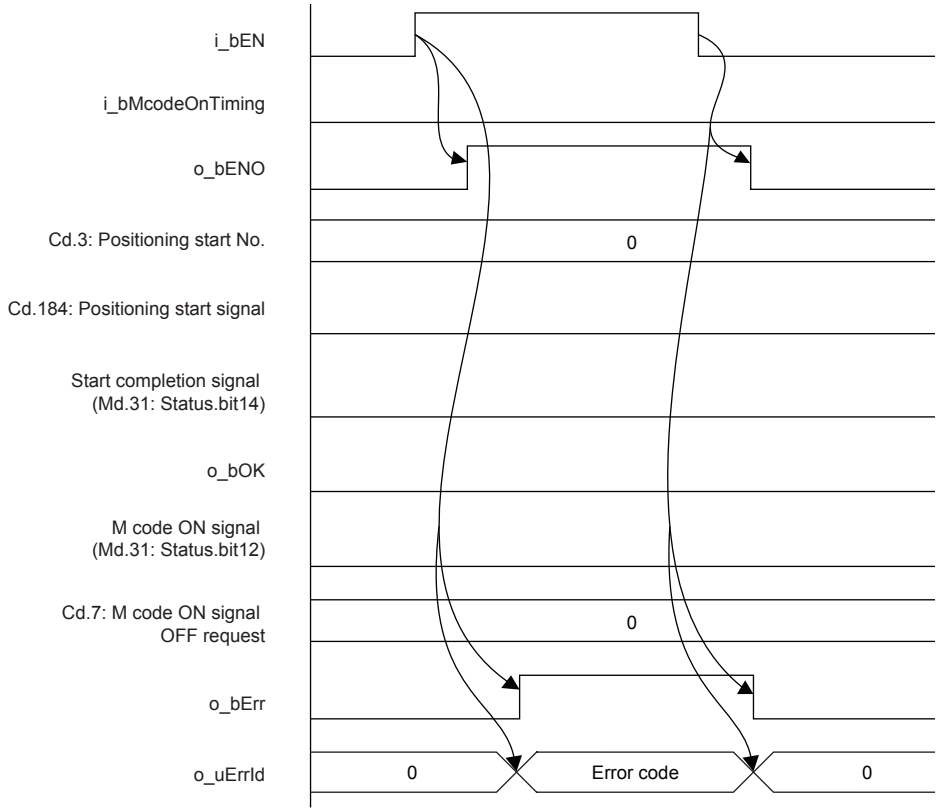
- When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the AFTER mode



■For error completion



Restrictions and precautions

- This FB sets "0FH: Center-designated circular interpolation control (ABS, CW)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is off and "11H: Center-designated circular interpolation control (INC, CW)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is on.
- This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis).
- ☞ Page 60 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))This FB sets "No. 599 (Positioning data No.)" in [Cd.3] Positioning start No. to set "No. 600 (Positioning data No.)" for the FBs that use the interrupt stop of ☞ Page 67 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed)). Even if a value is set in "No. 600 (Positioning data No.)" or "No. 599 (Positioning data No.)", it is overwritten after executing this FB.
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 101 M+FX5PG_CW_F (Circular Interpolation).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1, 2 Da.6: Positioning address (reference axis): K500 [pulse] Da.6: Positioning address (interpolation axis): K500 [pulse] Da7: Circular address (reference axis): K250 [pulse] Da7: Circular address (interpolation axis): K250 [pulse] Da.8: Command speed (axis 1): K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	4450 ms	1.810 ms	5432 scans
FX5U, FX5UC*1*2	Axis 1, 2 Da.6: Positioning address (reference axis): K500 [pulse] Da.6: Positioning address (interpolation axis): K500 [pulse] Da7: Circular address (reference axis): K250 [pulse] Da7: Circular address (interpolation axis): K250 [pulse] Da.8: Command speed (axis 1): K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	4450 ms	1.570 ms	6214 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.

*2 The standard area is used for the labels.

Error code

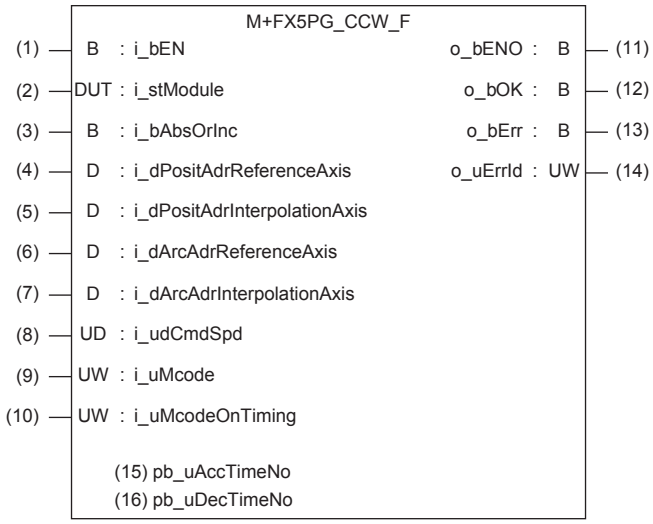
Error code (hexadecimal)	Description	Action
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.4 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise))

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the center-designated circular interpolation positioning (counterclockwise) performs.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_bAbsOrInc	Absolute/relative selection	Bit	ON: The relative method is specified. OFF: The absolute method is specified.	Specify the relative/absolute method.
(4)	i_dPositAdrReferenceAxis	Da.6: Positioning address (reference axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(5)	i_dPositAdrInterpolationAxis	Da.6: Positioning address (interpolation axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.
(6)	i_dArcAdrReferenceAxis	Da7: Circular address (reference axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, pulse, $\times 10^{-5}$ inch) ■Pr.1: For the unit setting 2 Not used (Set 0.)	Use this label only for the circular interpolation control. For the sub point designation, set the sub point address. For the center point designation, set the circular center point address.
(7)	i_dArcAdrInterpolationAxis	Da7: Circular address (interpolation axis)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, pulse, $\times 10^{-5}$ inch) ■Pr.1: For the unit setting 2 Not used (Set 0.)	Use this label only for the circular interpolation control. For the sub point designation, set the sub point address. For the center point designation, set the circular center point address.
(8)	i_udCmdSpd	Da.8: Command speed	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(9)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code*1 for the control method.
(10)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode*2 2: AFTER mode*2	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(11)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(12)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(13)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(14)	o_uErrId	Error code	Word [Unsigned]/ Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(15)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(16)	pb_uDecTimeNo	Da.4: Deceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	662 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.05K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the center-designated circular interpolation positioning (counterclockwise) is performed only when all of the following conditions are satisfied.

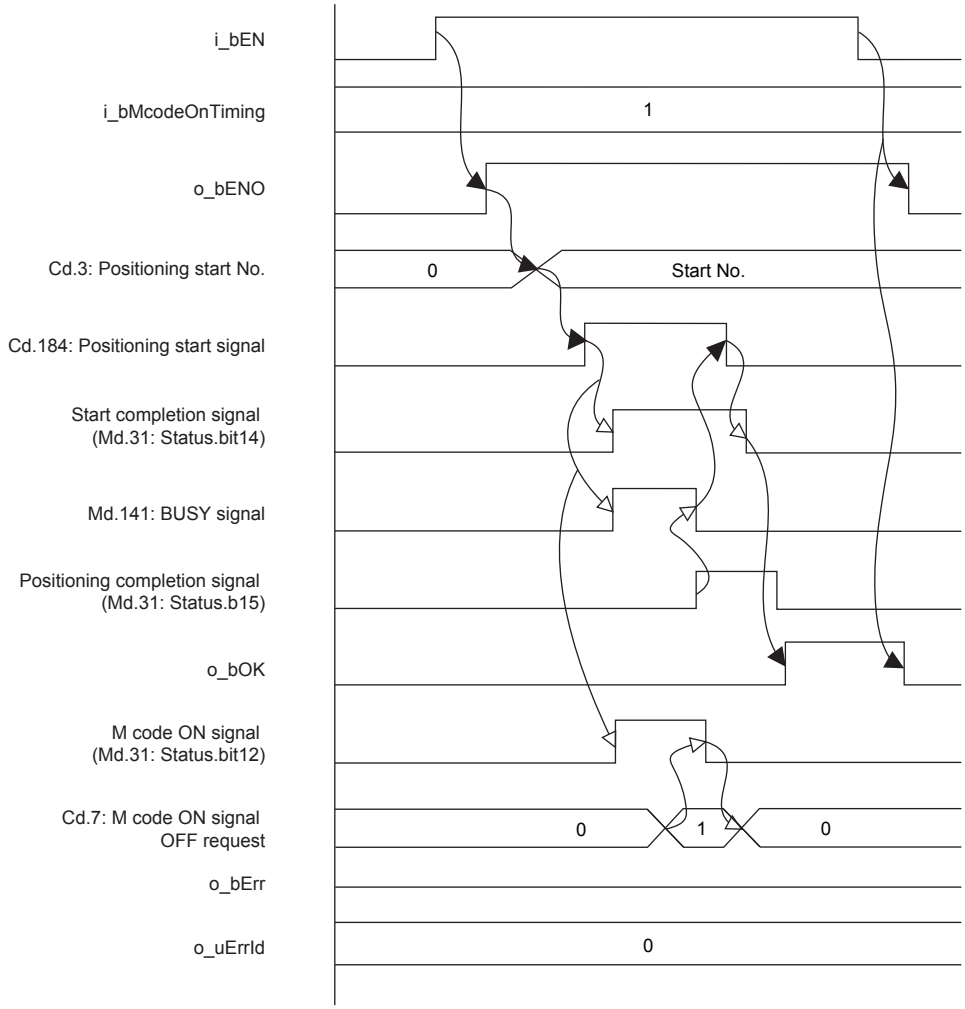
· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 42 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (M_FX5PG_CCW_F_00A_1.pb_uAccTimeNo1) and set the acceleration time of positioning.

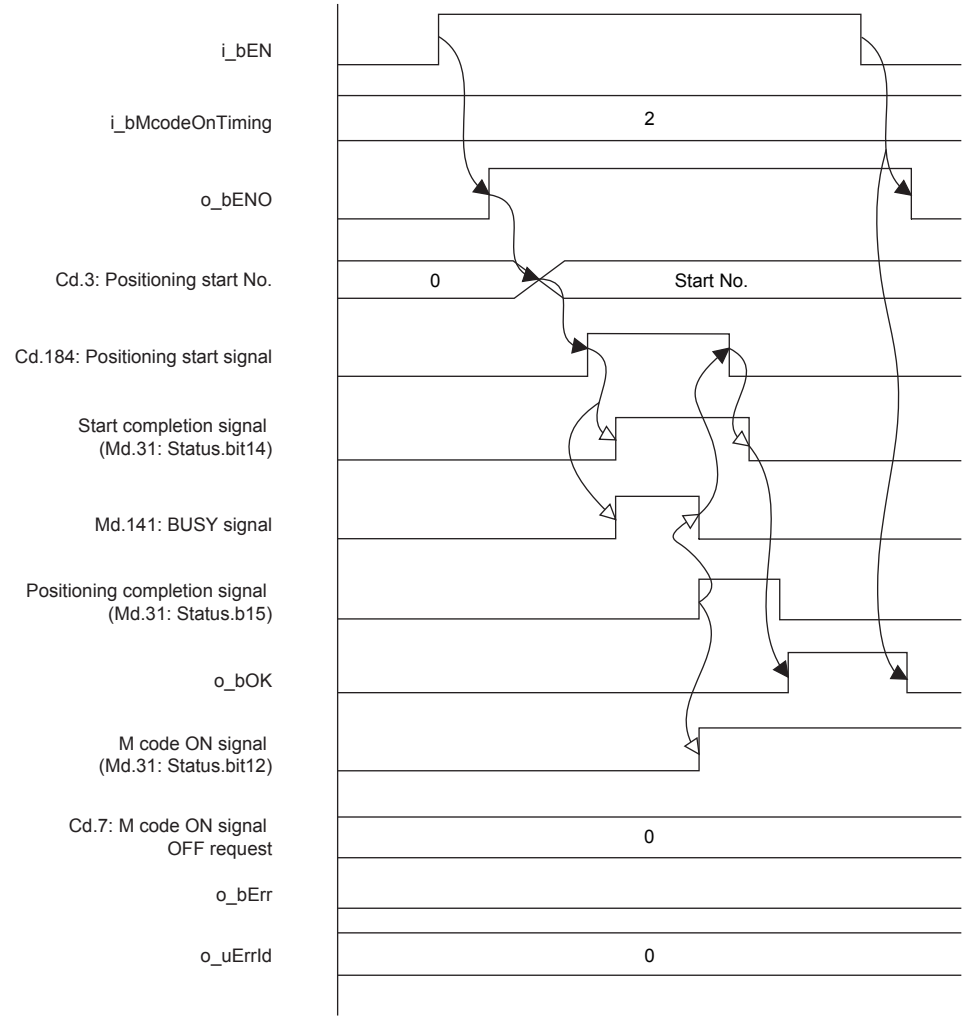
Timing chart of I/O signals

■For normal completion

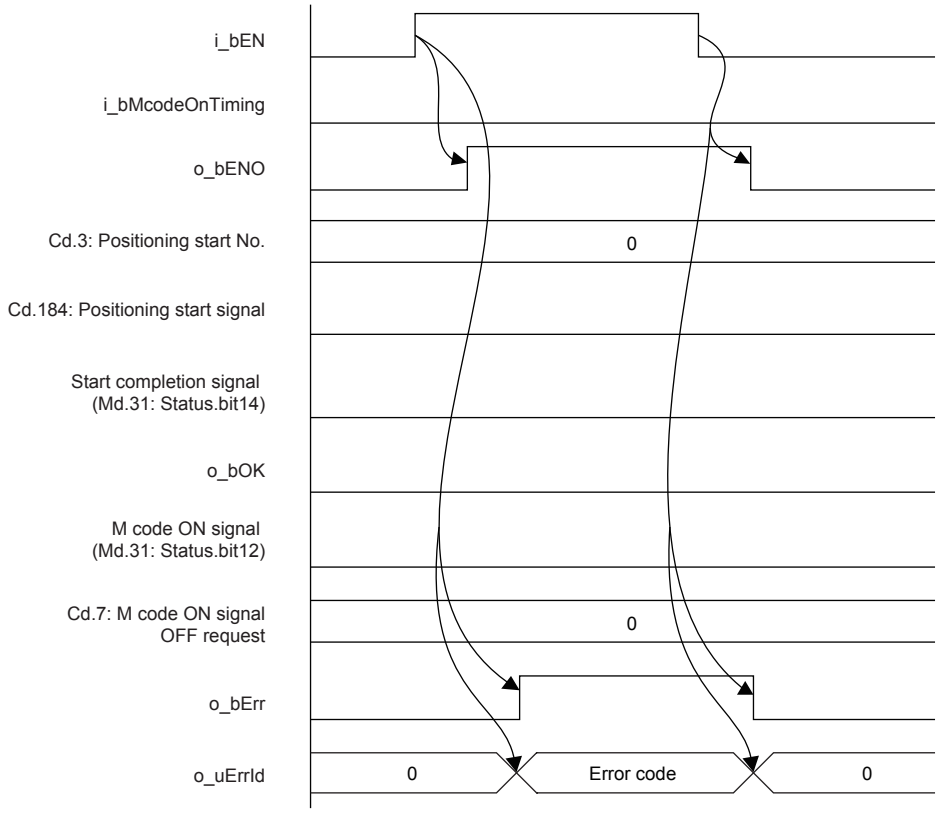
• When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the AFTER mode



■For error completion



Restrictions and precautions

- This FB sets "10H: Center-designated circular interpolation control (ABS, CCW)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is off and "12H: Center-designated circular interpolation control (INC, CCW)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is on.
- This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis).
- ☞ Page 60 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))This FB sets "No. 599 (Positioning data No.)" in [Cd.3] Positioning start No. to set "No. 600 (Positioning data No.)" for the FBs that use the interrupt stop of ☞ Page 67 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed)). Even if a value is set in "No. 600 (Positioning data No.)" or "No. 599 (Positioning data No.)", it is overwritten after executing this FB.
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 105 M+FX5PG_CCW_F (Circular Interpolation).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1, 2 Da.6: Positioning address (reference axis): K500 [pulse] Da.6: Positioning address (interpolation axis): K500 [pulse] Da7: Circular address (reference axis): K250 [pulse] Da7: Circular address (interpolation axis): K250 [pulse] Da.8: Command speed (axis 1): K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	19600 ms	1.810 ms	13547 scans
FX5U, FX5UC*1*2	Axis 1, 2 Da.6: Positioning address (reference axis): K500 [pulse] Da.6: Positioning address (interpolation axis): K500 [pulse] Da7: Circular address (reference axis): K250 [pulse] Da7: Circular address (interpolation axis): K250 [pulse] Da.8: Command speed (axis 1): K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	11200 ms	1.600 ms	15521 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.

*2 The standard area is used for the labels.

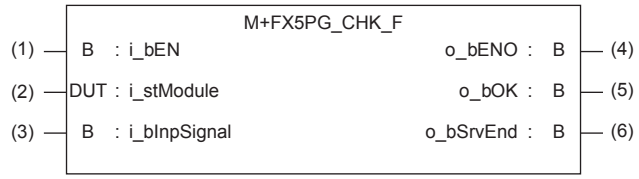
Error code

Error code (hexadecimal)	Description	Action
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.5 M+FX5PG_CHK_F (Servo End Check)

Overview

The INP signal is checked in the CPU module and the servo end check is performed using the M code of 20PG.



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_bInpSignal	INP signal	Bit	ON, OFF	ON: It indicates that the INP signal is on. OFF: It indicates that the INP signal is off.

Output label

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(5)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(6)	o_bSrvEnd	Servo end	Bit	OFF	Output the servo end status. ON: Executed OFF: Not executed

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1504, 1604	RW: M code ON signal OFF request (direct)	FX5PG_□.stnAxisControlData_Axis_D[].uMcodeOnSignalTurnsOffRequest_D	Word [Unsigned]/ Bit string [16-bit]	0	0, 1	R	Turn off the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

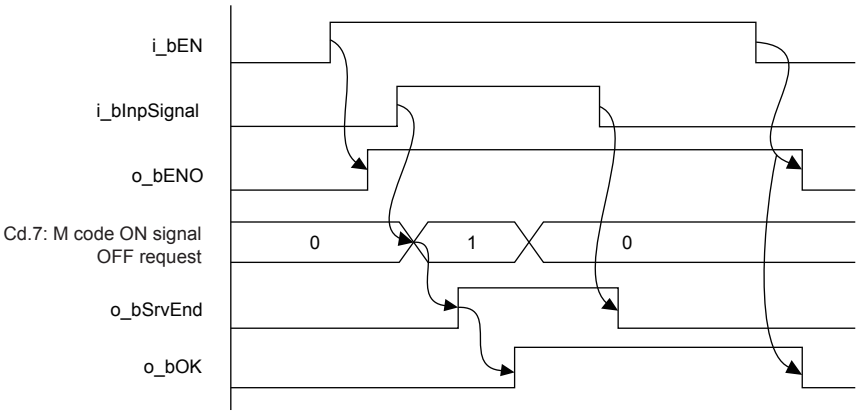
Item	Description
Programming language	Ladder
Number of steps	48 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the INP signal is checked in the CPU module and the servo end check is performed using the M code of FX5-20PG.
- By turning on i_bInpSignal (INP signal), this FB turns on ([Cd.7] M code OFF request), and o_bSrvEnd (Servo end) turns on.
- By turning on o_bSrvEnd (Servo end), o_bOK (Normal completion) turns on in this FB.

Timing chart of I/O signals

■For normal completion



Restrictions and precautions

- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	INP signal: ON	0.032 ms	0.621 ms	1 scan
FX5U, FX5UC*1*2	INP signal: ON	0.032 ms	0.514 ms	1 scan

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

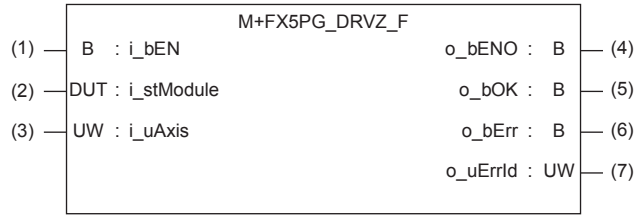
Error code (hexadecimal)	Description	Action
None	None	None

2.6 M+FX5PG_DRVZ_F (Machine Home Position Return)

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the proximity dog type home position return starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.

Output label

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(5)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(6)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	294 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

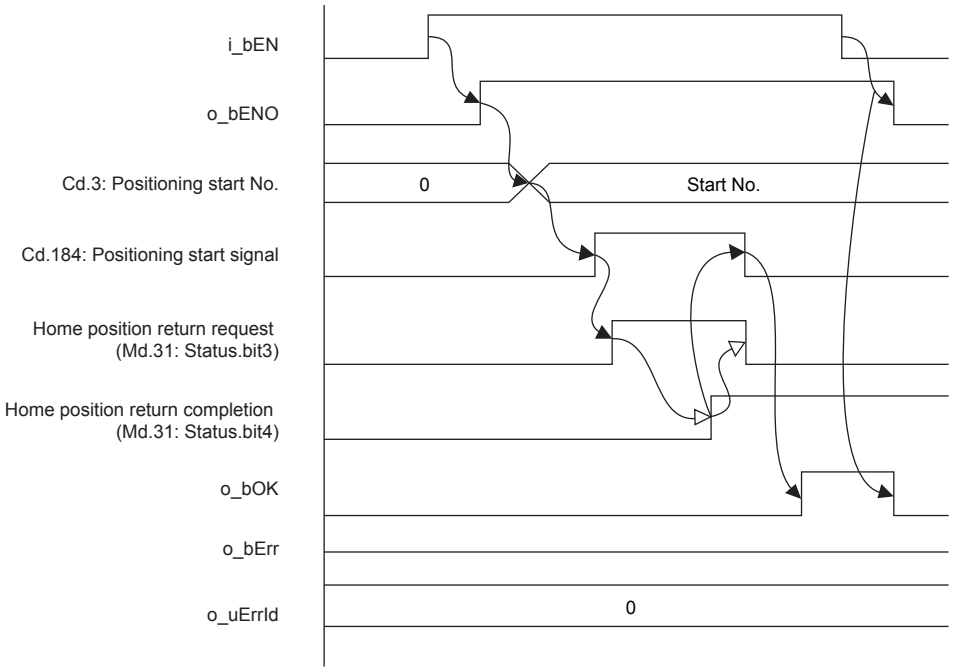
- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the proximity dog type home position return is started only when all of the following conditions are satisfied.

· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

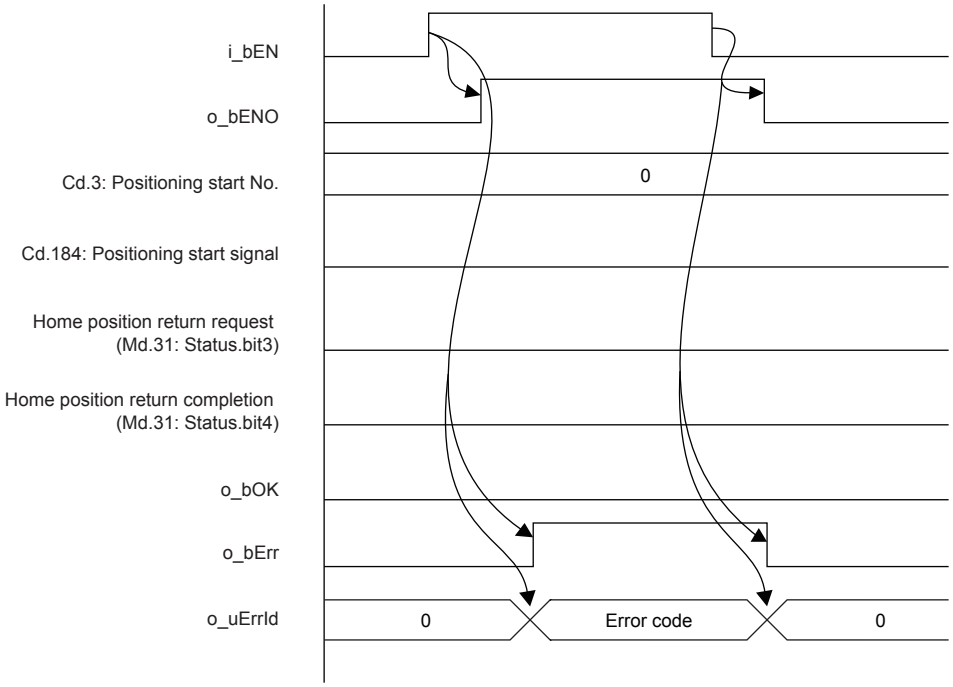
- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 50 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 50 Error code.

Timing chart of I/O signals

■For normal completion



■For error completion



Restrictions and precautions

- This FB sets "No. 9001 (Machine home position return)" in [Cd.3] Positioning start No.
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1	10100 ms	1.760 ms	15791 scans
FX5U, FX5UC*1*2	Axis 1	10100 ms	1.540 ms	17871 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

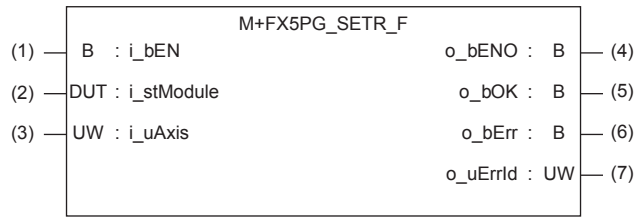
Error code

Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.7 M+FX5PG_SETR_F (Electric Home Position Setting)

Overview

[Md.20] Feed current value is written to [Pr.45] Home position address.



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.

Output label

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(5)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(6)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
800, 900	R: Feed current value (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].dCurrentFeedValue_D	Double word [Signed]	0	• Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 • Pr.1: For the unit setting 2 0 to 35999999	R	The address currently being commanded is stored.
72, 222	RW: Home position address (direct)	FX5PG_☐.stnParameter_Axis_D[].dOP_Address_D	Double word [Signed]	0	• Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 • Pr.1: For the unit setting 2 0 to 35999999	R/W	Set an address as a reference position for the positioning control.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

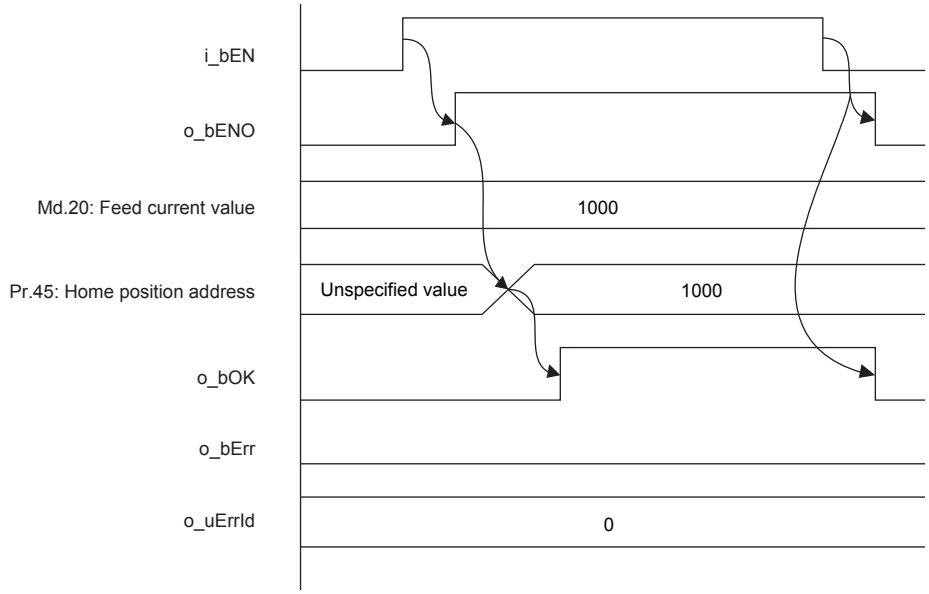
Item	Description
Programming language	Ladder
Number of steps	115 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

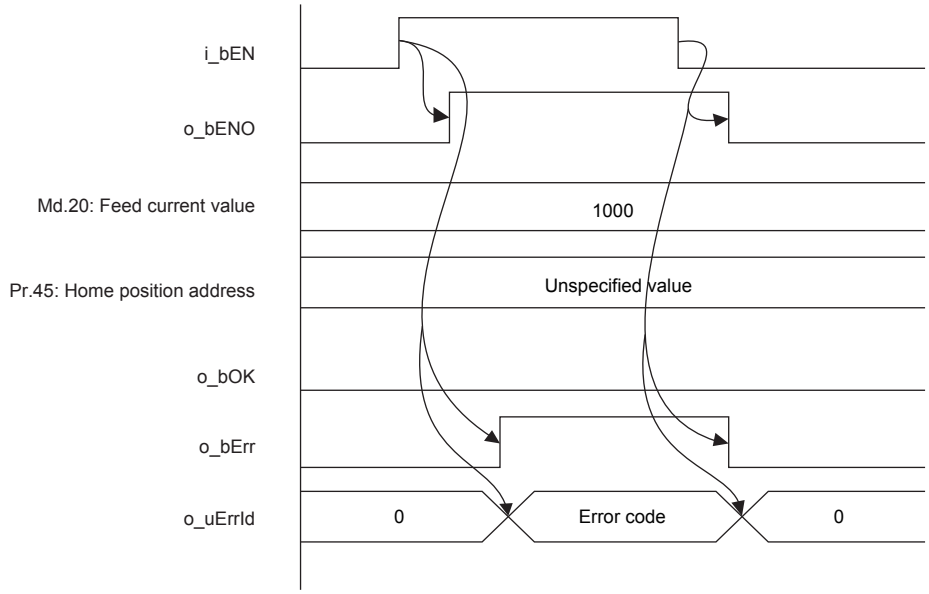
- By turning on i_bEN (Execution command), [Md.20] Feed current value is written to [Pr.45] Home position address.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 54 Error code.

Timing chart of I/O signals

■For normal completion



■For error completion



Restrictions and precautions

- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1	0.012 ms	1.110 ms	1 scan
FX5U, FX5UC[*1*2]	Axis 1	0.030 ms	0.845 ms	1 scan

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

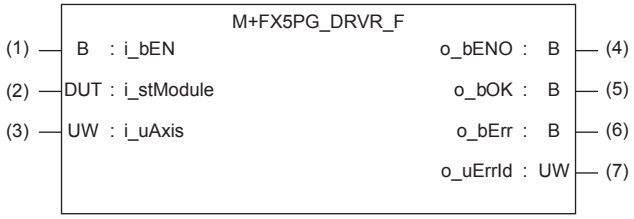
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.

2.8 M+FX5PG_DRVR_F (Electric Home Position Return)

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the electric home position return starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.

Output label

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(5)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(6)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	330 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

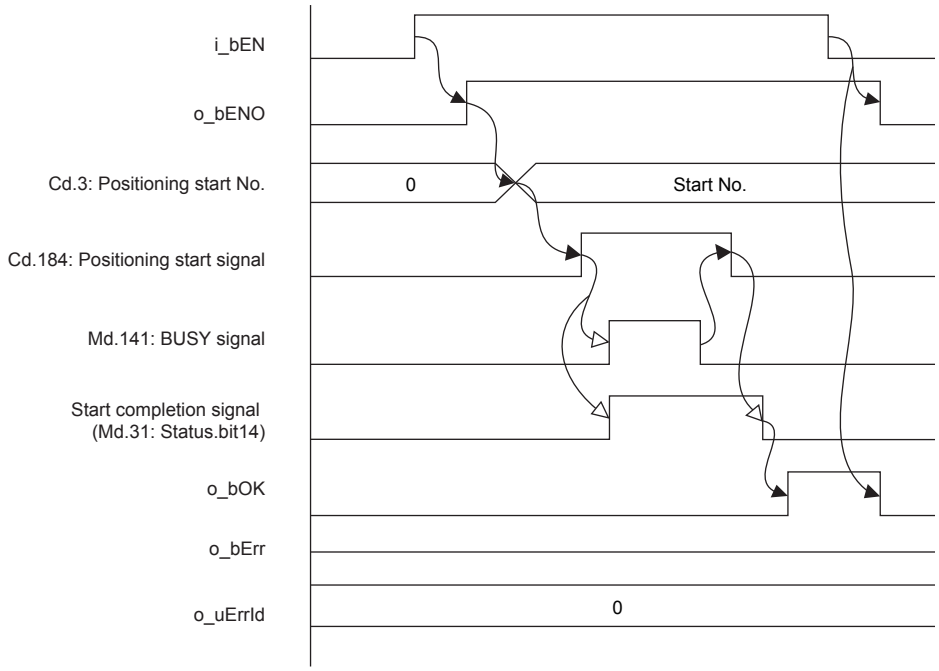
- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the electric home position return is started only when all of the following conditions are satisfied.

· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

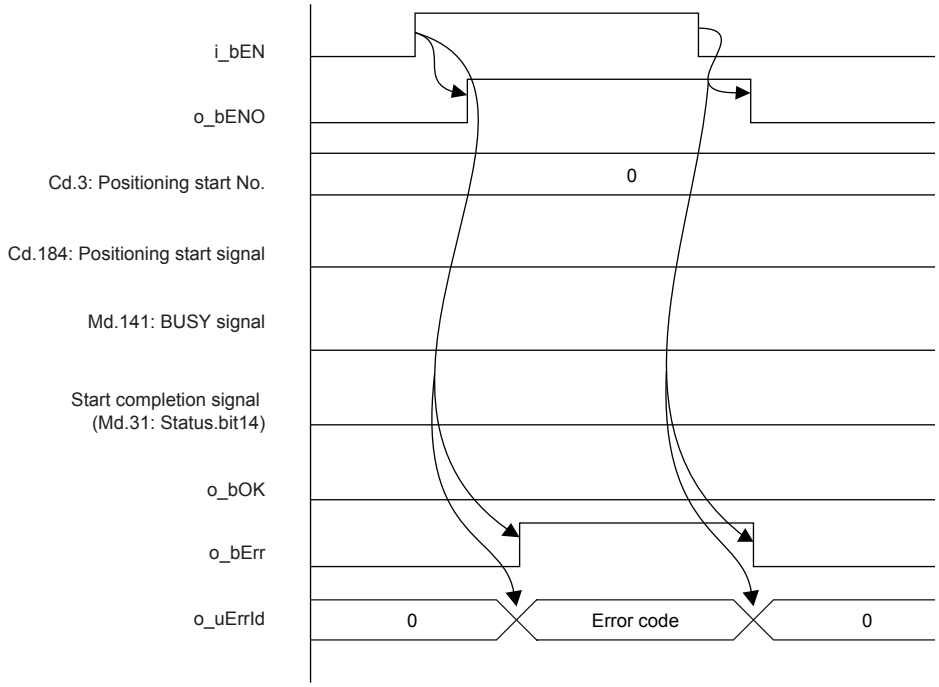
- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 59 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 59 Error code.

Timing chart of I/O signals

■For normal completion



■For error completion



Restrictions and precautions

- This FB sets "No. 9002 (High-speed home position return)" in [Cd.3] Positioning start No.
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1	0.004 ms	1.920 ms	5 scans
FX5U, FX5UC*1*2	Axis 1	0.005 ms	1.720 ms	6 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

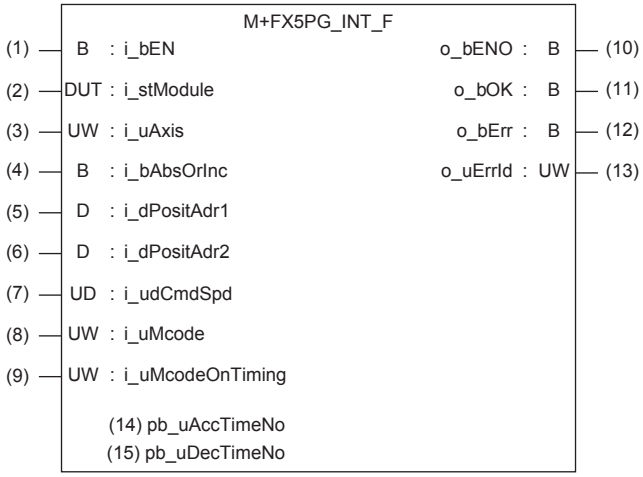
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.9 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the interrupt stop starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_bAbsOrInc	Absolute/relative selection	Bit	ON: The relative method is specified. OFF: The absolute method is specified.	Specify the absolute or relative method.
(5)	i_dPositAdr1	Da.6: Positioning address (axis 1)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • Da.2: Control method 01H 0 to 35999999 ($\times 10^{-5}$ degree) • Da.2: Control method 02H -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(6)	i_dPositAdr2	Da.6: Positioning address (axis 2)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 (× 10^{-1} μm, ×10^{-5} inch, pulse) ■Pr.1: For the unit setting 2 • Da.2: Control method 01H 0 to 35999999 (× 10^{-5} degree) • Da.2: Control method 02H -2147483648 to 2147483647 (× 10^{-5} degree)	Specify the target position and movement amount for positioning control.
(7)	i_udCmdSpd	Da.8: Command speed	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [× 10^{-2} mm/min, × 10^{-3} inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [× 10^{-3} degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
				■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
(8)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code*1 for the control method.
(9)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode*2 2: AFTER mode*2	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(13)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(14)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(15)	pb_uDecTimeNo	Da.4: Deceleration time No.	Word [Unsigned]/Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.
1547, 1647	RW: Skip command (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uSkipCommand_D	Word [Unsigned]/ Bit string [16-bit]	0	0, 1	R/W	Set "1" to skip the positioning currently being performed.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	1913 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.06K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the interrupt stop is started only when all of the following conditions are satisfied.

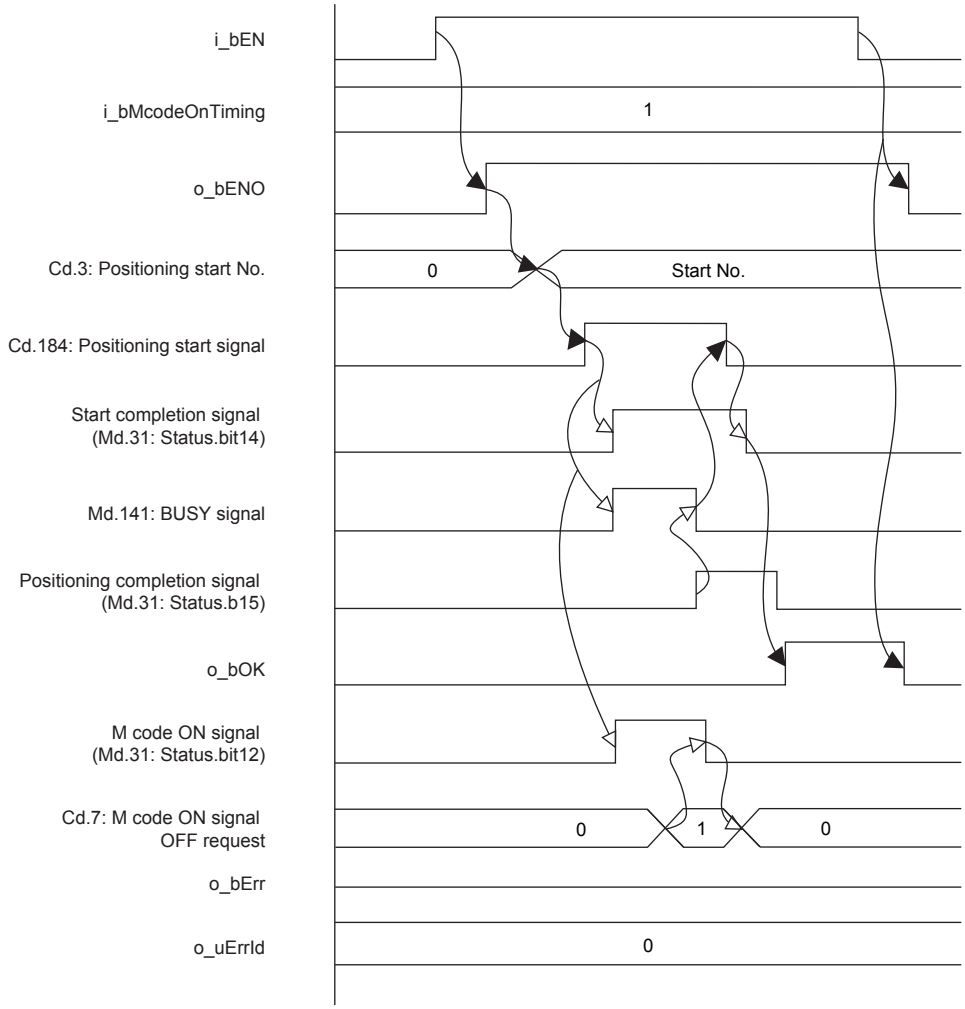
· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 66 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 66 Error code.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (M_FX5PG_INT_F_00A_1.pb_uAccTimeNo) and set the acceleration time of positioning.

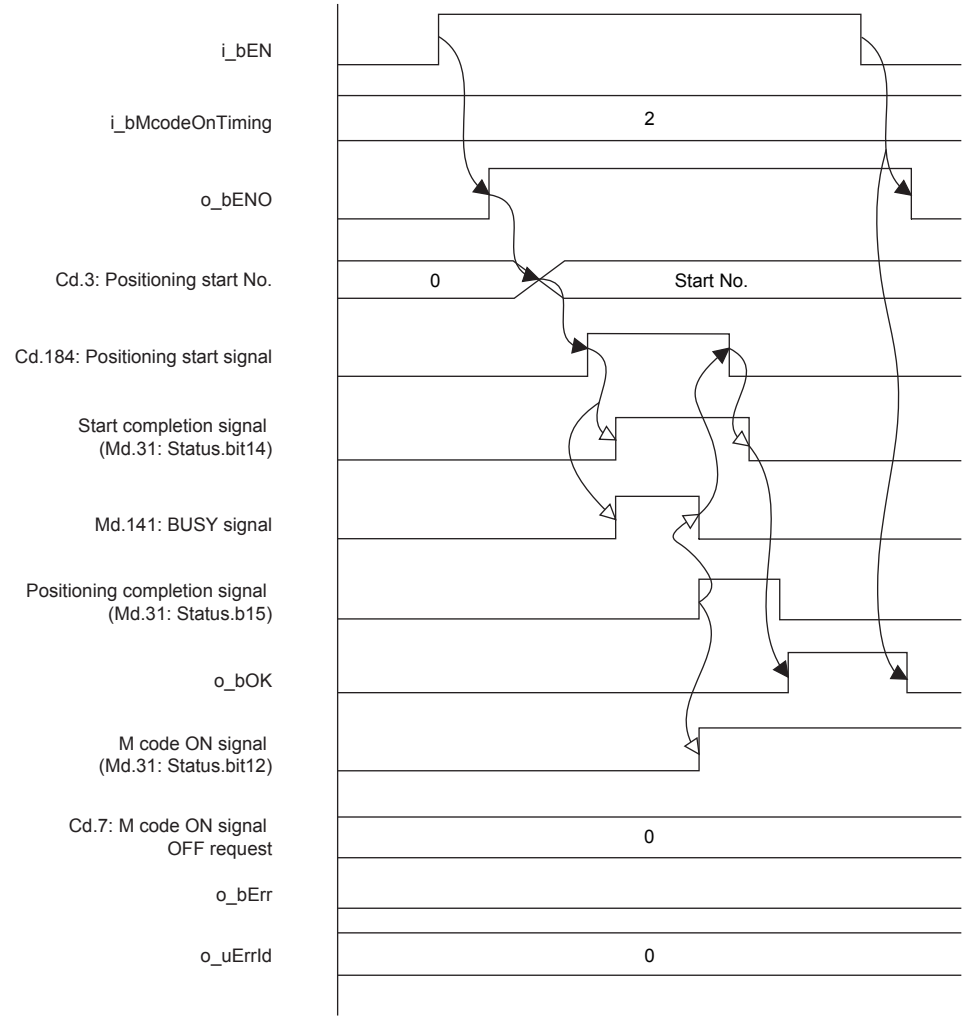
Timing chart of I/O signals

■For normal completion

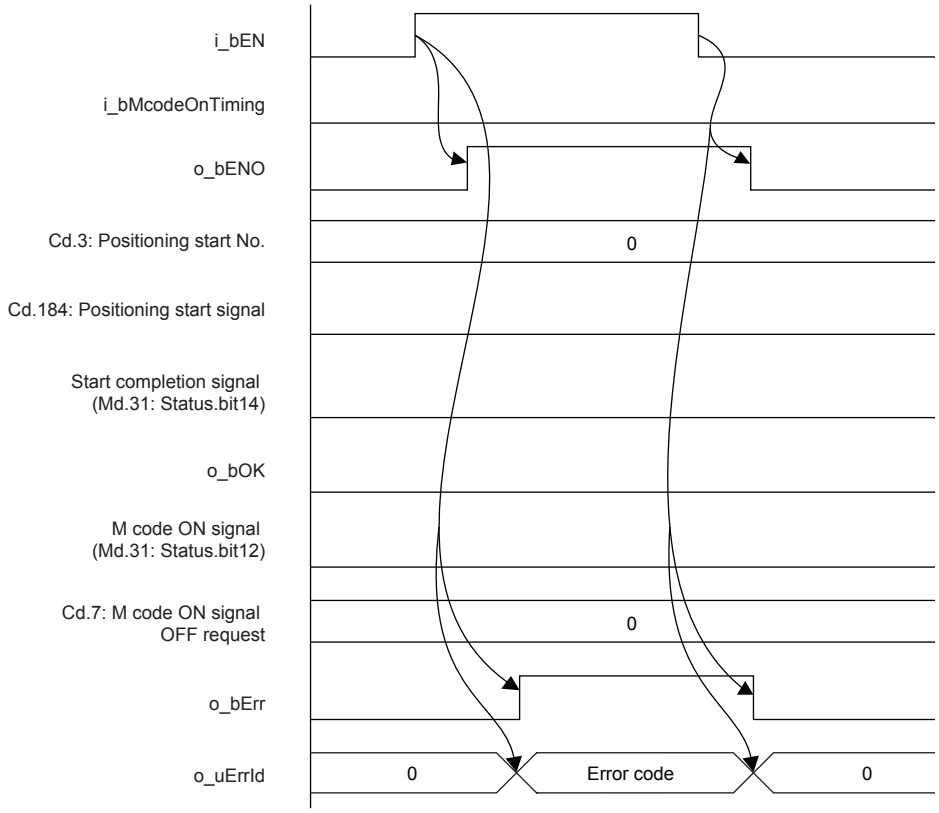
• When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the AFTER mode



■For error completion



Restrictions and precautions

- This FB sets "01H: Axis linear control (ABS)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is off and "02H: Axis linear control (INC)" in ([Da.2] Control method) when i_bAbsOrInc (Absolute/relative selection) is on.
- This FB sets "No. 600 (Positioning data No.)" in [Cd.3] Positioning start No., and sets "No. 599 (Positioning data No.)" in a table which performs the 1-axis linear control or 2-axis linear interpolation control. Even if a value is set in "No. 600 (Positioning data No.)" or "No. 599 (Positioning data No.)", it is overwritten after executing this FB.
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 109 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.840 ms	10473 scans
FX5U, FX5UC*1*2	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	17700 ms	1.750 ms	11786 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

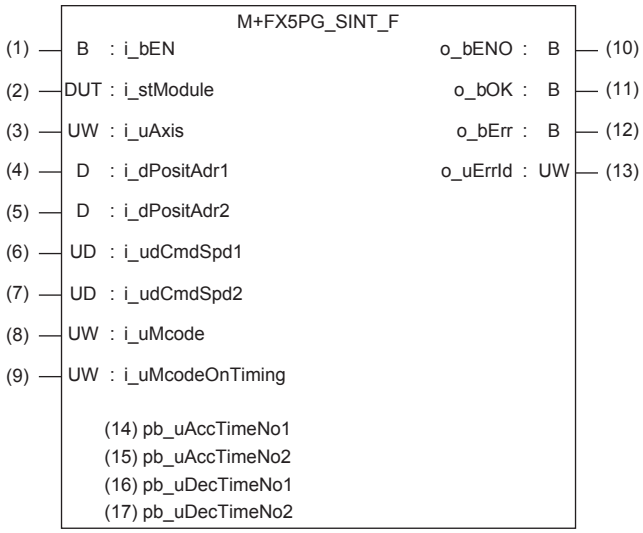
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.10 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed))

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the interrupt fixed feeding (first level speed) starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_dPositAdr1	Da.6: Positioning address (axis 1)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.

No.	Label	Label name	Data type	Setting range	Description
(5)	i_dPositAdr2	Da.6: Positioning address (axis 2)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 • When i_bAbsOrInc (Absolute/relative selection) is off 0 to 35999999 ($\times 10^{-5}$ degree) • When i_bAbsOrInc (Absolute/relative selection) is on -2147483648 to 2147483647 ($\times 10^{-5}$ degree)	Specify the target position and movement amount for positioning control.
(6)	i_udCmdSpd1	Da.8: Command speed (axis 1)	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
(7)	i_udCmdSpd2	Da.8: Command speed (axis 2)	Double word [Unsigned]/Bit string [32-bit]	■Current speed FFFFFFFFH (Set speed for the positioning data No. which was previously set)	Perform the positioning control using the speed for the positioning data No. which was previously set.
				■Pr.1: For the unit setting 0 and 1 1 to 2000000000 [$\times 10^{-2}$ mm/min, $\times 10^{-3}$ inch/min] ■Pr.1: For the unit setting 2 1 to 3000000000 [$\times 10^{-3}$ degree/min] ■Pr.1: For the unit setting 3 1 to 5000000 [pulse/s]	Set the operation speed for positioning.
(8)	i_uMcode	Da.10: M code	Word [Unsigned]/Bit string [16-bit]	0 to 65535	Set the condition data No., the number of duplication, or M code*1 for the control method.
(9)	i_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [Unsigned]/Bit string [16-bit]	0: The setting value of [Pr.18] M code ON signal output timing is used. 1: WITH mode*2 2: AFTER mode*2	Set the output timing of the M code ON signal.

*1 For the M codes, refer to Section 17.4 Positioning Data in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, refer to Section 12.9 Other Functions in MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

Output label

No.	Label	Label name	Data type	Default value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(13)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Public variable (operation parameter)

No.	Label	Label name	Data type	Setting range	Description
(14)	pb_uAccTimeNo1	Da.3: Acceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(15)	pb_uAccTimeNo2	Da.3: Acceleration time No. (axis 2)	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as the acceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(16)	pb_uDecTimeNo1	Da.4: Deceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.
(17)	pb_uDecTimeNo2	Da.4: Deceleration time No. (axis 2)	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to be used as the deceleration time of the positioning. When a value equal to or greater than 4, which is out of the setting range, is set, bit 0 or 1 is enabled. For example, when 4 is set, bit 0 is enabled.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
27, 177	RW: M code ON signal output timing (direct)	FX5PG_☐.stnParameter_Axis_D[].uMcodeOnTiming_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	Set the output timing of the M code ON signal.
34, 184	RW: Speed/ position function selection (direct)	FX5PG_☐.stnParameter_Axis_D[].uSpeedPositionFunctionSelection _D	Word [Unsigned]	0	0: Speed/position switching control (INC mode) 2: Speed/position switching control (ABS mode)	R/W	Select the mode of the speed/position switching control.*1

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1566, 1666	RW: Speed ⇔ position switching device selection (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uSpeedPositionSwitchingDeviceSelection_D	Word [Unsigned]	0	<Speed/position switching control> 0: The external command signal is used for switching the speed control to the position control. 1: The near-point dog signal is used for switching the speed control to the position control. 2: "[Cd.46] Speed ⇔ position switching command" is used for switching the speed control to the position control.	R/W	Select the device used for the speed ⇔ position switching.
1528, 1628	RW: Speed/ position switching enable flag (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uSpeedPositionSwitchingEnableFlag_D	Word [Unsigned]	0	0: The speed control is not switched to the position control even when the external command signal [CHG] turns on. 1: The speed control is switched to the position control when the external command signal [CHG] turns on.	R/W	Validate or invalidate the external command signal [CHG].
62, 212	RW: External command function selection (direct)	FX5PG_☐.stnParameter_Axis_D[].uExternalCommandFunctionSelection_D	Word [Unsigned]	0	0: External positioning start 1: External speed change request 2: Speed-position/position-speed control switching request 3: Skip request	R/W	Select a function in which the external command signal is used.
1505, 1605	RW: External command valid (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uExternalCommandValid_D	Word [Unsigned]	0	0: Invalidate the external command. 1: Validate the external command.	R/W	Validate or invalidate the external command signal.

*1 If a value other than 0 or 2 is set, the operation is performed in the INC mode regarding the set value as 0.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	1046 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.06K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the interrupt fixed feeding (first level speed) is started only when all of the following conditions are satisfied.

· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 76 Error code.
- This FB turns on the speed/position switching signal when the external interrupt input turns on, and performs the relative movement for the specified amount set in i_dPositAdr 1 ([Da.6] Positioning address (axis 1)) and i_dPositAdr 2 ([Da.6] Positioning address (axis 2)) without changing the speed, and then stops the movement.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- The following signals are turned off when the positioning start signal ([Cd.184] Positioning start signal) is turned off from on.

· BUSY signal ([Md.141] BUSY: b0, b1)
· Start completion signal ([Md.31] Status: b14)
· Speed/position switching enable flag ([Cd.24] Speed/position switching enable flag)

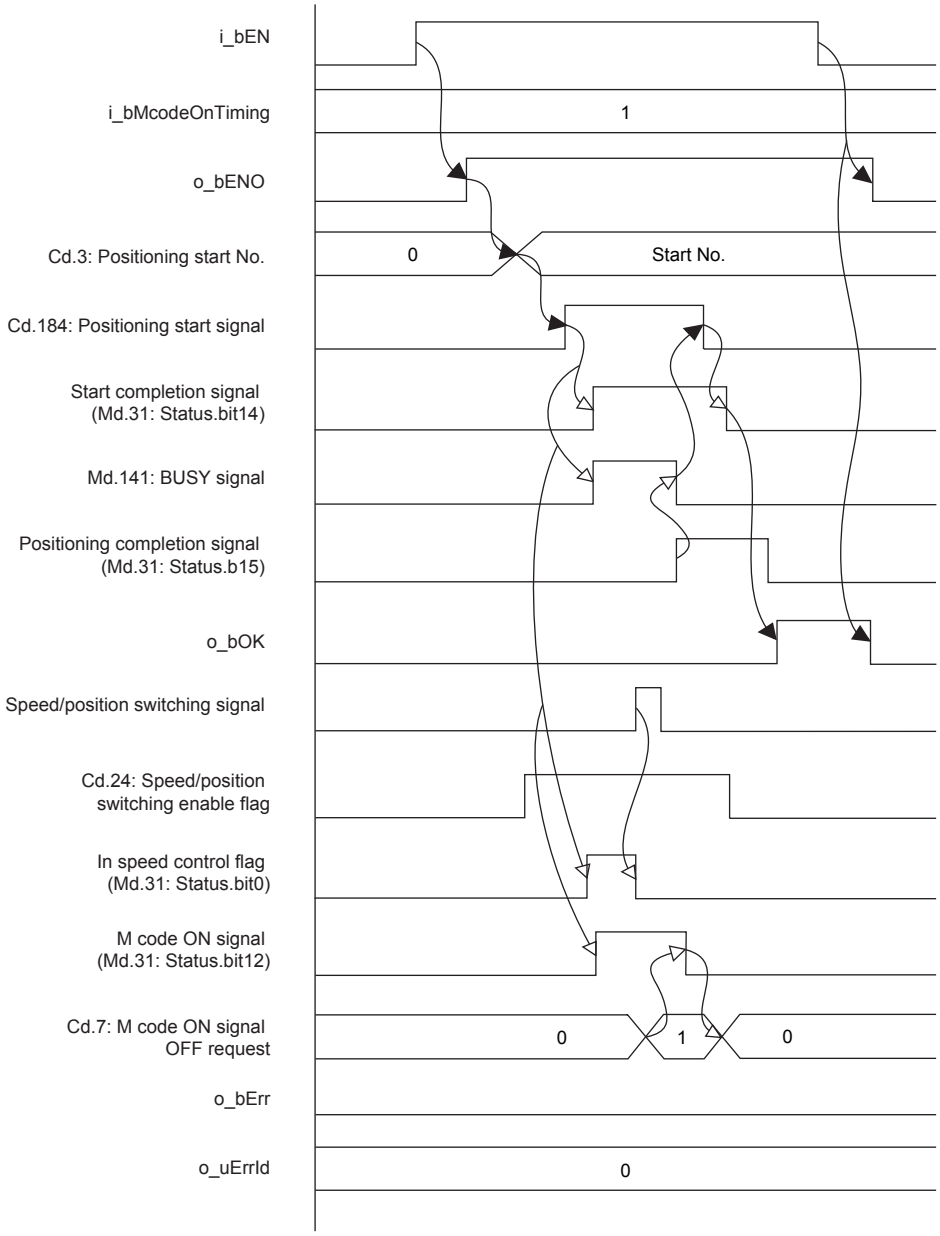
o_bOK (Normal completion) is turned on by the falling edge of Start completion signal ([Md.31] Status: b14).

- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 76 Error code.
- When setting or monitoring the public variable (operation parameter/monitor), add the program that executes the setting monitor as shown below. Specify the public variable as "FB instance"."Public variable". In the following program, substitute K0 for Da.3: Acceleration time No. (M_FX5PG_SINT_F_00A_1.pb_uAccTimeNo1) and set the acceleration time of positioning.

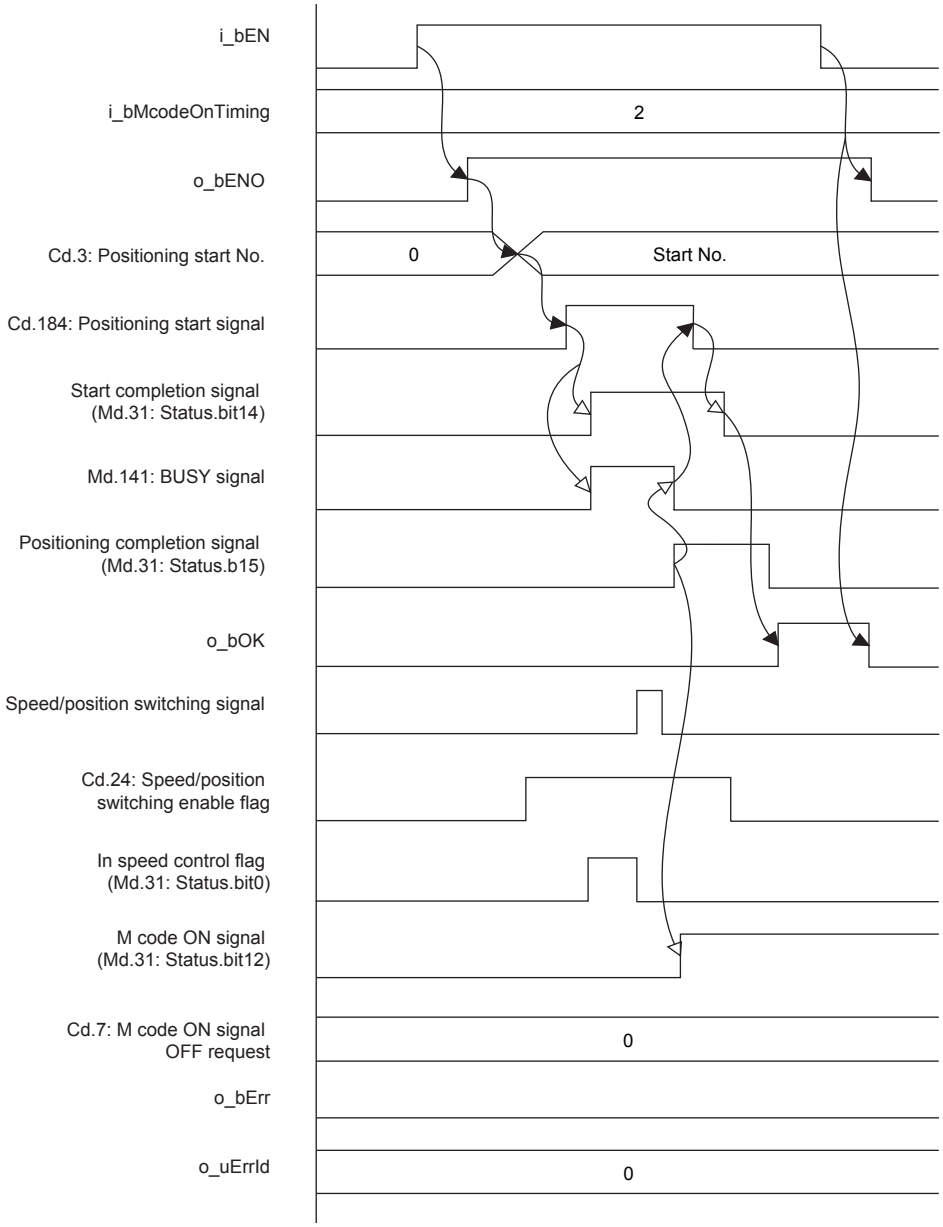
Timing chart of I/O signals

■For normal completion

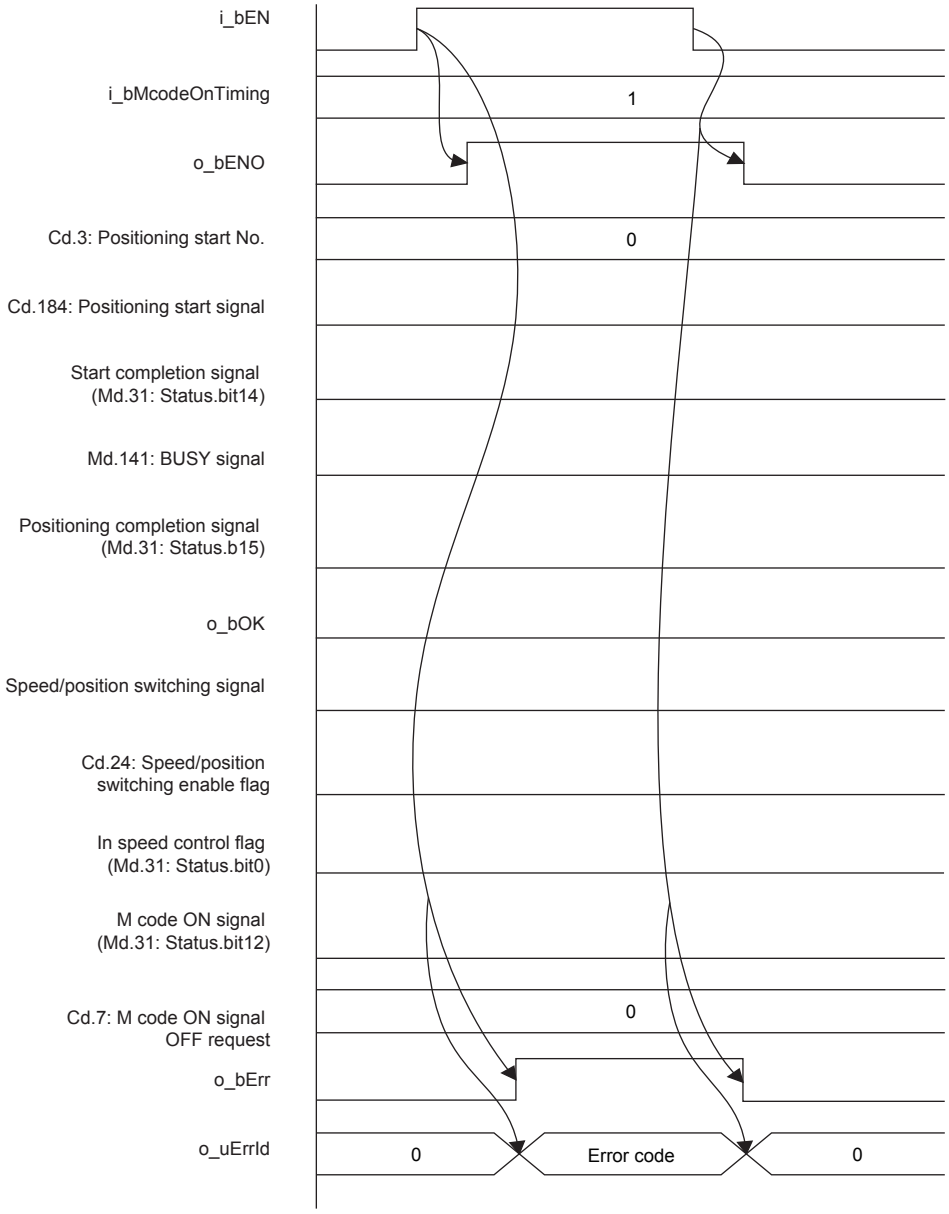
• When the output timing of the M code ON signal is the WITH mode



• When the output timing of the M code ON signal is the AFTER mode



■For error completion



Restrictions and precautions

- This FB sets "H06: Speed/position switching control (forward)" in ([Da.2] Control method).
- This FB sets "No. 600 (Positioning data No.)" in [Cd.3] Positioning start No. Even if a value is set in "No. 600 (Positioning data No.)", it is overwritten after executing this FB.
- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label. Set the public variable (operation parameter) as necessary.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 113 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed)).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	10100 ms	1.760 ms	14919 scans
FX5U, FX5UC*1*2	Axis 1 Da.6: Positioning address (axis 1): K1000 [pulse] Da.6: Positioning address (axis 2): K0 [pulse] Da.8: Command speed: K100 Da.10: M code: K0 Da.27: M code ON signal output timing: K0	17700 ms	1.460 ms	16903 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

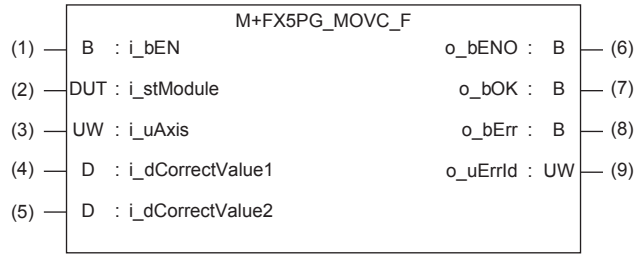
Error code

Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

2.11 M+FX5PG_MOVC_F (Movement Amount Correction)

Overview

The movement amount is corrected for the specified module.



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_dCorrectValue1	Correction value (axis 1)	Double word [Signed]	0 to ±999999	Specify the correction value for the positioning control.
(5)	i_dCorrectValue2	Correction value (axis 2)	Double word [Signed]	0 to ±999999	Specify the correction value for the positioning control.

Output label

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(7)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(8)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

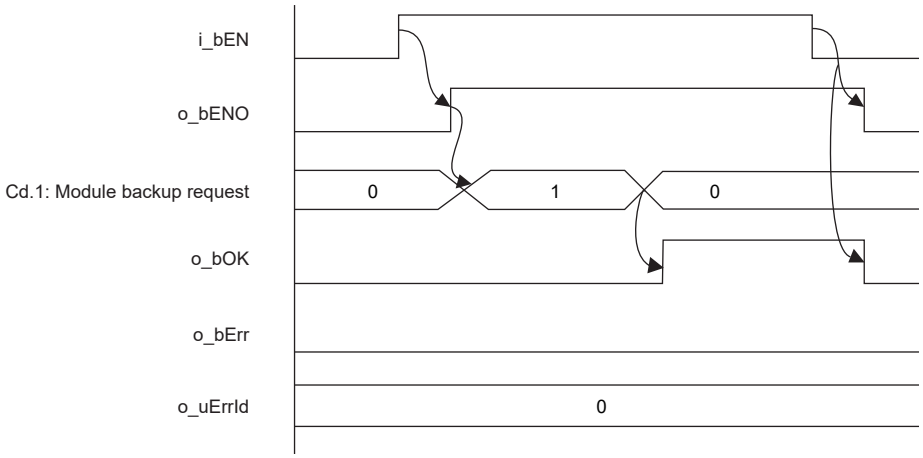
Item	Description
Programming language	Ladder
Number of steps	309 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

- By turning on i_bEN (Execution command), the movement amount is corrected for the specified module.
- The movement amount before the FB execution is not corrected. The movement amount after the FB execution is corrected for the FBs described in ☞ Page 79 Restrictions and precautions.
- Even if the movement amount to be corrected exceeds the upper limit value of the set movement amount of the FB, the correction amount is not aborted at the upper limit. It continues to be incremented and the operation is performed.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 80 Error code.

Timing chart of I/O signals

■For normal completion



Restrictions and precautions

- This FB does not correct the movement amount for the positioning control of FBs other than the following.

☞ Page 11 M+FX5PG_DRV_F (High-speed Positioning)
☞ Page 19 M+FX5PG_LIN_F (Linear Interpolation Positioning)
☞ Page 60 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))
☞ Page 67 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed))

- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 94 M+FX5PG_DRV_F (High-speed Positioning).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 Correction value (axis 1): K1000 Correction value (axis 2): K2000	0.692 ms	1.370 ms	1 scan
FX5U, FX5UC*1*2	Axis 1 Correction value (axis 1): K1000 Correction value (axis 2): K2000	0.647 ms	1.080 ms	1 scan

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

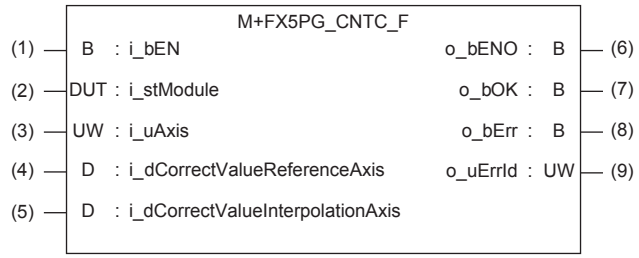
Error code

Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.

2.12 M+FX5PG_CNTC_F (Center Position Correction)

Overview

The center position is corrected for the specified module.



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_dCorrectValueReferenceAxis	Correction value (reference axis)	Double word [Signed]	0 to ±999999	Specify the correction value for the positioning control.
(5)	i_dCorrctValueInterpolationAxis	Correction value (interpolation axis)	Double word [Signed]	0 to ±999999	Specify the correction value for the positioning control.

Output label

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(7)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(8)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

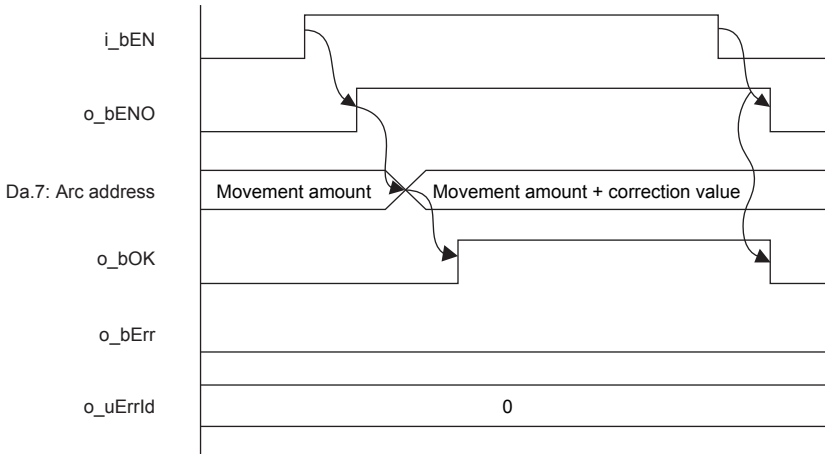
Item	Description
Programming language	Ladder
Number of steps	309 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

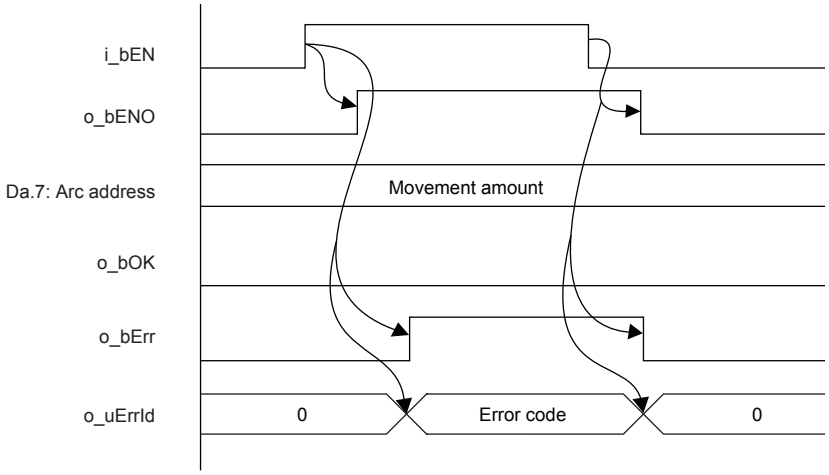
- By turning on i_bEN (Execution command), the center position is corrected for the specified module.
- The center position before the FB execution is not corrected. The center positions after the FB execution described in ☞ Page 27 M+FX5PG_CW_F (Circular Interpolation (Clockwise)) and ☞ Page 35 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise)) are corrected.
- For the center position correction, even if the upper limit value of the center position set value of the FB is exceeded, the correction amount is not aborted at the upper limit. It continues to be incremented and the operation is performed.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 84 Error code.

Timing chart of I/O signals

■For normal completion



■For error completion



Restrictions and precautions

- This FB does not correct the center position for the positioning control of FBs other than the following.

☞ Page 27 M+FX5PG_CW_F (Circular Interpolation (Clockwise))
☞ Page 35 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise))

- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 101 M+FX5PG_CW_F (Circular Interpolation).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 Correction value (axis 1): K1000 Correction value (axis 2): K2000	0.696 ms	1.350 ms	1 scan
FX5U, FX5UC*1*2	Axis 1 Correction value (axis 1): K1000 Correction value (axis 2): K2000	0.645 ms	1.070 ms	1 scan

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

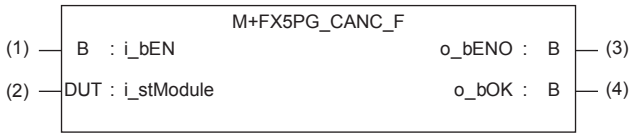
Error code

Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.

2.13 M+FX5PG_CANC_F (Correction Cancel)

Overview

The movement amount correction and center position correction are canceled for the specified module.



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.

Output label

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(4)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

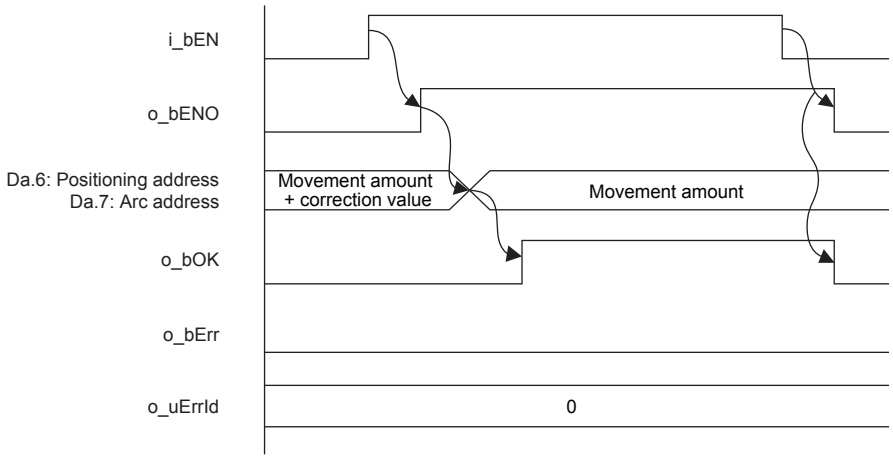
Item	Description
Programming language	Ladder
Number of steps	276 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

Refer to ☞ Page 85 Overview.

Timing chart of I/O signals

■For normal completion



Restrictions and precautions

- This FB uses the global label: stGmRenewal[0..15].
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Application example

For details of the application example, refer to ☞ Page 94 M+FX5PG_DRV_F (High-speed Positioning).

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Normal completion: ON	0.706 ms	1.390 ms	1 scan
FX5U, FX5UC*1*2	Normal completion: ON	0.664 ms	1.110 ms	1 scan

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

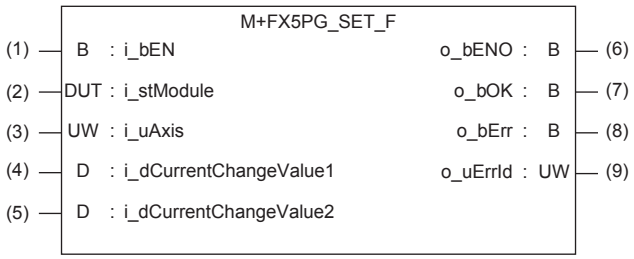
Error code (hexadecimal)	Description	Action
None	None	None

2.14 M+FX5PG_SET_F (Current Value Change)

Overview

Only when all of the following conditions are satisfied, the positioning start signal ([Cd.184] Positioning start signal) turns on and the current value change starts.

- Ready ([Md.140] Module status: b0): ON
- Positioning start signal ([Cd.184] Positioning start signal): OFF
- Start completion signal ([Md.31] Status: b14): OFF
- BUSY signal ([Md.141] BUSY: b0, b1): OFF



Label

Input label

No.	Label	Label name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.
(3)	i_uAxis	Target axis	Word [Unsigned]/Bit string [16-bit]	1: The axis 1 is specified. 2: The axis 2 is specified. F: The axis 1 and 2 are specified.	Specify the axis number.
(4)	i_dCurrentChangeValue1	New current value (axis 1)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: Unit setting 2 0 to 35999999 ($\times 10^{-5}$ degree)	Specify the new current value for the positioning control.
(5)	i_dCurrentChangeValue2	New current value (axis 2)	Double word [Signed]	■Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 ($\times 10^{-1}$ μm, $\times 10^{-5}$ inch, pulse) ■Pr.1: For the unit setting 2 0 to 35999999 ($\times 10^{-5}$ degree)	Specify the new current value for the positioning control.

Output label

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(7)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(8)	o_bErr	Error completion	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [Unsigned]/Bit string [16-bit]	0	The error code that occurred in the FB is stored.

Module label

Buffer memory address	Name	Label name	Data type	Default value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (Only 1 to 600 can be set for the pre-reading start function.)
31500	R: Ready (direct)	FX5PG_☐.stSystemMonitorData2_D.bReady_D	Bit	OFF	ON, OFF	R	Used for an interlock in the program.
31501	R: BUSY (direct)	FX5PG_☐.stSystemMonitorData2_D.bnBusy_Axis_D[]	Bit	OFF	ON, OFF	R	Turn on this label to start the positioning, home position return, or JOG operation.
30104, 30114	RW: Positioning start (direct)	FX5PG_☐.stnAxisControlData2_Axis_D[].uPositioningStart_D	Word [Unsigned]/ Bit string [16-bit]	0	0 to 1	R/W	This label becomes enabled at rising edge and starts the positioning.
817, 917	R: Status (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].uStatus_D	Word [Unsigned]/ Bit string [16-bit]	0008H	—	R	The ON/OFF state of each flag is stored. b14: Start completion Turn on this label to start the positioning.
1506, 1507 1606, 1607	RW: New current value (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].dNewCurrentValue_D	Double word [Signed]	0	• Pr.1: Unit setting 0, 1, 3 -2147483648 to 2147483647 • Pr.1: Unit setting 20 to 35999999	R/W	Set the feed current value after the current value change.
1504, 1604	RW: M code ON signal OFF request (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uMcodeOnSignalTurnsOffRequest_D	Word [Unsigned]/ Bit string [16-bit]	0	0, 1	R	Turn off the M code ON signal.

Function overview

Applicable hardware and software

■Positioning module

Applicable module	Firmware version	Engineering tool
FX5-20PG-P	—	GX Works3 Version 1.045X or later
FX5-20PG-D	—	GX Works3 Version 1.050C or later

■CPU module

MELSEC iQ-F series programmable controller CPU

Basic specifications

Item	Description
Programming language	Ladder
Number of steps	367 steps The number of steps of the FB in a program depends on the CPU module used, input and output definition, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Used label amount	• Used label amount: 0.01K points (Word) • Used latch label amount: 0K points (Word) The used label amount in a program depends on the CPU module used, device specified in the argument, and option settings of GX Works3. For the option settings of GX Works3, refer to 📖GX Works3 Operating Manual.
Number of used index register points	• Index register: 0 points • Long index register: 0 points
Used file register amount	File register: 0 points
FB dependence	No dependence
FB compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)

Function description

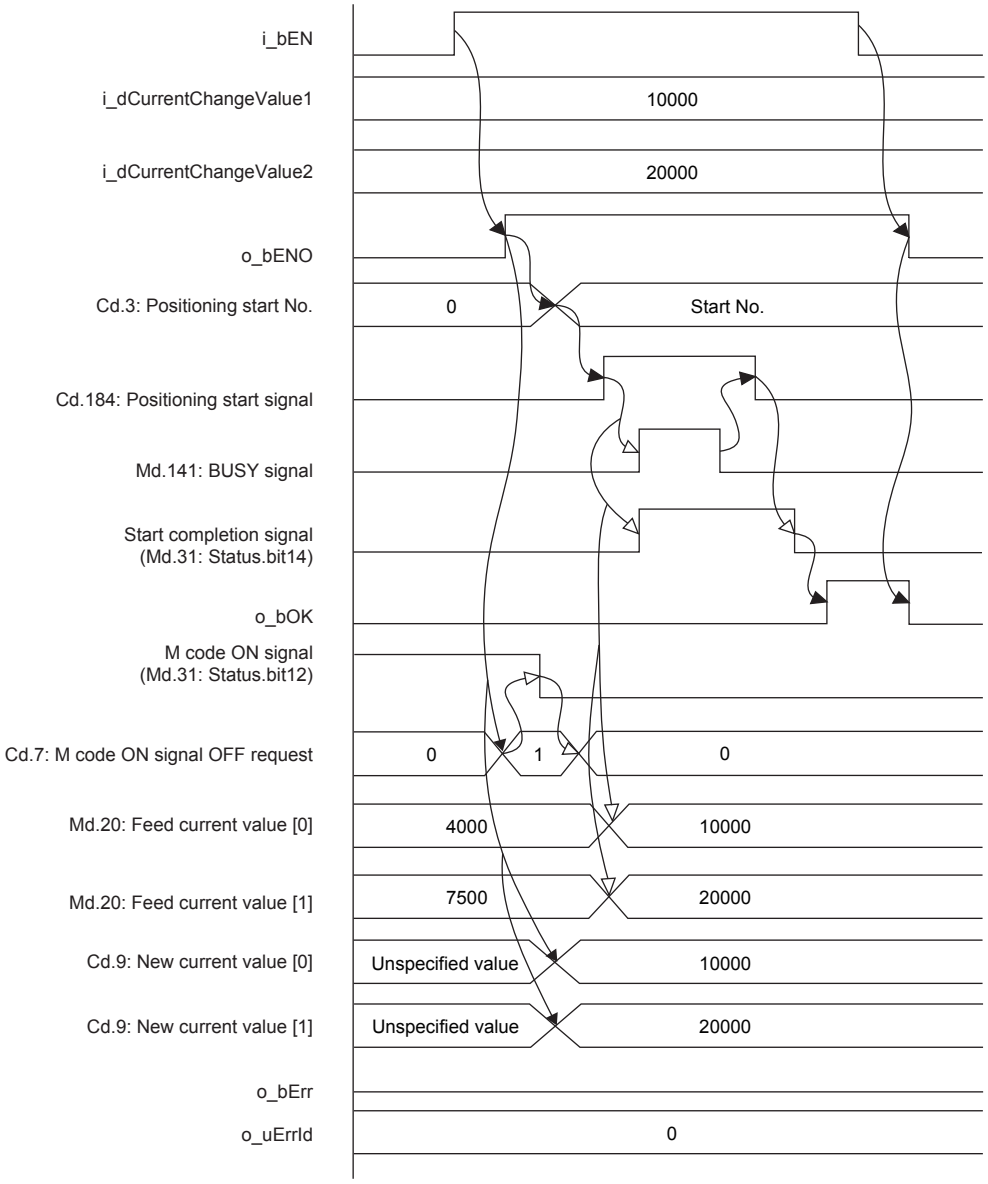
- By turning on i_bEN (Execution command), the positioning start signal ([Cd.184] Positioning start signal) is turned on and the current value change is started only when all of the following conditions are satisfied.

· Ready ([Md.140] Module status: b0): ON
· Positioning start signal ([Cd.184] Positioning start signal): OFF
· Start completion signal ([Md.31] Status: b14): OFF
· BUSY signal ([Md.141] BUSY: b0, b1): OFF

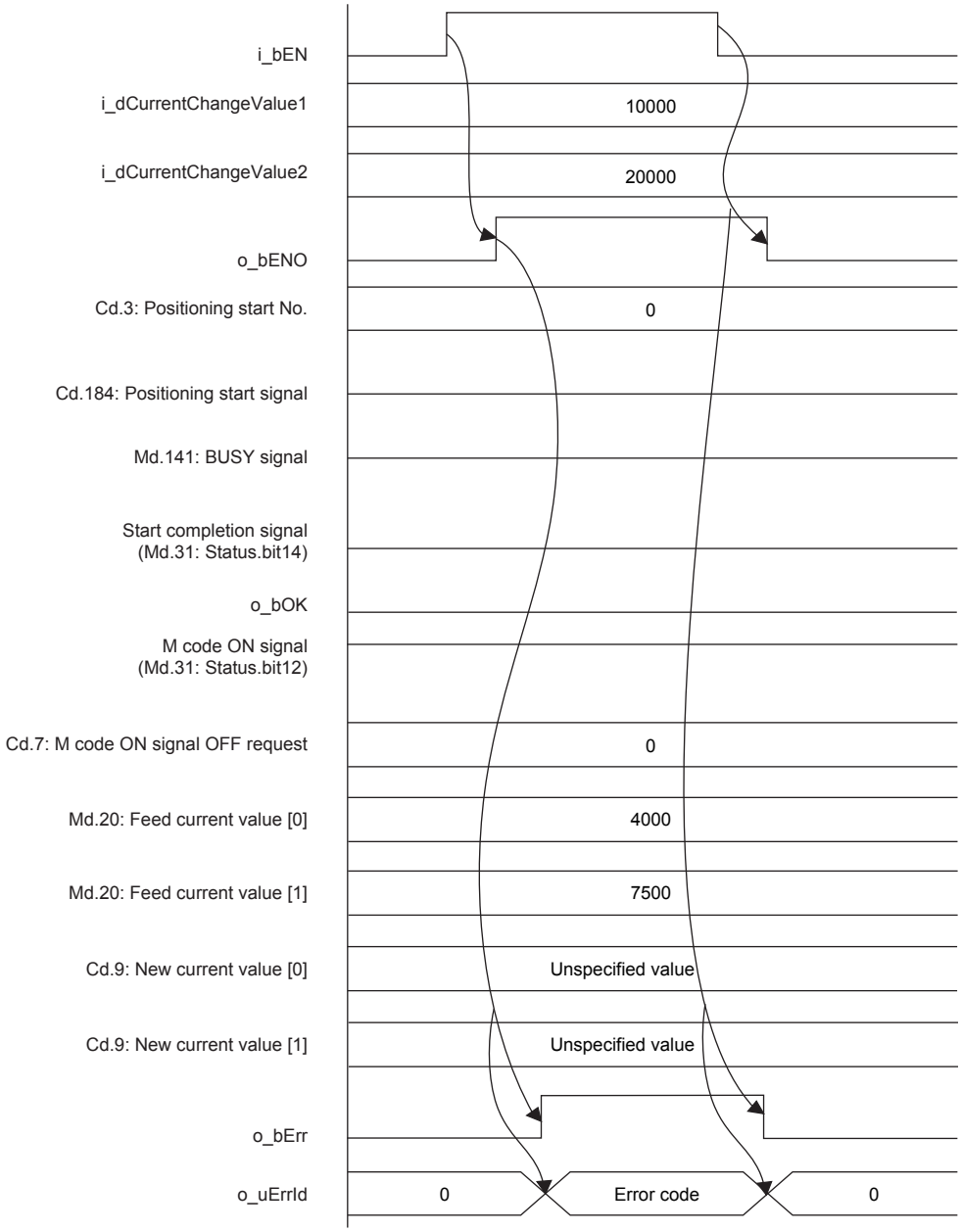
- If the conditions are not satisfied by turning on i_bEN (Execution command), o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 200H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 93 Error code.
- When the positioning completion signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) is turned off.
- When the positioning start signal ([Cd.184] Positioning start signal) turns off from on, o_bOK (Normal completion) is turned on by the falling edge of the start completion signal ([Md.31] Status: b14) after it turns off.
- When the setting value of the target axis is out of range, o_bErr (Error completion) turns on and the processing of the FB is interrupted. The error code 100H (hexadecimal) is stored in o_uErrId (Error code). For details of the error code, refer to ☞ Page 93 Error code.

Timing chart of I/O signals

■For normal completion



■For error completion



Restrictions and precautions

- This FB sets "No. 9003 (Current value change)" in ([Cd.3] Positioning start No.), and sets the changed ([Md.20] Feed current value) in ([Cd.9] New current value).
- By turning on ([Cd.7] M code ON signal OFF request), this FB turns off the M code ON signal ([Md.31] Status: b12) and then changes the current value.
- This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
- This FB cannot be used in an interrupt program.
- Using the FB in a program that is to be executed only once, such as a subroutine program or a FOR-NEXT loop, has a problem that i_bEN (Execution command) can no longer be turned off and normal operation is not possible; Always use the FB in a program that is capable of turning off i_bEN (Execution command).
- Since this FB turns on and off the positioning start signal ([Cd.184] Positioning start signal), do not turn on or off this signal outside the FB while the FB is in execution.
- When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis.
- This FB requires the ladder to be configured for every input label.

Parameter setting

There is no required parameter setting to use this FB.

Performance value

CPU	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5UJ	Axis 1 New current value (axis 1): K1000 [pulse] New current value (axis 2): K2000 [pulse]	4.950 ms	0.792 ms	8 scans
FX5U, FX5UC*1*2	Axis 1 New current value (axis 1): K1000 [pulse] New current value (axis 2): K2000 [pulse]	4.750 ms	0.721 ms	9 scans

*1 When the program capacity is set to 128K steps, the process speed may be decreased.
*2 The standard area is used for the labels.

Error code

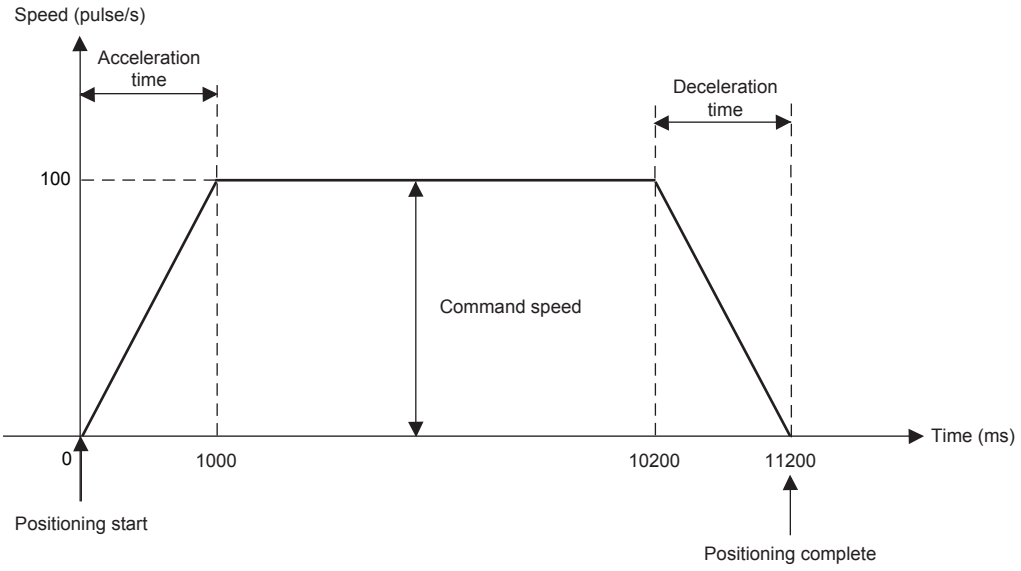
Error code (hexadecimal)	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of range. The target axis is set to a value other than 1, 2, or F.	Review and correct the setting and then execute the FB again.
200H	The conditions for starting the positioning are not satisfied. Any of the following conditions are not satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF	Execute the FB again when all of the following conditions are satisfied. • Ready: ON • Positioning start signal: OFF • Start completion signal: OFF • BUSY signal: OFF

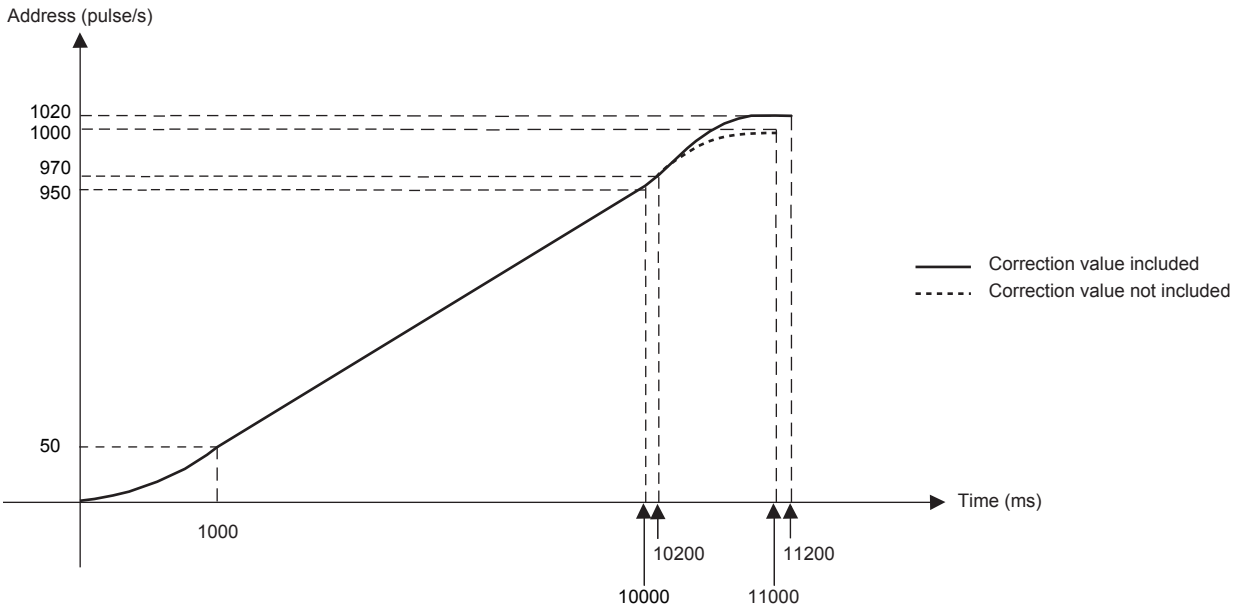
3 FB LIBRARY APPLICATION EXAMPLE

3.1 M+FX5PG_DRV_F (High-speed Positioning)

Overview of program example

For axis 1 of FX5PG, perform a correction of 20 pulses on the positioning address.
Output 1020 pulses (correction value included) to the drive unit to drive the motor and start the high speed positioning (absolute method) to move axis 1 in the positive direction for 1020 pulses (correction value included) from the current position. Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address. After the positioning is completed, cancel the correction value.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

Pre-setting

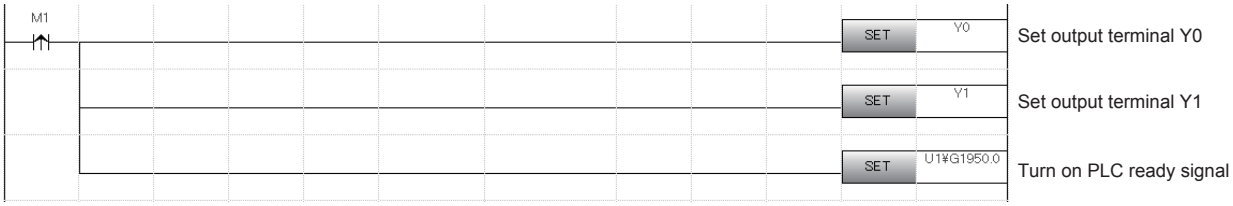
There are no necessary settings to be configured in advance to use this FB.

The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

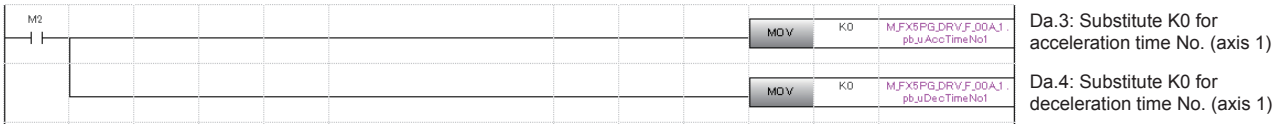
Positioning start setting of axis 1

Turn on the output terminal which connects the servo to axis 1 and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



Public variable setting

Set the public variables to be used in M+FX5PG_DRV_F (High-speed positioning) FB.



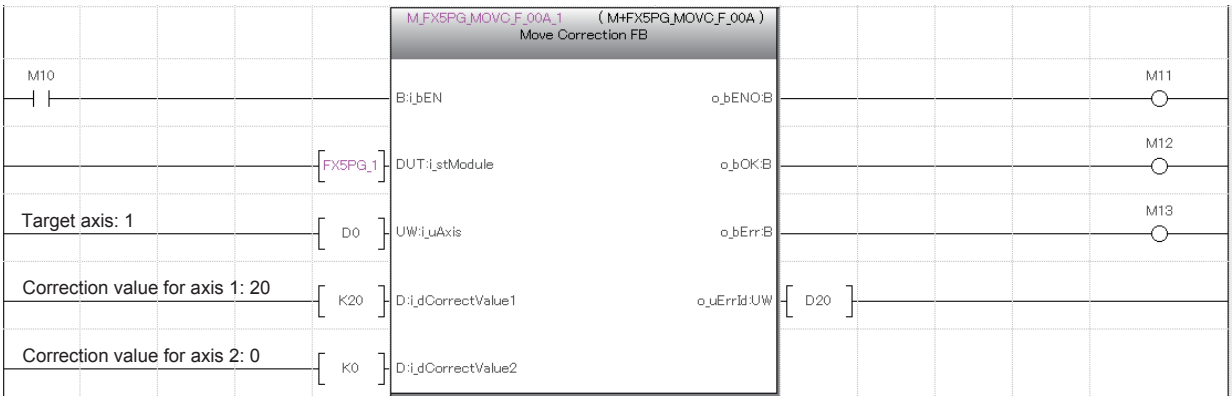
Axis No. setting

Movement amount correction setting

Set the movement amount correction for performing the positioning of M+FX5PG_DRV_F (High-speed positioning) in M+FX5PG_MOVC_F (Movement amount correction) FB.

For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

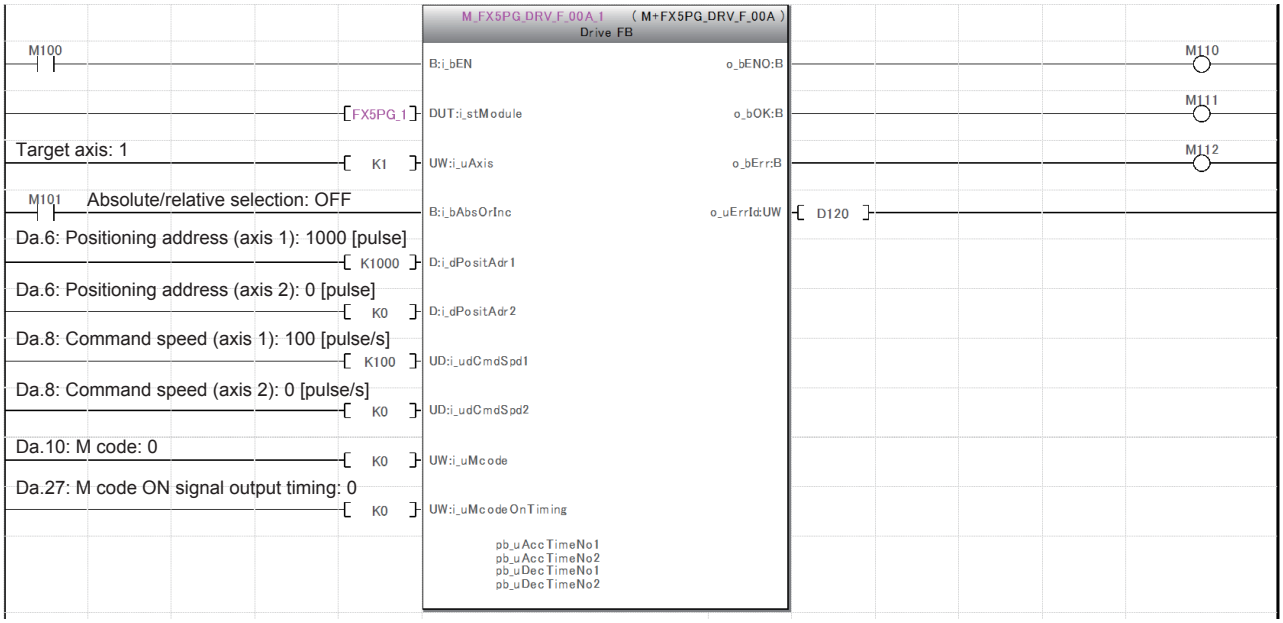
M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K20	Set the correction value 20 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K0	Set the correction value 0 for axis 2.



High-speed positioning setting and start

Turn off M101 to perform positioning with the absolute method. Output 1000 pulses from the drive unit at the command speed 100 (pulse/s) in M+FX5PG_DRV_F (High-speed positioning) FB, drive the motor, and start the high-speed positioning.

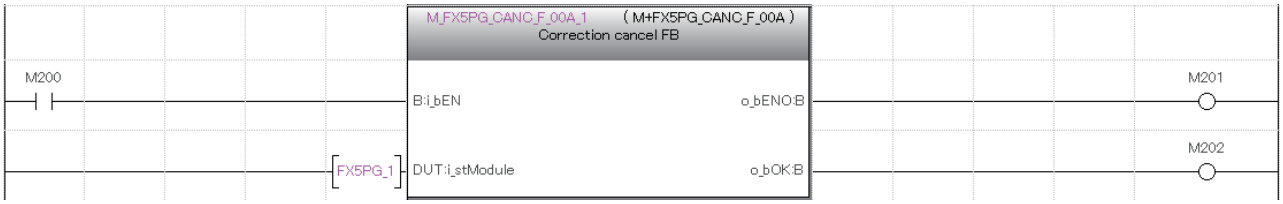
M+FX5PG_DRV_F (High-speed positioning)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (axis 1)	K1000	Set the positioning address of axis 1 to 1000 pulses.
i_dPositAdr2	Da.6: Positioning address (axis 2)	K0	Set the positioning address of axis 2 to 0.
i_udCmdSpd1	Da.8: Command speed (axis 1)	K100	Set the command speed of axis 1 to 100 pulse/s.
i_udCmdSpd2	Da.8: Command speed (axis 2)	K0	Set the command speed of axis 2 to 0.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo1	Da.3: Acceleration time No. (axis 1)	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo1	Da.4: Deceleration time No. (axis 1)	K0	Set the deceleration time No. to 0.



Movement amount correction cancel

Cancel the correction value using M+FX5PG_CANC_F (Correction cancel) FB.

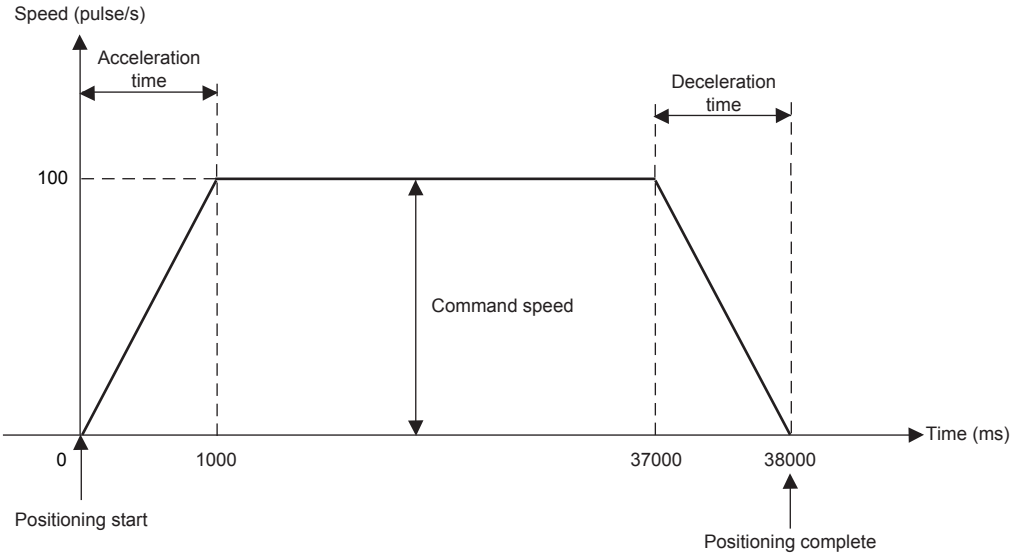
For details of the FB, refer to ☞ Page 85 M+FX5PG_CANC_F (Correction Cancel).

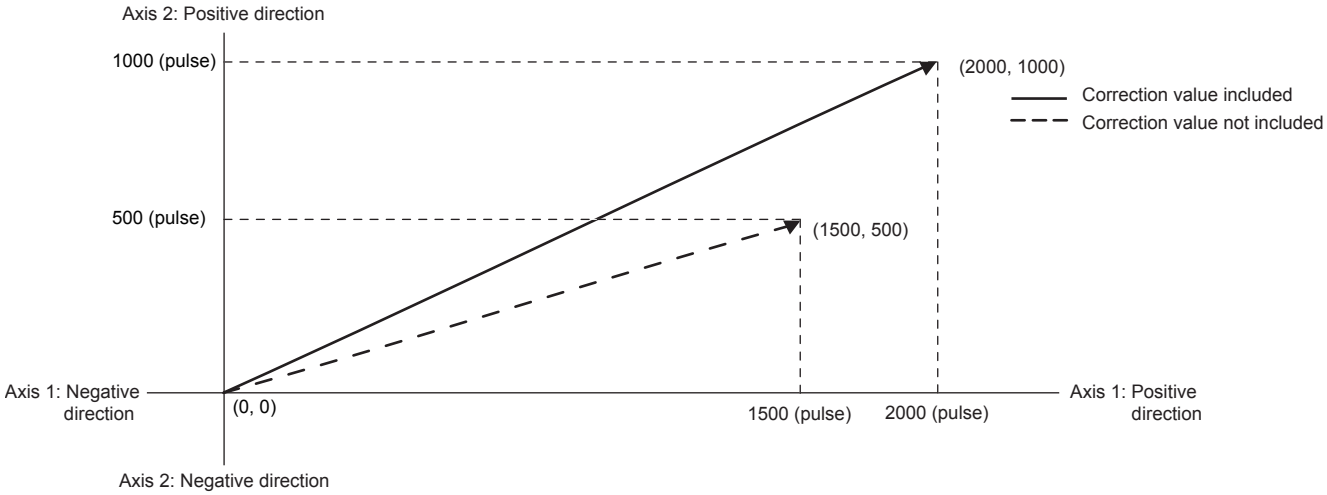


3.2 M+FX5PG_LIN_F (Linear Interpolation Positioning)

Overview of program example

For axis 1 and 2 of FX5PG, perform a correction of 500 pulses on the positioning address.
Then, output 2000 pulses (correction value included) from axis 1 and 1000 pulses (correction value included) from axis 2, drive the motor of each axis, and start the linear interpolation positioning with the absolute method. Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

Pre-setting

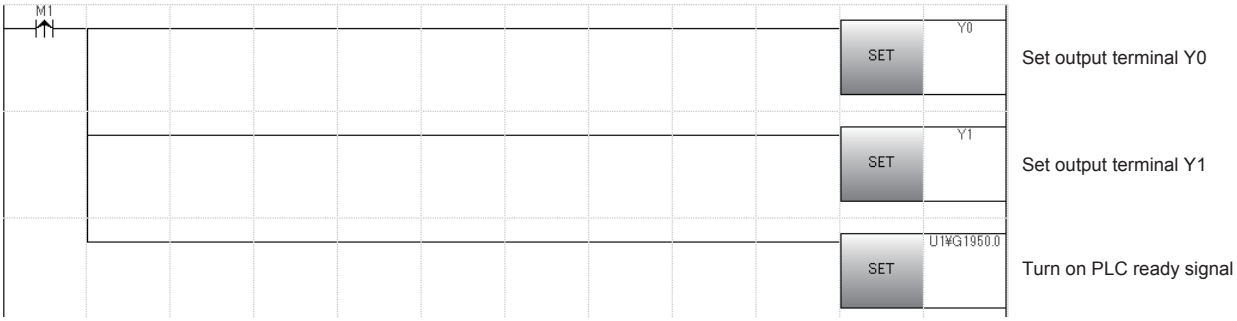
There are no necessary settings to be configured in advance to use this FB.

The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

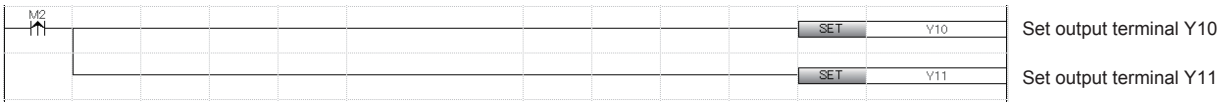
Positioning start setting of axis 1

Turn on the output terminal which connects the servo to axis 1 and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



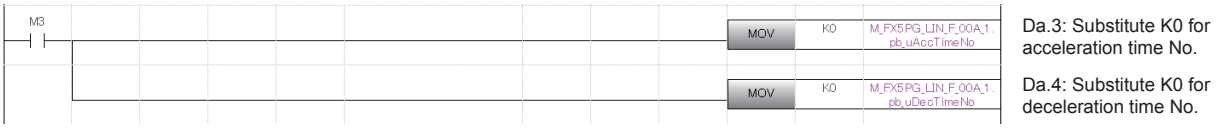
Positioning start setting of axis 2

Turn on the output terminal which connects the servo to axis 2 and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



Public variable setting

Set the public variables to be used in M+FX5PG_LIN_F (Linear interpolation positioning) FB.

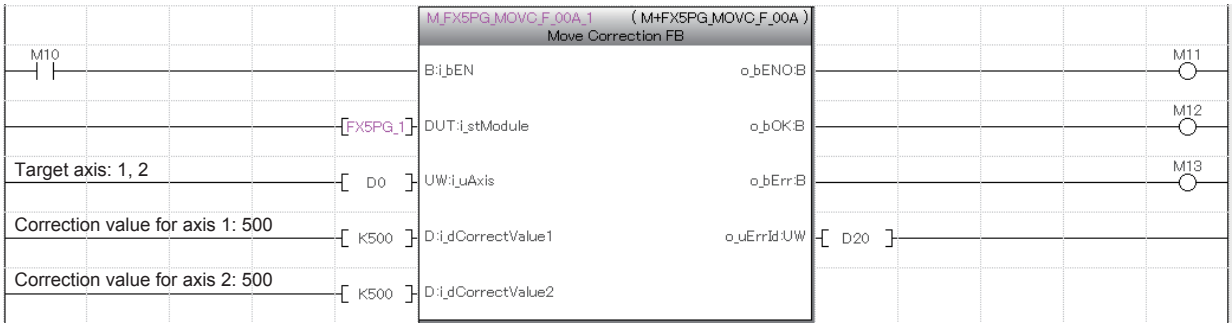


Axis No. setting

Movement amount correction setting

Set the movement amount correction for performing the positioning of M+FX5PG_LIN_F (Linear interpolation positioning) in M+FX5PG_MOVC_F (Movement amount correction) FB. For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K500	Set the correction value 500 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K500	Set the correction value 500 for axis 2.



Linear interpolation positioning setting and start

Turn off M104 to perform positioning with the absolute method.

Output 2000 pulses to axis 1 and 1000 pulses to axis 2 from the drive unit at the command speed 100 (pulse/s) in M+FX5PG_LIN_F (Linear interpolation positioning) FB, drive the motor of each axis, and start the linear interpolation positioning.

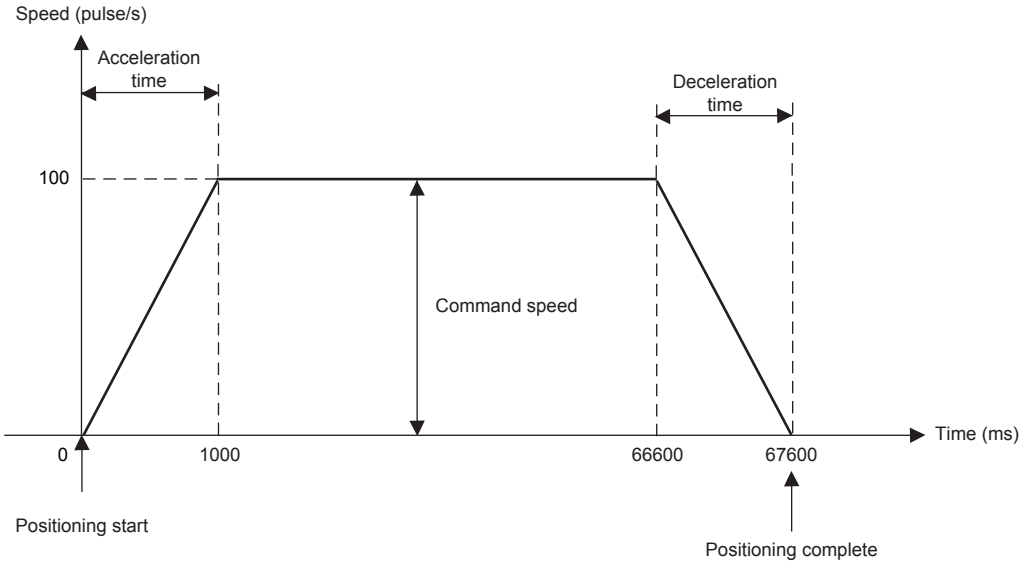
M+FX5PG_LIN_F (Linear interpolation positioning)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (axis 1)	K1500	Set the positioning address of axis 1 to 1500 pulses.
i_dPositAdr2	Da.6: Positioning address (axis 2)	K500	Set the positioning address of axis 2 to 500 pulses.
i_udCmdSpd	Da.8: Command speed	K100	Set the command speed to 100 pulse/s.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo	Da.3: Acceleration time No.	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo	Da.4: Deceleration time No.	K0	Set the deceleration time No. to 0.

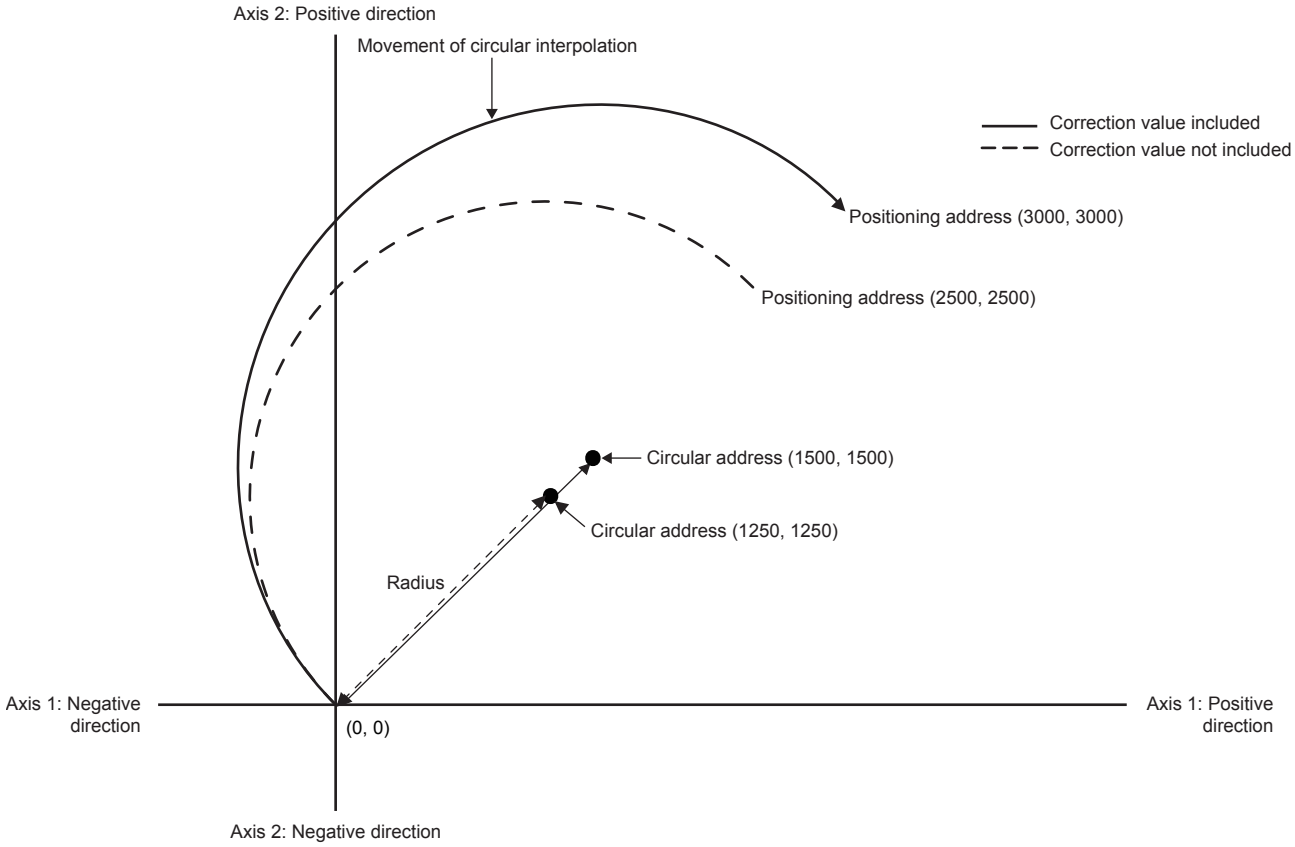
3.3 M+FX5PG_CW_F (Circular Interpolation)

Overview of program example

For axis 1 and 2 of FX5PG, perform a correction of 500 pulses on the positioning address and a correction of 250 pulses on the circular address.

Perform the positioning on the positioning address (3000, 3000) (correction value included) with the absolute method from the current stop position along the clockwise circular trajectory centering on the circular address (1500, 1500) (correction value included). Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

Pre-setting

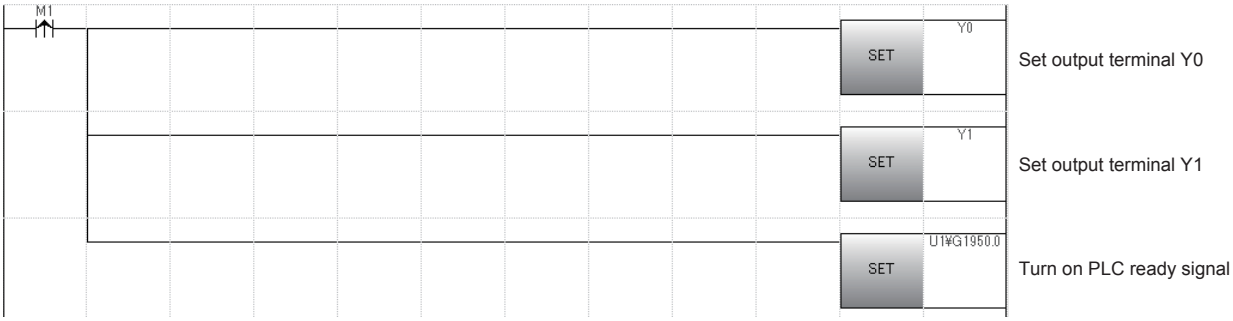
There are no necessary settings to be configured in advance to use this FB.

The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

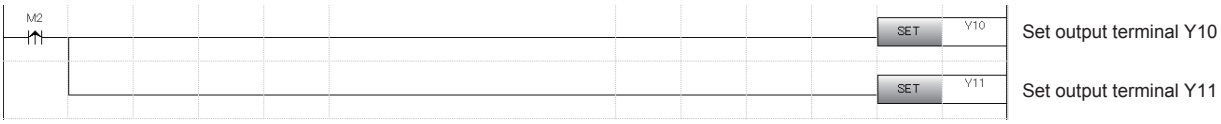
Reference axis positioning start setting

Turn on the output terminal which connects the servo of the reference axis and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



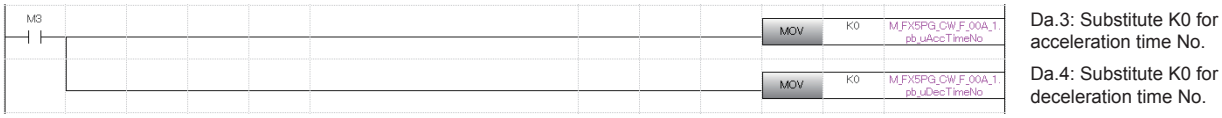
Interpolation axis positioning start setting

Turn on the output terminal which connects the servo of interpolation axis.



Public variable setting

Set the public variables to be used in M+FX5PG_CW_F (Circular interpolation) FB.



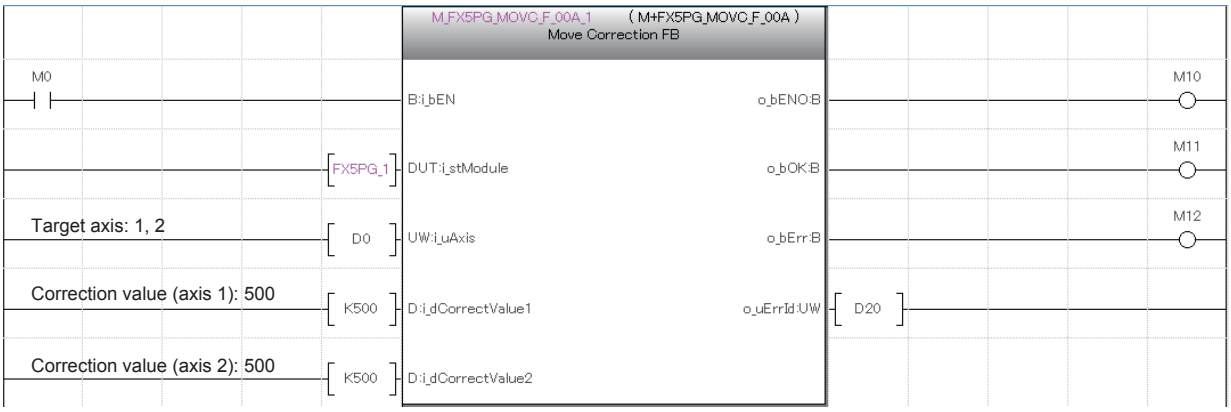
Axis No. setting

Movement amount correction setting

Set the movement amount correction for performing the circular interpolation positioning of M+FX5PG_CW_F (Circular interpolation) in M+FX5PG_MOVC_F (Movement amount correction) FB.

For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K500	Set the correction value 500 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K500	Set the correction value 500 for axis 2.

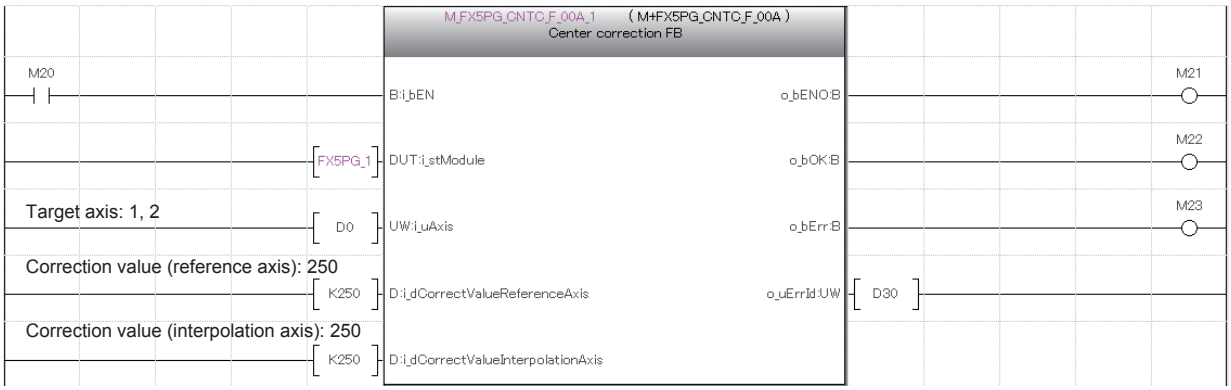


Center position correction setting

Set the center position correction for performing the circular interpolation positioning of M+FX5PG_CW_F (Circular interpolation) in M+FX5PG_CNTC_F (Center position correction) FB.

For details of the FB, refer to ☞ Page 81 M+FX5PG_CNTC_F (Center Position Correction).

M+FX5PG_CNTC_F (Center position correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValueReferenceAxis	Correction value (reference axis)	K250	Set correction value 250 for the reference axis.
i_dCorrctValueInterpolationAxis	Correction value (interpolation axis)	K250	Set correction value 250 for the interpolation axis.

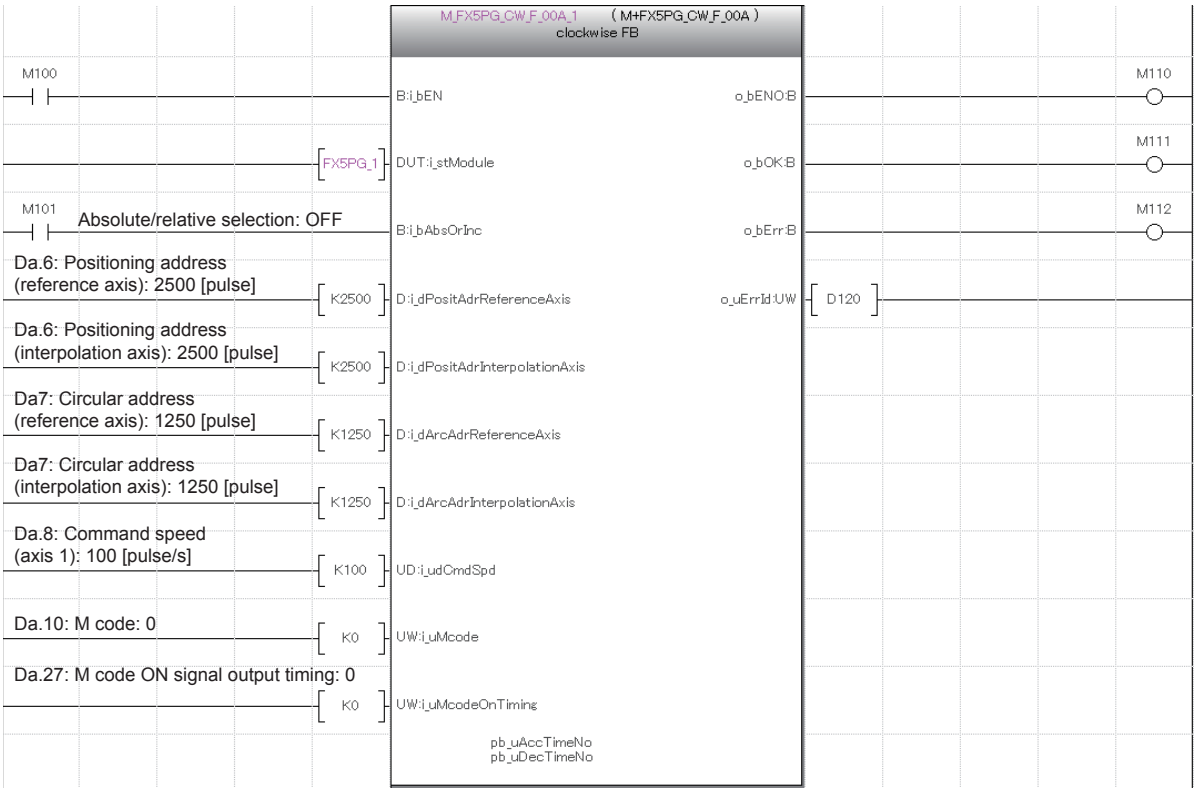


Circular interpolation positioning setting and start

Turn off M101 to perform positioning with the absolute method.

For the reference axis and interpolation axis, set the circular interpolation positioning information in M+FX5PG_CW_F (Circular interpolation) FB and perform the positioning on the address (3000, 3000) set as the positioning address at the command speed 100 (pulse/s) from the stop position along the clockwise circular trajectory centering on the address (1500, 1500) set as the circular address.

M+FX5PG_CW_F (Circular interpolation)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (reference axis)	K2500	Set the positioning address of the reference axis to 2500 pulses.
i_dPositAdr2	Da.6: Positioning address (interpolation axis)	K2500	Set the positioning address of the interpolation axis to 2500 pulses.
i_dArcAdrReferenceAxis	Da7: Circular address (reference axis)	K1250	Set the circular address of the reference axis to 1250 pulses.
i_dArcAdrInterpolationAxis	Da7: Circular address (interpolation axis)	K1250	Set the circular address of the interpolation axis to 1250 pulses.
i_udCmdSpd	Da.8: Command speed	K100	Set the command speed to 100 pulse/s.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo	Da.3: Acceleration time No.	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo	Da.4: Deceleration time No.	K0	Set the deceleration time No. to 0.

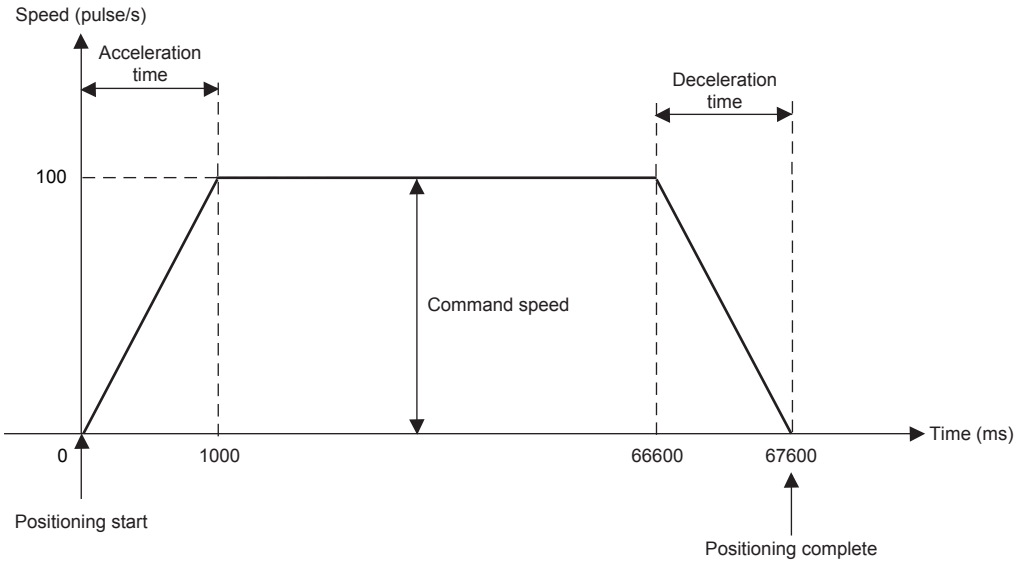


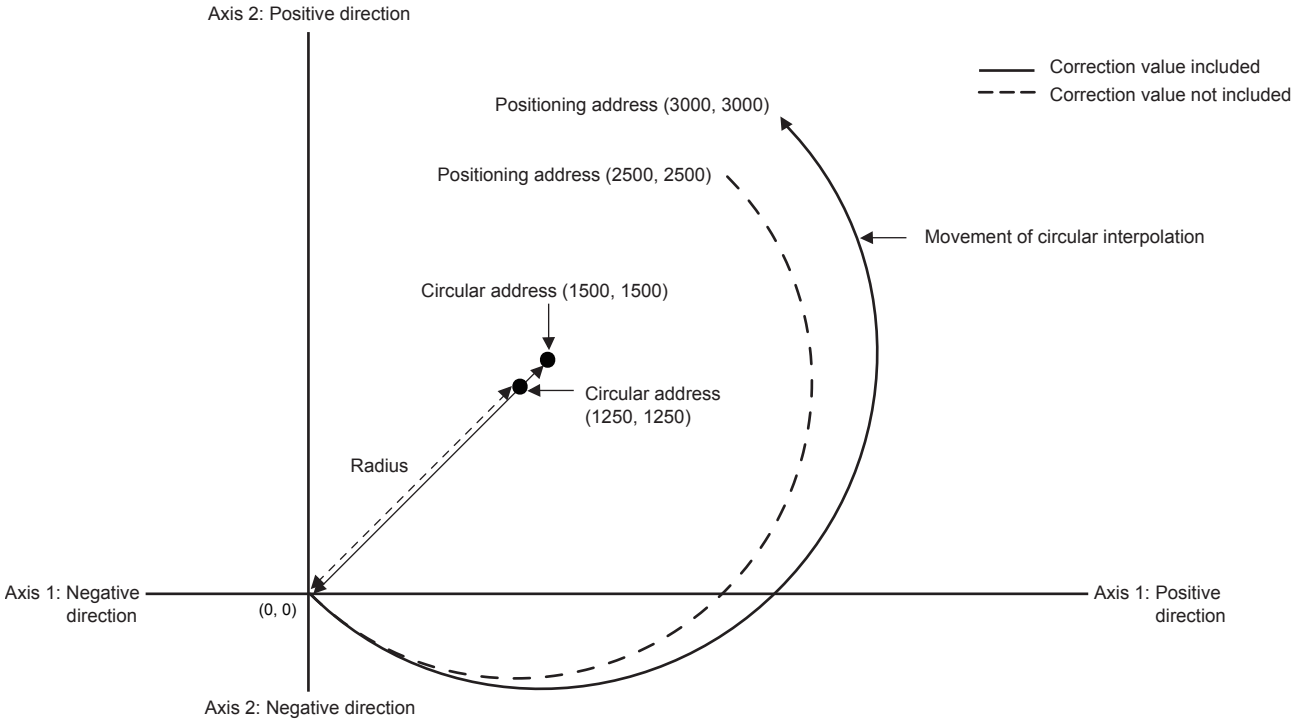
3.4 M+FX5PG_CCW_F (Circular Interpolation)

Overview of program example

For axis 1 and 2 of FX5PG, perform a correction of 500 pulses on the positioning address and a correction of 250 pulses on the circular address.

Perform the positioning on the positioning address (3000, 3000) (correction value included) with the absolute method from the current stop position along the counterclockwise circular trajectory centering on the circular address (1500, 1500) (correction value included). Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

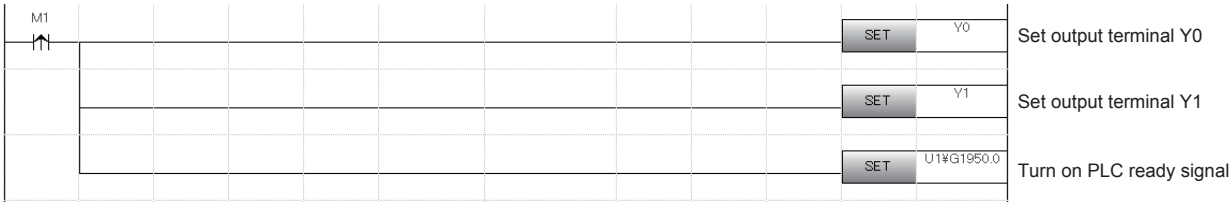
Pre-setting

There are no necessary settings to be configured in advance to use this FB.
The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

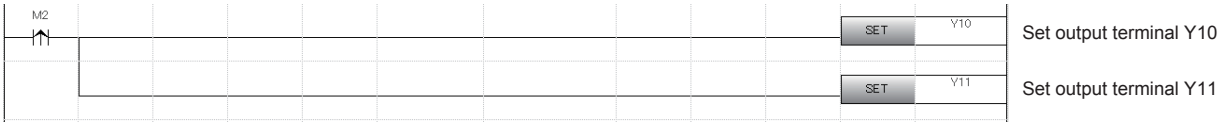
Reference axis positioning start setting

Turn on the output terminal which connects the servo of the reference axis and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



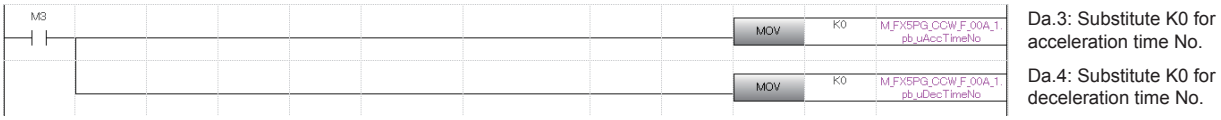
Interpolation axis positioning start setting

Turn on the output terminal which connects the servo of the interpolation axis and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



Public variable setting

Set the public variables to be used in M+FX5PG_CCW_F (Circular interpolation) FB.



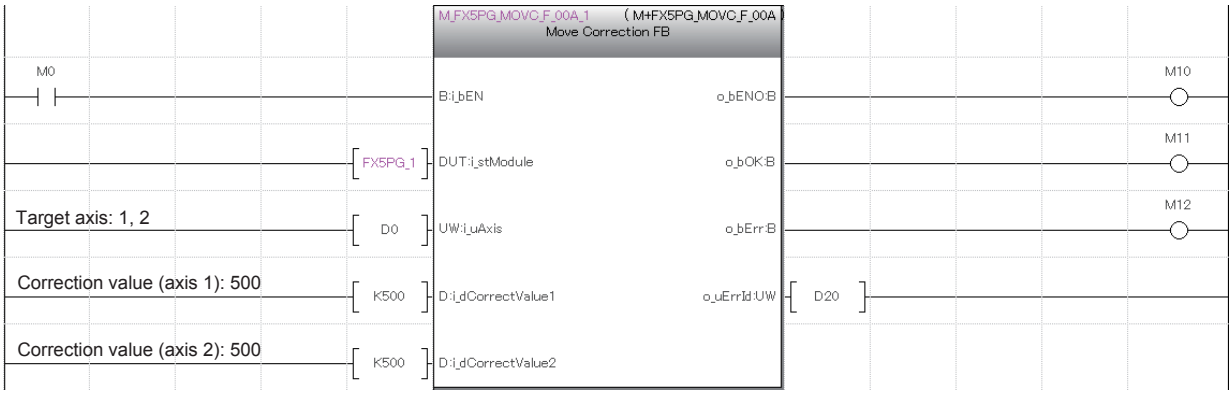
Axis No. setting

Movement amount correction setting

Set the movement amount correction for performing the circular interpolation positioning of M+FX5PG_CCW_F (Circular interpolation) in M+FX5PG_MOVC_F (Movement amount correction) FB.

For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K500	Set the correction value 500 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K500	Set the correction value 500 for axis 2.

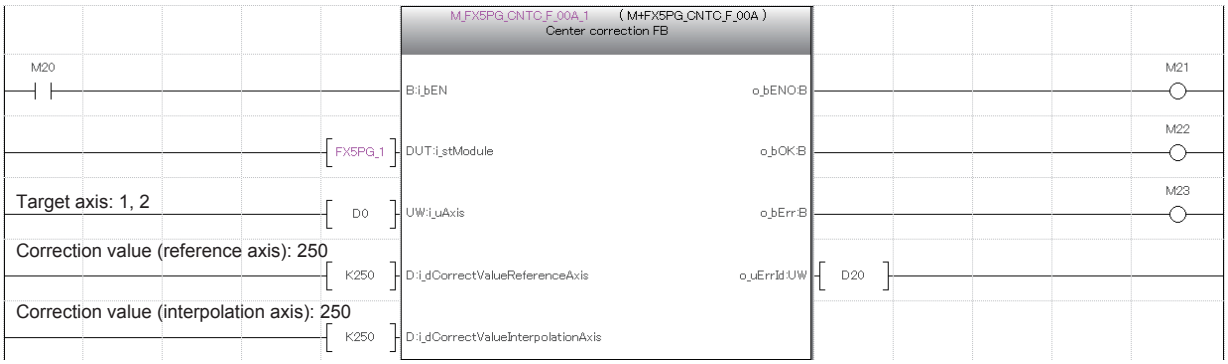


Center position correction setting

Set the center position correction for performing the circular interpolation positioning of M+FX5PG_CCW_F (Circular interpolation) in M+FX5PG_CNTC_F (Center position correction) FB.

For details of the FB, refer to ☞ Page 81 M+FX5PG_CNTC_F (Center Position Correction).

M+FX5PG_CNTC_F (Center position correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValueReferenceAxis	Correction value (reference axis)	K250	Set correction value 250 for the reference axis.
i_dCorrctValueInterpolationAxis	Correction value (interpolation axis)	K250	Set correction value 250 for the interpolation axis.

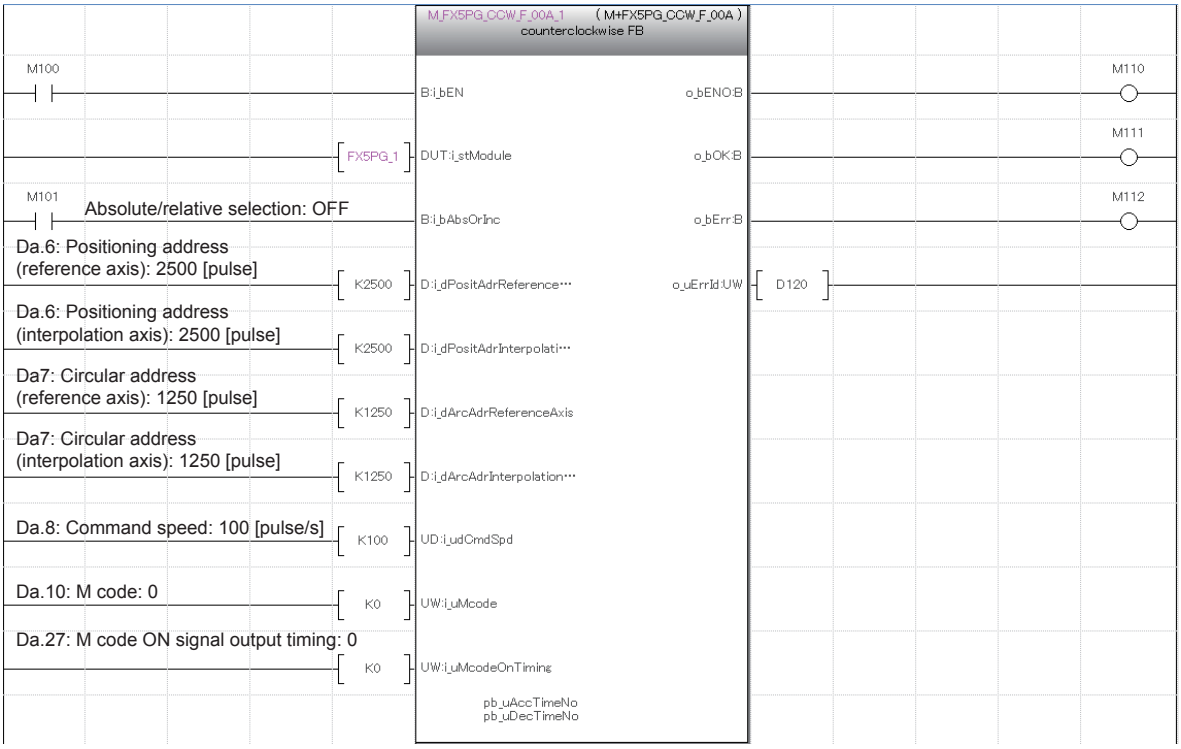


Circular interpolation positioning setting and start

Turn off M101 to perform positioning with the absolute method.

For the reference axis and interpolation axis, set the circular interpolation positioning information in M+FX5PG_CCW_F (Circular interpolation) FB and perform the positioning on the address (3000, 3000) set as the positioning address at the command speed 100 (pulse/s) from the stop position along the counterclockwise circular trajectory centering on the address (1500, 1500) set as the circular address.

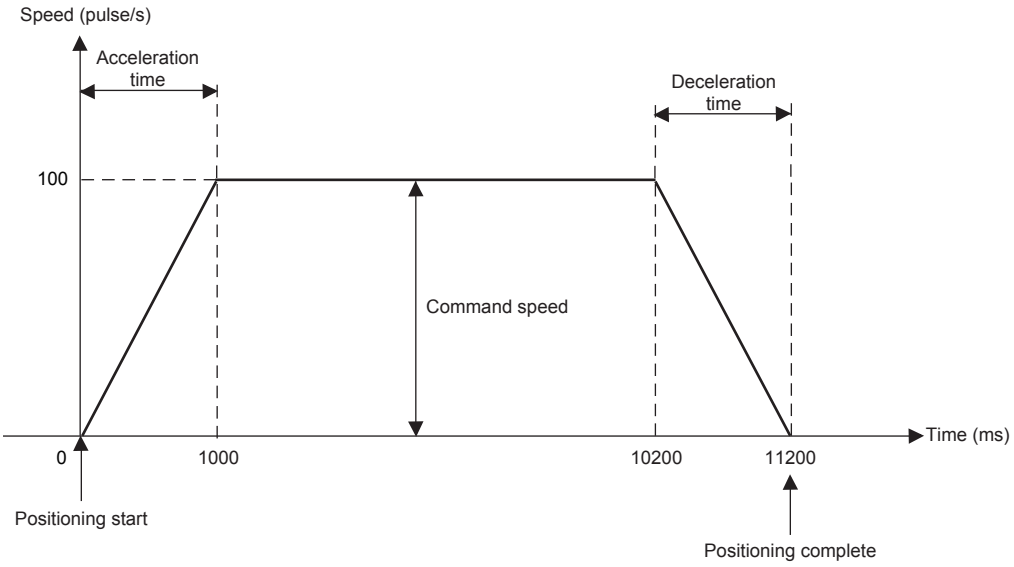
M+FX5PG_CW_F (Circular interpolation)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (reference axis)	K2500	Set the positioning address of the reference axis to 2500 pulses.
i_dPositAdr2	Da.6: Positioning address (interpolation axis)	K2500	Set the positioning address of the interpolation axis to 2500 pulses.
i_dArcAdrReferenceAxis	Da7: Circular address (reference axis)	K1250	Set the circular address of the reference axis to 1250 pulses.
i_dArcAdrInterpolationAxis	Da7: Circular address (interpolation axis)	K1250	Set the circular address of the interpolation axis to 1250 pulses.
i_udCmdSpd	Da.8: Command speed	K100	Set the command speed to 100 pulse/s.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo	Da.3: Acceleration time No.	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo	Da.4: Deceleration time No.	K0	Set the deceleration time No. to 0.

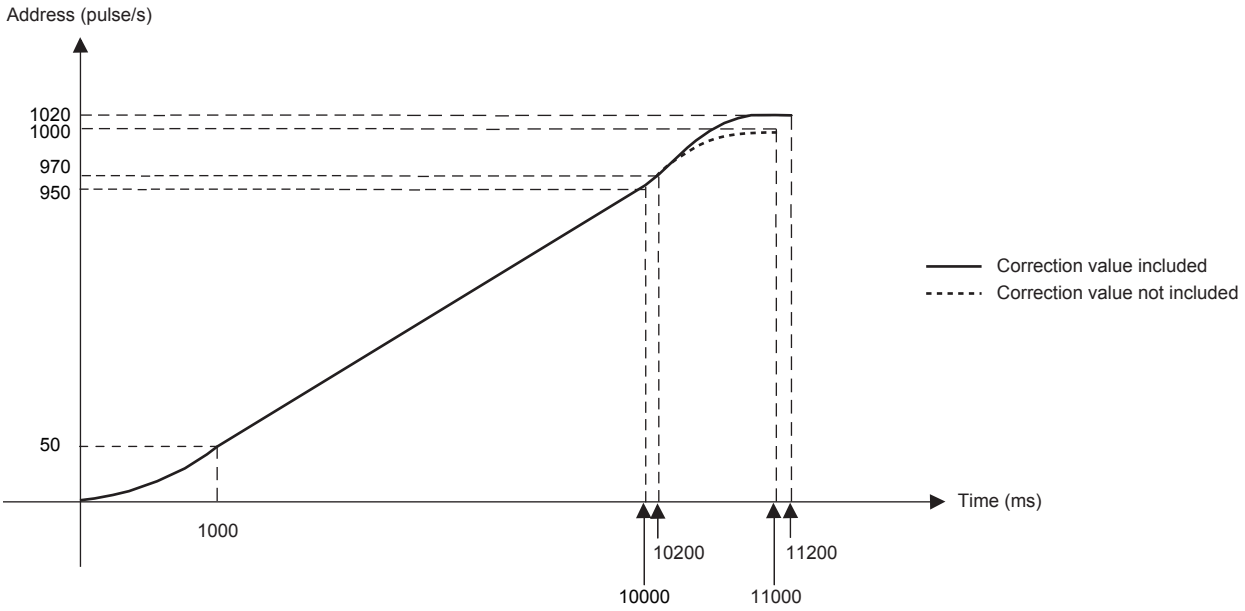


3.5 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance))

Overview of program example

For axis 1 of FX5PG, perform a correction of 20 pulses on the positioning address.
If other positioning is being performed when the interrupt stop (ignoring remaining distance) is started, the positioning stops.
Output 1020 pulses to the drive unit to move axis 1 in the positive direction for 1020 pulses (correction value included) with the absolute method from the stop position, and drive the motor. Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

Pre-setting

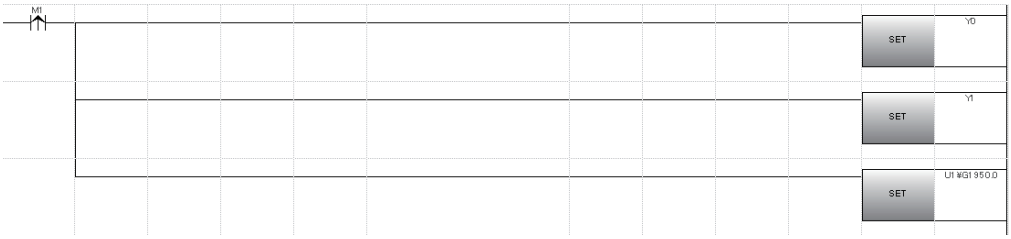
There are no necessary settings to be configured in advance to use this FB.

The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

Positioning start setting of axis 1

Turn on the output terminal which connects the servo to axis 1 and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



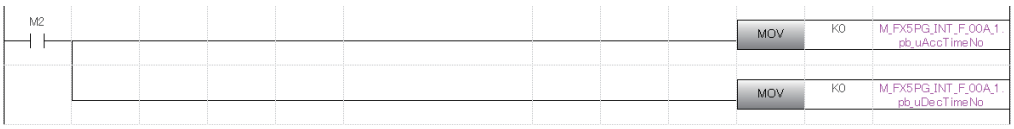
Set output terminal Y0

Set output terminal Y1

Turn on PLC ready signal

Public variable setting

Set the public variables to be used in M+FX5PG_INT_F (Interrupt stop (Ignoring remaining distance)) FB.



Da.3: Substitute K0 for acceleration time No. (axis 1)

Da.4: Substitute K0 for deceleration time No. (axis 1)

Axis No. setting

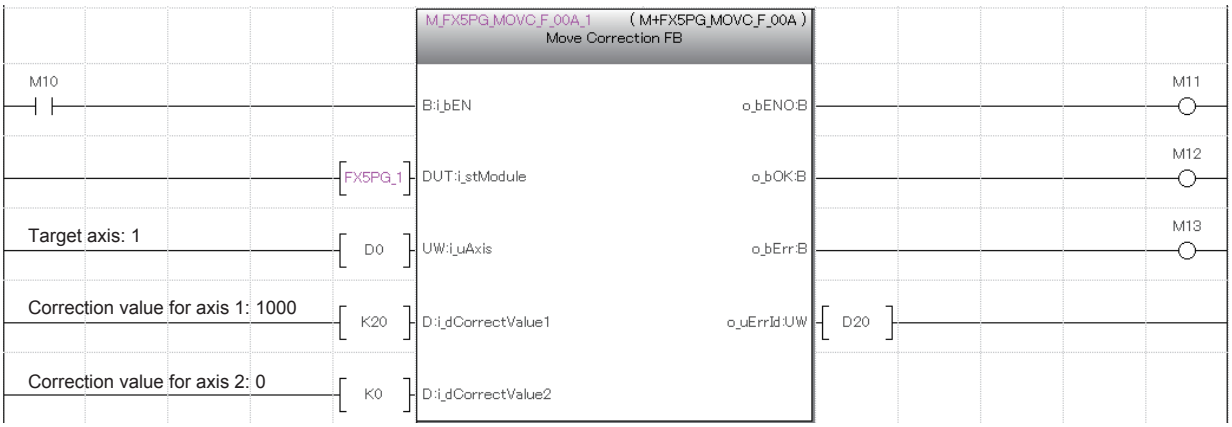
Set axis No. to 1

Movement amount correction setting

Set the movement amount correction for performing the interrupt stop of M+FX5PG_INT_F (Interrupt stop (Ignoring remaining distance)) in M+FX5PG_MOVC_F (Movement amount correction) FB.

For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K20	Set the correction value 20 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K0	Set the correction value 0 for axis 2.

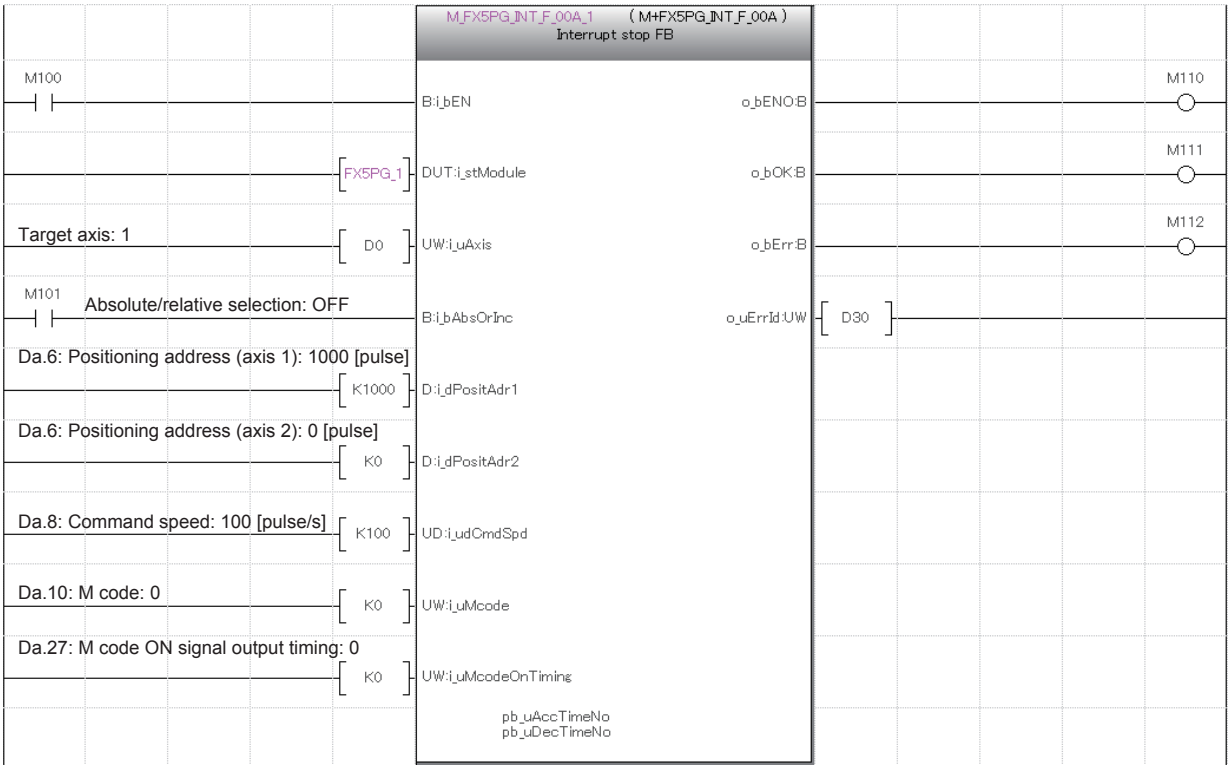


Interrupt stop start

Turn off M101 to perform positioning with the absolute method.

Set the positioning information in M+FX5PG_INT_F (Interrupt stop (Ignoring remaining distance) FB, output 2000 pulses from the drive unit at the command speed 100 (pulse/s), drive the motor, and start the interrupt stop.

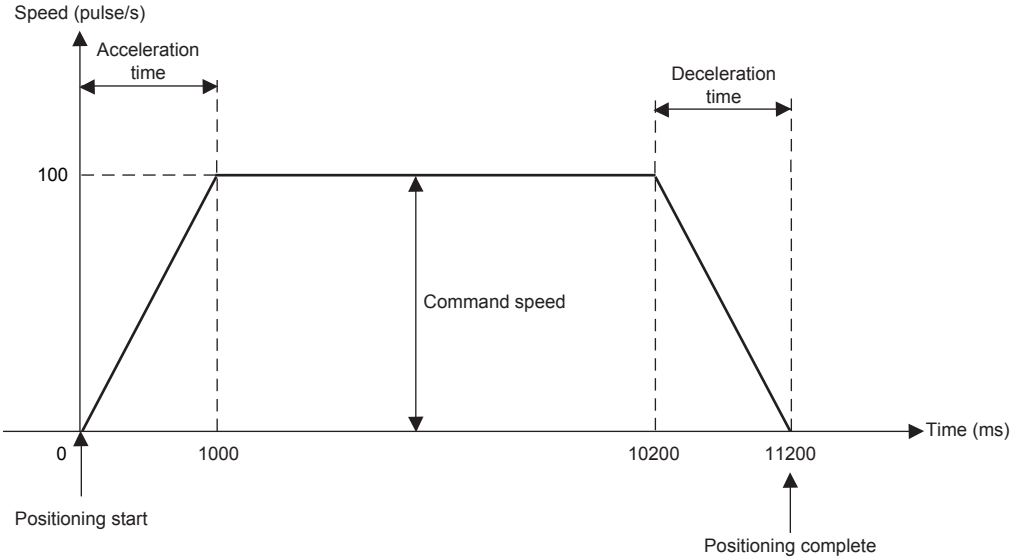
M+FX5PG_CW_F (Circular interpolation)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (axis 1)	K1000	Set the positioning address of axis 1 to 1000 pulses.
i_dPositAdr2	Da.6: Positioning address (axis 2)	K0	Set the positioning address of axis 2 to 0.
i_udCmdSpd	Da.8: Command speed (axis 1)	K100	Set the command speed to 100 pulse/s.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo	Da.3: Acceleration time No.	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo	Da.4: Deceleration time No.	K0	Set the deceleration time No. to 0.

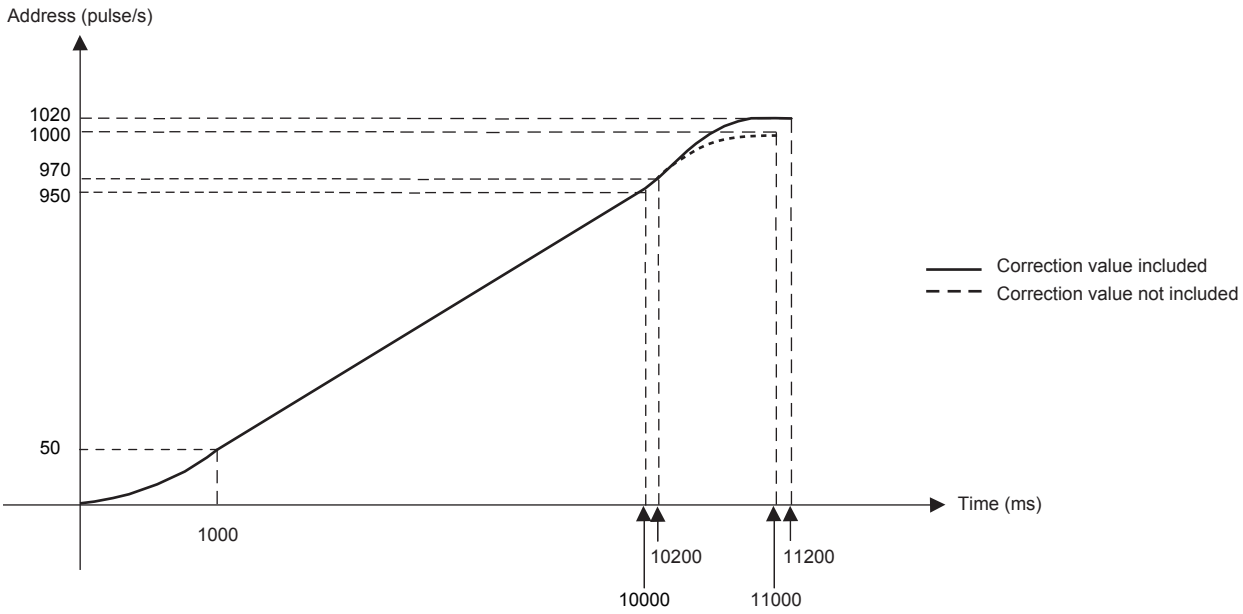


3.6 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First Level Speed))

Overview of program example

For axis 1 of FX5PG, perform a correction of 20 pulses on the positioning address.
If other positioning is being performed when the interrupt fixed feeding (first level speed) is started, the positioning stops.
Output 1020 pulses to the drive unit to move axis 1 in the positive direction for 1020 pulses (correction value included) with the absolute method regarding the stopped position as 0, and drive the motor. Axis 1 reaches the command speed 100 (pulse/s) at 1000 ms, decelerates by 1000 ms around the target position, and reaches the positioning address.





System configuration

For the system configuration example, refer to ☞ Page 10 System Configuration Example.

Pre-setting

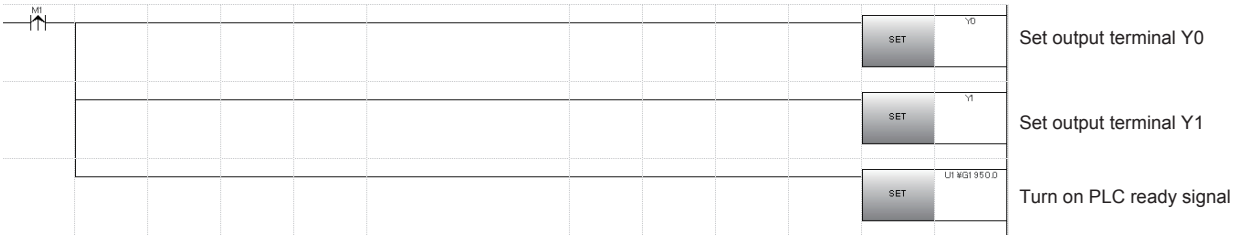
There are no necessary settings to be configured in advance to use this FB.

The unit setting (Pr.1) does not need to be changed since all the axes are set to 3 (pulse) by default.

Program

Positioning start setting of axis 1

Turn on the output terminal which connects the servo to axis 1 and turn on the PLC ready signal (Cd.190) to turn on Ready [Md.140].



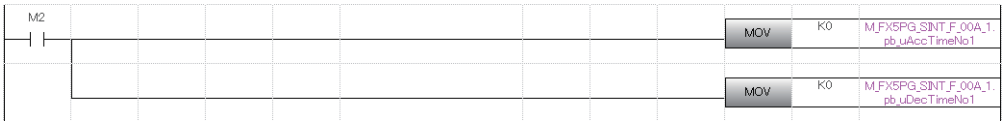
Set output terminal Y0

Set output terminal Y1

Turn on PLC ready signal

Public variable setting

Set the public variables to be used in M+FX5PG_SINT_F (Interrupt fixed feeding (First level speed)) FB.



Da.3: Substitute K0 for acceleration time No. (axis 1)

Da.4: Substitute K0 for deceleration time No. (axis 1)

Axis No. setting

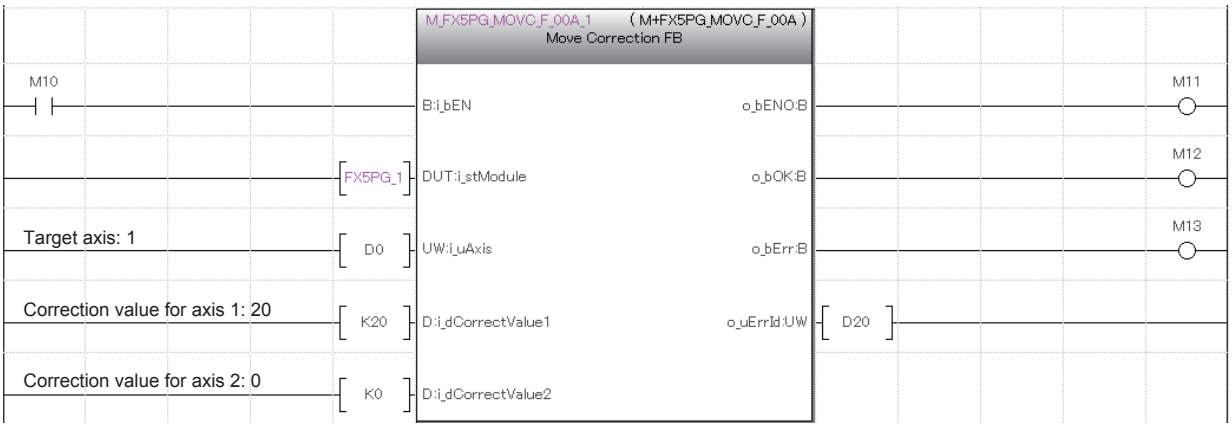
Set axis No. to 1

Movement amount correction setting

Set the movement amount correction for performing the interrupt fixed feeding of M+FX5PG_SINT_F (Interrupt fixed feeding (First level speed)) in M+FX5PG_MOVC_F (Movement amount correction) FB.

For details of the FB, refer to ☞ Page 77 M+FX5PG_MOVC_F (Movement Amount Correction).

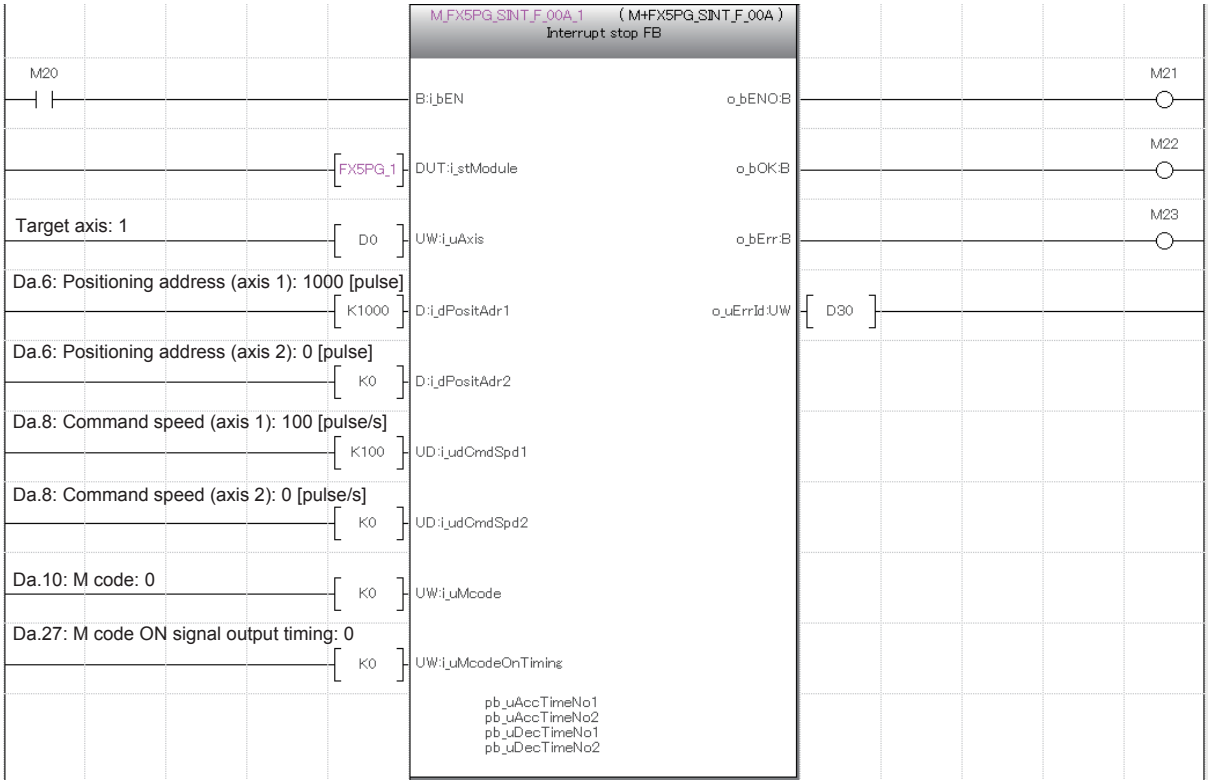
M+FX5PG_MOVC_F (Movement amount correction)			
Label	**Device/label setting**	**Setting value**	**Description**
i_dCorrectValue1	Correction value (axis 1)	K20	Set the correction value 20 for axis 1.
i_dCorrectValue2	Correction value (axis 2)	K0	Set the correction value 0 for axis 2.



Interrupt fixed feeding start

Set the positioning information in M+FX5PG_SINT_F (Interrupt fixed feeding (First level speed)) FB, output 1020 pulses from the drive unit at the command speed 100 (pulse/s), drive the motor, and start the interrupt fixed feeding.

M+FX5PG_SINT_F (Interrupt fixed feeding (First level speed))			
Label	**Device/label setting**	**Setting value**	**Description**
i_dPositAdr1	Da.6: Positioning address (axis 1)	K1000	Set the positioning address of axis 1 to 1000 pulses.
i_dPositAdr2	Da.6: Positioning address (axis 2)	K0	Set the positioning address of axis 2 to 0.
i_udCmdSpd1	Da.8: Command speed (axis 1)	K100	Set the command speed of axis 1 to 100 pulse/s.
i_udCmdSpd2	Da.8: Command speed (axis 2)	K0	Set the command speed of axis 2 to 0.
i_uMcode	Da.10: M code	K0	Set the M code to 0 since it is not used.
i_uMcodeOnTiming	Da.27: M code ON signal output timing	K0	Set the M code ON signal output timing to 0.
pb_uAccTimeNo	Da.3: Acceleration time No.	K0	Set the acceleration time No. to 0.
pb_uDecTimeNo	Da.4: Deceleration time No.	K0	Set the deceleration time No. to 0.



INSTRUCTION INDEX

M

MEMO

REVISIONS

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

Revision date	*Manual number	Description
April 2018	SH(NA)-081989ENG-A	First edition
October 2019	SH(NA)-081989ENG-B	■Added or modified parts Chapter 2, 3

Japanese manual number: SH-081988-B

TRADEMARKS

The company names, system names, and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.
In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

Manual number: SH(NA)-081989ENG-B(1910)

MITSUBISHI ELECTRIC CORPORATION

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