MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-F series

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

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1 OVERVIEW

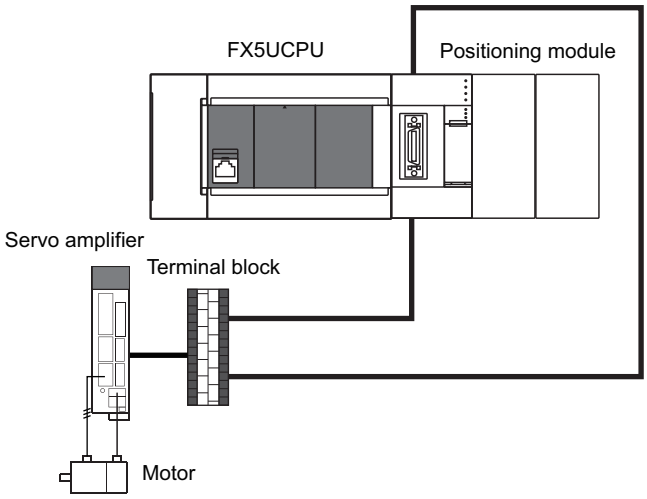
1.1 Overview of the FB Library

This FB list is for using the FX2N-20GM/10GM function with MELSEC iQ-F series FX5-20PG.

Item*1	Description
M+FX5PG_DRV_F	Sets and starts the high-speed positioning.
M+FX5PG_LIN_F	Sets and starts the linear interpolation positioning.
M+FX5PG_CW_F	Sets and starts the center-designated circular interpolation positioning (clockwise).
M+FX5PG_CCW_F	Sets and starts the center-designated circular interpolation positioning (counterclockwise).
M+FX5PG_CHK_F	Performs the servo end check.
M+FX5PG_DRVZ_F	Starts the near-point dog type home position return.
M+FX5PG_SETR_F	Sets the electric home position.
M+FX5PG_DRVR_F	Performs the electric home position return.
M+FX5PG_INT_F	Starts an interrupt stop.
M+FX5PG_SINT_F	Starts an interrupt fixed feeding.
M+FX5PG_MOVC_F	Corrects the movement amount.
M+FX5PG_CNTC_F	Corrects the center position.
M+FX5PG_CANC_F	Cancels the movement amount correction.
M+FX5PG_SET_F	Changes the current value.

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

1.2 System Configuration Example



MEMO

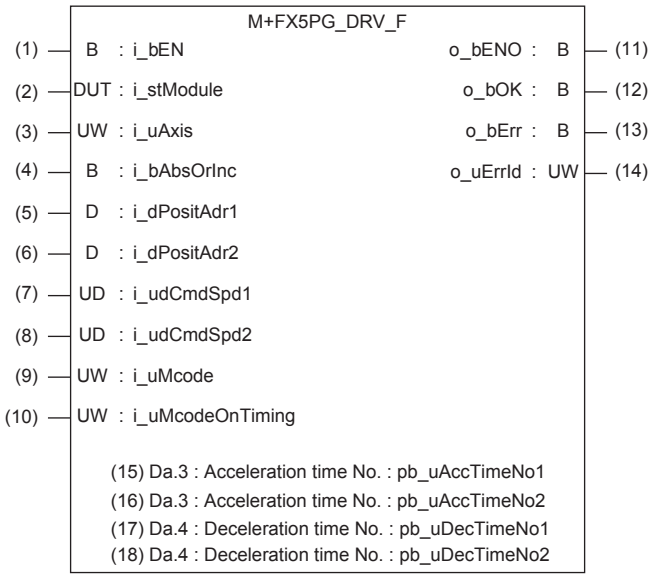
2 DETAILS OF THE FB LIBRARY

2.1 M+FX5PG_DRV_F (High-speed Positioning)

FB Name

M+FX5PG_DRV_F

Overview

Item	Description
Function overview	Sets and starts the high-speed positioning.
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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, 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, 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 MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

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

■Output label

No.	Variable name	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.

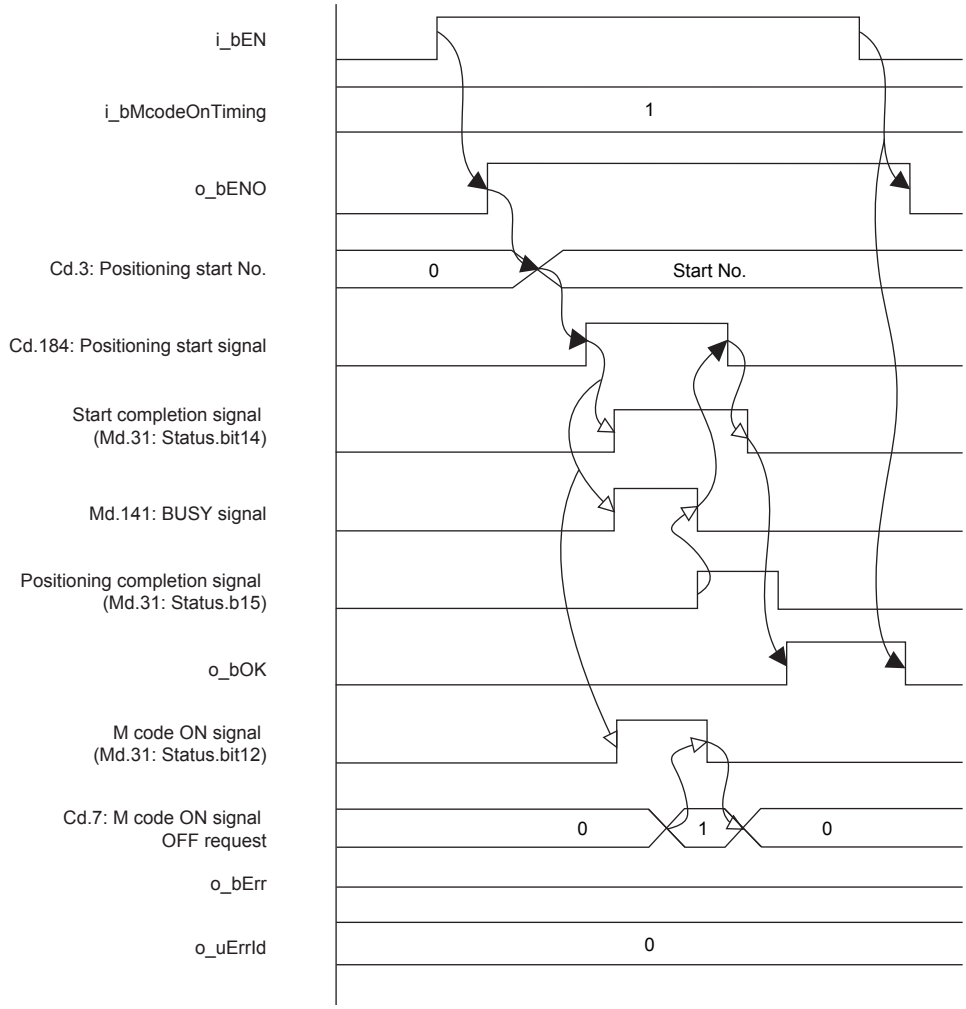
■External public label

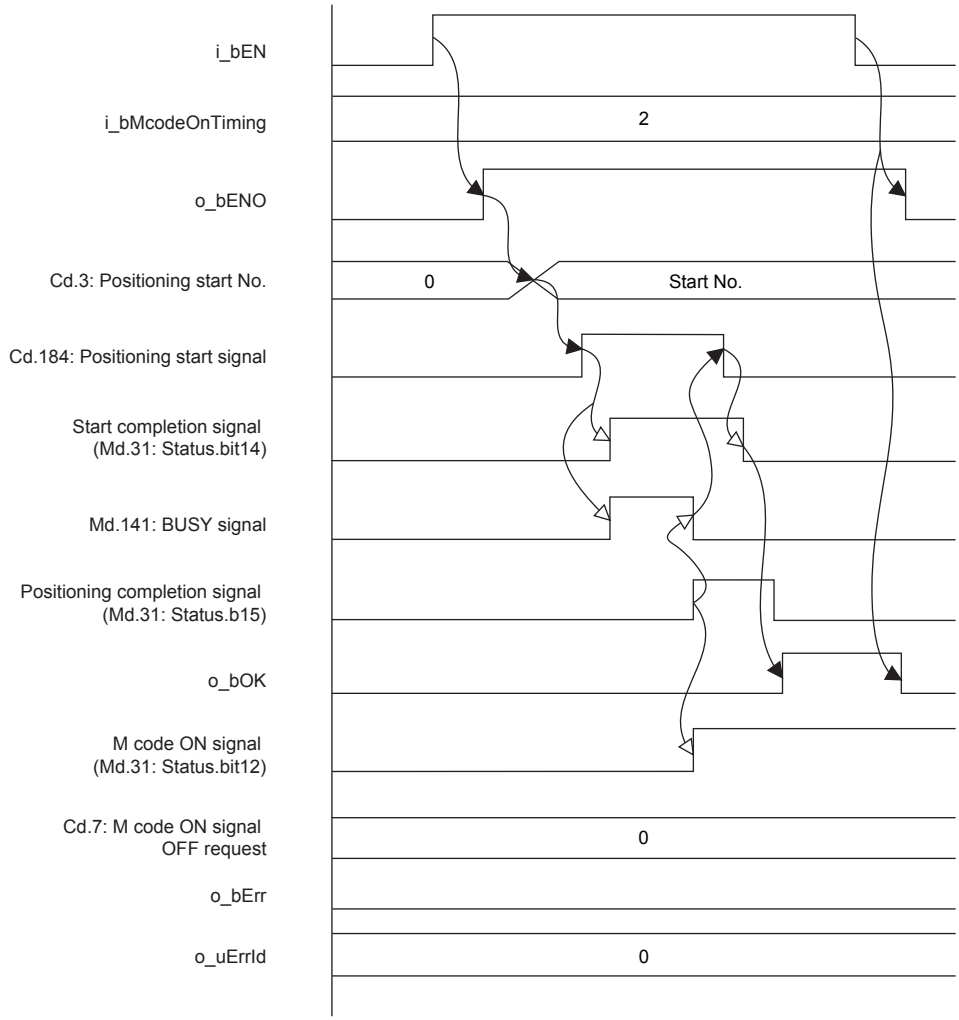
No.	Variable name	Name	Data type	Setting range	Description
(15)	pb_uAccTimeNo1	Da.3: Acceleration time No. (axis 1)	Word [Unsigned]/Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be 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.

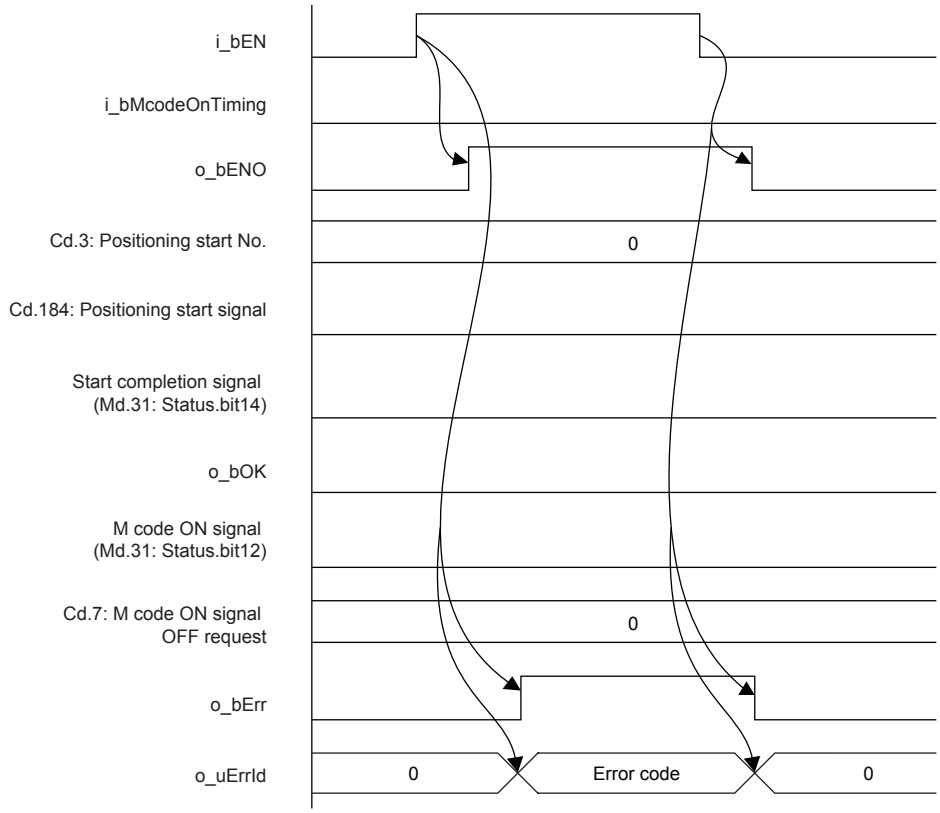
No.	Variable name	Name	Data type	Setting range	Description
(17)	pb_uDecTimeNo1	Da.4: Deceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Deceleration time 0 1: Deceleration time 1 2: Deceleration time 2 3: Deceleration time 3	Set the Deceleration time within the range of 0 to 3 to 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	999 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.	
Function description	(1) 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 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 they are not satisfied, 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). Refer to ☞ Page 10 Error Code for details. (2) 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. (3) 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. (4) 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). Refer to ☞ Page 10 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode 

Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) 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. (2) 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 described in ☞ Page 45 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)) and ☞ Page 51 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed)). 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. (3) This FB uses the global label: stGmRenewal[0..15]. (4) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (5) This FB cannot be used in an interrupt program. (6) 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). (7) 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. (8) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (9) This FB requires the configuration of the ladder for every input label. (10)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For details of the module parameters, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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 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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

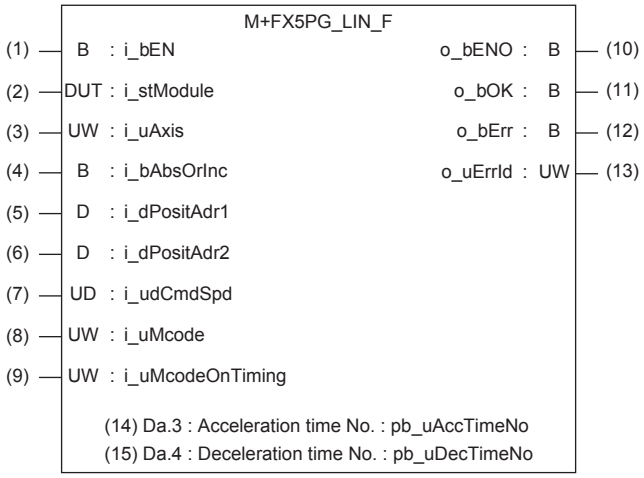
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

2.2 M+FX5PG_LIN_F(Linear Interpolation Positioning)

FB Name

M+FX5PG_LIN_F

Overview

Item	Description
Function overview	Sets and starts the linear interpolation positioning.
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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, 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 repetitions, 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 MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

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

■Output label

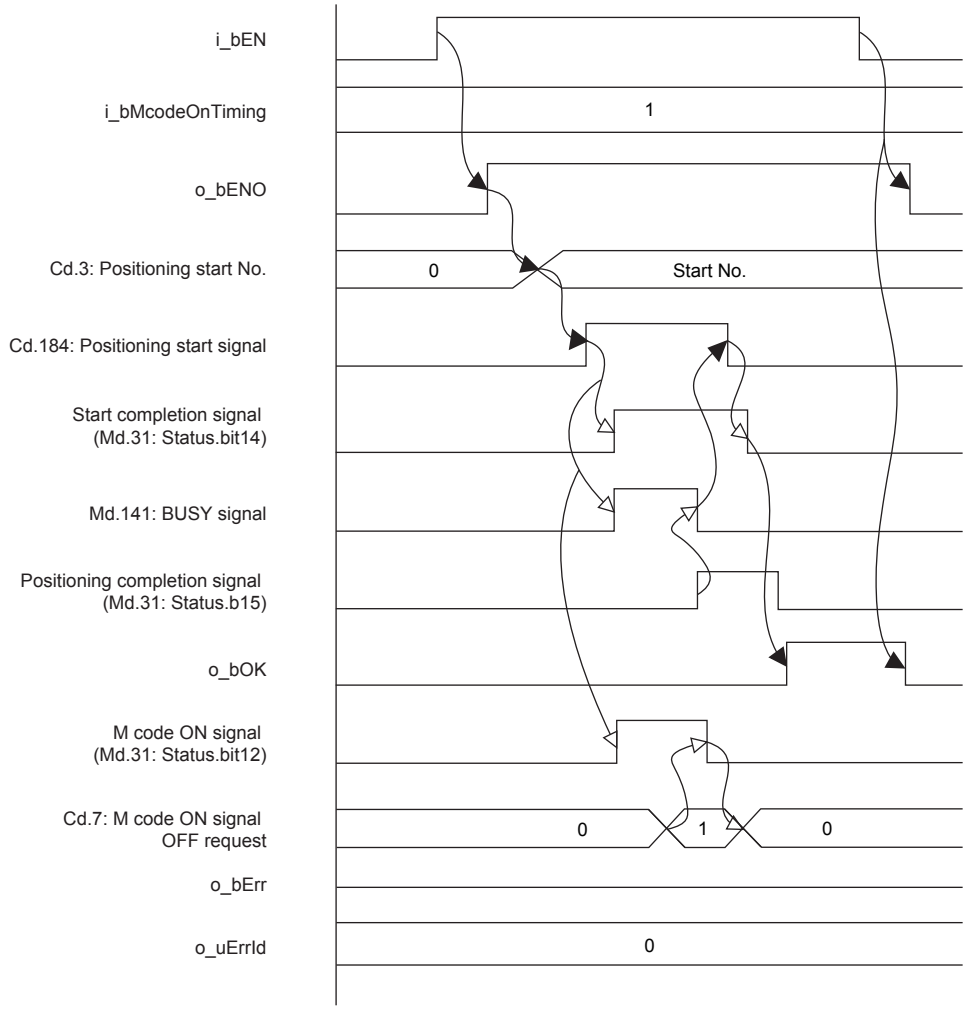
No.	Variable name	Name	Data type	Default Value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	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.

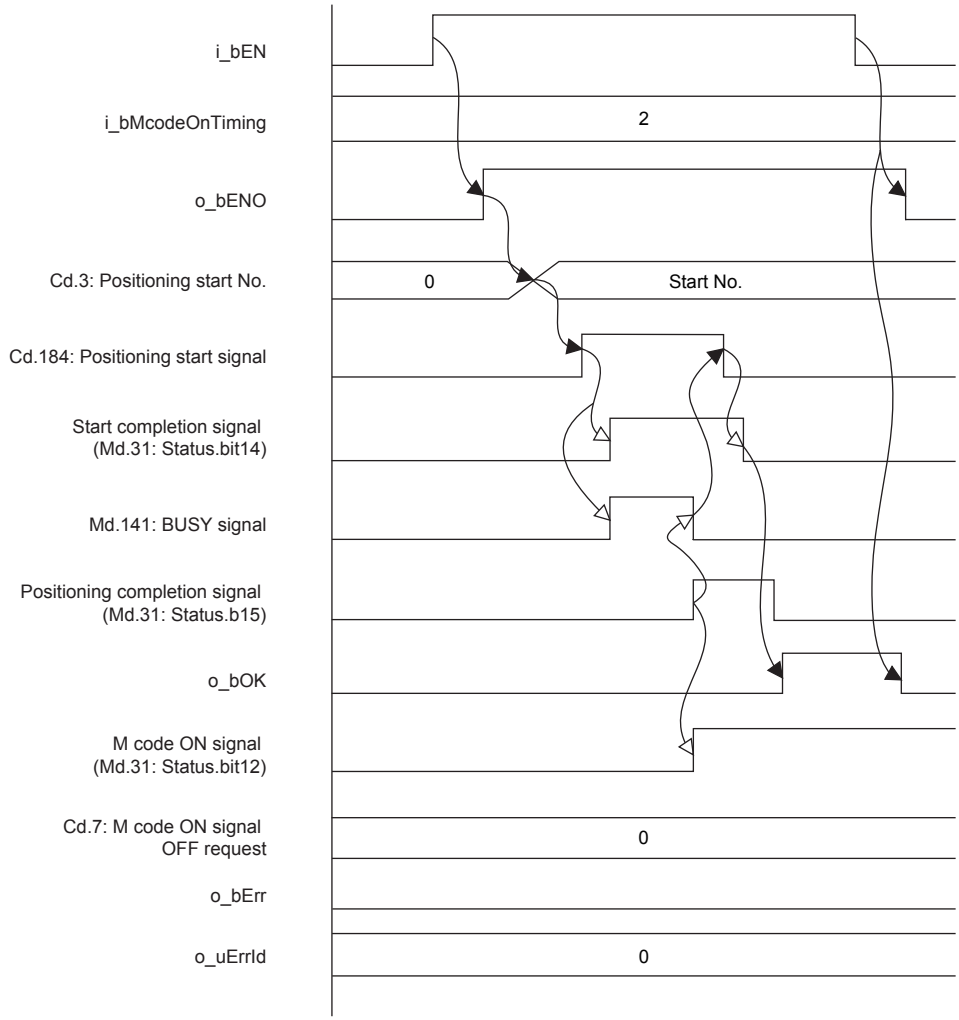
■External public label

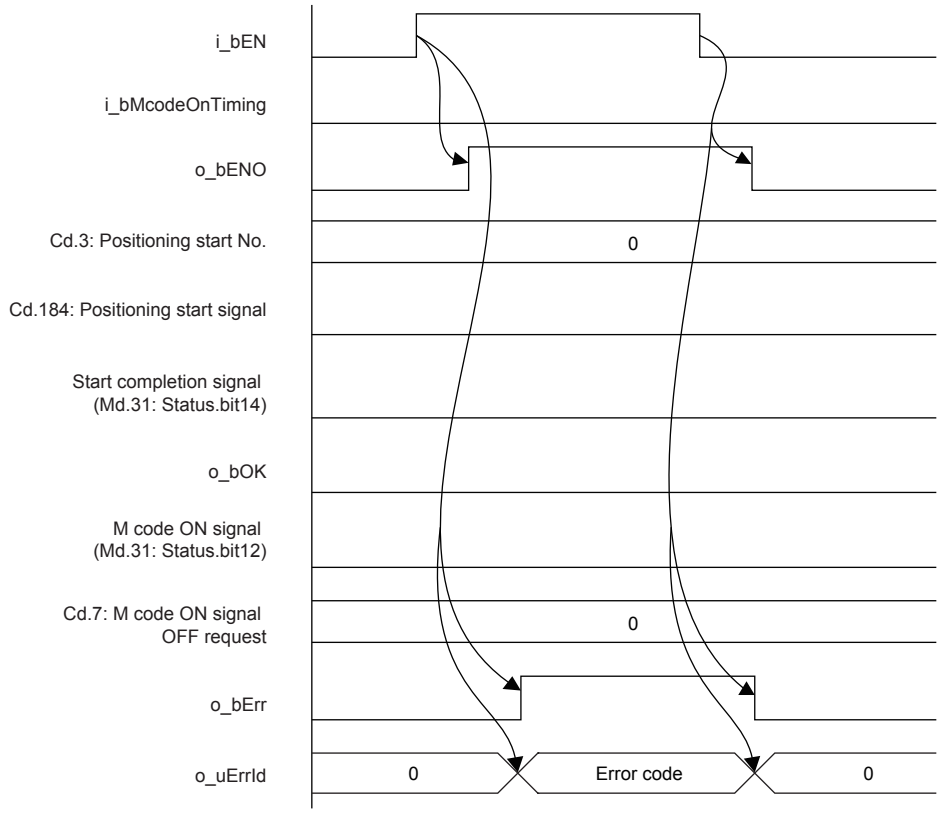
No.	Variable name	Name	Data type	Setting range	Description
(14)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	1248 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.	
Function description	(1) 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 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 they are not satisfied, 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). Refer to ☞ Page 16 Error Code for details. (2) 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. (3) 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. (4) 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). Refer to ☞ Page 16 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode	



Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) 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. (2) This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis). (3) 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 described in ☞ Page 45 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)) and ☞ Page 51 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed)). 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. (4) This FB uses the global label: stGmRenewal[0..15]. (5) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (6) This FB cannot be used in an interrupt program. (7) 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). (8) 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. (9) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (10)This FB requires the configuration of the ladder for every input label. (11)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For details of the module parameters, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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 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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

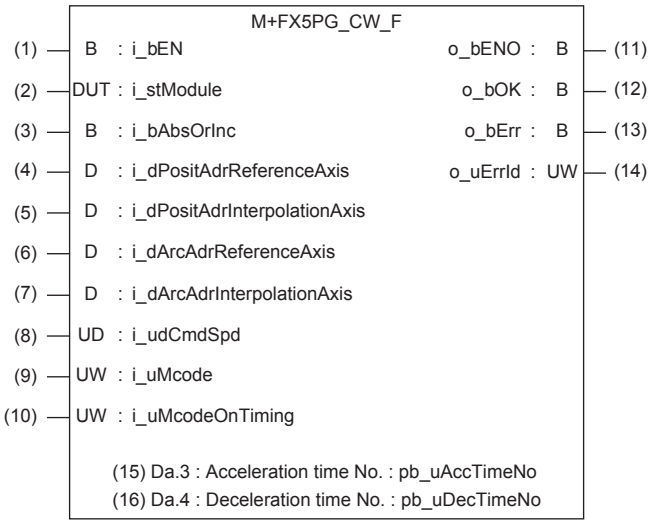
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

2.3 M+FX5PG_CW_F (Circular Interpolation (Clockwise))

FB Name

M+FX5PG_CW_F

Overview

Item	Description
Function overview	Sets and starts the center-designated circular interpolation positioning (clockwise).
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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, 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 repetitions, 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 MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

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

■Output label

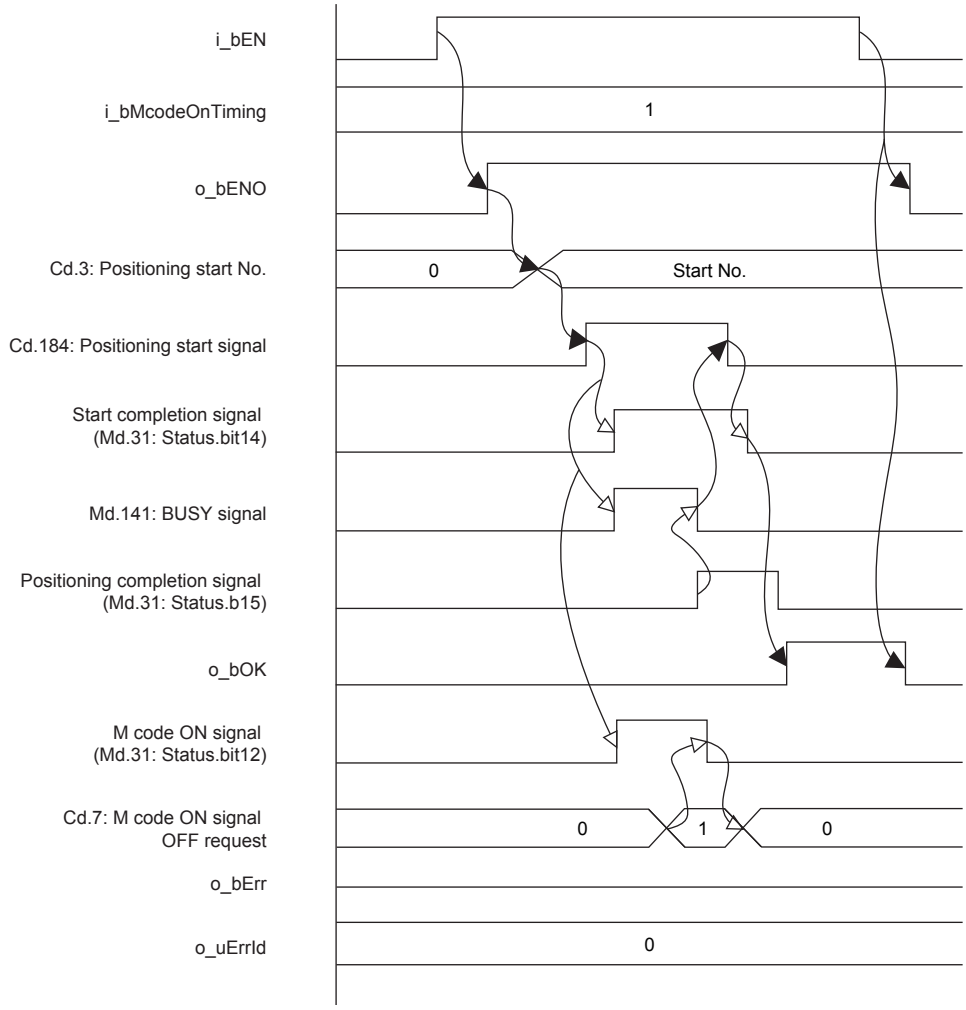
No.	Variable name	Name	Data type	Default Value	Description
(11)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(12)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(13)	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.

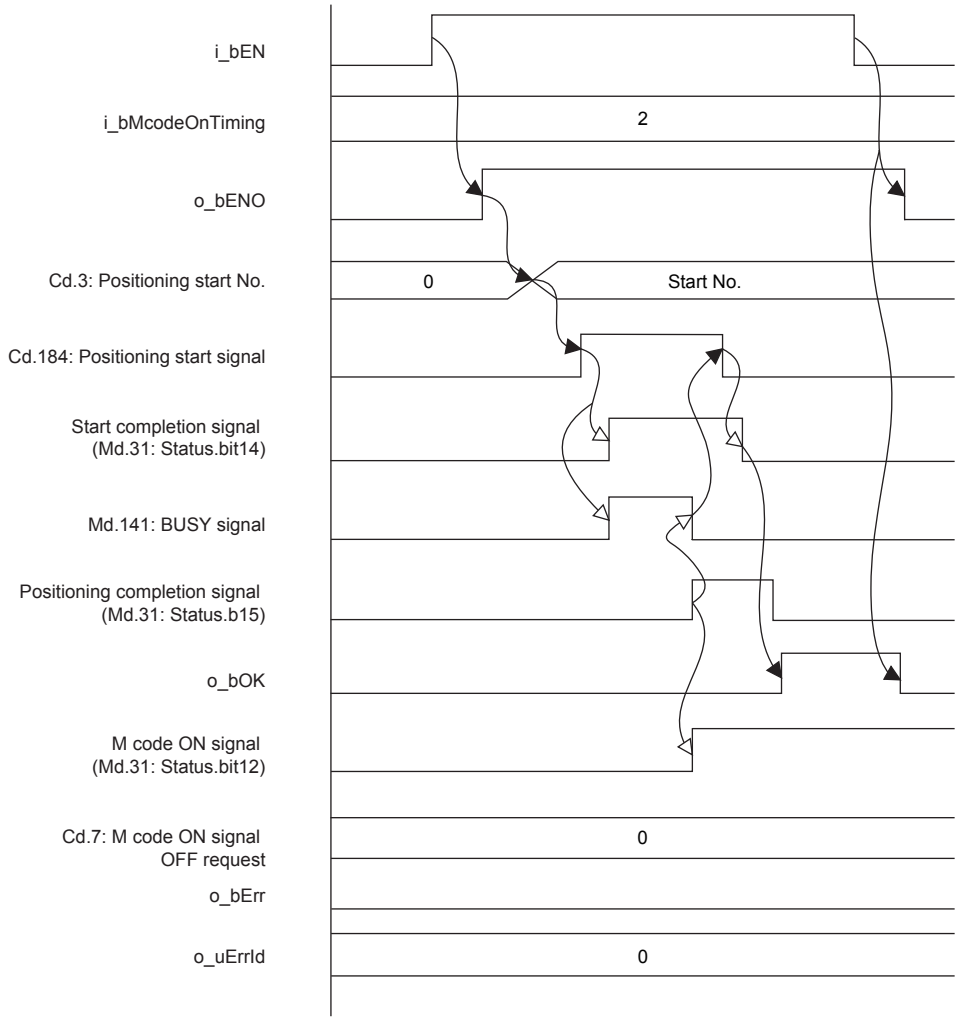
■External public label

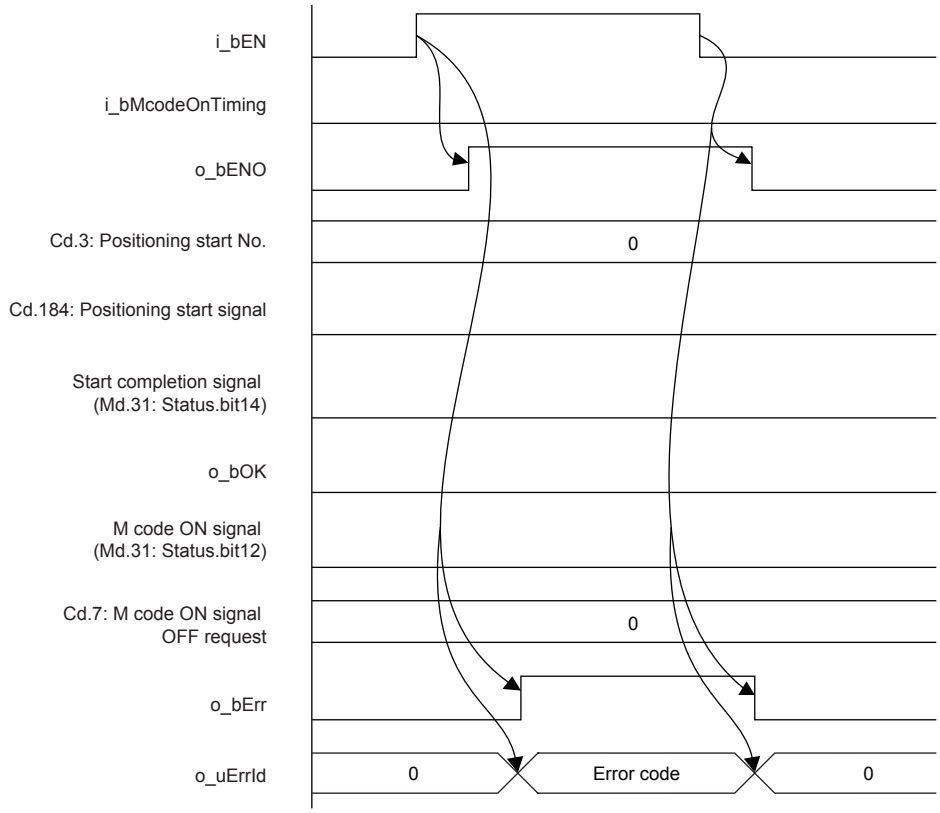
No.	Variable name	Name	Data type	Setting range	Description
(15)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	678 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.	
Function description	(1) 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 performed only when all 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 they are not satisfied, 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). Refer to ☞ Page 23 Error Code for details. (2) 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. (3) 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.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode 

Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) 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. (2) This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis). (3) 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 described in ☞ Page 45 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)) and ☞ Page 51 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed)). 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. (4) This FB uses the global label: stGmRenewal[0..15]. (5) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (6) This FB cannot be used in an interrupt program. (7) 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). (8) 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. (9) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (10)This FB requires the configuration of the ladder for every input label. (11)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For details of the module parameters, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

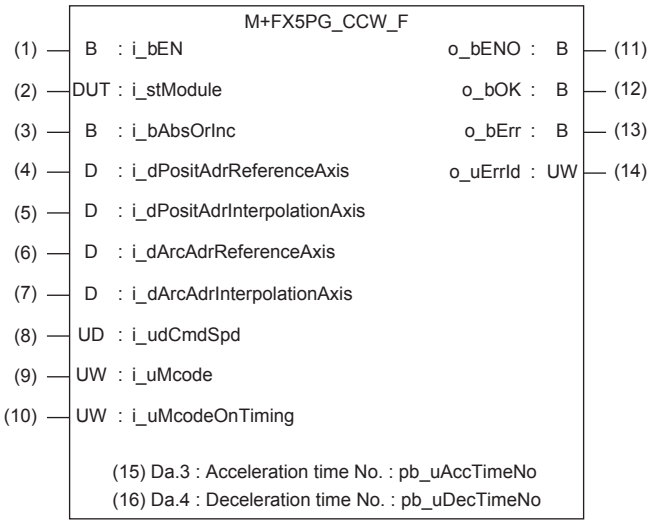
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

2.4 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise))

FB Name

M+FX5PG_CCW_F

Overview

Item	Description
Function overview	Sets and starts the center-designated circular interpolation positioning (counterclockwise).
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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, 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 repetitions, 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 MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

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

■Output label

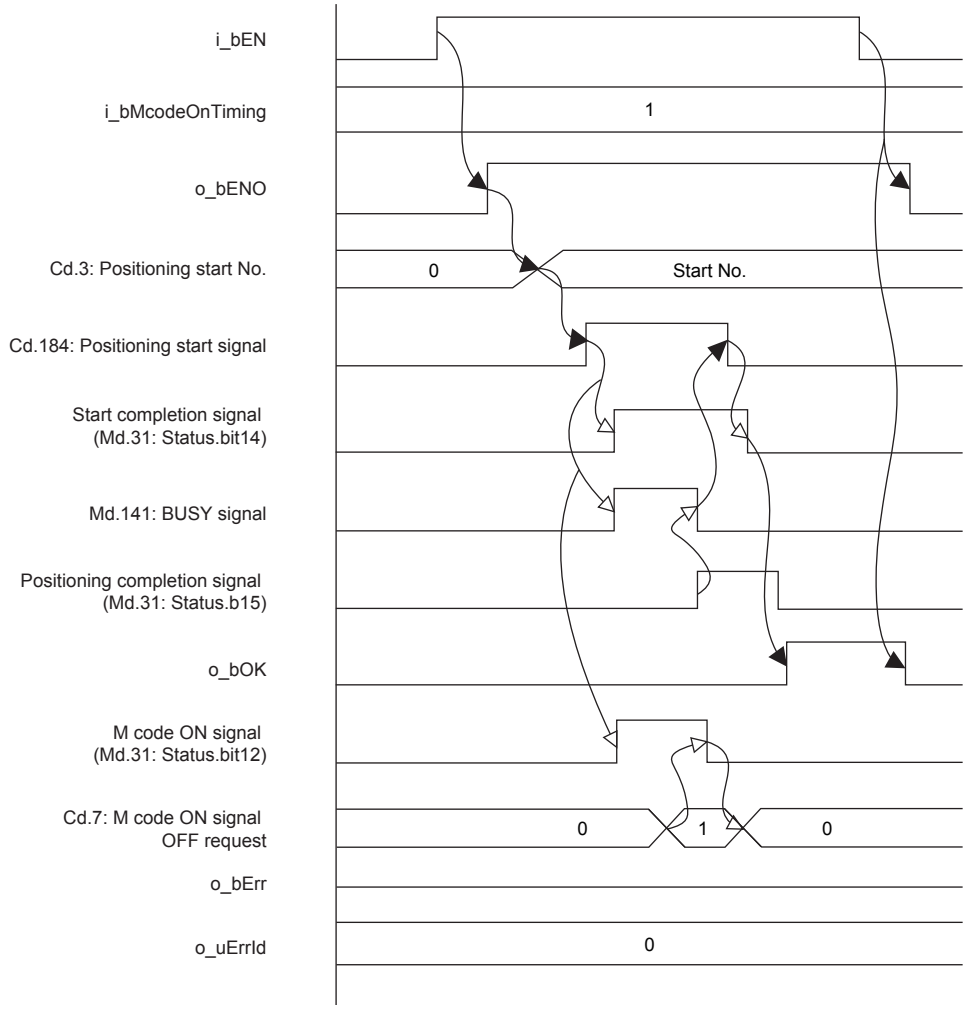
No.	Variable name	Name	Data type	Default Value	Description
(11)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(12)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(13)	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.

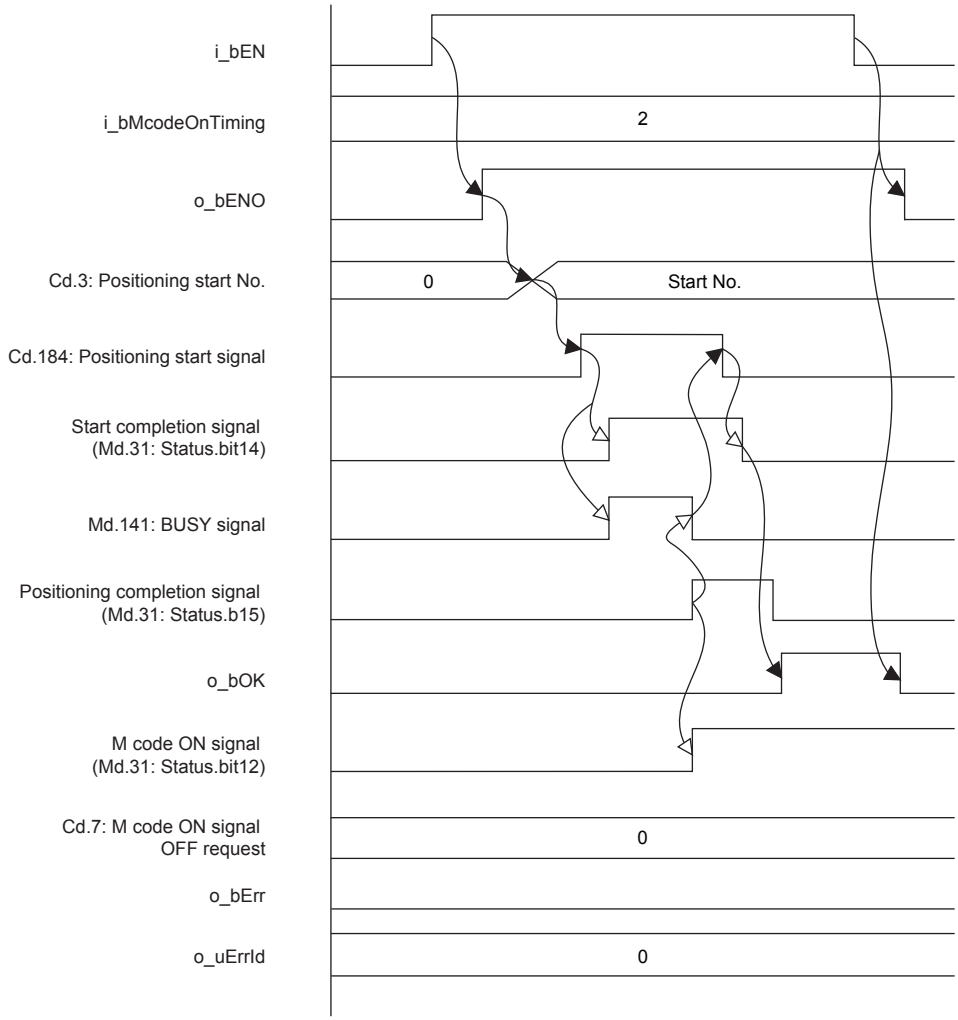
■External public label

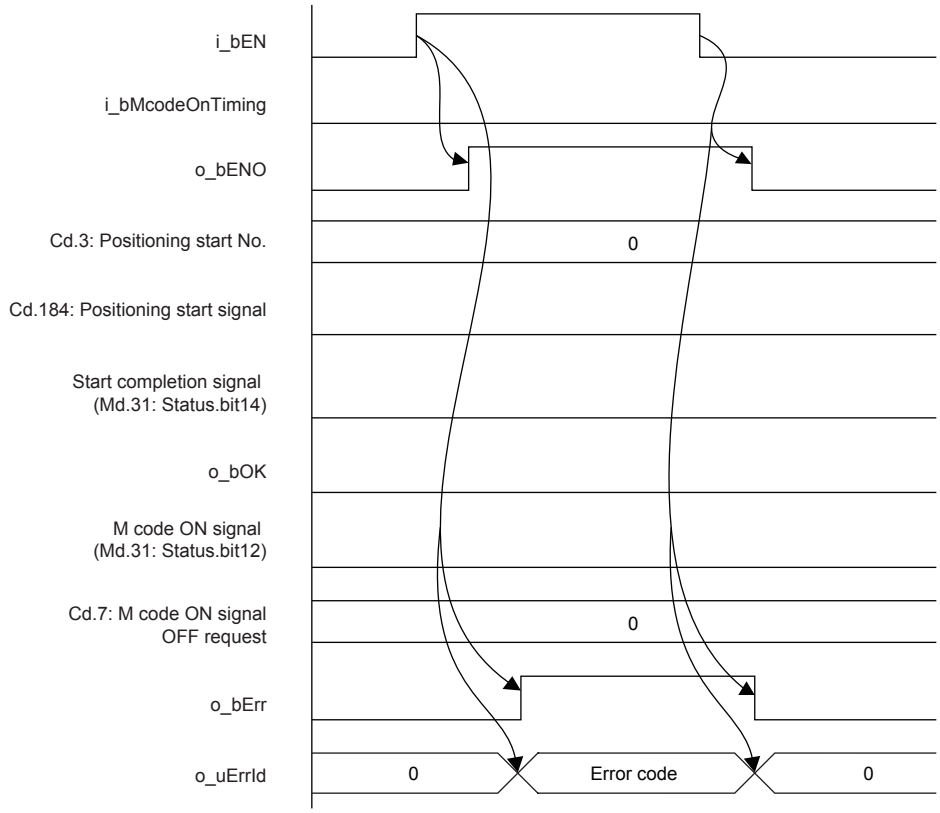
No.	Variable name	Name	Data type	Setting range	Description
(15)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	678 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.	
Function description	(1) 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 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 they are not satisfied, 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). Refer to ☞ Page 30 Error Code for details. (2) 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. (3) 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.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode 

Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) 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. (2) This FB sets "01: Axis 2 specification" in ([Da.5] Interpolation target axis). (3) 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 described in ☞ Page 45 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)) and ☞ Page 51 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed)). 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. (4) This FB uses the global label: stGmRenewal[0..15]. (5) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (6) This FB cannot be used in an interrupt program. (7) 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). (8) 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. (9) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target channel. (10)This FB requires the configuration of the ladder for every input label. (11)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For details of the module parameters, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

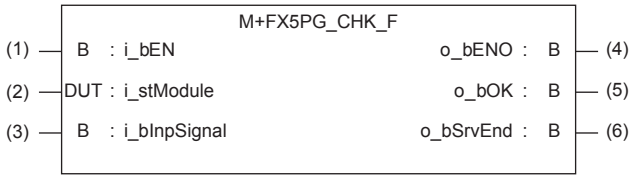
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

2.5 M+FX5PG_CHK_F (Servo End Check)

FB Name

M+FX5PG_CHK_F

Overview

Item	Description
Function overview	Performs the servo end check.
Symbol	

Label

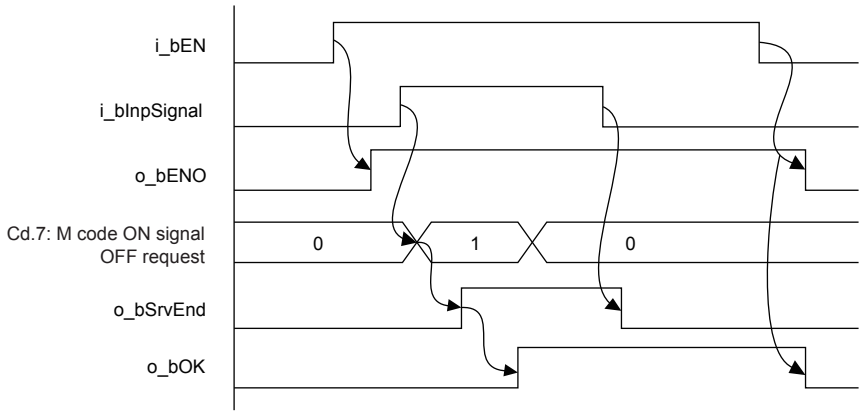
■Input label

No.	Variable name	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.	Variable name	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

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic 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.	
Function description	(1) 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. (2) By turning on i_bInpSignal (INP signal), this FB turns on [Cd.7] M code OFF request, and o_bSrvEnd (Servo end) turns on. (3) By turning on o_bSrvEnd (Servo end), o_bOK (Normal completion) turns on in this FB.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion] 	
Restrictions and precautions	(1) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (2) This FB cannot be used in an interrupt program. (3) 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). (4) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (5) This FB requires the configuration of the ladder for every input label. (6) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).	
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual	

Error Code

Error Code (Hexadecimal)	Description	Action
None	None	None

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

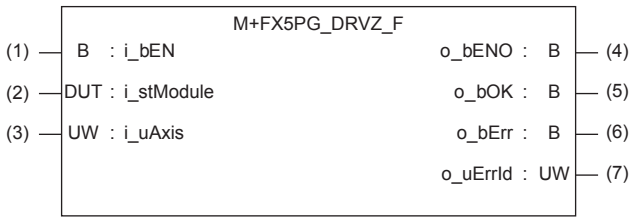
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1504, 1604	RW: M code ON signal OFF request (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uMcodeOnSignalTurnsOffRequest_D	Word [Unsigned]/ Bit string [16-bit]	0	0, 1	R	Turn off the M code ON signal.

2.6 M+FX5PG_DRVZ_F (Machine Home Position Return)

FB Name

M+FX5PG_DRVZ_F

Overview

Item	Description
Function overview	Starts the near-point dog type home position return.
Symbol	

Label

■Input label

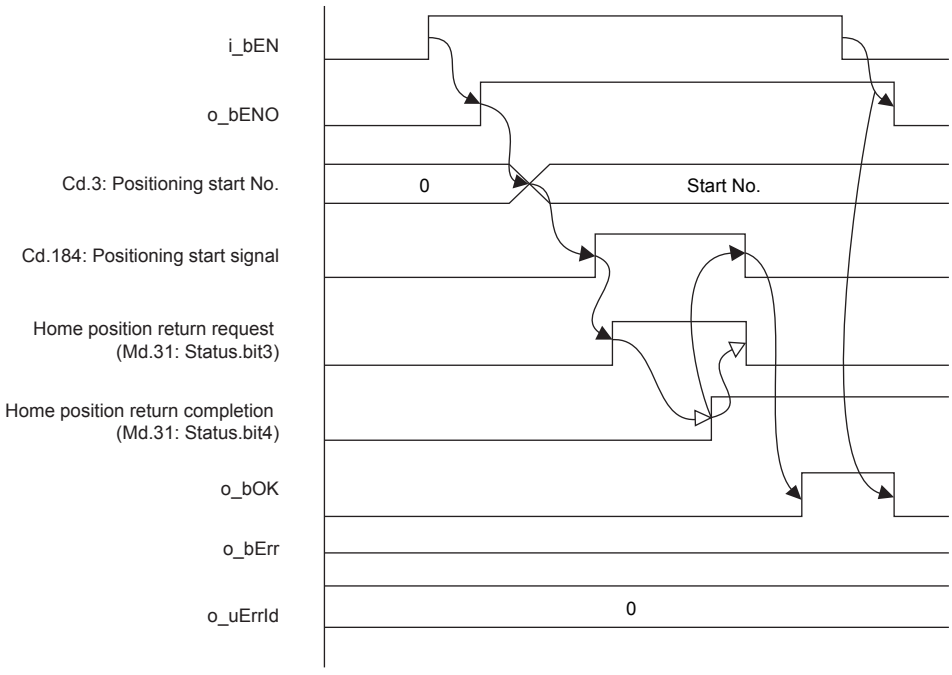
No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.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

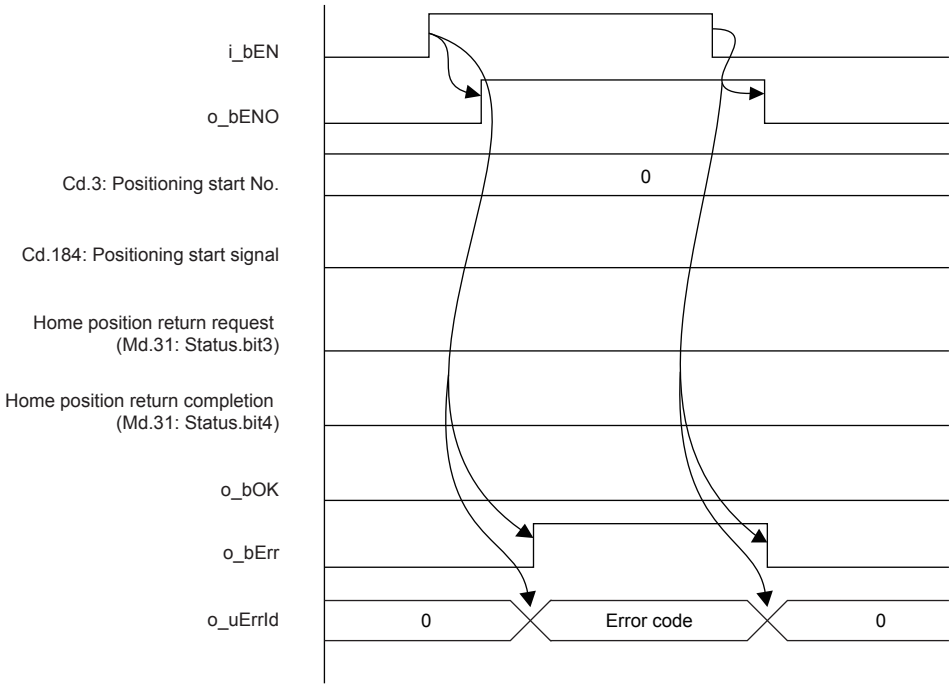
■Output label

No.	Variable name	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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	297 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.	
Function description	(1) 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 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, 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). Refer to ☞ Page 36 Error Code for details. (2) 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. (3) 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. (4) 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). Refer to ☞ Page 36 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion]	



Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) This FB sets "No. 9001 (Machine home position return)" in [Cd.3] Positioning start No. (2) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (3) This FB cannot be used in an interrupt program. (4) 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). (5) 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. (6) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (7) This FB requires the configuration of the ladder for every input label. (8) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual(Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

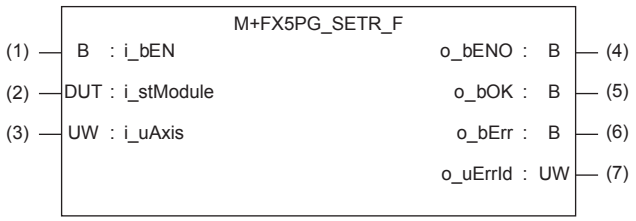
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

2.7 M+FX5PG_SETR_F (Electric Home Position Setting)

FB Name

M+FX5PG_SETR_F

Overview

Item	Description
Function overview	Sets the electric home position.
Symbol	

Label

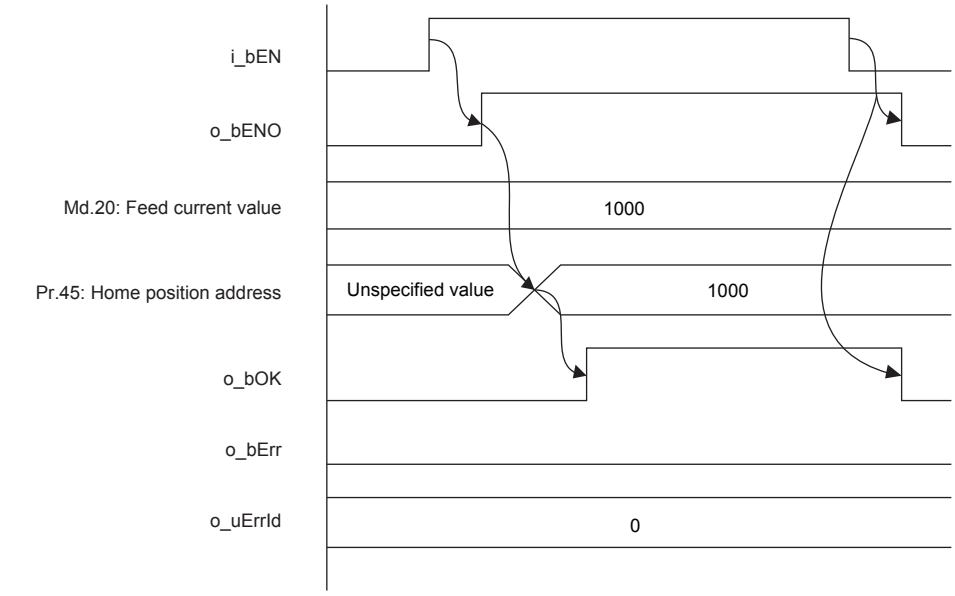
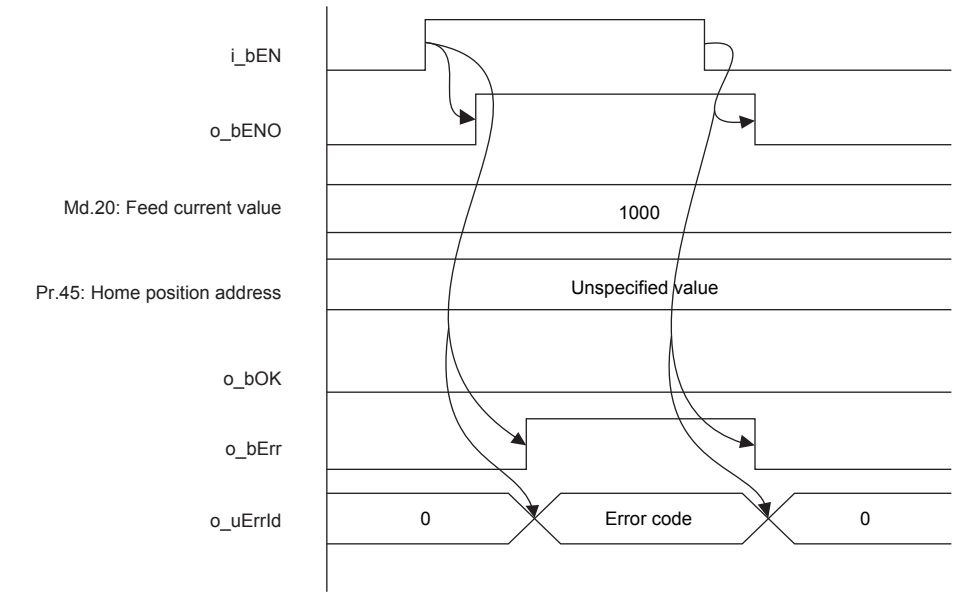
■Input label

No.	Variable name	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.	Variable name	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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic 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.	
Function description	(1) By turning on i_bEN (Execution command), [Md.20] Feed current value is written to [Pr.45] Home position address. (2) 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). Refer to ☞ Page 40 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (1 scan execution type)	
Timing chart	[For normal completion]  [For error completion]  	

Item	Description
Restrictions and precautions	(1) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (2) This FB cannot be used in an interrupt program. (3) 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). (4) This FB requires the configuration of the ladder for every input label. (5) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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.

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

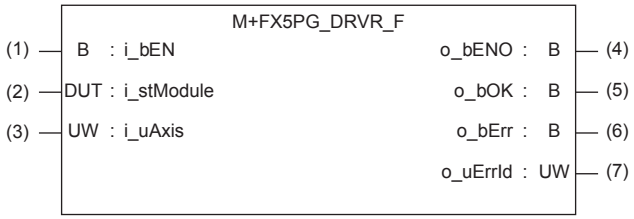
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
800, 900	R: Feed current value (direct)	FX5PG_☐.stnAxisMonitorData_Axis_D[].dCurrentFeedValue_D	Double word [Signed]	0	• Pr.1: For the unit setting 0, 1, and 3 -2147483648 to 2147483647 • Pr.1: For the unit setting 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.

2.8 M+FX5PG_DRVR_F (Electric Home Position Return)

FB Name

M+FX5PG_DRVR_F

Overview

Item	Description
Function overview	Performs the electric home position return.
Symbol	

Label

■Input label

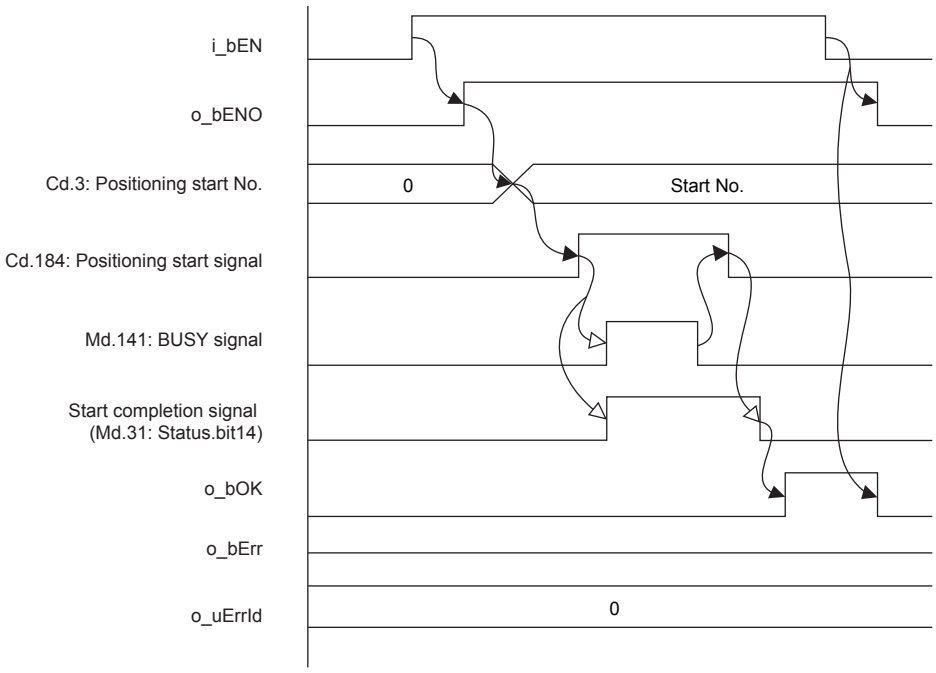
No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.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

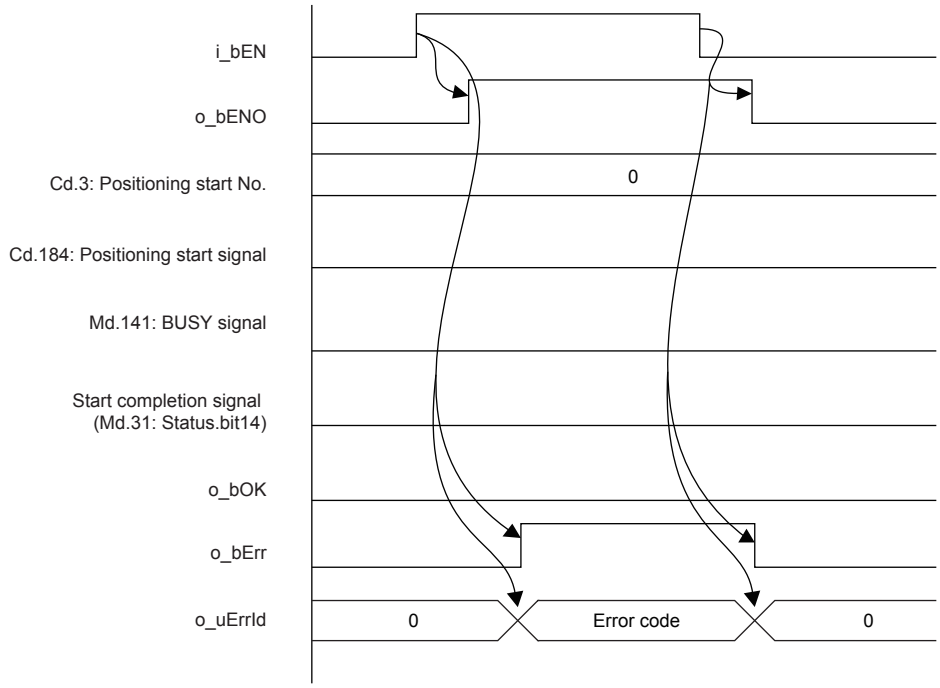
■Output label

No.	Variable name	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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	333 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.	
Function description	(1) 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 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, 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). Refer to ☞ Page 43 Error Code for details. (2) When the positioning complete signal ([Md.31] Status: b15) is on or i_bEN (Execution command) turns off, the positioning start signal ([Cd.184] Positioning start signal) turns off. (3) 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. (4) 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). Refer to ☞ Page 43 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion]	



Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) This FB sets "No. 9002 (High-speed home position return)" in [Cd.3] Positioning start No. (2) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (3) This FB cannot be used in an interrupt program. (4) 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). (5) 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. (6) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (7) This FB requires the configuration of the ladder for every input label. (8) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

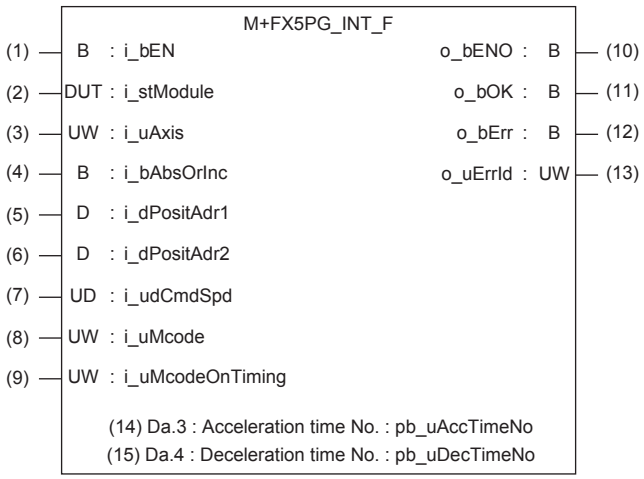
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.

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

FB Name

M+FX5PG_INT_F

Overview

Item	Description
Function overview	Starts an interrupt stop.
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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 • 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.
(7)	i_udCmdSpd	Da.8: Command speed	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0,1 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 repetitions, 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 code, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

■Output label

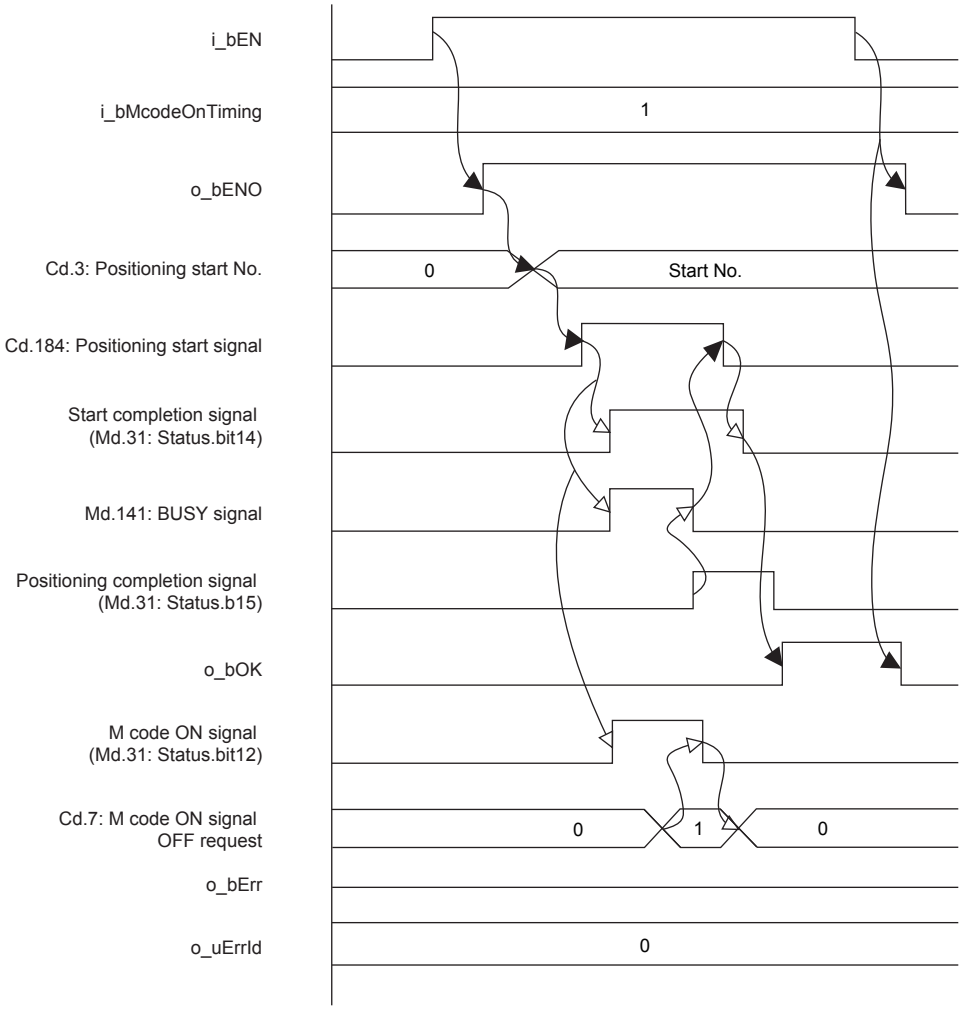
No.	Variable name	Name	Data type	Default Value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	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.

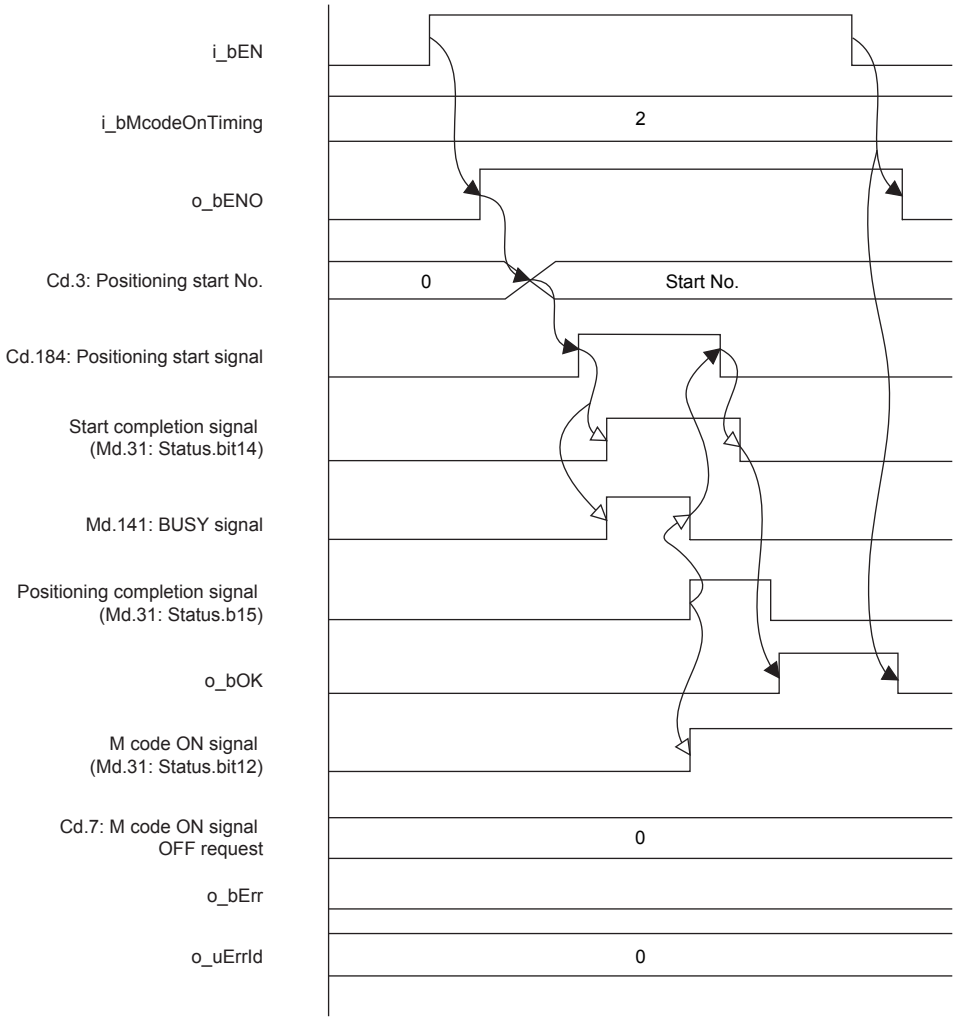
■External public label

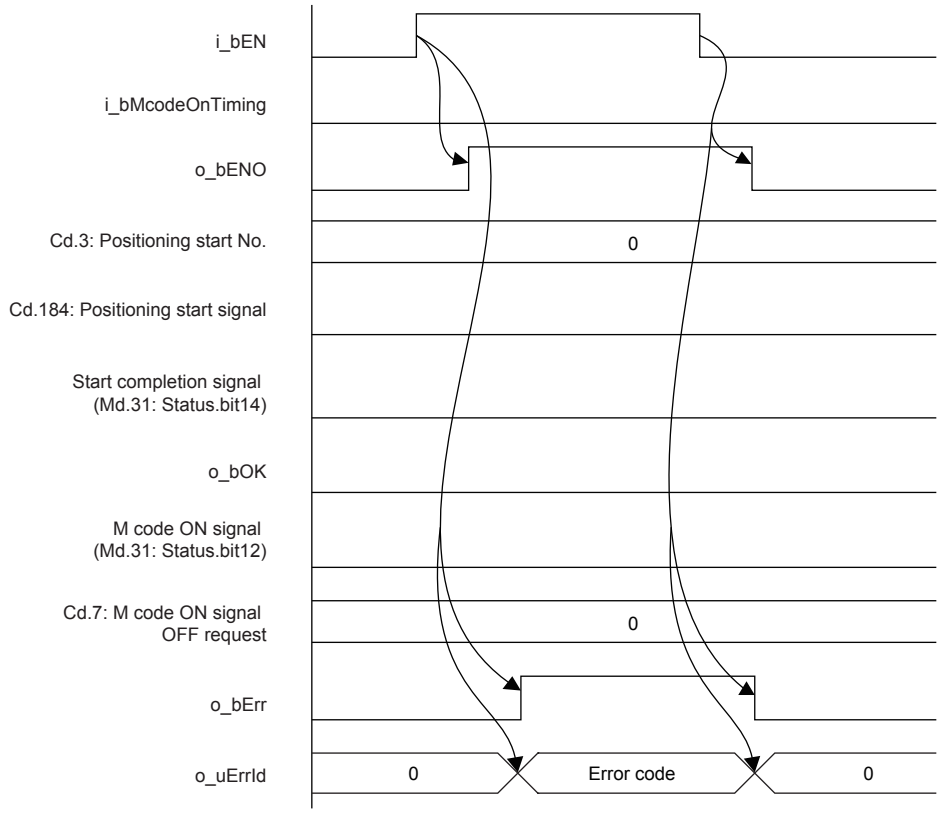
No.	Variable name	Name	Data type	Setting range	Description
(14)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to be used as 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	1969 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.	
Function description	(1) 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 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, 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). Refer to ☞ Page 50 Error Code for details. (2) 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. (3) 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. (4) 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). Refer to ☞ Page 50 Error Code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode	



Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) 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. (2) 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. (3) This FB uses the global label: stGmRenewal[0..15]. (4) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (5) This FB cannot be used in an interrupt program. (6) 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). (7) 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. (8) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (9) This FB requires the configuration of the ladder for every input label. (10)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

Module label

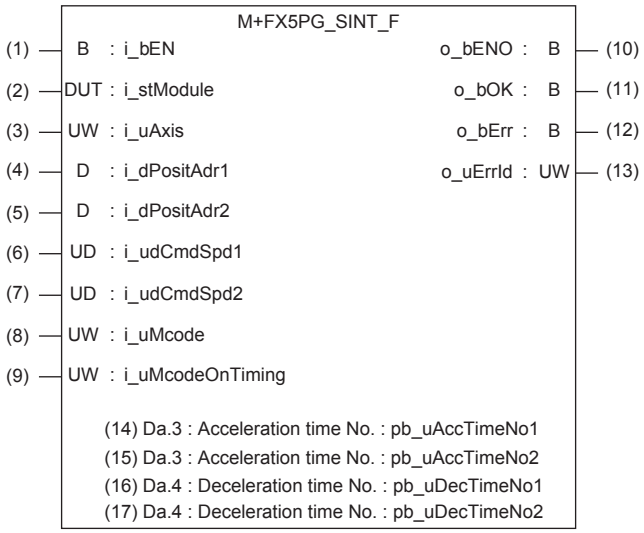
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1500, 1600	RW: Positioning start No. (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uPositioningStartNo_D	Word [Unsigned]/ Bit string [16-bit]	0	1 to 600 7000 to 7004 9001 to 9004	R/W	Set the start number for positioning. (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.
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.

2.10 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed))

FB Name

M+FX5PG_SINT_F

Overview

Item	Description
Function overview	Starts an interrupt fixed feeding.
Symbol	

Label

■Input label

No.	Variable name	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.	Variable name	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 0,1 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.
(7)	i_udCmdSpd2	Da.8: Command speed (axis 2)	Double word [Unsigned]/Bit string [32-bit]	■Pr.1: For the unit setting 0,1 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 repetitions, 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 code, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

*2 For the WITH mode and AFTER mode, MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).

■Output label

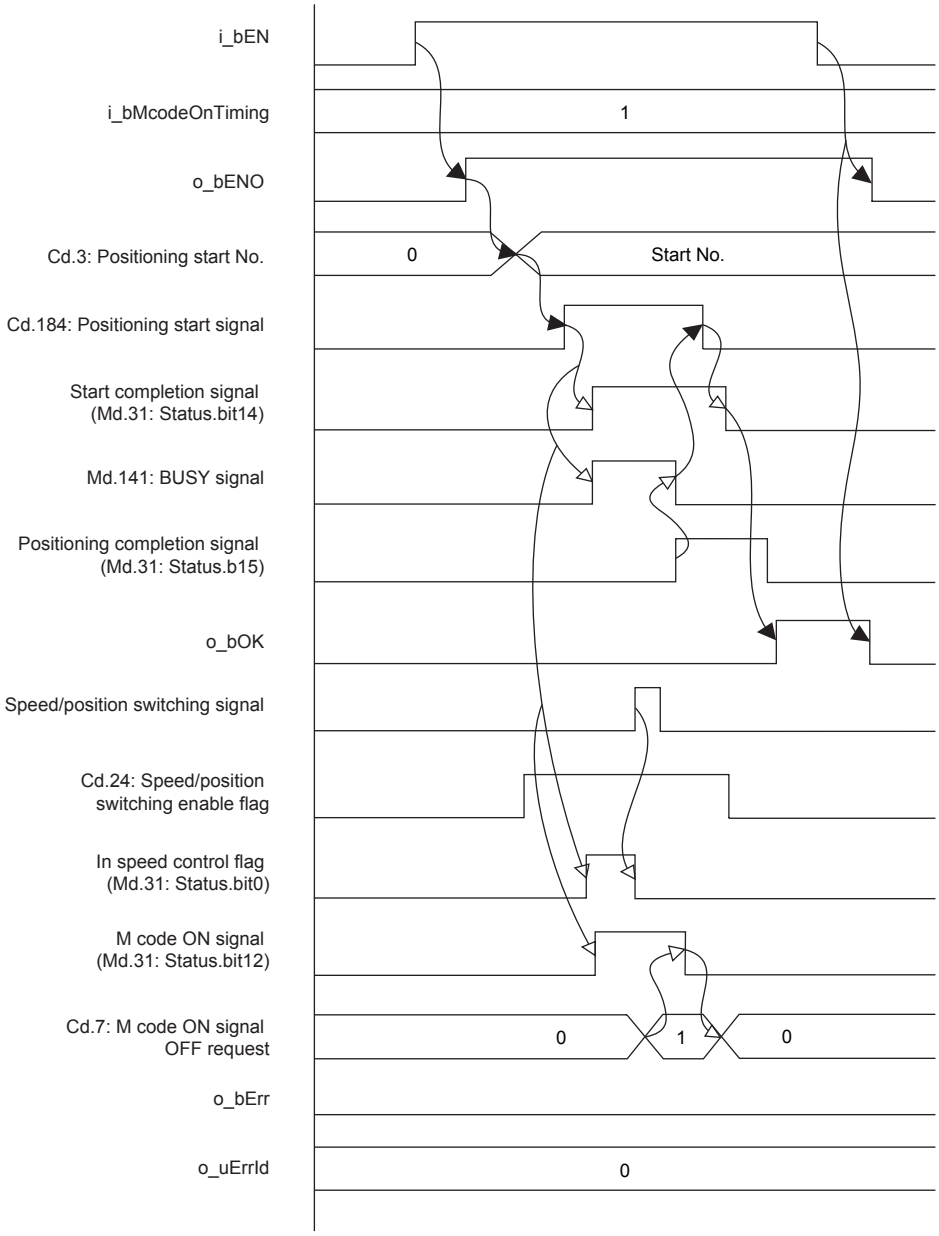
No.	Variable name	Name	Data type	Default Value	Description
(10)	o_bENO	Execution status	Bit	OFF	Output the FB execution status. ON: Executed OFF: Not executed
(11)	o_bOK	Normal completion	Bit	OFF	When this label is on, it indicates that the processing of the FB has been completed without error.
(12)	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.

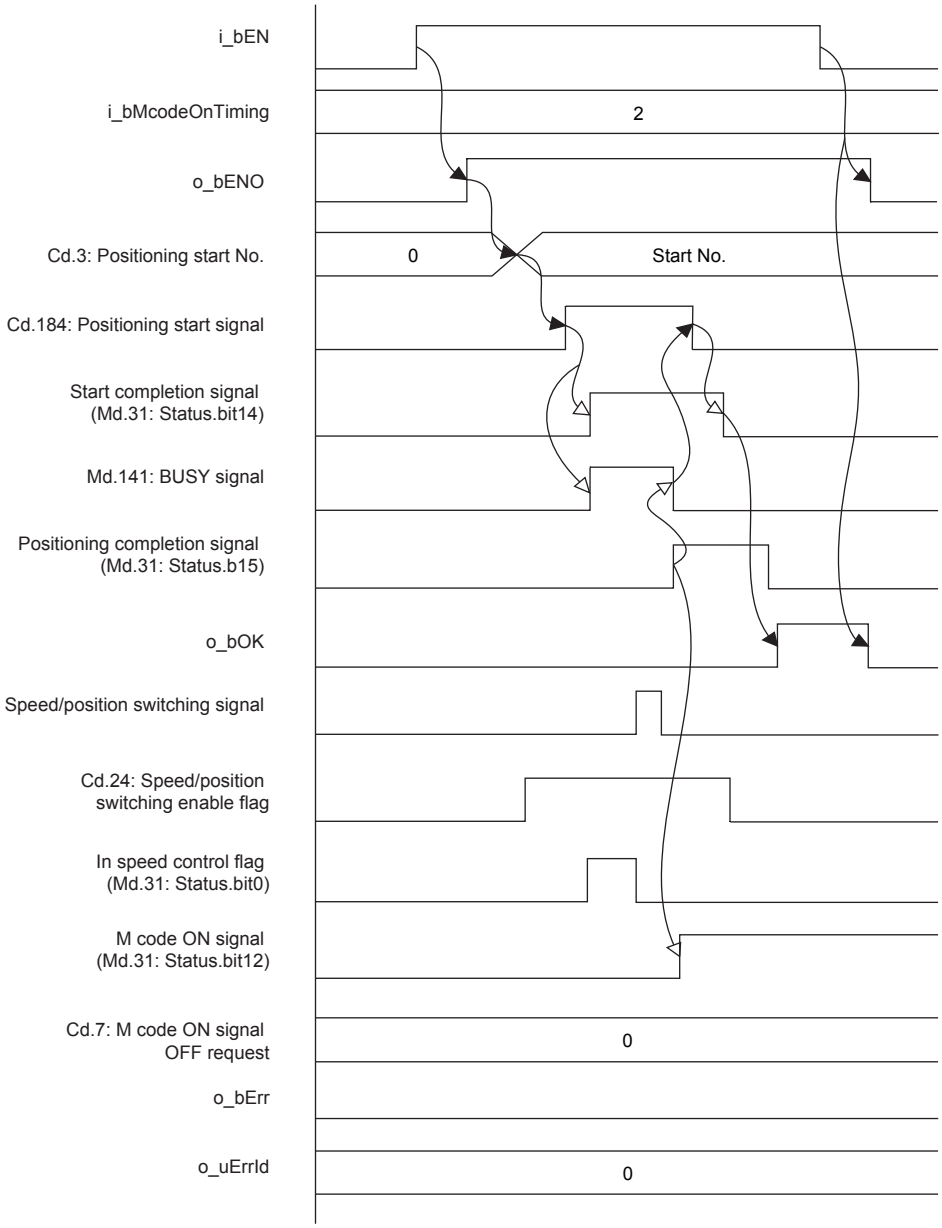
■Deceleration time

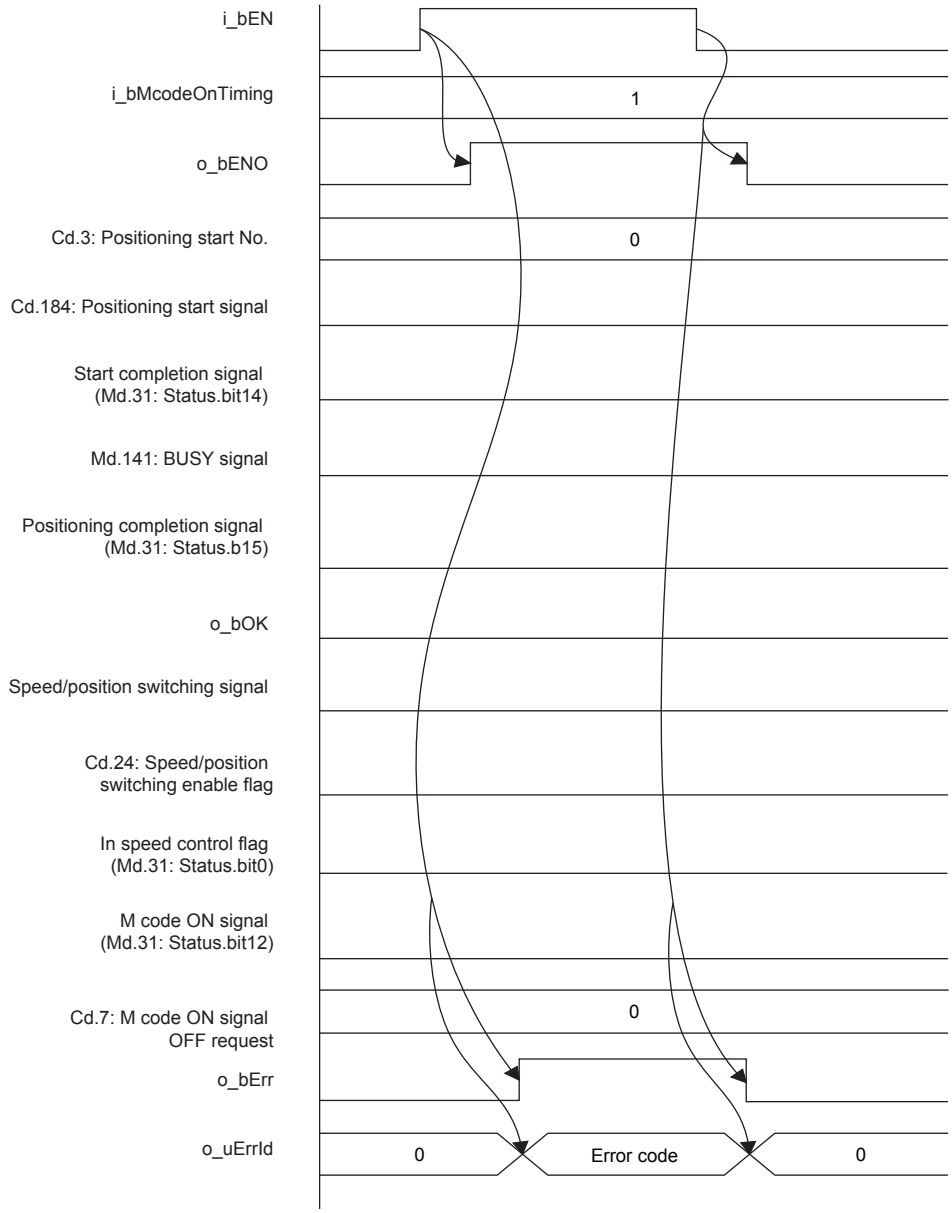
No.	Variable name	Name	Data type	Setting range	Description
(14)	pb_uAccTimeNo1	Da.3: Acceleration time No. (axis 1)	Word [Unsigned]/ Bit string [16-bit]	0: Acceleration time 0 1: Acceleration time 1 2: Acceleration time 2 3: Acceleration time 3	Set the Acceleration time within the range of 0 to 3 to 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.

Function Overview

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	1039 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.	
Function description	(1) 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 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, 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). Refer to ☞ Page 57 Error code for details. (2) 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. (3) 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. (4) The following signals are turned off when the positioning start signal ([Cd.184] Positioning start signal) is turned on and off. • 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 when turning off Start completion signal ([Md.31] Status: b14). (5) 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). Refer to ☞ Page 57 Error code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	[For normal completion] • When the output timing of the M code ON signal is the WITH mode 

Item	Description
Timing chart	• When the output timing of the M code ON signal is the AFTER mode 

Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) This FB sets "H06: Speed/position switching control (forward)" in ([Da.2] Control method). (2) 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. (3) This FB uses the global label: stGmRenewal[0..15] (4) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (5) This FB cannot be used in an interrupt program. (6) 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). (7) 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. (8) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (9) This FB requires the configuration of the ladder for every input label. (10)To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

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]/ Bit string [16-bit]	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. * If a value other than 0 or 2 is set, perform the operation in the INC mode regarding the set value as 0.

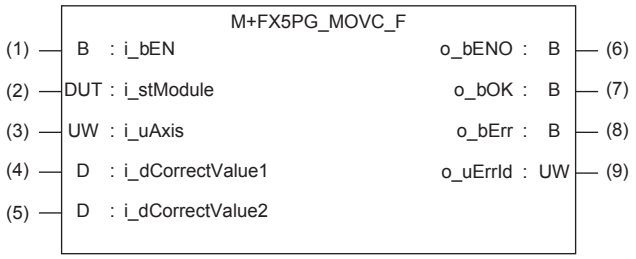
Buffer memory address	Name	Label name	Data type	Default Value	Setting range	R/W	Description
1566, 1666	RW: Speed/ position switching device selection (direct)	FX5PG_☐.stnAxisControlData_Axis_D[].uSpeedPositionSwitchingDeviceSelection_D	Word [Unsigned]/ Bit string [16-bit]	0	<Speed/position switching 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]/ Bit string [16-bit]	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	Enable or disable the external command signal [CHG].
62, 212	RW: External command function selection (direct)	FX5PG_☐.stnParameter_Axis_D[].uExternalCommandFunctionSelection_D	Word [Unsigned]/ Bit string [16-bit]	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]/ Bit string [16-bit]	0	0: Invalidate the external command. 1: Validate the external command.	R/W	Validate or invalidate the external command signal.

2.11 M+FX5PG_MOVC_F(Movement Amount Correction)

FB Name

M+FX5PG_MOVC_F

Overview

Item	Description
Function overview	Corrects the movement amount.
Symbol	

Label

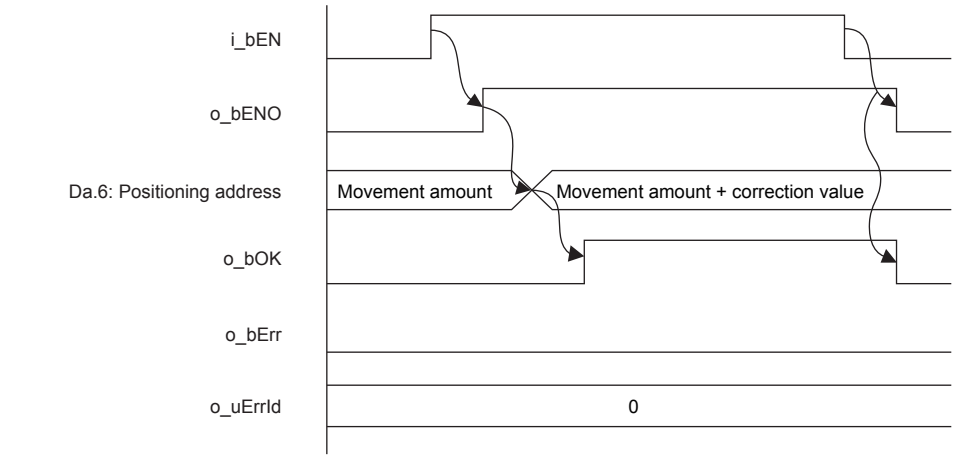
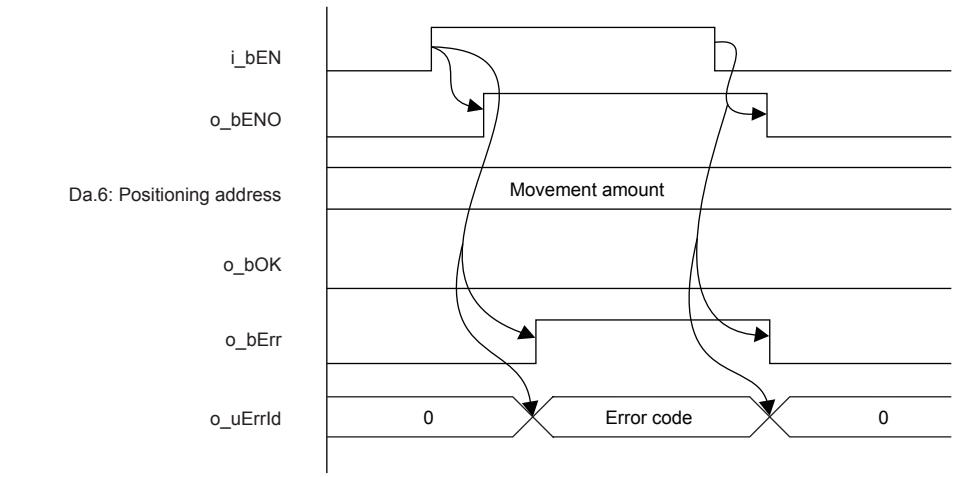
■Input label

No.	Variable name	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.	Variable name	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

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	313 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.	
Function description	(1) By turning on i_bEN (Execution command), the movement amount is corrected for the specified module. (2) The movement amount before the FB execution is not corrected. The movement amount after the FB execution is corrected for the FBs described in Restrictions and precautions 1). (3) 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. (4) 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). Refer to ☞ Page 61 Error code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (1 scan execution type)	
Timing chart	[For normal completion]  [For error completion]  	

Item	Description
Restrictions and precautions	(1) This FB does not correct the movement amount for the positioning control of FBs other than the following. ☞ Page 4 M+FX5PG_DRV_F (High-speed Positioning) ☞ Page 11 M+FX5PG_LIN_F(Linear Interpolation Positioning) ☞ Page 45 M+FX5PG_INT_F (Interrupt Stop (Ignoring Remaining Distance)) ☞ Page 51 M+FX5PG_SINT_F (Interrupt Fixed Feeding (First LevelSpeed)) (2) This FB uses the global label: stGmRenewal[0..15]. (3) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (4) This FB cannot be used in an interrupt program. (5) 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). (6) This FB requires the configuration of the ladder for every input label. (7) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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.

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

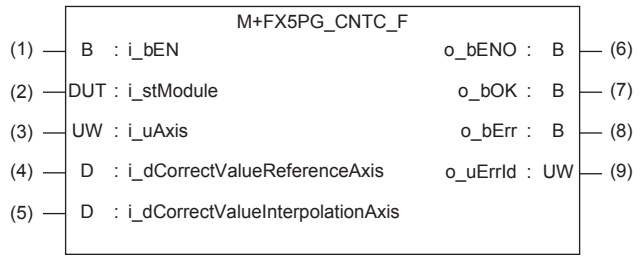
Please make sure to read user's manuals for the corresponding products before using the products.

2.12 M+FX5PG_CNTC_F(Center Position Correction)

FB Name

M+FX5PG_CNTC_F

Overview

Item	Description
Function overview	Corrects the center position.
Symbol	

Label

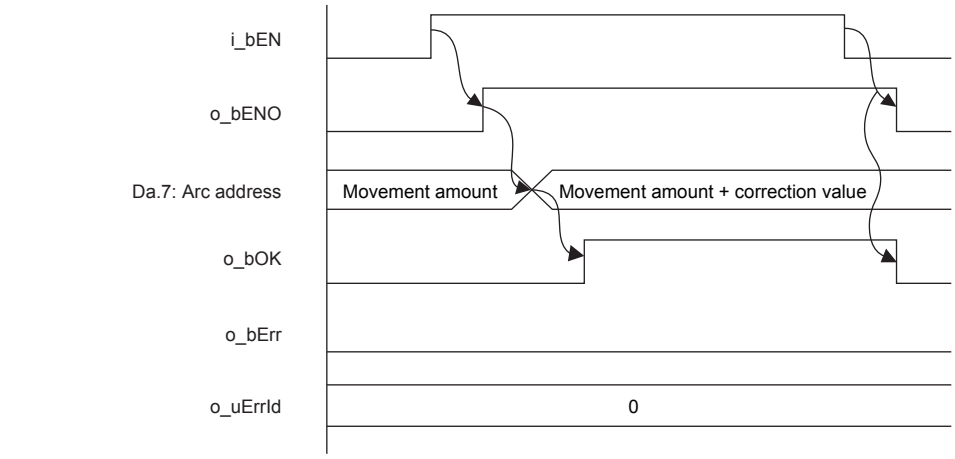
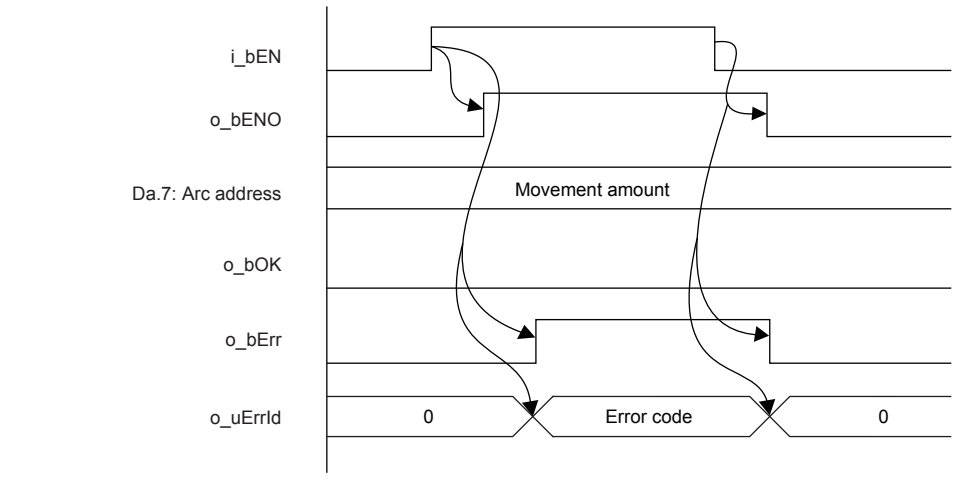
■Input label

No.	Variable name	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.	Variable name	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

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	313 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.	
Function description	(1) By turning on i_bEN (Execution command), the center position is corrected for the specified module. (2) The center position before the FB execution is not corrected. The center positions described in Page 17 M+FX5PG_CW_F (Circular Interpolation (Clockwise)) and Page 24 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise)) after the FB execution are corrected. (3) 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. (4) 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). Refer to Page 64 Error code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (1 scan execution type)	
Timing chart	[For normal completion]  [For error completion]  	

Item	Description
Restrictions and precautions	(1) This FB does not correct the center position for the positioning control of FBs other than the following. ☞ Page 17 M+FX5PG_CW_F (Circular Interpolation (Clockwise)) ☞ Page 24 M+FX5PG_CCW_F (Circular Interpolation (Counterclockwise)) (2) This FB uses the global label: stGmRenewal[0..15]. (3) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (4) This FB cannot be used in an interrupt program. (5) 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). (6) This FB requires the configuration of the ladder for every input label. (7) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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.

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

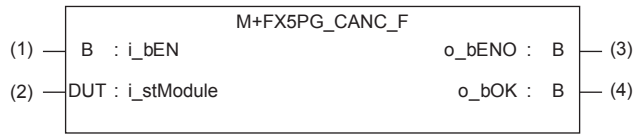
Please make sure to read user's manuals for the corresponding products before using the products.

2.13 M+FX5PG_CANC_F(Correction Cancel)

FB Name

M+FX5PG_CANC_F

Overview

Item	Description
Function overview	Cancels the movement amount correction.
Symbol	

Label

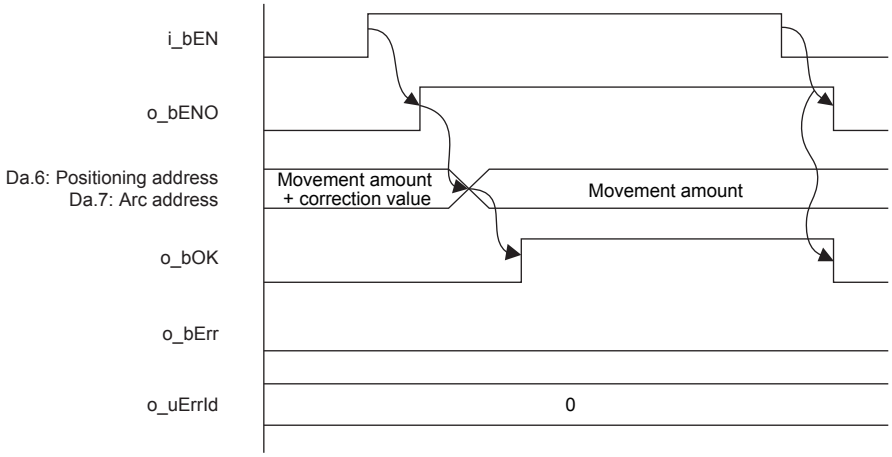
■Input label

No.	Variable name	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.	Variable name	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

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic steps	281 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.	
Function description	(1) By turning on i_bEN (Execution command), the movement amount correction and center position correction are canceled for the specified module.	
Compiling method	Macro type	
FB operation type	Pulsed execution (1 scan execution type)	
Timing chart	[For normal completion] 	
Restrictions and precautions	(1) This FB uses the global label: stGmRenewal[0..15]. (2) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (3) This FB cannot be used in an interrupt program. (4) 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). (5) This FB requires the configuration of the ladder for every input label. (6) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).	
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual	

Error code

Error code (Hexadecimal)	Description	Action
None	None	None

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

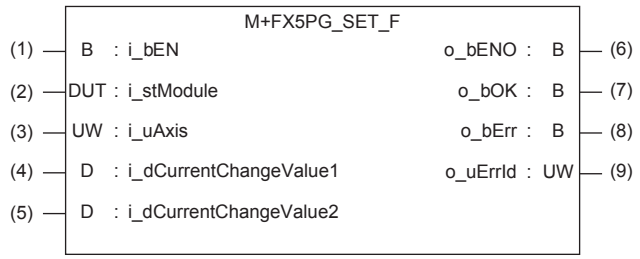
Please make sure to read user's manuals for the corresponding products before using the products.

2.14 M+FX5PG_SET_F(Current Value Change)

FB Name

M+FX5PG_SET_F

Overview

Item	Description
Function overview	Changes the current value.
Symbol	

Label

■Input label

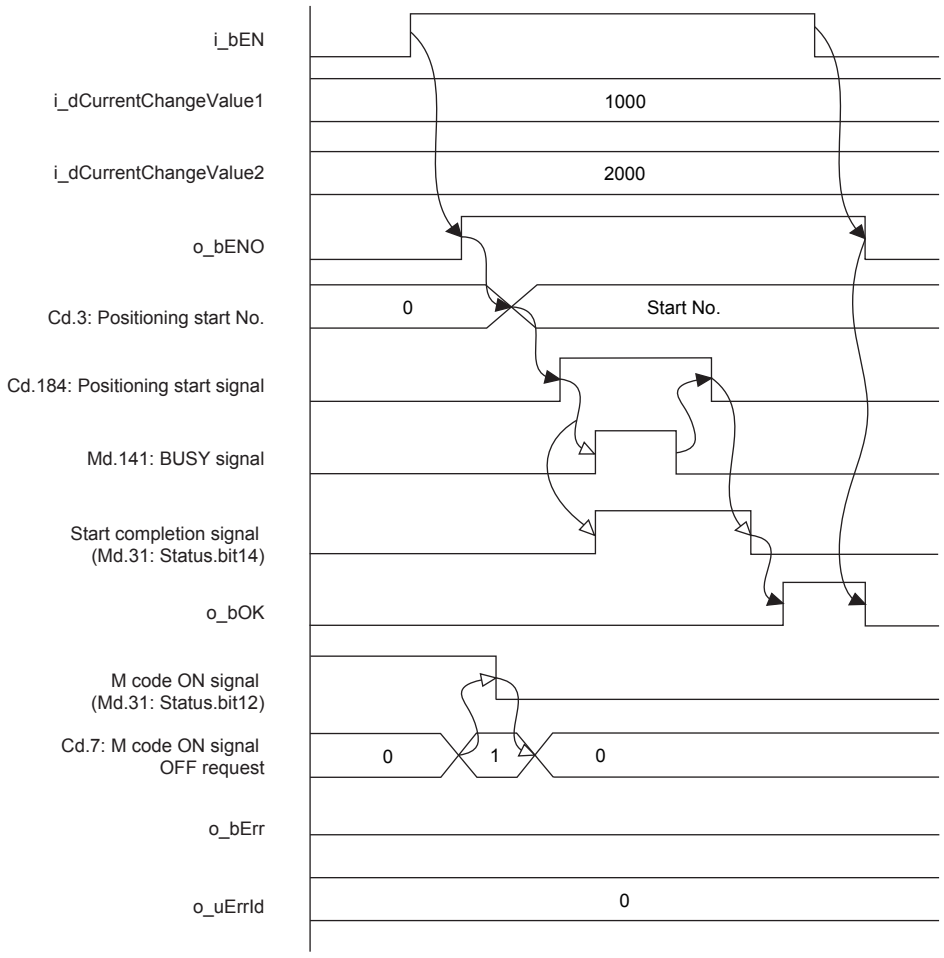
No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label for the positioning module.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

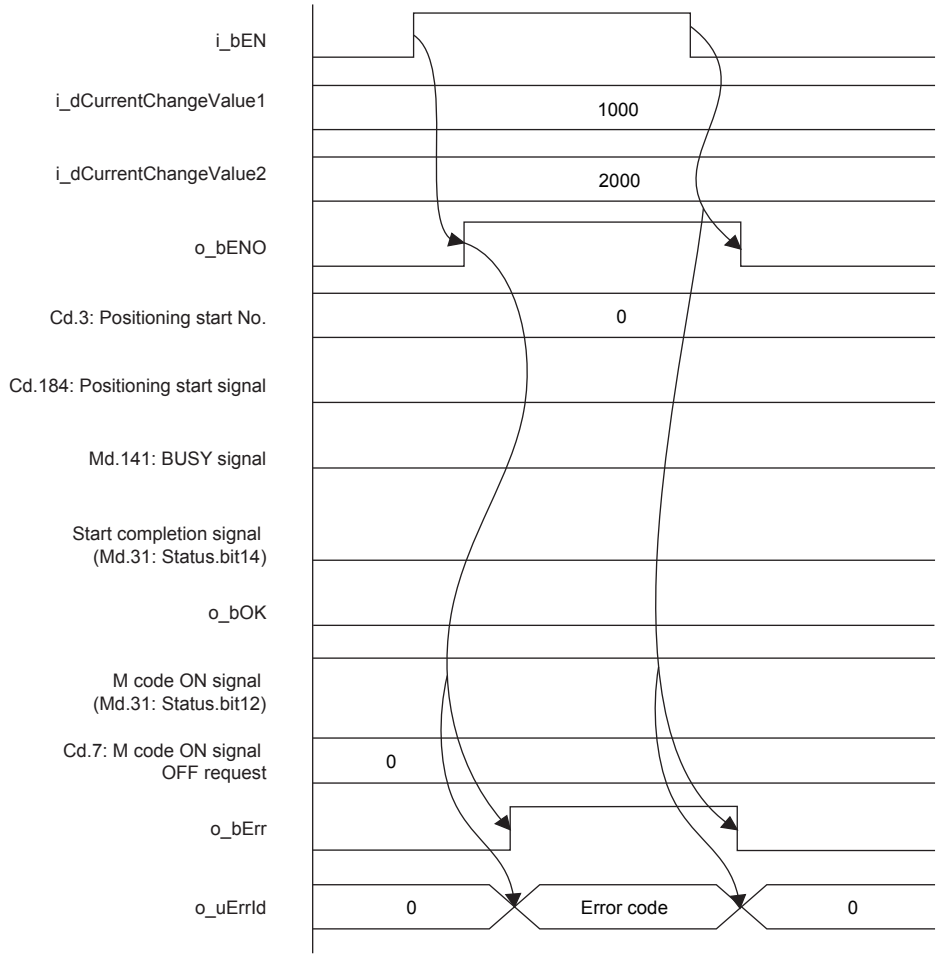
■Output label

No.	Variable name	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

Item	Description	
Applicable hardware and software	Target module	FX5-20PG-P
	Target CPU	FX5U CPU, FX5UC CPU
	Target engineering tool	GX Works3 Version 1.045X or later
Programming language	Ladder	
Number of basic 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.	
Function description	(1) 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 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 they are not satisfied, 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). Refer to ☞ Page 71 Error code. (2) 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. (3) 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. (4) 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). Refer to ☞ Page 71 Error code for details.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[For normal completion]	



Item	Description
Timing chart	[For error completion] 
Restrictions and precautions	(1) This FB sets "No. 9003 (Current value change)" in [Cd.3] Positioning start No. (2) 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. (3) This FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. (4) This FB cannot be used in an interrupt program. (5) 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). (6) 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. (7) When two or more of these FBs are used, precaution must be taken to avoid duplication of the target axis. (8) This FB requires the configuration of the ladder for every input label. (9) To operate the FX5-20PG, set the pulse output mode, external I/O signal logic, and others according to the device or system to be connected. Set the module parameters of GX Works3 according to the application. For the module parameter setting method, refer to MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module).
Relevant manual	• MELSEC iQ-F FX5U User's Manual (Hardware) • MELSEC iQ-F FX5UC User's Manual (Hardware) • MELSEC iQ-F FX5 User's Manual (Application) • MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module) • MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) • GX Works3 Operating Manual

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

FB Version Upgrade History

Version	Date	Description
00A	2018/4	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

Please make sure to read user's manuals for the corresponding products before using the products.

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	-2147483648 to 2147483647	R	The address currently being commanded is stored.

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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

Japanese manual number: SH-081988-A

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