MITSUBISHI ELECTRIC

PROGRAMMABLE CONTROLLERS

MELSEC iQ-F series

MELSEC iQ-F
FX5 CPU Module Function Block Reference

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1 FUNCTION BLOCK (FB) LIST

This chapter lists the FBs for the MELSEC iQ-F series FX5U, FX5UC CPU module.

Input/Output FB

Name[1]	Description
M+FX5UCPU-IO_OutputOnTimes	This FB counts (cumulatively) the number of ON times of the specified relay device number within the range from 0 to 4,294,967,295.
M+FX5UCPU-IO_CompareRelayOnTimes	• This FB counts (cumulatively) the number of ON times of the specified relay device number within the range from 0 to 4,294,967,295. • This FB compares the counted number of ON times with the set value, and outputs the comparison result.

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

Positioning FB

Name[1]	Description
M+FX5UCPU-Positioning_ABRST	This FB reads the absolute position (ABS) data from the servo amplifier, and writes the read value to the current address (pulse unit) of the target axis.

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

Serial Communication FB

Name[1]	Description
M+FX5UCPU-SerialComm_InputOutput	This FB stores the received data and sends the specified number of data points using non-protocol in serial communication.
M+FX5UCPU-SerialComm_Input	This FB stores the data received using non-protocol in serial communication.
M+FX5UCPU-SerialComm_Output	This FB sends the specified number of data points using non-protocol in serial communication.
M+FX5UCPU-SerialComm_ExeCommonProtocol	This FB executes the protocol registered with GX Works3.

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

Precautions

If upgrading module FB versions updates instructions, adds a new instruction, or adds a new device, please use the GX Works3 corresponding to the latest module FB.
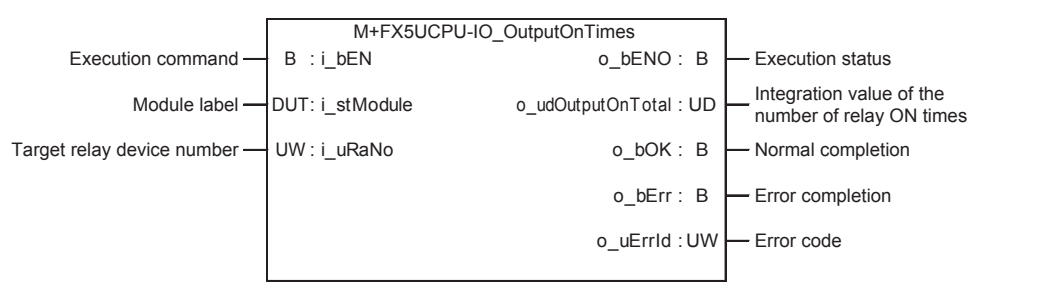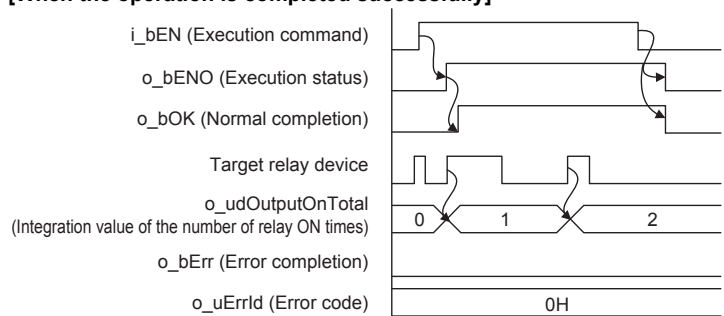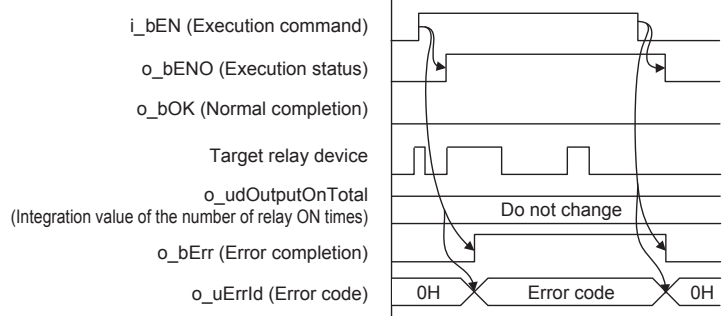
MEMO

2 INPUT/OUTPUT FB

2.1 M+FX5UCPU-IO_OutputOnTimes

Name

M+FX5UCPU-IO_OutputOnTimes

FB details

Item	Description
Overview	This FB counts (cumulatively) the number of ON times of the specified relay device number within the range from 0 to 4,294,967,295.
Symbol	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram
Number of basic steps	102 steps The number of steps of the FB in a program depends on the CPU model used and input and output definition.
Processing	• This FB starts counting when i_bEN (Execution command) turns ON. • If the setting value of i_uRaNo (Target relay device number) is out of the setting range, o_bErr (Error completion) turns ON and the processing of this FB is aborted. o_uErrId (Error code) stores the error code "100 (hexadecimal)".
FB compilation method	Macro type
FB operation	Always executed
Timing chart of I/O signals	**[When the operation is completed successfully]** **[When the operation is completed with an error]** **(When the target relay device number is outside the setting range)**

Item	Description
Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • This FB cannot be used in an interrupt program. • Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command). • When this FB is used twice or more, precaution must be taken to avoid duplication of the relay device number. • This FB uses the index register Z9. When using an interrupt program, do not use this index register in the interrupt program. • Every input must be provided with a value for proper FB operation. • When clearing current value of o_udOutputOnTotal (Integration value of No. of relay ON times), write K0 to "Instance name .o_udOutputOnTotal (Integration value of No. of relay ON times)" by DMOV instruction. • Because the target relay device is counted in ladder, the FB cannot count correctly if the target relay device is turned ON and OFF twice or more in 1 scan. • This FB uses latch labels. If the latch label area capacity is insufficient for the contents of the program, a message is displayed in GX Works3 when the program is compiled. In such a case, correct the program in accordance with the contents of the message. • Set the module parameters in GX Works3 in accordance with the connected equipment and system. For the module parameters, refer to the 📖MELSEC iQ-F FX5 User's Manual (Application).

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uRaNo (target relay device number) is out of the range. The target relay device number is not within the range of 0 to the value in Y device size.	Try again after checking the setting.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	The setting range differs depending on the module label.	Specify the module label of the CPU module.
Target relay device number)	i_uRaNo	Word [Unsigned]	0 to the value in Y device size[*1]	Specify the relay device number for counting the number of ON times. For example, specify "10 (octal)[*2]" to specify the output Y010.

*1 The set value of SD262 and SD263 (32 bit) shall be the upper limit.
*2 In GX Works3, program with 8#10.

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
Integration value of number of relay ON times	o_udOutputOnTotal	Double Word [Unsigned]	0	Stores the counted integration value of the number of times the specified relay device number has turned ON.[*1]
Normal completion	o_bOK	Bit	OFF	When this label is ON, it indicates that the FB is counting the relay ON times.
Error completion	o_bErr	Bit	OFF	When this label is ON, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code that occurred in the FB.

*1 Note that if o_udOutputOnTotal (Integration value of number of relay ON times) exceeds "4,294,967,295", the integration value returns to 0.
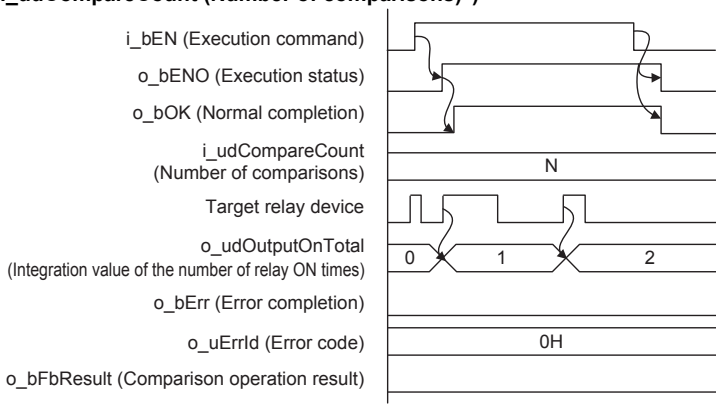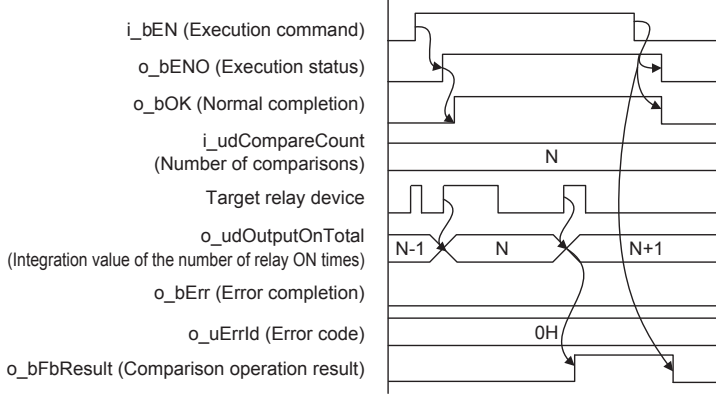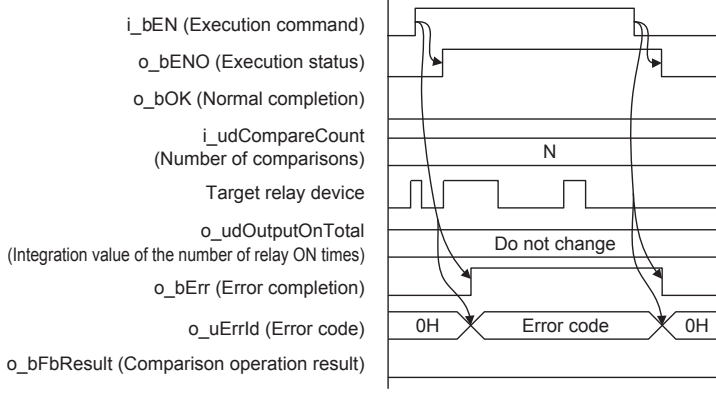
2.2 M+FX5UCPU-IO_CompareRelayOnTimes

Name

M+FX5UCPU-IO_CompareRelayOnTimes

FB details

Item	Description	
Overview	• This FB counts (cumulatively) the number of ON times of the specified relay device number within the range from 0 to 4,294,967,295. • This FB compares the counted number of ON times with the set value, and outputs the comparison result.	
Symbol	<table><tr><td colspan="3" align="center">M+FX5UCPU-IO_CompareRelayOnTimes</td></tr><tr><td>Execution command —</td><td>B : i_bEN</td><td>o_bENO : B</td><td>— Execution status</td></tr><tr><td>Module label —</td><td>DUT: i_stModule</td><td>o_udOutputOnTotal : UD</td><td>— Integration value of the number of relay ON times</td></tr><tr><td>Target relay device number —</td><td>UW : i_uRaNo</td><td>o_bOK : B</td><td>— Normal completion</td></tr><tr><td>Number of comparisons —</td><td>UD : i_udCompareCount</td><td>o_bErr : B</td><td>— Error completion</td></tr><tr><td></td><td></td><td>o_uErrId : UW</td><td>— Error code</td></tr><tr><td></td><td></td><td>o_bFbResult : B</td><td>— Comparison operation result</td></tr></table>	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram	
Number of basic steps	118 steps The number of steps of the FB in a program depends on the CPU model used and input and output definition.	
Processing	• This FB outputs the integration value of the number of output ON times of the relay specified by i_uRaNo (Target relay device number) in the module specified by i_stModule (Module label) to o_udOutputOnTotal (Integration value of number of relay ON times) when i_bEN (Execution command) turns ON. • If o_udOutputOnTotal (Integration value of number of relay ON times) exceeds the value set by i_udCompareCount (Number of comparisons), o_bFbResult (Comparison operation result) turns ON. • If the setting value of i_uRaNo (Target relay device number) is out of the setting range, o_bErr (Error completion) turns ON and the processing of this FB is interrupted. o_uErrId (Error code) stores the error code "100 (hexadecimal)".	
FB compilation method	Macro type	
FB operation	Always executed	

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]** **(In the case of "o_udOutputOnTotal (Integration value of number of relay ON times) ≤ i_udCompareCount (Number of comparisons)")** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) i_udCompareCount (Number of comparisons) — N Target relay device o_udOutputOnTotal (Integration value of the number of relay ON times) — 0, 1, 2 o_bErr (Error completion) o_uErrId (Error code) — 0H o_bFbResult (Comparison operation result) **[When the operation is completed successfully]** **(In the case of "o_udOutputOnTotal (Integration value of number of relay ON times) > i_udCompareCount (Number of comparisons)")** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) i_udCompareCount (Number of comparisons) — N Target relay device o_udOutputOnTotal (Integration value of the number of relay ON times) — N-1, N, N+1 o_bErr (Error completion) o_uErrId (Error code) — 0H o_bFbResult (Comparison operation result) **[When the operation is completed with an error]** **(When the target relay device number is outside the setting range)** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) i_udCompareCount (Number of comparisons) — N Target relay device o_udOutputOnTotal (Integration value of the number of relay ON times) — Do not change o_bErr (Error completion) o_uErrId (Error code) — 0H, Error code, 0H o_bFbResult (Comparison operation result)

Item	Description
Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • This FB cannot be used in an interrupt program. • Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command). • When this FB is used twice or more, precaution must be taken to avoid duplication of the relay device number. • This FB uses the index register Z9. When using an interrupt program, do not use this index register in the interrupt program. • Every input must be provided with a value for proper FB operation. • When clearing current value of o_udOutputOnTotal (Integration value of No. of relay ON times), write K0 to "Instance name .o_udOutputOnTotal (Integration value of No. of relay ON times)" by DMOV instruction. • Because the target relay device is counted in the ladder, normal counting is disabled if the target relay device is turned ON and OFF twice or more in 1 scan. • This FB uses the latch label. If the latch label area capacity is insufficient for the contents of the program, a message is displayed in GX Works3 while the program is converted. In such a case, correct the program in accordance with the contents of the message. • Set the module parameters in GX Works3 in accordance with the connected equipment and system. For the module parameters, refer to the 📖MELSEC iQ-F FX5 User's Manual (Application).

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uRaNo (Target relay device number) is out of the range. The target relay device number is not within the range of 0 to the value in Y device size.	Try again after checking the setting.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	The setting range differs depending on the module label.	Specify the module label of the CPU module.
Target relay device number)	i_uRaNo	Word [Unsigned]	0 to the value in Y device size[*1]	Specify the relay device number for counting the ON times. For example, specify "10 (octal)[*2]" for specifying the output Y010.
Number of comparisons	i_udCompareCount	Double Word [Unsigned]	0 to 4,294,967,295[*3*4]	Set the value to be compared with the integration value of the number of relay ON times.

*1 The set value of SD262 and SD263 (32 bit) shall be the upper limit.

*2 In GX Works3, program with 8#10.

*3 Setting method

1 to 2,147,483,647: Set a desired value in decimal.

2,147,483,648 to 4,294,967,295: Set a desired value converted into hexadecimal.

*4 Refer to "Product life of relay output contacts" in the following manual and specify a contact switching life suitable for the usage environment including switching current.

📖MELSEC iQ-F FX5U User's Manual (Hardware).

📖MELSEC iQ-F FX5UC User's Manual (Hardware).

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
Integration value of number of relay ON times	o_udOutputOnTotal	Double Word [Unsigned]	0	Stores the counted integration value of the number of times the specified relay device number has turned ON.[*1]
Normal completion	o_bOK	Bit	OFF	When this label is ON, it indicates that the FB is counting the relay ON times.
Error completion	o_bErr	Bit	OFF	When this label is ON, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code that occurred in the FB.
Comparison operation result	o_bFbResult	Bit	OFF[*1]	When this label is ON, it indicates that o_udOutputOnTotal (Integration value of number of relay ON times) is larger than i_udCompareCount (Number of comparisons).

*1   Note that if o_udOutputOnTotal (Integration value of number of relay ON times) exceeds "4,294,967,295", the integration value returns to 0, and o_bFbResult (Comparison operation result) turns ON→OFF.
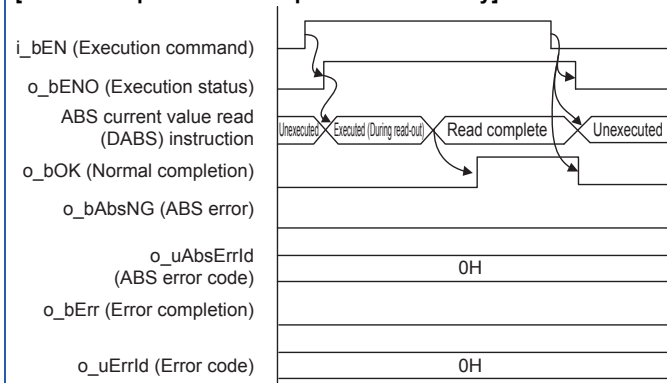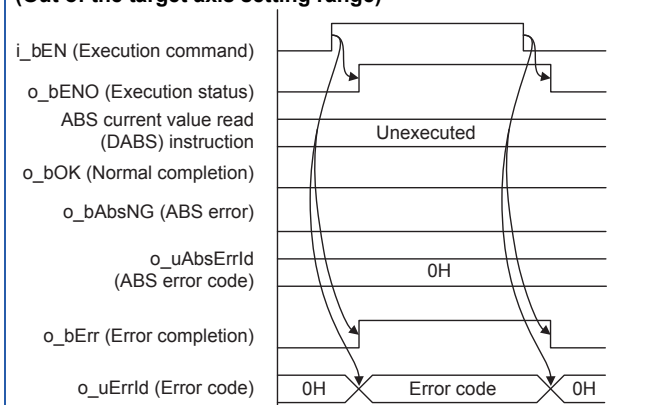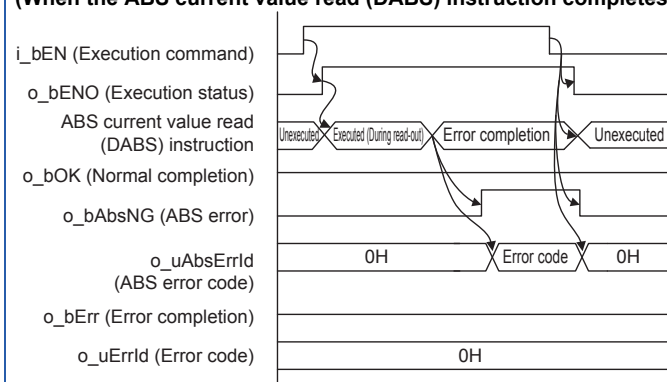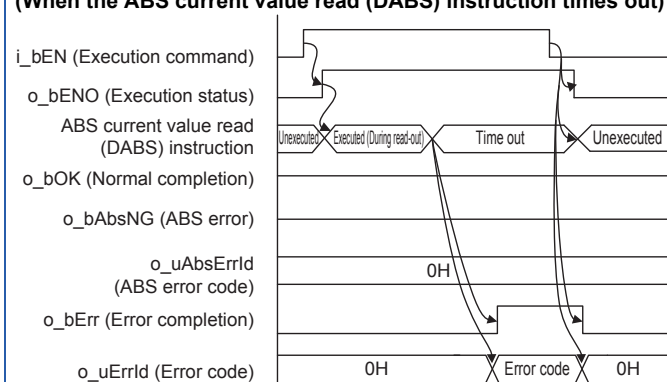
3 POSITIONING FB

3.1 M+FX5UCPU-Positioning_ABRST

Name

M+FX5UCPU-Positioning_ABRST

FB details

Item	Description
Overview	This FB reads the absolute position (ABS) data from the servo amplifier, and writes the read value to the current address (pulse unit) of the target axis.
Symbol	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram
Number of basic steps	240 steps The number of steps of the FB in a program depends on the CPU model used, input and output definition, and the option settings of GX Works3.[1]
Processing	• By turning on i_bEN (Execution command), the absolute position is restored. • When the absolute position restoration (ABS current value read) is completed with an error, o_bAbsNG (ABS error) turns ON and an error code is stored in o_uAbsErrId (ABS error code). For the error codes, refer to 📖MELSEC iQ-F FX5 User's Manual (Positioning Control). • If the set value of the target axis is outside the setting range, o_bErr (Error completion) turns ON and the processing of this FB is interrupted. In addition, the error code 100 (hexadecimal) is stored in o_uErrId (Error code). For the error code, refer to the list of error codes. • If absolute position restoration (ABS current value read) is not completed in 6 seconds, o_bErr (Error completion) turns ON and the processing of this FB is aborted. In addition, the error code 200 (hexadecimal) is stored in o_uErrId (Error code). For error codes, refer to the list of error codes.
FB compilation method	Macro type
FB operation	Always executed

The symbol block shows:

M+FX5UCPU-Positioning_ABRST

Input		Output
Execution command — B : i_bEN		o_bENO : B — Execution status
Module label — DUT : i_stModule		o_bOK : B — Normal completion
Target axis — UW : i_uAxis		o_bServoON : B — Servo ON signal
ABS data bit 0 — B : i_bAbsBit0		o_bAbsTrMode : B — ABS transmission mode
ABS data bit1 — B : i_bAbsBit1		o_bAbsReq : B — ABS request flag
Transmission data ready — B : i_bTrDataComp		o_bAbsNG : B — ABS error
		o_uAbsErrId : UW — ABS error code
		o_bErr : B — Error completion
		o_uErrId : UW — Error code

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]** i_bEN (Execution command) o_bENO (Execution status) ABS current value read (DABS) instruction — Unexecuted / Executed (During read-out) / Read complete / Unexecuted o_bOK (Normal completion) o_bAbsNG (ABS error) o_uAbsErrId (ABS error code) — 0H o_bErr (Error completion) o_uErrId (Error code) — 0H **[When the operation is completed with an error]** **(Out of the target axis setting range)** i_bEN (Execution command) o_bENO (Execution status) ABS current value read (DABS) instruction — Unexecuted o_bOK (Normal completion) o_bAbsNG (ABS error) o_uAbsErrId (ABS error code) — 0H o_bErr (Error completion) o_uErrId (Error code) — 0H / Error code / 0H **[When the operation is completed with an error]** **(When the ABS current value read (DABS) instruction completes with an error)** i_bEN (Execution command) o_bENO (Execution status) ABS current value read (DABS) instruction — Unexecuted / Executed (During read-out) / Error completion / Unexecuted o_bOK (Normal completion) o_bAbsNG (ABS error) o_uAbsErrId (ABS error code) — 0H / Error code / 0H o_bErr (Error completion) o_uErrId (Error code) — 0H **[When the operation is completed with an error]** **(When the ABS current value read (DABS) instruction times out)** i_bEN (Execution command) o_bENO (Execution status) ABS current value read (DABS) instruction — Unexecuted / Executed (During read-out) / Time out / Unexecuted o_bOK (Normal completion) o_bAbsNG (ABS error) o_uAbsErrId (ABS error code) — 0H o_bErr (Error completion) o_uErrId (Error code) — 0H / Error code / 0H

3

Item	Description
Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • This FB uses the ABS current value read (DABS) instruction. Executing this instruction 17 or more times at the same time will cause an error. • When using an interrupt program, use the DI/EI instruction before and after executing this FB so that this FB is executed in the interrupt disabled status. • This FB cannot be used in interrupt programs. • Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command). • When this FB is used twice or more, precaution must be taken to avoid duplication of the target axis. • Every input must be provided with a value for proper FB operation. • When this FB is used, i_bEN (Execution command) must remain ON even after absolute position restoration (ABS current value reading) is completed. • Do not turn OFF i_bEN (Execution command) during absolute position restoration (ABS current value reading). If i_bEN (Execution command) is turned OFF before absolute position restoration (ABS current value read) is completed, reset the CPU module and servo amplifier, and then turn OFF and ON i_bEN (Execution command) again. • The number of available axes varies depending on the setting of the pulse output mode. Select a proper axis in accordance with the system. • When the servo ON signal is required in the first zero point detection, create a program that sets and resets the output connected to the servo ON signal (o_ServoON) of this FB. • Set the pulse output mode, external I/O signal logic, etc. in accordance with the connected equipment and system. Set the module parameters in GX Works3 in accordance with the application. For the module parameter setting method, refer to the 📖MELSEC iQ-F FX5 User's Manual (Positioning Control).

*1 In GX Works3 Version 1.015R or later, the number of basic steps may vary greatly depending on the option settings (Convert) of GX Works3.

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uAxis (Target axis) is outside the setting range. The target axis is set to a value outside the range from 1 to 4.	Try again after checking the setting.
200H	Absolute position restoration (ABS current value read) was not completed in 6 seconds (timeout).	Review the system configuration, servo amplifier parameters and wiring, and then execute the FB again.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	The setting range differs depending on the module label.	Specify the module label of the CPU module.
Target axis	i_uAxis	Word [Unsigned]	1 to 4	Specify the axis number.
ABS data bit 0	i_bAbsBit0	Bit	ON, OFF	The lower bit of the data received from the servo amplifier.
ABS data bit 1	i_bAbsBit1	Bit	ON, OFF	The upper bit of the data received from the servo amplifier.
ABS transmission data ready	i_bTrDataComp	Bit	ON: Ready OFF: In preparation	The ready signal from the servo amplifier.

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is on. OFF: The execution command is off.
Normal completion	o_bOK	Bit	OFF	When this label is ON, it indicates that absolute position restoration (ABS current value read) is completed.
Servo ON signal	o_bServoON	Bit	OFF	Servo ON signal is on while this label is on.
ABS transmission mode	o_bAbsTrMode	Bit	OFF	The servo amplifier is in the ABS transmission mode while this label is on.
ABS request flag	o_bAbsReq	Bit	OFF	The ABS data is requested while this label is on.
ABS error	o_bAbsNG	Bit	OFF	When this label is on, it indicates that the absolute position restoration has been completed with an error.
ABS error code	o_uAbsErrId	Word [Unsigned]	0	Stores the error code of the ABS current value read (DABS) instruction.
Error completion	o_bErr	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code that occurred in the FB.

Version upgrade history

Version	Date	Description
00A	January 2015	First edition
01A	July 2015	Some of the label names and data type for the module label used in the FB program were changed.[1]

*1 The label name for the following module label and data type used in the FB program were changed. As needed, delete the module label (structured data types) used in the GX Works3 project, and add (import) it again, and then replace with the latest version of the FB in the program. (Does not replace automatically.)

		Before the change	After the change
Positioning current address (user unit)	Label name	udCurrentAddressU	dCurrentAddressU
	Data type	Double Word [Unsigned]	Double Word [Signed]
Positioning current address (pulse unit)	Label name	udCurrentAddressP	dCurrentAddressP
	Data type	Double Word [Unsigned]	Double Word [Signed]
Positioning zero-point address	Label name	udZeroPointAddress	dZeroPointAddress
	Data type	Double Word [Unsigned]	Double Word [Signed]

4 SERIAL COMMUNICATION FB

4.1 M+FX5UCPU-SerialComm_InputOutput

Name

M+FX5UCPU-SerialComm_InputOutput

FB details

Item	Description
Overview	This FB sends the specified number of data points using the non-protocol in serial communication.
Symbol	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram
Number of basic steps	713 steps The number of steps of the FB in a program depends on the CPU model used, input and output definition, and the option settings of GX Works3.[*1]
Processing	• When i_bEN (Execution command) turns ON, serial data transfer goes into sending/receiving standby state. • In data sending standby state, this FB sends the send data specified by i_uSendData (Send data storage device) and i_uSendDataLength (Number of send data points) using non-protocol triggered by the serial data transfer (RS2) instruction when i_bSendReq (Sending request) turns ON. When sending is completed, o_bSendComp (Sending complete) turns ON. • In data receiving standby state, when the FB receives the data, the FB writes the number of the received data to o_uRecvDataLength (Number of receive data points), writes the received data to o_uRecvData (Receive data storage device) and then o_bRecvComp (Receiving complete) turns ON. • This FB checks the following input values when started up. If an error occurs, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the error code. 　(1) Send/receive channel number 　(2) Allowable number of receive data points 　(3) Number of send data points (Only when sending request) • If an error occurs during data communication processing, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the serial communication error code. For error codes, refer to the list of error codes. When pb_bSerialComErrUndetection (Serial communication error undetection mode) is turned ON by a user program, this FB does not detect serial communication error. Detect serial communication error by a user program. • When data receiving is suspended and the time-out time elapses, time-out occurs, and then o_bRecvComp (Receiving complete) turns ON.
FB compilation method	Macro type
FB operation	Always executed

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]** **<ch1 example>** i_bEN (Execution command) o_bENO (Execution status) i_bSendReq (Send request) SM8561 (ch1 send request) Serial data transfer o_bSendComp (Send completion) SM8562 (ch1 receive completion) o_bRecvComp (Receive completion) o_bErr (Error completion) o_uErrId (Error code) Turns OFF after 1 scan time Sending Receiving *1 0H *1 Sending complete turns OFF when the next sending request is sent. **[When the operation is completed with an error]** **FB error (When the send/receive channel number is outside the setting range)** i_bEN (Execution command) o_bENO (Execution status) i_bSendReq (Send request) o_bSendComp (Send completion) o_bRecvComp (Receive completion) o_bErr (Error completion) o_uErrId (Error code) 0H Error code **[When the operation is completed with an error]** **Module error (Serial communication sending error) <ch1 example>** i_bEN (Execution command) o_bENO (Execution status) i_bSendReq (Send request) SM8561 (ch1 send completion) Serial data transfer SM8500 (ch1 communication error) o_bErr (Error completion) o_uErrId (Error code) Sending 0H Error code **[When the operation is completed with an error]** **Module error (Serial communication receiving error) <ch1 example>** i_bEN (Execution command) o_bENO (Execution status) o_bRecvComp (Receive completion) Serial data transfer SM8500 (ch1 communication error) o_bErr (Error completion) o_uErrId (Error code) Receiving 0H Error code

4

Item	Description
Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • This FB cannot be used in an interrupt program. • This FB uses the serial communication (RS2) instruction. • Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command). • When switching the "M+FX5UCPU-SerialComm_InputOutput" FB (this FB), "M+FX5UCPU-SerialComm_Input" FB, "M+FX5UCPU-SerialComm_Output" FB, and RS2 instruction using the same communication channel, turn OFF unused target FBs and RS2 instruction for at least 1 scan. • This FB uses the index register Z9. When using an interrupt program, do not use this index register in the interrupt program. • When using an interrupt program, use the DI/EI instruction before and after executing this FB so that this FB is executed in the interrupt disabled status. If executing this FB in the interrupt enabled status, a self-diagnosis error that occurs in an interrupt program is detected as an error that occurred in the FB. • When keeping the sending/receiving standby state of serial data using this FB, it is necessary to let i_bEN (Execution command) remain ON even after sending and receiving are completed. • Turn off i_bEN (Execution command) after o_bOK (Normal completion) or o_bErr (Error completion) is turned on. By turning off i_bEN (Execution command), o_bOK (Normal completion) and o_bErr (Error completion) are turned off. • Receiving complete flag of the corresponding channel (SM8562, SM8572, SM8582, and SM8592) are reset after one operation cycle. Receive the data of o_uRecvDataLength (Number of receive data points) and o_uRecvData (Receive data storage device) within one operation cycle. • Set the module parameters of the used communication channel in GX Works3 in accordance with the application. For the module parameter setting method, refer to the MELSEC iQ-F FX5 User's Manual (Serial Communication). • To validate the change of the setting value of allowable number of receive data, restart this FB. • FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set channel to one of ch1, ch3, ch4. • This FB does not support the SM/SD devices of FX3 series compatibility. When using this FB in communication channel ch1 or ch2, set the SM/SD devices of FX3 series compatibility of the module parameters of the used communication channel in GX Works3 to "Disable."

*1   In GX Works3 Version 1.015R or later, the number of basic steps may vary greatly depending on the option settings of GX Works3.

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uCh (communication channel) is outside the setting range. The target channel is set to a value outside the range from 1 to 4.	Try again after checking the setting.
101H	The set value of i_uMaxRecvData (Allowable number of receive data) is outside the setting range. The allowable number of receive data is set to a value outside the range from 0 to 4,096.	Try again after checking the setting.
102H	The set value of i_uSendDataLength (Send data length) is outside the setting range. The send data length is set to a value outside the range from 0 to 4,096.	Try again after checking the setting.
103H	The serial communication operation mode is set to an invalid mode. The serial communication operation mode is not set to "Non-protocol communication".	Try again after checking the setting.
Serial communication error	The contents are same as the error code that occurred in the serial communication (RS2) instruction.	Refer to the MELSEC iQ-F FX5 User's Manual (Serial Communication).
Self-diagnostics error	This error may occur in the serial communication (RS2) instruction.[*1]	Refer to the MELSEC iQ-F FX5 User's Manual (Application).

*1   When the same self-diagnosis error as another instruction occurs in this FB, this FB may not detect the error.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	—	Specify the module label of the CPU module.
Communication channel	i_uCh	Word [Unsigned]	1 to 4	Specify the send/receive channel number. FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set channel to one of ch1, ch3, ch4. • 1: Channel 1 (CH1 side) • 2: Channel 2 (CH2 side) • 3: Channel 3 (CH3 side) • 4: Channel 4 (CH4 side)
Number of send data points	i_uSendDataLength	Word [Unsigned]	0 to 4096	Specify the number of bytes of the send data.
Send data storage device	i_uSendData	Word [Unsigned]	Available devices: D, W, SD, SW and R	Specify the head address of the device which stores the send data.[*1][*2]
Send request	i_bSendReq	Bit	ON, OFF	ON: Request data sending OFF: Not request data sending
Allowable number of receive data points	i_uMaxRecvData	Word [Unsigned]	0 to 4096	Specify the allowable number of bytes of receive data that can be stored in the receive data storage device.[*1][*2]

*1 The data storage position in the word device varies depending on the 8-bit/16-bit mode setting.
*2 The number of required word devices varies depending on the 8-bit/16-bit mode setting.

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is on. OFF: The execution command is off.
Send completion	o_bSendComp	Bit	OFF	When this bit is ON, it indicates that data sending is completed.
Receive completion	o_bRecvComp	Bit	OFF	When this bit is ON, it indicates that data receiving is completed.
Error completion	o_bErr	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code that occurred in the FB.
Number of receive data points	o_uRecvDataLength	Word [Unsigned]	0	Stores the number of bytes of data received.
Receive data storage device	o_uRecvData	Word [Unsigned]	0	Specify the head address of the device which stores the received data.[*1][*2]

*1 The data storage position in the word device varies depending on the 8-bit/16-bit mode setting.
*2 The number of required word devices varies depending on the 8-bit/16-bit mode setting.

■Public label

Name	Variable name	Data type	Default value	Description
Serial communication error undetection mode	pb_bSerialComErrUndetection	Bit	OFF	ON: FB does not detect serial communication error.[*1] OFF: FB detects serial communication error.

*1 Even if a serial communication error occurs in the used communication channel, error completion and error code are not output and the FB does not stop. Use a user program to detect the error. For serial communication error and serial communication error code, refer to the following manual.
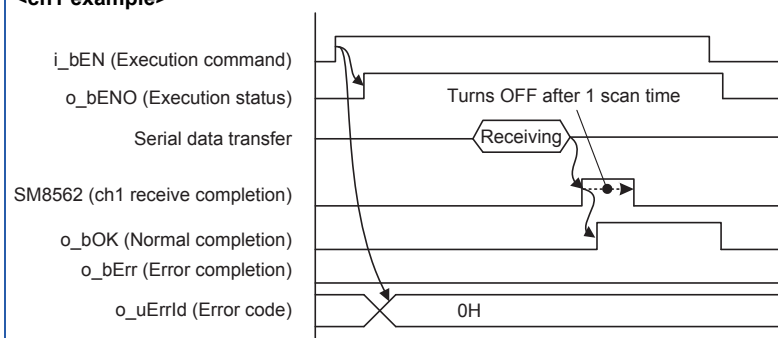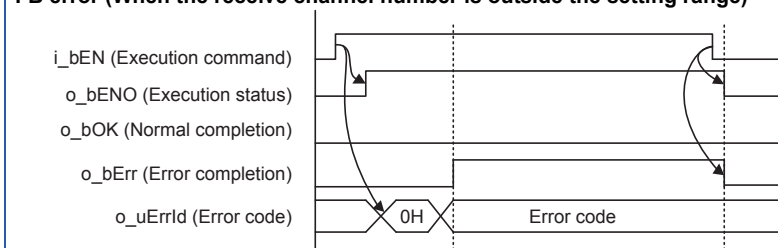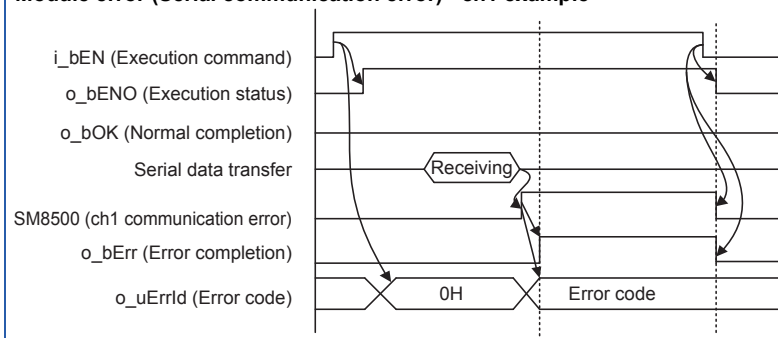📖MELSEC iQ-F FX5 User's Manual (Serial Communication)

4.2 M+FX5UCPU-SerialComm_Input

Name

M+FX5UCPU-SerialComm_Input

FB details

Item	Description
Overview	This FB stores the data received using the non-protocol in serial communication.
Symbol	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram
Number of basic steps	496 steps The number of steps of the FB in a program depends on the CPU model used, input and output definition, and the option settings of GX Works3.[1]

Processing	• When i_bEN (Execution command) turns ON, serial data transfer goes into receiving standby state.
	• In data receiving standby state, when the FB receives the data, the FB writes the number of received data to o_uRecvDataLength (Number of receive data points) and writes the received data to o_uRecvData (Receive data storage device). When receiving is completed, o_bRecvComp (Normal completion) turns ON.
	• This FB checks the following input values when started up. If an error occurs, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the error code.
	  (1) Receive channel number
	  (2) Allowable number of receive data points
	• If an error occurs during the data communication processing, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the serial communication error code. For error codes, refer to the list of error codes. When pb_bSerialComErrUndetection (Serial communication error undetection mode) is turned ON by a user program, this FB does not detect serial communication error. Detect serial communication error by a user program.
	• When data receiving is suspended and passes time-out time, time-out occurs, and then o_bRecvComp (Receiving complete) turns ON.

FB compilation method	Macro type
FB operation	Pulsed execution (multiple scan execution type)

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]** **<ch1 example>** i_bEN (Execution command) o_bENO (Execution status) Serial data transfer — Receiving — Turns OFF after 1 scan time SM8562 (ch1 receive completion) o_bOK (Normal completion) o_bErr (Error completion) o_uErrId (Error code) — 0H **[When the operation is completed with an error]** **FB error (When the receive channel number is outside the setting range)** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) o_bErr (Error completion) o_uErrId (Error code) — 0H — Error code **[When the operation is completed with an error]** **Module error (Serial communication error) <ch1 example>** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) Serial data transfer — Receiving SM8500 (ch1 communication error) o_bErr (Error completion) o_uErrId (Error code) — 0H — Error code

4

Item	Description

Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
	• This FB cannot be used in an interrupt program.
	• This FB uses the serial communication (RS2) instruction.
	• Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command).
	• When switching the "M+FX5UCPU-SerialComm_InputOutput" FB, "M+FX5UCPU-SerialComm_Input" FB (this FB), "M+FX5UCPU-SerialComm_Output" FB, and RS2 instruction using the same communication channel, turn OFF unused target FBs and RS2 instruction for at least 1 scan.
	• This FB uses the index register Z9. When using an interrupt program, do not use this index register in the interrupt program.
	• When using an interrupt program, use the DI/EI instruction before and after executing this FB so that this FB is executed in the interrupt disabled status. If executing this FB in the interrupt enabled status, a self-diagnosis error that occurs in an interrupt program is detected as an error that occurred in the FB.
	• The following FB does not support full-duplex bi-directional communication, interlink mode, communication using control line. To perform full-duplex bi-directional communication, interlink mode, communication using control line, please use "M+FX5UCPU-SerialComm_InputOutput" FB.
	  - M+FX5UCPU-SerialComm_Input (this FB)
	  - M+FX5UCPU-SerialComm_Output
	• When keeping the receiving standby state of serial data using the FB, it is necessary to let i_bEN (Execution command) remain ON even after receiving is completed.
	• Turn off i_bEN (Execution command) after o_bOK (Normal completion) or o_bErr (Error completion) is turned on. By turning off i_bEN (Execution command), o_bOK (Normal completion) and o_bErr (Error completion) are turned off.
	• Receiving complete flag of the corresponding channel (SM8562, SM8572, SM8582, and SM8592) are reset after one operation cycle. Receive the data of o_uRecvDataLength (Number of receive data points) and o_uRecvData (Receive data storage device) within one operation cycle.
	• Set the module parameters of the used communication channel in GX Works3 in accordance with the application. For the module parameter setting method, refer to the ⌴MELSEC iQ-F FX5 User's Manual (Serial Communication).
	• Restart this FB to allow changes to the number of allowable receive data points.
	• FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set a channel of one of ch1, ch3, ch4.
	• This FB does not support the SM/SD devices of FX3 series compatibility. When using this FB in communication channel ch1 or ch2, set the SM/SD devices of FX3 series compatibility of the module parameters of the used communication channel in GX Works3 to "Disable."

*1 In GX Works3 Version 1.015R or later, the number of basic steps may vary greatly depending on the option settings of GX Works3.

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uCh (Receive channel) is outside the setting range. The target channel is set to a value outside the range from 1 to 4.	Try again after checking the setting.
101H	The set value of i_uMaxRecvData (Allowable number of receive data) is outside the setting range. The allowable number of receive data is set to a value outside the range from 1 to 4,096.	Try again after checking the setting.
103H	The serial communication operation mode is set to an unavailable mode. The serial communication operation mode is not set to "Non-protocol communication".	Try again after checking the setting.
Serial communication error	The contents are same as the error code occurred in the serial communication (RS2) instruction.	Refer to the ⌴MELSEC iQ-F FX5 User's Manual (Serial Communication).
Self-diagnostics error	This error may occur in the serial communication (RS2) instruction.[*1]	Refer to the ⌴MELSEC iQ-F FX5 User's Manual (Application).

*1 When the same self-diagnosis error as another instruction occurs in this FB, this FB may not detect the error.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	—	Specify the module label of the CPU module.
Receive channel	i_uCh	Word [Unsigned]	1 to 4	Set the channel that receives the data. FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set channel to one of ch1, ch3, ch4. • 1: Channel 1 (CH1 side) • 2: Channel 2 (CH2 side) • 3: Channel 3 (CH3 side) • 4: Channel 4 (CH4 side)
Allowable number of receive data points	i_uMaxRecvData	Word [Unsigned]	1 to 4096	Specify the allowable number of bytes of the receive data that can be stored in the receive data storage device.[*1][*2]

*1 The data storage position in the word device varies depending on the 8-bit/16-bit mode setting.
*2 The number of required word devices varies depending on the 8-bit/16-bit mode setting.

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is on. OFF: The execution command is off.
Normal completion	o_bOK	Bit	OFF	When this bit is ON, it indicates that data receiving is completed normally.
Error completion	o_bErr	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code occurred in the FB.
Number of receive data points	o_uRecvDataLength	Word [Unsigned]	0	Stores the number of bytes which received the data.
Receive data storage device	o_uRecvData	Word [Unsigned]	0	Specify the head address of the device which stores the received data.[*1][*2]

*1 The data storage position in the word device varies depending on the 8-bit/16-bit mode setting.
*2 The number of required word devices varies depending on the 8-bit/16-bit mode setting.

■Public label

Name	Variable name	Data type	Default value	Description
Serial communication error undetection mode	pb_bSerialComErrUndetection	Bit	OFF	ON: FB does not detect serial communication error.[*1] OFF: FB detects serial communication error.

*1 Even if a serial communication error occurs in the used communication channel, error completion and error code are not output and the FB does not stop. Use a user program to detect the error. For serial communication error and serial communication error code, refer to the following manual.
📖MELSEC iQ-F FX5 User's Manual (Serial Communication)
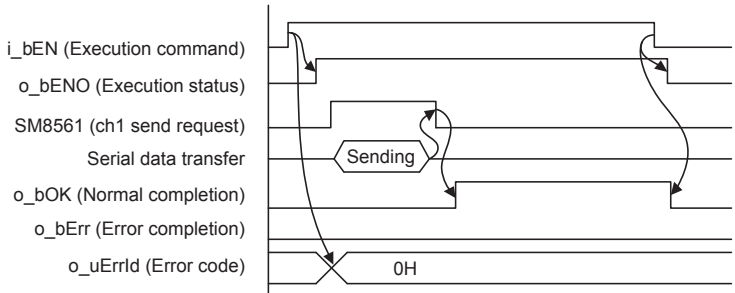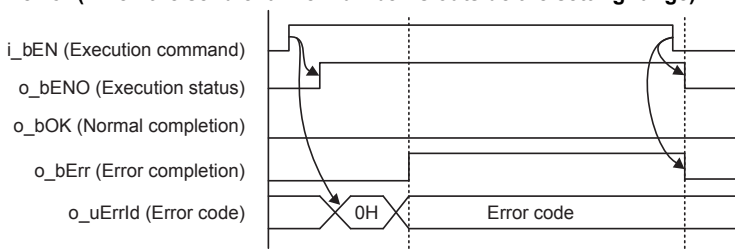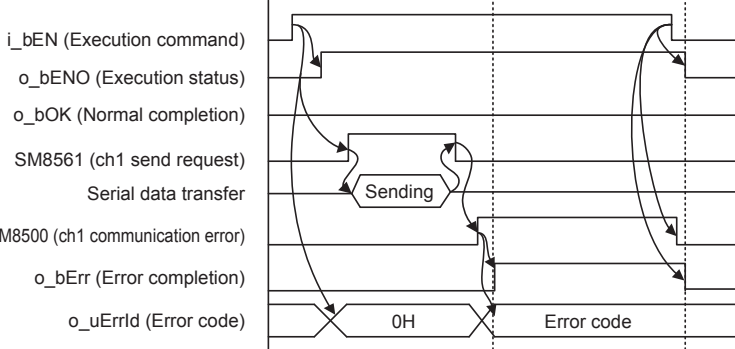
4.3 M+FX5UCPU-SerialComm_Output

Name

M+FX5UCPU-SerialComm_Output

FB details

Item	Description
Overview	This FB sends the specified number of data points using the non-protocol in serial communication.
Symbol	
Available device	CPU module	FX5U CPU, FX5UC CPU
	Engineering tool	GX Works3 Version 1.007H or later
Language	Ladder diagram
Number of basic steps	508 steps The number of steps of the FB in a program depends on the CPU model used, input and output definition, and the option settings of GX Works3.[*1]
Processing	• This FB sends the data specified by i_uSendData (Send data storage device) and i_uSendDataLength (Number of send data points) using the non-procedural protocol triggered by the serial data transfer (RS2) instruction when i_bEN (Execution command) turns ON. When sending is completed, o_bOK (Normal completion) turns ON. • This FB checks the following input values when started up. If an error occurs, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the error code. (1) Send channel number (2) Number of send data points • If an error occurs during the data communication processing, o_bErr (Error completion) turns ON, and o_uErrId (Error code) stores the serial communication error code. For the error code, refer to the list of error codes. When pb_bSerialComErrUndetection (Serial communication error undetection mode) is turned ON by a user program, this FB does not detect serial communication error. Detect serial communication error by a user program.
FB compilation method	Macro type
FB operation	Pulsed execution (multiple scan execution type)

The Symbol cell shows:

M+FX5UCPU-SerialComm_Output

Input		Output	
Execution command — B : i_bEN		o_bENO : B — Execution status
Module label — DUT: i_stModule		o_bOK : B — Normal completion
Send channel — UW: i_uCh		o_bErr : B — Error completion
Number of send data points — UW: i_uSendDataLength		o_uErrID : UW — Error code
Send data storage device — UW: i_uSendData		

pb_bSerialComErrUndetection (Serial communication error undetection)

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]** **<ch1 example>** i_bEN (Execution command) o_bENO (Execution status) SM8561 (ch1 send request) Serial data transfer — Sending o_bOK (Normal completion) o_bErr (Error completion) o_uErrId (Error code) — 0H **[When the operation is completed with an error]** **FB error (When the send channel number is outside the setting range)** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) o_bErr (Error completion) o_uErrId (Error code) — 0H / Error code **[When the operation is completed with an error]** **Module error (Serial communication error) <ch1 example>** i_bEN (Execution command) o_bENO (Execution status) o_bOK (Normal completion) SM8561 (ch1 send request) Serial data transfer — Sending SM8500 (ch1 communication error) o_bErr (Error completion) o_uErrId (Error code) — 0H / Error code

Restrictions or precautions	• This FB does not include the error recovery processing. Program the error recovery processing separately in accordance with the required system operation.
	• This FB cannot be used in an interrupt program.
	• This FB uses the serial communication (RS2) instruction.
	• Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command).
	• When switching the "M+FX5UCPU-SerialComm_InputOutput" FB, "M+FX5UCPU-SerialComm_Input" FB, "M+FX5UCPU-SerialComm_Output" FB (this FB), and RS2 instruction using a same communication channel, turn OFF unused target FBs and RS2 instruction for at least 1 scan.
	• This FB uses the index register Z9. When using an interrupt program, do not use this index register in the interrupt program.
	• When using an interrupt program, use the DI/EI instruction before and after executing this FB so that this FB is executed in the interrupt disabled status. If executing this FB in the interrupt enabled status, a self-diagnosis error that occurs in an interrupt program is detected as an error that occurred in the FB.
	• The following FB does not support full-duplex bi-directional communication, interlink mode, communication using control line. To perform full-duplex bi-directional communication, interlink mode, communication using control line, please use "M+FX5UCPU-SerialComm_InputOutput" FB.
	  - M+FX5UCPU-SerialComm_Input
	  - M+FX5UCPU-SerialComm_Output (this FB)
	• Turn off i_bEN (Execution command) after o_bOK (Normal completion) or o_bErr (Error completion) is turned on. By turning off i_bEN (Execution command), o_bOK (Normal completion) and o_bErr (Error completion) are turned off.
	• Set the module parameters of the used communication channel in GX Works3 in accordance with the application. For the module parameter setting method, refer to the ☐MELSEC iQ-F FX5 User's Manual (Serial Communication).
	• FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set a channel of one of ch1, ch3, ch4.
	• This FB does not support the SM/SD devices of FX3 series compatibility. When using this FB in communication channel ch1 or ch2, set the SM/SD devices of FX3 series compatibility of the module parameters of the used communication channel in GX Works3 to "Disable."

*1 In GX Works3 Version 1.015R or later, the number of basic steps may vary greatly depending on the option settings of GX Works3.

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uCh (Send channel) is outside the setting range. The target channel is set to a value outside the range from 1 to 4.	Try again after checking the setting.
102H	The set value of i_uSendDataLength (Send data length) is outside the setting range. The send data length is set to a value outside the range from 1 to 4,096.	Try again after checking the setting.
103H	The serial communication operation mode is set to an unavailable mode. The serial communication operation mode is not set to "Non-protocol communication".	Try again after checking the setting.
Serial communication error	The contents are same as the error code occurred in the serial communication (RS2) instruction.	Refer to the 📖MELSEC iQ-F FX5 User's Manual (Serial Communication)
Self-diagnostics error	This error may occur in the serial communication (RS2) instruction.[1]	Refer to the 📖MELSEC iQ-F FX5 User's Manual (Application)

*1 When the same self-diagnosis error as another instruction occurs in this FB, this FB may not detect the error.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	—	Specify the module label of the MELSEC iQ-F CPU module.
Send channel	i_uCh	Word [Unsigned]	1 to 4	Specify the send channel number. FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set channel to one of ch1, ch3, ch4. • 1: Channel 1 (CH1 side) • 2: Channel 2 (CH2 side) • 3: Channel 3 (CH3 side) • 4: Channel 4 (CH4 side)
Number of send data points	i_uSendDataLength	Word [Unsigned]	1 to 4096	Specify the number of bytes of the send data.
Send data storage device	i_uSendData	Word [Unsigned]	Available devices: D, W, SD, SW and R	Specify the head address of the device which stores the send data.[1][2]

*1 The data storage position in the word device varies depending on the 8-bit/16-bit mode setting.
*2 The number of required word devices varies depending on the 8-bit/16-bit mode setting.

■Output label

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is on. OFF: The execution command is off.
Normal completion	o_bOK	Bit	OFF	When this bit is ON, it indicates that data sending is completed normally.
Error completion	o_bErr	Bit	OFF	When this label is on, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code occurred in the FB.

■Public label

Name	Variable name	Data type	Default value	Description
Serial communication error undetection mode	pb_bSerialComErrUndetection	Bit	OFF	ON: FB does not detect serial communication error.[1] OFF: FB detects serial communication error.

*1 Even if a serial communication error occurs in the used communication channel, error completion and error code are not output and the FB does not stop. Use a user program to detect the error. For serial communication error and serial communication error code, refer to the following manual.
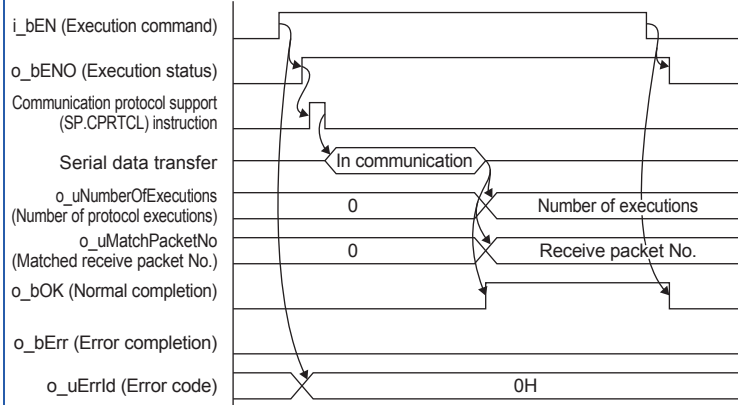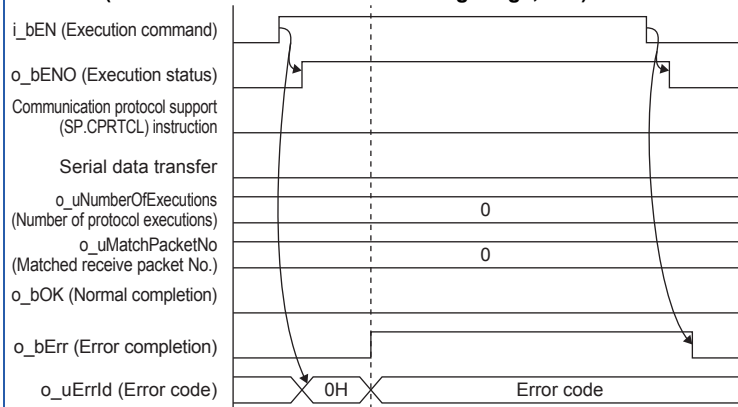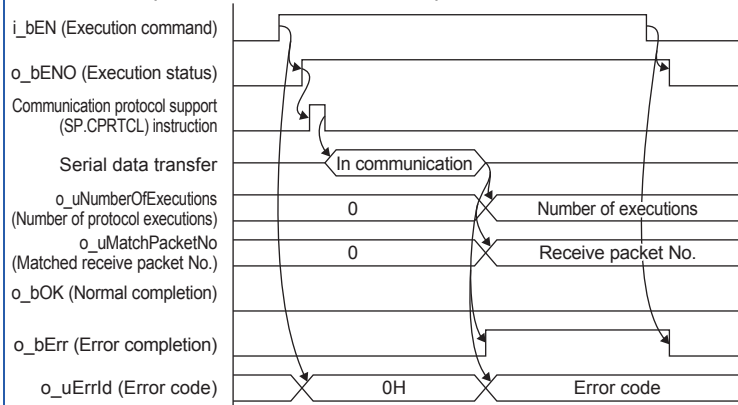📖MELSEC iQ-F FX5 User's Manual (Serial Communication)

4.4 M+FX5UCPU-SerialComm_ExeCommonProtocol

Name

M+FX5UCPU-SerialComm_ExeCommonProtocol

FB details

Item	Description	
Overview	This FB executes the protocol registered with GX Works3.	
Symbol		
Available device	CPU module	FX5U CPU (Version 1.015 or later), FX5UC CPU (Version 1.015 or later)
	Engineering tool	GX Works3 Version 1.015R or later
Language	Ladder diagram	
Number of basic steps	312 steps The number of steps of the FB in a program depends on the CPU model used, input and output definition, and the option settings of GX Works3.[1]	

Processing	• Executes the registered protocol by the communication protocol support function (predefined protocol support function) on GX Works3 using the communication protocol support (SP.CPRTCL) instruction, by turning i_bEN (Execution command) on. After executing the protocols specified with i_uExeProtocolNo (Execution protocol number) and i_uNumberOfExecutions (Number of consecutively-executed protocols), o_bOK (Normal completion) turns on.
	• This FB checks the following input values when started up. If an error occurs, o_bErr (Error completion) turns on, and o_uErrId (Error code) stores the error code.
	  (1) Communication channel
	  (2) Number of consecutive protocol executions
	• If an error occurs during data communication processing, o_bErr (Error completion) turns on, and the serial communication error code is stored to o_uErrId (Error code). For the error code, refer to the list of error codes. When pb_bSerialComErrUndetection (Serial communication error undetection mode) is turned on by a user program, this FB does not detect serial communication errors for error codes 7F67H to 7F6AH (the FB continues to operate). Detect serial communication errors using a user program.	

FB compilation method	Macro type	
FB operation	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart of I/O signals	**[When the operation is completed successfully]**

[When the operation is completed with an error]
FB error (Send channel is outside the setting range, etc.)

[When the operation is completed with an error]
Module error (Serial communication error)

Item	Description
Restrictions or precautions	• This FB does not include error recovery processing. Program error recovery processing separately in accordance with the required system operation. • This FB cannot be used in interrupt programs. • This FB uses the communication protocol support (SP.CPRTCL) instruction. • In communication protocol support function (predefined protocol support function), up to two channels are available to use in one CPU module. • Do not use this FB in programs that are executed only once, such as a subroutine program or FOR-NEXT loop, because i_bEN (Execution command) cannot be turned off and the normal operation cannot be acquired. Always use this FB in programs that can turn off i_bEN (Execution command). • When using an interrupt program, use the DI/EI instruction before and after executing this FB so that this FB is executed in the interrupt disabled status. If executing this FB in the interrupt enabled status, a self-diagnosis error that occurs in an interrupt program is detected as an error that occurred in the FB. • Turn off i_bEN (Execution command) after o_bOK (Normal completion) or o_bErr (Error completion) is turned on. By turning off i_bEN (Execution command), o_bOK (Normal completion) and o_bErr (Error completion) are turned off. • If turning i_bEN (Execution command) to off during communication, o_bENO (Execution status) does not turn off until communication is complete. Furthermore, when communication ends, o_bOK (Normal completion) or o_bErr (Error completion) turns on, and then turns off along with o_bENO (Execution status) during the next scan. • Set the module parameters of the used communication channel in GX Works3 in accordance with the application. For the module parameter setting method, refer to the 📖MELSEC iQ-F FX5 User's Manual (Serial Communication). • FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set a channel of one of ch1, ch3, ch4.

*1   In GX Works3 Version 1.015R or later, the number of basic steps may vary greatly depending on the option settings of GX Works3.

Error code

Error code (hexadecimal)	Description	Action
100H	The set value of i_uCh (Communication channel) is outside the setting range. The target channel is set to a value outside the range from 1 to 4.	Try again after checking the setting.
104H	The set value for i_uNumberOfExecutions (Number of continuous protocol executions) is outside the setting range. The number of continuous protocol executions is set to a value outside the range from 1 to 8.	Try again after checking the setting.
105H	The serial communication operation mode is set to an unavailable mode. The serial communication operation mode is not set to "communication protocol support (predefined protocol support)".	Try again after checking the setting.
Serial communication error	The contents are same as the error code occurred in the communication protocol support (SP.CPRTCL) instruction.	Refer to the 📖MELSEC iQ-F FX5 User's Manual (Serial Communication).
Self-diagnostics error	This may occur in the communication protocol support (SP.CPRTCL) instruction.[*1]	Refer to the 📖MELSEC iQ-F FX5 User's Manual (Application).

*1   When the same self-diagnosis error as another instruction occurs in this FB, this FB may not detect the error.

Labels

■Input label

Name	Variable name	Data type	Range	Description
Execution command	i_bEN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module label	i_stModule	Structure	—	Specify the module label of the CPU module.
Communication channel	i_uCh	Word [Unsigned]	1 to 4	Specify the communication channel number. FX5UC CPU does not have serial communication port ch2. When using this FB in FX5UC CPU, set channel to one of ch1, ch3, ch4. • 1: Channel 1 (CH1 side) • 2: Channel 2 (CH2 side) • 3: Channel 3 (CH3 side) • 4: Channel 4 (CH4 side)
Number of consecutive protocol executions	i_uNumberOfExecutions	Word [Unsigned]	1 to 8	Specify number of continuous executions of the protocol.

Name	Variable name	Data type	Range	Description
Execution protocol number	i_uExeProtocolNo	Word [Unsigned] (0..7)	1 to 64	Specify the protocol number to be executed. Protocols are executed in the specified order of the execution protocol numbers. 1st word: Execution protocol number 1 ⋮ 8th word: Execution protocol number 8 When it is specified using a label, use "ARRAY" for the data type.

■**Output label**

Name	Variable name	Data type	Default value	Description
Execution status	o_bENO	Bit	OFF	ON: The execution command is on. OFF: The execution command is off.
Normal completion	o_bOK	Bit	OFF	When this bit is ON, it indicates that data communication is completed normally.
Error completion	o_bErr	Bit	OFF	When this label is ON, it indicates that an error has occurred in the FB.
Error code	o_uErrId	Word [Unsigned]	0	Stores the error code that occurred in the FB.
Number of protocol executions	o_uNumberOfExecutions	Word [Unsigned]	0	The number of protocol executions is stored. The protocol in which an error has occurred is included in the number of executions. If the setting data and the setting details of the control data are incorrect, 0 is stored.
Matched receive packet number	o_uMatchPacketNo	Word [Unsigned] (0..7)	0	1st word: Matched receive packet No. 1 ⋮ 8th word: Matched receive packet No. 8 A value is stored in the area corresponding to the execution protocol number. When the communication type of the executed protocol is "Send only" or "Send and receive", the receive packet number that matches with the executed protocol, is stored. In the following cases, 0 is stored. • When the communication type is "Receive only" • When an error occurs in the executed protocol • The area is greater than or equal to the number of protocol executions When it is specified using a label, use "ARRAY" for the data type.

■**Public label**

Name	Variable name	Data type	Default value	Description
Serial communication error undetection mode	pb_bSerialComErrUndetection	Bit	OFF	ON: FB does not detect serial communication error.[1] OFF: FB detects serial communication error.

*1 Even if a serial communication error occurs in the used communication channel, error completion and error code are not output and the FB does not stop. Use a user program to detect the error. For serial communication error and serial communication error code, refer to the following manual.
📖MELSEC iQ-F FX5 User's Manual (Serial Communication)

INSTRUCTION INDEX

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REVISIONS

Revision date	Revision	Description
January 2015	A	First Edition
April 2015	B	A part of the cover design is changed.
July 2015	C	■Added or modified parts Chapter 1, Section 3.1, 4.1, 4.2, 4.3, 4.4

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HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

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