

Programmable Controller

MELSEC iQ-F
series




MELSEC iQ-F Industrial Robot MELFA Function
Block Library Reference

SAFETY PRECAUTIONS

(Read the precautions before using this product.)

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

This manual classifies the safety precautions into three categories: [ DANGER], [ WARNING], and [ CAUTION].

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

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

Observe the precautions of all the levels because they are important for personal and system safety.

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

SAFETY PRECAUTIONS FOR USING INDUSTRIAL ROBOTS

Always read the following precautions and the SAFETY MANUAL (BFP-A3541) of Mitsubishi Electric Industrial Robot before starting use of the robot to learn the required measures to be taken.

A. The following precautions are based on the Ordinance on Industrial Safety and Health (Articles 36, 104, 150, 151).

CAUTION

All teaching work must be carried out by an operator who has received special training.

(This also applies to maintenance work with the power source turned on.)

→Enforcement of safety training

CAUTION

For teaching work, prepare a work plan related to the methods and procedures of operating the robot, and to the measures to be taken when an error occurs or when restarting. Carry out work following this plan.

(This also applies to maintenance work with the power source turned on.)

→Preparation of work plan

WARNING

Prepare a device that allows operation to be stopped immediately during teaching work.

(This also applies to maintenance work with the power source turned on.)

→Setting of emergency stop switch

CAUTION

During teaching work, place a sign indicating that teaching work is in progress on the start switch or other parts.

(This also applies to maintenance work with the power source turned on.)

→Indication of teaching work in progress

DANGER

Provide a fence or enclosure during operation to prevent contact of the operator and robot.

→Installation of safety fence

CAUTION

Establish a set signaling method to the related operators for starting work, and follow this method.

→Signaling of operation start

CAUTION

As a principle turn the power off during maintenance work. Place a sign indicating that maintenance work is in progress on the start switch or other parts.

→Indication of maintenance work in progress

CAUTION

Before starting work, inspect the robot, emergency stop switch, and other related devices, and confirm that there are no errors.

→Inspection before starting work

B. The following precautions are taken from the SAFETY MANUAL (BFP-A3541) of Mitsubishi Electric Industrial Robot. For details, refer to the SAFETY MANUAL (BFP-A3541).

DANGER

When automatic operation of the robot is performed using multiple control devices (GOT, programmable controller, push-button switch), an interlock such as operation rights of the devices must be provided by users.

CAUTION

Use the robot within the environment given in the specifications.
Failure to do so could lead to a decrease in reliability or faults.
(Temperature, humidity, atmosphere, noise, and other environments)

CAUTION

Transport the robot with the designated transportation posture.
Transporting the robot in a non-designated posture could lead to personal injuries or faults from dropping.

CAUTION

Always use the robot installed on a secure table.
Use in an unstable posture could lead to positional deviation and vibration.

CAUTION

Wire the cable as far away from noise sources as possible.
If placed near a noise source, positional deviation or malfunction could occur.

CAUTION

Do not apply excessive force on the connector or excessively bend the cable.
Failure to observe this could lead to contact defects or wire breakage.

CAUTION

Make sure that the workpiece weight, including the hand, does not exceed the rated load or tolerable torque.
Exceeding these values could lead to errors or faults.

WARNING

Securely install the hand and tool, and securely grasp the workpiece.
Failure to observe this could lead to personal injuries or damage if the object comes off or flies off during operation.

WARNING

Securely ground the robot and controller.
Failure to observe this could lead to malfunctioning by noise or to electric shock accidents.

CAUTION

Indicate the operation state during robot operation.
Failure to indicate the state could lead to operators approaching the robot or to incorrect operation.

WARNING

When carrying out teaching work in the movement range of the robot, always secure the priority right for the robot control.
Failure to observe this could lead to personal injuries or damage if the robot is started with external commands.

CAUTION

Keep the jog speed as low as possible, and always watch the robot. Failure to do so could lead to interference with the workpiece or peripheral devices.

CAUTION

After editing the program, always confirm the operation with step operation before starting automatic operation. Failure to do so could lead to interference with peripheral devices because of programming mistakes or other factors.

CAUTION

Make sure that if the safety fence entrance door is opened during automatic operation, the door is locked or that the robot will automatically stop. Failure to do so could lead to personal injuries.

CAUTION

Never carry out modifications based on personal judgments, or use non-designated maintenance parts. Failure to observe this could lead to faults or failures.

WARNING

When the robot arm has to be moved by hand from an external area, do not place hands or fingers in the openings. Failure to observe this could lead to hands or fingers catching depending on the posture.

CAUTION

Do not stop the robot or apply emergency stop by turning off the main power of the controller. If the main power of the controller is turned off during automatic operation, the robot accuracy could be adversely affected. Moreover, it may interfere with the peripheral device by drop or move by inertia of the arm.

CAUTION

Do not turn off the main power to the controller while rewriting the internal information of the controller such as the program or parameters.

If the main power to the controller is turned off while in automatic operation or rewriting the program or parameters, the internal information of the controller may be damaged.

DANGER

Do not connect the Handy GOT when using the GOT direct connection function of this product. Failure to observe this may result in property damage or bodily injury because the Handy GOT can automatically operate the robot regardless of whether the operation rights are enabled or not.

DANGER

Do not connect the Handy GOT to a programmable controller when using an iQ Platform compatible product with the CR800-R/Q series. Failure to observe this may result in property damage or bodily injury because the Handy GOT can automatically operate the robot regardless of whether the operation rights are enabled or not.

DANGER

Do not remove the SSCNET III cable while power is supplied to the multiple CPU system or the servo amplifier. Do not look directly at light emitted from the tip of SSCNET III connectors or SSCNET III cables of the Motion CPU or the servo amplifier. Eye discomfort may be felt if exposed to the light. (Reference: SSCNET III employs a Class 1 or equivalent light source as specified in IEC 60825-1 and JIS C 6802 (domestic standards in Japan).)

DANGER

Do not remove the SSCNET III cable while power is supplied to the controller. Do not look directly at light emitted from the tip of SSCNET III connectors or SSCNET III cables. Eye discomfort may be felt if exposed to the light. (Reference: SSCNET III employs a Class 1 or equivalent light source as specified in IEC 60825-1 and JIS C 6802 (domestic standards in Japan).)

DANGER

Attach the cap to the SSCNET III connector after disconnecting the SSCNET III cable. If the cap is not attached, dirt or dust may adhere to the connector pins, resulting in deterioration connector properties, and leading to malfunction.

CAUTION

Make sure there are no mistakes in the wiring. Connecting differently to the way specified in the manual can result in errors, such as the emergency stop not being released.

To prevent errors occurring, be sure to check that all functions (such as the teaching pendant emergency stop, customer emergency stop, and door switch) are working properly after wiring is complete.

CAUTION

Connecting the USB port on the controller to commercially available devices such as computers and LAN hubs may not be compatible with our equipment or the temperature and electrical noise of some FA environments.

If using commercially available devices, check the operation carefully to determine if protection against EMI or the addition of a ferrite core is required.

We cannot guarantee the operation of the product and perform maintenance if the product is connected to commercial devices.

CAUTION

To maintain the security (confidentiality, integrity, and availability) of the robot and the system against unauthorized access, DoS^{*1} attacks, computer viruses, and other cyberattacks from unreliable networks and devices via network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

Mitsubishi Electric shall have no responsibility or liability for any problems involving robot trouble and system trouble by unauthorized access, DoS attacks, computer viruses, and other cyberattacks.

*1 DoS: A denial-of-service (DoS) attack disrupts services by overloading systems or exploiting vulnerabilities, resulting in a denial-of-service (DoS) state.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-F series programmable controllers.

This manual describes the module function blocks for the relevant modules, robots, and robot controller listed below. Please read this manual and the relevant manuals and fully understand the specifications before attempting to use the product.

Also, please ensure that the end users read this manual.

Target modules

- FX5S CPU module
- FX5UJ CPU module
- FX5U CPU module
- FX5UC CPU module

Target robots

- MELFA FR series
- MELFA CR series

Target robot controller

- CR800-D controller

Regarding use of this product

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

Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference and do not guarantee operation, please use the product after confirming for yourself the function and safety of the device and machine.
- The content, including specifications, in this manual may be changed for improvement without notice.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you have noticed a doubtful point or a doubtful error, please contact your local Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.

CONTENTS

SAFETY PRECAUTIONS	1
SAFETY PRECAUTIONS FOR USING INDUSTRIAL ROBOTS	2
INTRODUCTION	6
RELEVANT MANUALS	12
TERMS	13
GENERIC TERMS AND ABBREVIATIONS	13
CHAPTER 1 OVERVIEW	14
1.1 Features	14
Application example	14
1.2 List of FB Libraries	15
1.3 System Configuration	17
CHAPTER 2 SPECIFICATIONS	18
2.1 FB Library Specifications	18
2.2 List of Global Labels	18
2.3 List of Structures	20
2.4 Robot Controller Connection	23
2.5 Programmable Controller Settings	25
Own node settings	25
Network configuration settings	26
Predefined protocol support function settings	28
Global label settings	40
2.6 Robot Controller Settings	42
Socket communications function and real-time monitor function settings	42
Parameter settings	44
Robot program creation	46
Applicable mechanism and slot numbers	46
External variable P_DM settings	46
2.7 Precautions	47
2.8 Precautions on FB Combinations	48
CHAPTER 3 DETAILS OF FB LIBRARIES	49
3.1 M+MELFA_ConnectionOpen_F (Connection Establishment)	49
Overview	49
Labels	49
Function details	50
Performance values	52
Error codes	52
Example	53
3.2 M+MELFA_ConnectionClose_F (Connection Disconnection)	54
Overview	54
Labels	54
Function details	55
Performance values	57
Error codes	57
Example	58

3.3	M+MELFA_GetOperation_F (Operation Rights Acquisition)	59
	Overview	59
	Labels	59
	Function details	60
	Performance values	62
	Error codes	62
	Example	63
3.4	M+MELFA_ReleaseOperation_F (Operation Rights Release)	64
	Overview	64
	Labels	64
	Function details	65
	Performance values	67
	Error codes	67
	Example	68
3.5	M+MELFA_RoboStatusMonitor_F (Operating Status Monitor)	69
	Overview	69
	Labels	69
	Function details	71
	Performance values	74
	Error codes	74
	Example	75
3.6	M+MELFA_PosDataMonitor_F (Position Information Monitor)	76
	Overview	76
	Labels	76
	Function details	77
	Performance values	79
	Error codes	79
	Example	79
3.7	M+MELFA_MaintenanceMonitor_F (Maintenance Information Monitor)	81
	Overview	81
	Labels	81
	Function details	83
	Performance values	85
	Error codes	85
	Example	86
3.8	M+MELFA_VariableOperation_F (Variable Operation)	87
	Overview	87
	Labels	87
	Function details	89
	Performance values	94
	Error codes	94
	Example	95
3.9	M+MELFA_ProgramOperation_F (Program Operation)	97
	Overview	97
	Labels	97
	Function details	98
	Performance values	101
	Error codes	101
	Example	102
3.10	M+MELFA_MaintenanceOperation_F (Maintenance Data Operation)	103
	Overview	103

	Labels	103
	Function details	105
	Performance values	109
	Error codes	109
	Example	110
3.11	M+MELFA_InformationOperation_F (Robot Information Read Operation)	111
	Overview	111
	Labels	111
	Function details	112
	Performance values	115
	Error codes	115
	Example	116
3.12	M+MELFA_Hand_F (Robot Hand Operation)	118
	Overview	118
	Labels	118
	Function details	119
	Performance values	123
	Error codes	123
	Example	124
3.13	M+MELFA_Jog_F (Robot Jog Operation)	125
	Overview	125
	Labels	125
	Function details	127
	Performance values	131
	Error codes	131
	Example	131
3.14	M+MELFA_DedicatedInOut_F (Dedicated I/O Signal Processing)	133
	Overview	133
	Labels	133
	Function details	135
	Performance values	137
	Error codes	137
	Example	137
3.15	M+MELFA_PrgSelect_F (Program Selection)	139
	Overview	139
	Labels	139
	Function details	140
	Performance values	142
	Error codes	142
	Example	143
3.16	M+MELFA_Ovrd_F (Override I/O)	144
	Overview	144
	Labels	144
	Function details	145
	Performance values	148
	Error codes	148
	Example	149
3.17	M+MELFA_RealTimeMonitor_F (Real-time Monitor)	150
	Overview	150
	Labels	150
	Function details	152

	Performance values.	155
	Error codes	155
	Example.	156
3.18	M+MELFA_Direct_Mov_F (Joint Interpolation).....	157
	Overview	157
	Labels	157
	Function details	158
	Performance values.	161
	Error codes	161
	Example.	162
3.19	M+MELFA_Direct_Mvs_F (Linear Interpolation).....	163
	Overview	163
	Labels	163
	Function details	164
	Performance values.	167
	Error codes	167
	Example.	168
3.20	M+MELFA_Direct_Ovrd_F (Speed Specification).....	169
	Overview	169
	Labels	169
	Function details	170
	Performance values.	173
	Error codes	173
	Example.	174
3.21	M+MELFA_Direct_Spd_F (Interpolation Operation Speed Specification).....	175
	Overview	175
	Labels	175
	Function details	176
	Performance values.	179
	Error codes	179
	Example.	180
3.22	M+MELFA_Direct_Cnt_F (Continuous Path Mode Specification).....	181
	Overview	181
	Labels	181
	Function details	182
	Performance values.	185
	Error codes	185
	Example.	186
3.23	M+MELFA_Direct_Accel_F (Acceleration and Deceleration Speed Specification).....	187
	Overview	187
	Labels	187
	Function details	188
	Performance values.	191
	Error codes	191
	Example.	192
3.24	M+MELFA_Direct_Oadl_F (Optimum Acceleration and Deceleration Specification).....	193
	Overview	193
	Labels	193
	Function details	194
	Performance values.	197
	Error codes	197

Example.....	197
3.25 M+MELFA_Direct_LoadSet_F (Hand Additional Condition Specification).....	198
Overview.....	198
Labels.....	198
Function details.....	200
Performance values.....	203
Error codes.....	203
Example.....	203
3.26 M+MELFA_Direct_FineP_F (Positioning Range Specification).....	205
Overview.....	205
Labels.....	205
Function details.....	206
Performance values.....	209
Error codes.....	209
Example.....	210
CHAPTER 4 OPERATION EXAMPLES	211
<hr/>	
4.1 Work Flow.....	212
4.2 Teaching Work.....	212
4.3 Programmable Controller Program Creation.....	213
Label and device lists.....	213
Program configuration.....	214
Program.....	214
APPENDIX	219
<hr/>	
Appendix 1 List of Devices Used.....	219
INSTRUCTION INDEX	233
<hr/>	
REVISIONS.....	235
TRADEMARKS.....	236

RELEVANT MANUALS

Programmable controllers

Manual name	Description
MELSEC iQ-F FX5S/FX5UJ/FX5U/FX5UC User's Manual (Hardware) <SH-082452ENG>	Describes the details of hardware of the CPU module, including I/O specifications, wiring, installation, and maintenance.
MELSEC iQ-F FX5 User's Manual (Application) <JY997D55401>	Describes the basic knowledge required for program design, functions of the CPU module, devices/labels, and parameters.
MELSEC iQ-F FX5 Programming Manual (Program Design) <JY997D55701>	Describes the specifications of ladder, ST, FBD/LD, and SFC programs, and labels.
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) <JY997D55801>	Describes the specifications of instructions and functions that can be used in programs.
GX Works3 Operating Manual <SH-081215ENG>	Describes the system configuration, parameter settings, and online operations of GX Works3.

Robots

Manual name	Description
CR800 Controller RV-FR Series Standard Specifications Manual <BFP-A3470>	Describes the characteristics of the RV-FR series, specifications of the robot and controller, software functions, and command list.
CR800 Controller RH-FRH Series Standard Specifications Manual <BFP-A3468>	Describes the characteristics of the RH-FRH series, specifications of the robot and controller, software functions, and command list.
CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations <BFP-A3478>	Describes the functions and operation method of the controller and teaching pendant, and the functions and specifications of the MELFA-BASIC VI program language.
CR800 Series Controller INSTRUCTION MANUAL Troubleshooting <BFP-A3480>	Describes information on the causes and solutions to errors that may occur while the robot is being operated.
CR750/CR751 series controller, CR800 series controller Ethernet Function Instruction Manual <BFP-A3379>	Describes the Ethernet function of the robot controller.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
External device	A generic term for the personal computer and other Ethernet-equipped modules connected over Ethernet for data communications
FB	An abbreviation for "Function Block". A function block is created from a ladder block repeatedly used in a sequence program so that it can be used as a component in a sequence program. Using FBs helps develop programs more efficiently, reduce mistakes, and improve quality of programs.
GOT	A generic term for the GOT1000 and GOT2000 series
Peripheral device	A generic term for engineering tools and GOTs
TCP	An abbreviation for Transmission Control Protocol. This protocol is used to establish connection between device port numbers in communications between programmable controllers or communications with an external device connected via the network to perform reliable data communications.
UDP	An abbreviation for User Datagram Protocol. This protocol is high-speed compared to TCP because it is connectionless, but the reliability of data communications is low. Data loss or a change in the order of arrival may occur.

1 OVERVIEW

This FB is the FB library for connecting a MELSEC iQ-F series CPU module and MELFA FR series industrial robot via Ethernet to control and monitor the robot. Since the robot is controlled from the MELSEC iQ-F series, the robot can be operated in combination with various sensors and drive devices. Furthermore, robot control can also be described in a programmable controller program. This allows operators with little knowledge on robot programming to control the robot.

1.1 Features

This section describes the features of this function.

Flexible system design

The FB library can be used for designing programs to monitor the status of the robot, link the control of peripheral devices, and control the robot in accordance with the status of peripheral devices.

Robot control with sequence programs

FBs for various functions can be used for directly controlling the robot with a sequence program and for controlling (selecting and executing) an existing robot program with a sequence program.

More efficient start-up and adjustment operations

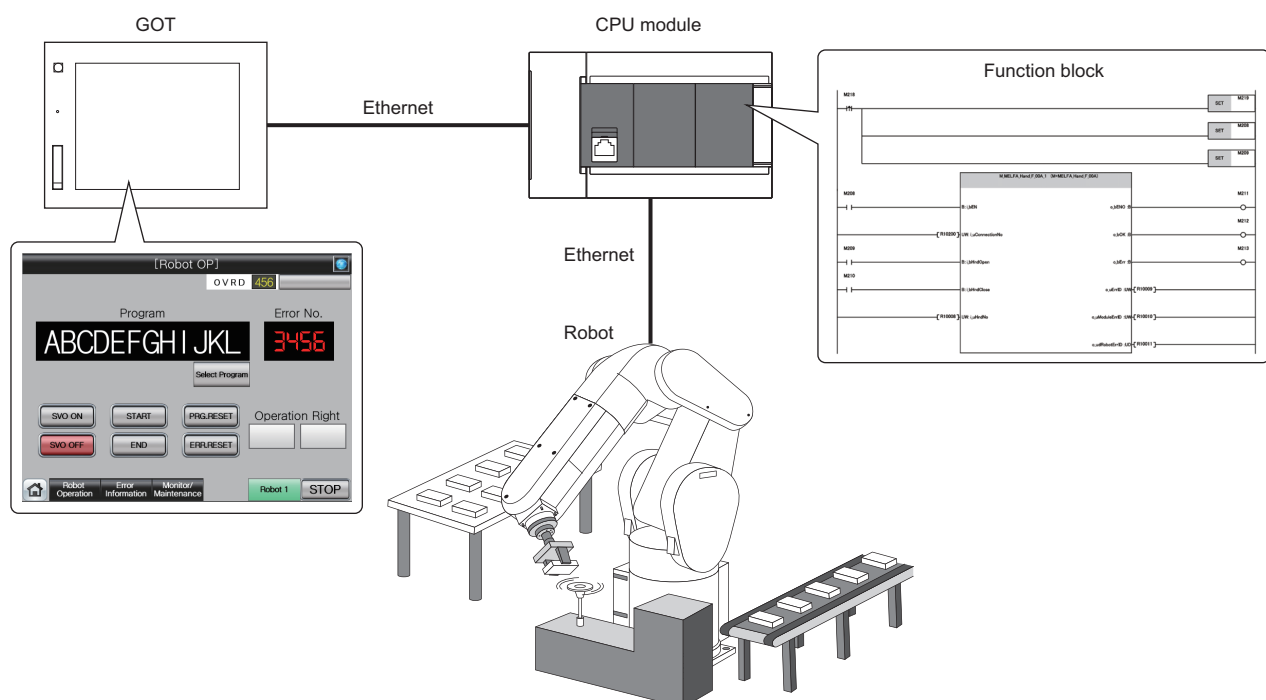
By using the MELSEC iQ-F series and sample programs of the GOT packaged with the FB library, the robot can be easily operated and monitored from the GOT.

Application example

The following shows an example of a device for polishing workpieces using a robot. The FBs control the following operations that the robot performs.

- Grasp the workpiece with the hand.
- Move the robot arm to the position of the polishing machine.
- Move the robot arm to the position of the conveyor after polishing is completed.
- Open the hand and place the workpiece on the conveyor.

The sample window on the GOT can be used on site for JOG operations and various monitoring operations.



1.2 List of FB Libraries

The following table lists the FB libraries.



To use these FB libraries, set the parameters using the engineering tool. (🔗 Page 25 Programmable Controller Settings)

Name*1	Description	Reference
M+MELFA_ConnectionOpen_F (connection establishment)	Opens (establishes) the connection for data communication with the robot controller.	🔗 Page 49 M+MELFA_ConnectionOpen_F (Connection Establishment)
M+MELFA_ConnectionClose_F (connection disconnection)	Closes (disconnects) the connection for data communication with the robot controller.	🔗 Page 54 M+MELFA_ConnectionClose_F (Connection Disconnection)
M+MELFA_GetOperation_F (operation rights acquisition)	Acquires the robot operation rights.	🔗 Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition)
M+MELFA_ReleaseOperation_F (operation rights release)	Releases the acquired robot operation rights.	🔗 Page 64 M+MELFA_ReleaseOperation_F (Operation Rights Release)
M+MELFA_RoboStatusMonitor_F (operating status monitor)	Monitors data related to the operational status of the robot, such as the status of collision detection and the compliance.	🔗 Page 69 M+MELFA_RoboStatusMonitor_F (Operating Status Monitor)
M+MELFA_PosDataMonitor_F (position information monitor)	Monitors the operation direction position information at robot collision.	🔗 Page 76 M+MELFA_PosDataMonitor_F (Position Information Monitor)
M+MELFA_MaintenanceMonitor_F (maintenance information monitor)	Monitors the maintenance information such as the belt remaining time and grease remaining time.	🔗 Page 81 M+MELFA_MaintenanceMonitor_F (Maintenance Information Monitor)
M+MELFA_VariableOperation_F (variable operation)	Operates (reads/writes the contents of) the numeric variable, position variable, and joint variable.	🔗 Page 87 M+MELFA_VariableOperation_F (Variable Operation)
M+MELFA_ProgramOperation_F (program operation)	Operates the robot program (reads the line that is currently being executed).	🔗 Page 97 M+MELFA_ProgramOperation_F (Program Operation)
M+MELFA_MaintenanceOperation_F (maintenance data operation)	Monitors the maximum values of the robot servo data (current value and load factor) and changes the maximum value data to 0.	🔗 Page 103 M+MELFA_MaintenanceOperation_F (Maintenance Data Operation)
M+MELFA_InformationOperation_F (robot information read operation)	Reads the robot error information and product information (such as the robot model and controller version).	🔗 Page 111 M+MELFA_InformationOperation_F (Robot Information Read Operation)
M+MELFA_Hand_F (robot hand operation)	Performs the robot hand operation.	🔗 Page 118 M+MELFA_Hand_F (Robot Hand Operation)
M+MELFA_Jog_F (robot jog operation)	Performs the robot jog operation.	🔗 Page 125 M+MELFA_Jog_F (Robot Jog Operation)
M+MELFA_DedicatedInOut_F (dedicated I/O signal processing)	Performs the robot external signal control such as the robot servo ON/OFF and start/stop.	🔗 Page 133 M+MELFA_DedicatedInOut_F (Dedicated I/O Signal Processing)
M+MELFA_PrgSelect_F (program selection)	Select a program from the ones stored in the robot controller.	🔗 Page 139 M+MELFA_PrgSelect_F (Program Selection)
M+MELFA_Ovrd_F (override I/O)	Reads or changes the robot override.	🔗 Page 144 M+MELFA_Ovrd_F (Override I/O)
M+MELFA_RealTimeMonitor_F (real-time monitor)	Reads and monitors the robot current position and input/output signals using the real-time monitor function of the robot controller.	🔗 Page 150 M+MELFA_RealTimeMonitor_F (Real-time Monitor)
M+MELFA_Direct_Mov_F (joint interpolation)	Executes the joint interpolation control. Use it to control the robot directly from the programmable controller.	🔗 Page 157 M+MELFA_Direct_Mov_F (Joint Interpolation)
M+MELFA_Direct_Mvs_F (linear interpolation)	Executes the linear interpolation control. Use it to control the robot directly from the programmable controller.	🔗 Page 163 M+MELFA_Direct_Mvs_F (Linear Interpolation)
M+MELFA_Direct_Ovrd_F (speed specification)	Specify the overall speed. Use it to control the robot directly from the programmable controller.	🔗 Page 169 M+MELFA_Direct_Ovrd_F (Speed Specification)

Name*1	Description	Reference
M+MELFA_Direct_Spd_F (interpolation operation speed specification)	Specify the speed for the linear or circular interpolation movement. Use it to control the robot directly from the programmable controller.	☞ Page 175 M+MELFA_Direct_Spd_F (Interpolation Operation Speed Specification)
M+MELFA_Direct_Cnt_F (continuous path mode specification)	Specify the continuous path mode. Use it to control the robot directly from the programmable controller.	☞ Page 181 M+MELFA_Direct_Cnt_F (Continuous Path Mode Specification)
M+MELFA_Direct_Accel_F (acceleration and deceleration speed specification)	Specify the acceleration/deceleration rate. Use it to control the robot directly from the programmable controller.	☞ Page 187 M+MELFA_Direct_Accel_F (Acceleration and Deceleration Speed Specification)
M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification)	Specify the optimum acceleration/deceleration speed. Use it in combination with M+MELFA_Direct_LoadSet_F (hand additional condition specification). Use it to control the robot directly from the programmable controller.	☞ Page 193 M+MELFA_Direct_Oadl_F (Optimum Acceleration and Deceleration Specification)
M+MELFA_Direct_LoadSet_F (hand additional condition specification)	Specify the hand's optional condition. Use it in combination with M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification). Use it to control the robot directly from the programmable controller.	☞ Page 198 M+MELFA_Direct_LoadSet_F (Hand Additional Condition Specification)
M+MELFA_Direct_FineP_F (positioning range specification)	Specify the positioning range. Use it to control the robot directly from the programmable controller.	☞ Page 205 M+MELFA_Direct_FineP_F (Positioning Range Specification)

*1 An FB name ends in the FB version information such as "_00A"; however, this reference manual leaves it out.



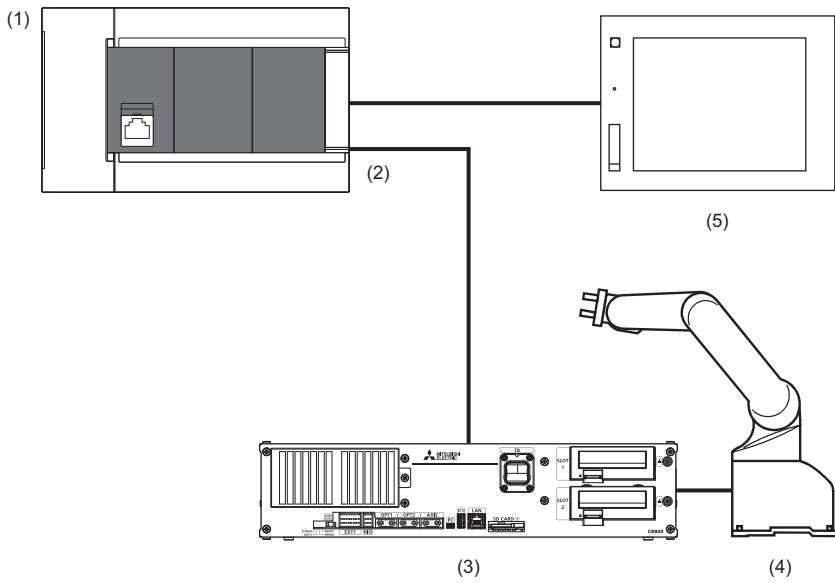
For the FB library, please consult your local Mitsubishi Electric representative.

For the FB library registration method, refer to the following.

GX Works3 Operating Manual

1.3 System Configuration

The following figure shows an example of system configuration for using the FB libraries.



No.	Device	
(1)	CPU module	FX5S CPU module
		FX5UJ CPU module
		FX5U CPU module
		FX5UC CPU module
(2)	Ethernet cable	—
(3)	Robot controller	CR800-D
(4)	Robot	MELFA FR series
		MELFA CR series
(5)	GOT	GT25

2 SPECIFICATIONS

This chapter describes the common specifications of the FB libraries.

2.1 FB Library Specifications

The following table lists the specifications of the FB libraries.

Item	Description
Communication type	Ethernet
Number of connected robot controllers per CPU module	2 units

2.2 List of Global Labels

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

M_MELFA_Progress_F

The data cannot be changed by the user. This area is read-only.

Label	Label name	Data type	Class	Description
G_blnProgress_MELFA_F	Robot FB communication in progress	Bit	VAR_GLOBAL	Use this label as an interlock for TCP/IP communications.
G_udFL1_MELFA_F	Structure flag 1 (Default value)	Double word [unsigned]/bit string [32 bits]	VAR_GLOBAL	Stores the initial value for structure flag 1 acquired when FB[M+MELFA_ConnectionOpen_F (line connection)] is executed.*1
G_udFL2_MELFA_F	Structure flag 2 (Default value)	Double word [unsigned]/bit string [32 bits]	VAR_GLOBAL	Stores the initial value for structure flag 2 acquired when FB[M+MELFA_ConnectionOpen_F (line connection)] is executed.*1
G_stDatatype1_MELFA_F	XYZ data (Command)	M_MELFA_PosData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1 of the real-time monitor function.*1
G_stDatatype2_MELFA_F	Joint data (Command)	M_MELFA_JoiData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID2 of the real-time monitor function.*1
G_stDatatype3_MELFA_F	Motor pulse data (Command)	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID3 of the real-time monitor function.*1
G_stDatatype7_MELFA_F	XYZ data (Encoder feedback value)	M_MELFA_PosData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID7 of the real-time monitor function.*1
G_stDatatype8_MELFA_F	Joint data (Encoder feedback value)	M_MELFA_JoiData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID8 of the real-time monitor function.*1
G_stDatatype9_MELFA_F	Motor pulse data (Encoder feedback value)	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID9 of the real-time monitor function.*1
G_stDatatype10_MELFA_F	Current command [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID10 of the real-time monitor function.*1
G_stDatatype11_MELFA_F	Current feedback [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID11 of the real-time monitor function.*1
G_stDatatype12_MELFA_F	Robot information	M_MELFA_StaData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID12 of the real-time monitor function.*1
G_stDatatype13_MELFA_F	Position droop	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID13 of the real-time monitor function.*1
G_stDatatype14_MELFA_F	Speed (Command) [r/min]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID14 of the real-time monitor function.*1
G_stDatatype15_MELFA_F	Speed (Feedback) [r/min]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID15 of the real-time monitor function.*1
G_stDatatype16_MELFA_F	Axis load level [%]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID16 of the real-time monitor function.*1
G_stDatatype17_MELFA_F	Encoder temperature [°C]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID17 of the real-time monitor function.*1

Label	Label name	Data type	Class	Description
G_stDatetype18_MELFA_F	Encoder miscount	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID18 of the real-time monitor function.*1
G_stDatetype19_MELFA_F	Motor voltage	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID19 of the real-time monitor function.*1
G_stDatetype20_MELFA_F	Regeneration level	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID20 of the real-time monitor function.*1
G_stDatetype21_MELFA_F	Tolerable command - [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID21 of the real-time monitor function.*1
G_stDatetype22_MELFA_F	Tolerable command + [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID22 of the real-time monitor function.*1
G_stDatetype23_MELFA_F	RMS current [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID23 of the real-time monitor function.*1
G_stDatetype101_MELFA_F	Force sensor current position xyz[N]abc[Nm]	M_MELFA_ForData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID101 of the real-time monitor function.*1
G_stDatetype102_MELFA_F	Force sensor original data (after offset cancel) xyz[N]abc[Nm]	M_MELFA_ForData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID102 of the real-time monitor function.*1
G_stDatetype103_MELFA_F	Force sensor original data (before offset cancel) xyz[N]abc[Nm]	M_MELFA_ForData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID103 of the real-time monitor function.*1
G_stDatetype104_MELFA_F	Position command of the force sensor correction	M_MELFA_PosData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID104 of the real-time monitor function.*1
G_stDatetype111_MELFA_F	COL presumed torque [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID111 of the real-time monitor function.*1
G_stDatetype112_MELFA_F	COL threshold + [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID112 of the real-time monitor function.*1
G_stDatetype113_MELFA_F	COL threshold - [0.1% rate]	M_MELFA_PulData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID113 of the real-time monitor function.*1
G_stDatetype1001_MELFA_F	XYZ data (Command) *Angle in degrees	M_MELFA_PosData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1001 of the real-time monitor function.*1
G_stDatetype1002_MELFA_F	Joint data (Command) *Angle in degrees	M_MELFA_JoiData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1002 of the real-time monitor function.*1
G_stDatetype1007_MELFA_F	XYZ data (Feedback) *Angle in degrees	M_MELFA_PosData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1007 of the real-time monitor function.*1
G_stDatetype1008_MELFA_F	Joint data (Feedback) *Angle in degrees	M_MELFA_JoiData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1008 of the real-time monitor function.*1
G_stDatetype1010_MELFA_F	Current command [Arms]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1010 of the real-time monitor function.*1
G_stDatetype1011_MELFA_F	Current feedback [Arms]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1011 of the real-time monitor function.*1
G_stDatetype1012_MELFA_F	Tolerable command - [Arms]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1012 of the real-time monitor function.*1
G_stDatetype1013_MELFA_F	Tolerable command + [Arms]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1013 of the real-time monitor function.*1
G_stDatetype1014_MELFA_F	RMS current [Arms]	M_MELFA_RealData_F(0..1)	VAR_GLOBAL	Stores the receive data for receive data ID1014 of the real-time monitor function.*1
G_stInOutsignal_MELFA_F	Dedicated input/output signal	M_MELFA_InOutData_F(0..1)	VAR_GLOBAL	Stores the receive data for the dedicated I/O signals using the real-time monitor function.*1

*1 The storage location for data acquired from the target robot differs depending on the element of the array type label.

- First robot: Array element 0
- Second robot: Array element 1

2.3 List of Structures

The following table lists the structures used for the FB libraries. Data can be read and written.

Name	Description
M_MELFA_PosData_F	Stores XYZ coordinate system data.
M_MELFA_ErrInfoData_F	Stores error information.
M_MELFA_RobotData_F	Stores robot information.
M_MELFA_StaData_F	Stores status of each robot operation.
M_MELFA_JoiData_F	Stores joint coordinate system data.
M_MELFA_ForData_F	Stores force sensor data of the robot.
M_MELFA_PuiData_F	Stores motor pulse coordinate data or current data of the robot.
M_MELFA_RealData_F	Stores single-precision real number data.
M_MELFA_InOutData_F	Stores status of dedicated input/output signals of the robot controller.

M_MELFA_PosData_F

This structure stores XYZ coordinate system data.

Label	Label name	Data type	Description
eCoord_X	X element	Single-precision real number	Stores the X axis coordinate.
eCoord_Y	Y element	Single-precision real number	Stores the Y axis coordinate.
eCoord_Z	Z element	Single-precision real number	Stores the Z axis coordinate.
eCoord_A	A element	Single-precision real number	Stores the A axis coordinate.
eCoord_B	B element	Single-precision real number	Stores the B axis coordinate.
eCoord_C	C element	Single-precision real number	Stores the C axis coordinate.
eCoord_L1	L1 element (Additional axis 1)	Single-precision real number	Stores the coordinate of additional axis 1.
eCoord_L2	L2 element (Additional axis 2)	Single-precision real number	Stores the coordinate of additional axis 2.
udFL1	FL1(Structure flag 1)	Double word [unsigned]/bit string [32 bits]	Stores the structure flag value.
udFL2	FL2(Structure flag 2)	Double word [unsigned]/bit string [32 bits]	Stores the multi-rotation data value.

M_MELFA_ErrInfoData_F

This structure stores error information.

Label	Label name	Data type	Description
uErrNo	Error number	Word [unsigned]/bit string [16 bits]	Stores the error number.
w12PrgName	Error occurrence program name	Word [signed] (0..11)	Stores the name of a program that causes an error.
uLineNo	Error occurrence line number	Word [unsigned]/bit string [16 bits]	Stores the line number of a line that causes an error.
udDetailNo	Detailed error number	Double word [unsigned]/bit string [32 bits]	Stores the detailed error number.
uSlotNo	Slot number	Word [unsigned]/bit string [16 bits]	Stores the slot number.

M_MELFA_RobotData_F

This structure stores robot information.

Label	Label name	Data type	Description
w20RobotModel	Robot model	Word [signed] (0..19)	Stores the robot model name.
w6CtrlVer	Controller version	Word [signed] (0..5)	Stores the controller version.
w16RobotSer	Robot serial number	Word [signed] (0..15)	Store the serial number of the robot.

M_MELFA_StaData_F

This structure stores status of each robot operation.

Label	Label name	Data type	Description
eFeedbackSpeed	Tool point speed (feedback)	Single-precision real number	Stores the current tool center point speed (feedback value).
eFeedbackDistance	Remaining distance (feedback)	Single-precision real number	Stores the remaining distance (feedback value) for the operation in progress.
eCommandSpeed	Tool point speed (command)	Single-precision real number	Stores the current tool center point speed (CMD).
eCommandDistance	Remaining distance (command)	Single-precision real number	Stores the remaining distance (CMD) for the operation in progress.
eGap	Gap of command and feedback	Single-precision real number	Stores the difference between the commanded position and the feedback position.
uTransportFactor	Transport factor (command)	Word [unsigned]/bit string [16 bits]	Stores the arrival rate (CMD) to the target position.
uAccelerationstate	Acceleration state (command)	Word [unsigned]/bit string [16 bits]	Stores the acceleration state (CMD).
uStepNumber	Step number	Word [unsigned]/bit string [16 bits]	Stores the step number.
sProgramName	Program name	String (6)	Stores the program name.
uContTemp	Controller temperature	Word [unsigned]/bit string [16 bits]	Stores the in-panel temperature.
udMonitorCounter	Monitoring counter	Double word [unsigned]/bit string [32 bits]	Stores the operation counter.

M_MELFA_JoiData_F

This structure stores joint coordinate system data.

Label	Label name	Data type	Description
eCoord_J1	J1 element	Single-precision real number	Stores J1 component.
eCoord_J2	J2 element	Single-precision real number	Stores J2 component.
eCoord_J3	J3 element	Single-precision real number	Stores J3 component.
eCoord_J4	J4 element	Single-precision real number	Stores J4 component.
eCoord_J5	J5 element	Single-precision real number	Stores J5 component.
eCoord_J6	J6 element	Single-precision real number	Stores J6 component.
eCoord_J7	J7 element	Single-precision real number	Stores J7 component.
eCoord_J8	J8 element	Single-precision real number	Stores J8 component.

M_MELFA_ForData_F

This structure stores force sensor data of the robot.

Label	Label name	Data type	Description
eCoord_F1	F1 element	Single-precision real number	Stores F1 component.
eCoord_F2	F2 element	Single-precision real number	Stores F2 component.
eCoord_F3	F3 element	Single-precision real number	Stores F3 component.
eCoord_F4	F4 element	Single-precision real number	Stores F4 component.
eCoord_F5	F5 element	Single-precision real number	Stores F5 component.
eCoord_F6	F6 element	Single-precision real number	Stores F6 component.

M_MELFA_PuIData_F

This structure stores motor pulse coordinate data or current data of the robot.

Label	Label name	Data type	Description
dCoord_M1	M1 element	Double word [signed]	Stores M1 component.
dCoord_M2	M2 element	Double word [signed]	Stores M2 component.
dCoord_M3	M3 element	Double word [signed]	Stores M3 component.
dCoord_M4	M4 element	Double word [signed]	Stores M4 component.
dCoord_M6	M6 element	Double word [signed]	Stores M6 component.
dCoord_M5	M5 element	Double word [signed]	Stores M5 component.
dCoord_M7	M7 element (Additional axis 1)	Double word [signed]	Stores M7 component (additional axis 1).
dCoord_M8	M8 element (Additional axis 2)	Double word [signed]	Stores M8 component (additional axis 2).

M_MELFA_RealData_F

This structure stores single-precision real number data.

Label	Label name	Data type	Description
eCoord_R1	Real value 1	Single-precision real number	Stores real number 1.
eCoord_R2	Real value 2	Single-precision real number	Stores real number 2.
eCoord_R3	Real value 3	Single-precision real number	Stores real number 3.
eCoord_R4	Real value 4	Single-precision real number	Stores real number 4.
eCoord_R5	Real value 5	Single-precision real number	Stores real number 5.
eCoord_R6	Real value 6	Single-precision real number	Stores real number 6.
eCoord_R7	Real value 7	Single-precision real number	Stores real number 7.
eCoord_R8	Real value 8	Single-precision real number	Stores real number 8.

M_MELFA_InOutData_F

This structure stores status of dedicated input/output signals of the robot controller.

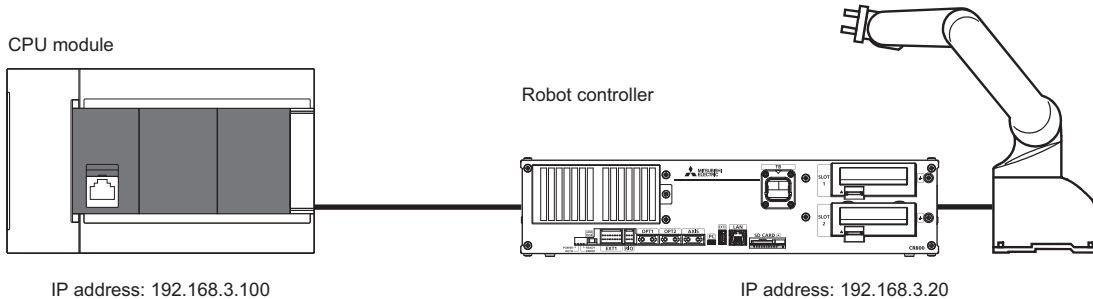
Label	Label name	Data type	Description
dInputSignal	Robot controller dedicated input signal	Double word [signed]	Stores the status of the dedicated input signal for the robot controller.
dOutputSignal	Robot controller dedicated output signal	Double word [signed]	Stores the status of the dedicated output signal for the robot controller.

2.4 Robot Controller Connection

The following parameters must be set according to the number of connected robot controllers.

When one unit is connected

The following figure shows the system configuration in which to connect one robot controller to one CPU module.



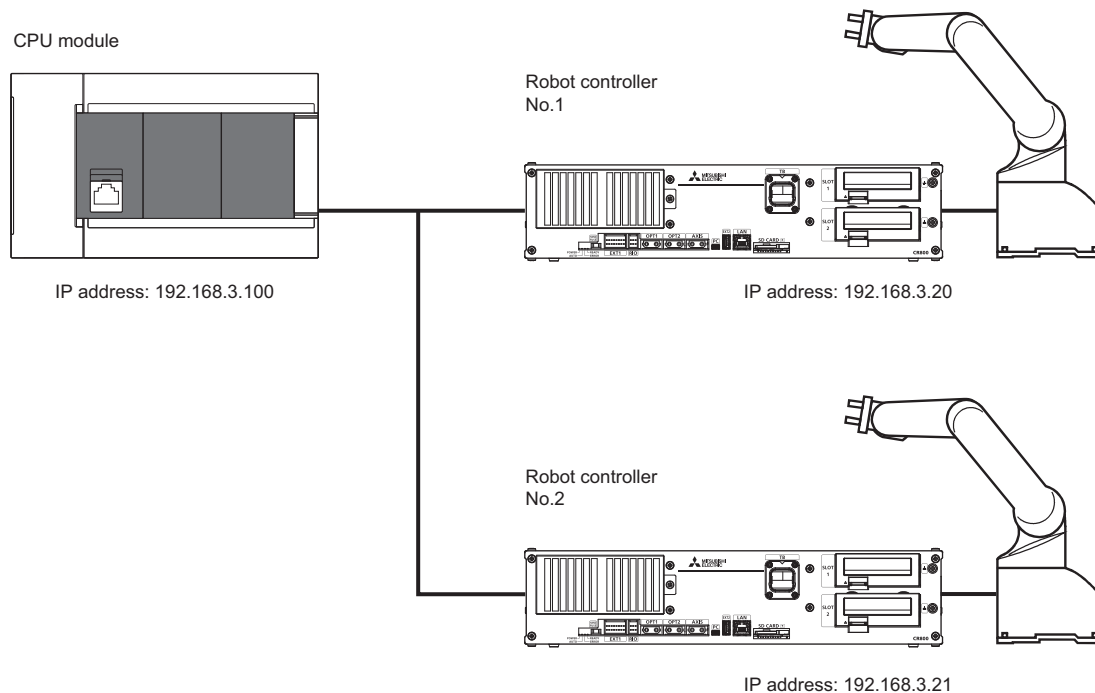
In this FB, three connections are used to control one robot controller.

Always set the connection number for each protocol as shown below. The IP address and port number can be changed in accordance with the environment.

Connection No.	Protocol	CPU module		Robot controller		Remarks
		IP address	Port No.	IP address	Port No.	
1	TCP/IP	192.168.3.100	10009	192.168.3.20	10009	—
2	UDP	192.168.3.100	12000	192.168.3.20	12000	Used as the send port on the CPU module side for the real-time monitor function.
3	UDP	192.168.3.100	12001	192.168.3.20	12001	Used as the receive port on the CPU module side for the real-time monitor function.

When two units are connected

The following figure shows the system configuration in which to connect two robot controllers to one CPU module.



Since three connections are used to control one robot controller in this FB, six connections are required in total. Always set the connection number for each protocol as shown below. The IP address and port number can be changed in accordance with the environment.

Connection No.	Protocol	CPU module		Robot controller		Remarks
		IP address	Port No.	IP address	Port No.	
1	TCP/IP	192.168.3.100	10009	192.168.3.20	10009	—
2	UDP	192.168.3.100	12000	192.168.3.20	12000	Used as the send port on the CPU module side for the real-time monitor function.
3	UDP	192.168.3.100	12001	192.168.3.20	12001	Used as the receive port on the CPU module side for the real-time monitor function.
4	TCP/IP	192.168.3.100	10019	192.168.3.21	10009	—
5	UDP	192.168.3.100	12010	192.168.3.21	12000	Used as the send port on the CPU module side for the real-time monitor function.
6	UDP	192.168.3.100	12011	192.168.3.21	12011	Used as the receive port on the CPU module side for the real-time monitor function.

2.5 Programmable Controller Settings

This section describes the setting method for connecting a CPU module and robot controller via Ethernet using GX Works3.

Own node settings

Set the IP address and subnet mask of the CPU module to be used.

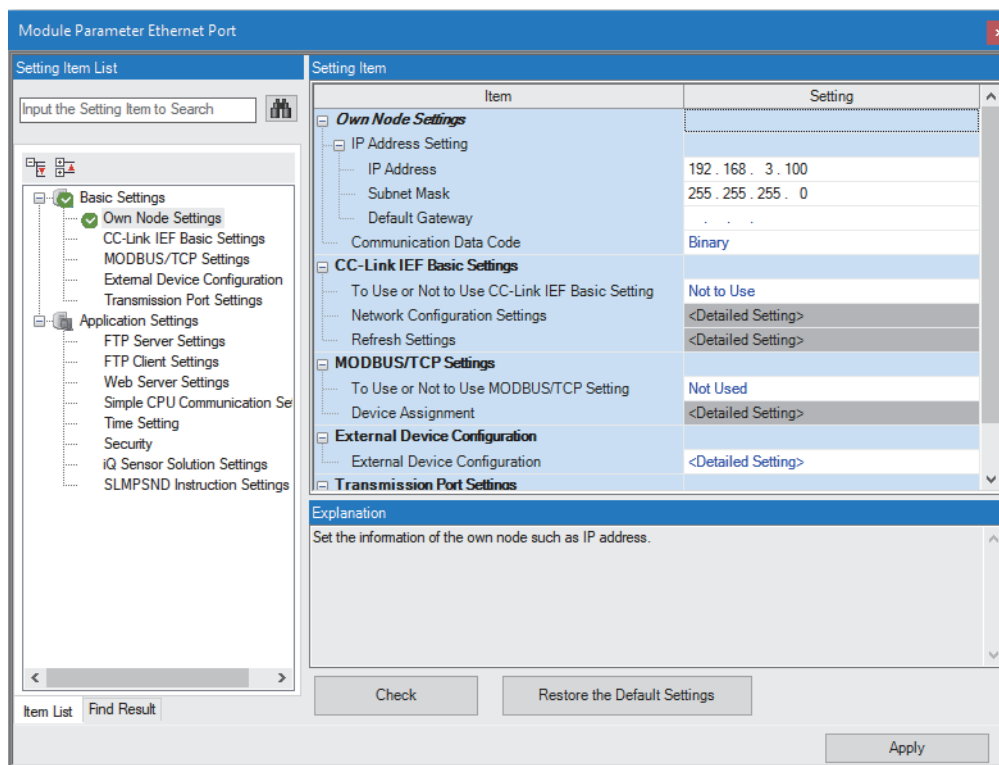
1. Open the Ethernet port setting window.

Navigation window ⇒ [Parameter] ⇒ CPU module ⇒ [Module Parameter] ⇒ [Ethernet Port]

2. Configure the own node settings.

[Basic Settings] ⇒ [Own Node Settings]

Item	Setting example
IP address	192.168.3.100
Subnet mask	255.255.255.0



Network configuration settings

1. Open the Ethernet port setting window.

Navigation window ⇒ [Parameter] ⇒ CPU module ⇒ [Module Parameter] ⇒ [Ethernet Port]

2. Configure the external device connection configuration settings.

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

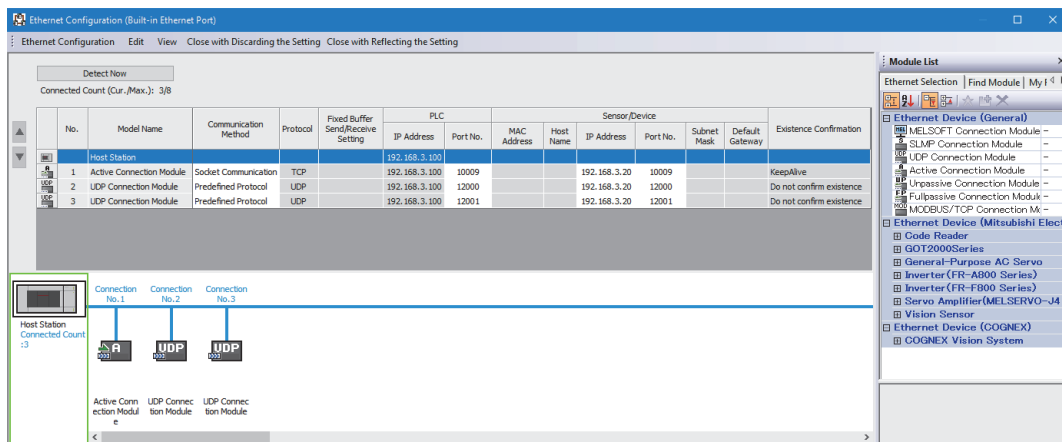
3. In the FB libraries, three sequentially numbered connections are used for one robot controller.

Set devices according to the number of robots to be used.

- Page 26 When one robot controller is connected
- Page 27 When two robot controllers are connected

When one robot controller is connected

1. From "Ethernet Device (General)", add or set "Active Connection Module" for connection number 1 and "UDP Connection Module" for connection numbers 2 and 3.



Connection number	Model Name	Communication Method	PLC		Sensor/Device	
			Port No.	IP Address	IP Address	Port No.
1	Active Connection Module	Socket Communication	10009	192.168.3.20	192.168.3.20	10009
2	UDP Connection Module	Predefined Protocol	12000	192.168.3.20	192.168.3.20	12000
3	UDP Connection Module	Predefined Protocol	12001	192.168.3.20	192.168.3.20	12001

2. Click [Close with Reflecting the Setting] to close the window.

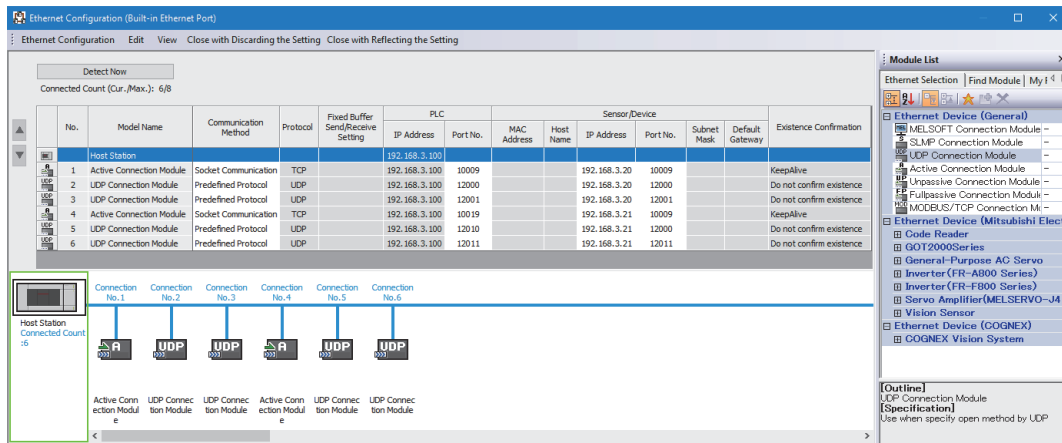
When two robot controllers are connected

1. Connect the first robot controller.

From "Ethernet Device (General)", add or set "Active Connection Module" for connection number 1 and "UDP Connection Module" for connection numbers 2 and 3.

2. Connect the second robot controller.

From "Ethernet Device (General)", add or set "Active Connection Module" for connection number 4 and "UDP Connection Module" for connection numbers 5 and 6.



Connection number	Model Name	Communication Method	PLC		Sensor/Device		Connected Count
			Port No.	IP Address	Port No.	IP Address	
1	Active Connection Module	Socket Communication	10009	192.168.3.20	10009	192.168.3.20	1st
2	UDP Connection Module	Predefined Protocol	12000	192.168.3.20	12000	192.168.3.20	
3	UDP Connection Module	Predefined Protocol	12001	192.168.3.20	12001	192.168.3.20	
4	Active Connection Module	Socket Communication	10019	192.168.3.21	10009	192.168.3.21	2nd
5	UDP Connection Module	Predefined Protocol	12010	192.168.3.21	12000	192.168.3.21	
6	UDP Connection Module	Predefined Protocol	12011	192.168.3.21	12011	192.168.3.21	

3. Click [Close with Reflecting the Setting] to close the window.

Precautions

The CPU module port number for connection numbers 3 and 6 must be set to the same as the port number on the robot controller. If different port numbers are set, some data from the robot controller cannot be received.

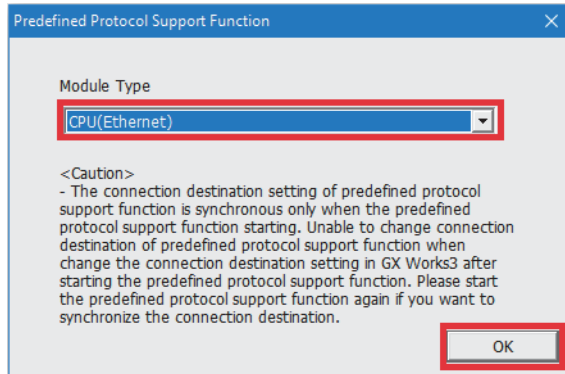
Predefined protocol support function settings

Set the predefined protocol support function using the predefined protocol setting file for communicating with the robot controller (IndRobMELFA_F.tpx)*1.

*1 The protocol setting file is stored in the FB libraries of the data downloaded from the Mitsubishi Electric FA website.

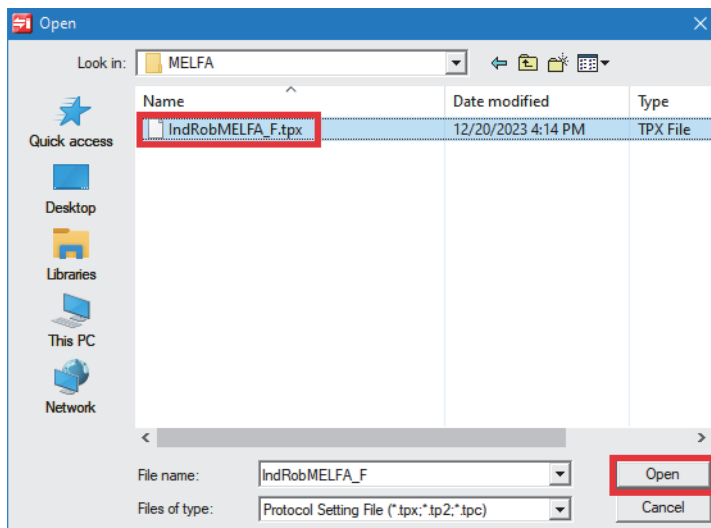
1. Using the predefined protocol support function of GX Works3, select "CPU(Ethernet)" and press the [OK] button.

[Tool] ⇒ [Predefined Protocol Support Function]



2. From the menu of the predefined protocol support function, open the protocol setting file (IndRobMELFA_F.tpx).

[File] ⇒ [Open]



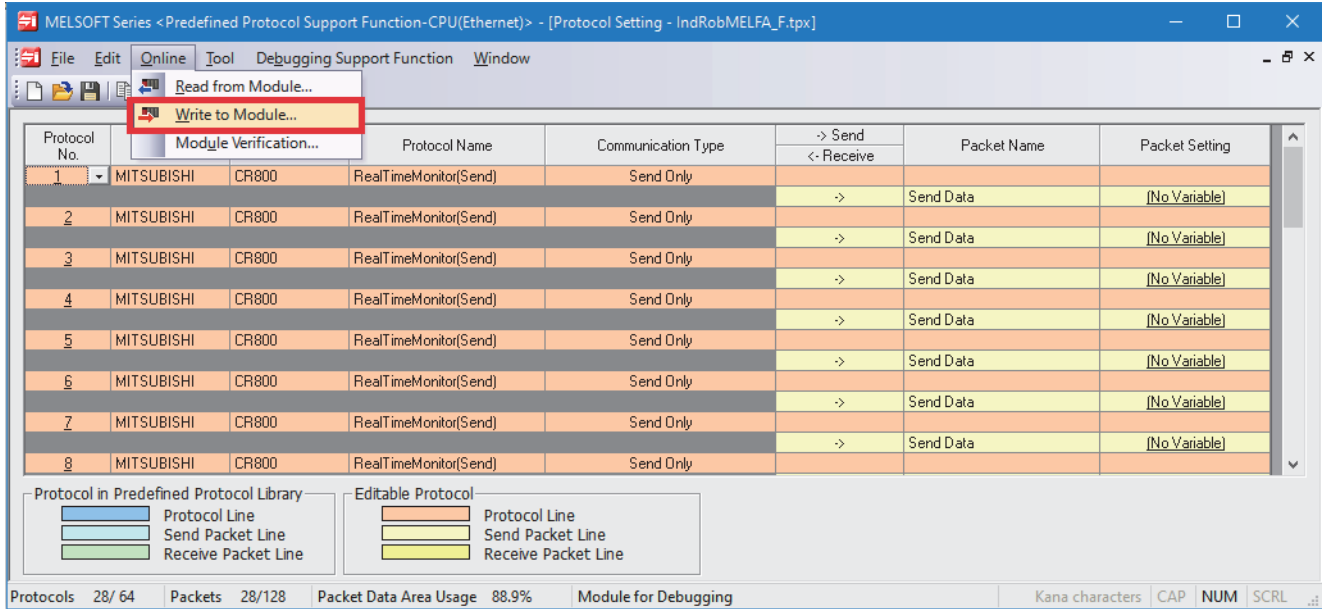
3. From the menu of the predefined protocol support function, write the settings to the CPU module.

[Online] ⇒ [Write to Module]

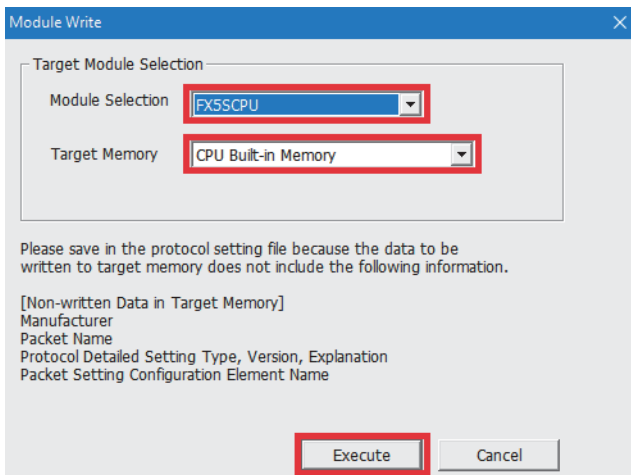
Point

If the area used by the file register overlaps with a different program, change the settings referring to the following.

Page 38 Send/receive data storage device settings



4. In the "Module Write" window, select the module, check that the target memory is selected as shown below, and press the [Execute] button.



Protocol setting file contents

In the protocol setting file, protocol settings for two robots are configured in advance. The protocol number used for the second robot starts with 15 and the range of devices used from the starting position starts from the 96th word. For the protocol numbers and devices used, refer to the following.

○: Used, △: Not used

Protocol No.	Robot connection	Description	Device	Reference	
1	Used for the first robot.	Send protocol	△	☞ Page 31 Monitor data combination 1	
2		Send protocol	△	☞ Page 32 Monitor data combination 2	
3		Send protocol	△	☞ Page 32 Monitor data combination 3	
4		Send protocol	△	☞ Page 33 Monitor data combination 4	
5		Send protocol	△	☞ Page 33 Monitor data combination 5	
6		Send protocol	△	☞ Page 34 Monitor data combination 6	
7		Send protocol	△	☞ Page 34 Monitor data combination 7	
8		Send protocol	△	☞ Page 35 Monitor data combination 8	
9		Send protocol	△	☞ Page 35 Monitor data combination 9	
10		Send protocol	△	☞ Page 36 Monitor data combination 10	
11		Send protocol	△	☞ Page 36 Monitor data combination 11	
12		Send protocol	○*1	☞ Page 37 Monitor data combination 12	
13			Communication end process command This protocol sends the communication end process command to the robot controller.	△	—
14			Receive protocol This receive protocol is used to receive data for all send protocols.	○	—
15	Used for the second robot.	Send protocol	△	☞ Page 31 Monitor data combination 1	
16		Send protocol	△	☞ Page 32 Monitor data combination 2	
17		Send protocol	△	☞ Page 32 Monitor data combination 3	
18		Send protocol	△	☞ Page 33 Monitor data combination 4	
19		Send protocol	△	☞ Page 33 Monitor data combination 5	
20		Send protocol	△	☞ Page 34 Monitor data combination 6	
21		Send protocol	△	☞ Page 34 Monitor data combination 7	
22		Send protocol	△	☞ Page 35 Monitor data combination 8	
23		Send protocol	△	☞ Page 35 Monitor data combination 9	
24		Send protocol	△	☞ Page 36 Monitor data combination 10	
25		Send protocol	△	☞ Page 36 Monitor data combination 11	
26		Send protocol	○*1	☞ Page 37 Monitor data combination 12	
27			Communication end process command This protocol sends the communication end process command to the robot controller.	△	—
28			Receive protocol This receive protocol is used to receive data for all send protocols.	○	—

*1 The device is used because the user can arbitrarily define the data type ID and I/O signals.

Data type IDs of the real-time monitor registered to the protocol setting file (IndRobMELFA_F.tpx) are shown. For details on data type IDs, refer to the robot controller manual.

In the monitor data combination example, only the protocols for the first robot are described. The protocol settings are the same for the second robot.

Ex.

Protocol No.1 and protocol No.14

Specify data type IDs 7, 12, 101, and 104 in protocol No.1 and send the command to start real-time monitoring from the programmable controller to the robot controller.

Replies on data type IDs 7, 12, 101, and 104 from the robot controller are received at protocol No.14 and the replies are stored in the device of the programmable controller.

In this protocol setting file, the start device is assigned as R15000 in advance. If the area used by the file register overlaps with a different program, change the device referring to the following.

☞ Page 38 Send/receive data storage device settings

■ Monitor data combination 1

Protocol No.1 (first robot), 15 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
7	Return data type 1	—	—	6
	XYZ data (Feedback) *Angle in radians	POSE	—	7-26
12	Return data type 2	—	—	33
	Robot information	ROBMON	—	34-53
101	Return data type 3	—	—	54
	Force sensor current position xyz[N]abc[Nm]	FORCE (Float × 8)	—	55-74
104	Return data type 4	—	—	75
	Position command of the force sensor correction	POSE	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■Monitor data combination 2

Protocol No.2 (first robot), 16 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
8	Return data type 1	—	—	6
	Joint data (Feedback) *Angle in radians	JOINT	—	7-26
12	Return data type 2	—	—	33
	Robot information	ROBMON	—	34-53
15	Return data type 3	—	—	54
	Speed (Feedback) [r/min]	PULSE (Long × 8)	—	55-74
1011	Return data type 4	—	—	75
	Current feedback [Arms]	FLOAT8 (Float × 8)	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■Monitor data combination 3

Protocol No.3 (first robot), 17 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
12	Return data type 1	—	—	6
	Robot information	ROBMON	—	7-26
15	Return data type 2	—	—	33
	Speed (Feedback) [r/min]	PULSE (Long × 8)	—	34-53
16	Return data type 3	—	—	54
	Axis load level [%]	FLOAT8 (Float × 8)	—	55-74
1011	Return data type 4	—	—	75
	Current feedback [Arms]	FLOAT8 (Float × 8)	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■ Monitor data combination 4

Protocol No.4 (first robot), 18 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
15	Return data type 1	—	—	6
	Speed (Feedback) [r/min]	PULSE (Long × 8)	—	7-26
19	Return data type 2	—	—	33
	Motor power voltage [V]	PULSE (Long × 8)	—	34-53
20	Return data type 3	—	—	54
	Regeneration level [%]	PULSE (Long × 8)	—	55-74
1011	Return data type 4	—	—	75
	Current feedback [Arms]	FLOAT8 (Float × 8)	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■ Monitor data combination 5

Protocol No.5 (first robot), 19 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
1	Return data type 1	—	—	6
	XYZ data (Command) *Angle in radians	POSE	—	7-26
2	Return data type 2	—	—	33
	Joint data (Command) *Angle in radians	JOINT	—	34-53
3	Return data type 3	—	—	54
	Motor pulse data (Command)	PULSE (Long × 8)	—	55-74
9	Return data type 4	—	—	75
	Motor pulse data (Encoder feedback value)	PULSE (Long × 8)	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■ Monitor data combination 6

Protocol No.6 (first robot), 20 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
10	Return data type 1	—	—	6
	Current command [0.1% rate]	PULSE (Long × 8)	—	7-26
11	Return data type 2	—	—	33
	Current feedback [0.1% rate]	PULSE (Long × 8)	—	34-53
13	Return data type 3	—	—	54
	Position droop	PULSE (Long × 8)	—	55-74
14	Return data type 4	—	—	75
	Speed (Command) [r/min]	PULSE (Long × 8)	—	76-95
Input/output No.	Description	Range of devices used from the starting position		
		Send	Receive	
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30	
10,000 to 10,031		—	31-32	
—	Input signal head bit No.	—	27	
—	Output signal head bit No.	—	28	

■ Monitor data combination 7

Protocol No.7 (first robot), 21 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
17	Return data type 1	—	—	6
	Encoder temperature [°C]	PULSE (Long × 8)	—	7-26
18	Return data type 2	—	—	33
	Encoder miscount	PULSE	—	34-53
21	Return data type 3	—	—	54
	Tolerable command - [0.1% rate]	PULSE (Long × 8)	—	55-74
22	Return data type 4	—	—	75
	Tolerable command + [0.1% rate]	PULSE (Long × 8)	—	76-95
Input/output No.	Description	Range of devices used from the starting position		
		Send	Receive	
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30	
10,000 to 10,031		—	31-32	
—	Input signal head bit No.	—	27	
—	Output signal head bit No.	—	28	

■ Monitor data combination 8

Protocol No.8 (first robot), 22 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
23	Return data type 1	—	—	6
	RMS current [0.1% rate]	PULSE (Long × 8)	—	7-26
102	Return data type 2	—	—	33
	Force sensor original data (after offset cancel) xyz[N]abc[Nm]	FORCE (Float × 8)	—	34-53
103	Return data type 3	—	—	54
	Force sensor original data (before offset cancel) xyz[N]abc[Nm]	FORCE (Float × 8)	—	55-74
111	Return data type 4	—	—	75
	COL presumed torque [0.1% rate]	PULSE (Long × 8)	—	76-95
Input/output No.	Description	Range of devices used from the starting position		
		Send	Receive	
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30	
10,000 to 10,031		—	31-32	
—	Input signal head bit No.	—	27	
—	Output signal head bit No.	—	28	

■ Monitor data combination 9

Protocol No.9 (first robot), 23 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
112	Return data type 1	—	—	6
	COL threshold + [0.1% rate]	PULSE (Long × 8)	—	7-26
113	Return data type 2	—	—	33
	COL threshold - [0.1% rate]	PULSE (Long × 8)	—	34-53
1010	Return data type 3	—	—	54
	Current command [Arms]	FLOAT8 (Float × 8)	—	55-74
1012	Return data type 4	—	—	75
	Tolerable command - [Arms]	FLOAT8 (Float × 8)	—	76-95
Input/output No.	Description	Range of devices used from the starting position		
		Send	Receive	
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30	
10,000 to 10,031		—	31-32	
—	Input signal head bit No.	—	27	
—	Output signal head bit No.	—	28	

■ Monitor data combination 10

Protocol No.10 (first robot), 24 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
1001	Return data type 1	—	—	6
	XYZ data (Command) *Angle in degrees	POSE	—	7-26
1002	Return data type 2	—	—	33
	Joint data (Command) *Angle in degrees	JOINT	—	34-53
1007	Return data type 3	—	—	54
	XYZ data (Feedback) *Angle in degrees	POSE	—	55-74
1008	Return data type 4	—	—	75
	Joint data (Feedback) *Angle in degrees	JOINT	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■ Monitor data combination 11

Protocol No.11 (first robot), 25 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
1013	Return data type 1	—	—	6
	Tolerable command + [Arms]	FLOAT8 (Float × 8)	—	7-26
1014	Return data type 2	—	—	33
	RMS current [Arms]	FLOAT8 (Float × 8)	—	34-53
0	No data	—	—	54
				55-74
0	No data	—	—	75
				76-95


Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
10,000 to 10,031	☞ Page 37 I/O signal assignment	—	29-30
10,000 to 10,031		—	31-32
—	Input signal head bit No.	—	27
—	Output signal head bit No.	—	28

■ Monitor data combination 12

This protocol allows any data type ID to be set and monitored in accordance with the specifications of the real-time monitor function of the robot controller.

Protocol No.12 (first robot), 25 (second robot)

Data type ID	Name	Data type	Range of devices used from the starting position	
			Send	Receive
Any value	Return data type 1	—	0	6
	Output data 1	—	—	7-26
Any value	Return data type 2	—	3	33
	Output data 2	—	—	34-53
Any value	Return data type 3	—	4	54
	Output data 3	—	—	55-74
Any value	Return data type 4	—	5	75
	Output data 4	—	—	76-95

Input/output No.	Description	Range of devices used from the starting position	
		Send	Receive
Any value	 Page 37 I/O signal assignment	—	29-30
Any value		—	31-32
Any value	Input signal head bit No.	1	27
Any value	Output signal head bit No.	2	28


■ I/O signal assignment

Parameters assigned to I/O signals 10000 to 10031 using the robot controller can be monitored with I/O signals. For the setting method of the robot controller, refer to Robot Controller Settings.

Input signal No.	Parameter	Description
10000	STOP2	Stop input
10002	START	Start input
10001	IOENA	Operation rights input
10003	ERRRESET	Error reset input
10004	SRVON	Servo ON input
10005	SRVOFF	Servo OFF input
10006-10031	(Assign any parameters.)* ¹	—

Output signal No.	Parameter	Description
10000	STOP2	Pausing output
10001	ATTOPMD	In automatic mode output
10002	TEACHMD	Teaching mode output
10003	IOENA	Operation rights output
10004	START	Operating output
10005	ERRRESET	Error occurring output
10006	SRVON	In servo ON output
10007	SRVOFF	In servo OFF output
10008-10015	HNDSTS1	Hand input signal status
10016-10023	HNDCTRL1	Hand output signal status
10024-10031	(Assign any parameters.)* ¹	—

*1 I/O signals are not assigned in this reference. However, the status of any I/O signals can be monitored by configuring the robot controller settings. For details on the setting method, refer to the following.

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

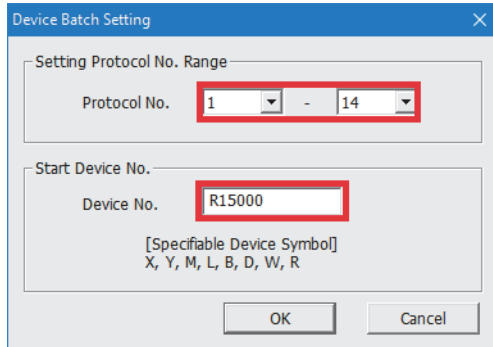
Send/receive data storage device settings

If the area used by the file register overlaps with a different program, the area used by the file register in this sample program needs to be changed. Configure the settings from the menu of the predefined protocol support function.

Ex.

When R15000 is the initial device

 [Edit] ⇒ [Device Batch Setting]

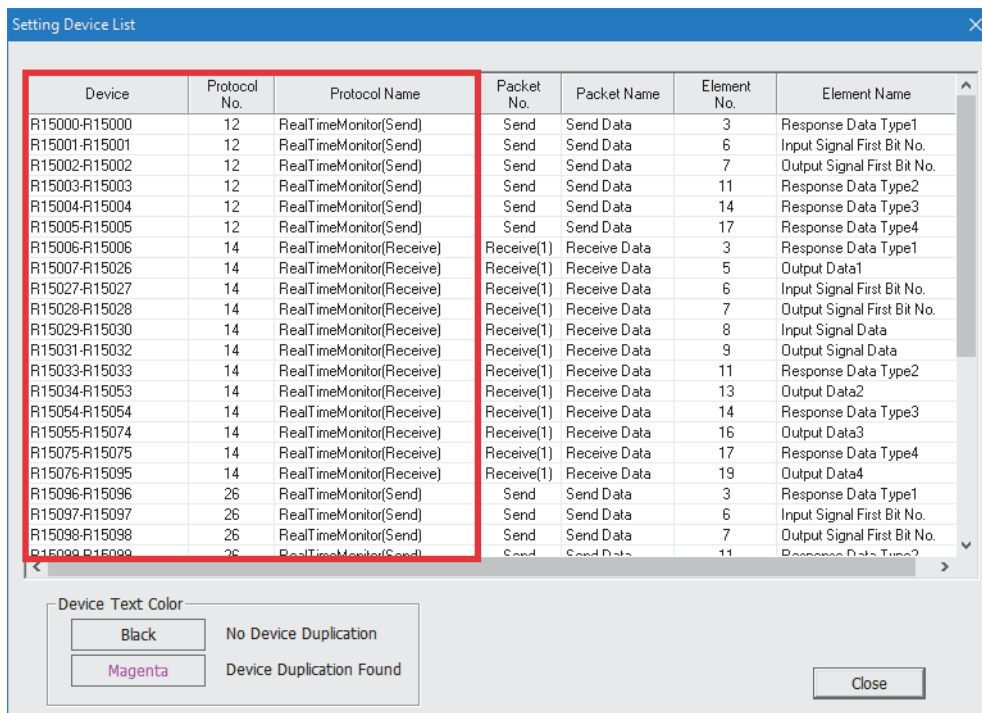


Setting item	Setting value	Remarks
Protocol No.	1-14	This setting is for supporting one robot. To support multiple pieces of equipment, match the setting values to the protocol numbers added.
Device No.	Any device No.	—

How to check device usage

Assigned devices can be checked from the menu of the predefined protocol support function.

 [Tool] ⇒ [Setting Device List]



Device	Protocol No.	Protocol Name	Packet No.	Packet Name	Element No.	Element Name
R15000-R15000	12	RealTimeMonitor(Send)	Send	Send Data	3	Response Data Type1
R15001-R15001	12	RealTimeMonitor(Send)	Send	Send Data	6	Input Signal First Bit No.
R15002-R15002	12	RealTimeMonitor(Send)	Send	Send Data	7	Output Signal First Bit No.
R15003-R15003	12	RealTimeMonitor(Send)	Send	Send Data	11	Response Data Type2
R15004-R15004	12	RealTimeMonitor(Send)	Send	Send Data	14	Response Data Type3
R15005-R15005	12	RealTimeMonitor(Send)	Send	Send Data	17	Response Data Type4
R15006-R15006	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	3	Response Data Type1
R15007-R15026	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	5	Output Data1
R15027-R15027	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	6	Input Signal First Bit No.
R15028-R15028	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	7	Output Signal First Bit No.
R15029-R15030	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	8	Input Signal Data
R15031-R15032	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	9	Output Signal Data
R15033-R15033	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	11	Response Data Type2
R15034-R15053	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	13	Output Data2
R15054-R15054	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	14	Response Data Type3
R15055-R15074	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	16	Output Data3
R15075-R15075	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	17	Response Data Type4
R15076-R15095	14	RealTimeMonitor(Receive)	Receive(1)	Receive Data	19	Output Data4
R15096-R15096	26	RealTimeMonitor(Send)	Send	Send Data	3	Response Data Type1
R15097-R15097	26	RealTimeMonitor(Send)	Send	Send Data	6	Input Signal First Bit No.
R15098-R15098	26	RealTimeMonitor(Send)	Send	Send Data	7	Output Signal First Bit No.
R15099-R15099	26	RealTimeMonitor(Send)	Send	Send Data	11	Response Data Type2

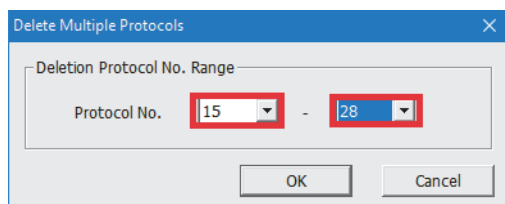
Under default settings, R15000 to R15095 are assigned for the first robot and the points of file registers used per robot controller are 96 words.

When only one robot controller is connected and used


Settings for two robot controllers are configured in the protocol setting file (IndRobMELFA_F.tpx) in advance.

1. When using only one robot controller, delete protocol numbers 15 to 28.


 [Edit] ⇒ [Delete Multiple Protocols]



2. Configure device settings.

 Page 38 Send/receive data storage device settings

3. After configuring device settings, write data to the programmable controller.

 [Online] ⇒ [Write to Module]

Global label settings

In the FB libraries, device values assigned to M_MELFA_Progress_F (global label) are used for the display in the GOT sample window. Under default settings, R16000 to R16591 are used. When using a different device, change the global label settings following the steps below.

1. Create a new global label.

Navigation window ⇒ [Label] ⇒ [Global Label] ⇒ [Global]

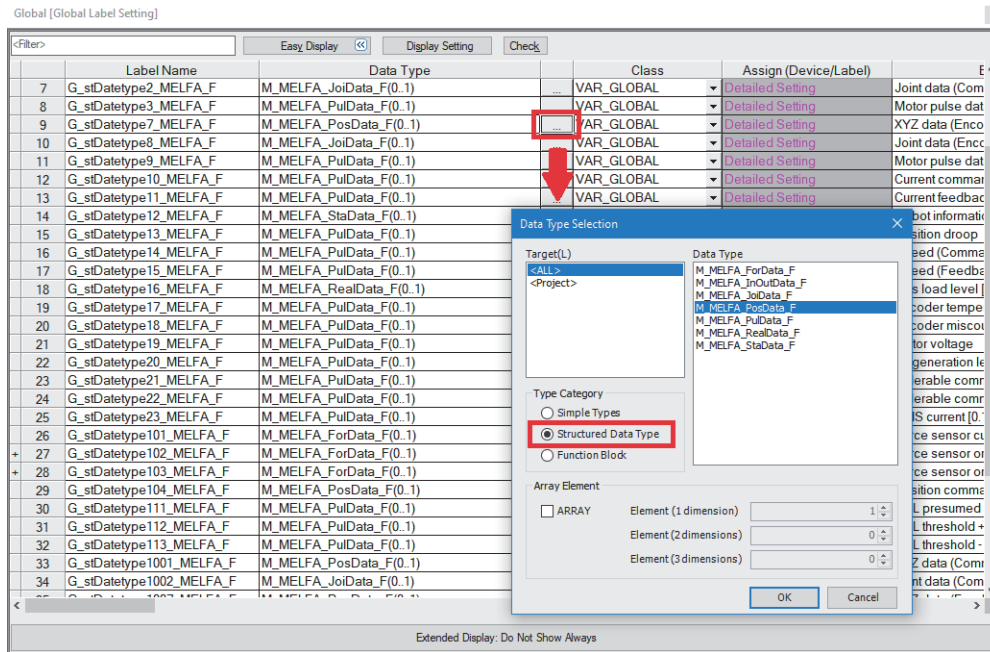
- Data type: Global label
- Data name: M_MELFA_Progress_F

2. Set global labels to the global label data created in Step 1 as follows.

When the user enters the data, refer to List of Global Labels. (Page 18 List of Global Labels)

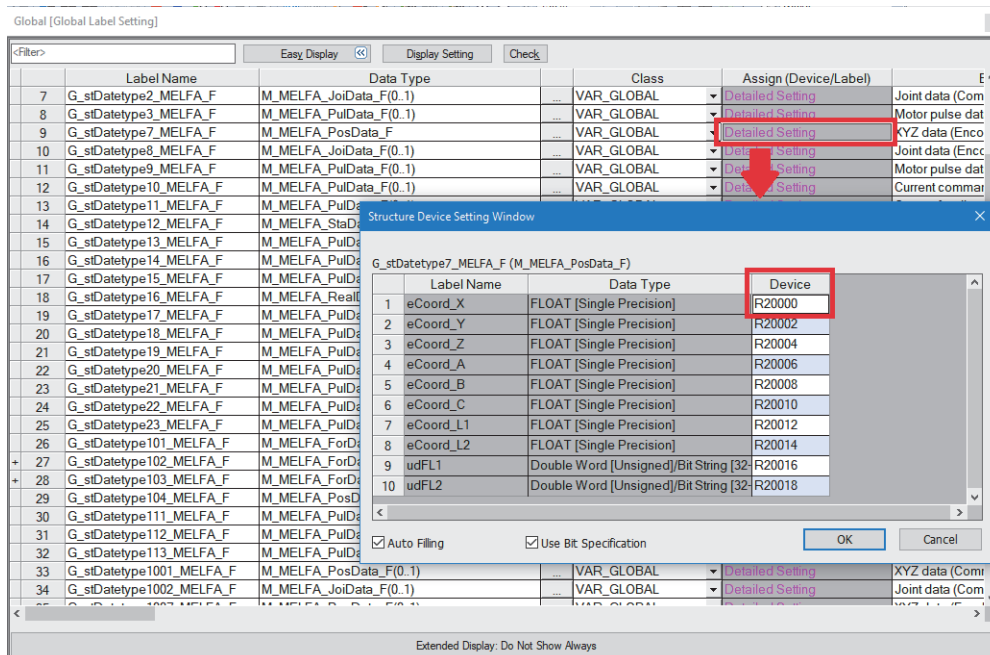
	Label Name	Data Type	Class	English(Display Target)
1	G_binProgress_MELFA_F	Bit	VAR_GLOBAL	Robot FB communication in progress
2				
3	G_udFL1_MELFA_F	Double Word [Unsigned]/Bit String [32-bit](0.1)	VAR_GLOBAL	Structure flag 1 (Default value)
4	G_udFL2_MELFA_F	Double Word [Unsigned]/Bit String [32-bit](0.1)	VAR_GLOBAL	Structure flag 2 (Default value)
5				
6	G_stDateType1_MELFA_F	M_MELFA_PosData_F(0.1)	VAR_GLOBAL	XYZ data (Command)
7	G_stDateType2_MELFA_F	M_MELFA_JoiData_F(0.1)	VAR_GLOBAL	Joint data (Command)
8	G_stDateType3_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Motor pulse data (Command)
9	G_stDateType7_MELFA_F	M_MELFA_PosData_F(0.1)	VAR_GLOBAL	XYZ data (Encoder feedback value)
10	G_stDateType8_MELFA_F	M_MELFA_JoiData_F(0.1)	VAR_GLOBAL	Joint data (Encoder feedback value)
11	G_stDateType9_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Motor pulse data (Encoder feedback value)
12	G_stDateType10_MELFA_F	M_MELFA_JoiData_F(0.1)	VAR_GLOBAL	Current command [0.1% rate]
13	G_stDateType11_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Current feedback [0.1% rate]
14	G_stDateType12_MELFA_F	M_MELFA_StaData_F(0.1)	VAR_GLOBAL	Robot information
15	G_stDateType13_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Position droop
16	G_stDateType14_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Speed (Command) [rpm]
17	G_stDateType15_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Speed (Feedback) [rpm]
18	G_stDateType16_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	Axis load level [%]
19	G_stDateType17_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Encoder temperature [°C]
20	G_stDateType18_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Encoder miscount
21	G_stDateType19_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Motor voltage
22	G_stDateType20_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Regeneration level
23	G_stDateType21_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Tolerable command - [0.1% rate]
24	G_stDateType22_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	Tolerable command + [0.1% rate]
25	G_stDateType23_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	RMS current [0.1% rate]
26	G_stDateType101_MELFA_F	M_MELFA_ForData_F(0.1)	VAR_GLOBAL	Force sensor current position xyz[N]abc[Nm]
27	G_stDateType102_MELFA_F	M_MELFA_ForData_F(0.1)	VAR_GLOBAL	Force sensor original data (after offset cancel)
28	G_stDateType103_MELFA_F	M_MELFA_ForData_F(0.1)	VAR_GLOBAL	Force sensor original data (before offset cancel)
29	G_stDateType104_MELFA_F	M_MELFA_PosData_F(0.1)	VAR_GLOBAL	Position command of the force sensor correction
30	G_stDateType111_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	COL presumed torque [0.1% rate]
31	G_stDateType112_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	COL threshold + [0.1% rate]
32	G_stDateType113_MELFA_F	M_MELFA_PuiData_F(0.1)	VAR_GLOBAL	COL threshold - [0.1% rate]
33	G_stDateType1001_MELFA_F	M_MELFA_PosData_F(0.1)	VAR_GLOBAL	XYZ data (Command) *Angle in degrees
34	G_stDateType1002_MELFA_F	M_MELFA_JoiData_F(0.1)	VAR_GLOBAL	Joint data (Command) *Angle in degrees
35	G_stDateType1007_MELFA_F	M_MELFA_PosData_F(0.1)	VAR_GLOBAL	XYZ data (Feedback) *Angle in degrees
36	G_stDateType1008_MELFA_F	M_MELFA_JoiData_F(0.1)	VAR_GLOBAL	Joint data (Feedback) *Angle in degrees
37	G_stDateType1010_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	Current command [Arms]
38	G_stDateType1011_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	Current feedback [Arms]
39	G_stDateType1012_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	Tolerable command - [Arms]
40	G_stDateType1013_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	Tolerable command + [Arms]
41	G_stDateType1014_MELFA_F	M_MELFA_RealData_F(0.1)	VAR_GLOBAL	RMS current [Arms]
42	G_stInOutsignal_MELFA_F	M_MELFA_InOutData_F(0.1)	VAR_GLOBAL	Dedicated input/output signal

When setting the data type to structure, select the type classification in the "Data Type Selection" window and select the target structure from the data type list.



2

3. Change the devices assigned to each global label to the devices to be used. To automatically assign devices, select the "Auto Filling" checkbox and set the head device to the No.1 label in "Structure Device Setting Window". For a structure array, setting the head device will enter devices sequentially.



4. Change the devices linked with the GOT sample window according to the devices assigned to the set global label.

Precautions

When a latch device is set, an error occurs during conversion due to a mismatch with the global label class settings. When using a latch device, set the class to VAR_GLOBAL_RETAIN.

2.6 Robot Controller Settings

Socket communications function and real-time monitor function settings

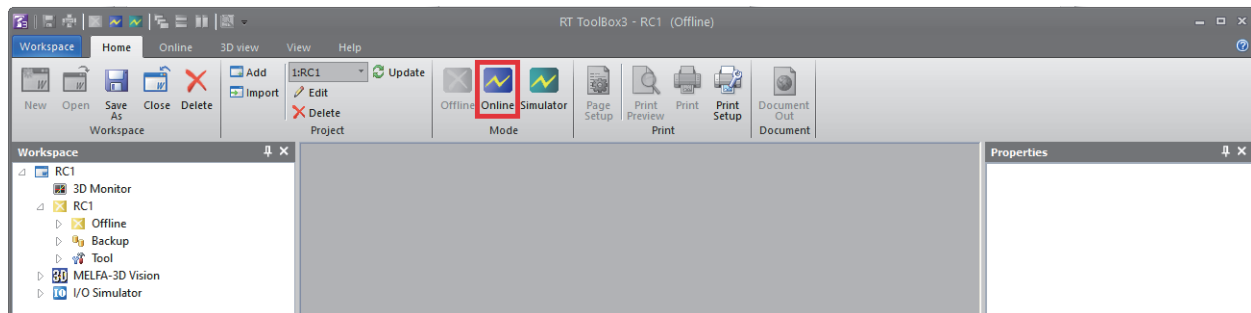
This section describes the setting method for connecting the CPU module with the robot controller via Ethernet using RT ToolBox3 and using the socket communications function and real-time monitor function.

Point

When connecting two robot controllers, configure settings for the second controller in the same procedure as the first one.

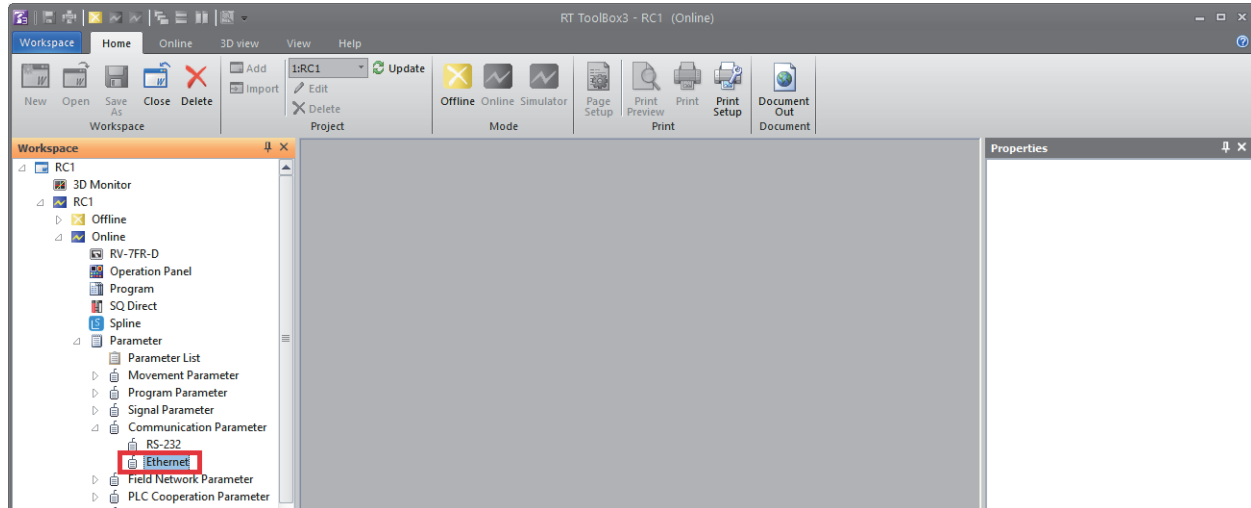
1. Change the operation mode to online and connect the module with the robot controller.

[Home] ⇒ [Online]



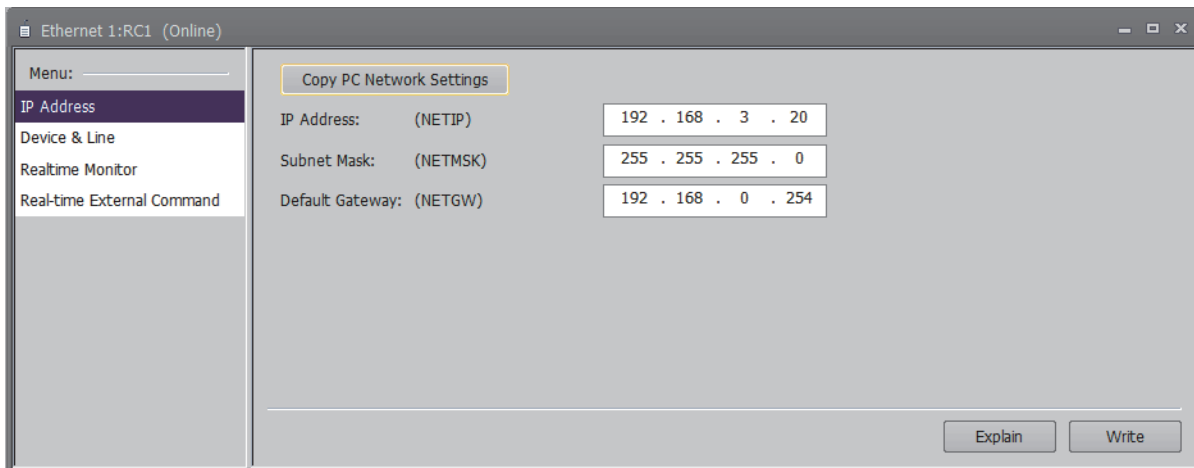
2. Set the parameters.

Workspace ⇒ [Online] ⇒ [Parameter] ⇒ [Communication Parameter] ⇒ [Ethernet]

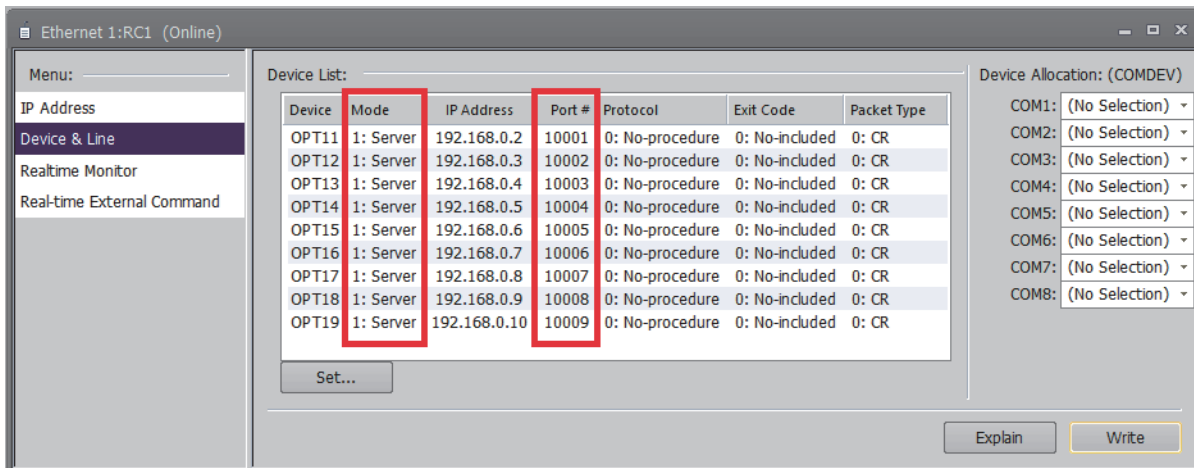



3. Select [IP Address] from the menu and set the IP address and subnet mask as follows.

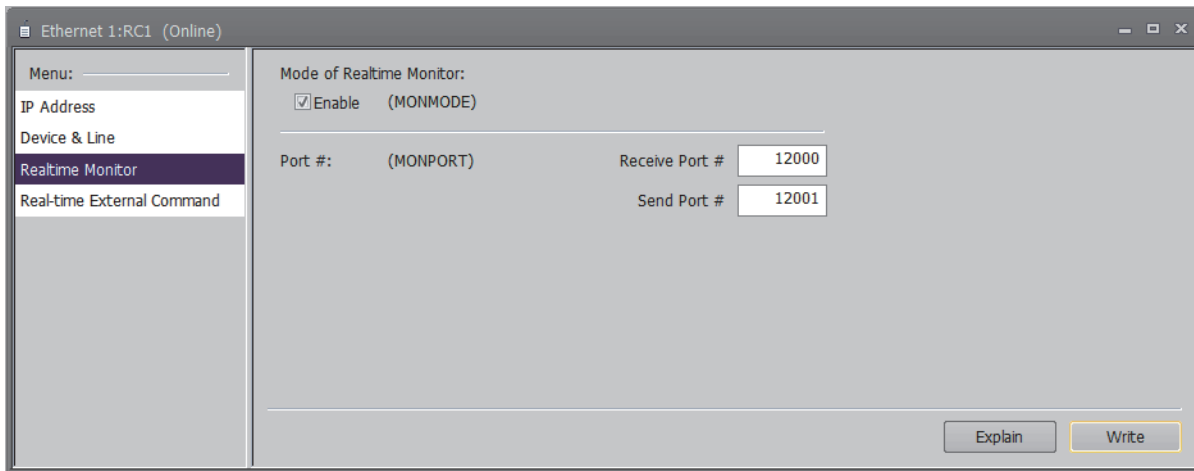
- IP address: 192.168.3.20
- Subnet mask: 255.255.255.0




4. Select [Device & Line] from the menu and check that the port number for socket communications set in the "network configuration settings" of the CPU module exists and that the mode is set to "1: Server". (Page 26 Network configuration settings)



- Select [Realtime Monitor] from the menu and configure settings for using the real-time monitor function. Enable real-time monitor mode and set the port number. Set this number so that it matches the port number on the robot controller side specified as "Predefined Protocol" for communication method in programmable controller settings. ( Page 25 Programmable Controller Settings)



- Press the [Write] button to complete the parameter settings.


Point  After changing parameters, the power supply to the robot controller needs to be turned off and restarted.

Parameter settings


For the FB libraries, parameters may need to be individually set depending on the FB used. The following shows the applicable FBs and how to set parameters.

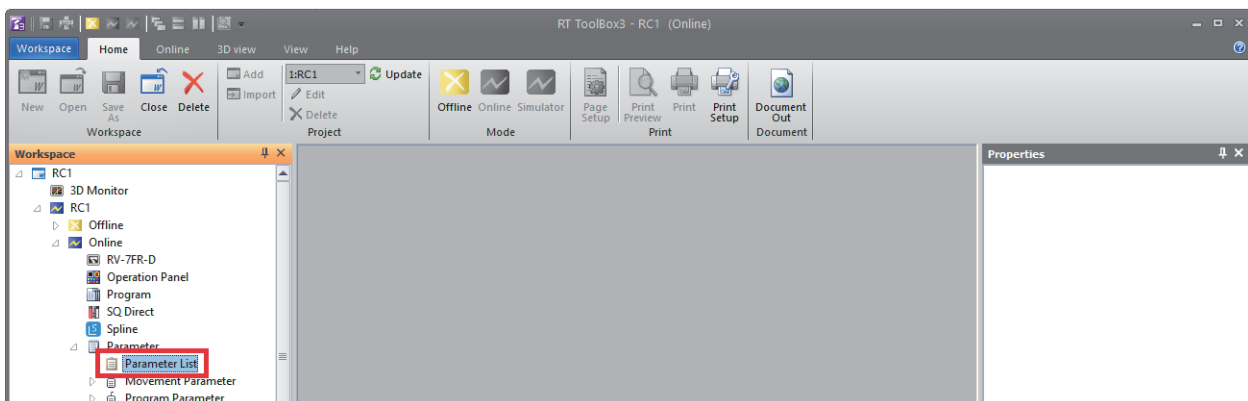
Applicable FB	Description
M+MELFA_RealTimeMonitor_F	In the real-time monitor function, 32 bits each are read from input 10000 and output 10000. Assign the parameters to be read to the I/O read target bit.
M+MELFA_VariableOperation_F	External variable P_DM is used for direct execution of robots. To use P_DM, enable IQMEM in the parameter settings.
M+MELFA_Direct_Mov_F	
M+MELFA_Direct_Mvs_F	

- Change the operation mode to online and connect the module with the robot controller.

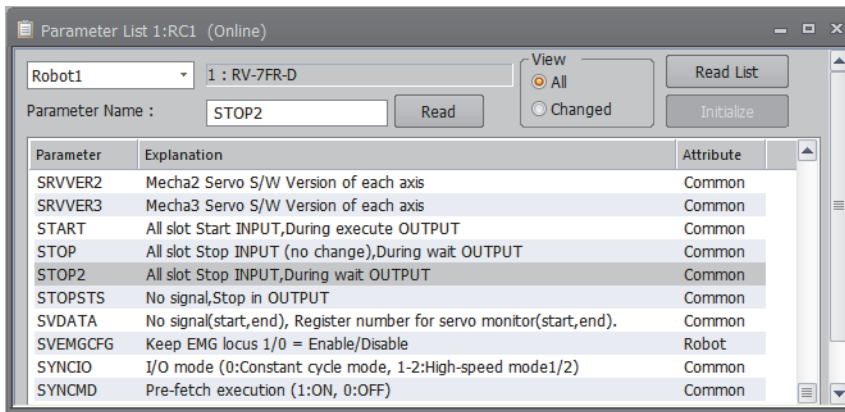
 [Home] ⇒ [Online]

- Set the parameters.

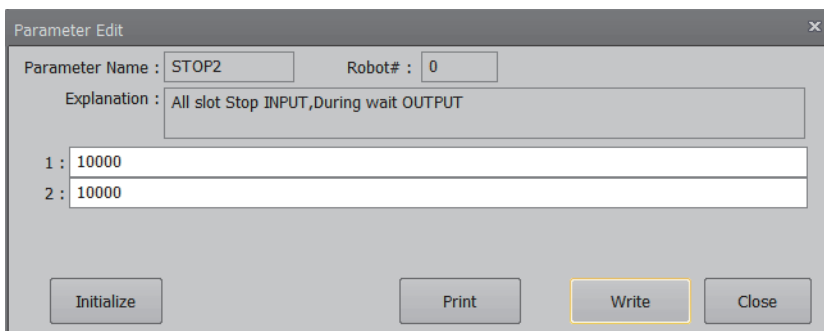
 Workspace ⇒ [Online] ⇒ [Parameter] ⇒ [Parameter List]



3. From the parameter list dialog, set the following parameters. "1:" in the window indicates the element number.



Double-click the parameter to be set, and perform the settings according to the table shown below. For signals to be set with the real-time monitor function, any parameters can be assigned to the range between 10006 and 10031 for input signals and the range between 10024 and 10031 for output signals.



Parameter name	Setting value	Description	Applicable FB
STOP2	1: 10000 2: 10000	Assigns stop to I/O signals to be read in the real-time monitor function.	M+MELFA_RealTimeMonitor_F
ATTOPMD	1: -1 2: 10001	Assigns the in automatic mode output signal to I/O signals to be read in the real-time monitor function.	
TEACHMD	1: -1 2: 10002	Assigns the in teaching mode output signal to I/O signals to be read in the real-time monitor function.	
IOENA	1: 10001 2: 10003	Assigns operation rights to I/O signals to be read in the real-time monitor function.	
START	1: 10002 2: 10004	Assigns starting/operating to I/O signals to be read in the real-time monitor function.	
ERRRESET	1: 10003 2: 10005	Assigns error reset/error occurring to I/O signals to be read in the real-time monitor function.	
SRVON	1: 10004 2: 10006	Assigns servo ON to I/O signals to be read in the real-time monitor function.	
SRVOFF	1: 10005 2: 10007	Assigns servo OFF to I/O signals to be read in the real-time monitor function.	
HNDSTS1	1: 10008 2: 10015	Assigns the hand input signal to I/O signals to be read in the real-time monitor function.	
HNDcntl1	1: 10016 2: 10023	Assigns the hand output signal to I/O signals to be read in the real-time monitor function.	
IQMEM	1: 0000000000000011	Allows programmable controller direct execution.	M+MELFA_Direct_Mov_F M+MELFA_Direct_Mvs_F

4. Press the [Write] button to complete the parameter settings. After changing parameters, the power supply to the robot controller needs to be turned off and restarted.

Robot program creation

A robot program needs to be created and selected to control robots using the FB library.

- When using an FB for directly controlling robots from the programmable controller, create a robot program and describe only a single line (such as End command) in the robot program. (Page 49 DETAILS OF FB LIBRARIES)
- To start a robot program created using RT ToolBox3 or TB to control robots from the programmable controller, create a robot program.
- This step is not required if there is a robot program created using RT Toolbox3 in advance.
- When the following FBs are used, an error may occur on the FB or robot controller if the program is not stored and selected in the robot.
 - M+MELFA_RoboStatusMonitor_F
 - M+MELFA_VariableOperation_F
 - M+MELFA_ProgramOperation_F
 - M+MELFA_DedicatedInOut_F

Applicable mechanism and slot numbers

The FB library operates on robot parameters and programs stored in the following.

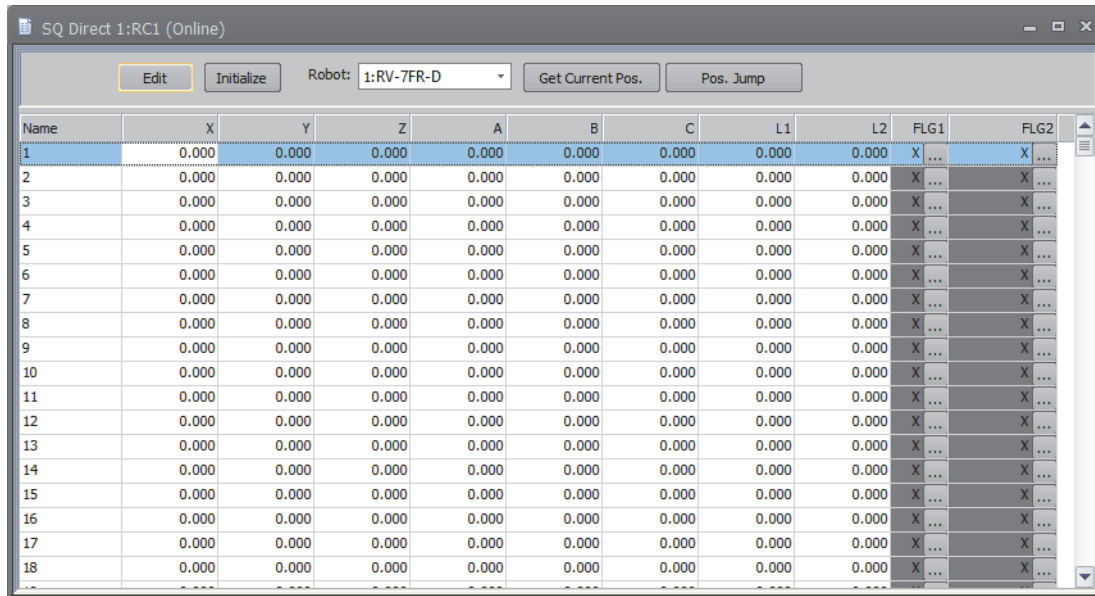
Mechanism number: 1

Slot number: 1

External variable P_DM settings

To set position coordinates to an external variable P_DM using RT ToolBox3 in advance, display the variable settings window. "Name" numbers 1 to 999 are assigned to P_DM(1) to P_DM(999).

Workspace ⇄ [Online] ⇄ [SQ Direct]



2.7 Precautions

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

For precautions specific to each FB, refer to precautions in DETAILS OF FB LIBRARIES.

No.	Description
1	For performance values of each FB, time required to complete the process of an FB varies depending on the time required to process programs other than the relevant FB and other factors. Refer to performance values as a guide for the processing time.
2	The FBs in this reference manual do not include the error recovery processing. Prepare the error recovery processing separately to suit the user's system and the expected operation.
3	The FB cannot be used in an interrupt program.
4	If the FB is used in a program that is to be executed only once such as a subroutine program or a FOR-NEXT loop, the processing for turning off i_bEN (execution command) of the FB cannot be executed and normal operation is not possible. Always use the FB in a program that is capable of turning off the execution command.
5	The FB requires the configuration of a ladder block for every input label.
6	Before connecting with the robot controller, set parameters in the module parameter of GX Works3. (Page 25 Programmable Controller Settings)
7	Before using the FB library, check that the robot controller mode is set to "AUTOMATIC".
8	Prepare and select a robot program in the robot controller before using the FB library. The FB operates on programs stored in Robot 1 and Slot number 1.
9	While the FB is being executed, do not perform the online change.
10	If either of the operations shown below is performed, the processing of the FB is aborted, which may cause the rest of the processing for all the FBs in this FB library not to be performed. Reset the CPU module, and then perform the processing again. <ul style="list-style-type: none">• Online change is performed while the FB is being executed• i_bEN is forcibly turned off during internal processing of the FB
11	When using this FB library, be sure to execute M+MELFA_ConnectionOpen_F first to establish an Ethernet connection between the programmable controller and robot controller.

2.8 Precautions on FB Combinations

This section describes the influence of using FBs in the FB library in combination.

Combinations of FBs that can be processed simultaneously

- M+MELFA_RealTimeMonitor_F (real-time monitor) can be processed simultaneously with other FBs without any operation delays.
- An operation delay occurs in combinations of FBs that can be processed simultaneously except for M+MELFA_RealTimeMonitor_F (real-time monitor).

Combinations of FBs that cannot be processed simultaneously

Combinations of FBs that cannot be processed simultaneously are as follows:

—: Combinations of FBs that can be processed simultaneously (including cases where operation delays occur)

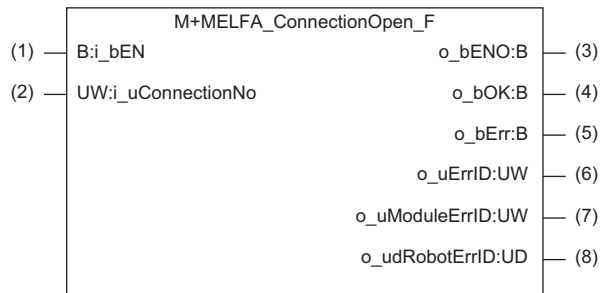
Applicable FB	M+MELFA_ConnectionOpen_F (connection establishment)	M+MELFA_ConnectionClose_F (connection disconnection)	M+MELFA_Hand_F (robot hand operation)	M+MELFA_Jog_F (robot jog operation)	M+MELFA_DedicatedInOut_F (dedicated I/O signal processing)	M+MELFA_PrgSelect_F (program selection)	M+MELFA_Ovr_F (override input/output)	M+MELFA_RealTimeMonitor_F (real-time monitor)
M+MELFA_ConnectionOpen_F (connection establishment)	Not possible	Not possible	—	—	—	—	—	—
M+MELFA_ConnectionClose_F (connection disconnection)	Not possible	Not possible	—	—	—	—	—	—
M+MELFA_Hand_F (robot hand operation)	—	—	Not possible	Not possible	Not possible	Not possible	Not possible	—
M+MELFA_Jog_F (robot jog operation)	—	—	Not possible	Not possible	Not possible	Not possible	Not possible	—
M+MELFA_DedicatedInOut_F (dedicated I/O signal processing)	—	—	Not possible	Not possible	Not possible	Not possible	Not possible	—
M+MELFA_PrgSelect_F (program selection)	—	—	Not possible	Not possible	Not possible	Not possible	—	—
M+MELFA_Ovr_F (override input/output)	—	—	Not possible	Not possible	Not possible	—	Not possible	—
M+MELFA_RealTimeMonitor_F (real-time monitor)	—	—	—	—	—	—	—	Not possible

3 DETAILS OF FB LIBRARIES

3.1 M+MELFA_ConnectionOpen_F (Connection Establishment)

Overview

This FB opens (establishes) the connection for data communication with the robot controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

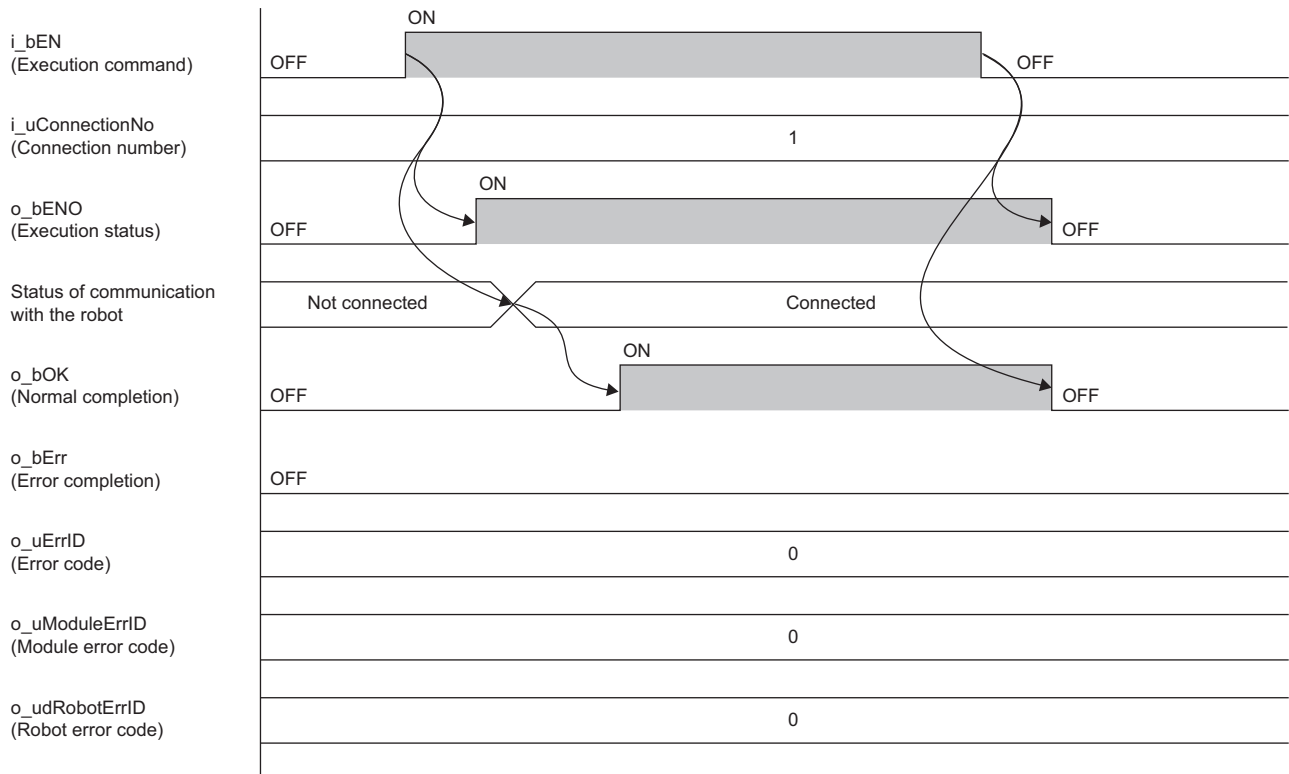
Item	Description
Number of steps	1402 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 300 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

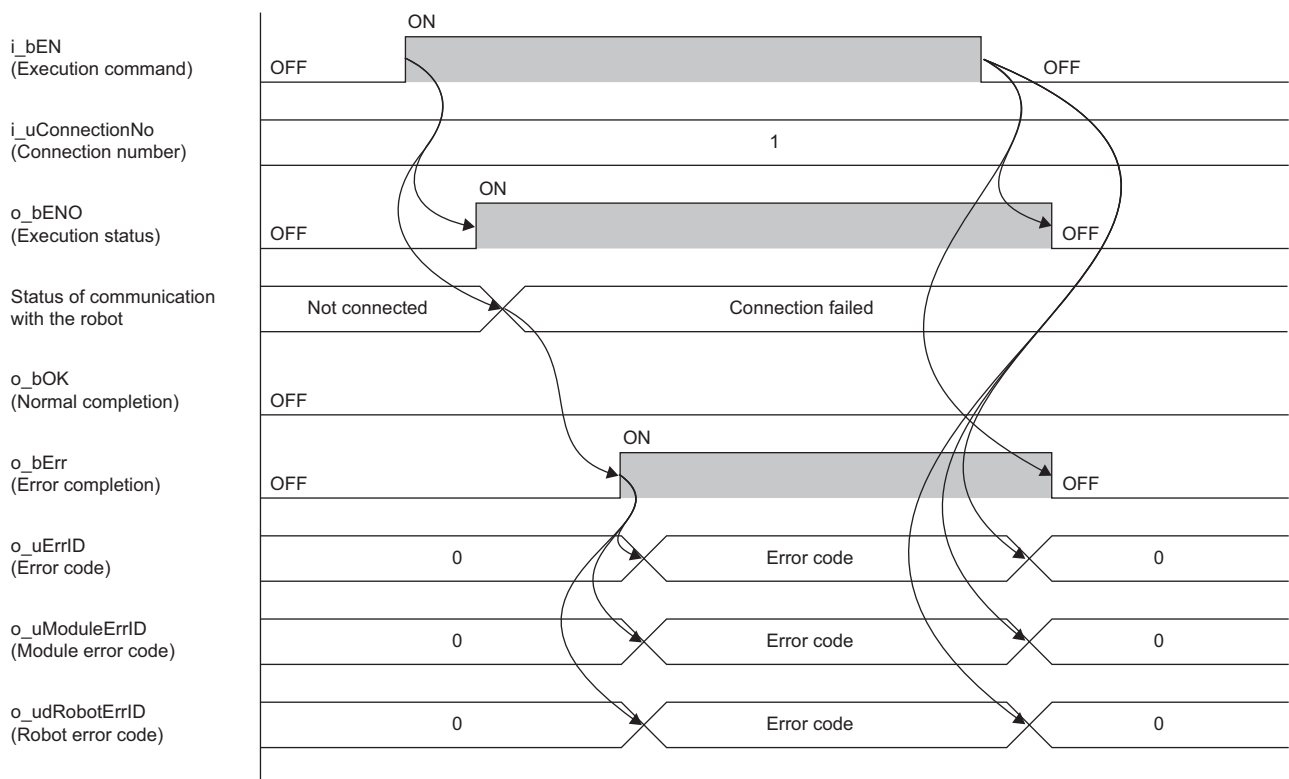
- When using this FB library, first execute this FB to connect the programmable controller and the robot controller.
- This FB is executed at the rising edge of i_bEN (execution command). A connection is established according to the specified i_uConnectionNo (connection number).
- When the connection with the robot is completed successfully, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 52 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCOPEN, SP.SOCSND, and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	3158.704ms	2.023ms	6904 scans
FX5UJ CPU module	1 robot controller	3192.464ms	0.806ms	9146 scans
FX5U CPU module ^{*1*2}	1 robot controller	3215.147ms	0.606ms	11038 scans
FX5UC CPU module ^{*1*2}	1 robot controller	3215.147ms	0.606ms	11038 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

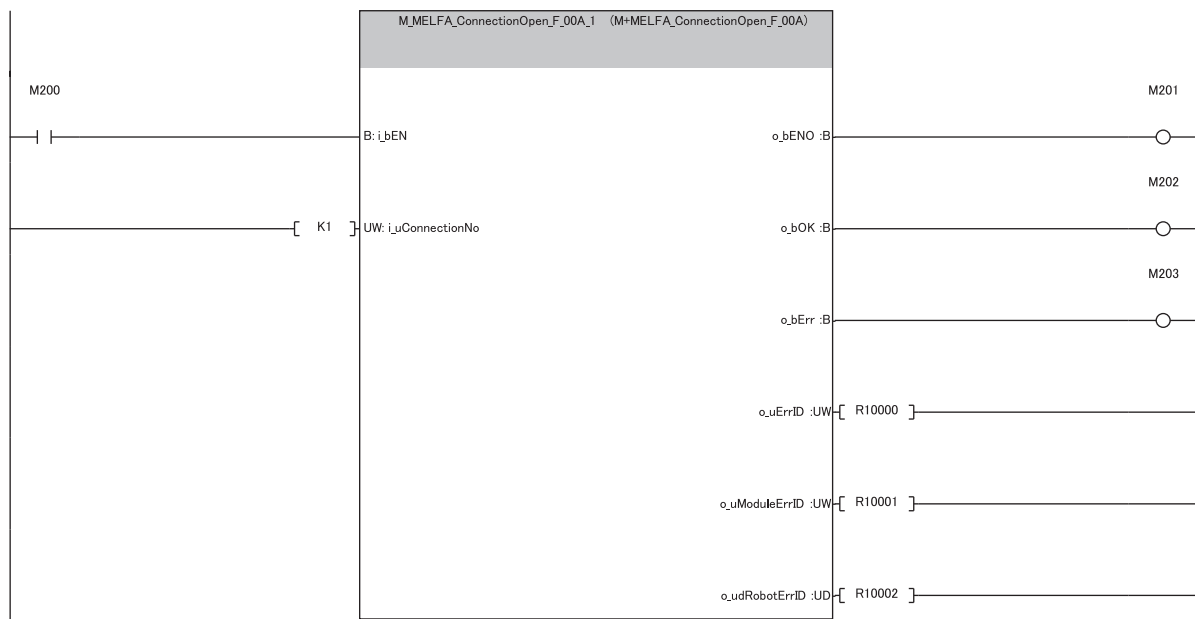
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M200	FB execution flag
M201	FB execution status display flag
M202	FB normal completion display flag
M203	FB error completion display flag
R10000	FB error code storage device
R10001	Module error code storage device
R10002 to R10003	Robot error code storage device

Program

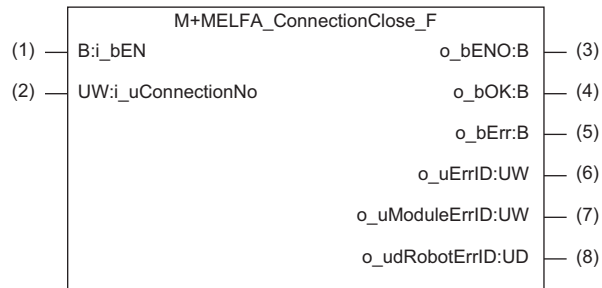


Processing order	Processing details
1	When M200 is turned on, M201 turns on and the FB is executed for connection number 1.
2	When the line between the programmable controller and robot controller is connected normally, M202 turns on.
3	When an error such as a line connection error occurs, M203 turns on. At this time, the related error code is stored in the error code storage device.

3.2 M+MELFA_ConnectionClose_F (Connection Disconnection)

Overview

This FB closes (disconnects) the connection for data communication with the robot controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software

■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later

■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

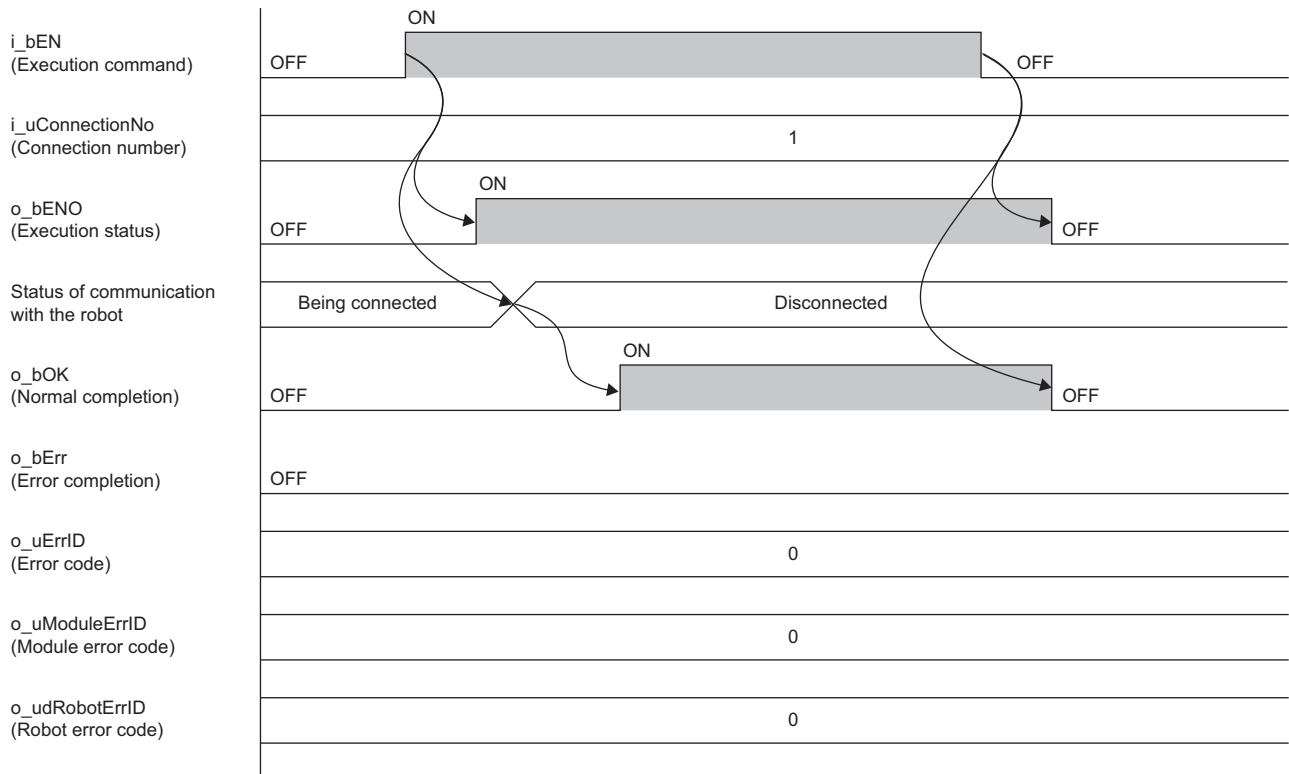
Item	Description
Number of steps	808 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 116 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

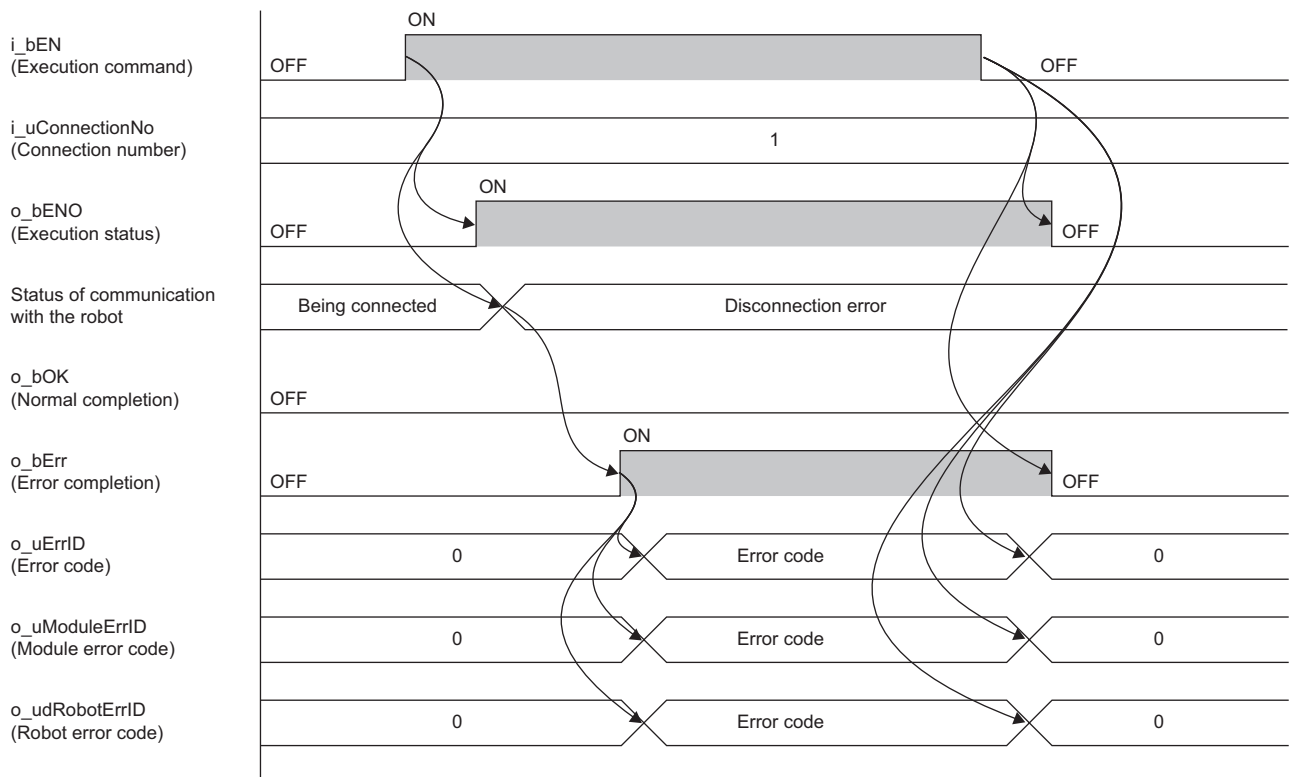
- This FB is executed at the rising edge of i_bEN (execution command). A connection is disconnected according to the specified i_uConnectionNo (connection number).
- When the connection is disconnected successfully, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. (Page 57 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

This FB uses SP.SOCSND, SP.SOCRCV, and SP.SOCCLOSE. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	12.349ms	1.117ms	20 scans
FX5UJ CPU module	1 robot controller	12.998ms	0.926ms	28 scans
FX5U CPU module ^{*1*2}	1 robot controller	13.630ms	0.678ms	32 scans
FX5UC CPU module ^{*1*2}	1 robot controller	13.630ms	0.678ms	32 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

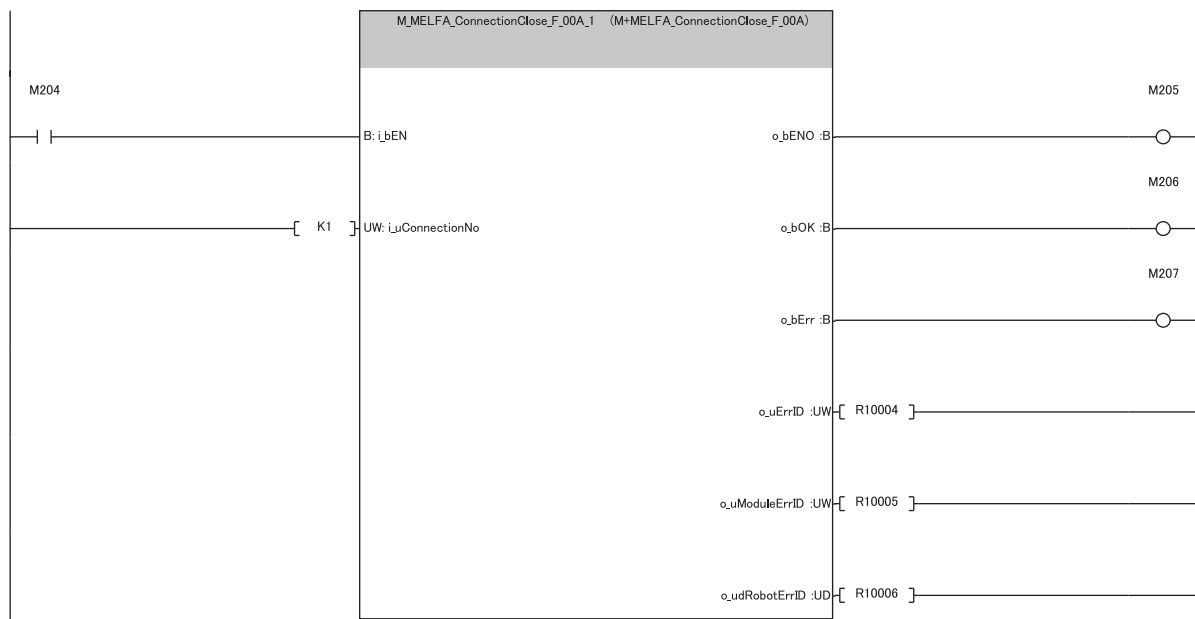
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M204	FB execution flag
M205	FB execution status display flag
M206	FB normal completion display flag
M207	FB error completion display flag
R10004	FB error code storage device
R10005	Module error code storage device
R10006 to R10007	Robot error code storage device

Program

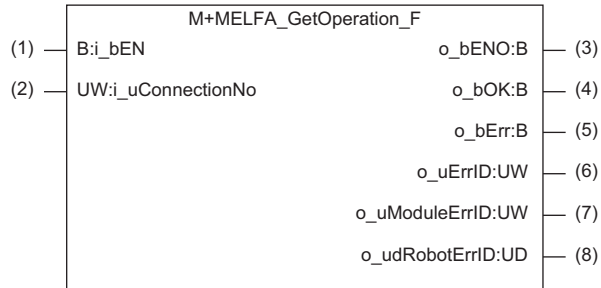


Processing order	Processing details
1	When M204 is turned on, M205 turns on and the FB is executed for connection number 1.
2	When the line between the programmable controller and robot controller is disconnected successfully, M206 turns on.
3	When an error such as a disconnection error occurs, M207 turns on. At this time, the related error code is stored in the error code storage device.

3.3 M+MELFA_GetOperation_F (Operation Rights Acquisition)

Overview

This FB acquires the robot operation rights.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts and operation rights are acquired. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

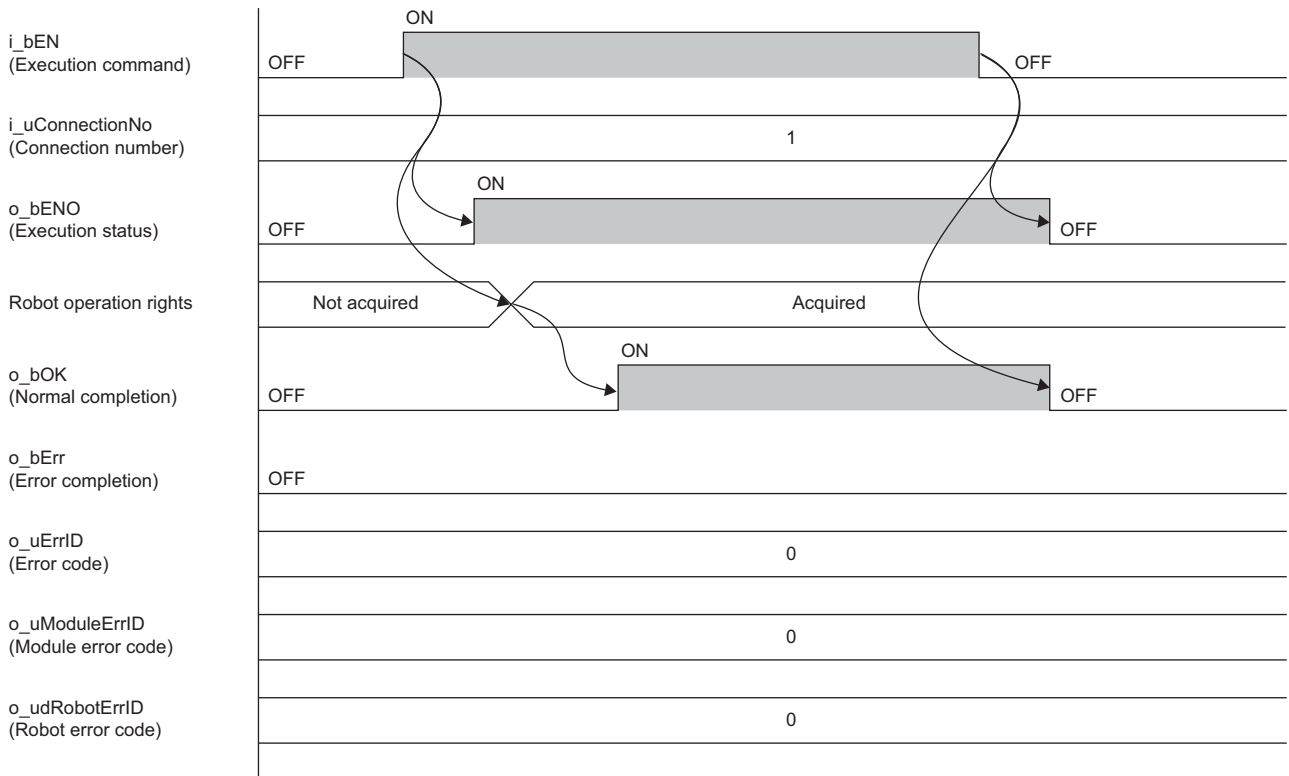
Item	Description
Number of steps	751 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 88 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

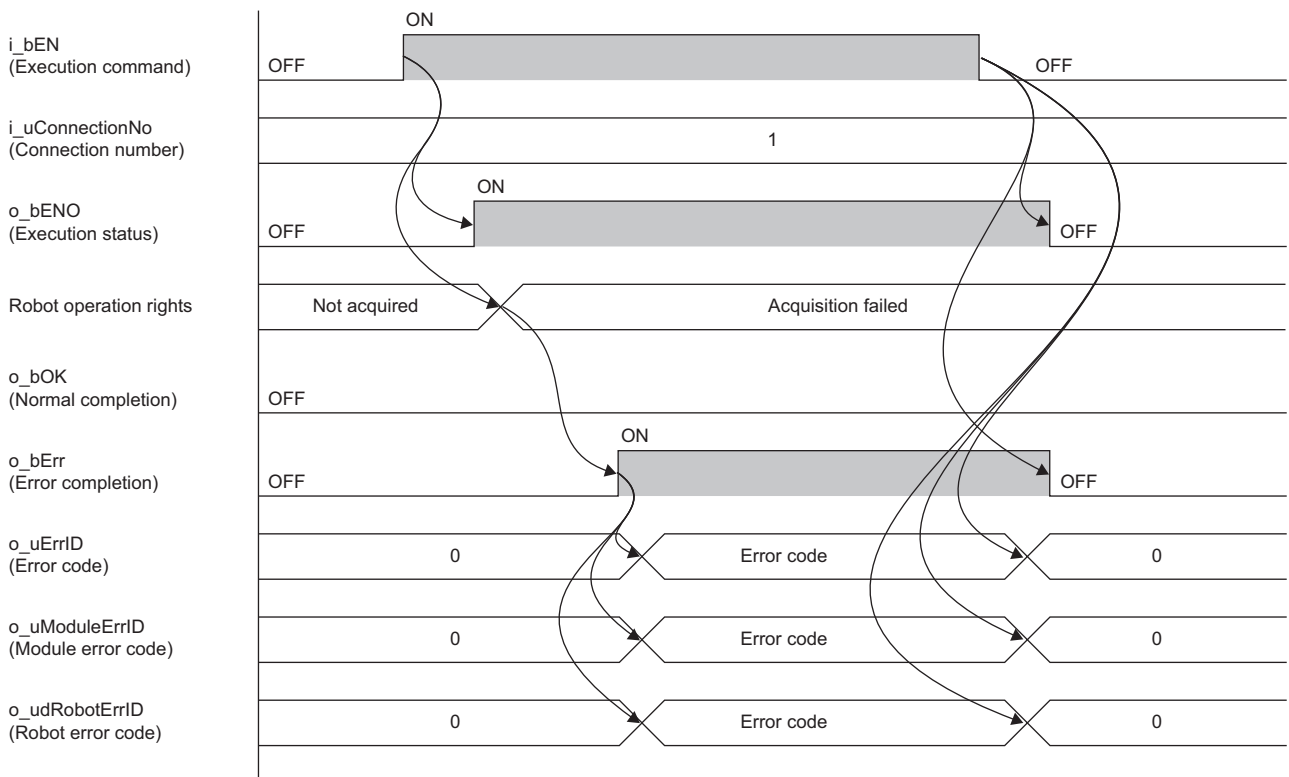
- This FB is executed at the rising edge of i_bEN (execution command). Robot operation rights are acquired according to the specified i_uConnectionNo (connection number).
- When the acquisition of the operation rights is completed, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 62 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

- The operation rights of the robot controller are granted to one external device. When another external device has acquired the operation rights, the operation rights cannot be acquired by executing this FB. Since the execution of this FB completes successfully while waiting for the operation rights to be acquired, it is recommended to execute other FBs that require operation rights after this FB completes successfully and check whether the operation rights have been acquired.

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	59.899ms	1.481ms	95 scans
FX5UJ CPU module	1 robot controller	61.043ms	1.076ms	129 scans
FX5U CPU module ^{*1*2}	1 robot controller	61.775ms	0.865ms	149 scans
FX5UC CPU module ^{*1*2}	1 robot controller	61.775ms	0.865ms	149 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

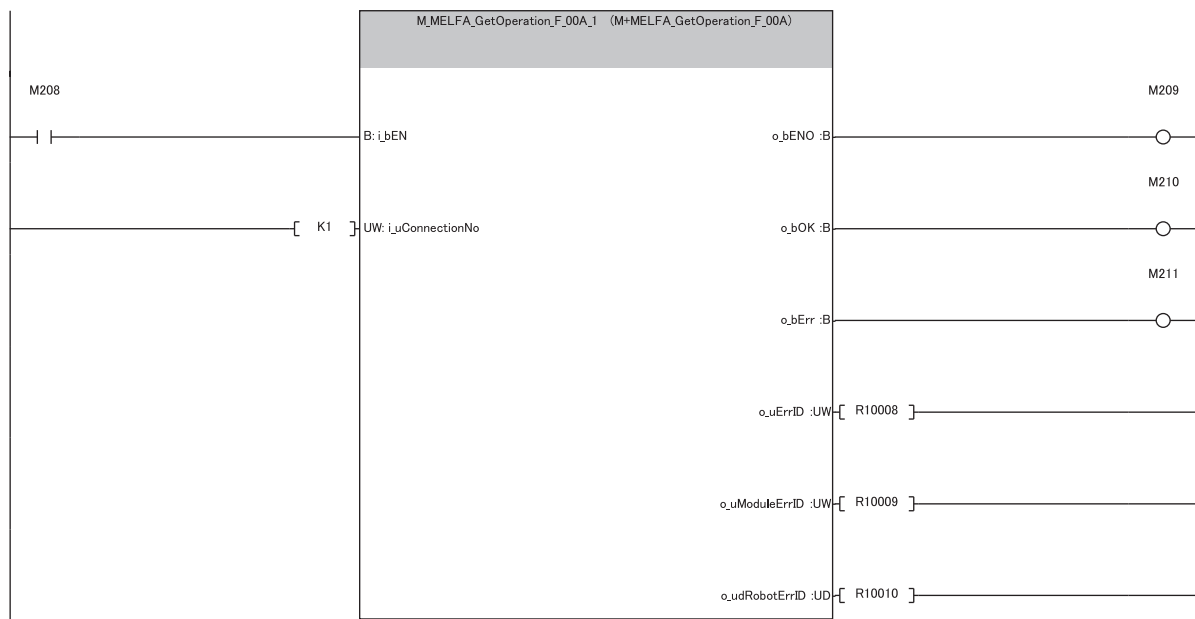
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M208	FB execution flag
M209	FB execution status display flag
M210	FB normal completion display flag
M211	FB error completion display flag
R10008	FB error code storage device
R10009	Module error code storage device
R10010 to R10011	Robot error code storage device

Program

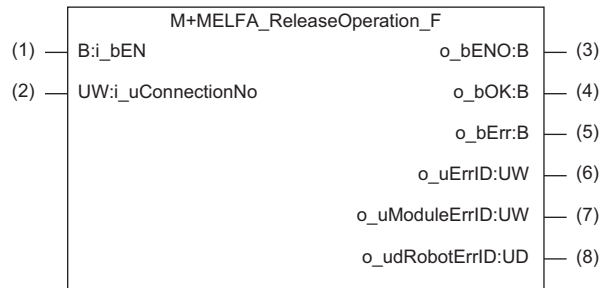


Processing order	Processing details
1	When M208 is turned on, M209 turns on and the FB is executed for connection number 1.
2	When the acquisition of operation rights is completed, M210 turns on.
3	When an error such as a failure to acquire operation rights occurs, M211 turns on. At this time, the related error code is stored in the error code storage device.

3.4 M+MELFA_ReleaseOperation_F (Operation Rights Release)

Overview

This FB releases the acquired robot operation rights.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts and operation rights are released. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

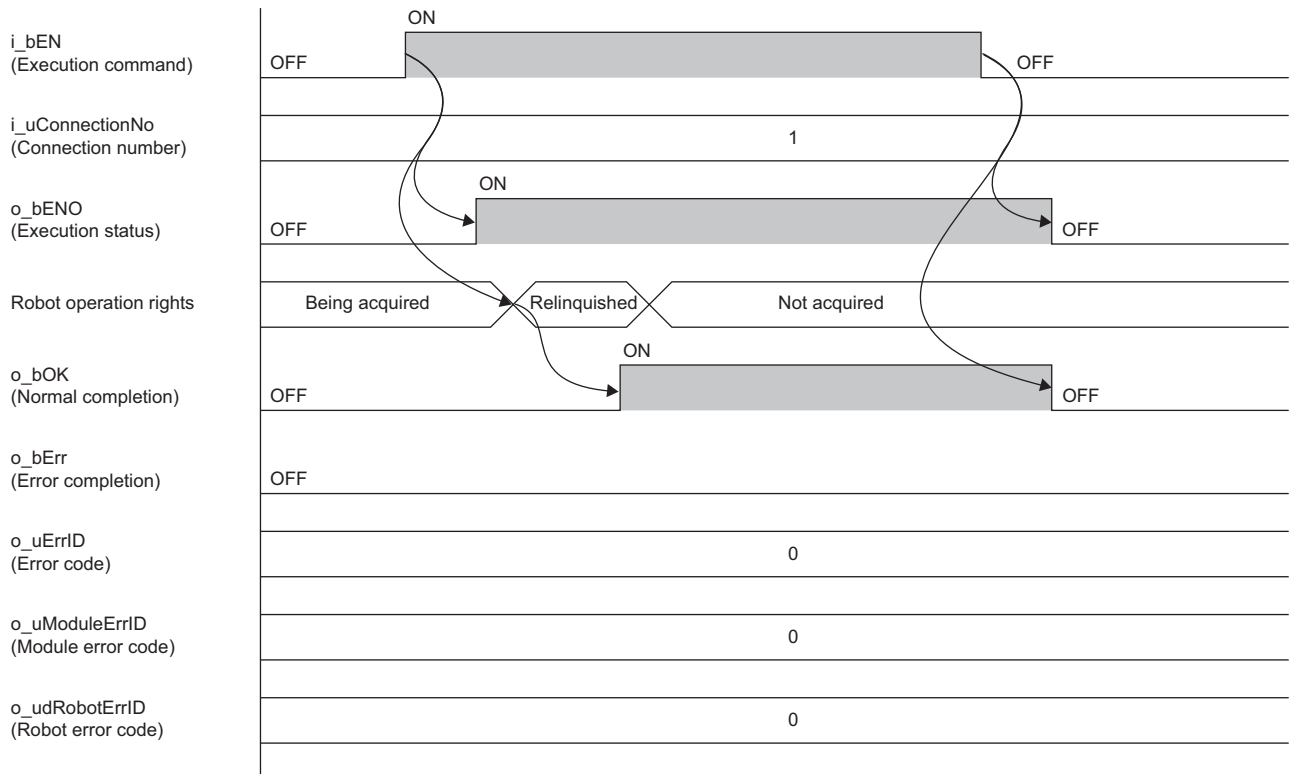
Item	Description
Number of steps	754 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 88 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

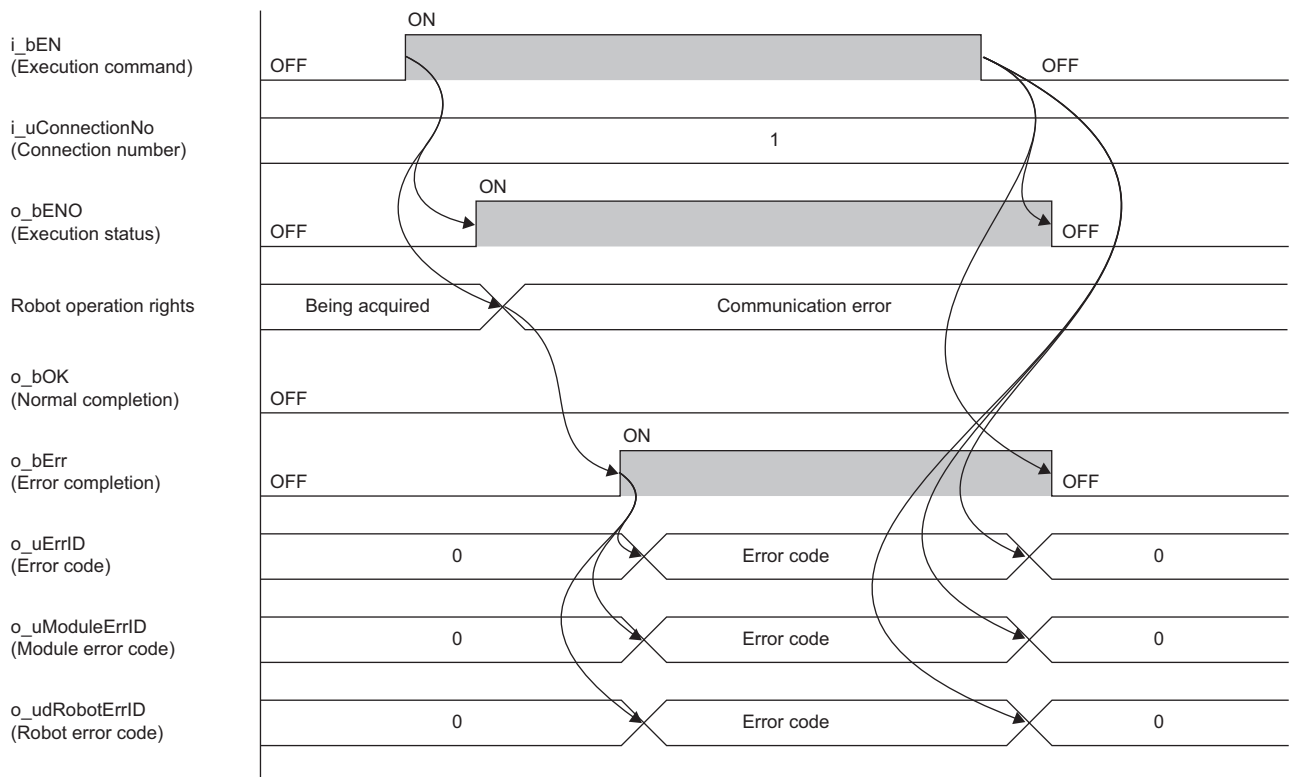
- This FB is executed at the rising edge of i_bEN (execution command). The robot operation rights are released according to the specified i_uConnectionNo (connection number).
- When the release of the operation rights is completed, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 67 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.112ms	1.227ms	9 scans
FX5UJ CPU module	1 robot controller	6.960ms	0.700ms	14 scans
FX5U CPU module ^{*1*2}	1 robot controller	9.673ms	0.532ms	16 scans
FX5UC CPU module ^{*1*2}	1 robot controller	9.673ms	0.532ms	16 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

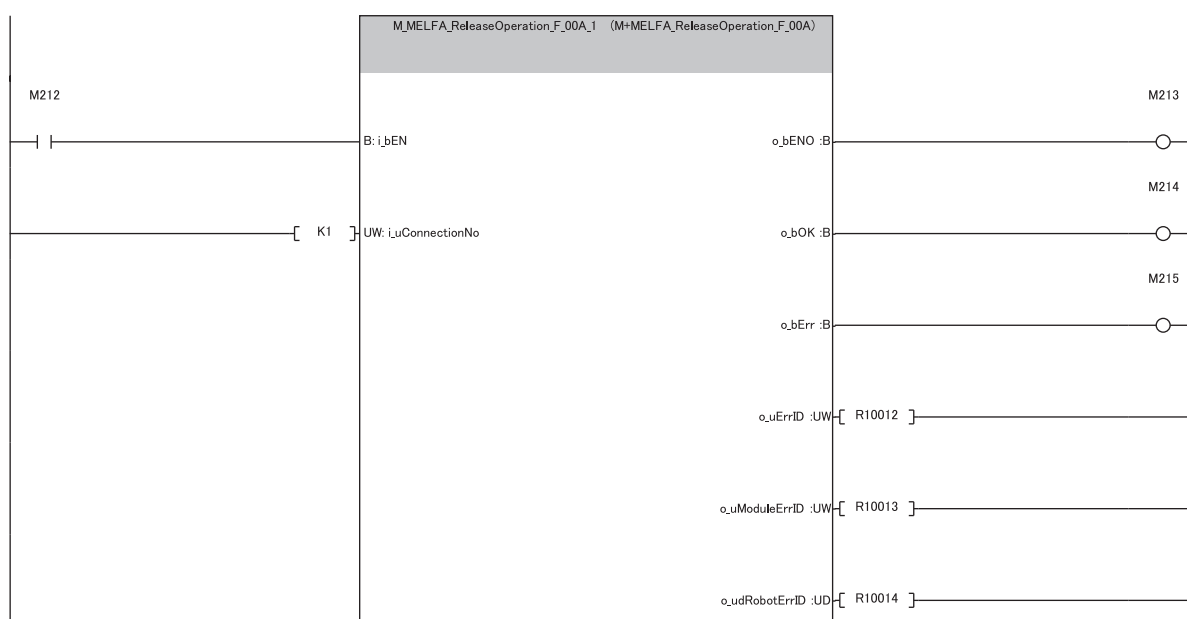
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M212	FB execution flag
M213	FB execution status display flag
M214	FB normal completion display flag
M215	FB error completion display flag
R10012	FB error code storage device
R10013	Module error code storage device
R10014 to R10015	Robot error code storage device

Program

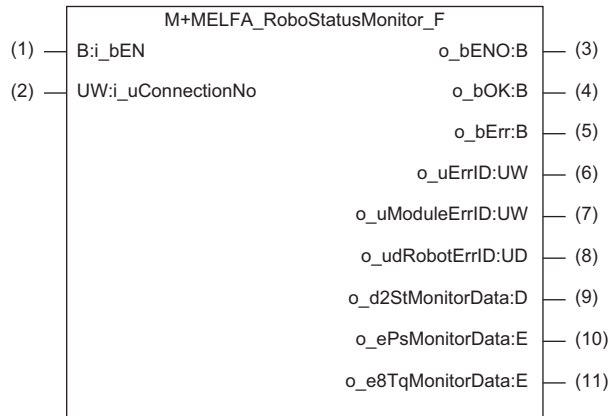


Processing order	Processing details
1	When M212 is turned on, M213 turns on and the FB is executed for connection number 1.
2	When an error such as a send error occurs, M215 turns on. At this time, the related error code is stored in the error code storage device.
3	When the release of operation rights is completed, M214 turns on.

3.5 M+MELFA_RoboStatusMonitor_F (Operating Status Monitor)

Overview

This FB monitors data related to the operational status of the robot, such as the status of collision detection and the compliance.




Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(9)	o_d2StMonitorData	Status monitoring data	Double word [signed] (0..1)	0	Status information is stored. (Page 70 o_d2StMonitorData)
(10)	o_ePsMonitorData	Positional deviation amount monitoring data	Single-precision real number	0	The command value and positional deviation amount during compliance execution are stored. (Page 70 o_ePsMonitorData)

No.	Label	Label name	Data type	Default value	Description
(11)	o_e8TqMonitorData	Torque difference monitoring data	Single-precision real number (0..7)	0	The difference between the estimated torque and the actual torque during collision detection is stored. ( Page 70 o_e8TqMonitorData)

■o_d2StMonitorData

Array element No.	Data description
[0]	Collision detection status
[1]	Report of exceeding limits during compliance execution

■o_ePsMonitorData


Array element No.	Data description
—	Command value and position deviation amount during compliance execution

■o_e8TqMonitorData

Array element No.	Data description	
[0]	Difference between the estimated torque and the actual torque during collision detection	J1 axis
[1]		J2 axis
[2]		J3 axis
[3]		J4 axis
[4]		J5 axis
[5]		J6 axis
[6]		J7 axis
[7]		J8 axis

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software

■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later

■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

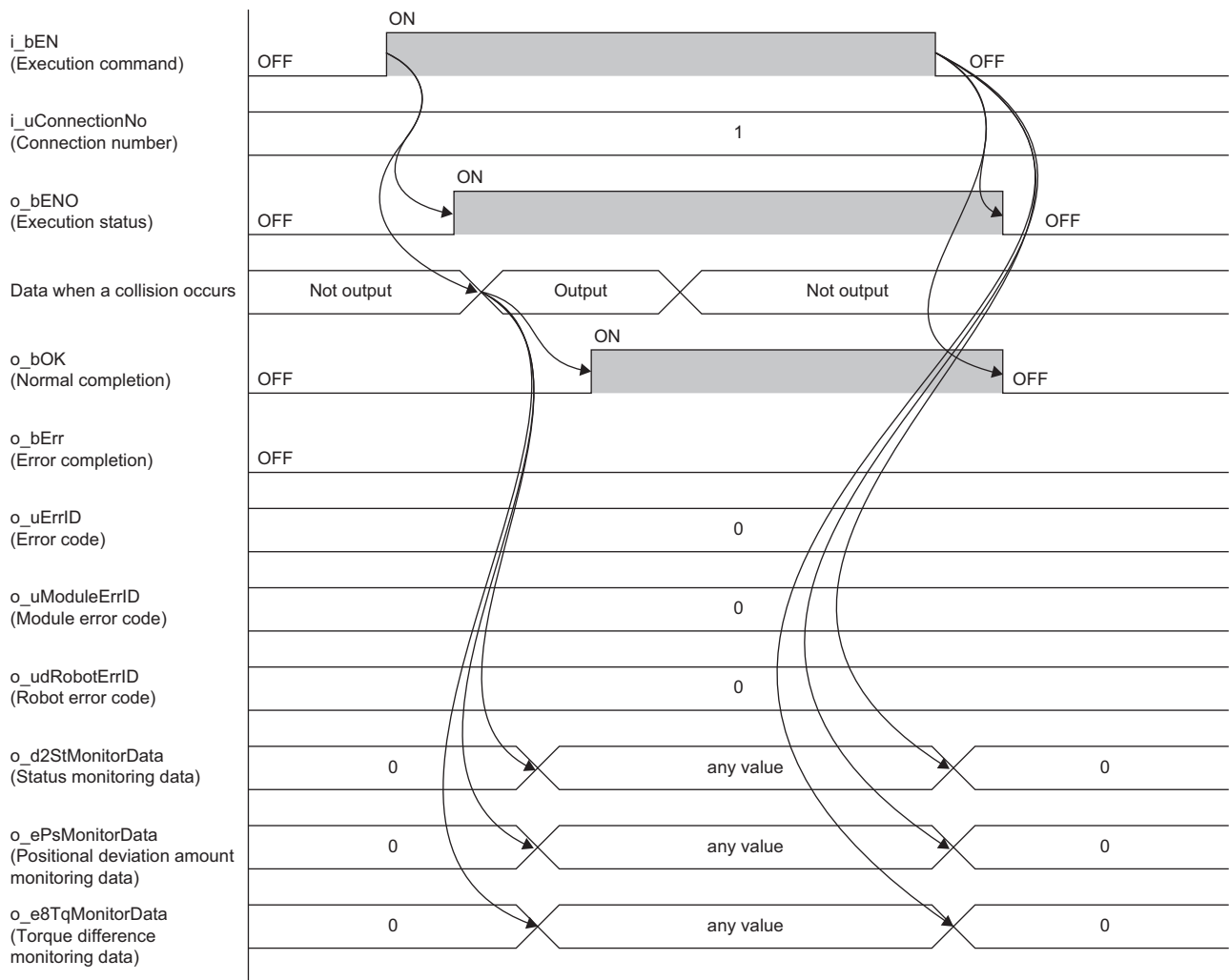
Item	Description
Number of steps	1889 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 252 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

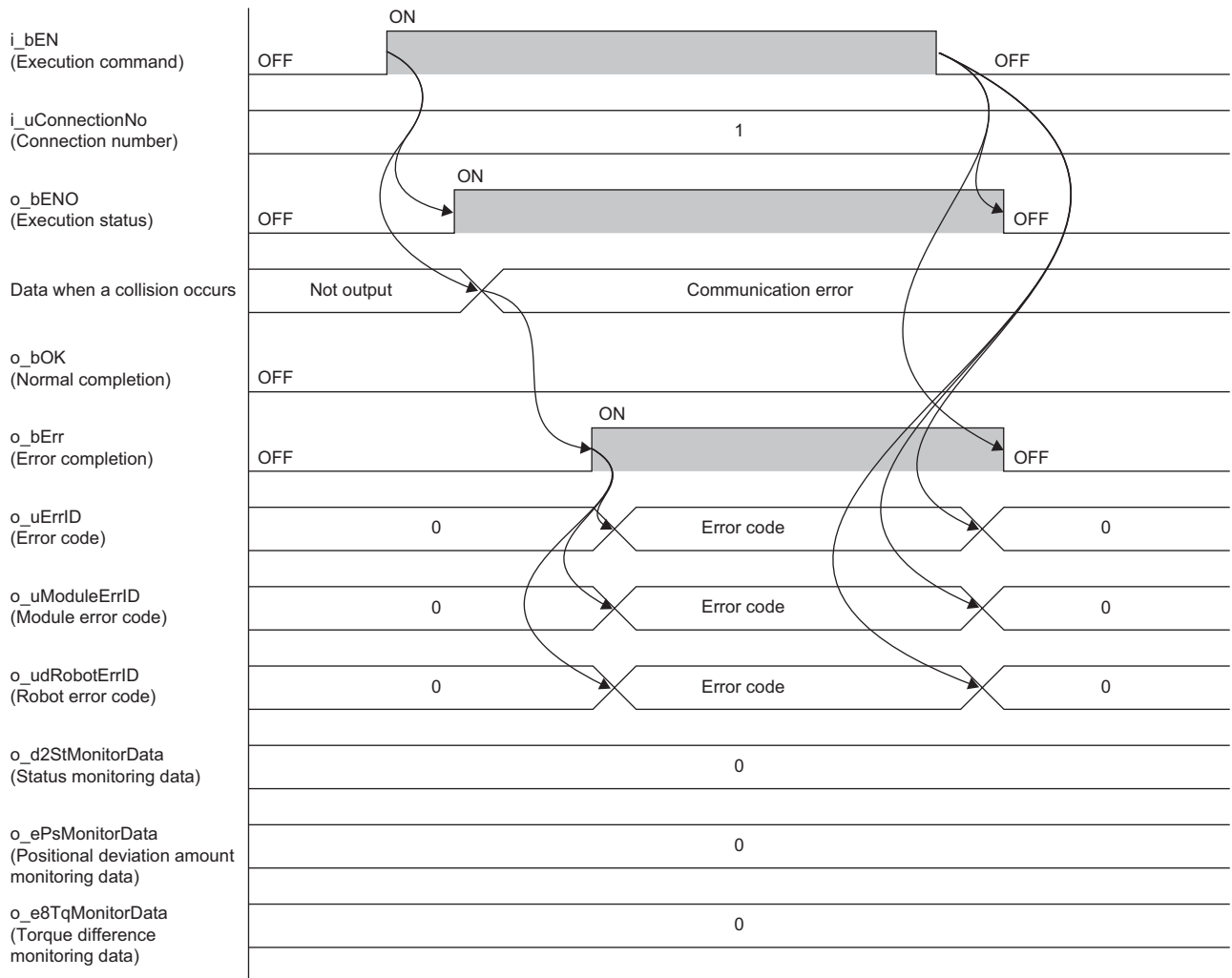
- This FB is executed at the rising edge of i_bEN (execution command). Data regarding the operating status of robot is acquired according to the specified i_uConnectionNo (connection number).
- When the acquisition of all data is completed, o_bOK (normal completion) turns on.
- Although this FB does not execute a robot program, it reads robot controller variables. Therefore, a robot program is required. When using this FB, store the robot program in the robot controller in advance.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. (Page 74 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

- Prepare the robot program in advance and start the operation of this FB with the program selected on the robot side. If a robot program is not selected, the FB is completed normally, but an operation error occurs.
- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	29.617ms	1.958ms	31 scans
FX5UJ CPU module	1 robot controller	28.524ms	1.625ms	41 scans
FX5U CPU module ^{*1*2}	1 robot controller	28.580ms	1.411ms	49 scans
FX5UC CPU module ^{*1*2}	1 robot controller	28.580ms	1.411ms	49 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

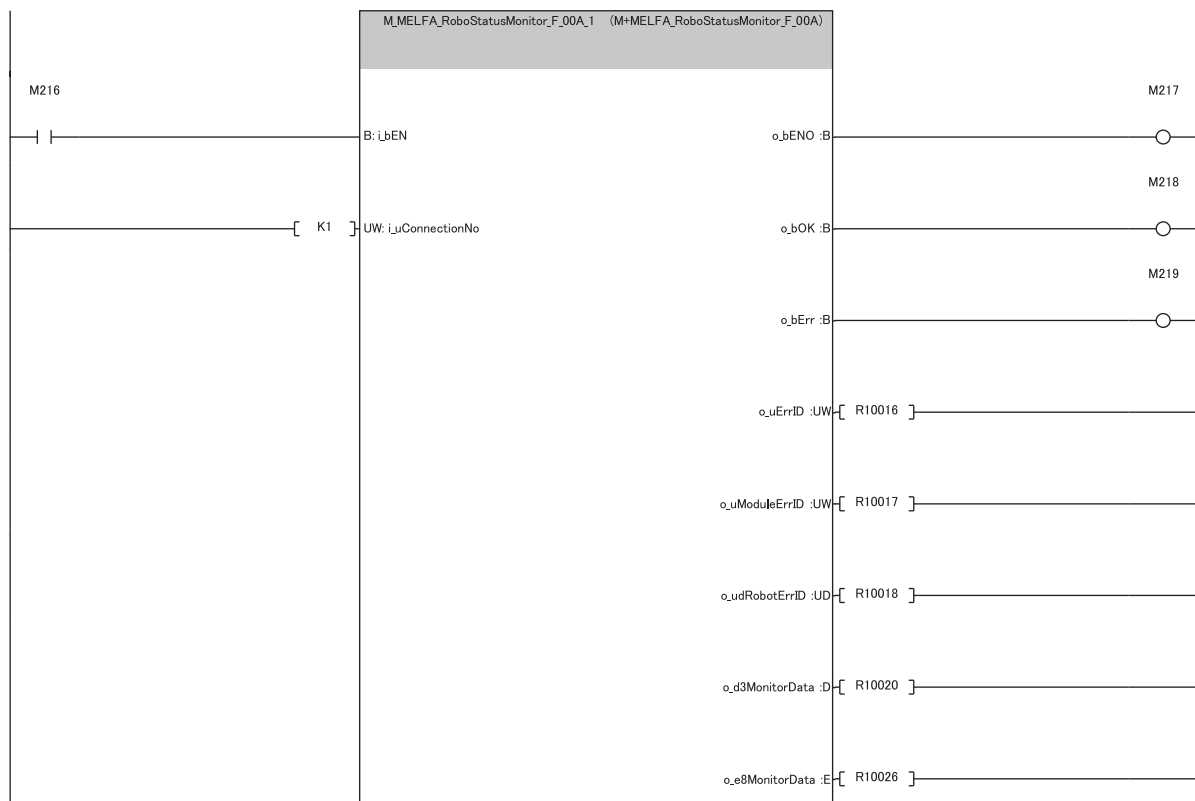
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M216	FB execution flag
M217	FB execution status display flag
M218	FB normal completion display flag
M219	FB error completion display flag
R10016	FB error code storage device
R10017	Module error code storage device
R10018 to R10019	Robot error code storage device
R10020 to R10023	Status monitoring data storage device
R10024 to R10025	Positional deviation amount monitoring data storage device
R10026 to R10041	Torque difference monitoring data storage device

Program

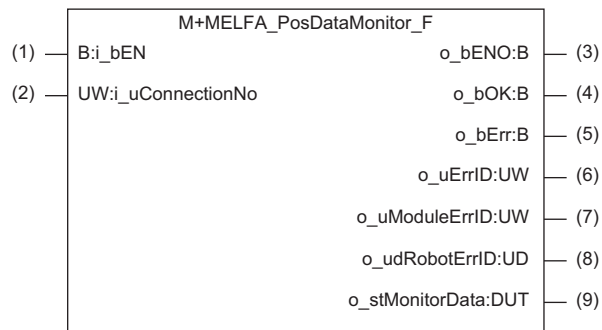


Processing order	Processing details
1	When M216 is turned on, M217 turns on and the FB is executed for connection number 1.
2	When the operating status is acquired and the value is stored in R10020 to R10041, M218 turns on.
3	When an error such as a send error occurs, M219 turns on. At this time, the related error code is stored in the error code storage device.

3.6 M+MELFA_PosDataMonitor_F (Position Information Monitor)

Overview

This FB monitors the operation direction position information at robot collision.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(9)	o_stMonitorData	Monitor data	M_MELFA_PosData_F	—	The monitor data is stored. (Page 20 M_MELFA_PosData_F)

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

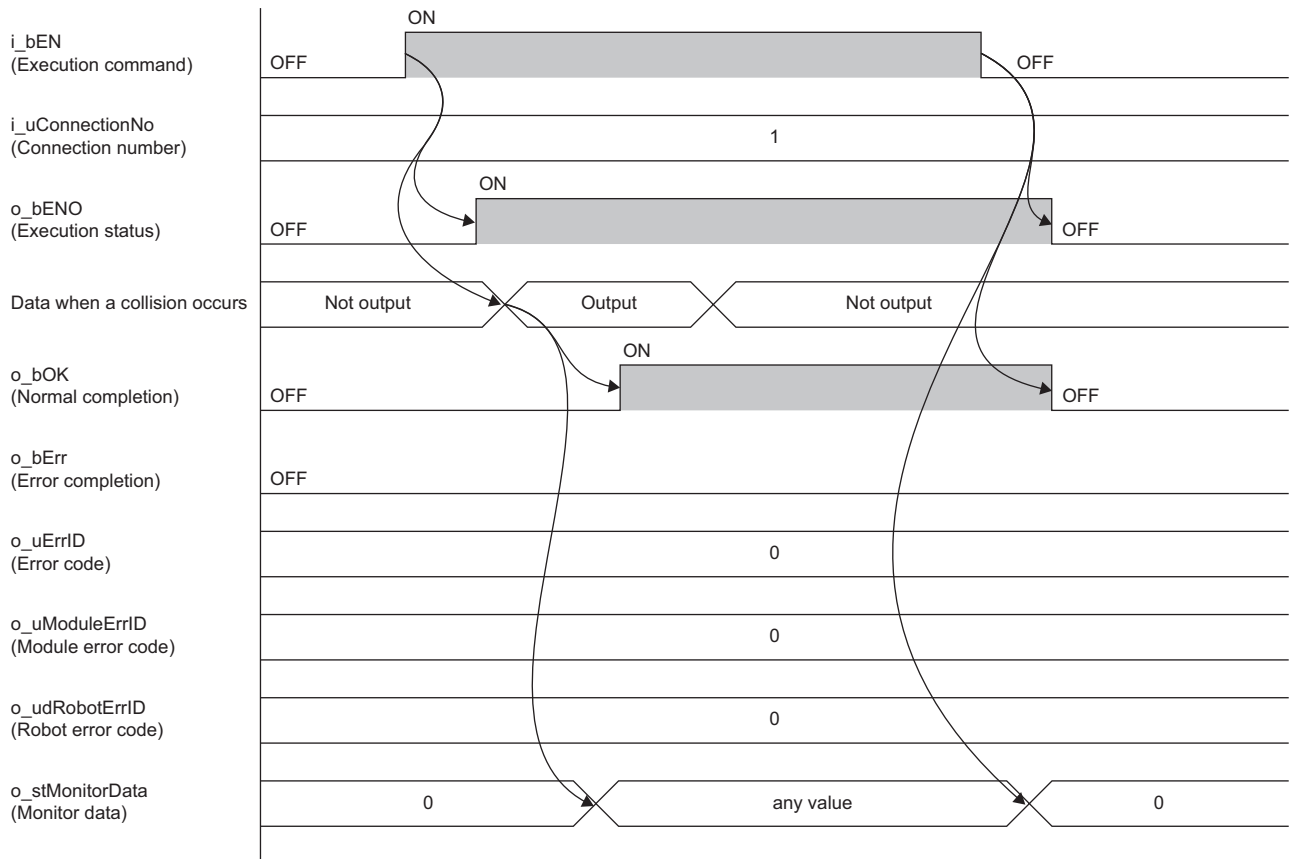
Item	Description
Number of steps	1458 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 272 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

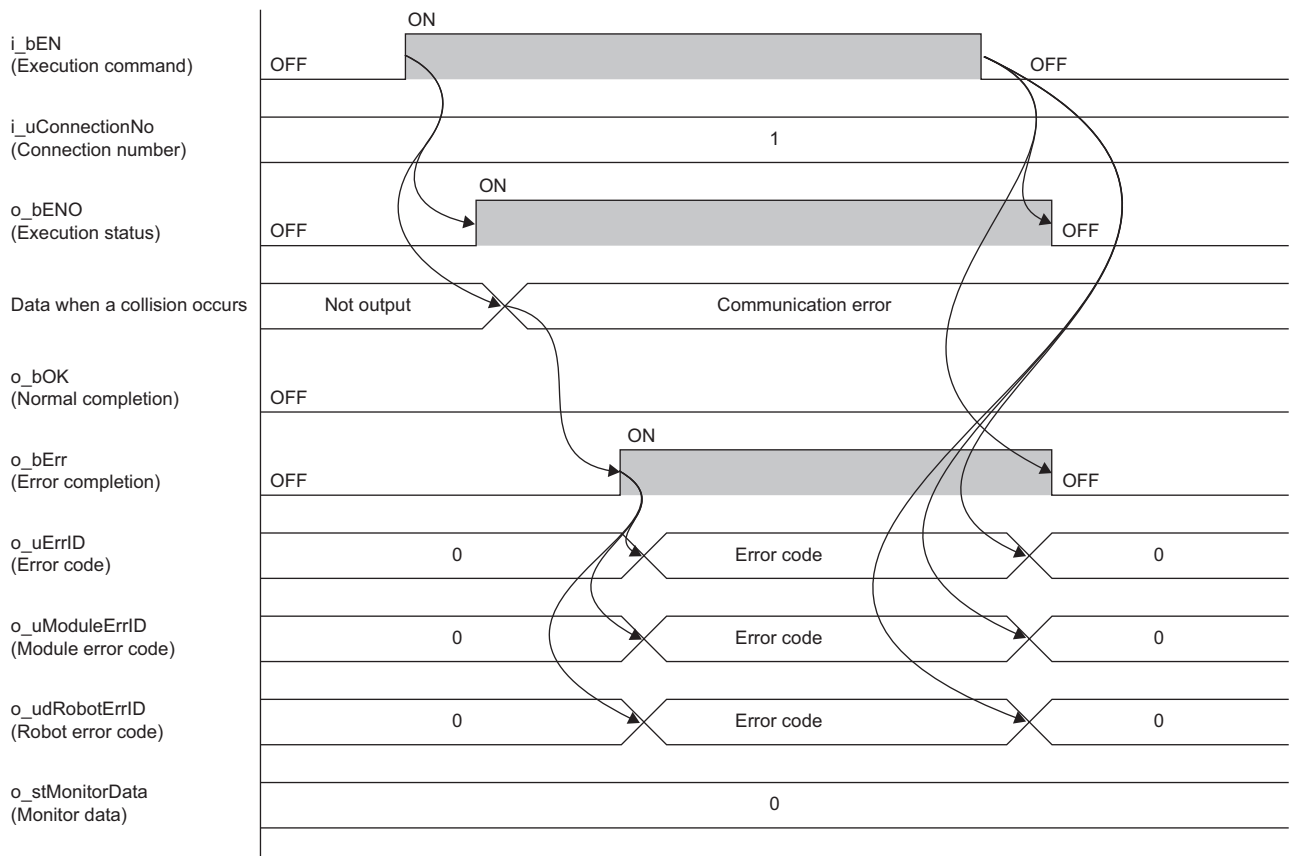
- This FB is executed at the rising edge of i_bEN (execution command). Position data at the time of collision is monitored according to the specified i_uConnectionNo (connection number).
- When the acquisition of operation direction at the time of collision is completed, o_bOK (normal completion) turns on.
- Although this FB does not execute a robot program, it reads robot controller variables. Therefore, a robot program is required. When using this FB, store the robot program in the robot controller in advance.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 79 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

- When using the collision detection function, prepare a dedicated robot program in advance. If a robot program is not selected, the FB is completed normally, but an operation error occurs.
- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	9.953ms	2.028ms	7 scans
FX5UJ CPU module	1 robot controller	8.239ms	1.712ms	9 scans
FX5U CPU module ^{*1*2}	1 robot controller	9.288ms	1.517ms	15 scans
FX5UC CPU module ^{*1*2}	1 robot controller	9.288ms	1.517ms	15 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

Example

The following shows an example of using this FB in a ladder program.

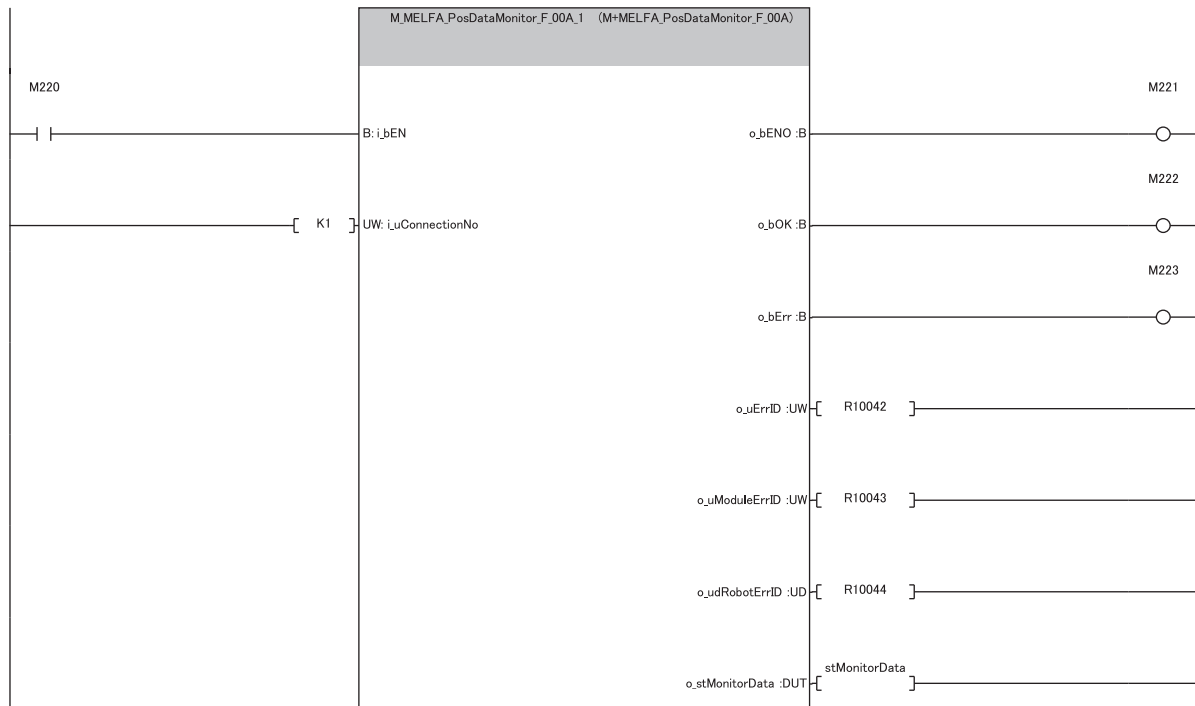
Devices used

Device	Application
M220	FB execution flag
M221	FB execution status display flag
M222	FB normal completion display flag
M223	FB error completion display flag
R10042	FB error code storage device
R10043	Module error code storage device
R10044 to R10045	Robot error code storage device
R10046 to R10065	Monitor data storage device stMonitorData is an M_MELFA_PosData_F structure. (📖 Page 20 M_MELFA_PosData_F)

■ Monitor data storage device

Device	Global labels	Structure	Structure member	Data type	Description
R10046 to R10047	stMonitorData	M_MELFA_PosData_F	eCoord_X	Single-precision real number	X component
R10048 to R10049			eCoord_Y	Single-precision real number	Y component
R10050 to R10051			eCoord_Z	Single-precision real number	Z component
R10052 to R10053			eCoord_A	Single-precision real number	A component
R10054 to R10055			eCoord_B	Single-precision real number	B component
R10056 to R10057			eCoord_C	Single-precision real number	C component
R10058 to R10059			eCoord_L1	Single-precision real number	L1 component (additional axis 1)
R10060 to R10061			eCoord_L2	Single-precision real number	L2 component (additional axis 2)
R10062 to R10063			udFL1	Double word [unsigned]/bit string [32 bits]	FL1 (structure flag 1)
R10064 to R10065			udFL2	Double word [unsigned]/bit string [32 bits]	FL2 (structure flag 2)

Program

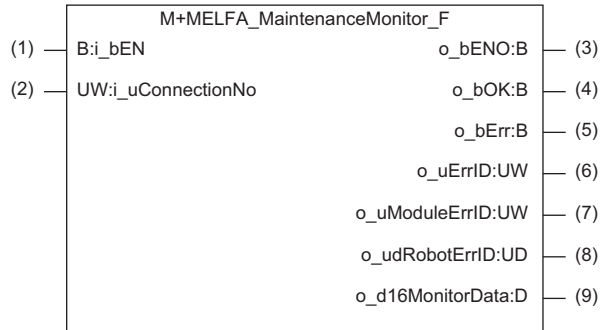


Processing order	Processing details
1	When M220 is turned on, M221 turns on and the FB is executed for connection number 1.
2	When the operation direction at the time of collision is acquired and stored in R10046 to R10065, M222 turns on.
3	When an error such as a send error occurs, M223 turns on. At this time, the related error code is stored in the error code storage device.

3.7 M+MELFA_MaintenanceMonitor_F (Maintenance Information Monitor)

Overview

This FB monitors the maintenance information such as the belt remaining time and grease remaining time.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection

Output labels


No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(9)	o_d16MonitorData	Monitor data	Double word [signed] (0..15)	0	The grease remaining time and belt remaining time are stored. (☞ Page 82 o_d16MonitorData)

■o_d16MonitorData

Array element No.	Data description	
[0]	Grease remaining time	J1 axis
[1]		J2 axis
[2]		J3 axis
[3]		J4 axis
[4]		J5 axis
[5]		J6 axis
[6]		J7 axis
[7]		J8 axis
[8]	Belt remaining time	J1 axis
[9]		J2 axis
[10]		J3 axis
[11]		J4 axis
[12]		J5 axis
[13]		J6 axis
[14]		J7 axis
[15]		J8 axis

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software

■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later

■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

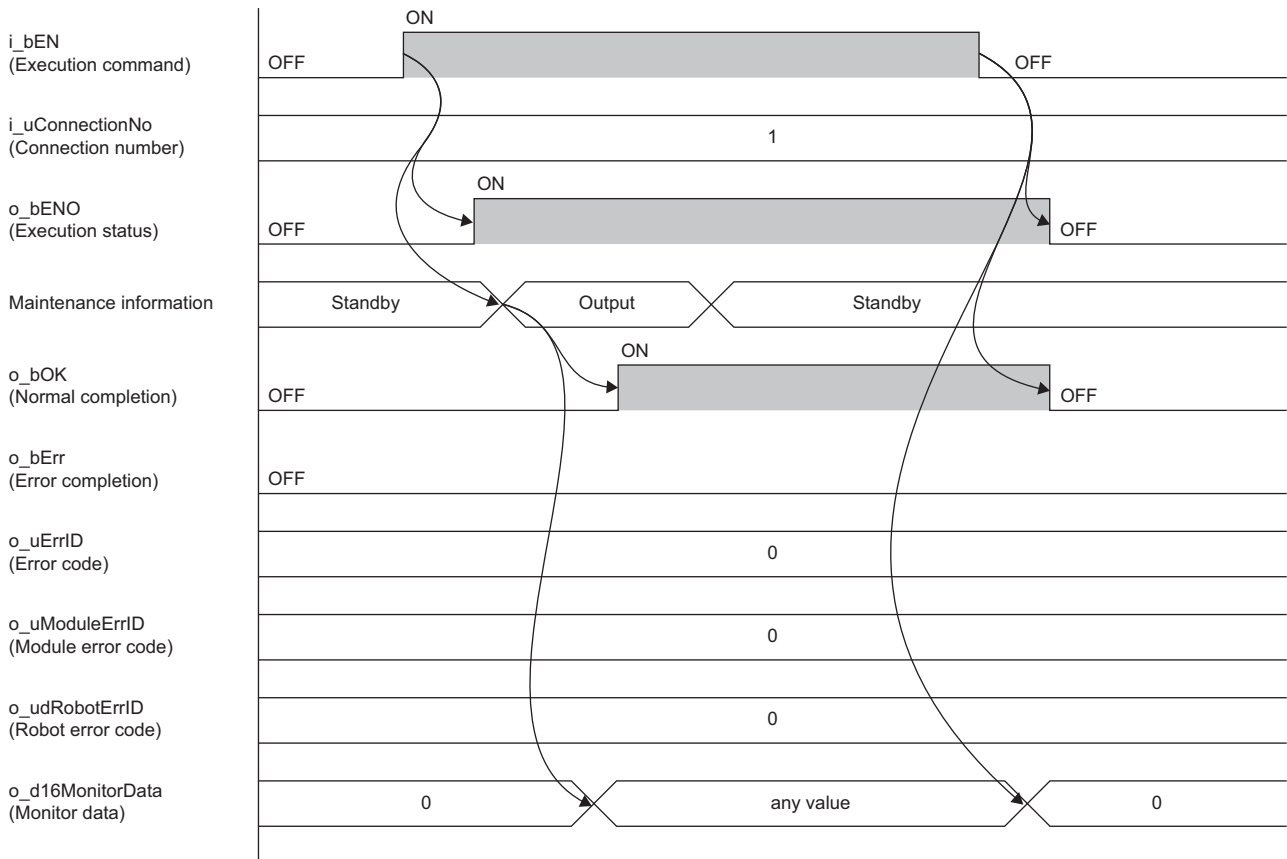
Item	Description
Number of steps	1200 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 224 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

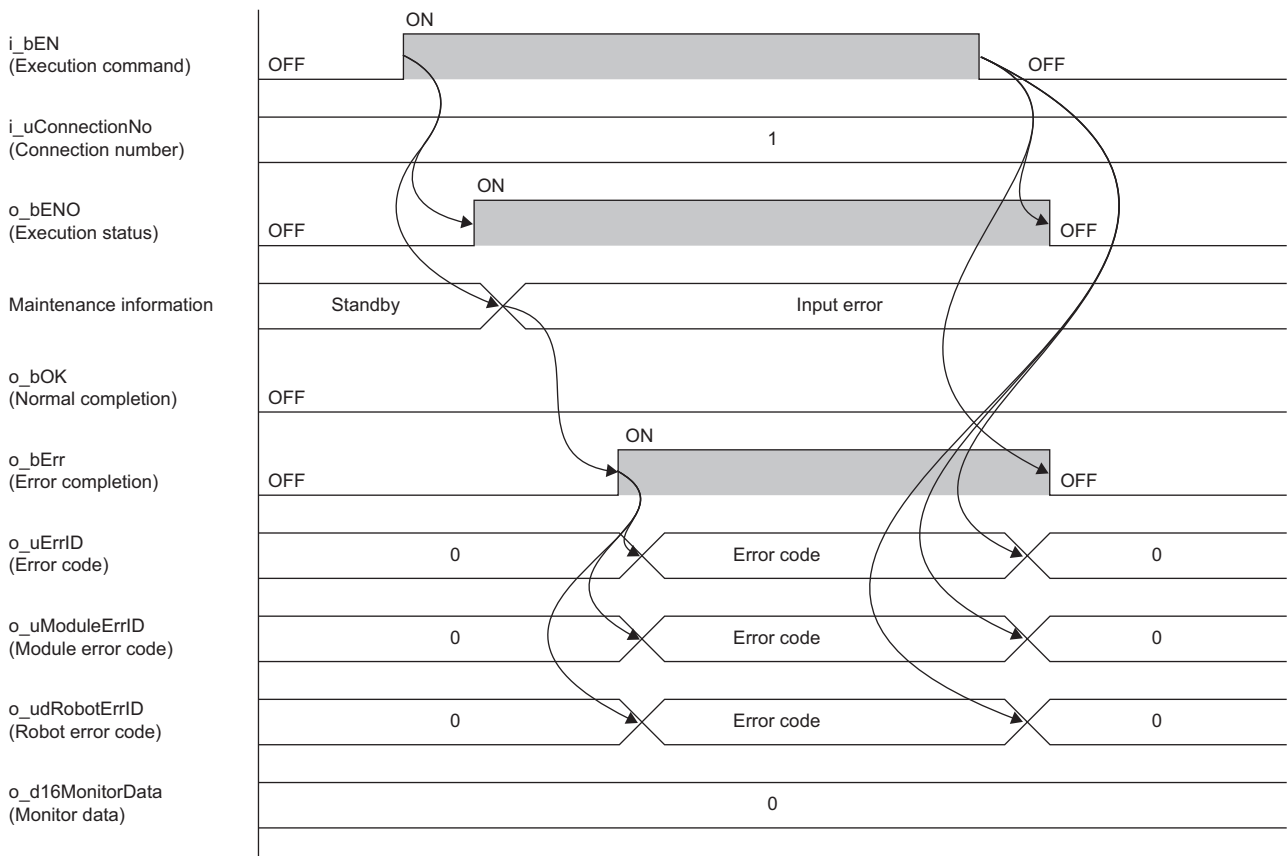
- This FB is executed at the rising edge of i_bEN (execution command). The grease remaining time and belt remaining time are acquired according to the specified i_uConnectionNo (connection number).
- When the acquisition of the grease remaining time and belt remaining time is completed, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. (Page 85 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	17.223ms	2.285ms	16 scans
FX5UJ CPU module	1 robot controller	16.395ms	1.631ms	22 scans
FX5U CPU module ^{*1*2}	1 robot controller	22.790ms	1.983ms	30 scans
FX5UC CPU module ^{*1*2}	1 robot controller	22.790ms	1.983ms	30 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

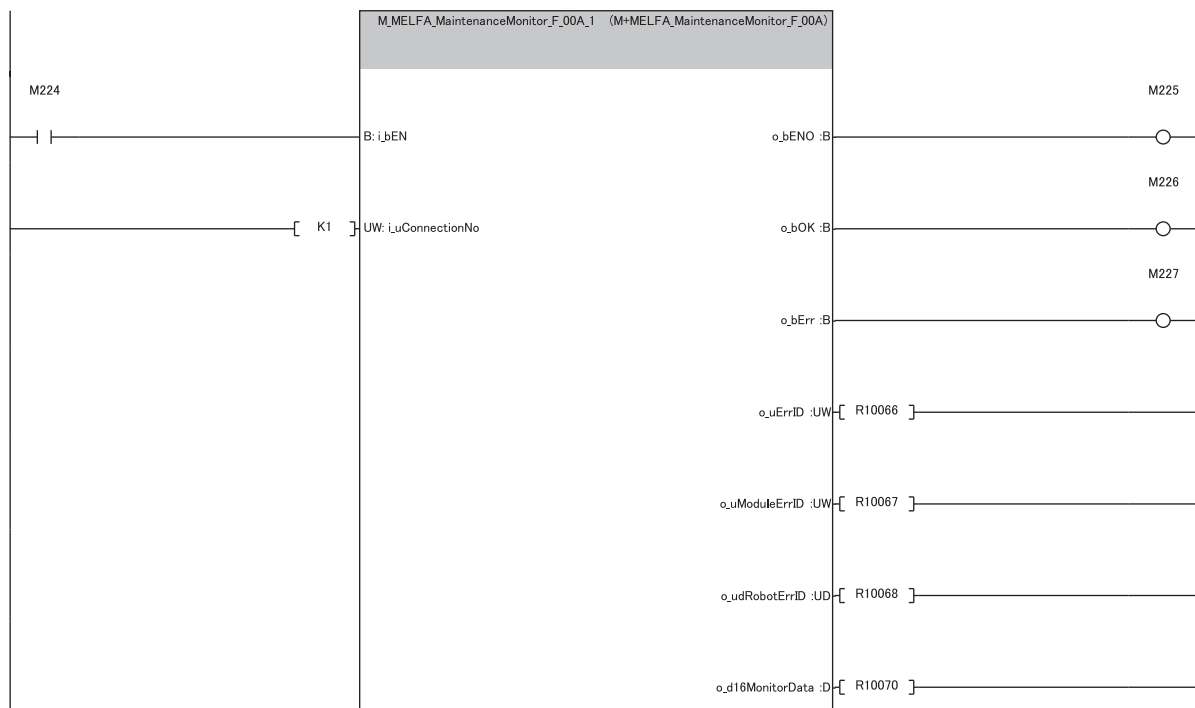
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M224	FB execution flag
M225	FB execution status display flag
M226	FB normal completion display flag
M227	FB error completion display flag
R10066	FB error code storage device
R10067	Module error code storage device
R10068 to R10069	Robot error code storage device
R10070 to R10101	Monitor data storage device

Program

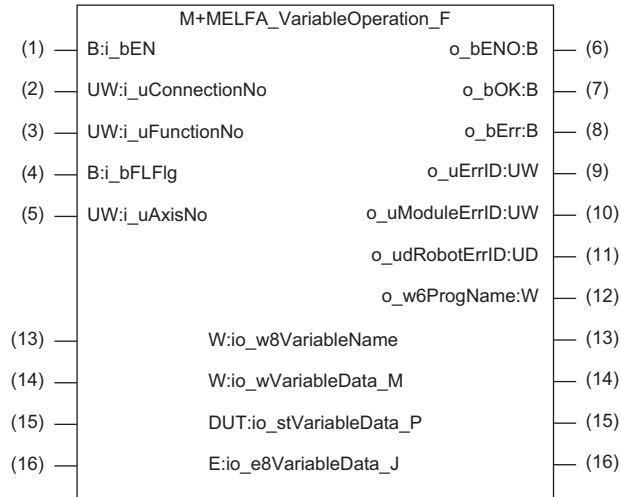


Processing order	Processing details
1	When M224 is turned on, M225 turns on and the FB is executed for connection number 1.
2	When the belt remaining time and grease remaining time are read and stored in R10070 to R10101, M226 turns on.
3	When an error such as a send error occurs, M227 turns on. At this time, the related error code is stored in the error code storage device.

3.8 M+MELFA_VariableOperation_F (Variable Operation)

Overview

This FB operates (reads/writes the contents of) the numeric variable, position variable, and joint variable.



Labels



Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_uFunctionNo	Function number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 8	Specify the applicable function. (☞ Page 87 i_uFunctionNo)
(4)	i_bFLFlg	Additional axis	Bit	Only when FB starts	ON/OFF	The value changes to on when an additional axis exists.
(5)	i_uAxisNo	Number of robot axes	Word [unsigned]/bit string [16 bits]	Only when FB starts	4 to 8	Specify the number of robot axes.

■ i_uFunctionNo

Function number	Item	Description
1	Reading of numeric variables	Reads the content of a variable whose name is specified.
2	Writing of numeric variables	Rewrites the content of a variable whose name and data are specified.
3	Reading of position variables	Reads the content of a variable whose name is specified.
4	Writing of position variables	Rewrites the content of a variable whose name and data are specified.
5	Reading of joint variables	Reads the content of a variable whose name is specified.
6	Writing of joint variables	Rewrites the content of a variable whose name and data are specified.
7	Reading of external variables (P_DM)	Reads the content of a variable whose name is specified.
8	Writing of external variables (P_DM)	Rewrites the content of a variable whose name and data are specified.

Output labels

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(7)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(8)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(9)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(10)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(11)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(12)	o_w6ProgName	Program name	Double word [signed] (0..5)	0	The program name is stored in ASCII code.
(13)	io_w8VariableName	Variable name	Double word [signed] (0..7)	0	The variable name (16 ASCII characters - 8 words) is stored. The following variables can be set. • Numeric variable (M**) • Position variable (P**) • Joint variable (J**) • External variable (P_DM(**))
(14)	io_wVariableData_M	Numeric variable data	Word [signed]	0	The numeric variable is stored. If the applicable data does not exist, 0 is stored.
(15)	io_stVariableData_P	Position variable data	M_MELFA_PosData_F	—	The position variable or external variable P_DM is stored. If the data does not exist or is omitted, 0 is stored. If structure flag 1 and structure flag 2 of a position variable are omitted, the initial value is stored.  Page 20 M_MELFA_PosData_F
(16)	io_e8VariableData_J	Joint variable data	Single-precision real number (0..7)	0	The position variable and joint variable are stored. If the applicable data does not exist or is omitted, 0 is stored.  Page 88 io_e8VariableData_J

■io_e8VariableData_J

Array element No.	Description
[0]	J1 coordinate value
[1]	J2 coordinate value
[2]	J3 coordinate value
[3]	J4 coordinate value
[4]	J5 coordinate value
[5]	J6 coordinate value
[6]	J7 coordinate value
[7]	J8 coordinate value

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later




■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

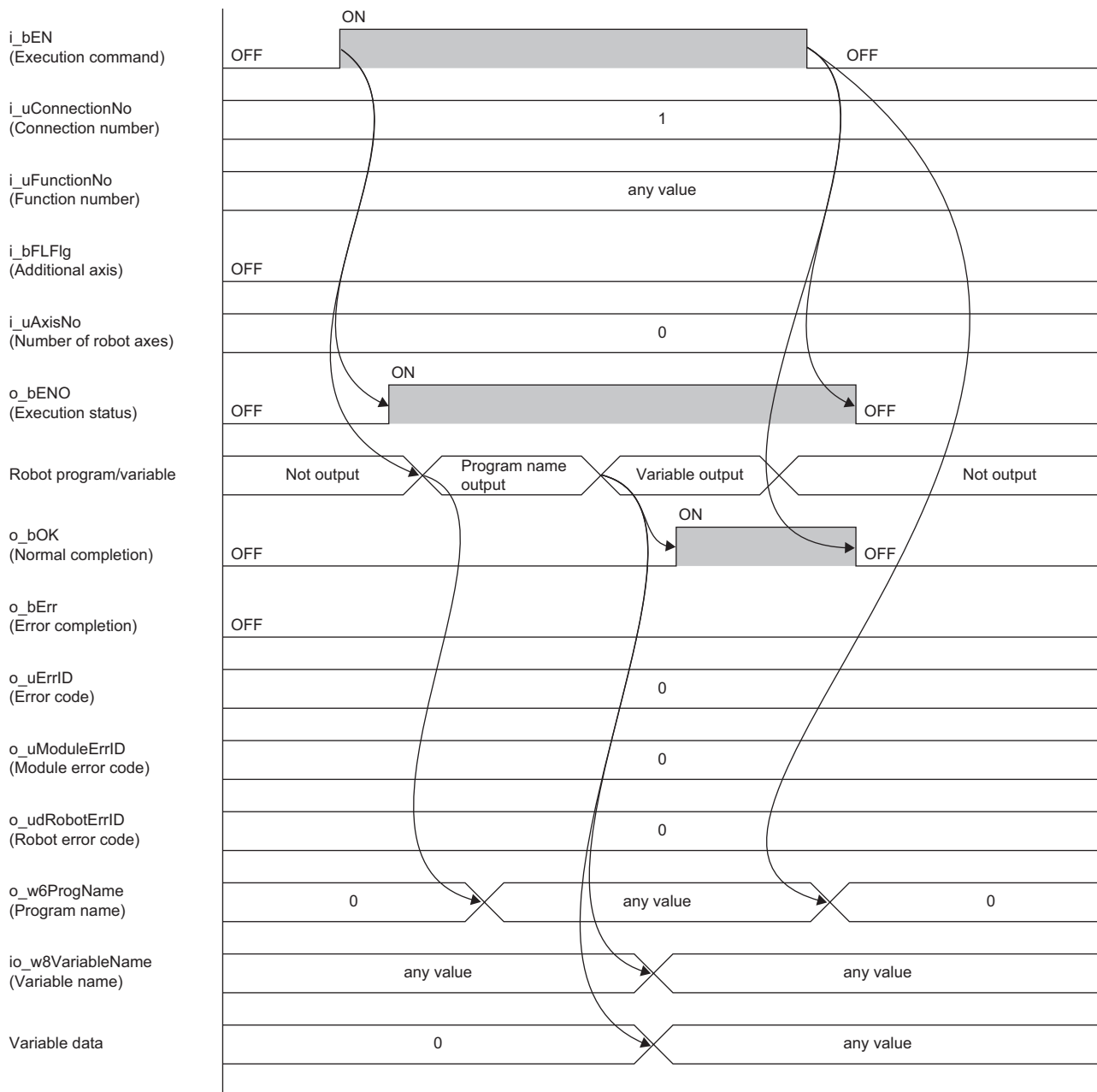
Item	Description
Number of steps	3501 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none">• Label: 988 points (Word)• Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none">• Index register: 0 points• Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

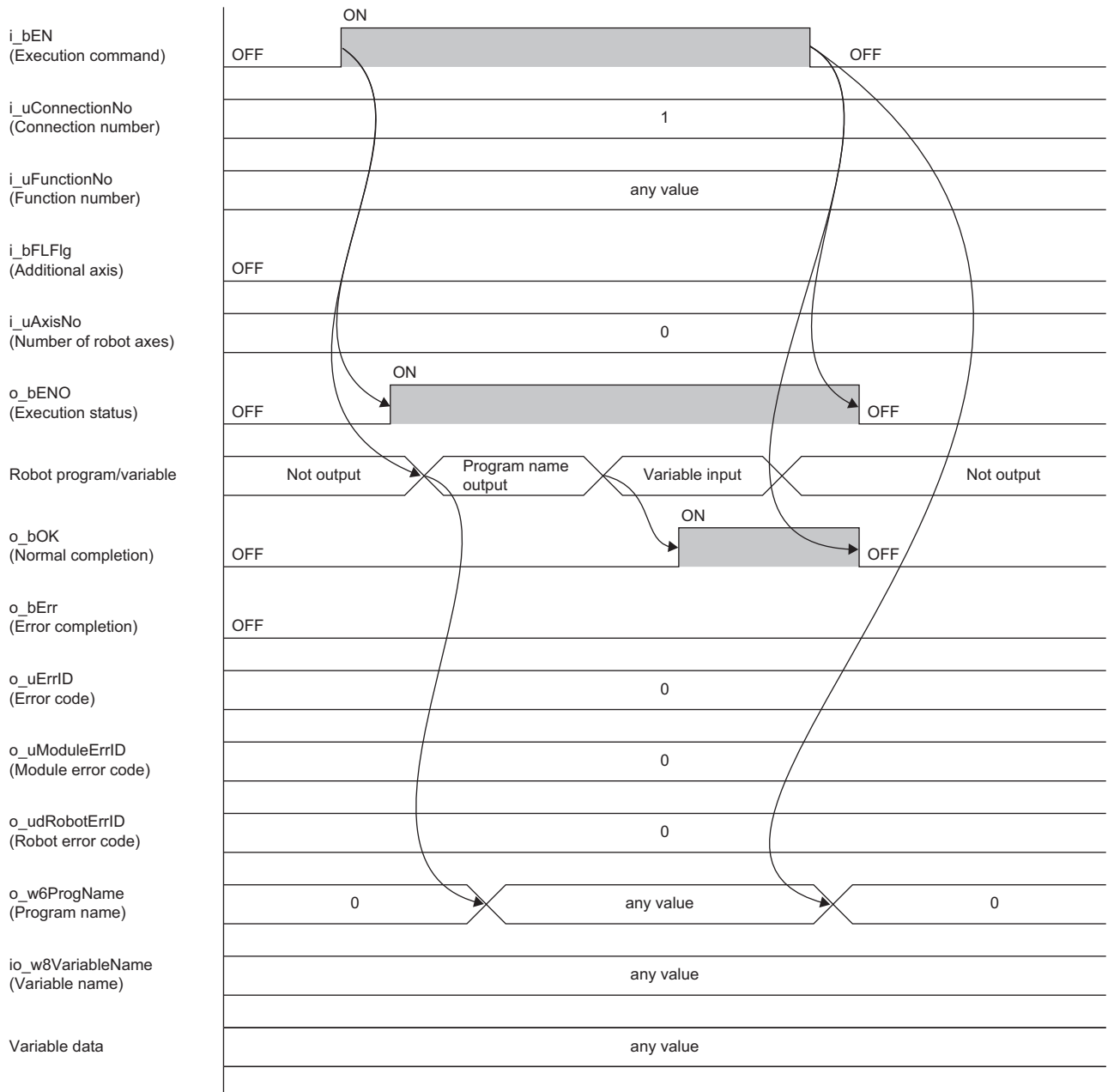
- This FB is executed at the rising edge of i_bEN (execution command). A variable is read or written according to the specified i_uConnectionNo (connection number). If a position variable, external variable P_DM, or joint variable is specified, this FB follows also the settings of i_uAxisNo (number of robot axes) and i_bFLFlg (additional axes).
- If i_uFunctionNo (function number) is set to read, the content of a variable is read according to the value of io_wVariableName (variable name).
- If i_uFunctionNo (function number) is set to write, the content of a variable is written according to io_wVariableName (variable name) and the value of io_wVariableData_M (numeric variable data) for numerical variables, io_stVariableData_P (position variable data) for position variables or external variables P_DM, or io_e8VariableData_J (joint variable data) for joint variables.
- If the applicable data does not exist in the returned command, such as when data is omitted or there is no additional axis, 0 is stored. However, if structure flag 1 and structure flag 2 are omitted, the initial value acquired by M+MELFA_ConnectionOpen_F (connection probability), the value of G_udFL1 (structure flag 1 (initial value)), and the value of G_udFL2 (structure flag 2 (initial value)) are stored. ( Page 49 M+MELFA_ConnectionOpen_F (Connection Establishment))
- When the storage of the values is completed, o_bOK (normal completion) turns on.
- Although this FB does not execute a robot program, it reads and writes robot controller variables. Therefore, a robot program is required. When using this FB, store the robot program in the robot controller in advance. Also, if the robot program is not selected when variables are read or if variables other than the position variable (P_DM) are not defined in the program, 0 is stored.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 94 Error codes)

Timing chart of I/O signals

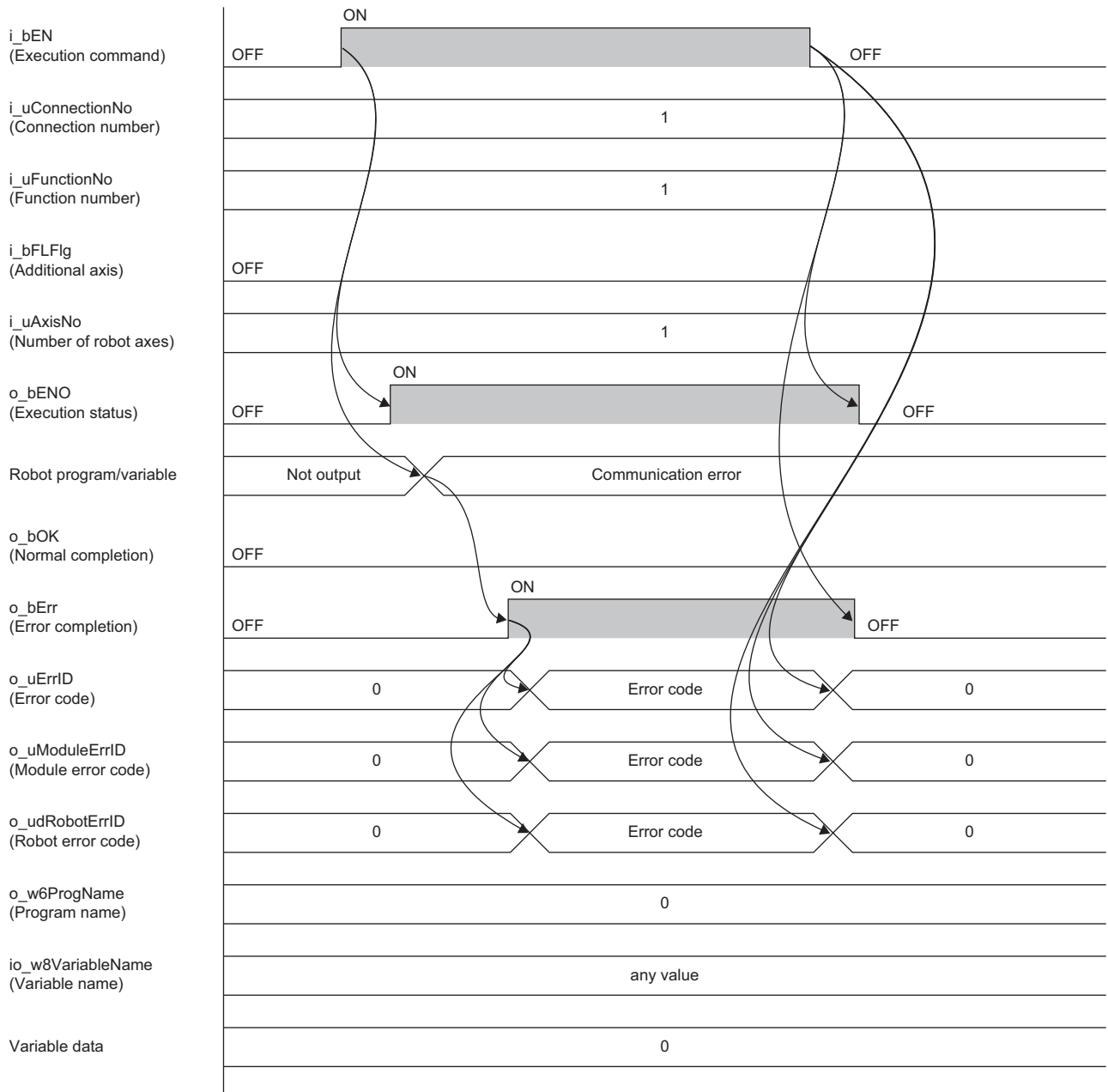
■ Normal completion (reading of variables)



■ Normal completion (writing of variables)



■ Error completion



Precautions

- Prepare the robot program in advance and start the operation of this FB with the program selected on the robot side.
- If a variable that does not exist in the program is written, the robot returns an error. If such a variable is read, it is ignored.
- This FB uses SP.SOCSND and SP.SOCRVC. If an error occurs with these instructions, `o_bErr` (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	26.530ms	3.732ms	10 scans
FX5UJ CPU module	1 robot controller	25.019ms	2.943ms	12 scans
FX5U CPU module ^{*1*2}	1 robot controller	23.605ms	2.592ms	14 scans
FX5UC CPU module ^{*1*2}	1 robot controller	23.605ms	2.592ms	14 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
101H	A value other than 1 to 8 is set for i_uFunctionNo (function number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

Example

The following shows an example of using this FB in a ladder program.

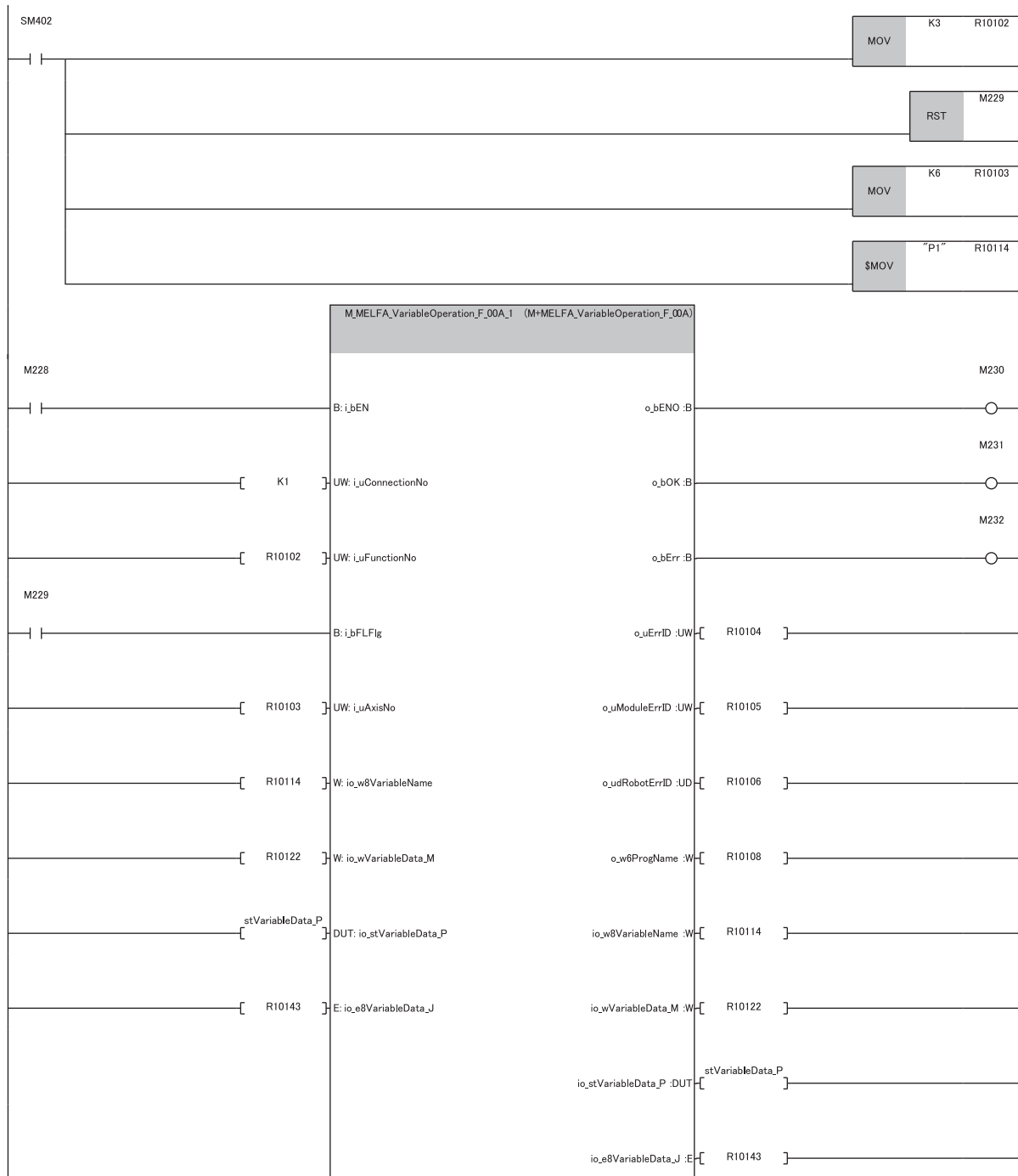
Devices used

Device	Application
M228	FB execution flag
R10102	Function number specification device
M229	Additional axis flag
R10103	Number-of-axes specification device
M230	FB execution status display flag
M231	FB normal completion display flag
M232	FB error completion display flag
R10104	FB error code storage device
R10105	Module error code storage device
R10106 to R10107	Robot error code storage device
R10108 to R10113	Program name storage device
R10114 to R10121	Variable name storage device
R10122	Numeric variable data storage device
R10123 to R10142	Position variable data storage device stVariableData_P is an M_MELFA_PosData_F structure. (Page 20 M_MELFA_PosData_F)
R10143 to R10158	Joint variable data storage device

Position variable data storage device

Device	Global labels	Structure	Structure member	Data type	Description
R10123 to R10124	stVariableData_P	M_MELFA_PosData_F	eCoord_X	Single-precision real number	X component
R10125 to R10126			eCoord_Y	Single-precision real number	Y component
R10127 to R10128			eCoord_Z	Single-precision real number	Z component
R10129 to R10130			eCoord_A	Single-precision real number	A component
R10131 to R10132			eCoord_B	Single-precision real number	B component
R10133 to R10134			eCoord_C	Single-precision real number	C component
R10135 to R10136			eCoord_L1	Single-precision real number	L1 component (additional axis 1)
R10137 to R10138			eCoord_L2	Single-precision real number	L2 component (additional axis 2)
R10139 to R10140			udFL1	Double word [unsigned]/bit string [32 bits]	FL1 (structure flag 1)
R10141 to R10142			udFL2	Double word [unsigned]/bit string [32 bits]	FL2 (structure flag 2)

Program

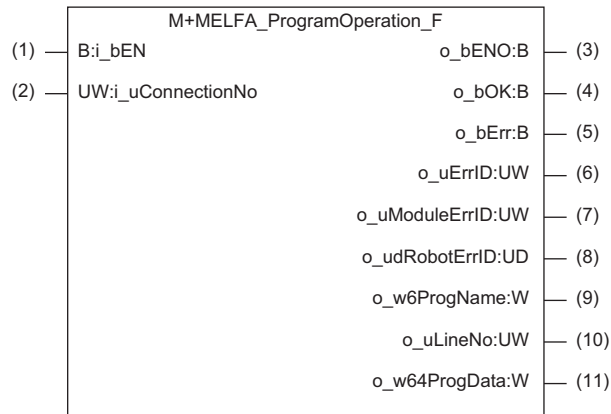


Processing order	Processing details
1	When function number 3 (position variable read) is set to R10102, M229 is turned off, number of axes 6 is set to R10103, variable name "P1" is set to R10114, and M228 is turned on, M230 turns on, and then the FB is executed for connection number 1.
2	When the program name and variables are read and stored in R10108 to R10158, M231 turns on.
3	When an error such as a send error occurs, M232 turns on. At this time, the related error code is stored in the error code storage device.

3.9 M+MELFA_ProgramOperation_F (Program Operation)

Overview

This FB operates the robot program (reads the line that is currently being executed).



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(9)	o_w6ProgName	Program name	Double word [signed] (0..5)	0	The program name is stored in ASCII code.
(10)	o_uLineNo	Line number	Word [unsigned]/bit string [16 bits]	0	The line number being executed is stored.
(11)	o_w64ProgData	Program data	Double word [signed] (0..63)	0	The program data is stored in ASCII code.

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

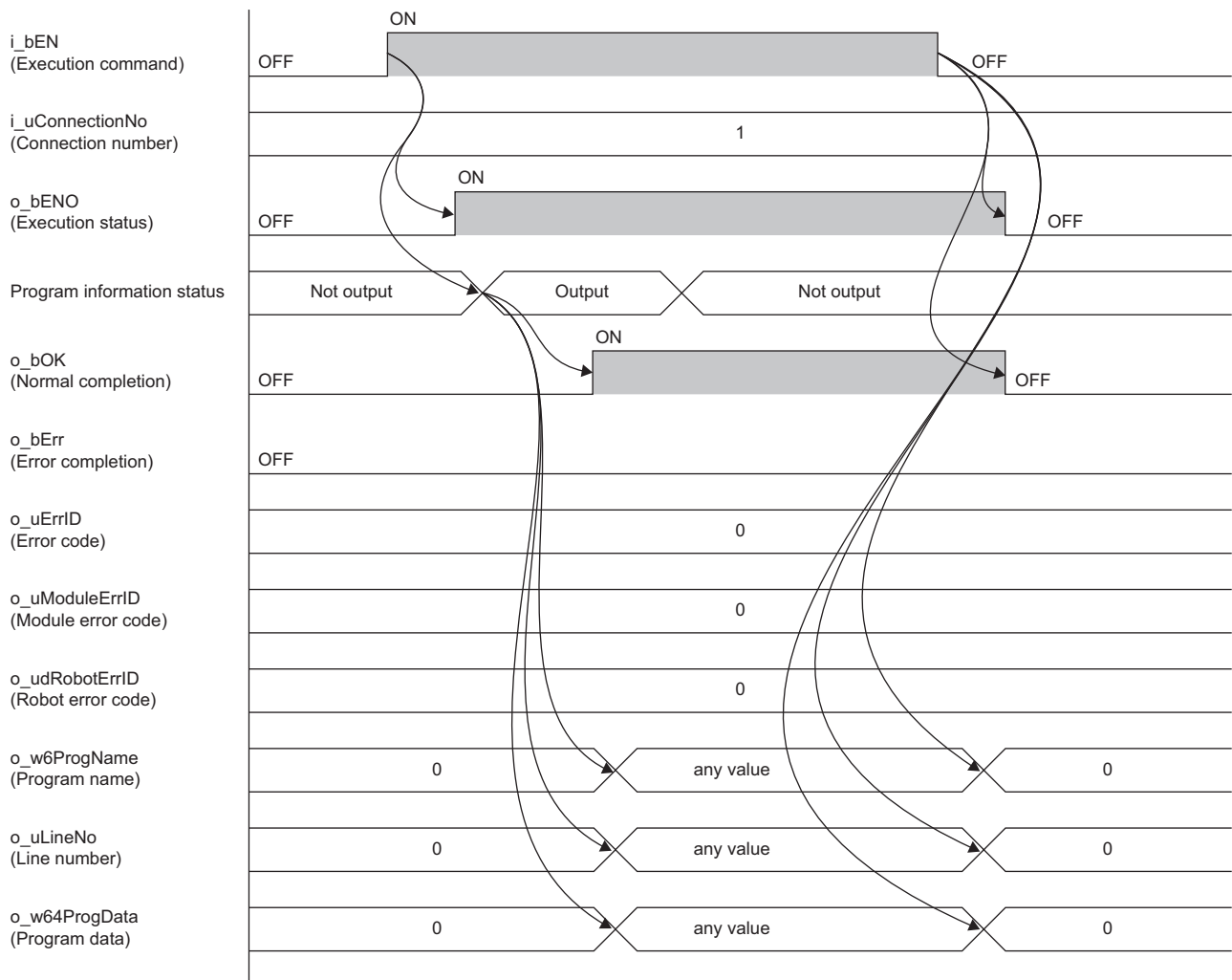
Item	Description
Number of steps	1127 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 376 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

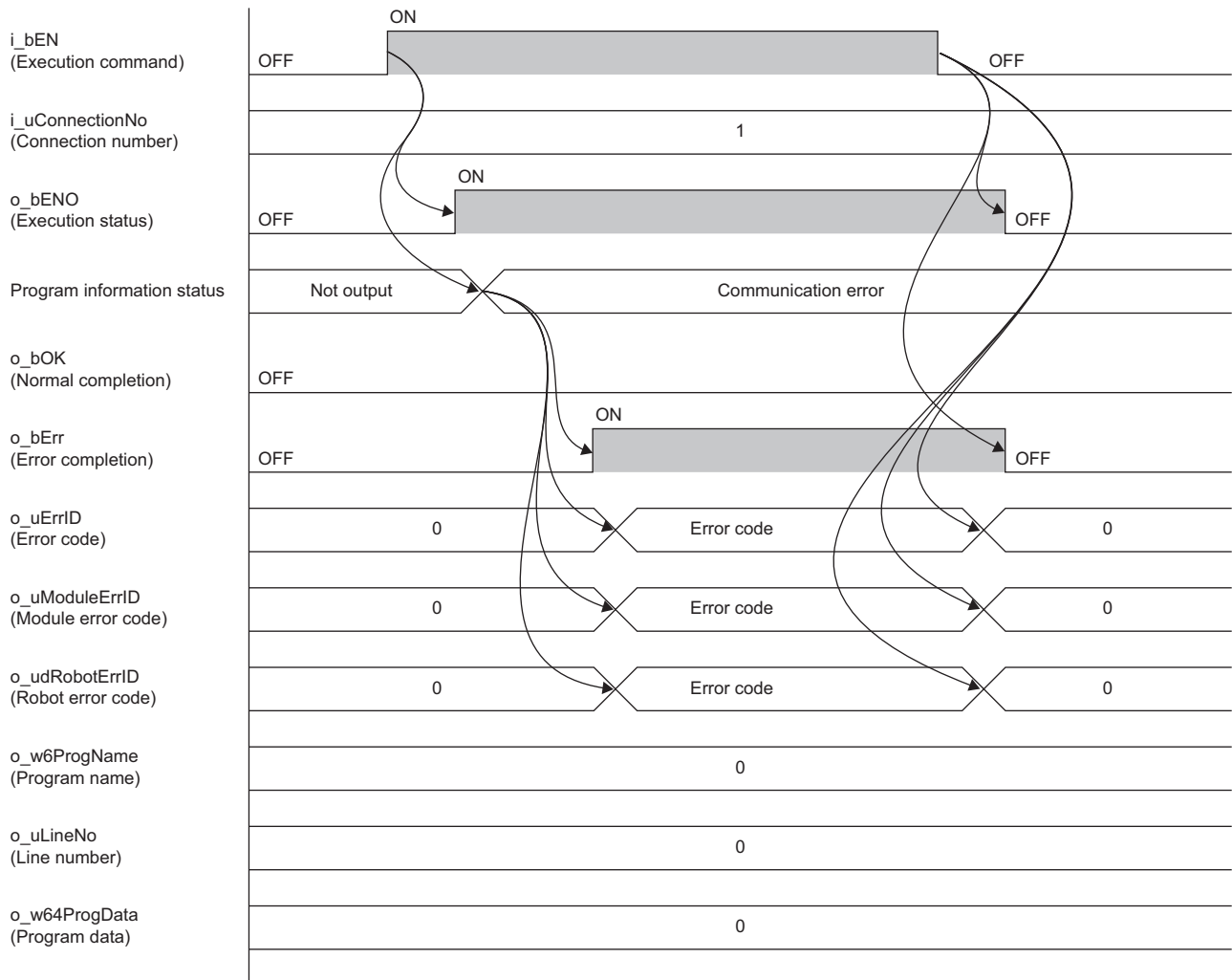
- This FB is executed at the rising edge of i_bEN (execution command). Information about the robot program is acquired according to the specified i_uConnectionNo (connection number).
- When reading of information about the program is completed, o_bOK (normal completion) turns on.
- Although this FB does not execute a robot program, it reads robot controller variables. Therefore, a robot program is required. When using this FB, store the robot program in the robot controller in advance.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 101 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

- Prepare the robot program in advance and start the operation of this FB with the program selected on the robot side.
- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	21.676ms	1.092ms	30 scans
FX5UJ CPU module	1 robot controller	18.456ms	0.943ms	34 scans
FX5U CPU module ^{*1*2}	1 robot controller	17.193ms	0.809ms	39 scans
FX5UC CPU module ^{*1*2}	1 robot controller	17.193ms	0.809ms	39 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

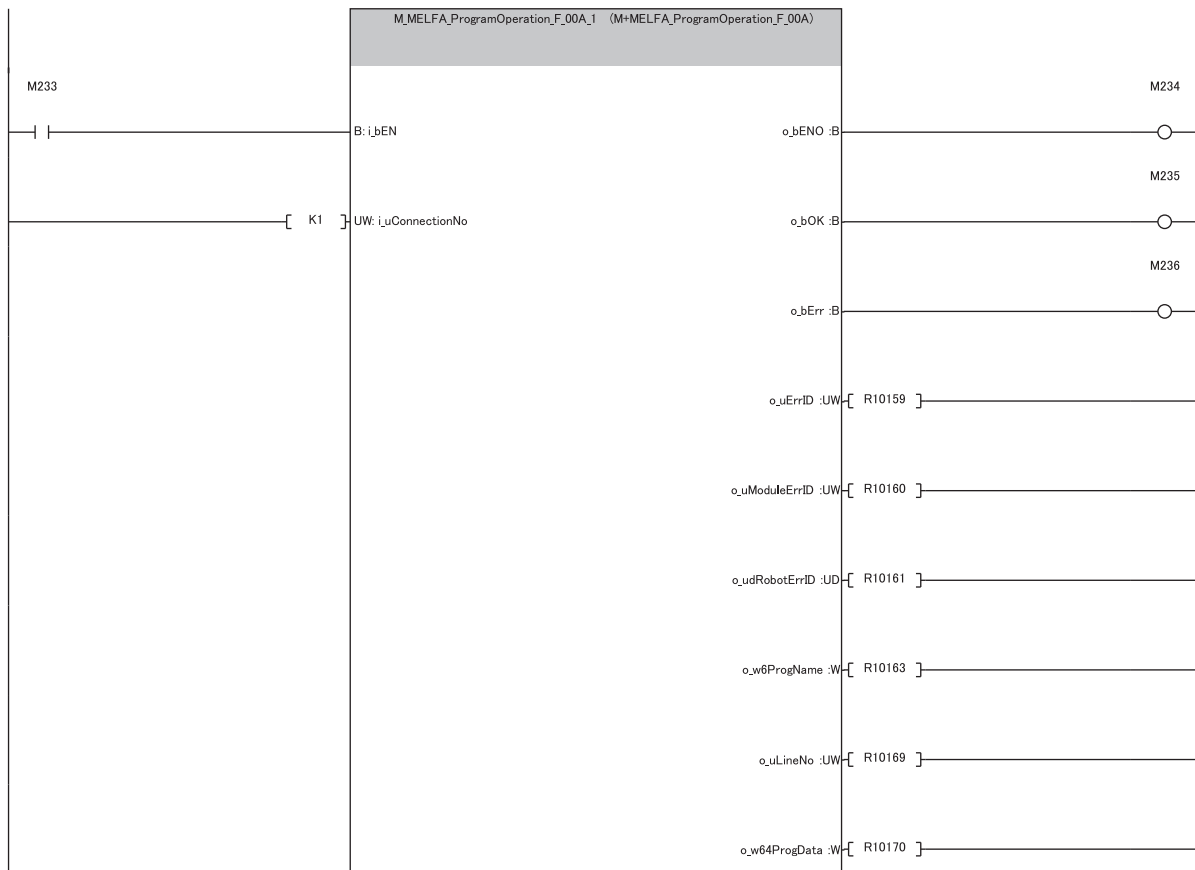
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M233	FB execution flag
M235	FB normal completion display flag
M234	FB execution status display flag
M236	FB error completion display flag
R10159	FB error code storage device
R10160	Module error code storage device
R10161 to R10162	Robot error code storage device
R10163 to R10168	Program name storage device
R10169	Line number storage device
R10170 to R10233	Program data storage device

Program

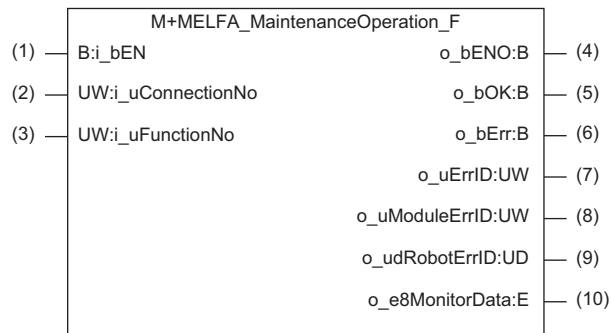


Processing order	Processing details
1	When M233 is turned on, M234 turns on and the FB is executed for connection number 1.
2	When program information is read and stored in R10163 to R10233, M235 turns on.
3	When an error such as a send error occurs, M236 turns on. At this time, the related error code is stored in the error code storage device.

3.10 M+MELFA_MaintenanceOperation_F (Maintenance Data Operation)

Overview

This FB monitors the maximum values of the robot servo data (current value and load factor) and changes the maximum value data to 0.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_uFunctionNo	Function number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 4	Specify the applicable function. (☞ Page 103 i_uFunctionNo)

■ i_uFunctionNo

Function number	Item	Description
1	Max. Current Cmd1 monitor	Monitors Max. Current Cmd1.
2	Max. Current Cmd2 monitor	Monitors Max. Current Cmd2.
3	Max. Axis Load Level monitor	Monitors Max. Axis Load Level.
4	Servo monitor maximum value reset	Resets the servo monitor maximum value.

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

No.	Label	Label name	Data type	Default value	Description
(10)	o_e8MonitorData	Monitor data	Single-precision real number (0..7)	0	The monitor data is stored. (📖 Page 104 o_e8MonitorData)

■ o_e8MonitorData

Array element No.	Description
[0]	J1 axis
[1]	J2 axis
[2]	J3 axis
[3]	J4 axis
[4]	J5 axis
[5]	J6 axis
[6]	J7 axis
[7]	J8 axis

The output data changes depending on the setting value of i_uFunctionNo (function number).

- 1: Max. Current Cmd1
- 2: Max. Current Cmd2
- 3: Max. Axis Load Level

Global labels

Refer to the following.

📖 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

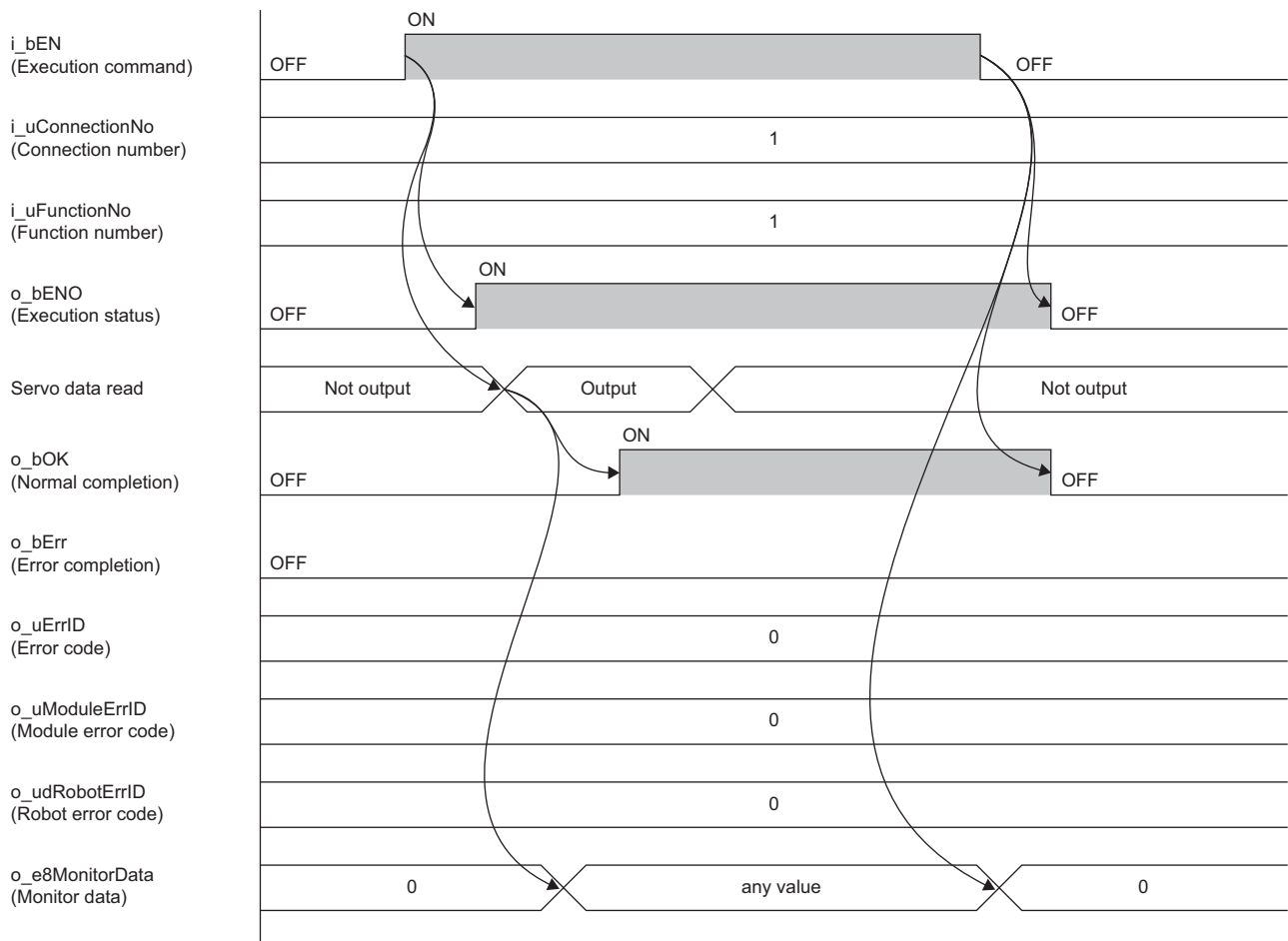
Item	Description
Number of steps	1279 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 456 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

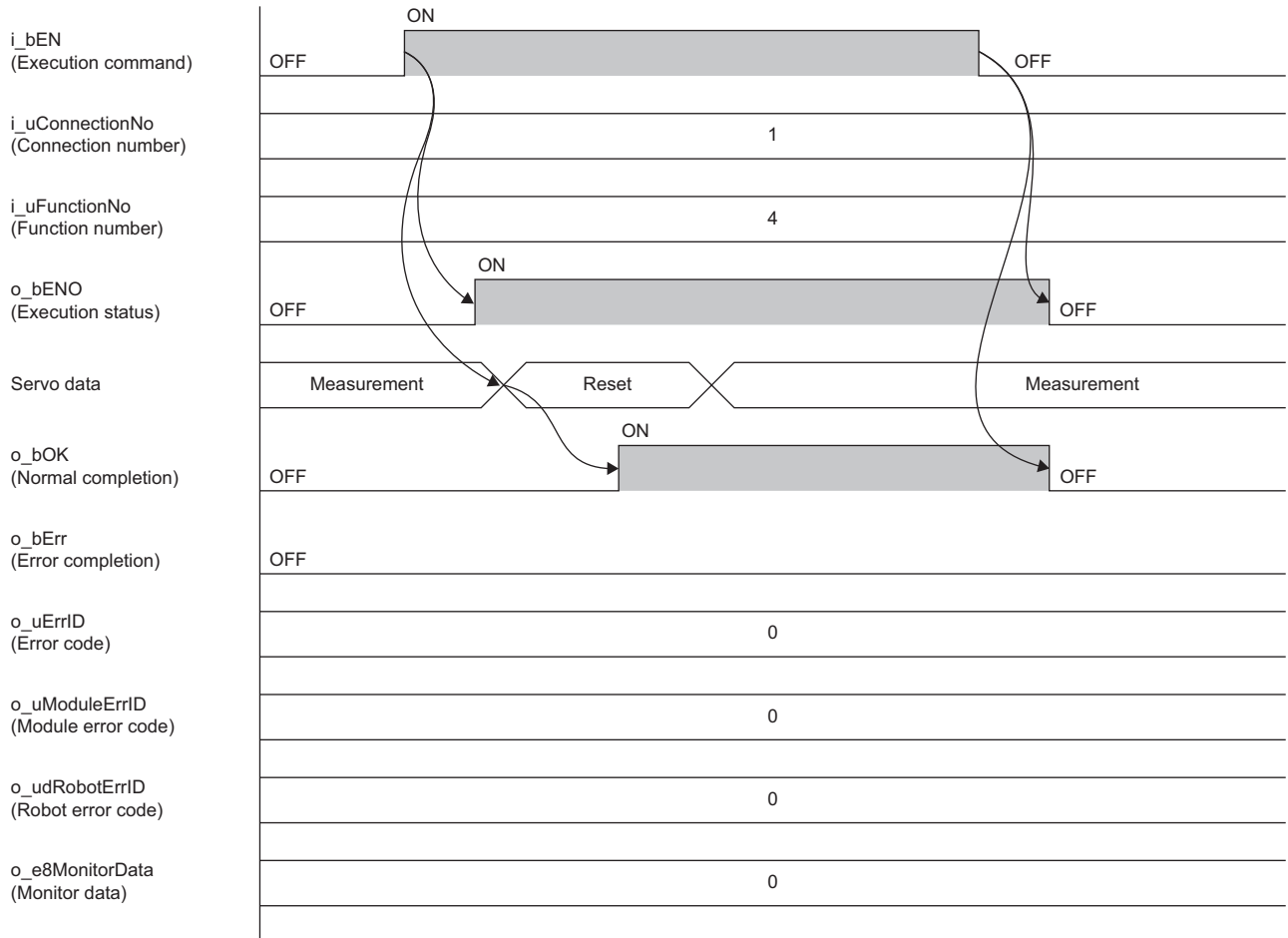
- This FB is executed at the rising edge of i_bEN (execution command). The servo data is read or reset according to the specified i_uConnectionNo (connection number) and i_uFunctionNo (function number).
- When reading or resetting of data is completed, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 109 Error codes)

Timing chart of I/O signals

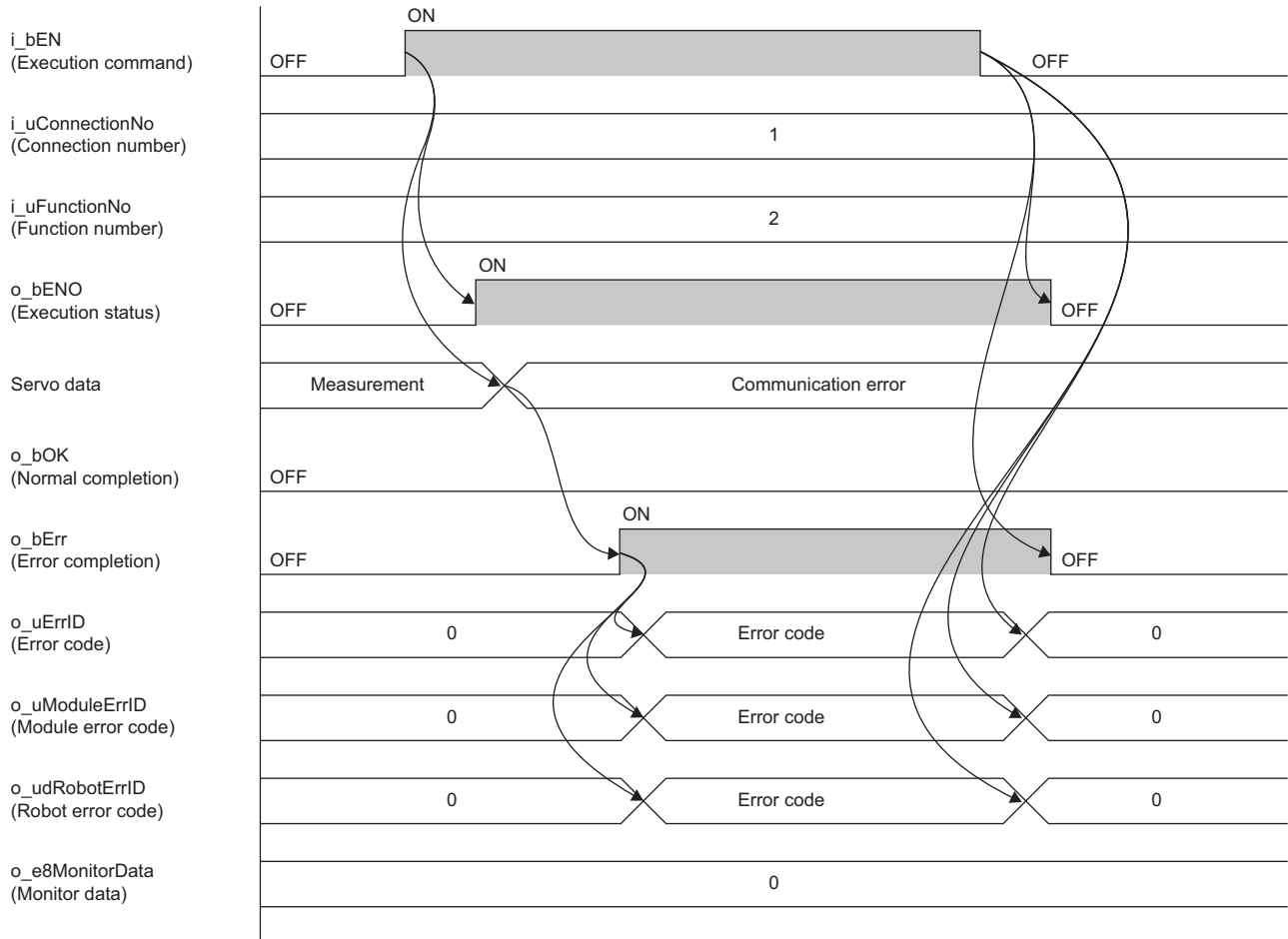
■ Normal completion (for reading of the maximum value data)



■ Normal completion (for reset)



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	10.280ms	3.473ms	7 scans
FX5UJ CPU module	1 robot controller	10.064ms	2.271ms	9 scans
FX5U CPU module ^{*1*2}	1 robot controller	12.861ms	2.332ms	17 scans
FX5UC CPU module ^{*1*2}	1 robot controller	12.861ms	2.332ms	17 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
101H	A value other than 1 to 4 is set for i_uFunctionNo (function number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

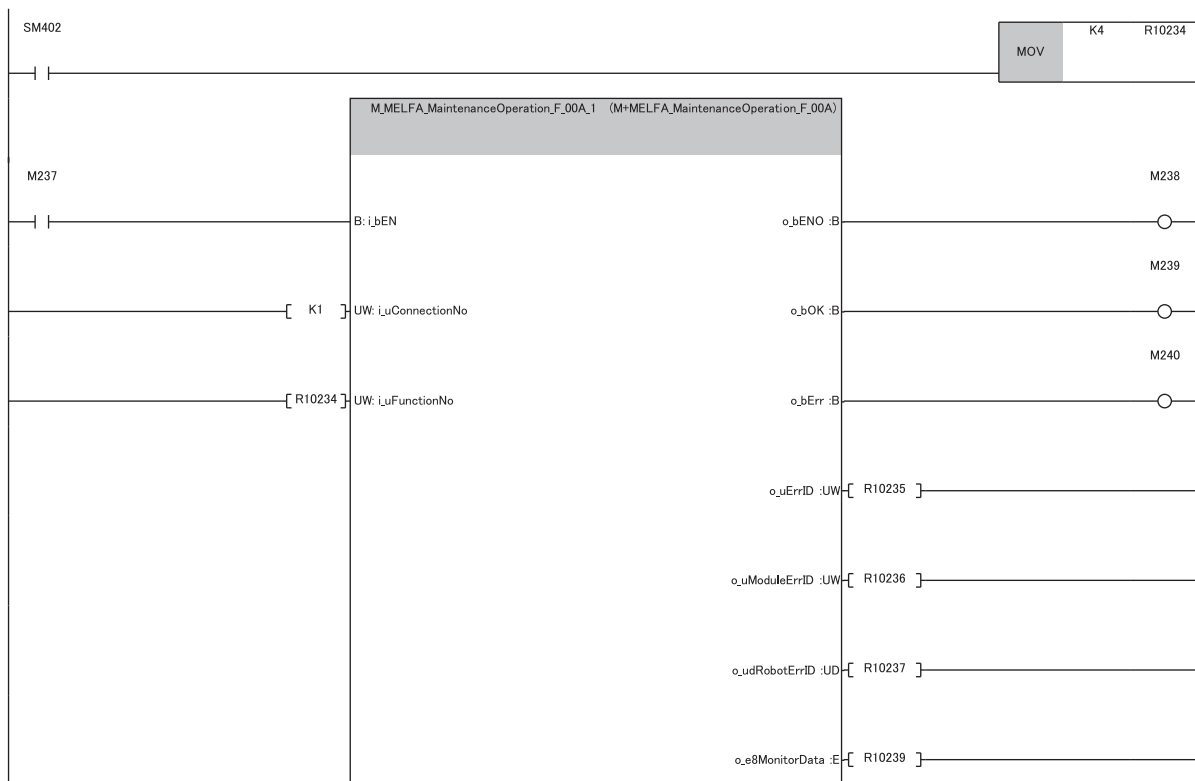
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M237	FB execution flag
R10234	Function number specification device
M238	FB execution status display flag
M239	FB normal completion display flag
M240	FB error completion display flag
R10235	FB error code storage device
R10236	Module error code storage device
R10237 to R10238	Robot error code storage device
R10239 to R10254	Maximum value data storage device

Program

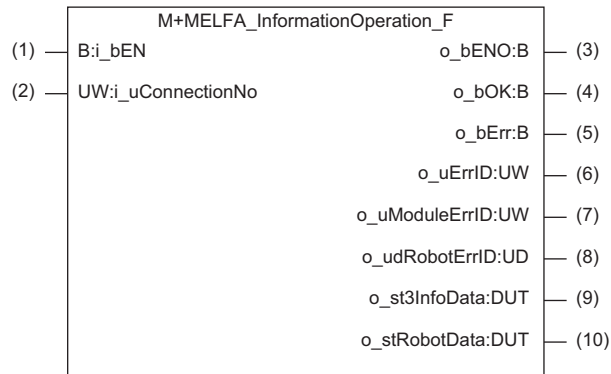


Processing order	Processing details
1	When function number 4 is set in R10234 and M244 is turned on, M238 turns on and the FB is executed for connection number 1.
2	When the reset is completed, M239 turns on.
3	When an error such as a communication error occurs, M240 turns on. At this time, the related error code is stored in the error code storage device.

3.11 M+MELFA_InformationOperation_F (Robot Information Read Operation)

Overview

This FB reads the robot error information and product information (such as the robot model and controller version).



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection

Output labels

No.	Label	Label name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(4)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(5)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(6)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(7)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(8)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(9)	o_st3InfoData	Error information	M_MELFA_ErrInfoData_F(0..2)	—	Stores error information. (☞ Page 20 M_MELFA_ErrInfoData_F)
(10)	o_stRobotData	Product information	M_MELFA_RobotData_F	—	The product information is stored. (☞ Page 20 M_MELFA_RobotData_F)

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later

■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	1746 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 464 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

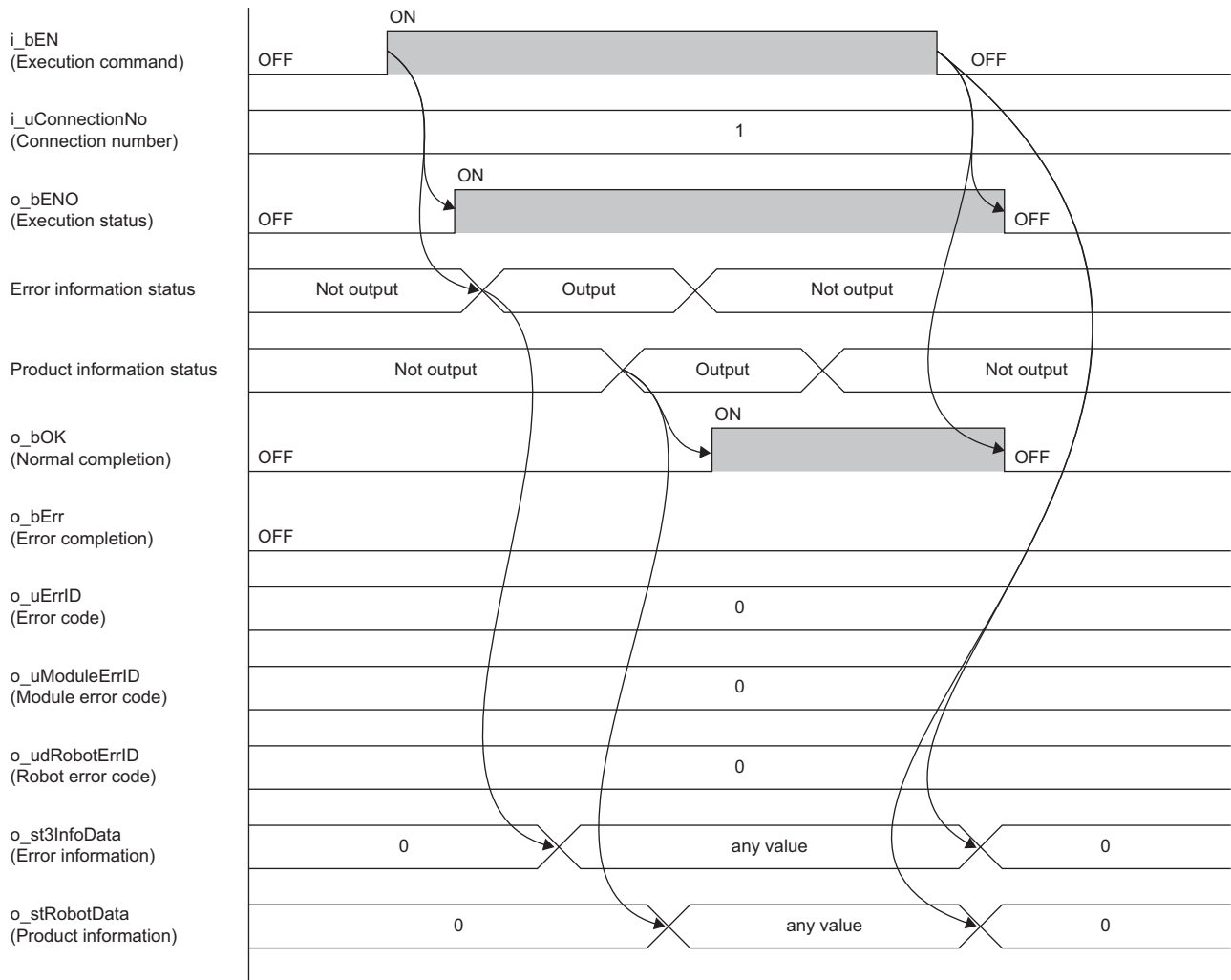
- This FB is executed at the rising edge of i_bEN (execution command). The error information and product information are read according to the specified i_uConnectionNo (connection number). Up to three errors currently occurring are read as error information. If no error has occurred, 0 is stored in the error number.
- When reading of all data is completed, o_bOK (normal completion) turns on.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

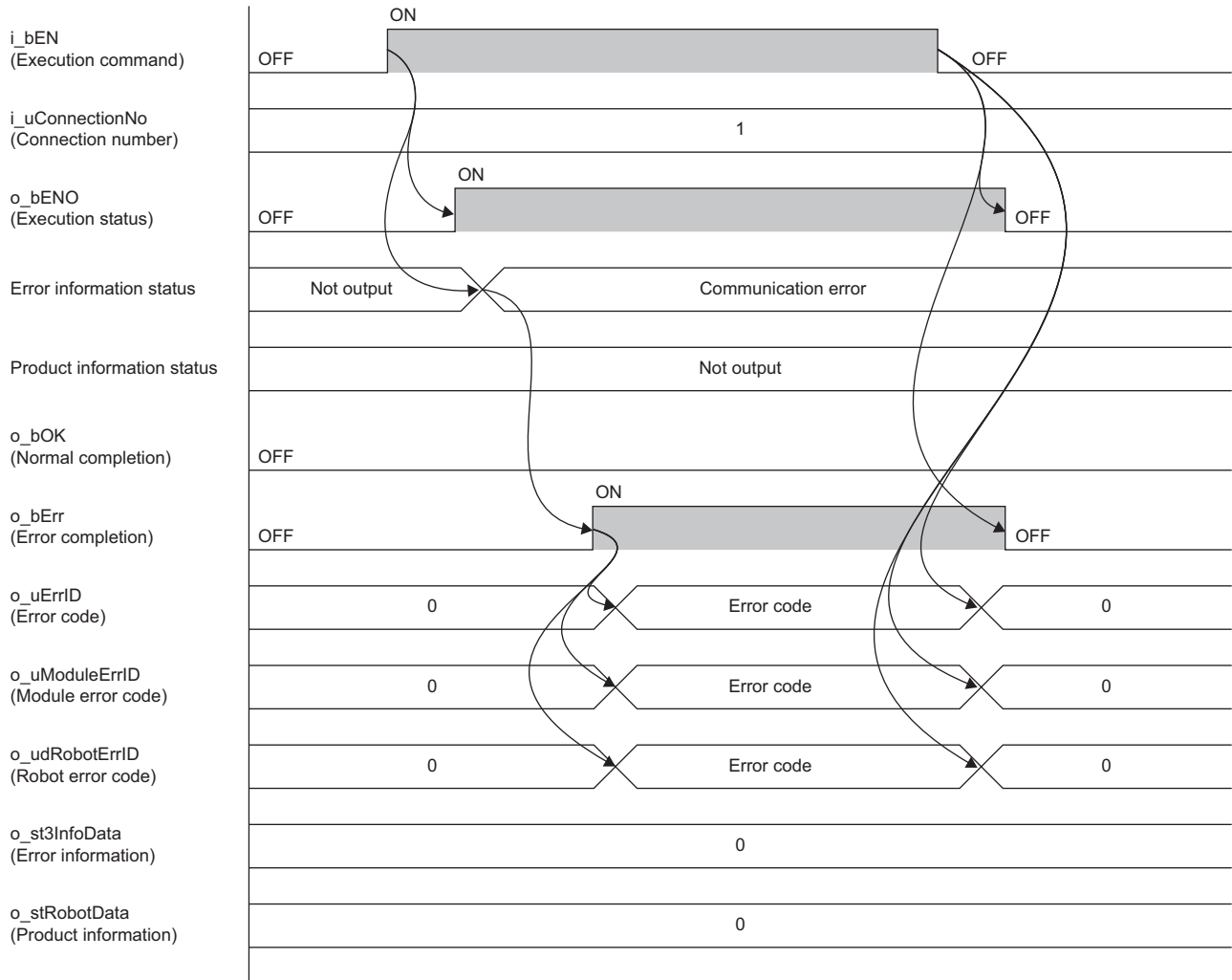
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 115 Error codes)

Timing chart of I/O signals

Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	69.140ms	2.662ms	84 scans
FX5UJ CPU module	1 robot controller	64.866ms	3.023ms	103 scans
FX5U CPU module ^{*1*2}	1 robot controller	82.390ms	1.443ms	137 scans
FX5UC CPU module ^{*1*2}	1 robot controller	82.390ms	1.443ms	137 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M241	FB execution flag
M242	FB execution status display flag
M243	FB normal completion display flag
M244	FB error completion display flag
R10255	FB error code storage device
R10256	Module error code storage device
R10257 to R10258	Robot error code storage device
R10259 to R10275	Error information 1 storage device (☞ Page 116 Error information 1 storage device) st3InfoData[0] is an M_MELFA_ErrInfoData_F structure. (☞ Page 20 M_MELFA_ErrInfoData_F)
R10276 to R10292	Error information 2 storage device (☞ Page 116 Error information 2 storage device) st3InfoData[1] is an M_MELFA_ErrInfoData_F structure. (☞ Page 20 M_MELFA_ErrInfoData_F)
R10293 to R10309	Error information 3 storage device (☞ Page 116 Error information 3 storage device) st3InfoData[2] is an M_MELFA_ErrInfoData_F structure. (☞ Page 20 M_MELFA_ErrInfoData_F)
R10310 to R10351	Product information storage device (☞ Page 117 Product information storage device) stRobData is an M_MELFA_RobotData_F structure. (☞ Page 20 M_MELFA_RobotData_F)

■Error information 1 storage device

Device	Global labels	Structure	Structure member	Data type	Description
R10259	st3InfoData[0]	M_MELFA_ErrInfoData_F	wErrNo	Word [unsigned]/bit string [16 bits]	Error No.
R10260 to R10271			w12PrgName	Word [signed] (0..11)	Error program name
R10272			wLineNo	Word [unsigned]/bit string [16 bits]	Error line No.
R10273 to R10274			wDetailNo	Double word [unsigned]/bit string [32 bits]	Detailed error No.
R10275			wSlotNo	Word [unsigned]/bit string [16 bits]	Error slot No.

■Error information 2 storage device

Device	Global labels	Structure	Structure member	Data type	Description
R10276	st3InfoData[1]	M_MELFA_ErrInfoData_F	wErrNo	Word [unsigned]/bit string [16 bits]	Error No.
R10277 to R10288			w12PrgName	Word [signed] (0..11)	Error program name
R10289			wLineNo	Word [unsigned]/bit string [16 bits]	Error line No.
R10290 to R10291			dDetailNo	Double word [unsigned]/bit string [32 bits]	Detailed error No.
R10292			wSlotNo	Word [unsigned]/bit string [16 bits]	Error slot No.

■Error information 3 storage device

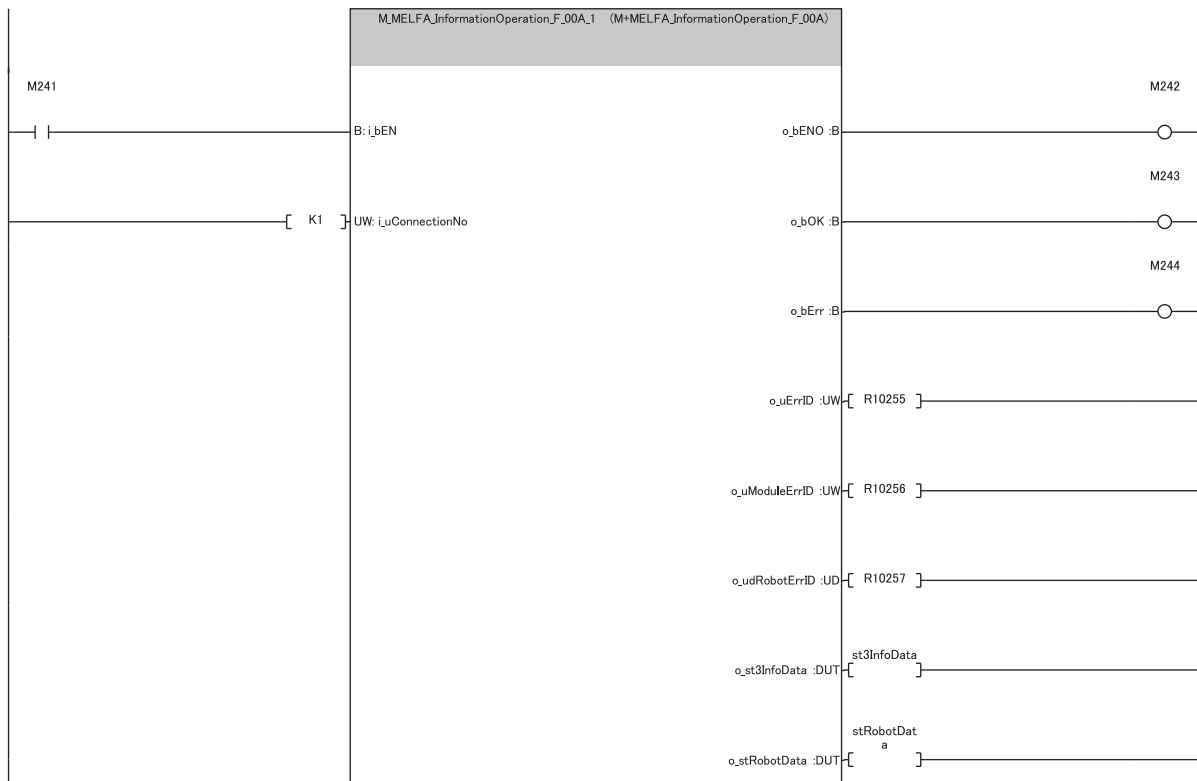
Device	Global labels	Structure	Structure member	Data type	Description
R10293	st3InfoData[2]	M_MELFA_ErrInfoData_F	wErrNo	Word [unsigned]/bit string [16 bits]	Error No.
R10294 to R10305			w12PrgName	Word [signed] (0..11)	Error program name
R10306			wLineNo	Word [unsigned]/bit string [16 bits]	Error line No.
R10307 to R10308			dDetailNo	Double word [unsigned]/bit string [32 bits]	Detailed error No.
R10309			wSlotNo	Word [unsigned]/bit string [16 bits]	Error slot No.

Product information storage device

Device	Global labels	Structure	Structure member	Data type	Description
R10310 to R10329	stRobData	M_MELFA_RobotData_F	w20RobotModel	Word [signed] (0..19)	Robot model
R10330 to R10335			w6CtrlVer	Word [signed] (0..5)	Controller version
R10336 to R10351			w16RobotSer	Word [signed] (0..15)	Robot serial No.

3

Program

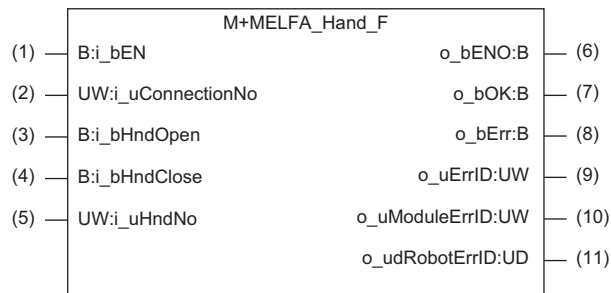


Processing order	Processing details
1	When M241 is turned on, M242 turns on and the FB is executed for connection number 1.
2	When error information and product information are acquired and stored in R10259 to R10351, M243 turns on.
3	When an error such as a send error occurs, M244 turns on. At this time, the related error code is stored in the error code storage device.

3.12 M+MELFA_Hand_F (Robot Hand Operation)

Overview

This FB performs the robot hand operation.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_bHndOpen	Hand open	Bit	Always	ON/OFF	The hand with the specified number is opened.
(4)	i_bHndClose	Hand close	Bit	Always	ON/OFF	The hand with the specified number is closed.
(5)	i_uHndNo	Hand No.	Word [unsigned]/bit string [16 bits]	Always	1 to 4	Specify the hand number of a hand to open/close.

Output labels

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(7)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(8)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(9)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(10)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(11)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later



■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	868 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> • Label: 124 points (Word) • Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> • Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	On-demand execution type

Function description

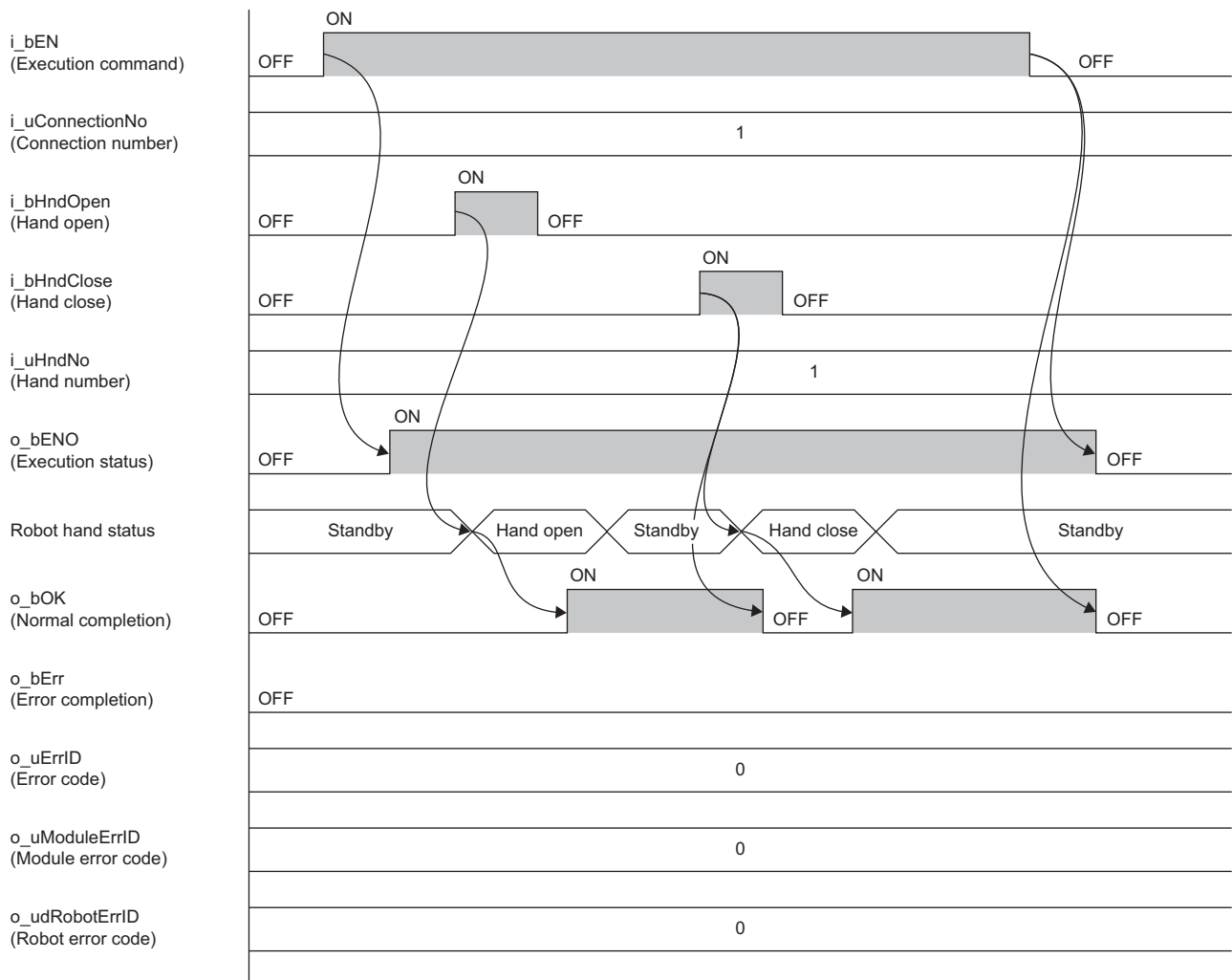
- This FB is executed at the rising edge of each flag when i_bEN (execution command) is in the on state. The hand is opened or closed according to the specified i_uConnectionNo (connection number).
- The specified i_uHndNo (hand number) is operated at the rising edge of i_bHndOpen (hand open) when the hand is open, or i_bHndClose (hand close) when the hand is closed. The operation is performed only once every time each flag raised. To perform the same operation more than once, turn off and on the flag.
- If i_bHndOpen (hand open) and i_bHndClose (hand close) are turned on at the same time, the hand will open and close in this order.
- When opening/closing of the hand is completed, o_bOK (normal completion) turns on. Note that o_bOK (normal completion) turns off once at the next rising edge of i_bHndOpen (hand open) or i_bHndClose (hand close), and turns on again after opening/closing is completed.
- To perform a hand operation using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- To monitor the open/close status of the hand, use the M+MELFA_RealTimeMonitor_F (real-time monitor) FB. ( Page 150 M+MELFA_RealTimeMonitor_F (Real-time Monitor))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

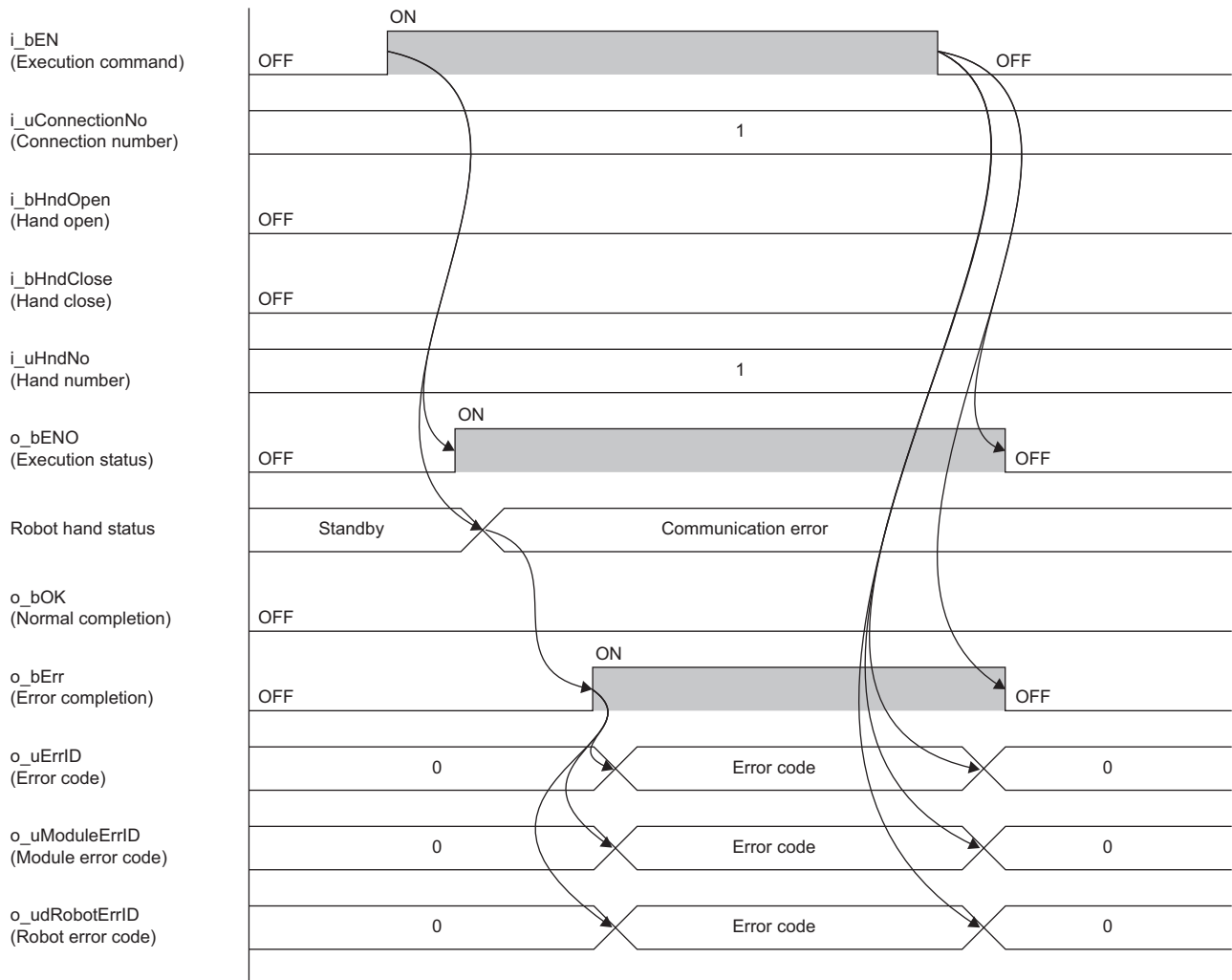
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 123 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

- This FB uses SP.SOCSSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

- This FB can only be used with the MELFA FR series.

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.413ms	1.121ms	9 scans
FX5UJ CPU module	1 robot controller	8.490ms	1.192ms	14 scans
FX5U CPU module ^{*1*2}	1 robot controller	19.813ms	1.047ms	21 scans
FX5UC CPU module ^{*1*2}	1 robot controller	19.813ms	1.047ms	21 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
102H	A value other than 1 to 4 is set to i_uHndNo (hand number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

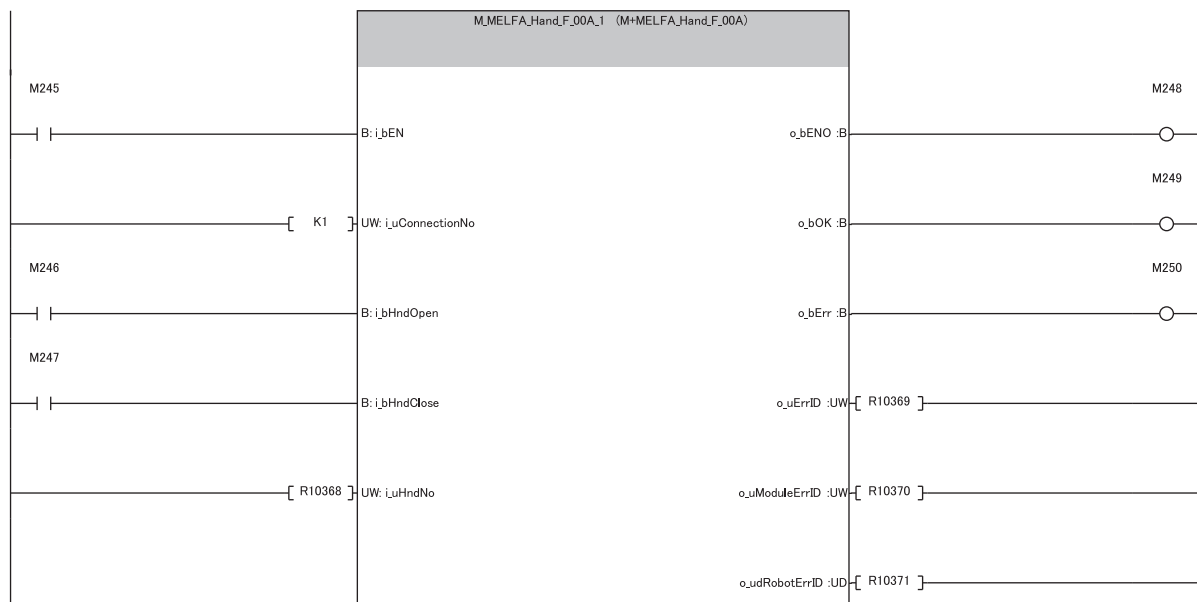
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M245	FB execution flag
M246	Hand open flag
M247	Hand close flag
R10368	Hand number specification device
M248	FB execution status display flag
M249	FB normal completion display flag
M250	FB error completion display flag
R10369	FB error code storage device
R10370	Module error code storage device
R10371 to R10372	Robot error code storage device

Program

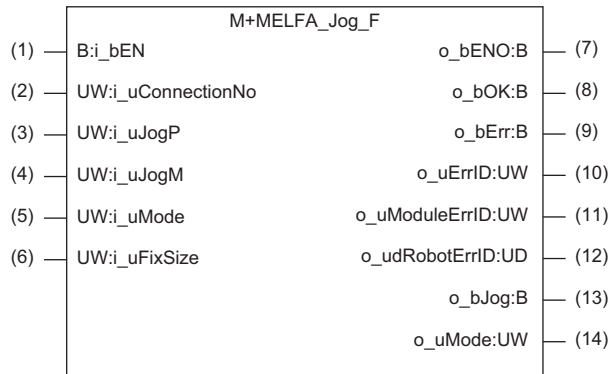


Processing order	Processing details
1	When M245 is turned on, M246 turns on and the FB is executed for connection number 1.
2	When M246 is turned on and the hand is open, M249 turns on.
3	When an error such as absence of operation rights occurs, M250 turns on. At this time, the related error code is stored in the error code storage device.

3.13 M+MELFA_Jog_F (Robot Jog Operation)

Overview

This FB performs the robot jog operation.



Labels

Input labels


No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. 📄 Page 23 Robot Controller Connection
(3)	i_uJogP	Jog feed plus side	Word [unsigned]/bit string [16 bits]	Always	—	The jog + feed is instructed. Each bit corresponds to each axis. • Bit0: J1/X axis • Bit1: J2/Y axis • Bit2: J3/Z axis • Bit3: J4/A axis • Bit4: J5/B axis • Bit5: J6/C axis • Bit6: J7/L1 axis • Bit7: J8/L2 axis
(4)	i_uJogM	Jog feed minus side	Word [unsigned]/bit string [16 bits]	Always	—	The jog - feed is instructed. Each bit corresponds to each axis. • Bit0: J1/X axis • Bit1: J2/Y axis • Bit2: J3/Z axis • Bit3: J4/A axis • Bit4: J5/B axis • Bit5: J6/C axis • Bit6: J7/L1 axis • Bit7: J8/L2 axis
(5)	i_uMode	Jog mode	Word [unsigned]/bit string [16 bits]	Always	0 to 4	Specify the jog mode. • 0: Joint • 1: XYZ • 2: Cylindrical • 3: 3-axis XYZ • 4: Tool
(6)	i_uFixSize	Inching	Word [unsigned]/bit string [16 bits]	Always	0 to 2	Specify the fixed-length. • 0: Fixed-length OFF • 1: Fixed-length High • 2: Fixed-length Low

Output labels

No.	Label	Label name	Data type	Default value	Description
(7)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(8)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(9)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(10)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(11)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(12)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(13)	o_bJog	During jog operation	Bit	OFF	If the value is on, the jog operation is in progress.
(14)	o_uMode	Jog mode	Word [unsigned]/bit string [16 bits]	0	The selected jog mode of the robot is stored. <ul style="list-style-type: none"> • 0: Joint • 1: XYZ • 2: Cylindrical • 3: 3-axis XYZ • 4: Tool

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later




■Robot controller


Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

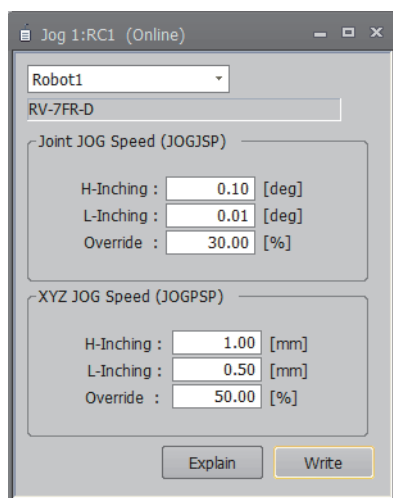
Basic specifications

Item	Description
Number of steps	1819 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> • Label: 116 points (Word) • Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> • Index register: 0 points • Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description


- This FB is executed at the rising edge of i_bEN (execution command). The jog operation is performed according to the specified i_uConnectionNo (connection number).
- While the i_uJogP (jog + feed) bit or i_uJogM (jog - feed) bit corresponding to the axis to be operated is turned on, the jog operation is performed at every scan according to the mode specified by i_uMode (jog mode) and i_uFixSize (fixed-length). To stop the jog operation, turn off the i_uJogP (jog + feed) bit or i_uJogM (jog - feed) bit corresponding to the axis to be stopped.
- i_uMode (jog mode) and i_uFixSize (fixed-length) can be changed while the jog operation is stopped.
- When the jog operation is executed successfully, o_bOK (normal completion) turns on.
- To perform a jog operation using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- When using the jog operation of this FB, turn on the servo and set an override in advance. To set an override other than the initial value in RT ToolBox3, refer to the robot manual. The servo ON and override can also be set using this FB library. ( Page 133 M+MELFA_DedicatedInOut_F (Dedicated I/O Signal Processing),  Page 144 M+MELFA_Ovrd_F (Override I/O))
- Set the fixed-length High and fixed-length Low values using RT ToolBox3 as necessary. For details on the setting method, refer to the robot manual.
- The distance and speed of one jog operation depend on the jog parameter settings of the robot controller. To change the distance or speed of the jog operation executed in one scan of a sequence program, change the setting values of RT ToolBox3.

 Workspace ⇒ [Parameter] ⇒ [Movement Parameter] ⇒ [Jog]



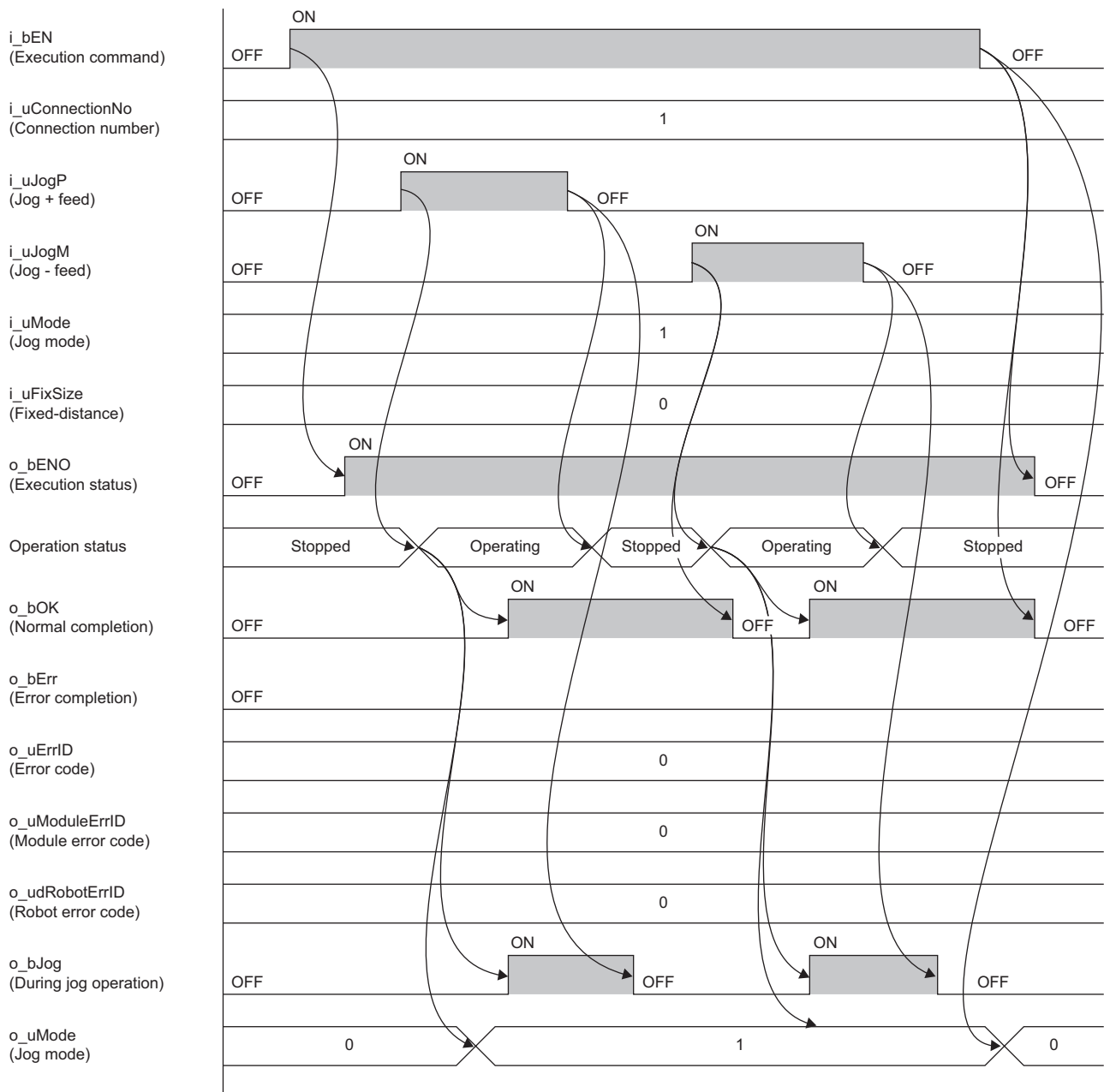
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

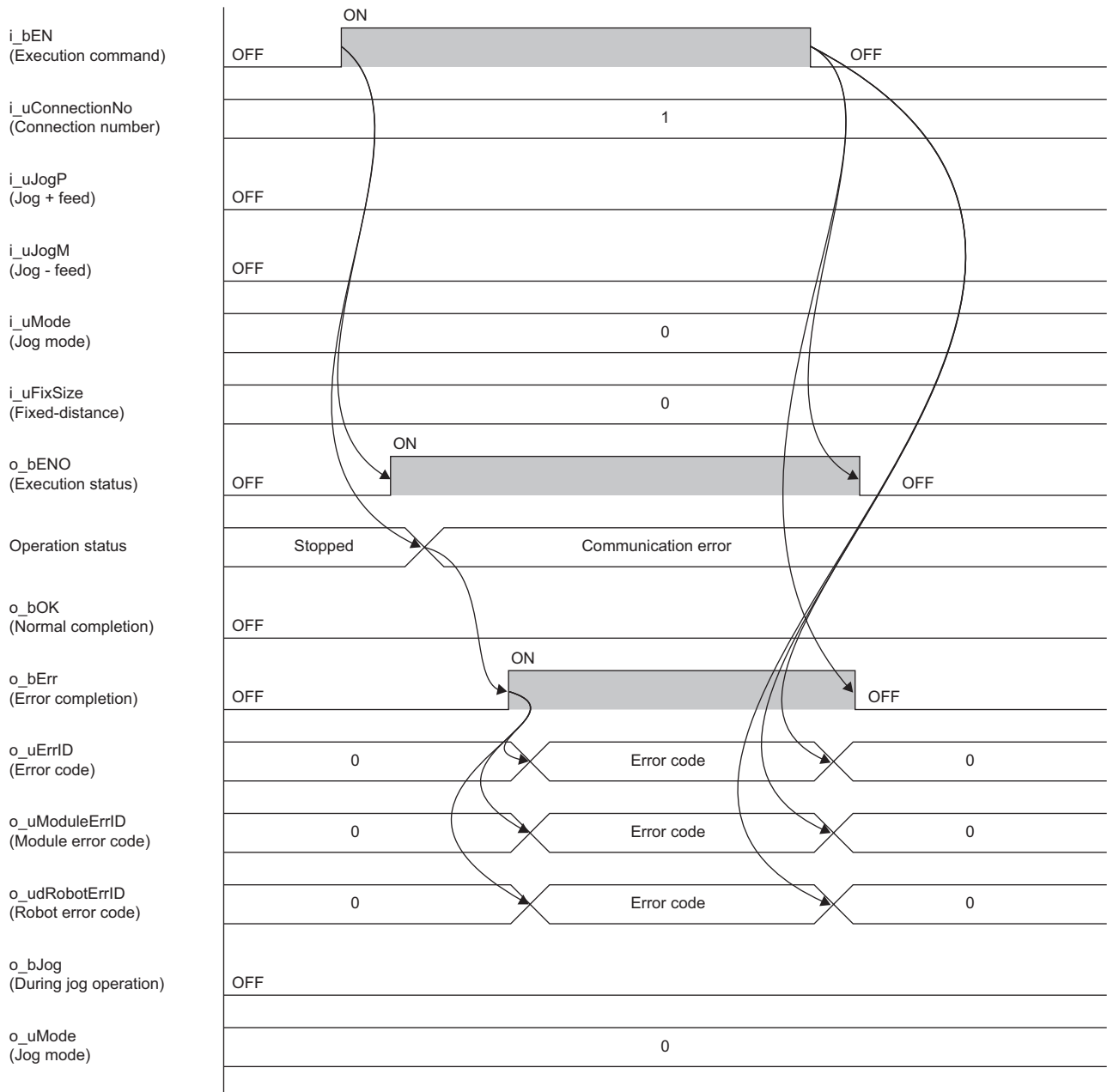
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 131 Error codes)

Timing chart of I/O signals

Normal completion



■ Error completion



Precautions

- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, `o_bErr` (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

- When using this FB, do not execute any FBs other than M+MELFA_RealTimeMonitor_F (real-time monitor) at the same time. When an FB other than M+MELFA_RealTimeMonitor_F (real-time monitor) is used, the execution timing of this FB may be delayed, and the travel distance may not be as intended.

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	112.150ms	1.499ms	193 scans
FX5UJ CPU module	1 robot controller	112.412ms	1.207ms	253 scans
FX5U CPU module ^{*1*2}	1 robot controller	113.130ms	1.005ms	303 scans
FX5UC CPU module ^{*1*2}	1 robot controller	113.130ms	1.005ms	303 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
103H	A value other than 0 to 4 is set for i_uMode (jog mode).	After reviewing the settings, execute the FB again.
104H	A value other than 0 to 2 is set for i_uFixSize (fixed length).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

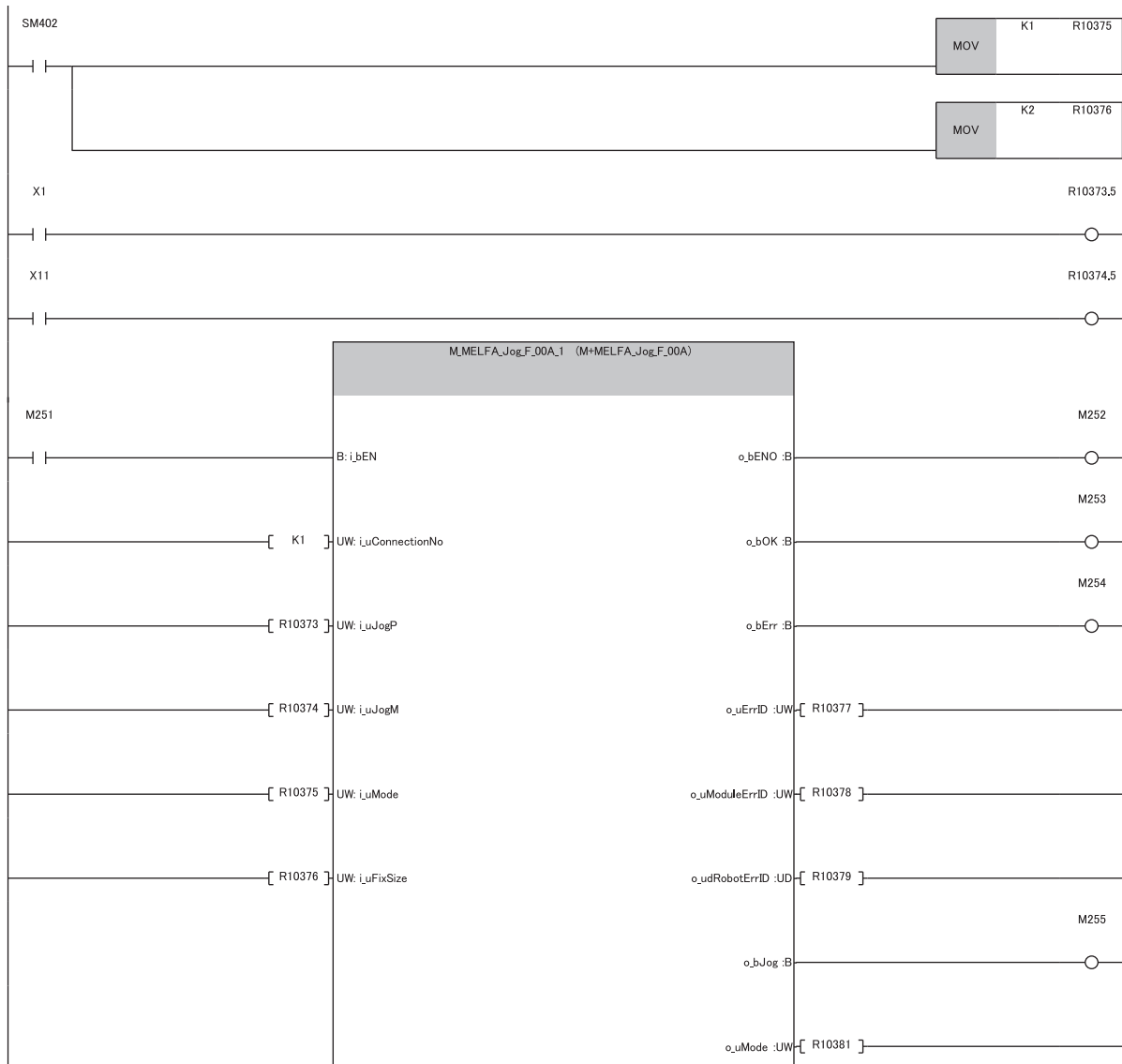
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
X1	+ direction jog operation flag
X11	- direction jog operation flag
M251	FB execution flag
R10373	Jog + feed specification device
R10374	Jog - feed specification device
R10375	Jog mode specification device
R10376	Fixed-length specification device
M252	FB execution status display flag
M253	FB normal completion display flag
M254	FB error completion display flag
R10377	FB error code storage device
R10378	Module error code storage device
R10379 to R10380	Robot error code storage device
M255	During jog operation flag
R10381	Jog mode storage device

Program

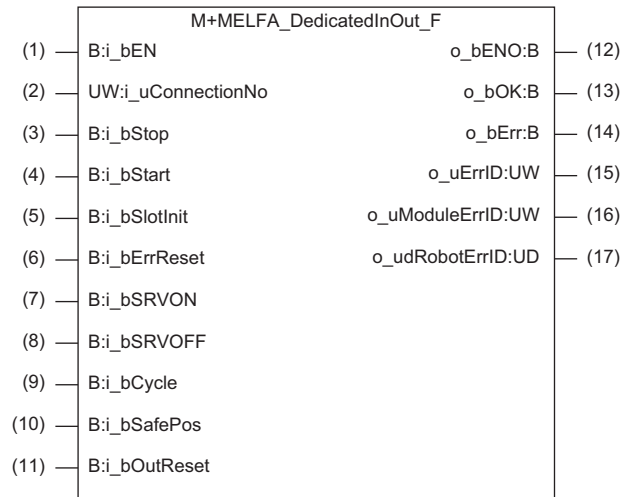


Processing order	Processing details
1	When M251 is turned on, M252 turns on and the FB is executed for connection number 1.
2	J6 axis jog operation is started by storing 1 (jog mode: XYZ) in R10375 and 2 (fixed-length Low) in R10376, and turning on X1 for the + direction or X11 for the - direction. When the jog operation is executed successfully and the selected jog mode is stored in R10381, M253 and M255 turn on.
3	When an error such as a connection error occurs, M254 turns on. At this time, the related error code is stored in the error code storage device.

3.14 M+MELFA_DedicatedInOut_F (Dedicated I/O Signal Processing)

Overview

This FB performs the robot external signal control such as the robot servo ON/OFF and start/stop.



Labels

Input labels


No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_bStop	Stop input	Bit	Always	ON/OFF	The robot-dedicated input signal STOP is turned on or off.
(4)	i_bStart	Start input	Bit	Always	ON/OFF	The robot-dedicated input signal START is turned on or off.
(5)	i_bSlotInit	Program reset	Bit	Always	ON/OFF	The robot-dedicated input signal SLOTINIT is turned on or off.
(6)	i_bErrReset	Error reset input signal	Bit	Always	ON/OFF	The robot-dedicated input signal ERRRESET is turned on or off.
(7)	i_bSRVON	Servo ON input signal	Bit	Always	ON/OFF	The robot-dedicated input signal SRVON is turned on or off.
(8)	i_bSRVOFF	Servo OFF input signal	Bit	Always	ON/OFF	The robot-dedicated input signal SRVOFF is turned on or off.
(9)	i_bCycle	Cycle stop input signal	Bit	Always	ON/OFF	The robot-dedicated input signal CYCLE is turned on or off.
(10)	i_bSafePos	Safe point return input signal	Bit	Always	ON/OFF	The robot-dedicated input signal SAFEPOS is turned on or off.
(11)	i_bOutReset	General-purpose output signal reset	Bit	Always	ON/OFF	The robot-dedicated input signal OUTRESET is turned on or off.

Output labels

No.	Label	Label name	Data type	Default value	Description
(12)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(13)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(14)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(15)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(16)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(17)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later




■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

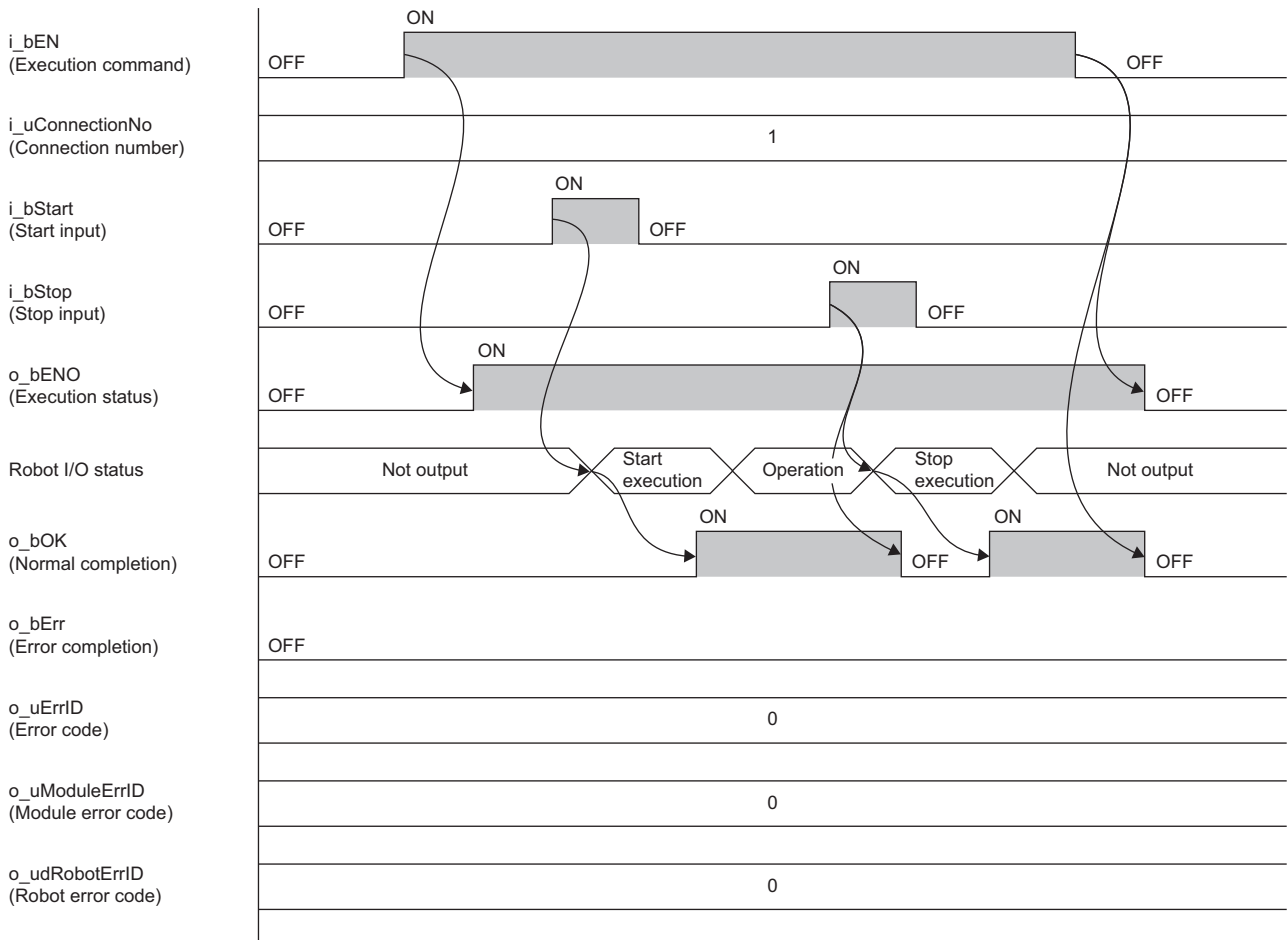
Item	Description
Number of steps	1154 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 92 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	On-demand execution type

Function description

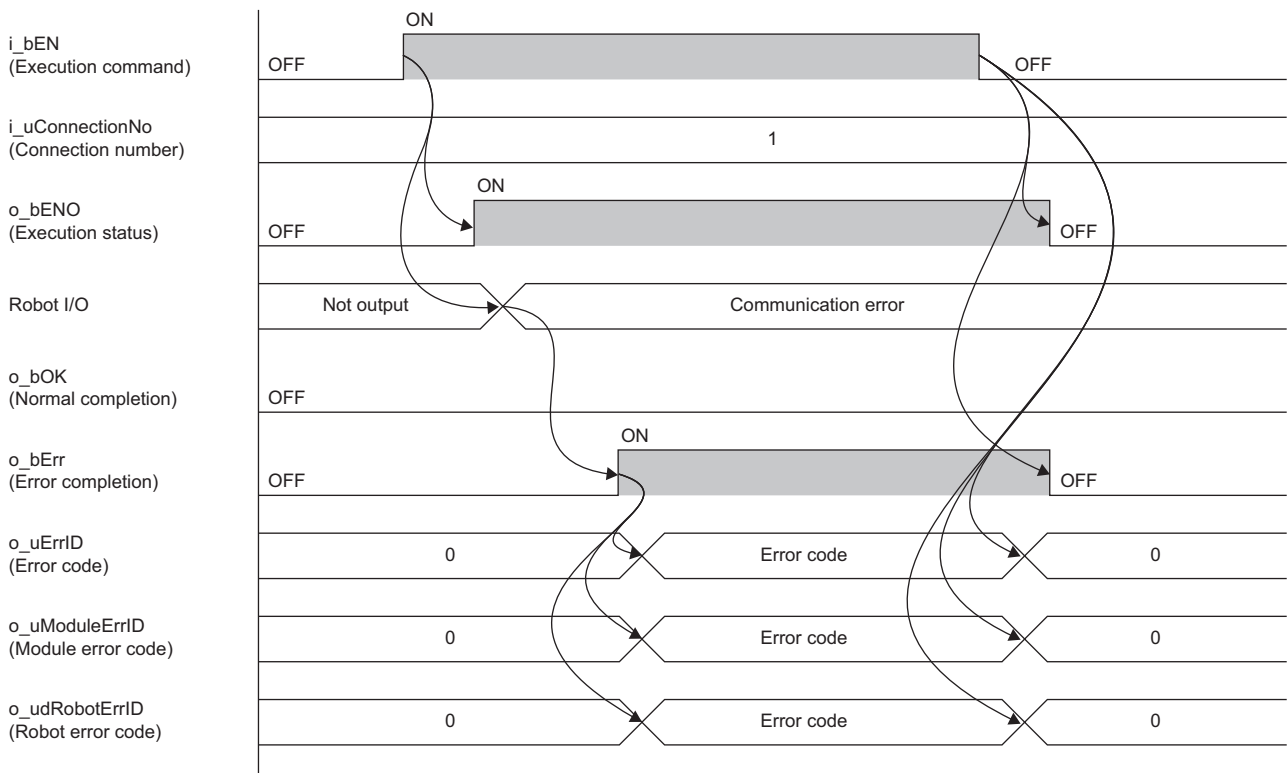
- This FB is executed at the rising edge of each flag after i_bEN (execution command) turns on. The robot is operated according to i_uConnectionNo (connection number).
- When signal input is completed, o_bOK (normal completion) turns on. Each command is executed only once every time each flag raised. To perform the same operation more than once, turn off and on the flag.
- Since this FB operates a robot, the robot program is required. When using this FB, store the robot program in the robot controller in advance.
- To perform the write operation using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 137 Error codes)

Timing chart of I/O signals

■ Normal completion (for starting or stopping a robot program)



■ Error completion



Precautions

- Prepare the robot program in advance and start the operation of this FB with the program selected on the robot side.
- Always write the END instruction at the end of the robot program to be executed so that it stops after one cycle.
- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	9.642ms	1.090ms	11 scans
FX5UJ CPU module	1 robot controller	9.778ms	1.206ms	16 scans
FX5U CPU module ^{*1*2}	1 robot controller	9.510ms	1.073ms	18 scans
FX5UC CPU module ^{*1*2}	1 robot controller	9.510ms	1.073ms	18 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

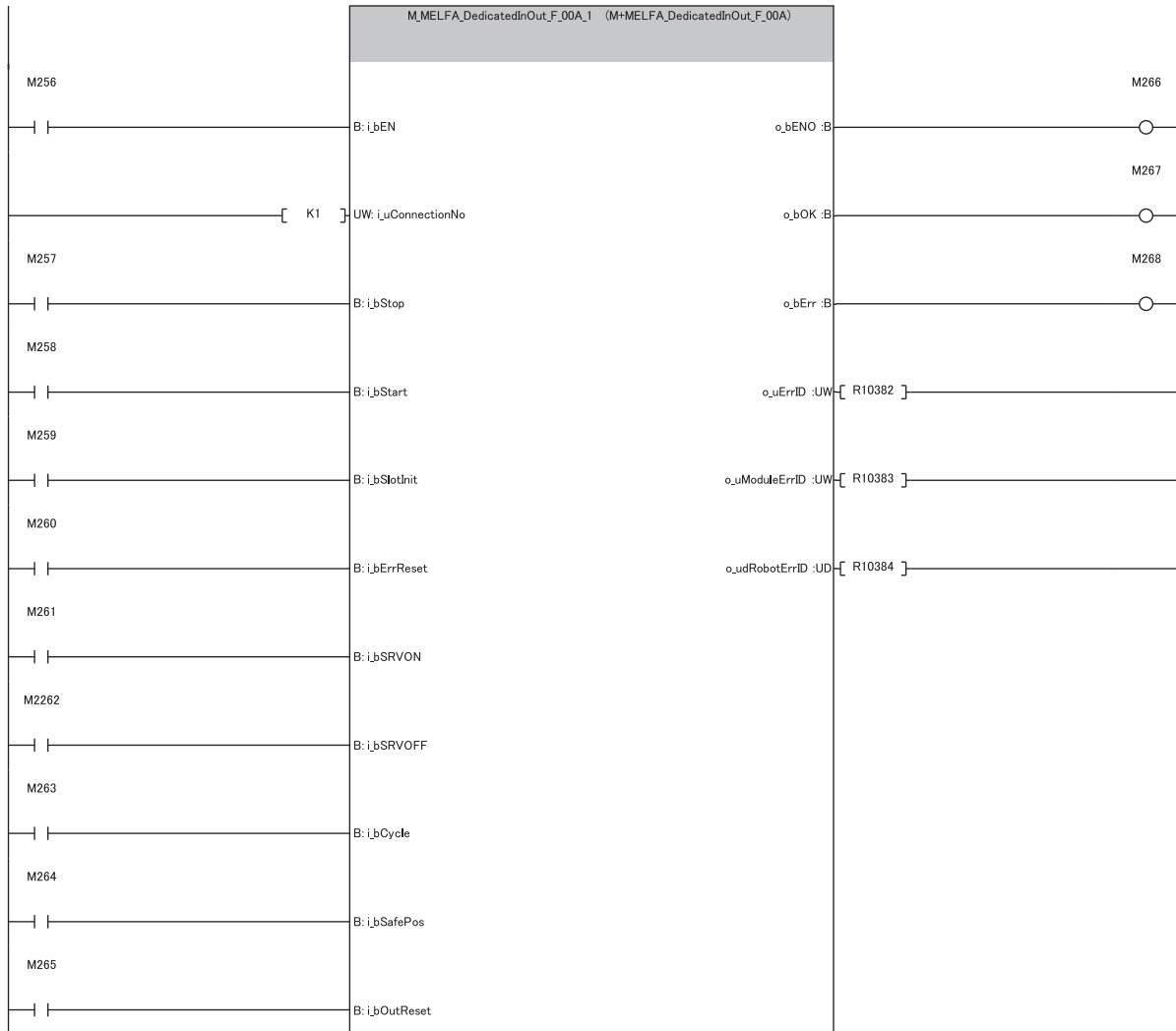
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M256	FB execution flag
M257	Stop flag
M258	Start flag
M259	Program reset flag
M260	Error reset flag
M261	Servo ON flag
M262	Servo OFF flag
M263	Cycle stop flag
M264	Home position return flag
M265	General-purpose output signal reset flag
M266	FB execution status display flag
M267	FB normal completion display flag
M268	FB error completion display flag
R10382	FB error code storage device
R10383	Module error code storage device
R10384 to R10385	Robot error code storage device

Program

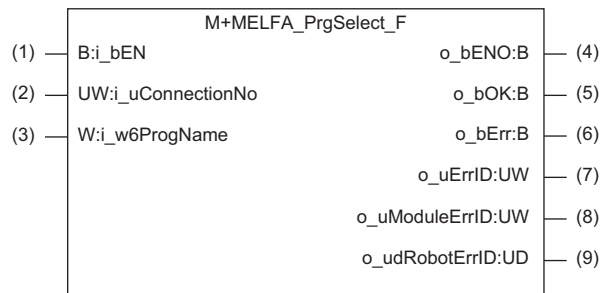


Processing order	Processing details
1	When M256 is turned on, M266 turns on and the FB is executed for connection number 1.
2	When M258 is turned on and the robot starts the operation, M267 turns on.
3	When an error such as no selected program occurs, M268 turns on. At this time, the related error code is stored in the error code storage device.

3.15 M+MELFA_PrgSelect_F (Program Selection)

Overview

Select a program from the ones stored in the robot controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_w6ProgName	Program name	Word [signed] (0..5)	Always	—	Set the robot program name (12 ASCII characters - 6 words).

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	763 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 96 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

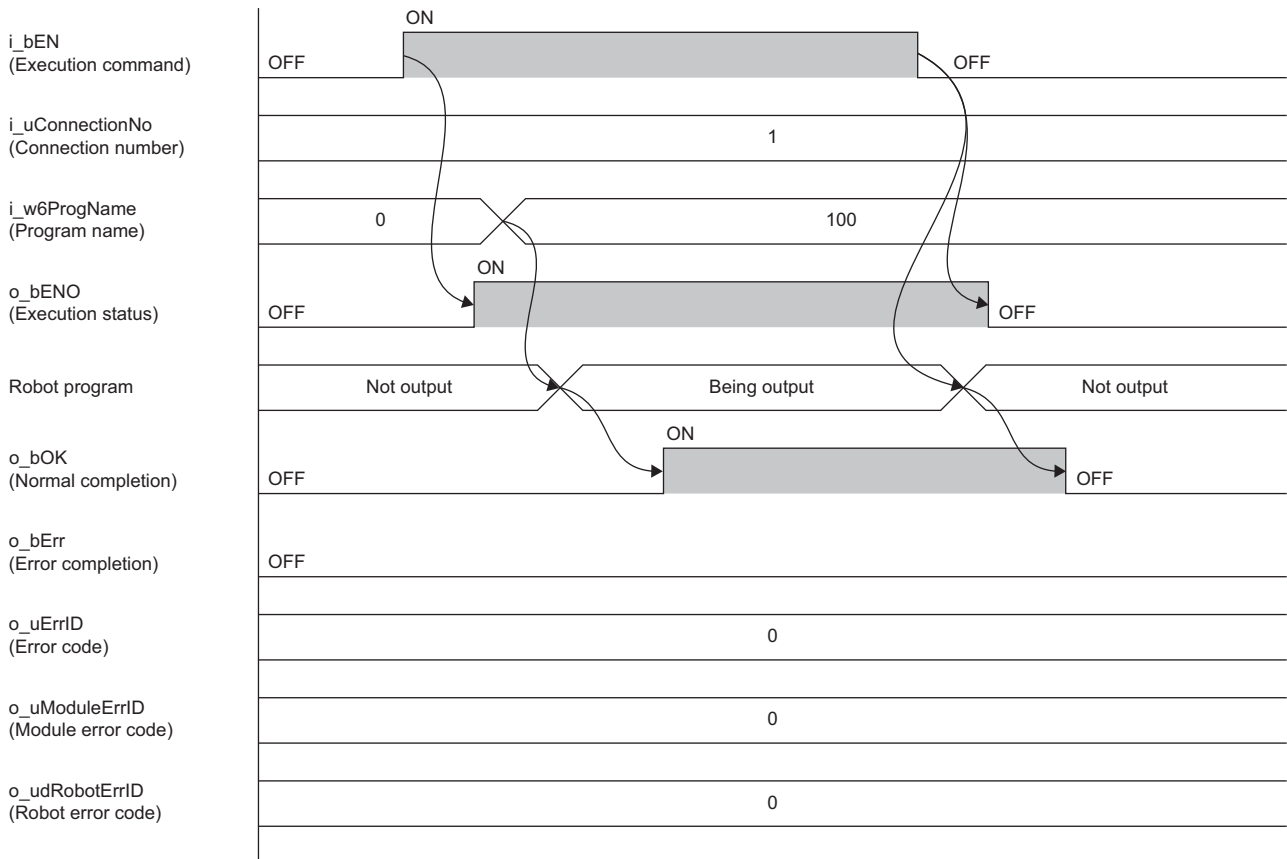
- This FB is executed at the rising edge of i_bEN (execution command). A program is selected to run on the robot according to the specified i_uConnectionNo (connection number) and i_w6ProgName (program name).
- When the selection of the specified program is completed, o_bOK (normal completion) turns on.
- Since this FB selects a program that is already stored in a robot, a robot program is required. When using this FB, store the robot program in the robot controller in advance.
- To perform the write operation using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

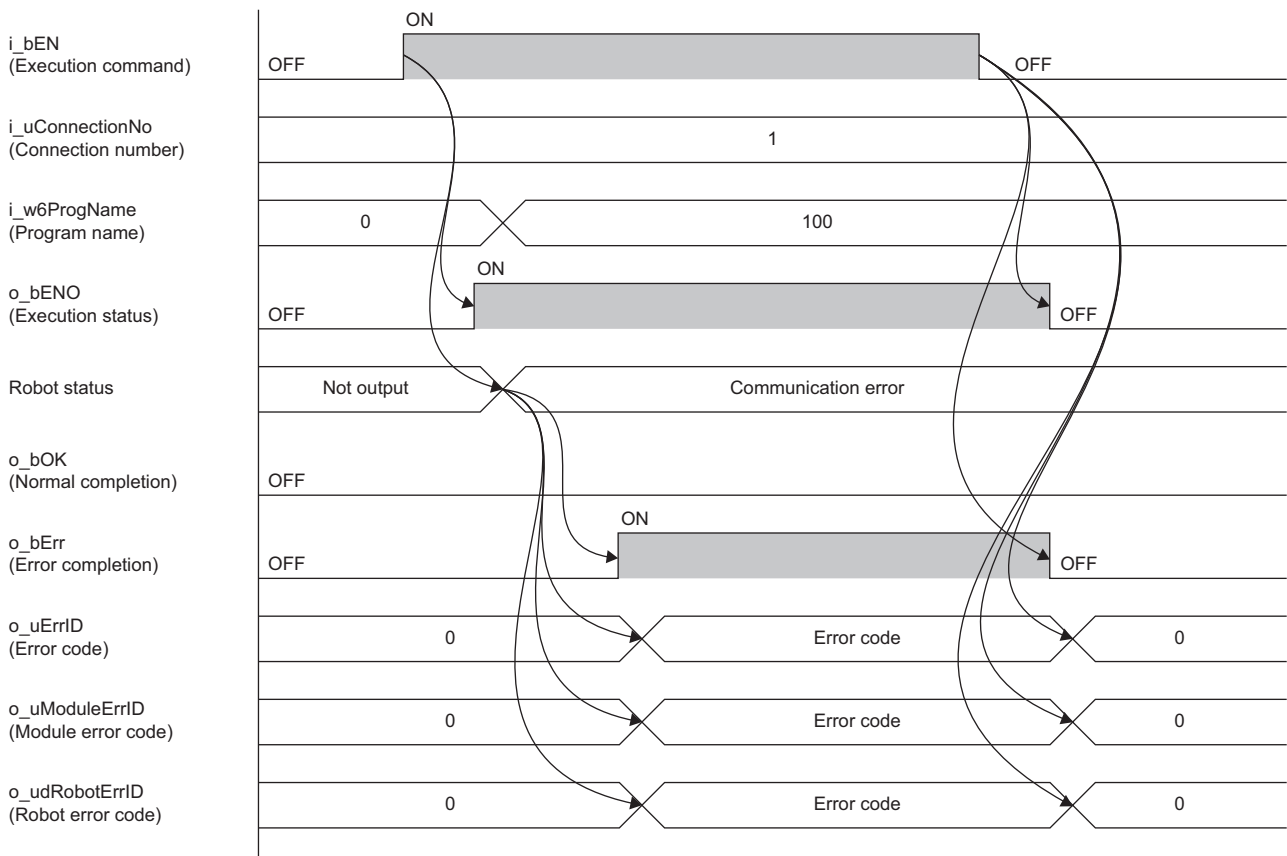
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 142 Error codes)

Timing chart of I/O signals

Normal completion



Error completion



Precautions

- Prepare the robot program in advance and start the operation of this FB.
- This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.163ms	1.124ms	9 scans
FX5UJ CPU module	1 robot controller	9.566ms	1.038ms	13 scans
FX5U CPU module ^{*1*2}	1 robot controller	7.952ms	0.601ms	15 scans
FX5UC CPU module ^{*1*2}	1 robot controller	7.952ms	0.601ms	15 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

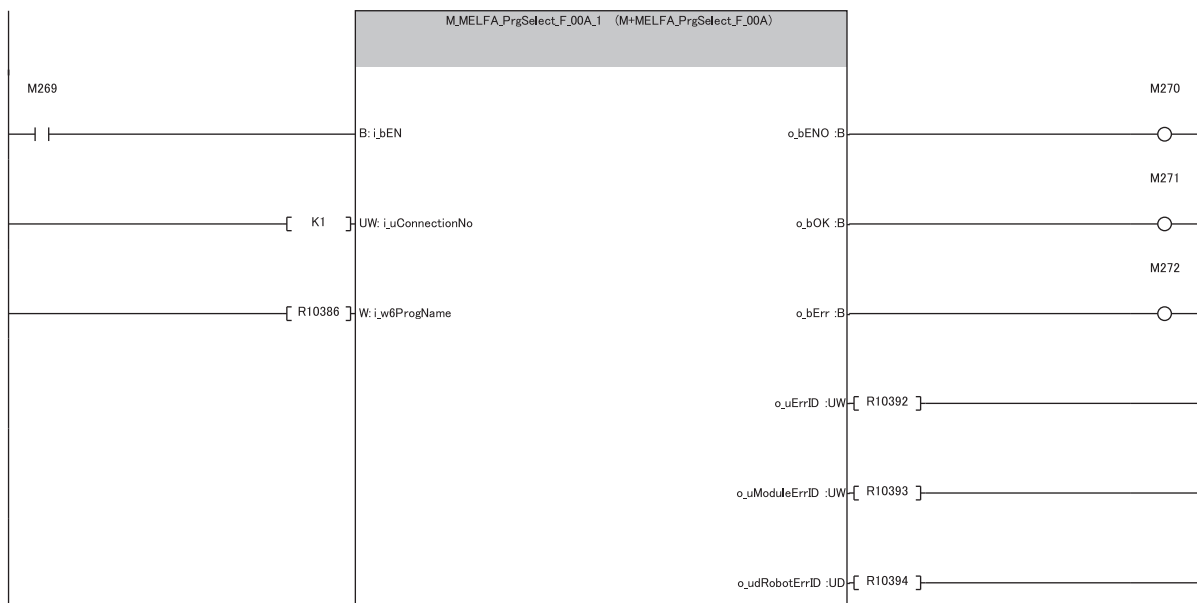
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M269	FB execution flag
R10386 to R10391	Program name specification device
M270	FB execution status display flag
M271	FB normal completion display flag
M272	FB error completion display flag
R10392	FB error code storage device
R10393	Module error code storage device
R10394 to R10395	Robot error code storage device

Program

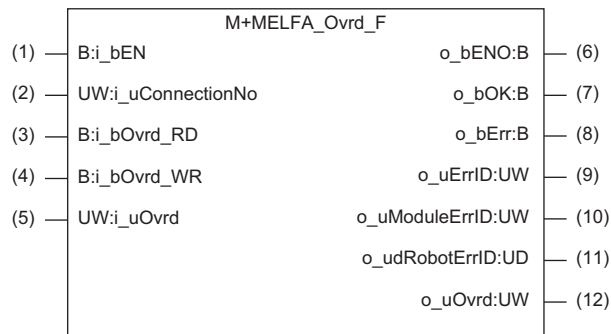


Processing order	Processing details
1	When M269 is turned on, M270 turns on and the FB is executed for connection number 1.
2	When the selection of the program specified by R10386 to R10391 is completed, M271 turns on.
3	When an error such as rewriting of a program name occurs while the robot is operating, M272 turns on. At this time, the related error code is stored in the error code storage device.

3.16 M+MELFA_Ovrd_F (Override I/O)


Overview

This FB reads or changes the robot OP override.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_bOvrd_RD	Override read start	Bit	Always	ON/OFF	The current override is read.
(4)	i_bOvrd_WR	Override write start	Bit	Always	ON/OFF	The specified override is written.
(5)	i_uOvrd	Override	Word [unsigned]/bit string [16 bits]	Always	1 to 100	Set a robot override.

Output labels

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(7)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(8)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(9)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(10)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(11)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.
(12)	o_uOvrd	Override	Word [unsigned]/bit string [16 bits]	0	The override currently set on the robot is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software

■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later

■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

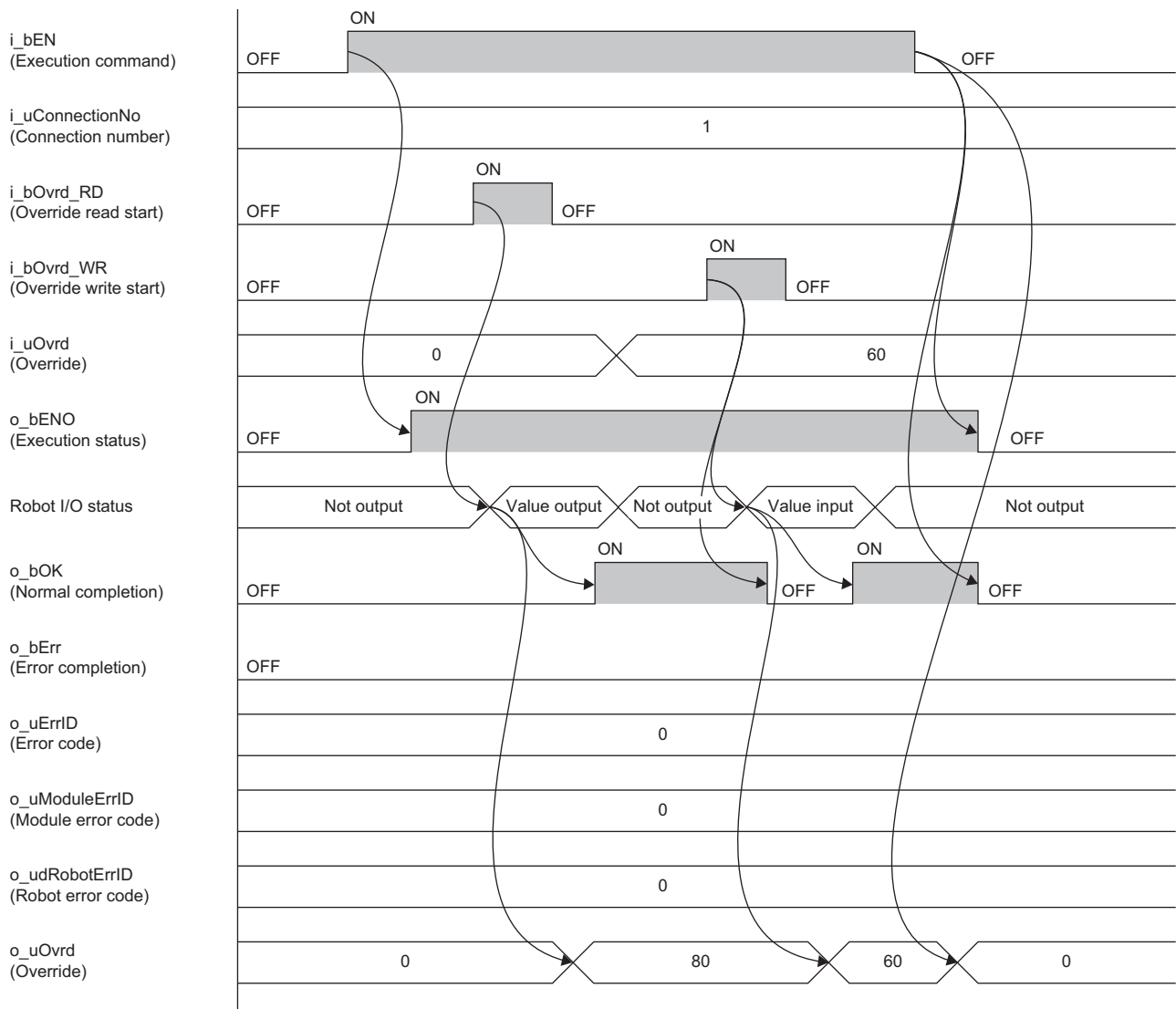
Item	Description
Number of steps	989 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 144 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following. GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	On-demand execution type

Function description

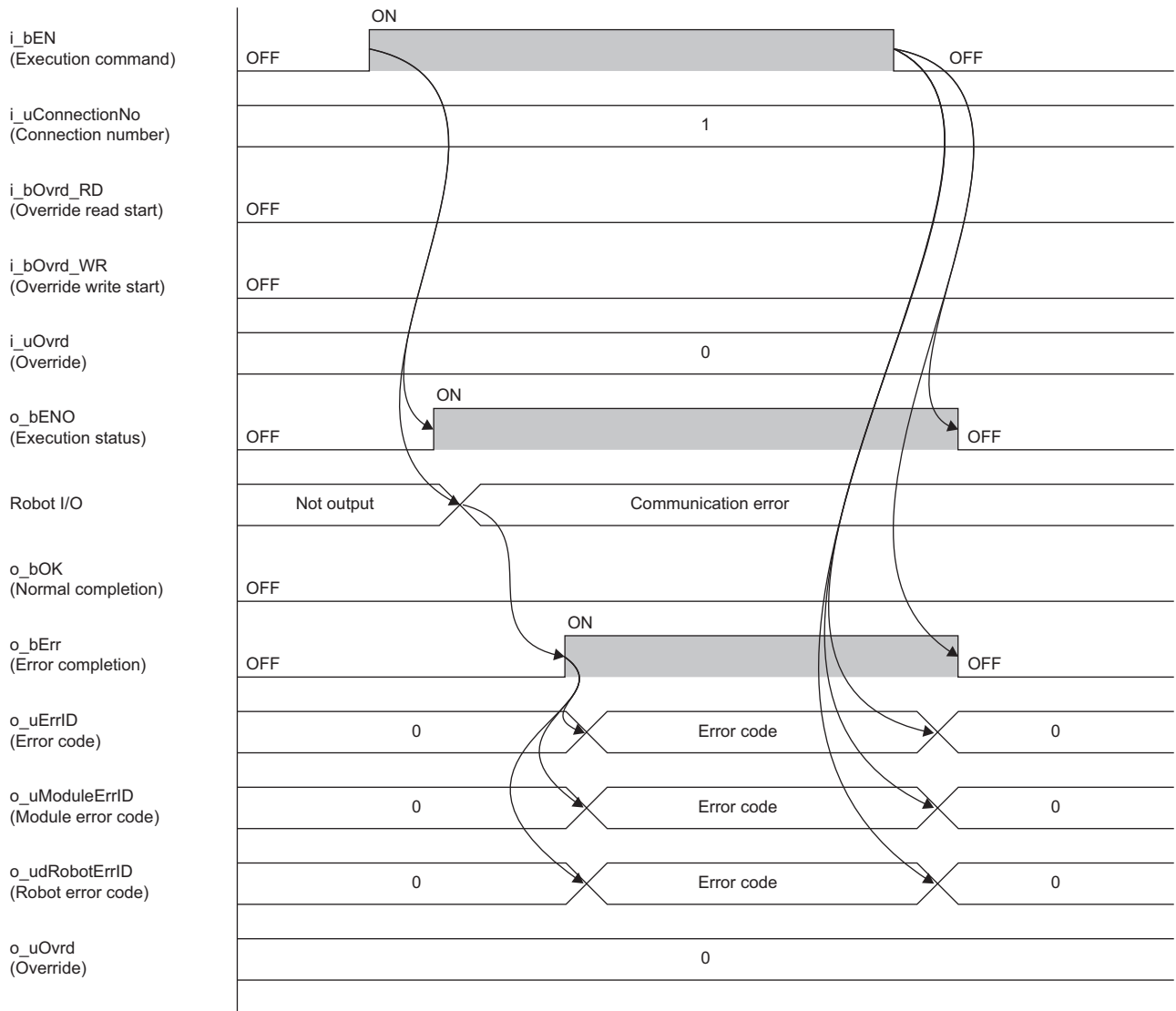
- This FB is executed at the rising edge of each flag after i_bEN (execution command) turns on.
- When override read/write is completed, o_bOK (normal completion) turns on. Each command is executed only once every time each flag raised. To perform the same operation more than once, turn off and on the flag.
- To perform the write operation using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. (Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. (Page 148 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSSND and SP.SOCRCV. If an error occurs with these instructions, `o_bErr` (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.283ms	1.079ms	9 scans
FX5UJ CPU module	1 robot controller	7.425ms	0.769ms	11 scans
FX5U CPU module ^{*1*2}	1 robot controller	8.514ms	0.565ms	15 scans
FX5UC CPU module ^{*1*2}	1 robot controller	8.514ms	0.565ms	15 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
105H	A value other than 1 to 100 is set for i_uOvrd (write override).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

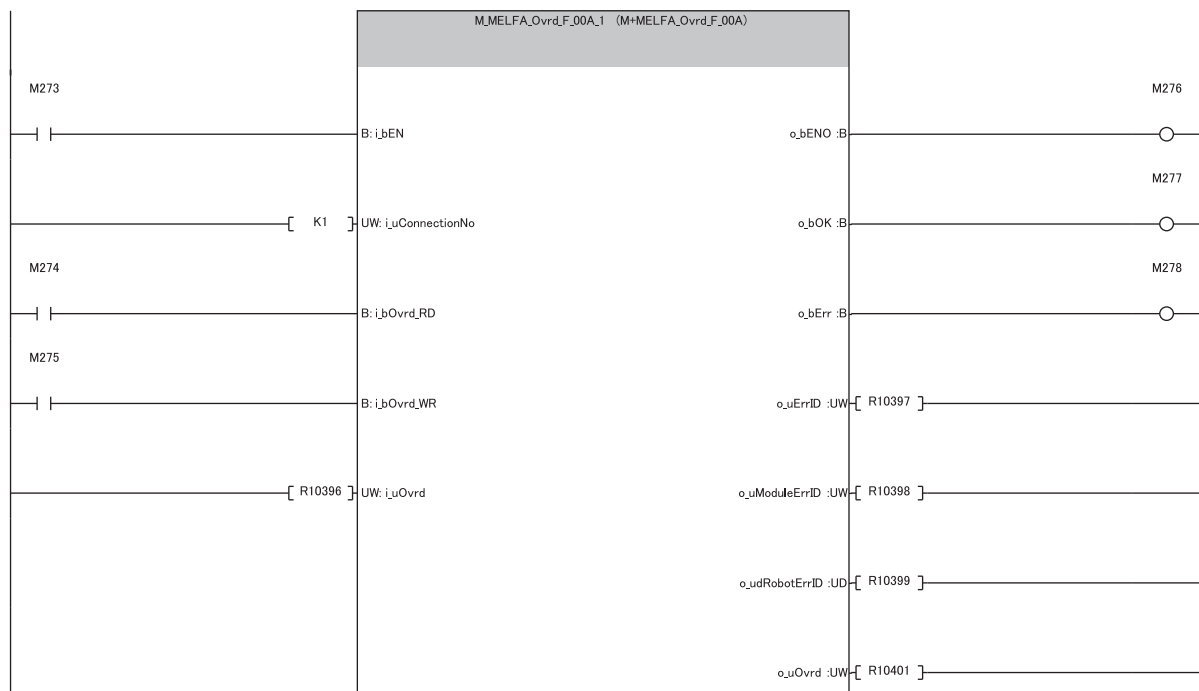
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M273	FB execution flag
M274	Override read flag
M275	Override write flag
R10396	Override specification device
M276	FB execution status display flag
M277	FB normal completion display flag
M278	FB error completion display flag
R10397	FB error code storage device
R10398	Module error code storage device
R10399 to R10400	Robot error code storage device
R10401	Override storage device

Program

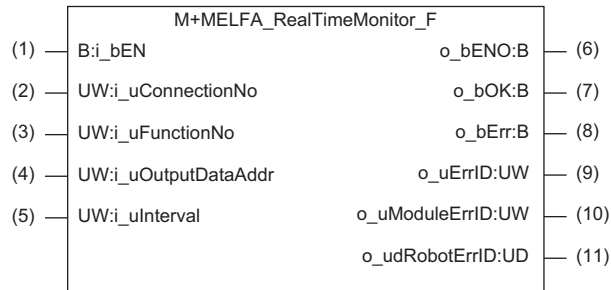


Processing order	Processing details
1	When M273 is turned on, M276 turns on and the FB is executed for connection number 1.
2	When a value is set in R10396, M274 is turned on, and an override is written, M275 turns on.
3	When an error such as writing of an override without operation rights occurs, M278 turns on. At this time, the related error code is stored in the error code storage device.

3.17 M+MELFA_RealTimeMonitor_F (Real-time Monitor)

Overview

This FB reads and monitors the robot current position and input/output signals using the real-time monitor function of the robot controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_uFunctionNo	Function number	Word [unsigned]/bit string [16 bits]	Always	1 to 12	Specify the protocol number used for transmission and reception. (☞ Page 151 i_uFunctionNo)
(4)	i_uOutputDataAddr	Output data start address	Word [unsigned]/bit string [16 bits]	Only when FB starts	Valid device range ^{*1}	Specify the start address of the device set with the predefined protocol support function.
(5)	i_uInterval	Reception interval	Word [unsigned]/bit string [16 bits]	Always	0 to 65535	Specify the interval, in ms units, from when the predefined protocol support function completes execution of a reception protocol until the start of execution of the next reception protocol.

*1 The setting range differs depending on "Device/Label Memory Area Setting" in "CPU Parameter".

■ i_uFunctionNo

For details on protocols, refer to parameter settings. (📖 Page 30 Protocol setting file contents)

Function No.	Protocol No. to be used		Data type				Input signal	Output signal
	1st unit	2nd unit	ID1	ID2	ID3	ID4		
1	Send: Protocol number 1 Receive: Protocol number 14	Send: Protocol number 15 Receive: Protocol number 28	7	12	101	104	10000	10000
2	Send: Protocol number 2 Receive: Protocol number 14	Send: Protocol number 16 Receive: Protocol number 28	8	12	15	1011	10000	10000
3	Send: Protocol number 3 Receive: Protocol number 14	Send: Protocol number 17 Receive: Protocol number 28	12	15	16	1011	10000	10000
4	Send: Protocol number 4 Receive: Protocol number 14	Send: Protocol number 18 Receive: Protocol number 28	15	19	20	1011	10000	10000
5	Send: Protocol number 5 Receive: Protocol number 14	Send: Protocol number 19 Receive: Protocol number 28	1	2	3	9	10000	10000
6	Send: Protocol number 6 Receive: Protocol number 14	Send: Protocol number 20 Receive: Protocol number 28	10	11	13	14	10000	10000
7	Send: Protocol number 7 Receive: Protocol number 14	Send: Protocol number 21 Receive: Protocol number 28	17	18	21	22	10000	10000
8	Send: Protocol number 8 Receive: Protocol number 14	Send: Protocol number 22 Receive: Protocol number 28	23	102	103	111	10000	10000
9	Send: Protocol number 9 Receive: Protocol number 14	Send: Protocol number 23 Receive: Protocol number 28	112	113	1010	1012	10000	10000
10	Send: Protocol number 10 Receive: Protocol number 14	Send: Protocol number 24 Receive: Protocol number 28	1001	1002	1007	1008	10000	10000
11	Send: Protocol number 11 Receive: Protocol number 14	Send: Protocol number 25 Receive: Protocol number 28	1013	1014	0	0	10000	10000
12 ^{*1}	Send: Protocol number 12 Receive: Protocol number 14	Send: Protocol number 26 Receive: Protocol number 28	Any value	Any value	Any value	Any value	Any value	Any value

*1 This function number is used by the user to set the ID of any real-time monitor and acquire the necessary combination of output data. Before executing this FB, create a program to set the ID to the device assigned to the ID. For details on device assignment, refer to the following.

📖 Page 30 Protocol setting file contents

Output labels

No.	Label	Label name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(7)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(8)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(9)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(10)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(11)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

📖 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	1732 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 80 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 1 point (device number used: Z0) Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	On-demand execution type

Function description

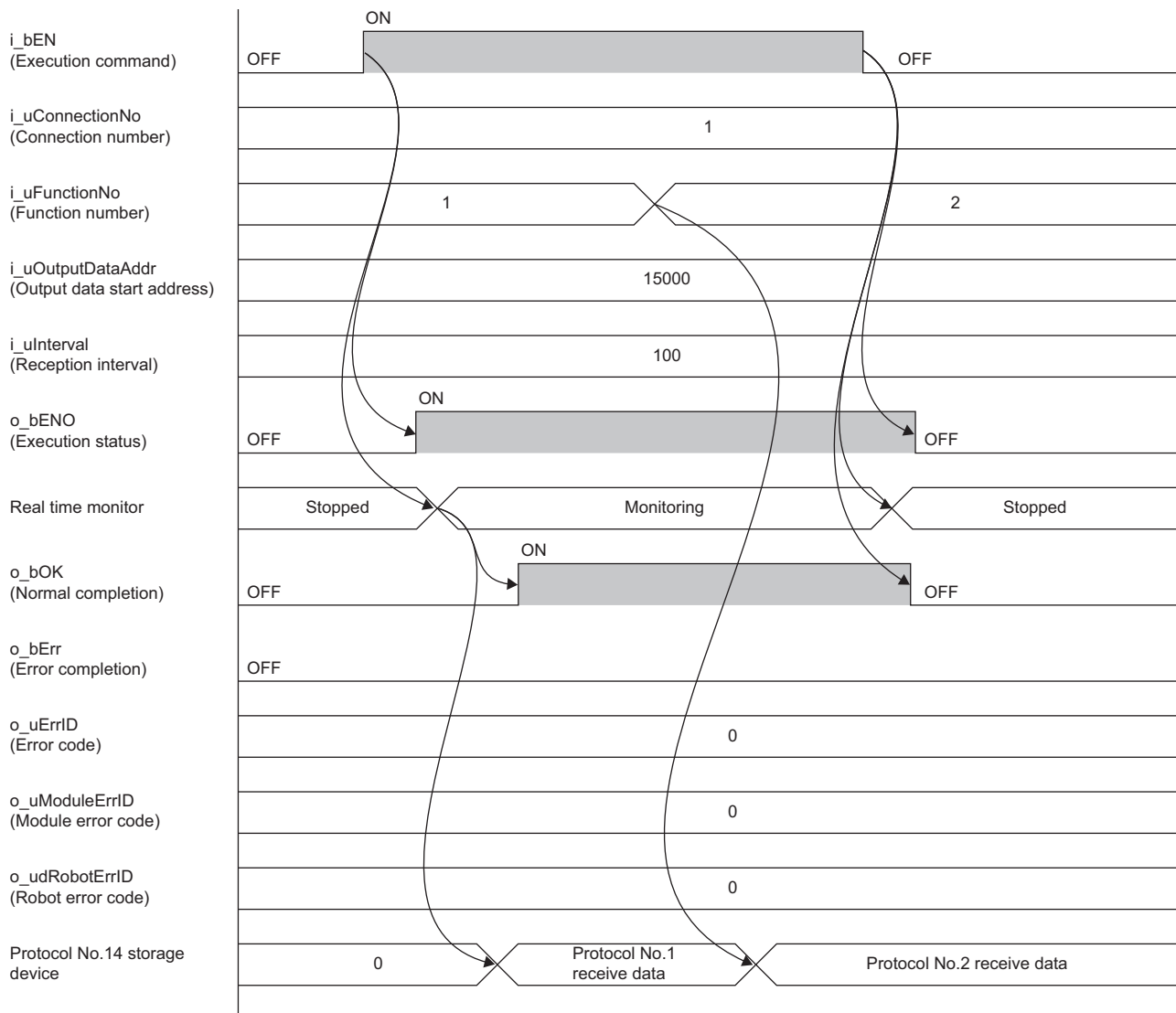
- This FB is executed at the rising edge of i_bEN (execution command). The real-time monitor function is activated to start monitoring according to the specified i_uConnectionNo (connection number) and i_uFunctionNo (function number).
- When monitoring is performed successfully using the real-time monitor function, o_bOK (normal completion) turns on.
- The received data is stored in the device set with the predefined protocol support function ( Page 28 Predefined protocol support function settings). After the data is stored in the device, it is also stored in the global label specified for each received data ID.
- Data is received at intervals of i_uInterval (reception interval) × 1ms.
- The value of i_uFunctionNo (function number) can be changed during FB execution so that the content to be monitored is changed.
- When i_bEN (execution command) turns off, the real-time monitor function stops.
- If an error occurs during data send/receive, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 155 Error codes)

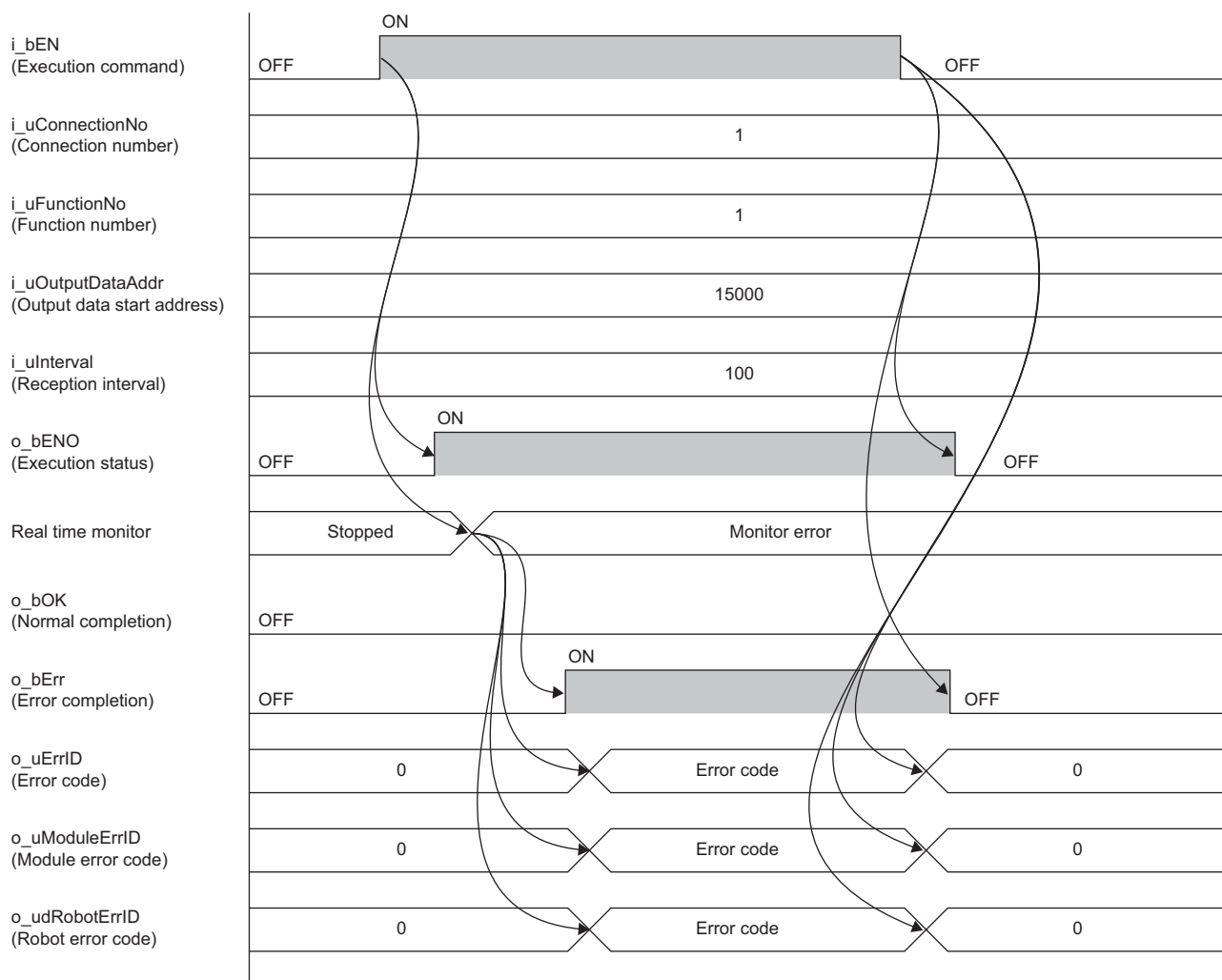
Timing chart of I/O signals

■ Normal completion



If *i_uFunctionNo* is 1, the protocol of protocol number 1 of the predefined protocol support function starts and received data is acquired using protocol number 14. If *i_uFunctionNo* is changed from 1 to 2 while the predefined protocol support function is running, the protocol of protocol number 1 stops and that of protocol number 2 starts. Received data is acquired using protocol number 14, which is the same as protocol number 1.

■ Error completion



Precautions

- This FB uses the predefined protocol support function. If an error occurs, o_bErr (error completion) turns on and the processing of the FB is stopped. For details, refer to the following.

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

- If the i_uInterval (reception interval) setting value is small, the connection between GX Works3 or other external devices and the CPU module may be disconnected. In such a situation, communications are successfully performed between the robot controller and the CPU module. Therefore, no error occurs in the CPU module and the program processing continues. When operating this FB while monitoring with GX Works3, increase the setting value of i_uInterval (reception interval).
- If this FB is executed for two robots at the same time, the communication load becomes high, causing the communications between the CPU module and other devices to be disconnected. Create an interlock circuit with a program outside of the FB to execute the FB only for either one of the two robots.

Performance values

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	33.641ms	2.928ms	16 scans
FX5UJ CPU module	1 robot controller	28.361ms	2.666ms	17 scans
FX5U CPU module ^{*1*2}	1 robot controller	24.647ms	1.939ms	17 scans
FX5UC CPU module ^{*1*2}	1 robot controller	24.647ms	1.939ms	17 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
101H	A value other than 1 to 12 is set for i_uFunctionNo (function number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

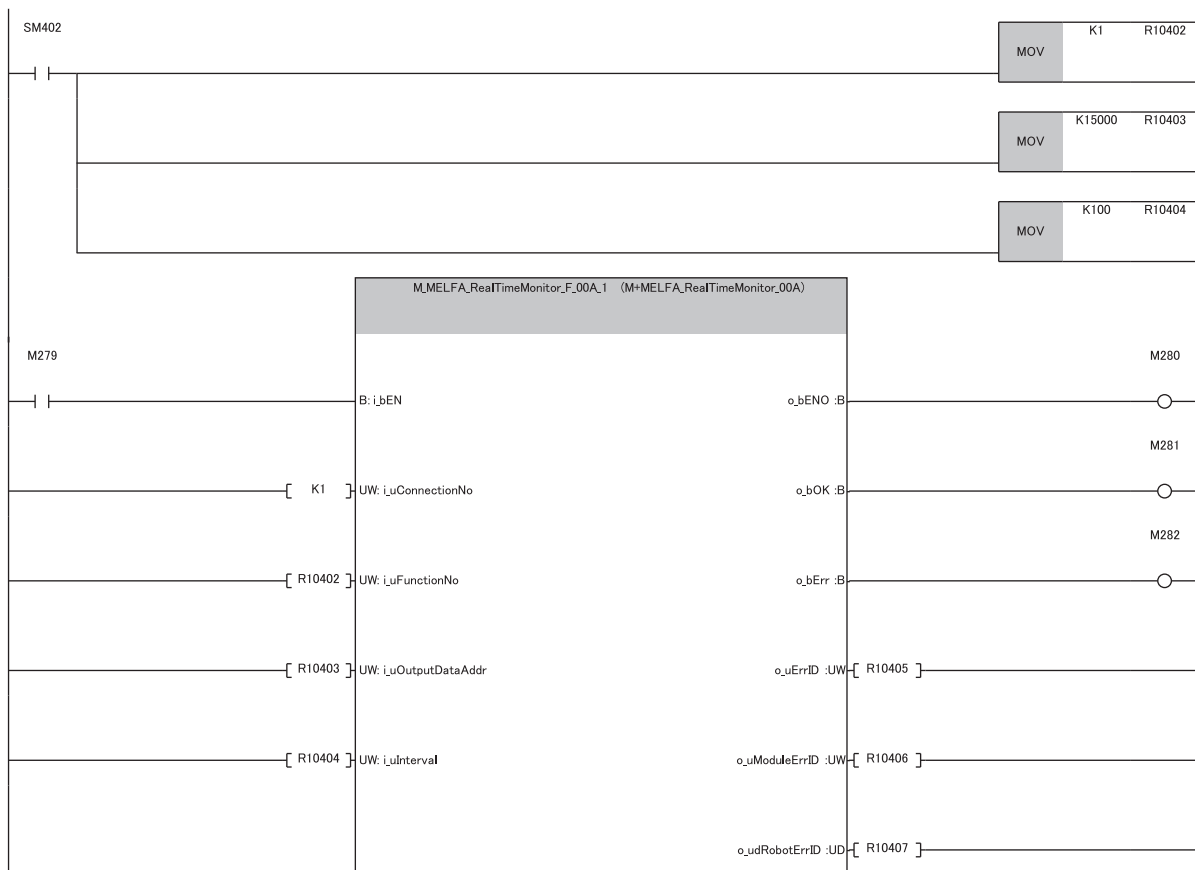
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M279	FB execution flag
R10402	Function number specification device
R10403	Output data start address specification device
R10404	Reception interval specification device
M280	FB execution status display flag
M281	FB normal completion display flag
M282	FB error completion display flag
R10405	FB error code storage device
R10406	Module error code storage device
R10407 to R10408	Robot error code storage device

Program

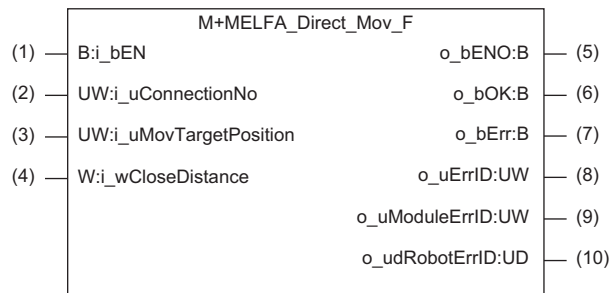


Processing order	Processing details
1	When K1 is specified in R10402 and M279 is turned on, M280 turns on and the FB is executed for connection numbers 2 to 3. R10402 is always captured in the FB and the operation is performed according to the captured content.
2	Data receive processing is executed from the device at the start address specified in R10403 at the reception interval specified in R10404.
3	When the real-time monitor function starts successfully, M281 turns on.
4	When an error such as a communication error occurs, M282 turns on. At this time, the related error code is stored in the error code storage device.

3.18 M+MELFA_Direct_Mov_F (Joint Interpolation)

Overview

This FB executes the joint interpolation control. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. ☞ Page 23 Robot Controller Connection
(3)	i_uMovTargetPosition	Target position	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 999	Specify the address of external variable P_DM of the robot controller as the target position.
(4)	i_wCloseDistance	Close distance	Word [signed]	Only when FB starts	-10000 to 10000	The position is adjusted from the external variable P_DM specified in i_uMovTargetPosition (move target position) to a position shifted by the set value distance. The setting value is set in mm units. When no value is set, the label is treated as 0.

Output labels

No.	Label	Label name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(6)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(7)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(9)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(10)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

☞ Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	847 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 128 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

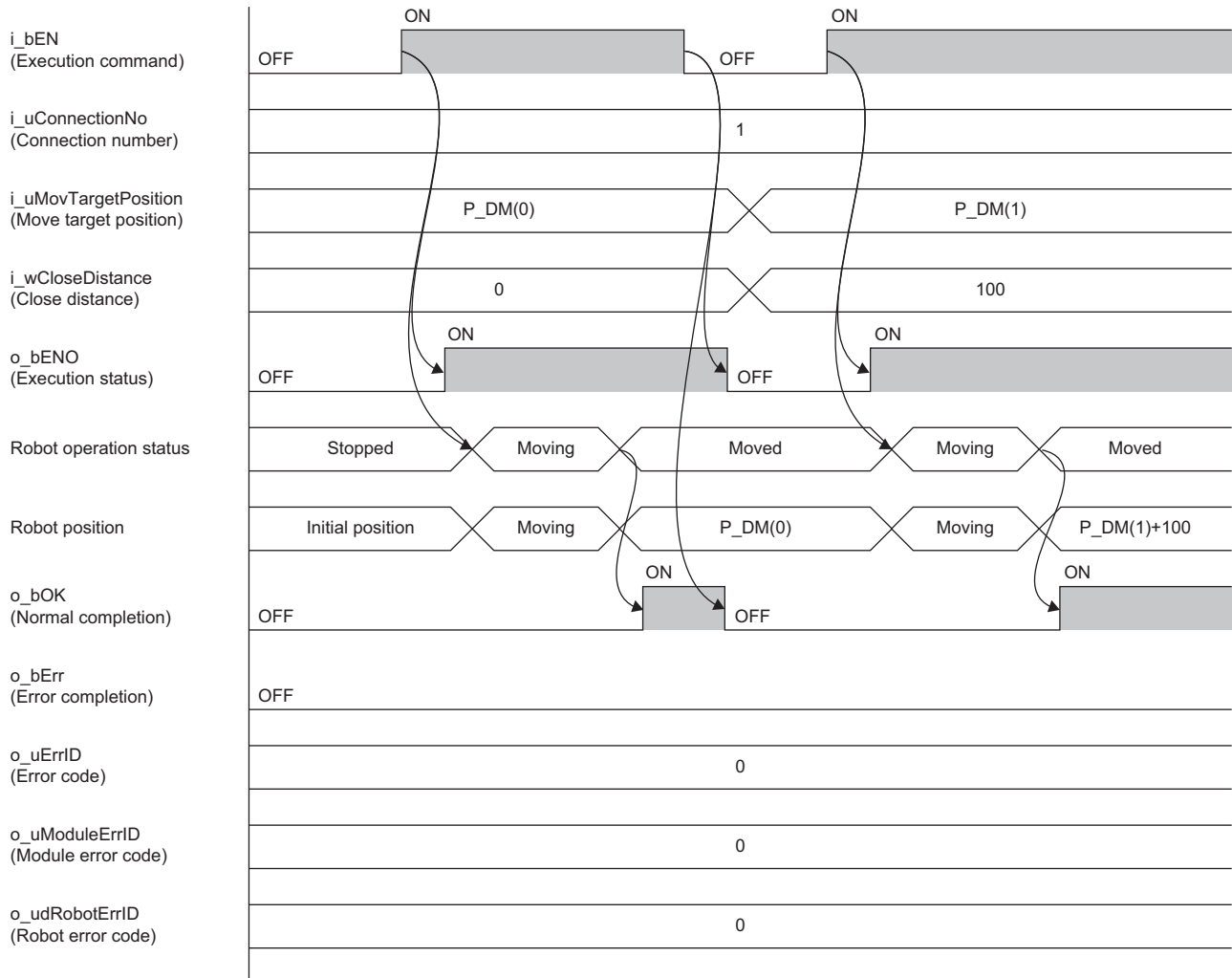
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Mov instruction on the robot controller.
- When this FB is executed, the robot moves to the external variable P_DM of the address set in i_uMovTargetPosition (move target position).
- When a value is set for i_wCloseDistance (approach distance), the robot moves from the specified external variable P_DM to a position shifted by the set value distance.
- When the robot completes moving to the target position, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- This FB uses external variables P_DM(1) to P_DM(999) of the robot controller. Therefore, it is necessary to set the RT ToolBox3 parameter iQMEM and enable the CPU buffer memory extension function.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

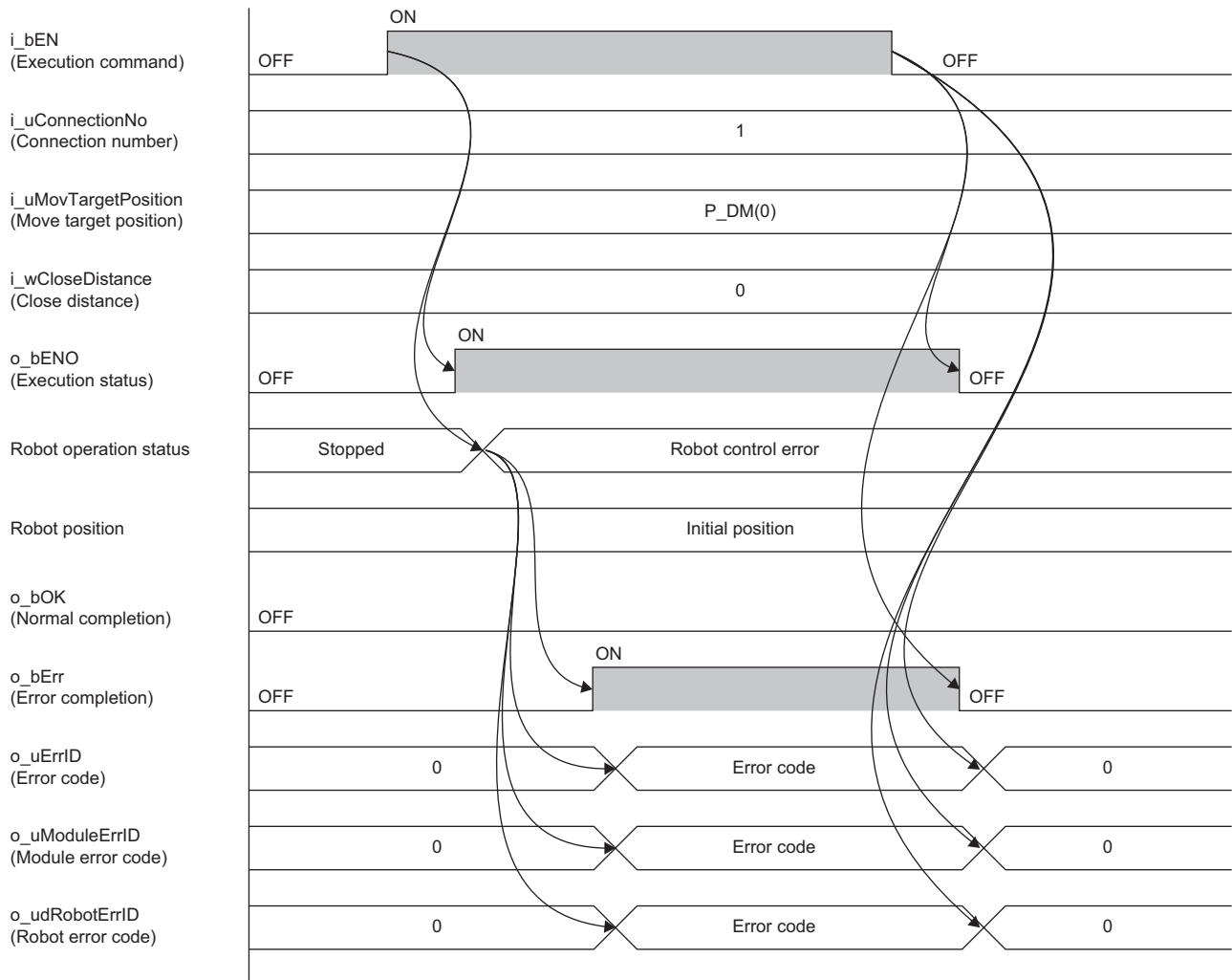
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 161 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values of this FB vary depending on the move target position.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
106H	A value other than 1 to 999 is set for i_uMovTargetPosition (move target position).	Turn off i_bEN, set the normal value, and then turn on i_bEN again.
107H	A value other than -10000 to 10000 is set for i_wCloseDistance (approach distance).	Turn off i_bEN, set the normal value, and then turn on i_bEN again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

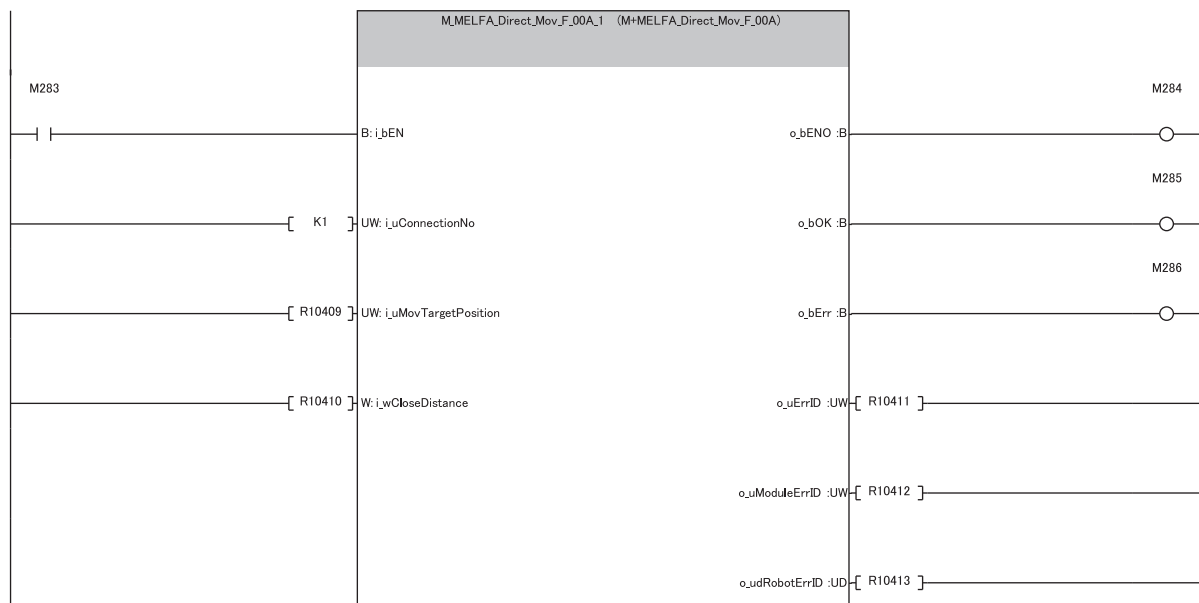
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M283	FB execution flag
R10409	Move target position specification device
R10410	Approach distance specification device
M284	FB execution status display flag
M285	FB normal completion display flag
M286	FB error completion display flag
R10411	FB error code storage device
R10412	Module error code storage device
R10413 to R10414	Robot error code storage device

Program

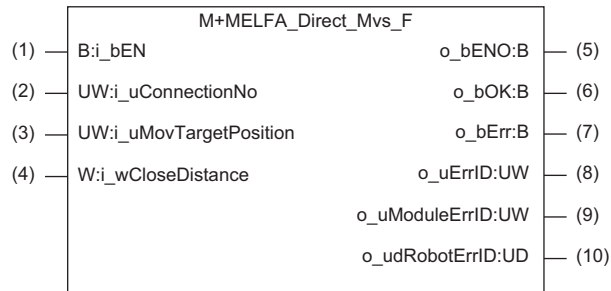


Processing order	Processing details
1	When M283 is turned on, M284 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Mov instruction is executed with R10409 as the move target position and R10410 as the approach distance.
3	When an error such as a send error occurs, M286 turns on. At this time, the related error code is stored in the error code storage device.

3.19 M+MELFA_Direct_Mvs_F (Linear Interpolation)

Overview

This FB executes the linear interpolation control. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection
(3)	i_uMovTargetPosition	Target position	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 999	Specify the address of external variable P_DM of the robot controller as the target position.
(4)	i_wCloseDistance	Close distance	Word [signed]	Only when FB starts	-10000 to 10000	The position is adjusted from the external variable P_DM specified in i_uMovTargetPosition (move target position) to a position shifted by the set value distance. The setting value is set in mm units. When no value is set, the label is treated as 0.

Output labels

No.	Label	Label name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(6)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(7)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(9)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(10)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller


Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	847 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 128 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

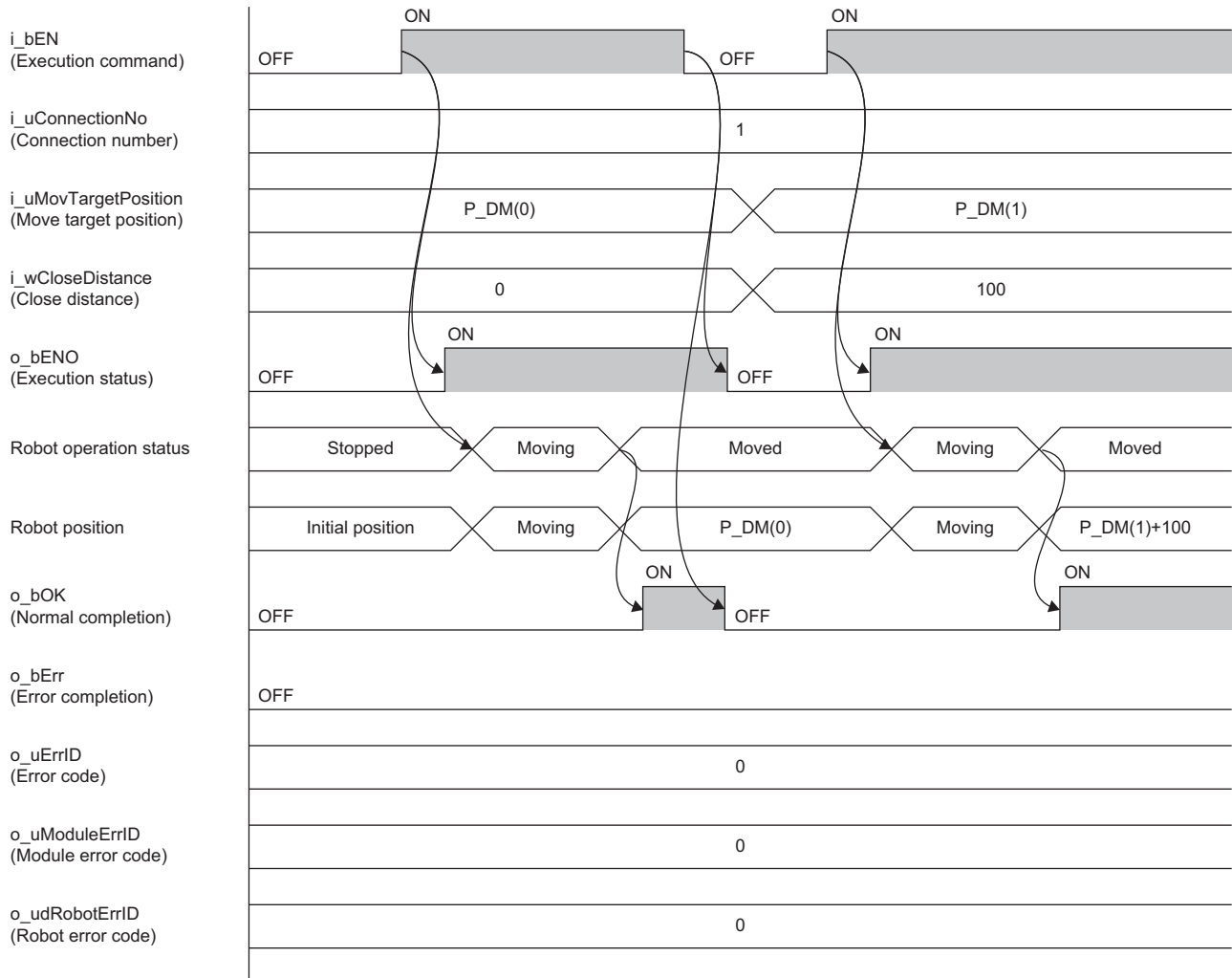
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Mvs instruction on the robot controller.
- When this FB is executed, the robot moves to the external variable P_DM of the address set in i_uMovTargetPosition (move target position).
- When a value is set for i_wCloseDistance (approach distance), the robot moves from the specified external variable P_DM to a position shifted by the set value distance.
- When the robot completes moving to the target position, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- This FB uses external variables P_DM(1) to P_DM(999) of the robot controller. Therefore, it is necessary to set the RT ToolBox3 parameter iQMEM and enable the CPU buffer memory extension function.
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

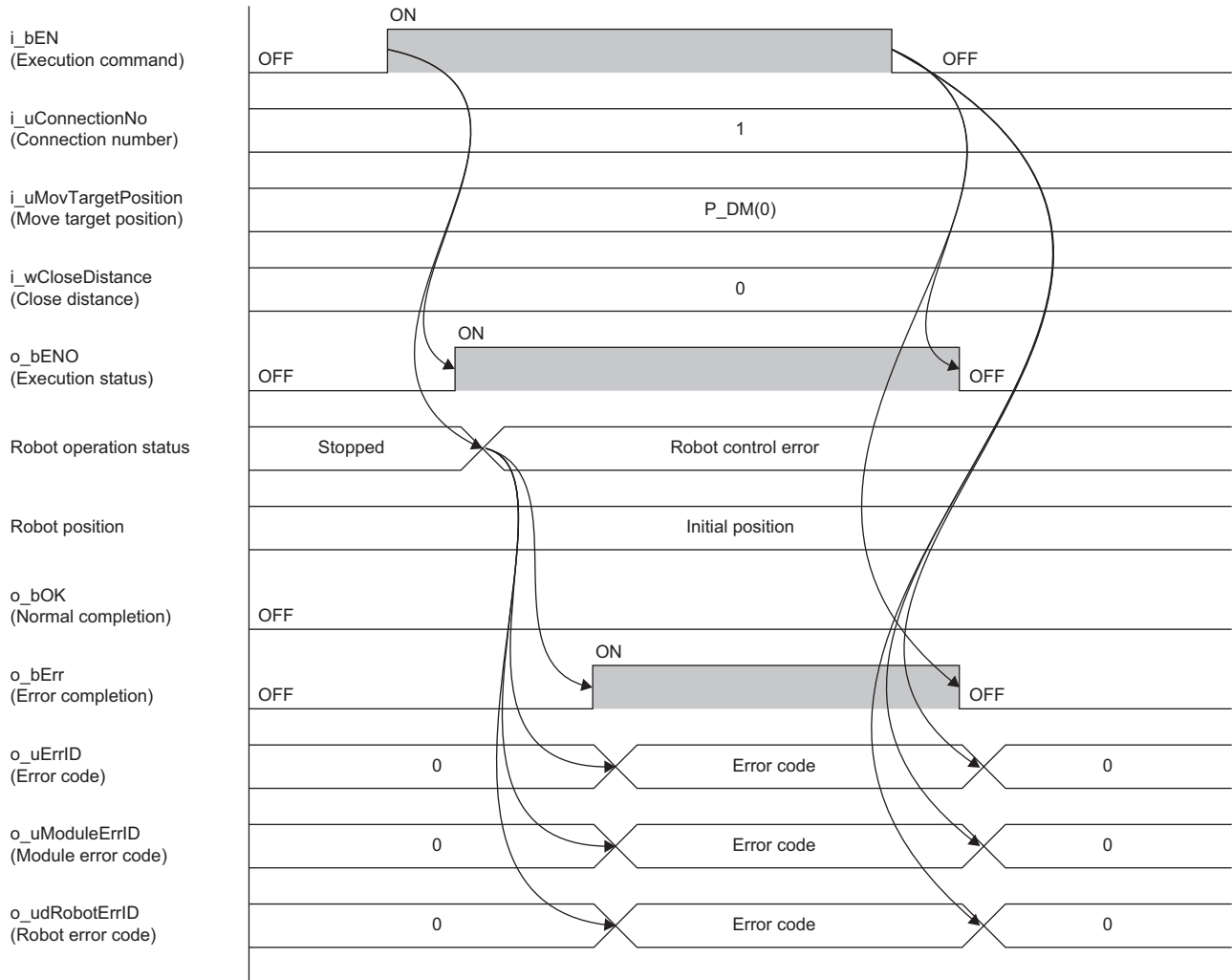
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 167 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values of this FB vary depending on the move target position.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
106H	A value other than 1 to 999 is set for i_uMovTargetPosition (move target position).	Turn off i_bEN, set the normal value, and then turn on i_bEN again.
107H	A value other than -10000 to 10000 is set for i_wCloseDistance (approach distance).	Turn off i_bEN, set the normal value, and then turn on i_bEN again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

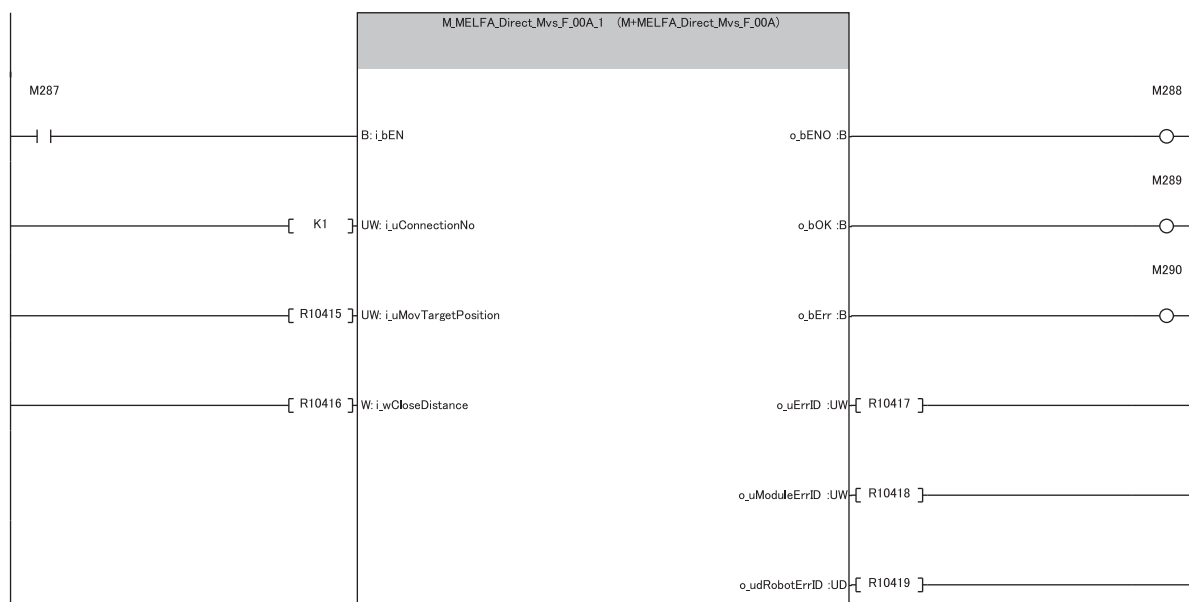
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M287	FB execution flag
R10415	Move target position specification device
R10416	Approach distance specification device
M288	FB execution status display flag
M289	FB normal completion display flag
M290	FB error completion display flag
R10417	FB error code storage device
R10418	Module error code storage device
R10419 to R10420	Robot error code storage device

Program

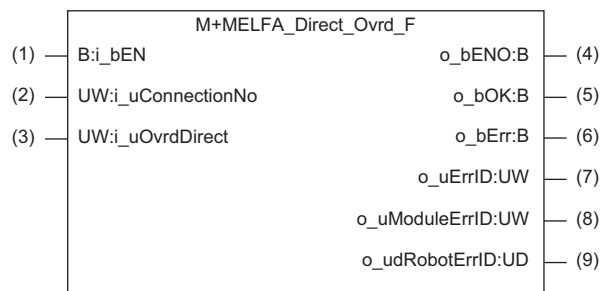


Processing order	Processing details
1	When M287 is turned on, M288 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Mvs instruction is executed with R10415 as the move target position and R10416 as the approach distance.
3	When an error such as a send error occurs, M290 turns on. At this time, the related error code is stored in the error code storage device.

3.20 M+MELFA_Direct_Ovrd_F (Speed Specification)


Overview

Specify the overall speed. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_uOvrdDirect	Override (Direct control)	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 100	Set an override in units of 1%.

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later




■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

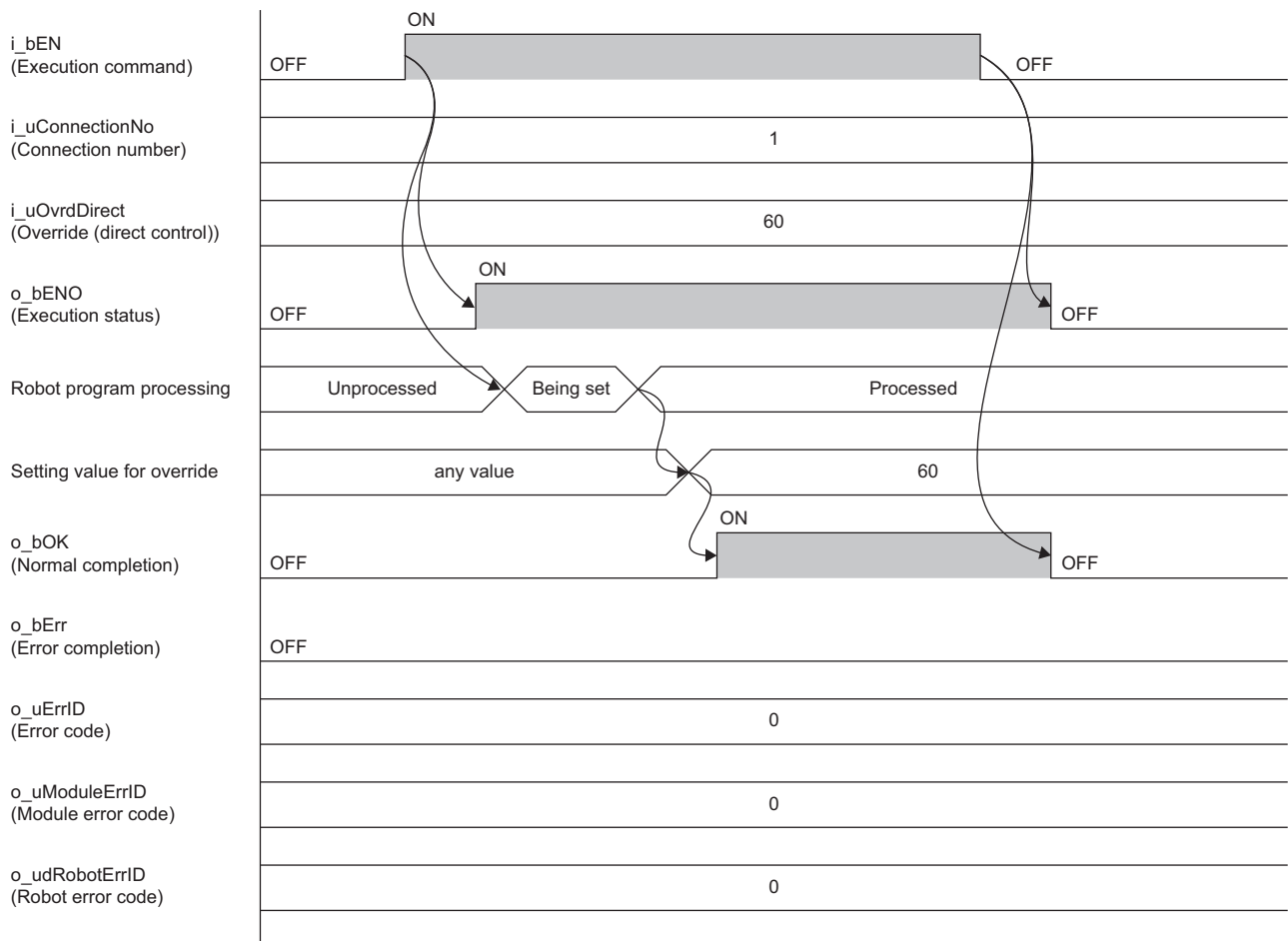
Item	Description
Number of steps	809 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 108 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

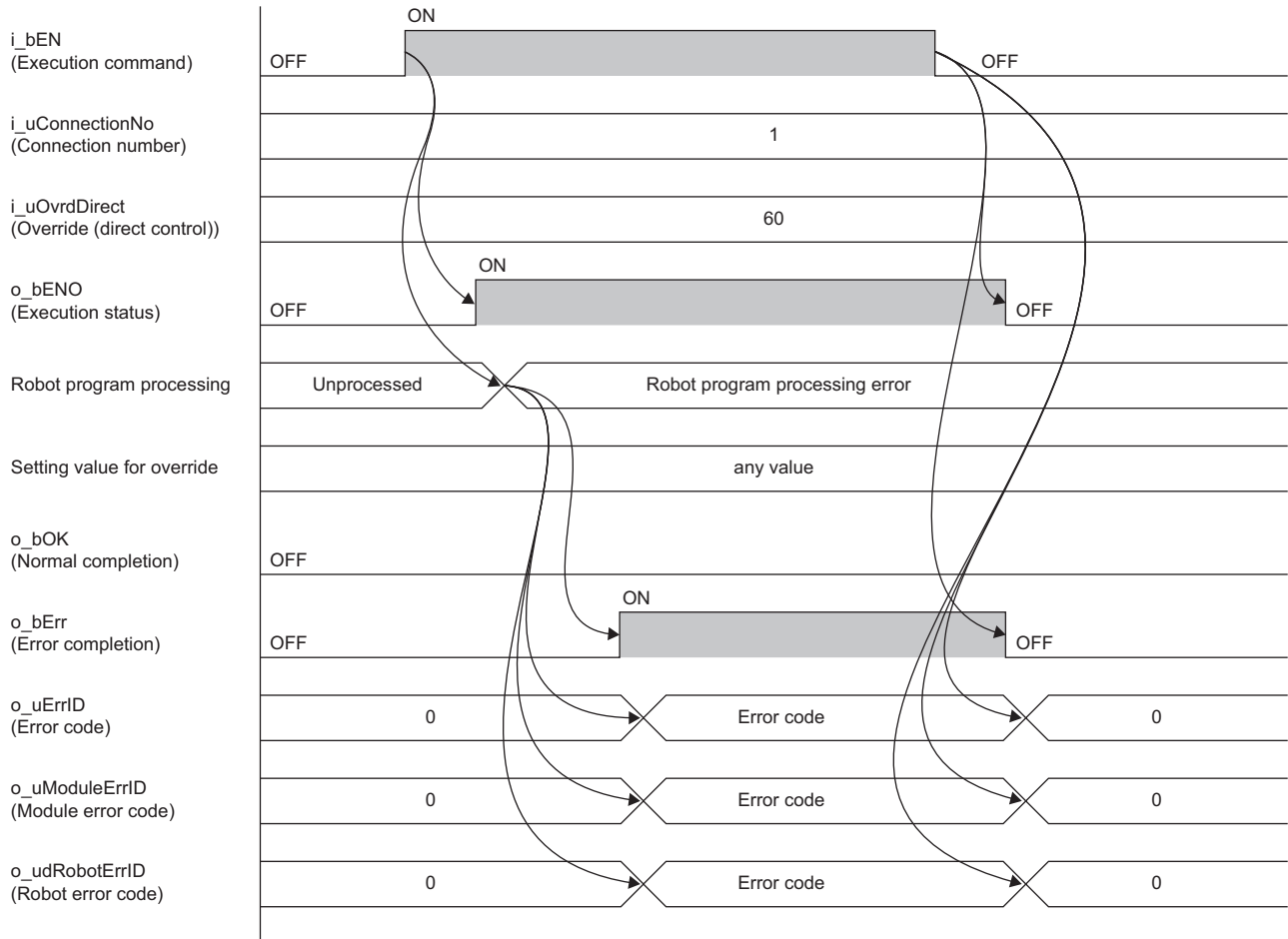
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Ovrdr instruction on the robot controller.
- When this FB is executed, the value set in i_uOvrdr (override) is set as an override for the entire robot program.
- When the override setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 173 Error codes)

Timing chart of I/O signals

Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.031ms	1.124ms	10 scans
FX5UJ CPU module	1 robot controller	9.258ms	1.049ms	14 scans
FX5U CPU module ^{*1*2}	1 robot controller	8.285ms	0.848ms	17 scans
FX5UC CPU module ^{*1*2}	1 robot controller	8.285ms	0.848ms	17 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
108H	A value other than 1 to 100 is set for i_uOvrDirect (override (direct control)).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

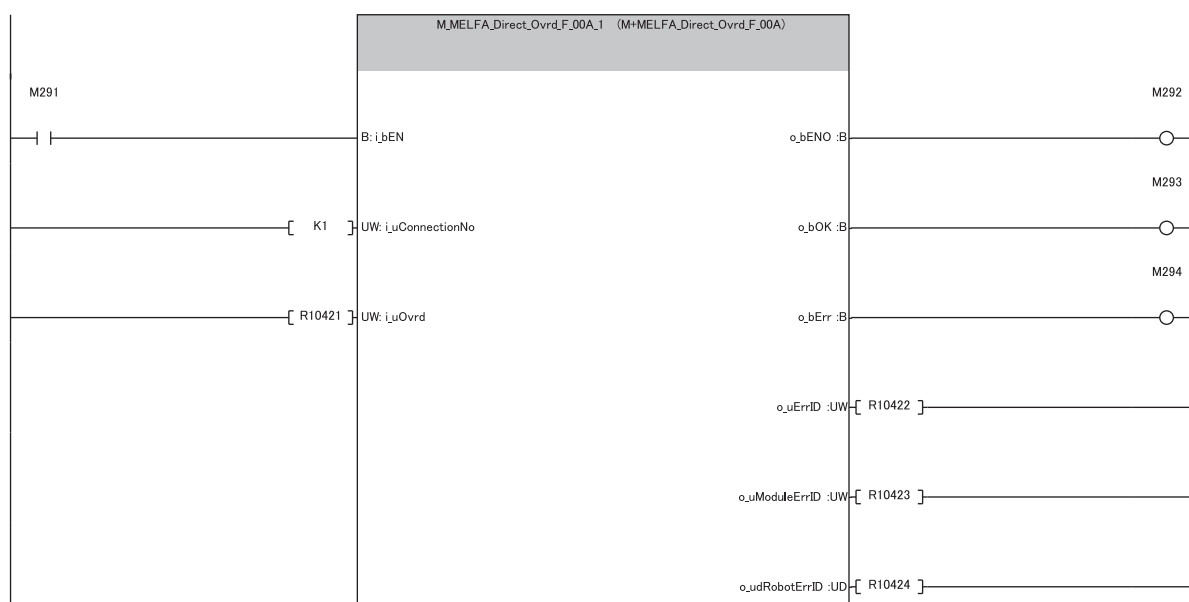
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M291	FB execution flag
R10421	Override specification device
M292	FB execution status display flag
M293	FB normal completion display flag
M294	FB error completion display flag
R10422	FB error code storage device
R10423	Module error code storage device
R10424 to R10425	Robot error code storage device

Program

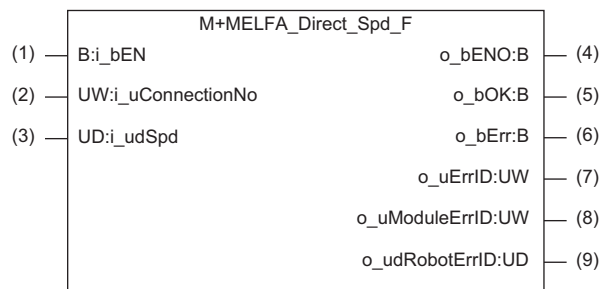


Processing order	Processing details
1	When M291 is turned on, M292 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Ovrd instruction is executed with R10421 as the override setting value.
3	M294 turns on when an error such as a send error occurs. At this time, the related error code is stored in the error code storage device.

3.21 M+MELFA_Direct_Spd_F (Interpolation Operation Speed Specification)

Overview

Specify the speed for the linear or circular interpolation movement. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection
(3)	i_udSpd	Specified speed	Double word [unsigned]/bit string [32 bits]	Only when FB starts	1 to 1000000	Set the robot speed in units of 0.01mm/s. (0.01 to 10000mm/s)

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later




■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

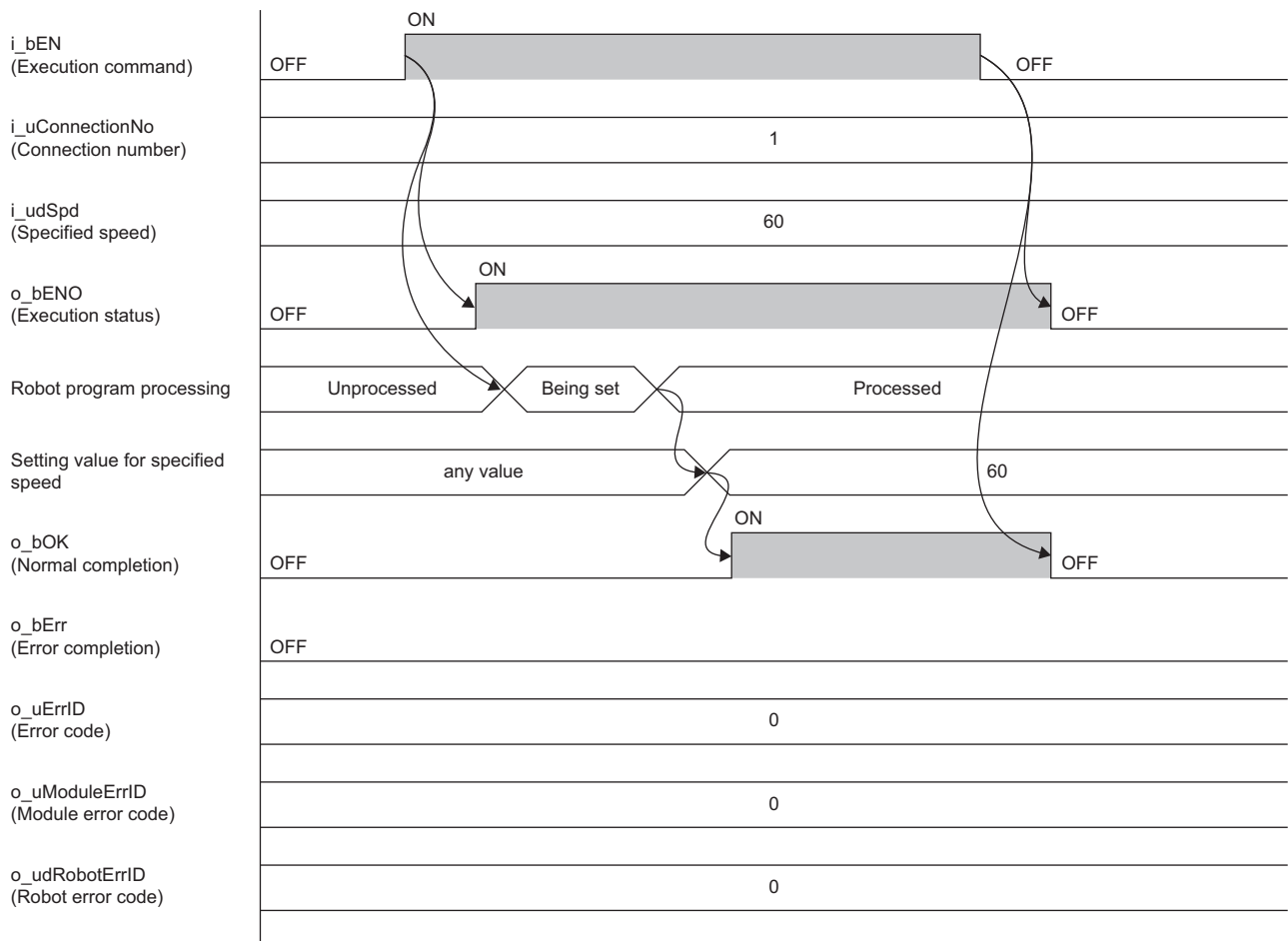
Item	Description
Number of steps	908 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 132 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

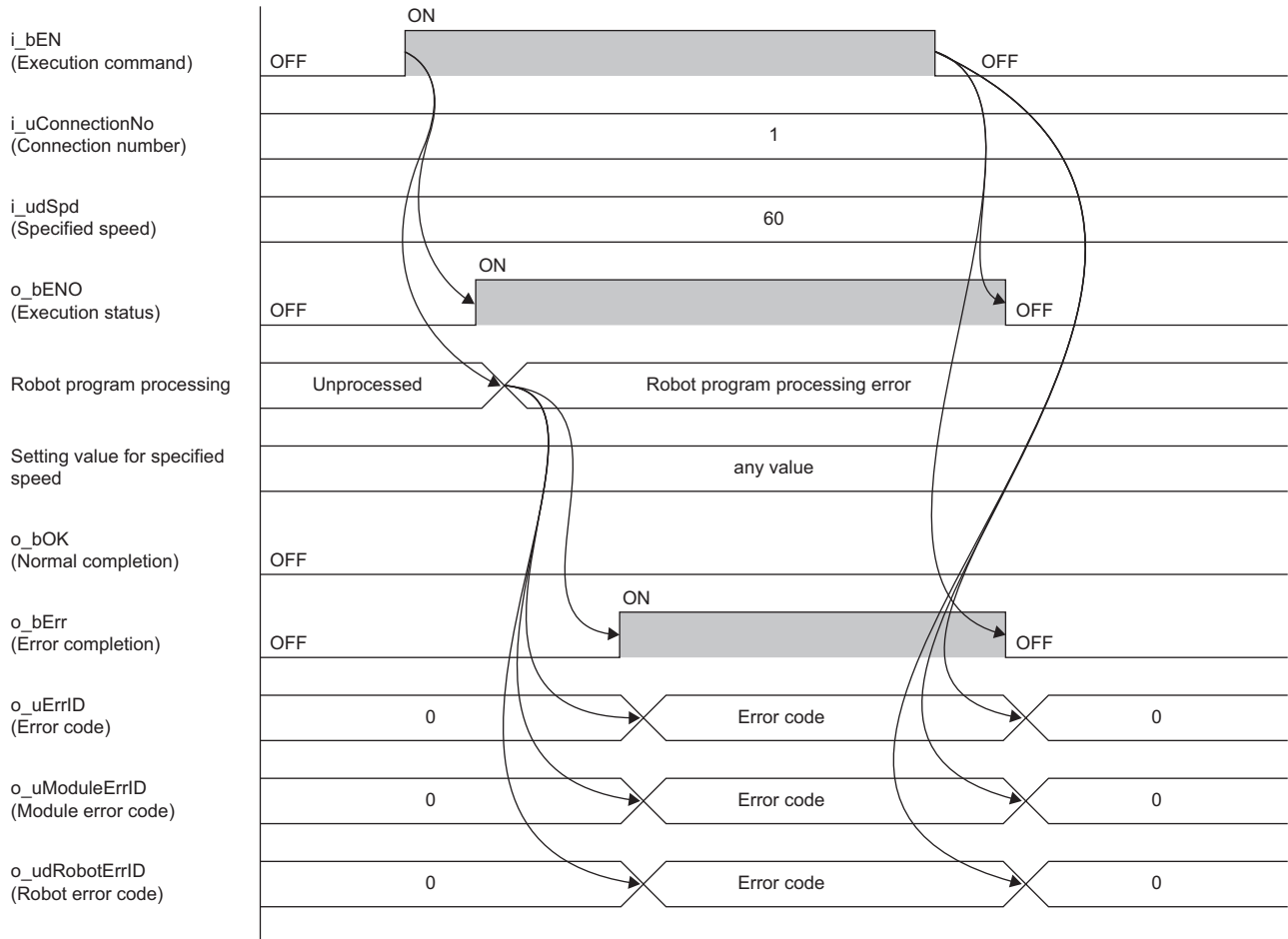
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Spd instruction on the robot controller.
- When this FB is executed, the value set in i_udSpd (specified speed) is set as the speed of the robot when it moves in a straight line or in an arc.
- When the speed specification is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 179 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	8.044ms	1.669ms	11 scans
FX5UJ CPU module	1 robot controller	8.642ms	1.426ms	14 scans
FX5U CPU module ^{*1*2}	1 robot controller	7.715ms	1.070ms	15 scans
FX5UC CPU module ^{*1*2}	1 robot controller	7.715ms	1.070ms	15 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
109H	A value other than 1 to 1000000 is set for i_udSpd (specified speed).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

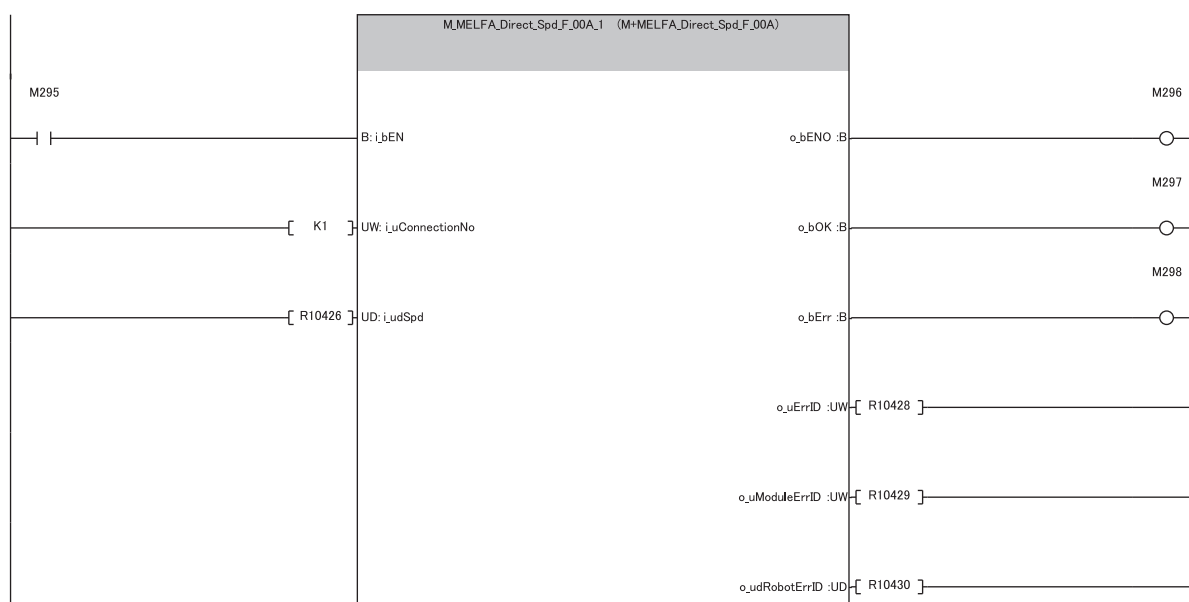
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M295	FB execution flag
R10426 to R10427	Speed specification device
M296	FB execution status display flag
M297	FB normal completion display flag
M298	FB error completion display flag
R10428	FB error code storage device
R10429	Module error code storage device
R10430 to R10431	Robot error code storage device

Program

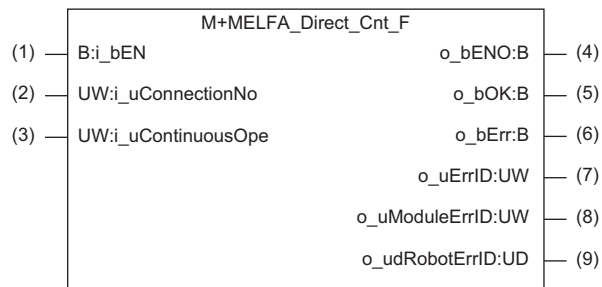


Processing order	Processing details
1	When M295 is turned on, M296 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Spd instruction is executed with R10426 as the specified speed setting value.
3	When an error such as a send error occurs, M298 turns on. At this time, the related error code is stored in the error code storage device.

3.22 M+MELFA_Direct_Cnt_F (Continuous Path Mode Specification)


Overview

Specify the continuous path mode. Use it to control the robot directly from the programmable controller.



Labels

Input labels


No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_uContinuousOpe	Continuous movement	Word [unsigned]/bit string [16 bits]	Only when FB starts	0, 1	Specify the continuous operation of interpolation. • 0: Acceleration/deceleration operation • 1: Continuous operation specification When no value is set, the label is treated as 0.

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	809 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 108 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

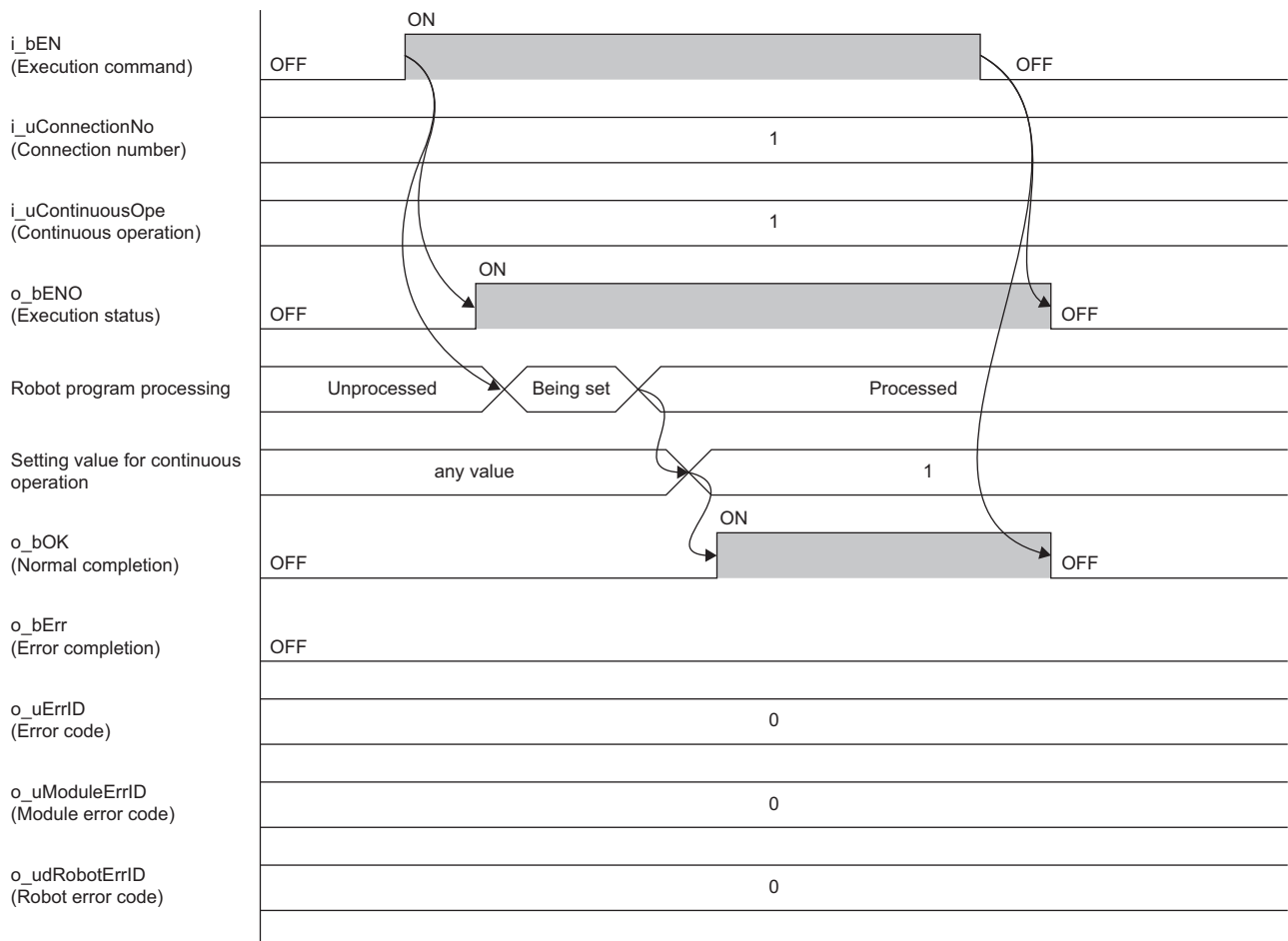
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Cnt instruction on the robot controller.
- When this FB is executed, the robot is set to operate according to the value set in i_uContinuousOpe (continuous operation).
- When the setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

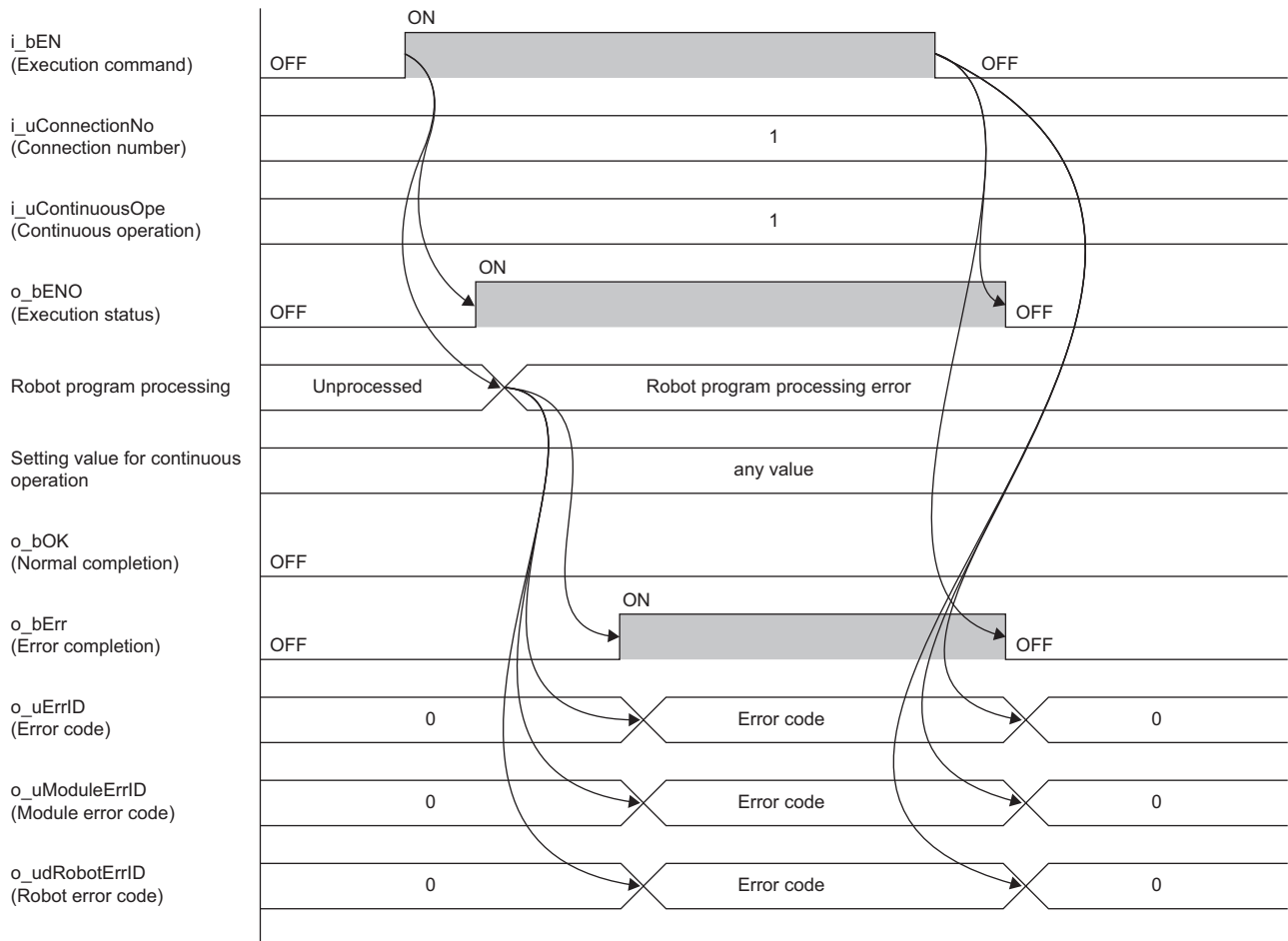
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 185 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	10.314ms	1.671ms	12 scans
FX5UJ CPU module	1 robot controller	11.951ms	1.114ms	19 scans
FX5U CPU module ^{*1*2}	1 robot controller	11.729ms	0.975ms	23 scans
FX5UC CPU module ^{*1*2}	1 robot controller	11.729ms	0.975ms	23 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
10AH	A value other than 0 and 1 is set for i_uCnt (continuous operation).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

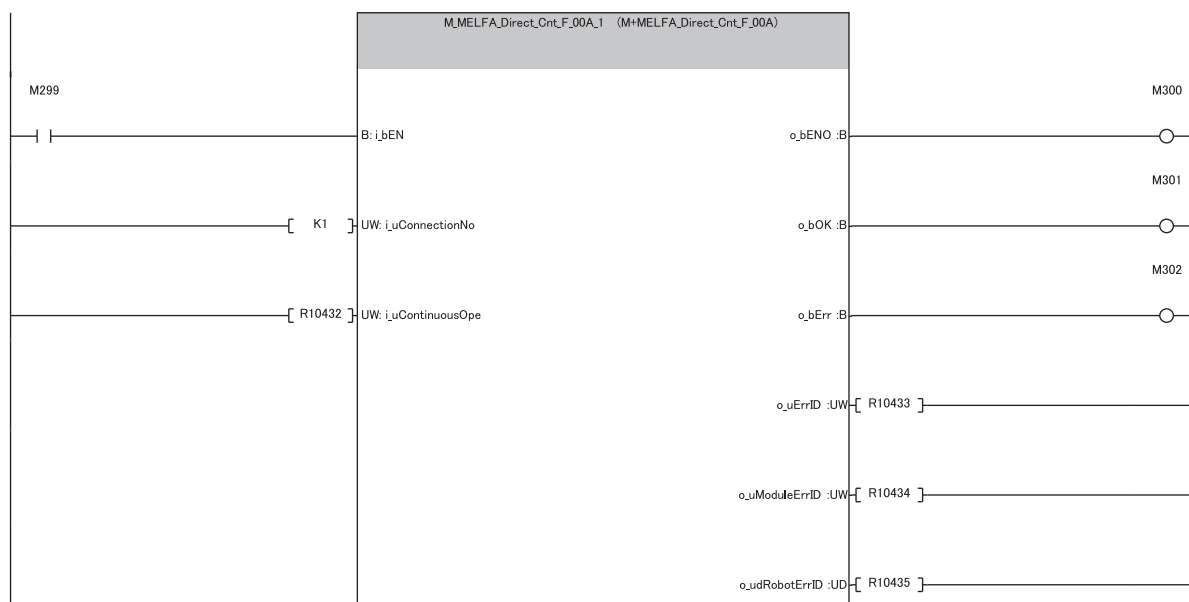
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M299	FB execution flag
R10432	Continuous operation specification device
M300	FB execution status display flag
M301	FB normal completion display flag
M302	FB error completion display flag
R10433	FB error code storage device
R10434	Module error code storage device
R10435 to R10436	Robot error code storage device

Program

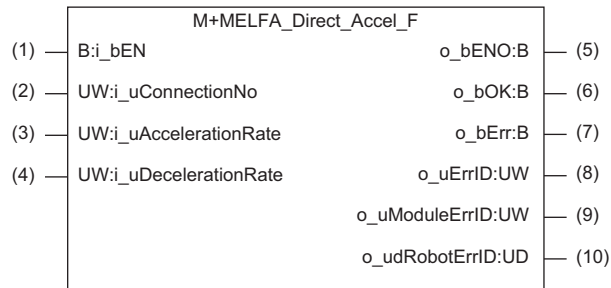


Processing order	Processing details
1	When M299 is turned on, M300 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Cnt instruction is executed with R10432 as the continuous operation setting value.
3	When an error such as a send error occurs, M302 turns on. At this time, the related error code is stored in the error code storage device.

3.23 M+MELFA_Direct_Accel_F (Acceleration and Deceleration Speed Specification)


Overview

Specify the acceleration/deceleration rate. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_uAccelerationRate	Acceleration rate	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 100	Set the acceleration during robot operation as a percentage (in %) of the maximum speed.
(4)	i_uDecelerationRate	Deceleration rate	Word [unsigned]/bit string [16 bits]	Only when FB starts	1 to 100	Set the deceleration during robot operation as a percentage (in %) of the maximum speed.

Output labels

No.	Label	Label name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(6)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(7)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(9)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(10)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	845 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 124 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

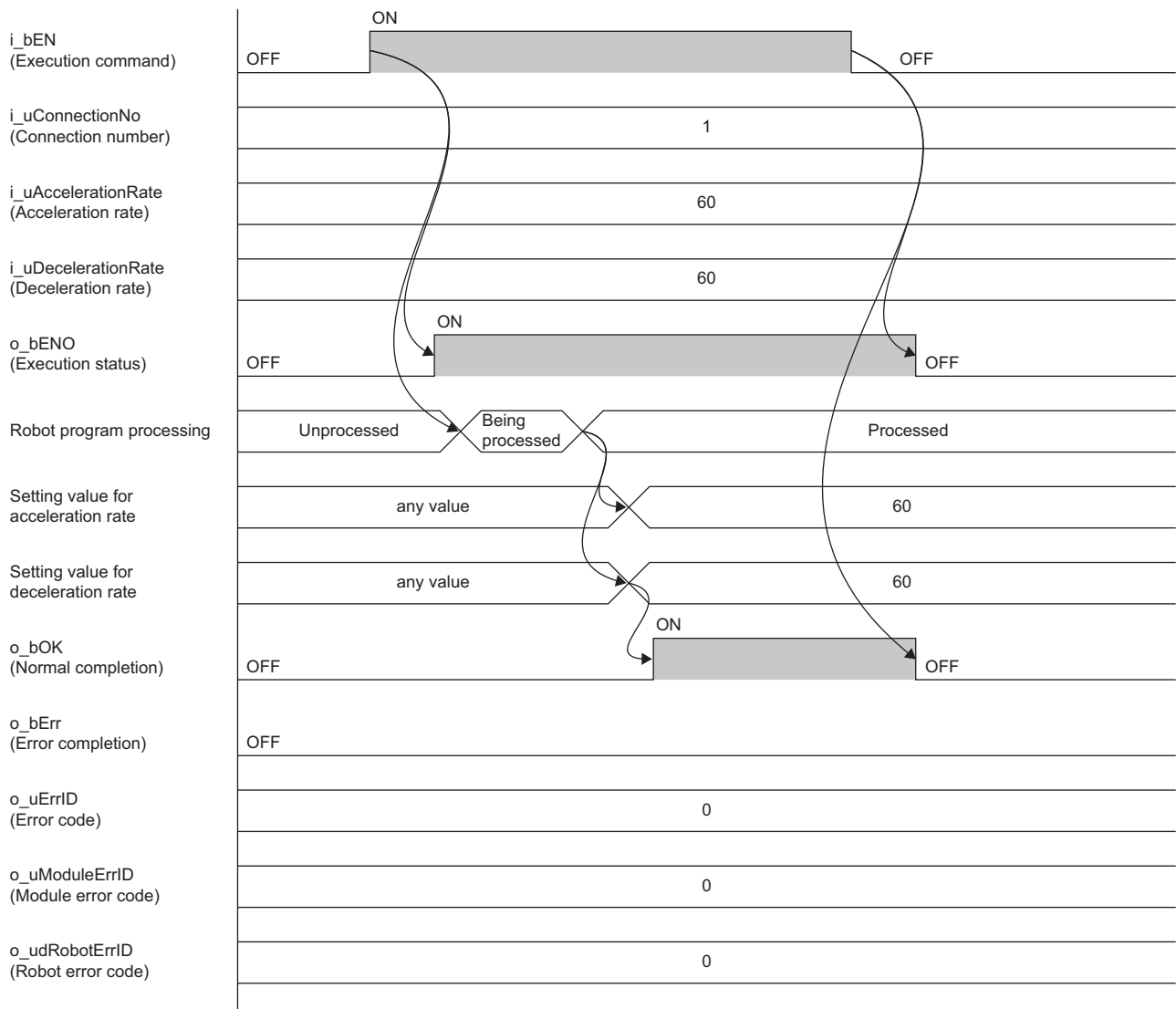
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Accel instruction on the robot controller.
- When this FB is executed, the robot is set to the acceleration and deceleration speeds of the values set in i_uAccelerationRate (acceleration rate) and i_uDecelerationRate (deceleration rate).
- When the setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

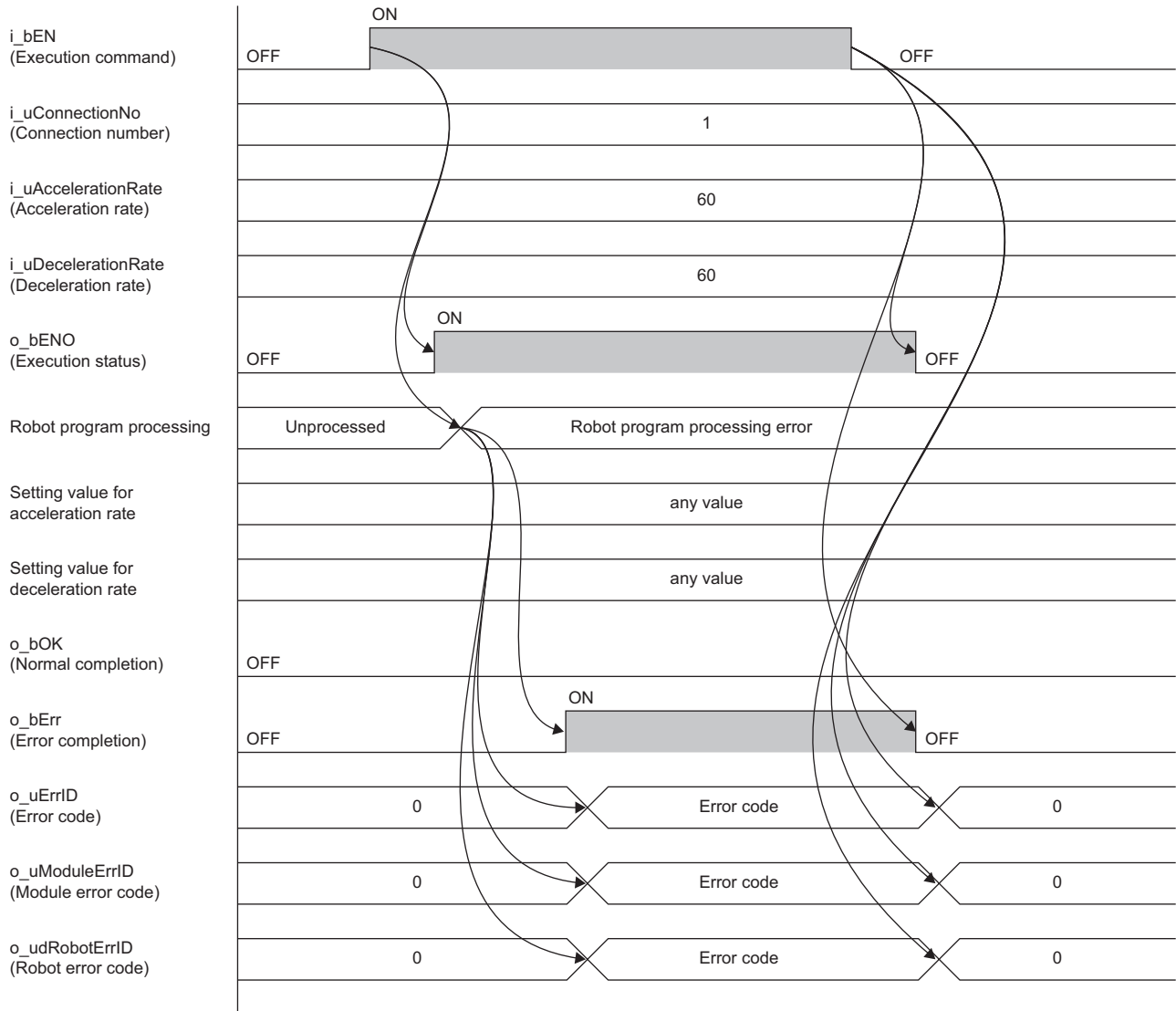
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 191 Error codes)

Timing chart of I/O signals

Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.892ms	1.160ms	9 scans
FX5UJ CPU module	1 robot controller	7.987ms	0.997ms	12 scans
FX5U CPU module ^{*1*2}	1 robot controller	8.255ms	0.923ms	17 scans
FX5UC CPU module ^{*1*2}	1 robot controller	8.255ms	0.923ms	17 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
10BH	A value other than 1 to 100 is set for i_uAccelerationRate (acceleration rate).	After reviewing the settings, execute the FB again.
10CH	A value other than 1 to 100 is set for i_uDecelerationRate (deceleration rate).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

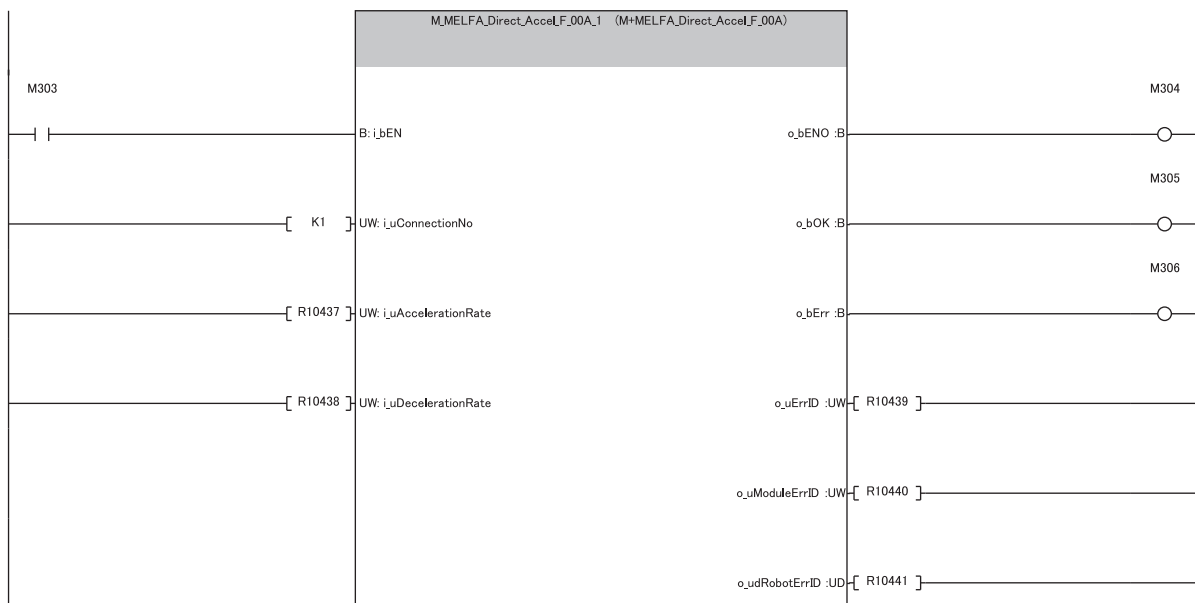
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M303	FB execution flag
R10437	Acceleration rate specification device
R10438	Deceleration rate specification device
M304	FB execution status display flag
M305	FB normal completion display flag
M306	FB error completion display flag
R10439	FB error code storage device
R10440	Module error code storage device
R10441 to R10442	Robot error code storage device

Program

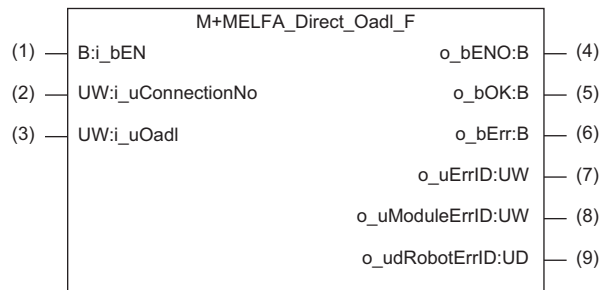


Processing order	Processing details
1	When M303 is turned on, M304 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Accel instruction is executed with R10437 as the acceleration rate setting value and R10438 as the deceleration rate setting value.
3	M306 turns on when an error such as a send error occurs. At this time, the related error code is stored in the error code storage device.

3.24 M+MELFA_Direct_Oadl_F (Optimum Acceleration and Deceleration Specification)

Overview

Specify the optimum acceleration/deceleration speed. Use it in combination with M+MELFA_Direct_LoadSet_F (hand additional condition specification). Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following. Page 23 Robot Controller Connection
(3)	i_uOadl	Optimum acceleration/ deceleration speed	Word [unsigned]/bit string [16 bits]	Only when FB starts	0, 1	Set the value to determine whether to execute the operation using the optimum acceleration and deceleration speeds. • 0: The optimum acceleration and deceleration speeds end. • 1: The optimum acceleration and deceleration speeds start. When no value is set, the label is treated as 0.

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	799 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 88 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

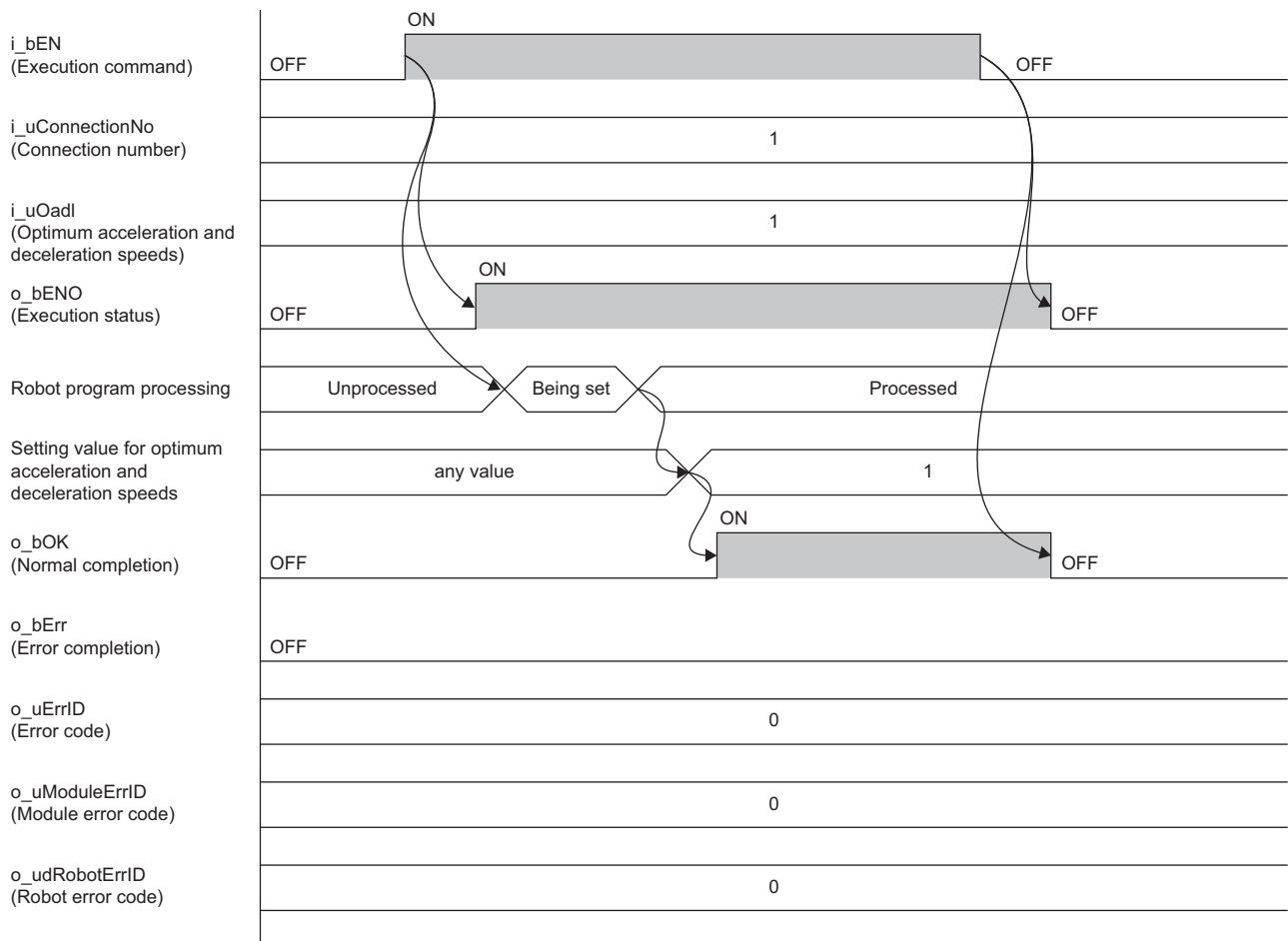
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Oadl instruction on the robot controller.
- When this FB is executed, the robot operates at the optimum acceleration and deceleration set in i_uOadl (optimum acceleration and deceleration speeds).
- When the setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

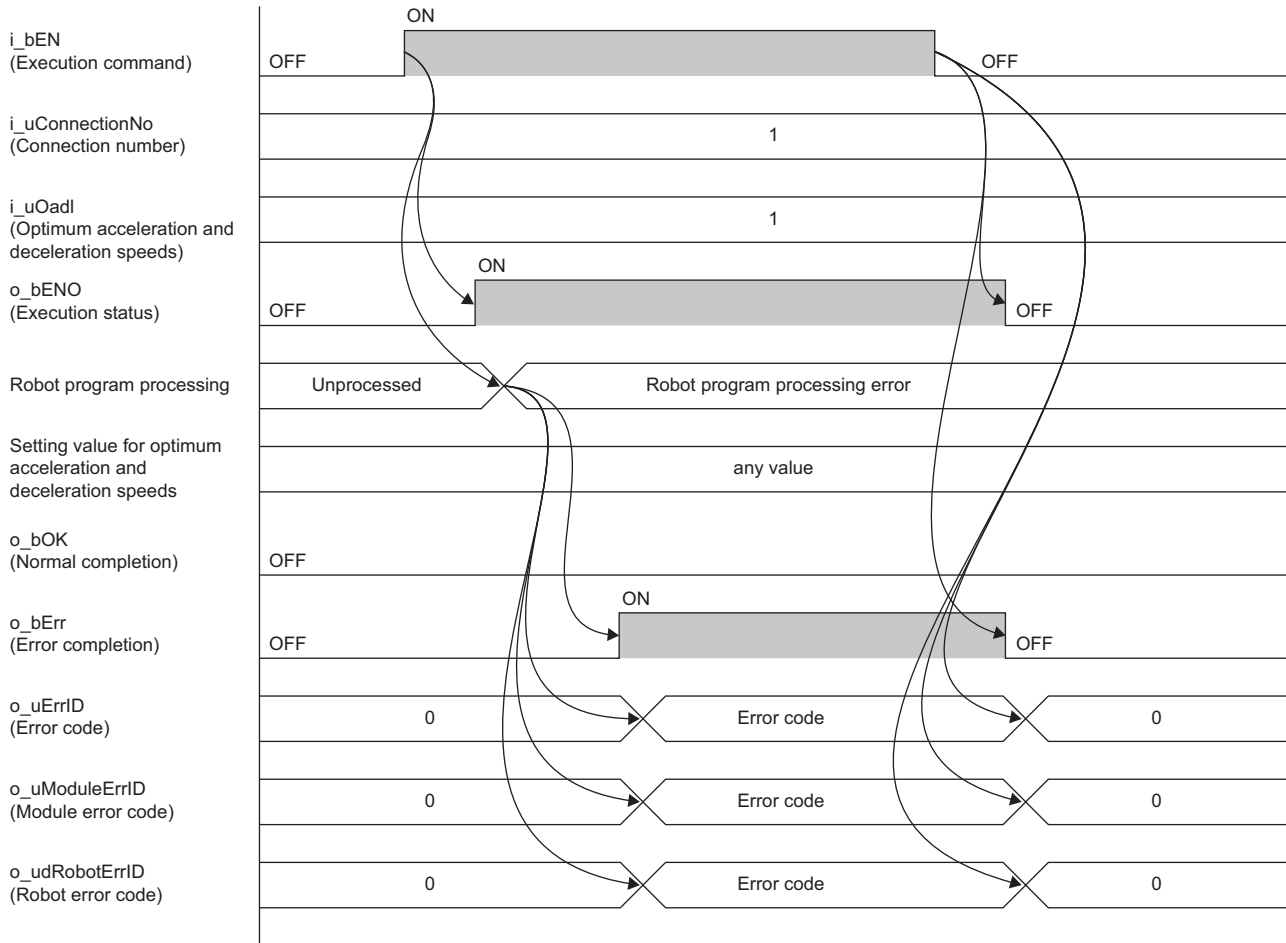
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 197 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, *o_bErr* (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	7.930ms	1.281ms	10 scans
FX5UJ CPU module	1 robot controller	8.195ms	1.069ms	16 scans
FX5U CPU module ^{*1*2}	1 robot controller	8.372ms	0.545ms	17 scans
FX5UC CPU module ^{*1*2}	1 robot controller	8.372ms	0.545ms	17 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
10DH	A value other than 0 and 1 is set for i_uOadl (optimum acceleration and deceleration speeds).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

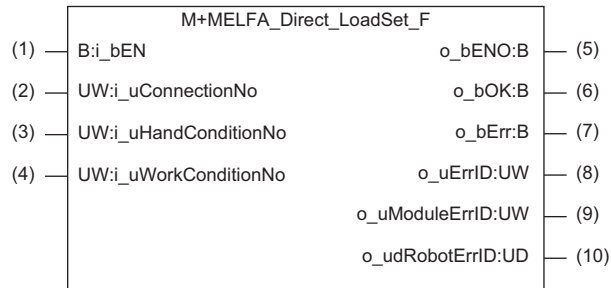
Example

For an example of using this FB in a ladder program, refer to M+MELFA_Direct_LoadSet_F (hand additional condition specification). (Page 203 M+MELFA_Direct_LoadSet_F (Hand Additional Condition Specification))

3.25 M+MELFA_Direct_LoadSet_F (Hand Additional Condition Specification)


Overview

Specify the hand's optional condition. Use it in combination with M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification). Use it to control the robot directly from the programmable controller.



Labels

Input labels


No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_uHandConditionNo	Hand condition number	Word [unsigned]/bit string [16 bits]	Only when FB starts	0 to 8	Specify the hand conditions for executing M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification). Parameters HNDDAT0 to HNDDAT8 of RT ToolBox3 can be specified. When no value is set, the label is treated as 0.
(4)	i_uWorkConditionNo	Workpiece condition number	Word [unsigned]/bit string [16 bits]	Only when FB starts	0 to 8	Specify the workpiece conditions for executing M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification). Parameters WRKDAT0 to WRKDAT8 of RT ToolBox3 can be specified. When no value is set, the label is treated as 0.

Output labels

No.	Label	Label name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(6)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(7)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(8)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(9)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(10)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later





■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later

Basic specifications

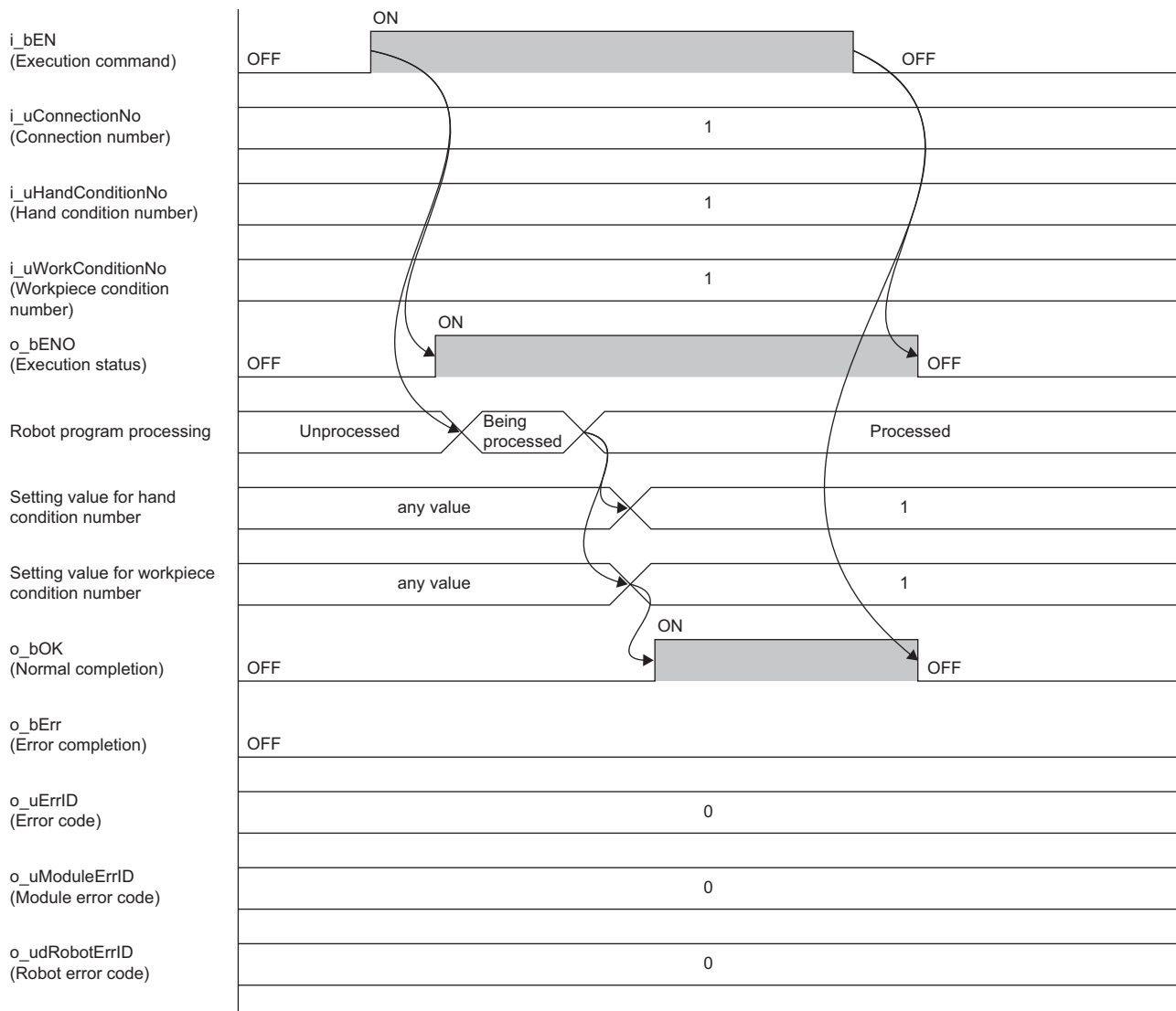
Item	Description
Number of steps	846 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 124 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

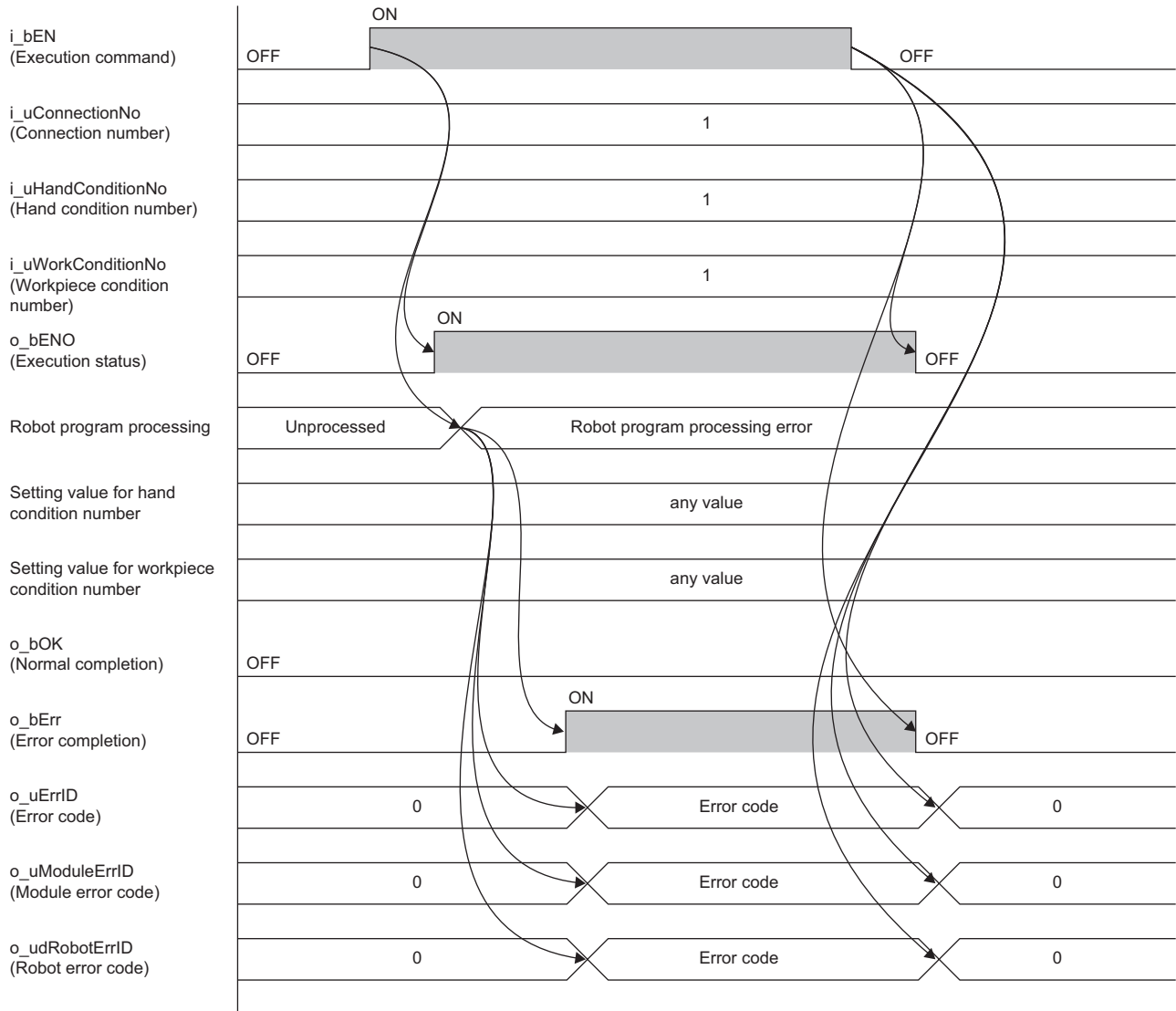
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic LoadSet instruction on the robot controller.
- When this FB is executed, the contents specified in i_uHandConditionNo (hand condition number) and i_uWorkConditionNo (workpiece condition number) are set to the robot as the conditions for executing M+MELFA_Direct_Oadl_F (optimum acceleration and deceleration specification). ( Page 193 M+MELFA_Direct_Oadl_F (Optimum Acceleration and Deceleration Specification))
- When the setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.
 MELSEC iQ-F FX5 User's Manual (Communication)
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 203 Error codes)

Timing chart of I/O signals

■ Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	8.416ms	1.203ms	10 scans
FX5UJ CPU module	1 robot controller	7.879ms	0.812ms	13 scans
FX5U CPU module ^{*1*2}	1 robot controller	7.997ms	0.840ms	16 scans
FX5UC CPU module ^{*1*2}	1 robot controller	7.997ms	0.840ms	16 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
10EH	A value other than 0 to 8 is set for i_uHandConditionNo (hand condition number).	After reviewing the settings, execute the FB again.
10FH	A value other than 0 to 8 is set for i_uWorkConditionNo (workpiece condition number).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

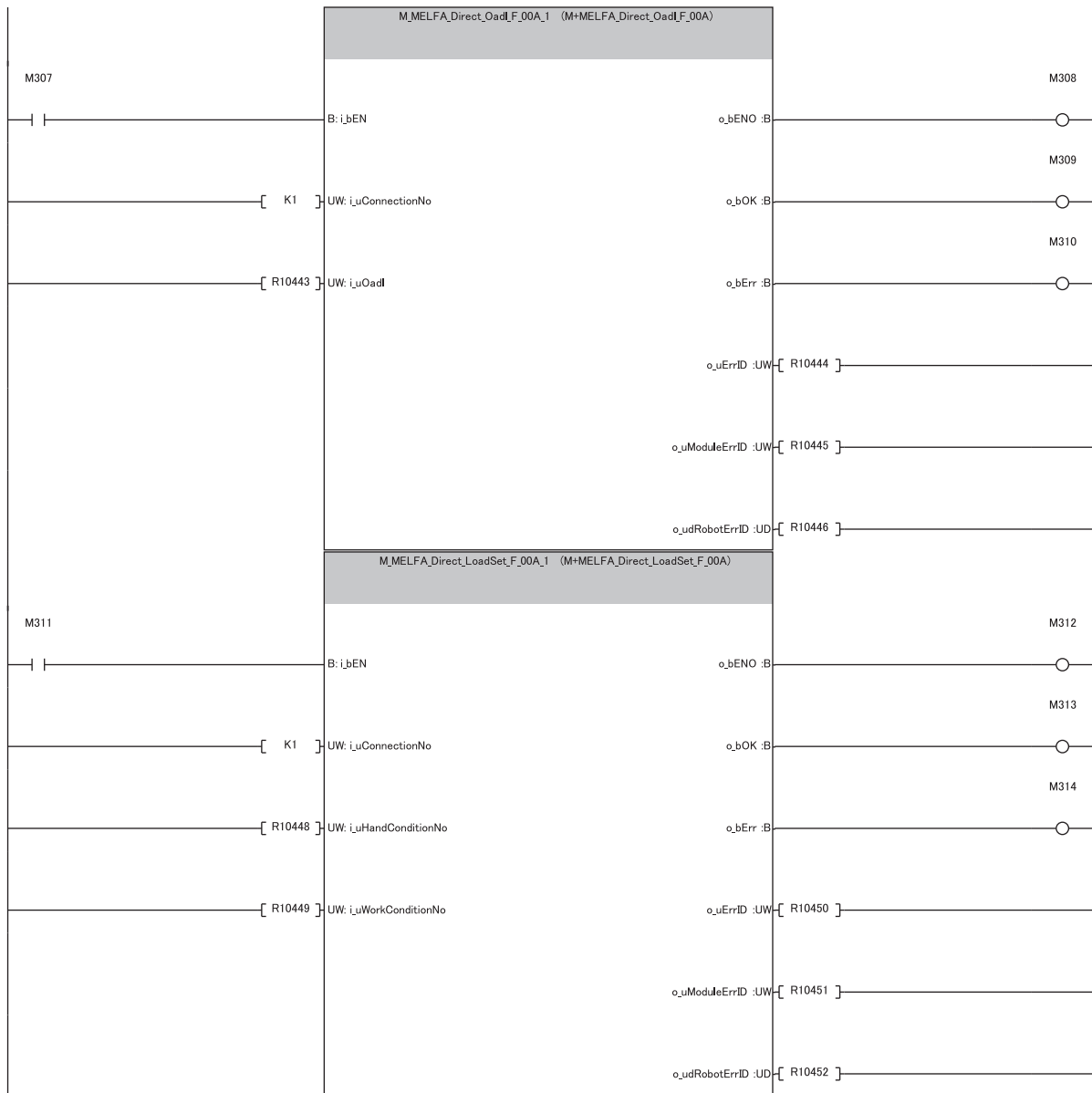
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M307	FB execution flag
R10443	Optimum acceleration and deceleration speed specification device
M308	FB execution status display flag
M309	FB normal completion display flag
M310	FB error completion display flag
R10444	FB error code storage device
R10445	Module error code storage device
R10446 to R10447	Robot error code storage device
M311	FB execution flag
R10448	Hand condition number specification device
R10449	Workpiece condition number specification device
M312	FB execution status display flag
M313	FB normal completion display flag
M314	FB error completion display flag
R10450	FB error code storage device
R10451	Module error code storage device
R10452 to R10453	Robot error code storage device

Program

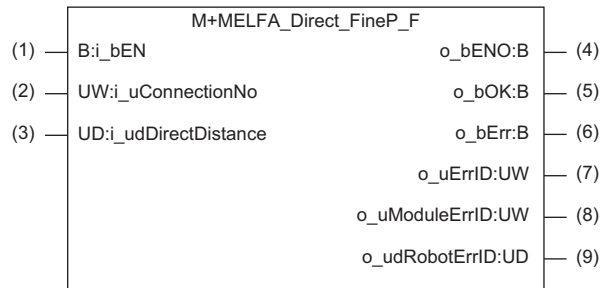


Processing order	Processing details
1	When M307 is turned on, M308 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Oadl instruction is executed with R10443 as the optimum acceleration and deceleration speed setting value.
3	When M311 is turned on, M312 turns on and the FB is executed for connection number 1.
4	The MELFA Basic LoadSet instruction is executed with R10448 as the hand condition number setting value and R10449 as the workpiece condition number setting value.
5	When an error such as a send error occurs, M310 and M314 turn on. At this time, the related error code is stored in the error code storage device.

3.26 M+MELFA_Direct_FineP_F (Positioning Range Specification)


Overview

Specify the positioning range. Use it to control the robot directly from the programmable controller.



Labels

Input labels

No.	Label	Label name	Data type	Capture	Setting range	Description
(1)	i_bEN	Execution command	Bit	Always	—	ON: The FB starts. OFF: The FB does not start.
(2)	i_uConnectionNo	Connection number	Word [unsigned]/bit string [16 bits]	Only when FB starts	1, 4	Set the socket communication connection number of the robot controller to be used. For details on connection numbers, refer to the following.  Page 23 Robot Controller Connection
(3)	i_udDirectDistance	Linear distance	Double word [unsigned]/bit string [32 bits]	Only when FB starts	0 to 100000	Set the positioning direct distance in units of 0.001mm. (0.001 to 100mm) If 0 is specified, the label becomes invalid.

Output labels

No.	Label	Label name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command turns on. OFF: The execution command turns off.
(5)	o_bOK	Normal completion	Bit	OFF	ON: The value changes to on when processing is completed. OFF: The value changes to off when the request signal turns off.
(6)	o_bErr	Error completion	Bit	OFF	The on state indicates that an error has occurred in the FB.
(7)	o_uErrID	Error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred in the FB is returned.
(8)	o_uModuleErrID	Module error code	Word [unsigned]/bit string [16 bits]	0	The error code of an error that occurred during communication is returned.
(9)	o_udRobotErrID	Robot error code	Double word [unsigned]/bit string [32 bits]	0	The error code returned from the robot controller is stored.

Global labels

Refer to the following.

 Page 18 List of Global Labels

Function details

Applicable hardware and software



■Programmable controller

Module	Firmware version	Engineering tool
FX5S CPU module	1.010 or later	GX Works3 Version 1.097B or later
FX5UJ CPU module	1.040 or later	GX Works3 Version 1.097B or later
FX5U CPU module	1.280 or later	GX Works3 Version 1.097B or later
FX5UC CPU module	1.280 or later	GX Works3 Version 1.097B or later


■Robot controller

Controller	Firmware version	Engineering tool
CR800-D	C2d or later	RT ToolBox3 Version 2.10L or later


Basic specifications

Item	Description
Number of steps	916 steps The number of steps of the FB embedded in a program depends on the CPU module used, the input/output definitions, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of labels used	<ul style="list-style-type: none"> Label: 132 points (Word) Latch label: 0 points (Word) The points of labels embedded in a program depend on the CPU module used, the devices specified for arguments, and the option setting of GX Works3. For the option setting of GX Works3, refer to the following.  GX Works3 Operating Manual
Points of index registers used	<ul style="list-style-type: none"> Index register: 0 points Long index register: 0 points
Points of file registers used	File register: 0 points (Word)
FB dependency	No dependency
FB compilation method	Subroutine type
FB operation	Pulse execution type (multiple scan execution type)

Function description

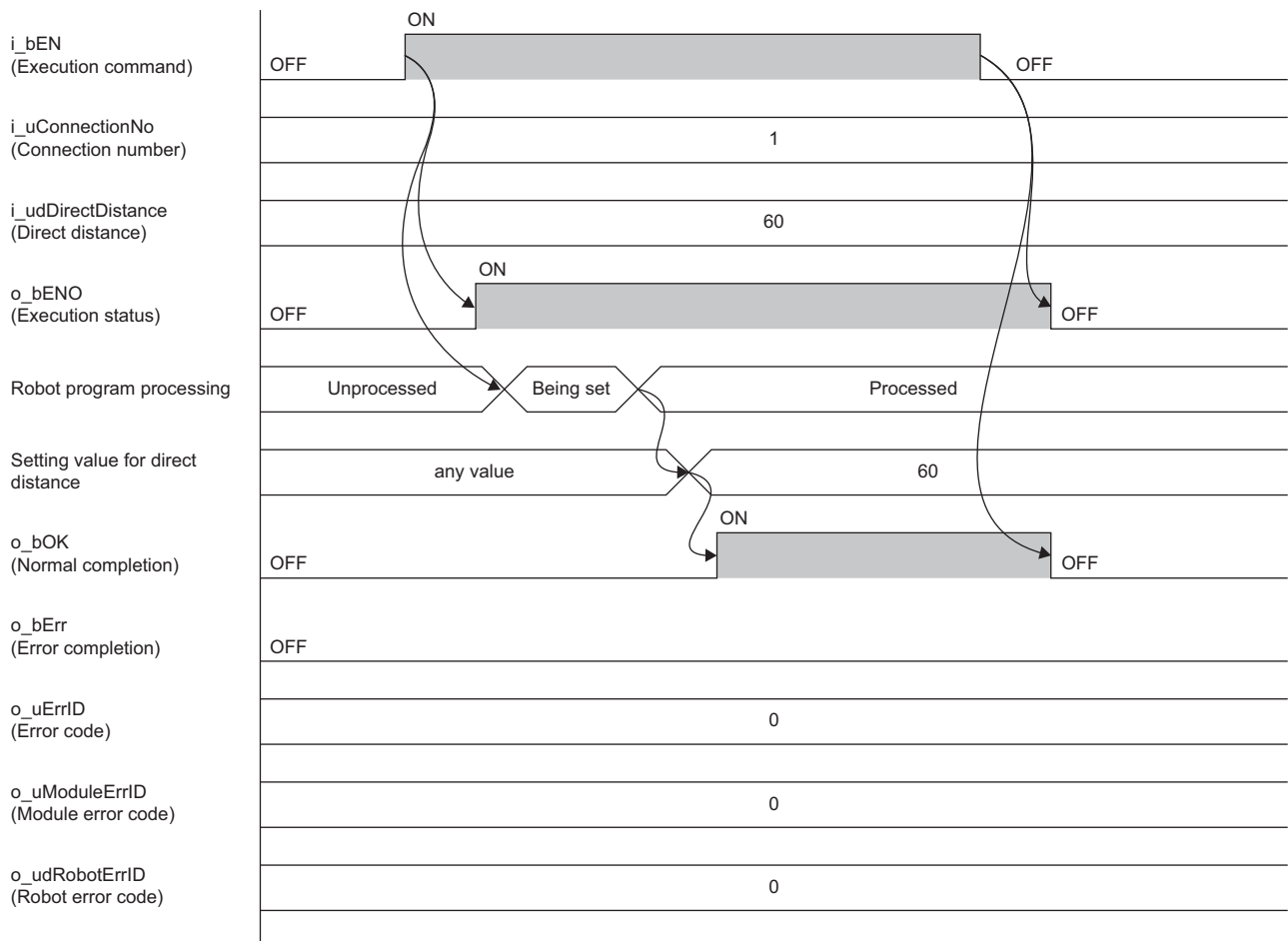
- This FB is executed at the rising edge of i_bEN (execution command) and directly executes the MELFA Basic Fine P instruction on the robot controller.
- When this FB is executed, the direct distance of the positioning completion condition is set to the robot according to the value set in i_udDirectDistance (direct distance).
- When the setting is completed on the robot controller side, o_bOK (normal completion) turns on.
- To apply the control using this FB, robot operation rights must be acquired using the programmable controller. Therefore, execute the M+MELFA_GetOperation_F (operation rights acquisition) FB in advance. ( Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition))
- If an error occurs during send/receive in socket communication, o_bErr (error completion) turns on and 200H is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the error code is stored in o_uModuleErrID (module error code). For details on error codes, refer to the following.

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

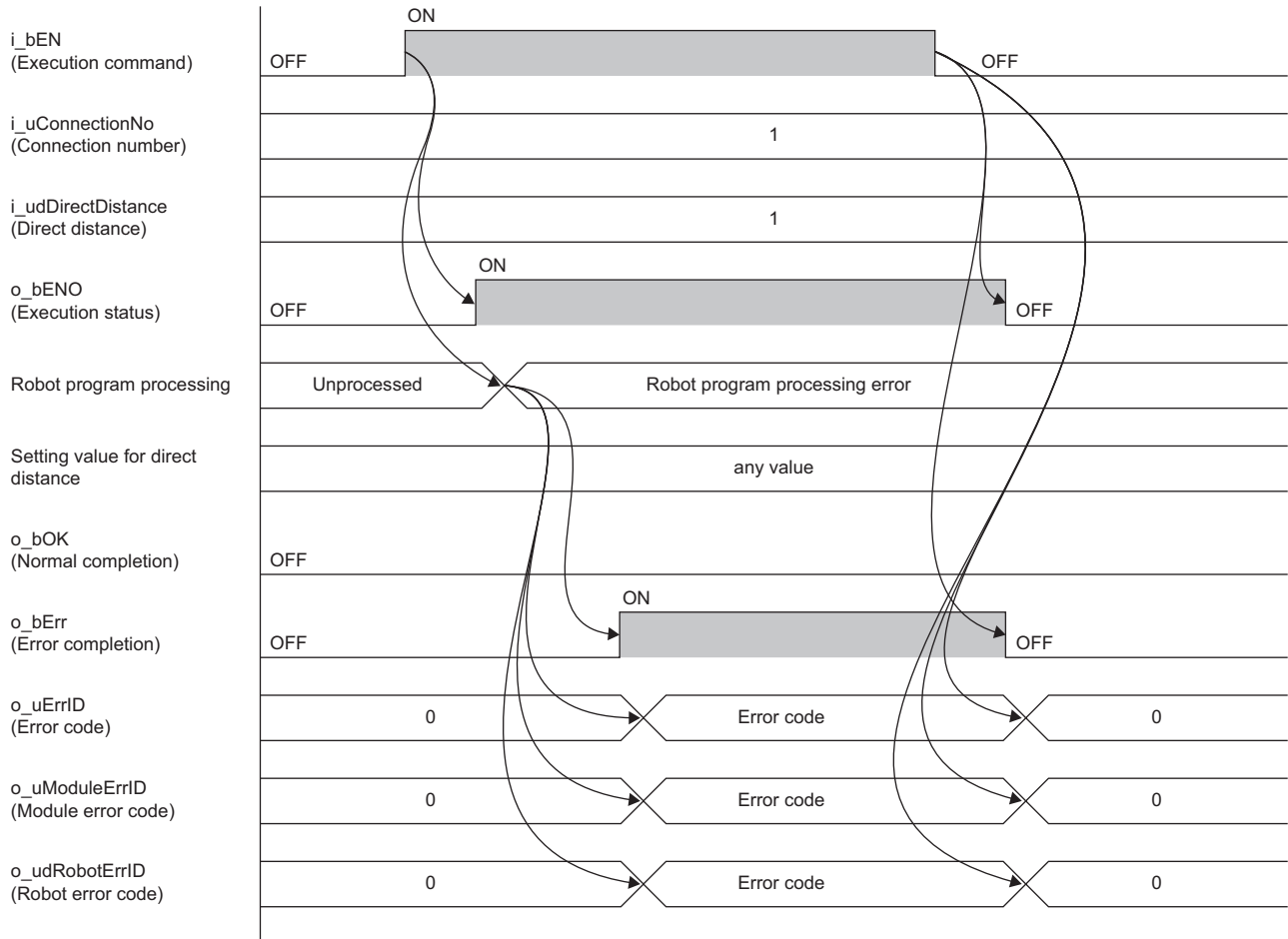
- If an error occurs in communication with the robot controller and this FB receives an error code, o_bErr (error completion) turns on and FFFFH is stored in o_uErrID (error code), then the processing of this FB is interrupted. In addition, the received error code is stored in o_udRobotErrID (robot error code). For error codes related to robots, refer to the robot manual.
- If any other error occurs, o_bErr (error completion) turns on and the processing of the FB is interrupted. ( Page 209 Error codes)

Timing chart of I/O signals

Normal completion



■ Error completion



Precautions

This FB uses SP.SOCSND and SP.SOCRCV. If an error occurs with these instructions, o_bErr (error completion) turns on and the processing of the FB is stopped. For details on each instruction, refer to the following.

📖 MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)

Performance values

The performance values are calculated including the FBs (such as M+ConnectionOpen_F) that are required to execute this FB.

Module	Measurement condition	Processing time	Maximum scan time	Number of scans
FX5S CPU module	1 robot controller	11.509ms	1.664ms	15 scans
FX5UJ CPU module	1 robot controller	13.659ms	1.433ms	19 scans
FX5U CPU module ^{*1*2}	1 robot controller	9.575ms	1.083ms	20 scans
FX5UC CPU module ^{*1*2}	1 robot controller	9.575ms	1.083ms	20 scans

*1 When the program capacity is set to 128K steps, the processing speed may become slow.

*2 The standard area is used for labels.

Error codes

Error code	Description	Action
100H	A value other than 1 and 4 is set for i_uConnectionNo (connection number).	After reviewing the settings, execute the FB again.
110H	A value other than 0 to 100000 is set for i_udDirectDistance (direct distance).	After reviewing the settings, execute the FB again.
200H	An error has occurred during socket communication.	Check the connection status, clear the error, and then execute the FB again.
FFFFH	An error has occurred during communication with the robot controller.	Check the robot status, clear the error, and then execute the FB again. For error codes related to robots, refer to the robot manual.

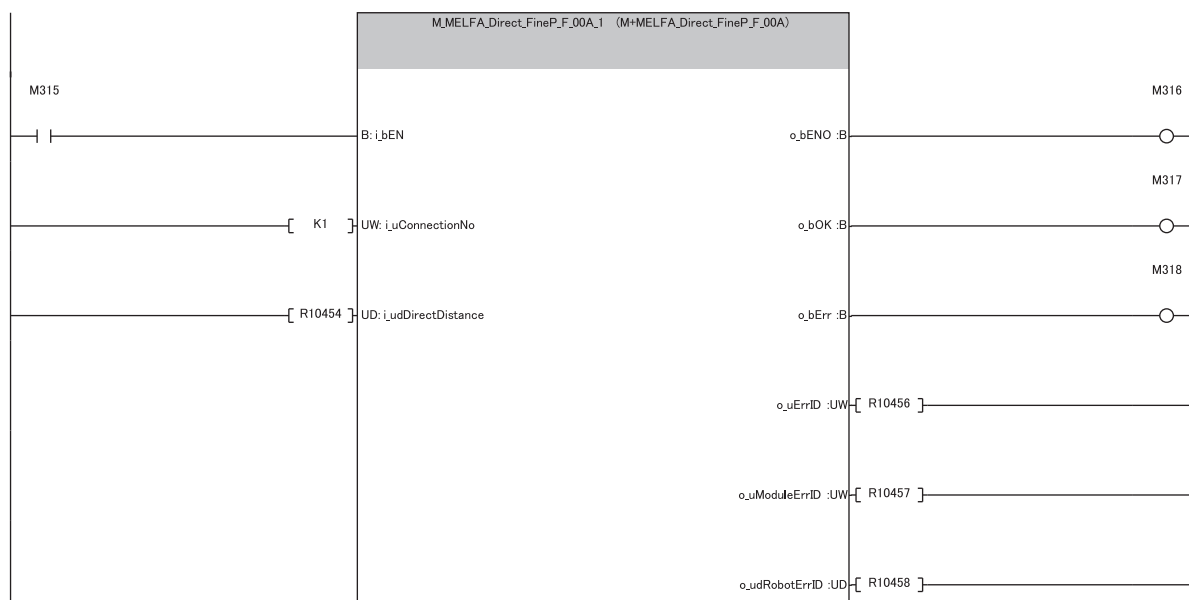
Example

The following shows an example of using this FB in a ladder program.

Devices used

Device	Application
M315	FB execution flag
R10454 to R10455	Direct distance specification device
M316	FB execution status display flag
M317	FB normal completion display flag
M318	FB error completion display flag
R10456	FB error code storage device
R10457	Module error code storage device
R10458 to R10459	Robot error code storage device

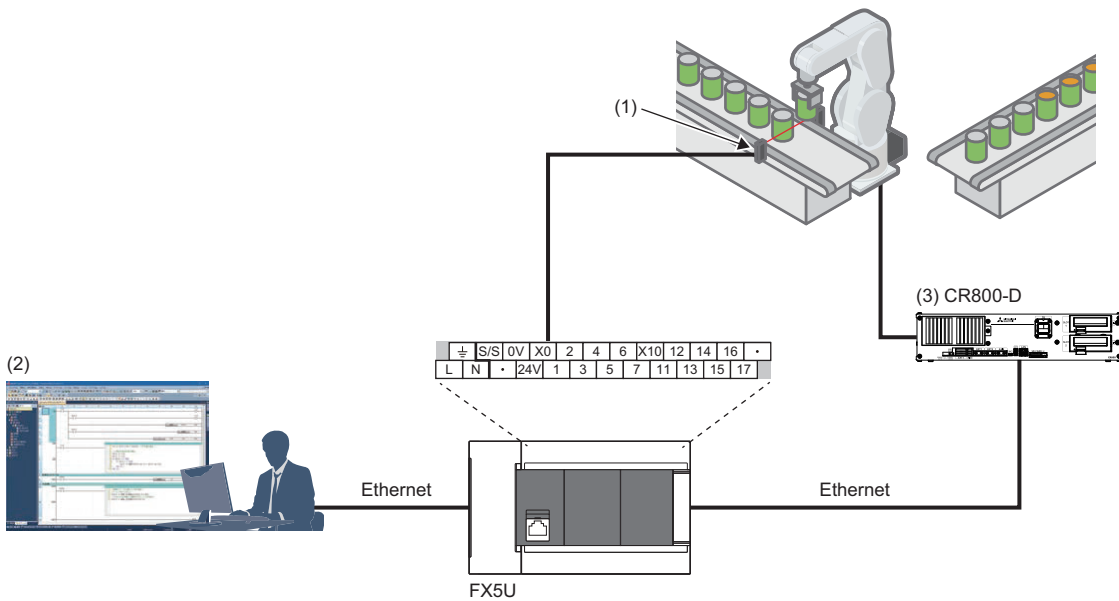
Program



Processing order	Processing details
1	When M315 is turned on, M316 turns on and the FB is executed for connection number 1.
2	The MELFA Basic Fine P instruction is executed with R10454 to R10455 as the setting values for the direct distance.
3	When an error such as a send error occurs, M318 turns on. At this time, the related error code is stored in the error code storage device.

4 OPERATION EXAMPLES

This chapter gives examples of operation using this FB library. It assumes a system where the robot grasps a workpiece carried in to a specific position on a loading conveyor and moves it to another unloading conveyor, as shown below.



- (1) Sensor
- (2) Personal computer for monitoring movement
- (3) CR800-D: Robot controller

Operation overview

1. A sensor detects the workpiece transported by the loading conveyor and stops the conveyor.
2. The workpiece is grasped by the robot and moved to the unloading conveyor.

■FB to be used

No.	FB name	Reference
1	M+MELFA_ConnectionOpen_F (connection establishment)	☞ Page 49 M+MELFA_ConnectionOpen_F (Connection Establishment)
2	M+MELFA_GetOperation_F (operation rights acquisition)	☞ Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition)
3	M+MELFA_Hand_F (robot hand operation)	☞ Page 118 M+MELFA_Hand_F (Robot Hand Operation)
4	M+MELFA_Direct_Mov_F (joint interpolation)	☞ Page 157 M+MELFA_Direct_Mov_F (Joint Interpolation)

Precautions

- When using the program examples in this chapter, verify in advance that they can be used safely in the applicable system.
- Robot programs controlled by the robot controller are not described. The customer needs to prepare robot programs in advance.
- Teaching work is required before controlling the robot. (☞ Page 212 Teaching Work)
- Wiring and program examples for devices other than robots are not described.
- The examples assume that the loading conveyor is operating.

4.1 Work Flow

The following shows the work flow using this FB.

1. Registration of FB library in GX Works3

For the FB library, please consult your local Mitsubishi Electric representative.

For the FB library registration method, refer to the following.

 GX Works3 Operating Manual

2. Wiring

Connect the robot controller and CPU module with a LAN cable.


3. Programmable controller parameter settings

Set the programmable controller parameters with GX Works3. ( Page 25 Programmable Controller Settings)

4. Robot controller parameter settings

Set the robot controller parameters with RT ToolBox3. ( Page 42 Robot Controller Settings)

5. Teaching work

Perform the teaching work. ( Page 212 Teaching Work)

6. Programmable controller program creation

Create a programmable controller program. ( Page 213 Programmable Controller Program Creation)

4.2 Teaching Work

- When moving a workpiece, it is necessary to perform the teaching work in advance to determine the position coordinates to move the robot arm. For the FB to use, refer to the following.

 Page 87 M+MELFA_VariableOperation_F (Variable Operation)

 Page 125 M+MELFA_Jog_F (Robot Jog Operation)

- This program uses the external variables P_DM(1) and P_DM(2) as position variables. Set P_DM(1) and P_DM(2) in advance to values appropriate for the system environment.
- P_DM(1) assumes the position coordinates where the sensor detects a workpiece on the loading conveyor, the workpiece stops, and the workpiece is grasped.
- P_DM(2) assumes the position coordinates where the workpiece is moved onto the unloading conveyor.

4.3 Programmable Controller Program Creation

Label and device lists

The following tables list the labels and devices used in the program.

Global labels

M_MELFA_Progress_F (Page 18 List of Global Labels)

Local labels

	Label Name	Data Type	Class	English(Display Target)
1	M_MELFA_ConnectionOpen_F_00A_1	M+MELFA_ConnectionOpen_F_00A	VAR	
2	M_MELFA_GetOperation_F_00A_1	M+MELFA_GetOperation_F_00A	VAR	
3	M_MELFA_Hand_F_00A_1	M+MELFA_Hand_F_00A	VAR	
4	M_MELFA_Direct_Mov_F_00A_1	M+MELFA_Direct_Mov_F_00A	VAR	

Devices

Related FB	Device	Description
M+MELFA_ConnectionOpen_F Page 49 M+MELFA_ConnectionOpen_F (Connection Establishment)	M200	FB execution flag
	M201	FB execution status display flag
	M202	FB normal completion display flag
	M203	FB error completion display flag
	R10000	FB error code storage device
	R10001	Module error code storage device
	R10002 to R10003	Robot error code storage device
M+MELFA_GetOperation_F Page 59 M+MELFA_GetOperation_F (Operation Rights Acquisition)	M204	FB execution flag
	M205	FB execution status display flag
	M206	FB normal completion display flag
	M207	FB error completion display flag
	R10004	FB error code storage device
	R10005	Module error code storage device
	R10006 to R10007	Robot error code storage device
M+MELFA_Hand_F Page 118 M+MELFA_Hand_F (Robot Hand Operation)	M208	FB execution flag
	M209	Hand open flag
	M210	Hand close flag
	R10008	Hand number specification device
	M211	FB execution status display flag
	M212	FB normal completion display flag
	M213	FB error completion display flag
	R10009	FB error code storage device
	R10010	Module error code storage device
	R10011 to R10012	Robot error code storage device
M+MELFA_Direct_Mov_F Page 157 M+MELFA_Direct_Mov_F (Joint Interpolation)	M214	FB execution flag
	R10013	Move target position specification device
	R10014	Approach distance specification device
	M215	FB execution status display flag
	M216	FB normal completion display flag
	M217	FB error completion display flag
	R10015	FB error code storage device
	R10016	Module error code storage device
	R10017 to R10018	Robot error code storage device
—	X0	Sensor detection bit
—	M218	Sensor input result holding device

Related FB	Device	Description
—	M219	Step 1 execution flag
—	M220	Step 2 execution flag
—	M221	Step 3 execution flag
—	R10200	Connection number storage device

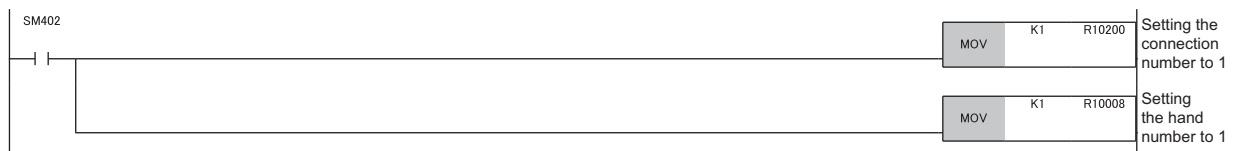
Program configuration

Item	Description
1. FB initial settings	Sets the initial values for executing each FB. (Page 214 FB initial settings)
2. Preparation for operation	<ul style="list-style-type: none"> Establishes a connection. (Page 215 Connection establishment) Acquires operation rights. (Page 215 Operation rights acquisition)
3. Stopping the loading conveyor	Stops the conveyor when a workpiece is detected. (Page 215 Stopping the loading conveyor)
4. Hand operation and workpiece movement (execution of joint interpolation)	■Step 1: Grasping a workpiece by hand <ul style="list-style-type: none"> Opens the hand with M+MELFA_Hand_F (robot hand operation). (Page 216 Hand operation) Moves it to the position of the workpiece detected by the sensor using M+MELFA_Direct_Mov_F (joint interpolation). (Page 217 Workpiece movement (execution of joint interpolation))
	■Step 2: Moving the workpiece to the unloading conveyor <ul style="list-style-type: none"> Closes the hand using M+MELFA_Hand_F (robot hand operation). (Page 216 Hand operation) Moves the workpiece to another conveyor using M+MELFA_Direct_Mov_F (joint interpolation). (Page 217 Workpiece movement (execution of joint interpolation))
	■Step 3: Releasing the workpiece <ul style="list-style-type: none"> Opens the hand with M+MELFA_Hand_F (robot hand operation). (Page 216 Hand operation)
5. Step transition processing	<ul style="list-style-type: none"> Changes the step transition process as well as process content. (Page 218 Step transition processing)

Program

FB initial settings

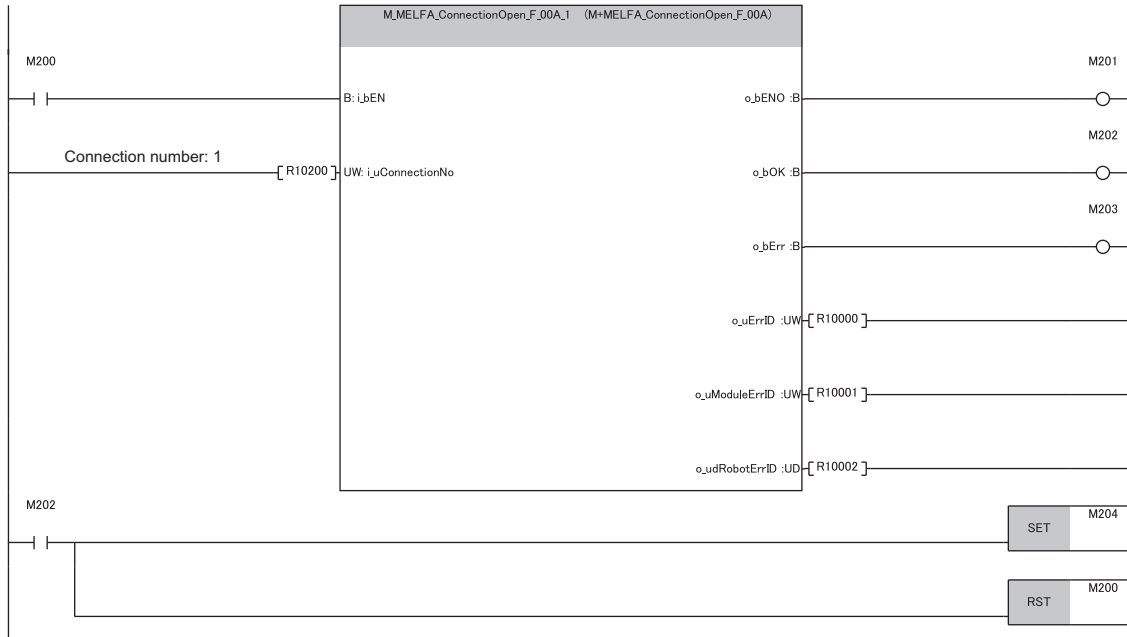
The connection number and hand number are set.



Preparation for operation

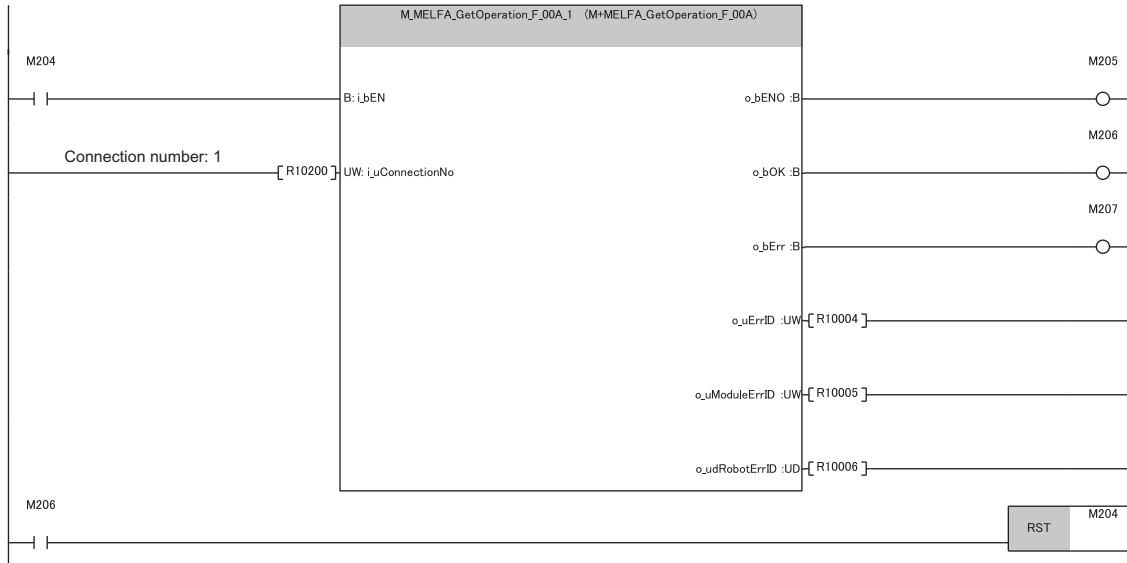
■ Connection establishment

When M200 starts up, a connection with the robot is established.



■ Operation rights acquisition

Robot operation rights are acquired by using M+MELFA_GetOperation_F (operation rights acquisition).



Stopping the loading conveyor

When the sensor turns on, input X0 is turned on and the sensor input result holding device M218 is turned on.

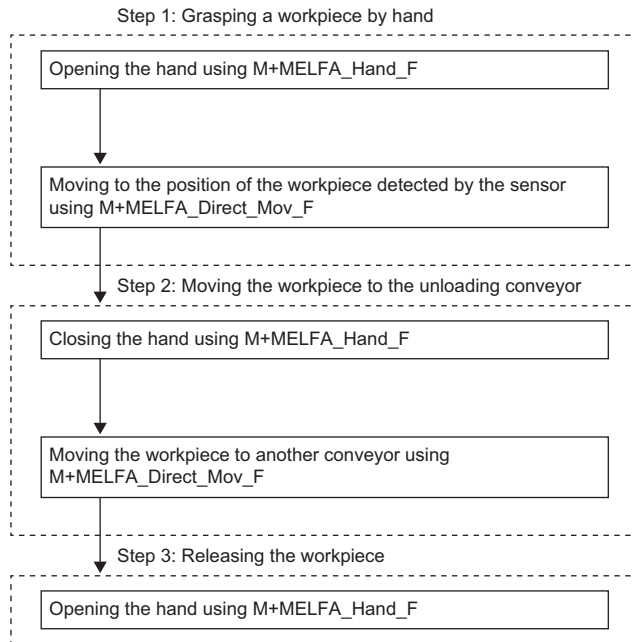
The loading conveyor will be stopped based on the information from M218. This program does not include programs to stop the loading conveyor.



Hand operation and workpiece movement (execution of joint interpolation)

Hand operation and workpiece movement (execution of joint interpolation) are performed in the following three steps.

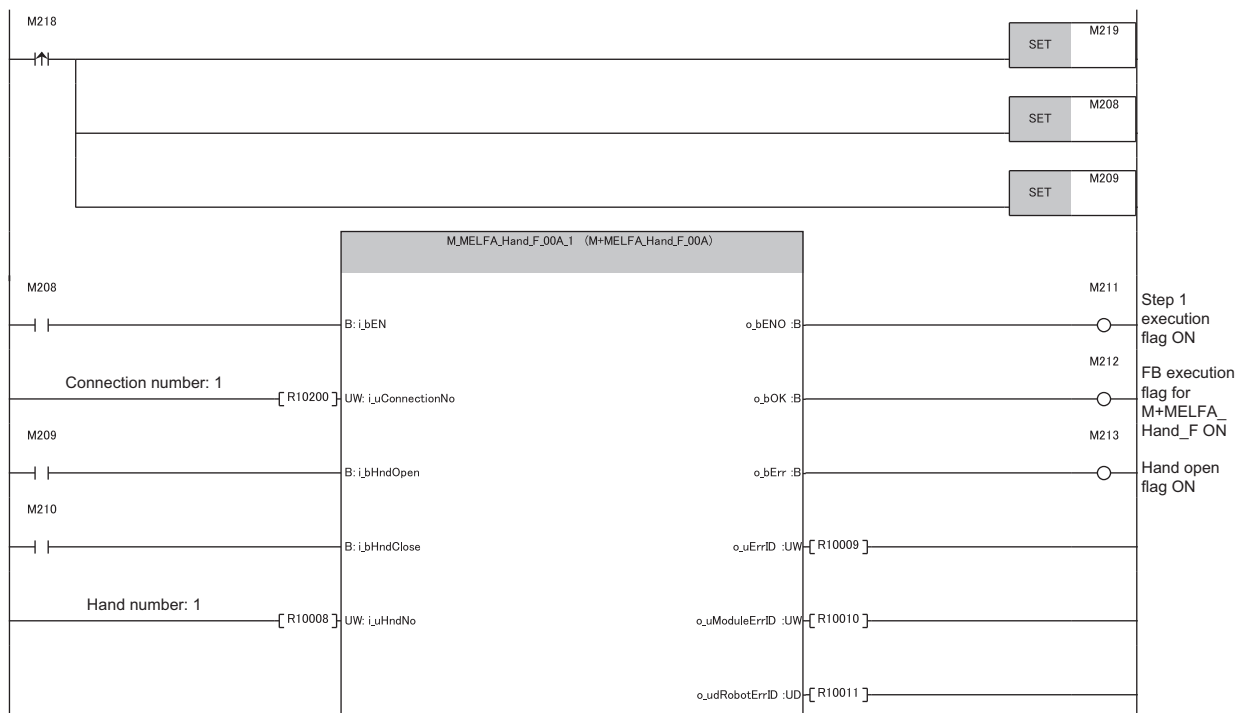
- Step 1: Grasping a workpiece by hand
- Step 2: Moving the workpiece to the unloading conveyor
- Step 3: Releasing the workpiece



■ Hand operation

M+MELFA_Hand_F (robot hand operation) opens and closes the robot hand. In this program, the contents executed differ depending on the steps described.

- Step 1: Hand open
- Step 2: Hand close
- Step 3: Hand open



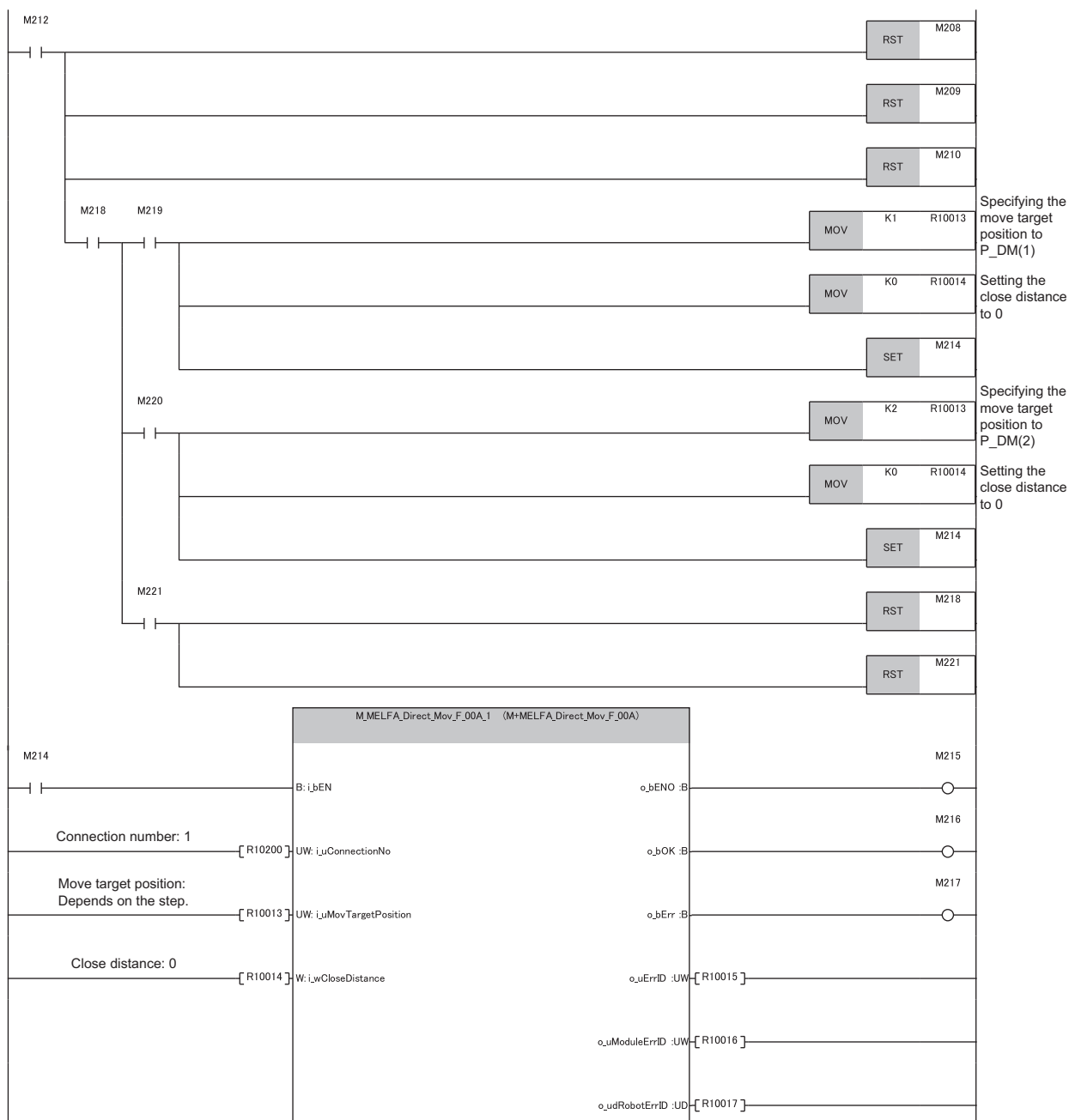
Workpiece movement (execution of joint interpolation)

M+MELFA_Direct_Mov_F (joint interpolation) moves the robot to the specified coordinates. In this program, one FB executes movement to multiple position coordinates. Therefore, the contents executed differ depending on the step described.

- Step 1: Moving to the position of the workpiece detected by the sensor
- Step 2: Moving the workpiece to another conveyor
- Step 3: —



In this chapter, to simplify the operation, the robot is moved directly to the workpiece without moving it to a close position above the workpiece. To move it above the workpiece, modify the program.



Step transition processing

Each time M+MELFA_Direct_Mov_F is executed, step transition processing is performed, and the processing contents by M+MELFA_Hand_F and M+MELFA_Direct_Mov_F are changed in the next scan and thereafter.



APPENDIX

Appendix 1 List of Devices Used

The following tables list the devices used in the FB libraries. The following device assignment can be changed in accordance with the environment because it is set for the FB libraries by default. Refer to the following when changing it.

☞ Page 25 Programmable Controller Settings

M+MELFA_RealTimeMonitor_F (real-time monitor)

■Devices used for the predefined protocol support function

Protocol No.	Element No.	Devises used	Robot connection	Description
12	3	R15000	First robot	Real-time monitor function send packet Return data type 1
	6	R15001	First robot	Real-time monitor function send packet Input signal head bit No.
	7	R15002	First robot	Real-time monitor function send packet Output signal head bit No.
	11	R15003	First robot	Real-time monitor function send packet Return data type 2
	14	R15004	First robot	Real-time monitor function send packet Return data type 3
	17	R15005	First robot	Real-time monitor function send packet Return data type 4
14	3	R15006	First robot	Real-time monitor function receive packet Return data type 1
	5	R15007 to R15026	First robot	Real-time monitor function receive packet Output data 1
	6	R15027	First robot	Real-time monitor function receive packet Input signal head bit No.
	7	R15028	First robot	Real-time monitor function receive packet Output signal head bit No.
	8	R15029 R15030	First robot	Real-time monitor function receive packet Input signal data
	9	R15031 R15032	First robot	Real-time monitor function receive packet Output signal data
	11	R15033	First robot	Real-time monitor function receive packet Return data type 2
	13	R15034 to R15053	First robot	Real-time monitor function receive packet Output data 2
	14	R15054	First robot	Real-time monitor function receive packet Return data type 3
	16	R15055 to R15074	First robot	Real-time monitor function receive packet Output data 3
	17	R15075	First robot	Real-time monitor function receive packet Return data type 4
	19	R15076 to R15095	First robot	Real-time monitor function receive packet Output data 4
26	3	R15096	Second robot	Real-time monitor function send packet Return data type 1
	6	R15097	Second robot	Real-time monitor function send packet Input signal head bit No.
	7	R15098	Second robot	Real-time monitor function send packet Output signal head bit No.
	11	R15099	Second robot	Real-time monitor function send packet Return data type 2
	14	R15100	Second robot	Real-time monitor function send packet Return data type 3
	17	R15101	Second robot	Real-time monitor function send packet Return data type 4
28	3	R15102	First robot	Real-time monitor function receive packet Return data type 1
	5	R15103 to R15122	First robot	Real-time monitor function receive packet Output data 1
	6	R15123	First robot	Real-time monitor function receive packet Input signal head bit No.
	7	R15124	First robot	Real-time monitor function receive packet Output signal head bit No.
	8	R15125 R15126	First robot	Real-time monitor function receive packet Input signal data
	9	R15127 R15128	First robot	Real-time monitor function receive packet Output signal data
	11	R15129	First robot	Real-time monitor function receive packet Return data type 2
	13	R15130 to R15149	First robot	Real-time monitor function receive packet Output data 2
	14	R15150	First robot	Real-time monitor function receive packet Return data type 3
	16	R15151 to R15170	First robot	Real-time monitor function receive packet Output data 3
	17	R15171	First robot	Real-time monitor function receive packet Return data type 4
	19	R15172 R15191	First robot	Real-time monitor function receive packet Output data 4

■Devices assigned to receive data transfer destination global label

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype1_MELFA_F	eCoord_X	R16000	R16020	XYZ coordinate data X component
	eCoord_Y	R16002	R16022	XYZ coordinate data Y component
	eCoord_Z	R16004	R16024	XYZ coordinate data Z component
	eCoord_A	R16006	R16026	XYZ coordinate data A component
	eCoord_B	R16008	R16028	XYZ coordinate data B component
	eCoord_C	R16010	R16030	XYZ coordinate data C component
	eCoord_L1	R16012	R16032	XYZ coordinate data L1 component (additional axis 1)
	eCoord_L2	R16014	R16034	XYZ coordinate data L2 component (additional axis 2)
	udFL1	R16016	R16036	XYZ coordinate data FL1 (structure flag 1)
	udFL2	R16018	R16038	XYZ coordinate data FL2 (structure flag 2)
G_stDatetype2_MELFA_F	eCoord_J1	R16040 R16041	R16056 R16057	JOINT coordinate data J1 component
	eCoord_J2	R16042 R16043	R16058 R16059	JOINT coordinate data J2 component
	eCoord_J3	R16044 R16045	R16060 R16061	JOINT coordinate data J3 component
	eCoord_J4	R16046 R16047	R16062 R16063	JOINT coordinate data J4 component
	eCoord_J5	R16048 R16049	R16064 R16065	JOINT coordinate data J5 component
	eCoord_J6	R16050 R16051	R16066 R16067	JOINT coordinate data J6 component
	eCoord_J7	R16052 R16053	R16068 R16069	JOINT coordinate data J7 component
	eCoord_J8	R16054 R16055	R16070 R16071	JOINT coordinate data J8 component
G_stDatetype3_MELFA_F	dCoord_M1	R16072 R16073	R16088 R16089	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16074 R16075	R16090 R16091	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16076 R16077	R16092 R16093	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16078 R16079	R16094 R16095	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16080 R16081	R16096 R16097	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16082 R16083	R16098 R16099	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16084 R16085	R16100 R16101	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16086 R16087	R16102 R16103	Motor pulse coordinate data or current data [0.1% rating] M8 component

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype7_MELFA_F	eCoord_X	R16104 R16105	R16124 R16125	XYZ coordinate data X component
	eCoord_Y	R16106 R16107	R16126 R16127	XYZ coordinate data Y component
	eCoord_Z	R16108 R16109	R16128 R16129	XYZ coordinate data Z component
	eCoord_A	R16110 R16111	R16130 R16131	XYZ coordinate data A component
	eCoord_B	R16112 R16113	R16132 R16133	XYZ coordinate data B component
	eCoord_C	R16114 R16115	R16134 R16135	XYZ coordinate data C component
	eCoord_L1	R16116 R16117	R16136 R16137	XYZ coordinate data L1 component (additional axis 1)
	eCoord_L2	R16118 R16119	R16138 R16139	XYZ coordinate data L2 component (additional axis 2)
	udFL1	R16120 R16121	R16140 R16141	XYZ coordinate data FL1 (structure flag 1)
	udFL2	R16122 R16123	R16142 R16143	XYZ coordinate data FL2 (structure flag 2)
G_stDatetype8_MELFA_F	eCoord_J1	R16144 R16145	R16160 R16161	JOINT coordinate data J1 component
	eCoord_J2	R16146 R16147	R16162 R16163	JOINT coordinate data J2 component
	eCoord_J3	R16148 R16149	R16164 R16165	JOINT coordinate data J3 component
	eCoord_J4	R16150 R16151	R16166 R16167	JOINT coordinate data J4 component
	eCoord_J5	R16152 R16153	R16168 R16169	JOINT coordinate data J5 component
	eCoord_J6	R16154 R16155	R16170 R16171	JOINT coordinate data J6 component
	eCoord_J7	R16156 R16157	R16172 R16173	JOINT coordinate data J7 component
	eCoord_J8	R16158 R16159	R16174 R16175	JOINT coordinate data J8 component
G_stDatetype9_MELFA_F	dCoord_M1	R16176 R16177	R16192 R16193	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16178 R16179	R16194 R16195	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16180 R16181	R16196 R16197	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16182 R16183	R16198 R16199	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16184 R16185	R16200 R16201	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16186 R16187	R16202 R16203	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16188 R16189	R16204 R16205	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16190 R16191	R16206 R16207	Motor pulse coordinate data or current data [0.1% rating] M8 component



Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype10_MELFA_F	dCoord_M1	R16208 R16209	R16224 R16225	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16210 R16211	R16226 R16227	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16212 R16213	R16228 R16229	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16214 R16215	R16230 R16231	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16216 R16217	R16232 R16233	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16218 R16219	R16234 R16235	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16220 R16221	R16236 R16237	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16222 R16223	R16238 R16239	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype11_MELFA_F	dCoord_M1	R16240 R16241	R16256 R16257	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16242 R16243	R16258 R16259	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16244 R16245	R16260 R16261	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16246 R16247	R16262 R16263	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16248 R16249	R16264 R16265	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16250 R16251	R16266 R16267	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16252 R16253	R16268 R16269	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16254 R16255	R16270 R16271	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype12_MELFA_F	eFeedbackSpeed	R16272 R16273	R16292 R16293	Current tool center point speed (feedback value)
	eFeedbackDistance	R16274 R16275	R16294 R16295	Remaining distance (feedback value) for the operation in progress
	eCommandSpeed	R16276 R16277	R16296 R16297	Current tool center point speed (CMD)
	eCommandDistance	R16278 R16279	R16298 R16299	Remaining distance (CMD) for the operation in progress
	eGap	R16280 R16281	R16300 R16301	Difference between the commanded position and the feedback position
	uTransportFactor	R16282	R16302	Arrival rate (CMD) to the target position
	uAccelerationstate	R16283	R16303	Acceleration state (CMD)
	uStepNumber	R16284	R16304	Step No.
	sProgramName	R16285 to R16288	R16305 to R16308	Program name
	uContTemp	R16289	R16309	In-panel temperature
udMonitorCounter	R16290 R16291	R16310 R16311	Operation counter	

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype13_MELFA_F	dCoord_M1	R16312 R16313	R16328 R16329	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16314 R16315	R16330 R16331	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16316 R16317	R16332 R16333	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16318 R16319	R16334 R16335	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16320 R16321	R16336 R16337	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16322 R16323	R16338 R16339	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16324 R16325	R16340 R16341	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16326 R16327	R16342 R16343	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype14_MELFA_F	dCoord_M1	R16344 R16345	R16360 R16361	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16346 R16347	R16362 R16363	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16348 R16349	R16364 R16365	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16350 R16351	R16366 R16367	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16352 R16353	R16368 R16369	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16354 R16355	R16370 R16371	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16356 R16357	R16372 R16373	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16358 R16359	R16374 R16375	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype15_MELFA_F	dCoord_M1	R16376 R16377	R16392 R16393	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16378 R16379	R16394 R16395	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16380 R16381	R16396 R16397	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16382 R16383	R16398 R16399	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16384 R16385	R16400 R16401	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16386 R16387	R16402 R16403	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16388 R16389	R16404 R16405	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16390 R16391	R16406 R16407	Motor pulse coordinate data or current data [0.1% rating] M8 component



Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype16_MELFA_F	eCoord_R1	R16408 R16409	R16424 R16425	Single-precision real number data Real number 1
	eCoord_R2	R16410 R16411	R16426 R16427	Single-precision real number data Real number 2
	eCoord_R3	R16412 R16413	R16428 R16429	Single-precision real number data Real number 3
	eCoord_R4	R16414 R16415	R16430 R16431	Single-precision real number data Real number 4
	eCoord_R5	R16416 R16417	R16432 R16433	Single-precision real number data Real number 5
	eCoord_R6	R16418 R16419	R16434 R16435	Single-precision real number data Real number 6
	eCoord_R7	R16420 R16421	R16436 R16437	Single-precision real number data Real number 7
	eCoord_R8	R16422 R16423	R16438 R16439	Single-precision real number data Real number 8
G_stDatetype17_MELFA_F	dCoord_M1	R16440 R16441	R16456 R16457	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16442 R16443	R16458 R16459	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16444 R16445	R16460 R16461	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16446 R16447	R16462 R16463	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16448 R16449	R16464 R16465	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16450 R16451	R16466 R16467	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16452 R16453	R16468 R16469	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16454 R16455	R16470 R16471	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype18_MELFA_F	dCoord_M1	R16472 R16473	R16488 R16489	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16474 R16475	R16490 R16491	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16476 R16477	R16492 R16493	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16478 R16479	R16494 R16495	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16480 R16481	R16496 R16497	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16482 R16483	R16498 R16499	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16484 R16485	R16500 R16501	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16486 R16487	R16502 R16503	Motor pulse coordinate data or current data [0.1% rating] M8 component

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype19_MELFA_F	dCoord_M1	R16504 R16505	R16520 R16521	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16506 R16507	R16522 R16523	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16508 R16509	R16524 R16525	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16510 R16511	R16526 R16527	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16512 R16513	R16528 R16529	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16514 R16515	R16530 R16531	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16516 R16517	R16532 R16533	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16518 R16519	R16534 R16535	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype20_MELFA_F	dCoord_M1	R16536 R16537	R16552 R16553	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16538 R16539	R16554 R16555	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16540 R16541	R16556 R16557	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16542 R16543	R16558 R16559	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16544 R16545	R16560 R16561	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16546 R16547	R16562 R16563	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16548 R16549	R16564 R16565	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16550 R16551	R16566 R16567	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype21_MELFA_F	dCoord_M1	R16568 R16569	R16584 R16585	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16570 R16571	R16586 R16587	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16572 R16573	R16588 R16589	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16574 R16575	R16590 R16591	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16576 R16577	R16592 R16593	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16578 R16579	R16594 R16595	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16580 R16581	R16596 R16597	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16582 R16583	R16598 R16599	Motor pulse coordinate data or current data [0.1% rating] M8 component



Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype22_MELFA_F	dCoord_M1	R16600 R16601	R16616 R16617	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16602 R16603	R16618 R16619	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16604 R16605	R16620 R16621	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16606 R16607	R16622 R16623	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16608 R16609	R16624 R16625	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16610 R16611	R16626 R16627	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16612 R16613	R16628 R16629	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16614 R16615	R16630 R16631	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype23_MELFA_F	dCoord_M1	R16632 R16633	R16648 R16649	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16634 R16635	R16650 R16651	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16636 R16637	R16652 R16653	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16638 R16639	R16654 R16655	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16640 R16641	R16656 R16657	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16642 R16643	R16658 R16659	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16644 R16645	R16660 R16661	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16646 R16647	R16662 R16663	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype101_MELFA_F	eCoord_R1	R16664 R16665	R16676 R16677	Force sensor data [N, Nm] F1 component
	eCoord_R2	R16666 R16667	R16678 R16679	Force sensor data [N, Nm] F2 component
	eCoord_R3	R16668 R16669	R16680 R16681	Force sensor data [N, Nm] F3 component
	eCoord_R4	R16670 R16671	R16682 R16683	Force sensor data [N, Nm] F4 component
	eCoord_R5	R16672 R16673	R16684 R16685	Force sensor data [N, Nm] F5 component
	eCoord_R6	R16674 R16675	R16686 R16687	Force sensor data [N, Nm] F6 component
G_stDatetype102_MELFA_F	eCoord_R1	R16688 R16689	R16700 R16701	Force sensor data [N, Nm] F1 component
	eCoord_R2	R16690 R16691	R16702 R16703	Force sensor data [N, Nm] F2 component
	eCoord_R3	R16692 R16693	R16704 R16705	Force sensor data [N, Nm] F3 component
	eCoord_R4	R16694 R16695	R16706 R16707	Force sensor data [N, Nm] F4 component
	eCoord_R5	R16696 R16697	R16708 R16709	Force sensor data [N, Nm] F5 component
	eCoord_R6	R16698 R16699	R16710 R16711	Force sensor data [N, Nm] F6 component

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype103_MELFA_F	eCoord_R1	R16712 R16713	R16724 R16725	Force sensor data [N, Nm] F1 component
	eCoord_R2	R16714 R16715	R16726 R16727	Force sensor data [N, Nm] F2 component
	eCoord_R3	R16716 R16717	R16728 R16729	Force sensor data [N, Nm] F3 component
	eCoord_R4	R16718 R16719	R16730 R16731	Force sensor data [N, Nm] F4 component
	eCoord_R5	R16720 R16721	R16732 R16733	Force sensor data [N, Nm] F5 component
	eCoord_R6	R16722 R16723	R16734 R16735	Force sensor data [N, Nm] F6 component
G_stDatetype104_MELFA_F	eCoord_X	R16736 R16737	R16756 R16757	XYZ coordinate data X component
	eCoord_Y	R16738 R16739	R16758 R16759	XYZ coordinate data Y component
	eCoord_Z	R16740 R16741	R16760 R16761	XYZ coordinate data Z component
	eCoord_A	R16742 R16743	R16762 R16763	XYZ coordinate data A component
	eCoord_B	R16744 R16745	R16764 R16765	XYZ coordinate data B component
	eCoord_C	R16746 R16747	R16766 R16767	XYZ coordinate data C component
	eCoord_L1	R16748 R16749	R16768 R16769	XYZ coordinate data L1 component (additional axis 1)
	eCoord_L2	R16750 R16751	R16770 R16771	XYZ coordinate data L2 component (additional axis 2)
	udFL1	R16752 R16753	R16772 R16773	XYZ coordinate data FL1 (structure flag 1)
	udFL2	R16754 R16755	R16774 R16775	XYZ coordinate data FL2 (structure flag 2)
G_stDatetype111_MELFA_F	dCoord_M1	R16776 R16777	R16792 R16793	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16778 R16779	R16794 R16795	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16780 R16781	R16796 R16797	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16782 R16783	R16798 R16799	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16784 R16785	R16800 R16801	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16786 R16787	R16802 R16803	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16788 R16789	R16804 R16805	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16790 R16791	R16806 R16807	Motor pulse coordinate data or current data [0.1% rating] M8 component



Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype112_MELFA_F	dCoord_M1	R16808 R16809	R16824 R16825	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16810 R16811	R16826 R16827	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16812 R16813	R16828 R16829	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16814 R16815	R16830 R16831	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16816 R16817	R16832 R16833	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16818 R16819	R16834 R16835	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16820 R16821	R16836 R16837	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16822 R16823	R16838 R16839	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype113_MELFA_F	dCoord_M1	R16840 R16841	R16858 R16859	Motor pulse coordinate data or current data [0.1% rating] M1 component
	dCoord_M2	R16842 R16843	R16860 R16861	Motor pulse coordinate data or current data [0.1% rating] M2 component
	dCoord_M3	R16844 R16845	R16862 R16863	Motor pulse coordinate data or current data [0.1% rating] M3 component
	dCoord_M4	R16846 R16847	R16864 R16865	Motor pulse coordinate data or current data [0.1% rating] M4 component
	dCoord_M5	R16848 R16849	R16866 R16867	Motor pulse coordinate data or current data [0.1% rating] M5 component
	dCoord_M6	R16850 R16851	R16868 R16869	Motor pulse coordinate data or current data [0.1% rating] M6 component
	dCoord_M7	R16852 R16853	R16870 R16871	Motor pulse coordinate data or current data [0.1% rating] M7 component
	dCoord_M8	R16854 R16855	R16872 R16873	Motor pulse coordinate data or current data [0.1% rating] M8 component
G_stDatetype1001_MELFA_F	eCoord_X	R16872 R16873	R16892 R16893	XYZ coordinate data X component
	eCoord_Y	R16874 R16875	R16894 R16895	XYZ coordinate data Y component
	eCoord_Z	R16876 R16877	R16896 R16897	XYZ coordinate data Z component
	eCoord_A	R16878 R16879	R16898 R16899	XYZ coordinate data A component
	eCoord_B	R16880 R16881	R16900 R16901	XYZ coordinate data B component
	eCoord_C	R16882 R16883	R16902 R16903	XYZ coordinate data C component
	eCoord_L1	R16884 R16885	R16904 R16905	XYZ coordinate data L1 component (additional axis 1)
	eCoord_L2	R16886 R16887	R16906 R16907	XYZ coordinate data L2 component (additional axis 2)
	udFL1	R16888 R16889	R16908 R16909	XYZ coordinate data FL1 (structure flag 1)
	udFL2	R16890 R16891	R16910 R16911	XYZ coordinate data FL2 (structure flag 2)

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype1002_MELFA_F	eCoord_J1	R16912 R16913	R16928 R16929	JOINT coordinate data J1 component
	eCoord_J2	R16914 R16915	R16930 R16931	JOINT coordinate data J2 component
	eCoord_J3	R16916 R16917	R16932 R16933	JOINT coordinate data J3 component
	eCoord_J4	R16918 R16919	R16934 R16935	JOINT coordinate data J4 component
	eCoord_J5	R16920 R16921	R16936 R16937	JOINT coordinate data J5 component
	eCoord_J6	R16922 R16923	R16938 R16939	JOINT coordinate data J6 component
	eCoord_J7	R16924 R16925	R16940 R16941	JOINT coordinate data J7 component
	eCoord_J8	R16926 R16927	R16942 R16943	JOINT coordinate data J8 component
G_stDatetype1007_MELFA_F	eCoord_X	R16944 R16945	R16964 R16965	XYZ coordinate data X component
	eCoord_Y	R16946 R16947	R16966 R16967	XYZ coordinate data Y component
	eCoord_Z	R16948 R16949	R16968 R16969	XYZ coordinate data Z component
	eCoord_A	R16950 R16951	R16970 R16971	XYZ coordinate data A component
	eCoord_B	R16952 R16953	R16972 R16973	XYZ coordinate data B component
	eCoord_C	R16954 R16955	R16974 R16975	XYZ coordinate data C component
	eCoord_L1	R16956 R16957	R16976 R16977	XYZ coordinate data L1 component (additional axis 1)
	eCoord_L2	R16958 R16959	R16978 R16979	XYZ coordinate data L2 component (additional axis 2)
	udFL1	R16960 R16961	R16980 R16981	XYZ coordinate data FL1 (structure flag 1)
	udFL2	R16962 R16963	R16982 R16983	XYZ coordinate data FL2 (structure flag 2)
G_stDatetype1008_MELFA_F	eCoord_J1	R16984 R16985	R17000 R17001	JOINT coordinate data J1 component
	eCoord_J2	R16986 R16987	R17002 R17003	JOINT coordinate data J2 component
	eCoord_J3	R16988 R16989	R17004 R17005	JOINT coordinate data J3 component
	eCoord_J4	R16990 R16991	R17006 R17007	JOINT coordinate data J4 component
	eCoord_J5	R16992 R16993	R17008 R17009	JOINT coordinate data J5 component
	eCoord_J6	R16994 R16995	R17010 R17011	JOINT coordinate data J6 component
	eCoord_J7	R16996 R16997	R17012 R17013	JOINT coordinate data J7 component
	eCoord_J8	R16998 R16999	R17014 R17015	JOINT coordinate data J8 component



Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype1010_MELFA_F	eCoord_R1	R17016 R17017	R17032 R17033	Single-precision real number data Real number 1
	eCoord_R2	R17018 R17019	R17034 R17035	Single-precision real number data Real number 2
	eCoord_R3	R17020 R17021	R17036 R17037	Single-precision real number data Real number 3
	eCoord_R4	R17022 R17023	R17038 R17039	Single-precision real number data Real number 4
	eCoord_R5	R17024 R17025	R17040 R17041	Single-precision real number data Real number 5
	eCoord_R6	R17026 R17027	R17042 R17043	Single-precision real number data Real number 6
	eCoord_R7	R17028 R17029	R17044 R17045	Single-precision real number data Real number 7
	eCoord_R8	R17030 R17031	R17046 R17047	Single-precision real number data Real number 8
G_stDatetype1011_MELFA_F	eCoord_R1	R17048 R17049	R17064 R17065	Single-precision real number data Real number 1
	eCoord_R2	R17050 R17051	R17066 R17067	Single-precision real number data Real number 2
	eCoord_R3	R17052 R17053	R17068 R17069	Single-precision real number data Real number 3
	eCoord_R4	R17054 R17055	R17070 R17071	Single-precision real number data Real number 4
	eCoord_R5	R17056 R17057	R17072 R17073	Single-precision real number data Real number 5
	eCoord_R6	R17058 R17059	R17074 R17075	Single-precision real number data Real number 6
	eCoord_R7	R17060 R17061	R17076 R17077	Single-precision real number data Real number 7
	eCoord_R8	R17062 R17063	R17078 R17079	Single-precision real number data Real number 8
G_stDatetype1012_MELFA_F	eCoord_R1	R17080 R17081	R17096 R17097	Single-precision real number data Real number 1
	eCoord_R2	R17082 R17083	R17098 R17099	Single-precision real number data Real number 2
	eCoord_R3	R17084 R17085	R17100 R17101	Single-precision real number data Real number 3
	eCoord_R4	R17086 R17087	R17102 R17103	Single-precision real number data Real number 4
	eCoord_R5	R17088 R17089	R17104 R17105	Single-precision real number data Real number 5
	eCoord_R6	R17090 R17091	R17106 R17107	Single-precision real number data Real number 6
	eCoord_R7	R17092 R17093	R17108 R17109	Single-precision real number data Real number 7
	eCoord_R8	R17094 R17095	R17110 R17111	Single-precision real number data Real number 8

Global label name	Structure element name	Devises used		Description
		First robot	Second robot	
G_stDatetype1013_MELFA_F	eCoord_R1	R17112 R17113	R17128 R17129	Single-precision real number data Real number 1
	eCoord_R2	R17114 R17115	R17130 R17131	Single-precision real number data Real number 2
	eCoord_R3	R17116 R17117	R17132 R17133	Single-precision real number data Real number 3
	eCoord_R4	R17118 R17119	R17134 R17135	Single-precision real number data Real number 4
	eCoord_R5	R17120 R17121	R17136 R17137	Single-precision real number data Real number 5
	eCoord_R6	R17122 R17123	R17138 R17139	Single-precision real number data Real number 6
	eCoord_R7	R17124 R17125	R17140 R17141	Single-precision real number data Real number 7
	eCoord_R8	R17126 R17127	R17142 R17143	Single-precision real number data Real number 8
G_stDatetype1014_MELFA_F	eCoord_R1	R17144 R17145	R17160 R17161	Single-precision real number data Real number 1
	eCoord_R2	R17146 R17147	R17162 R17163	Single-precision real number data Real number 2
	eCoord_R3	R17148 R17149	R17164 R17165	Single-precision real number data Real number 3
	eCoord_R4	R17150 R17151	R17166 R17167	Single-precision real number data Real number 4
	eCoord_R5	R17152 R17153	R17168 R17169	Single-precision real number data Real number 5
	eCoord_R6	R17154 R17155	R17170 R17171	Single-precision real number data Real number 6
	eCoord_R7	R17156 R17157	R17172 R17173	Single-precision real number data Real number 7
	eCoord_R8	R17158 R17159	R17174 R17175	Single-precision real number data Real number 8
G_stInOutsignal_MELFA_F	dInputSignal	R17176 R17177	R17180 R17181	Input signal data
	dOutputSignal	R17178 R17179	R17182 R17183	Output signal data



MEMO

INSTRUCTION INDEX

M

M+MELFA_ConnectionClose_F	54
M+MELFA_ConnectionOpen_F	49
M+MELFA_DedicatedInOut_F	133
M+MELFA_Direct_Accel_F	187
M+MELFA_Direct_Cnt_F	181
M+MELFA_Direct_FineP_F	205
M+MELFA_Direct_LoadSet_F	198
M+MELFA_Direct_Mov_F	157
M+MELFA_Direct_Mvs_F	163
M+MELFA_Direct_Oadl_F	193
M+MELFA_Direct_Spd_F	169,175
M+MELFA_GetOperation_F	59
M+MELFA_Hand_F	118
M+MELFA_InformationOperation_F	111
M+MELFA_Jog_F	125
M+MELFA_MaintenanceMonitor_F	81
M+MELFA_MaintenanceOperation_F	103
M+MELFA_Ovrd_F	144
M+MELFA_PosDataMonitor_F	76
M+MELFA_PrgSelect_F	139
M+MELFA_ProgramOperation_F	97
M+MELFA_RealTimeMonitor_F	150
M+MELFA_ReleaseOperation_F	64
M+MELFA_RobotStatusMonitor_F	69
M+MELFA_VariableOperation_F	87

MEMO

REVISIONS

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

Revision date	*Manual number	Description
April 2024	SH(NA)-082672ENG-A	First edition

Japanese manual number: SH-082671-A

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 2024 MITSUBISHI ELECTRIC CORPORATION

TRADEMARKS

The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

In some cases, trademark symbols such as [™] or [®] are not specified in this manual.

Manual Number: SH(NA)-082672ENG-A

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA 461-8670, JAPAN

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.