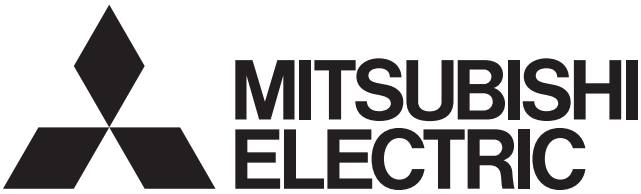


Programmable Controller

MR-JE-C Mapping Change Function Block Reference

CONTENTS

1 OVERVIEW

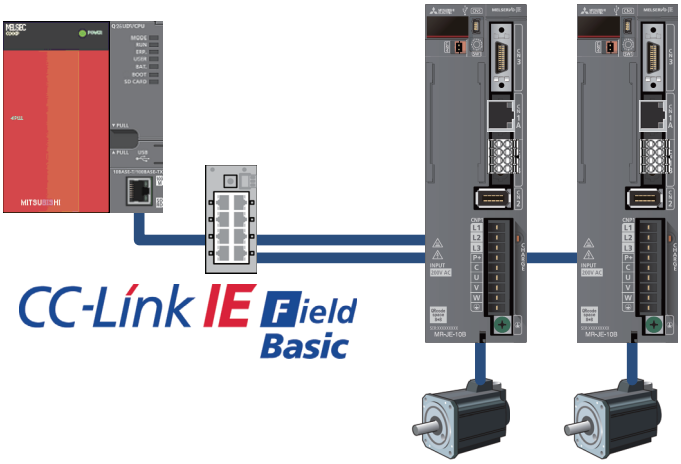
1.1 Introduction

This sample program is used to read/write objects of the servo amplifier MR-JE-C with SLMP.
With this program, data such as parameters can be read/written, and a mapping of link device responses message can be changed.

1.2 Applicable Hardware and Software

Applicable Hardware and Software	Description
CPU module	MELSEC-Q series CPU module Q**UDVCPU (First five digits of the serial No. are "18112" or later)
Slave unit	CC-Link IE Field Network Basic compatible MELSERVO-JE servo amplifier MR-JE-C
Engineering software	MELSOFT GX Works2 of version 1.560J or later

1.3 System Configuration Example



1.4 Relevant Manuals

- MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL [SH030257]
- MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL (CC-Link IE Field Network Basic) [SH030256]
- MELSERVO-JE Servo amplifier INSTRUCTION MANUAL (TROUBLE SHOOTING) [SH030166]
- QCPU User's Manual (Hardware Design, Maintenance and Inspection) [SH080483]
- QnUCPU User's Manual (Function Explanation, Program Fundamentals) [SH080807]
- SLMP Reference Manual [SH080956]
- GX Works2 Version1 Operating Manual (Common) [SH080779]

1.5 Notes

This manual does not include the information on restrictions for using CPU modules and the combination.
Please read the user's manuals of the products before using them.
Please note the following and use the programs and FBs described in this manual.

- When using the FBs in an actual system, confirm that the FBs do not cause system control problems.
- Consider the points where interlock conditions are required in the system and insert interlock conditions.
- Mitsubishi Electric Corporation will not compensate any damages caused by the FBs.
- Contents may be deleted or changed without prior notice.

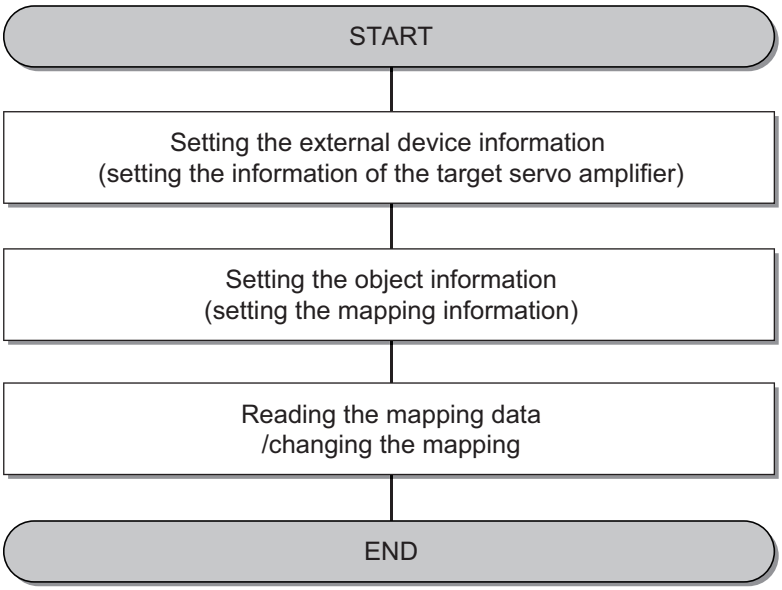
MEMO

2 FUNCTION DESCRIPTION

2.1 Sample Program

This sample program changes the mapping of the servo amplifier MR-JE-C.
The program uses the function blocks (FBs) for reading and writing objects of the servo amplifier.
The sample program is a structured project.

2.2 Sample Program Processing



2.3 Sample Program Configuration

File name	Description	Model	Engineering environment
ChangeMapping_Q.gxw	FBD, ST program	QnUDVCPU	MELSOFT GX Works2

List of programs

Program name	Description	Execution type	Description method
Sample/ReadMap	Mapping data reading sample program	Scan	FBD
Sample/ChangeMap	Mapping changing sample program	Scan	FBD
Sample/ServoObjectRW	Object reading/writing sample program	Scan	FBD

FB/FUN

FB name	Description
SVFB_ReadObject	Reads an object of a servo amplifier.
SVFB_WriteObject	Writes an object of a servo amplifier.
SVFB_ReadMultiObject	Reads multiple objects of a servo amplifier.
SVFB_WriteMultiObject	Writes multiple objects of a servo amplifier.

2.4 Mapping Change in Sample Program

This sample program adds the following items to the default mapping of the cyclic communication of the servo amplifier MR-JE-C and changes the mapping.

For details of the mapping and object data, refer to the MR-JE-_C SERVO AMPLIFIER INSTRUCTION MANUAL.

Servo amplifier → Master station (RWrn)			
Device No.	**Index**	**Name**	**Default/Additional**
RWrn00	6061	Control mode display	MR-JE-C default mapping
RWrn01	—	—	
RWrn02	6041	Control status	
RWrn03	6064	Current position (command unit)	
RWrn04			
RWrn05	606C	Current velocity	
RWrn06			
RWrn07	60F4	Droop pulse	
RWrn08			
RWrn09	6077	Current torque	
RWrn0A	2D11	Control output 1	
RWrn0B	2D12	Control output 2	
RWrn0C	2D13	Control output 3	
RWrn0D	2A42	Alarm No.	
RWrn0E	60B9	Touch probe function status	
RWrn0F	60BA	Touch probe 1 Position latched on the rising edge	
RWrn10			
RWrn11	60BB	Touch probe 1 Position latched on the falling edge	
RWrn12			
RWrn13	2C12	Input device status 1	
RWrn14			
RWrn15	2B09	Effective load ratio	Sample program additional mapping data
RWrn16	2B0A	Peak load ratio	
RWrn17	2B02	Servo motor speed [r/min]	
RWrn18			
RWrn19	2B0C	Position within one rotation	
RWwn1A			
RWwn1B	2B0F	Bus voltage	
RWwn1C	2B25	Internal temperature of encoder	
RWwn1D	2B2D	Module power consumption	
RWwn1E	2B2E	Module total power consumption	
RWwn1F			

2.5 Program Execution Procedure

1. Double-click the sample project "ChangeMapping_Q.gxw" and launch the programming tool.
2. Change the model settings according to the CPU type used.
3. Write all the sample data to the CPU module.
4. After writing the data, reset the CPU module.
5. Turn ON the execution command label in the sample program to execute the program.

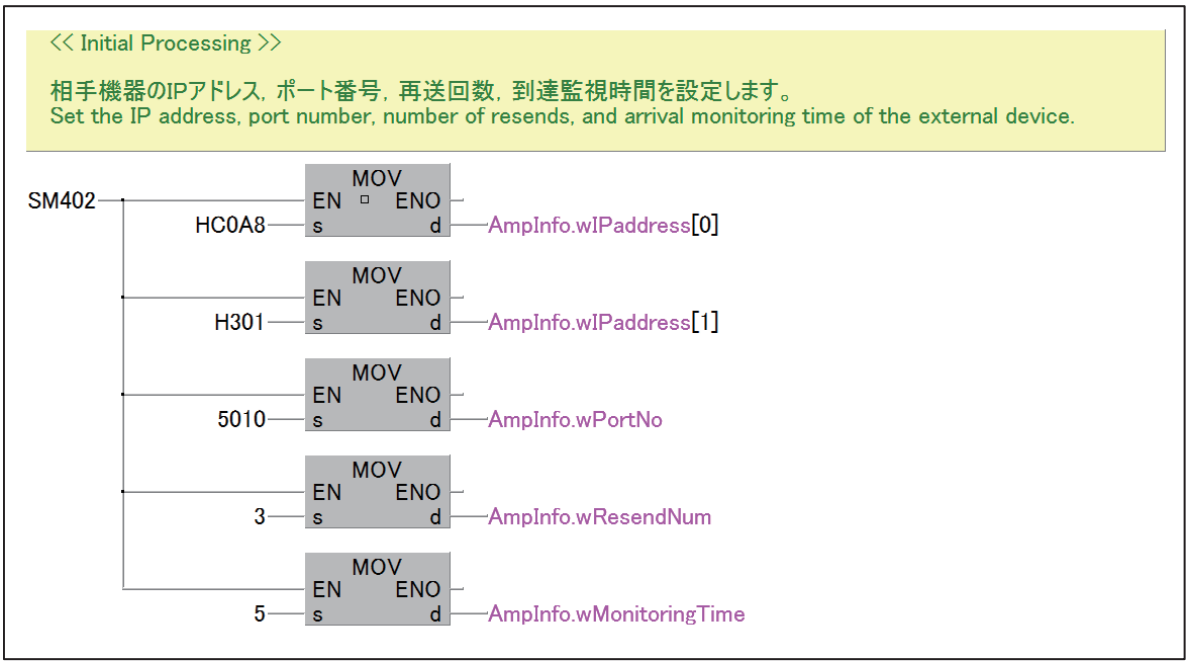
2.6 Program Details

Servo amplifier mapping data reading program (Sample/ReadMap)

1. Set the device information.

The IP address and port number of the servo amplifier are set in the External device information structure (AmpInfo) when the operating status of the CPU module is switched from STOP to RUN. Change the number of resends and arrival monitoring time as needed.

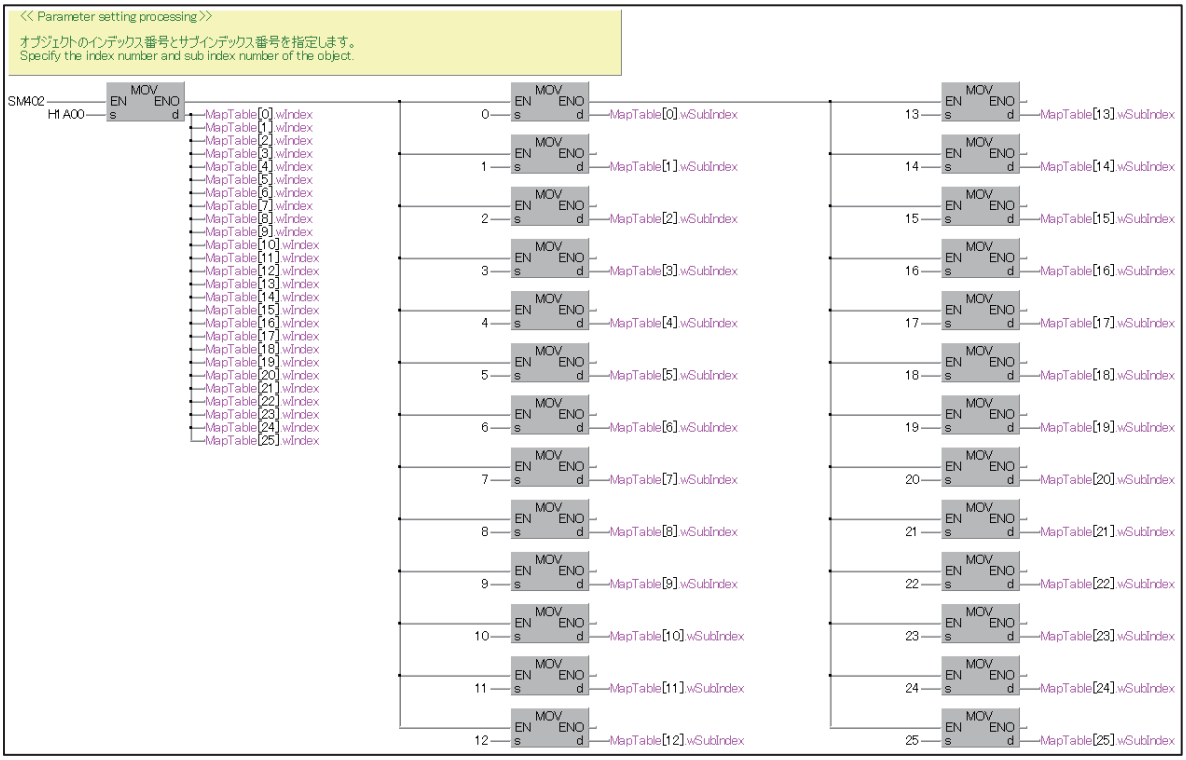
Example) IP address: 192.168.3.1, port number: 5010 (fixed for MR-JE-C)



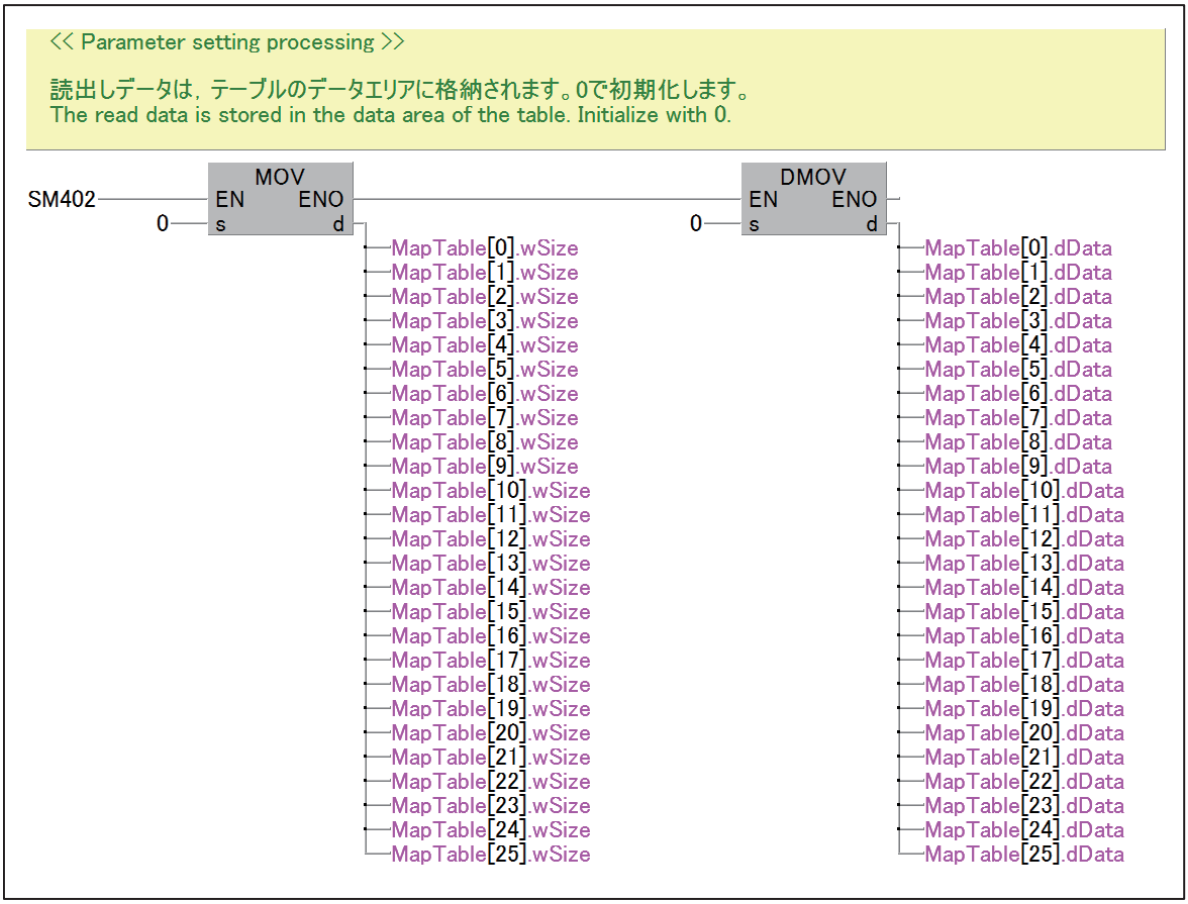
2. Set the object information.

The response message register object of the servo amplifier is set in the Object information structure (MapTable).

* The sample program initializes data of 26 objects.



The read data is stored in the data area of the table and initialized.

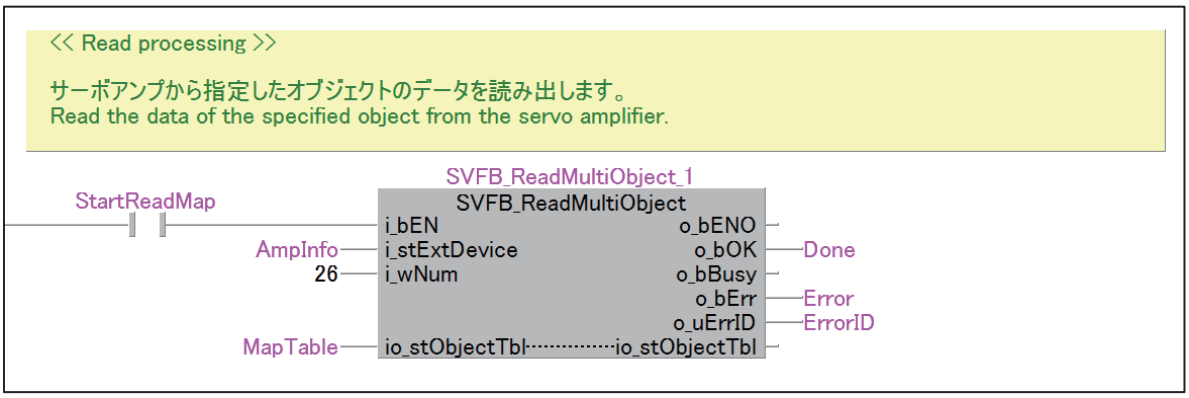


3. Read the mapping information.

The mapping information is read from the servo amplifier after the StartReadMap label is turned ON.

When the processing normally completes, the Done label turns ON.

* The sample program is designed to read data of 26 objects.

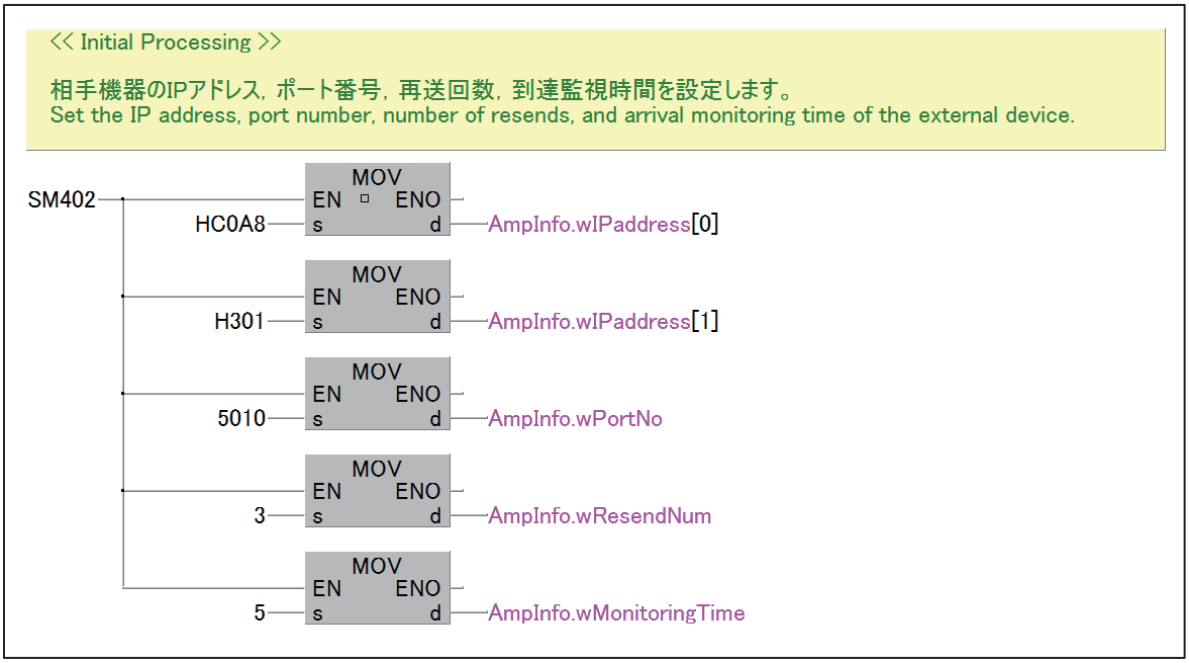


Servo amplifier mapping data changing program (Sample/ ChangeMap)

1. Set the device information.

The IP address and port number of the servo amplifier are set in the External device information structure (AmpInfo) when the operating status of the CPU module is switched from STOP to RUN. Change the number of resends and arrival monitoring time as needed.

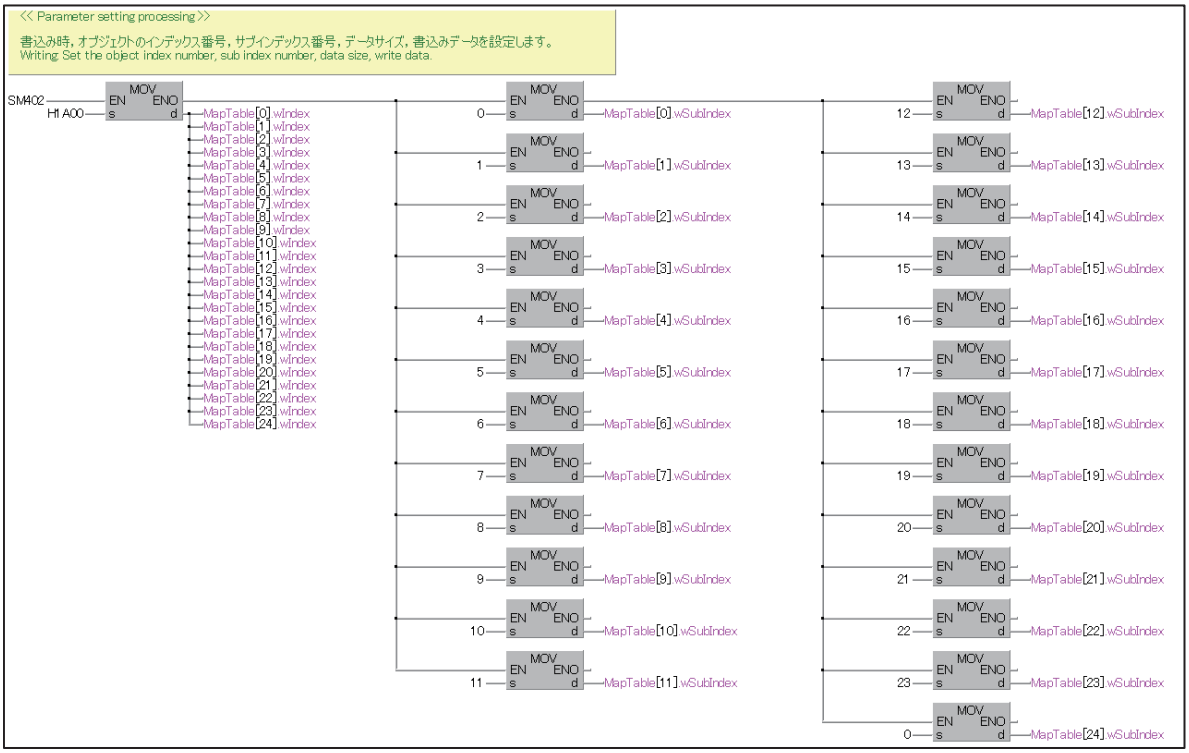
Example) IP address: 192.168.3.1, port number: 5010 (fixed for MR-JE-C)



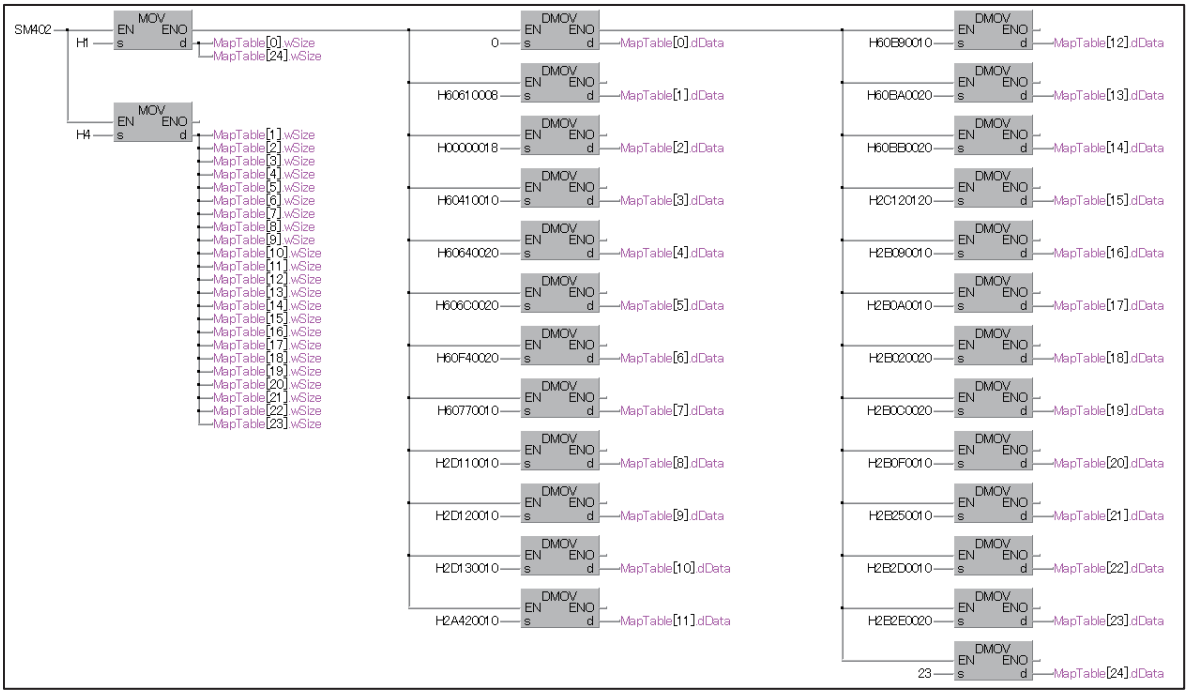
2. Set the object information.

The response message register object of the servo amplifier is set in the Object information structure (MapTable).

* The sample program specifies data of 25 objects.



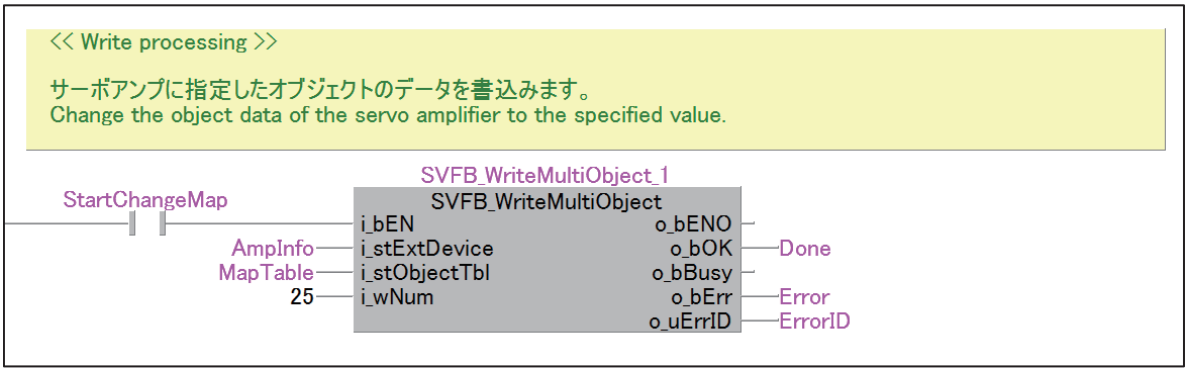
The start [0] and end [24] of the table set the number of components, and [1] to [23] set the mapping data.



3. Write the mapping information.

The mapping information of the servo amplifier is written after the StartChangeMap label is turned ON.

When the processing normally completes, the Done label turns ON.

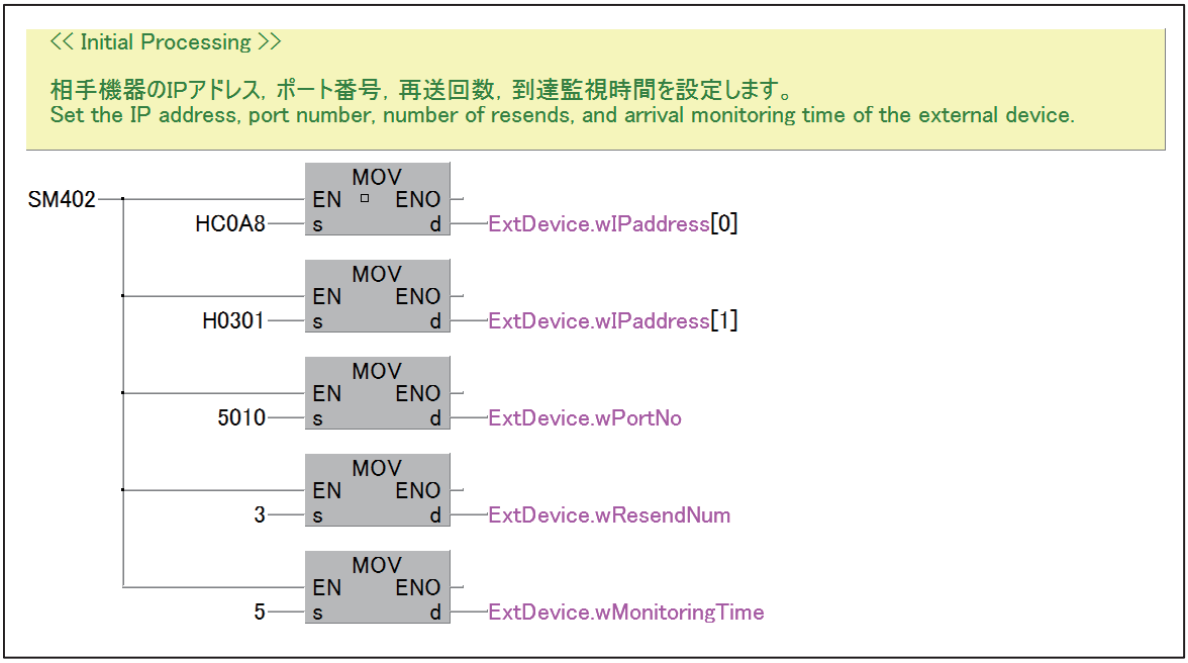


Servo amplifier object reading/writing program (Sample/ ServoObjectRW)

1. Set the device information.

The IP address and port number of the servo amplifier are set in the External device information structure (ExtDevice) when the operating status of the CPU module is switched from STOP to RUN. Change the number of resends and arrival monitoring time as needed.

Example) IP address: 192.168.3.1, port number: 5010 (fixed for MR-JE-C)



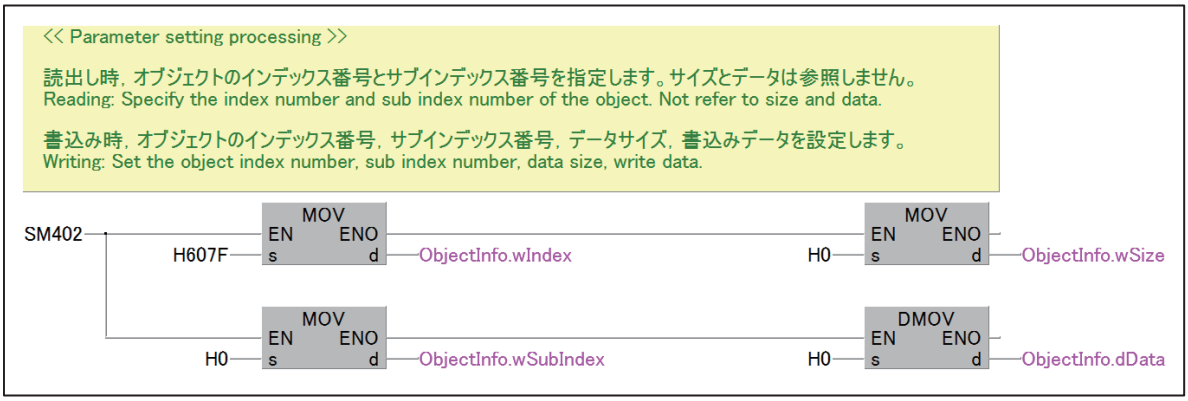
2. Set the object information.

The object of the servo amplifier to be read is set in the Object information structure (ObjectInfo).

Example) When reading the maximum velocity command (607Fh: 0h)

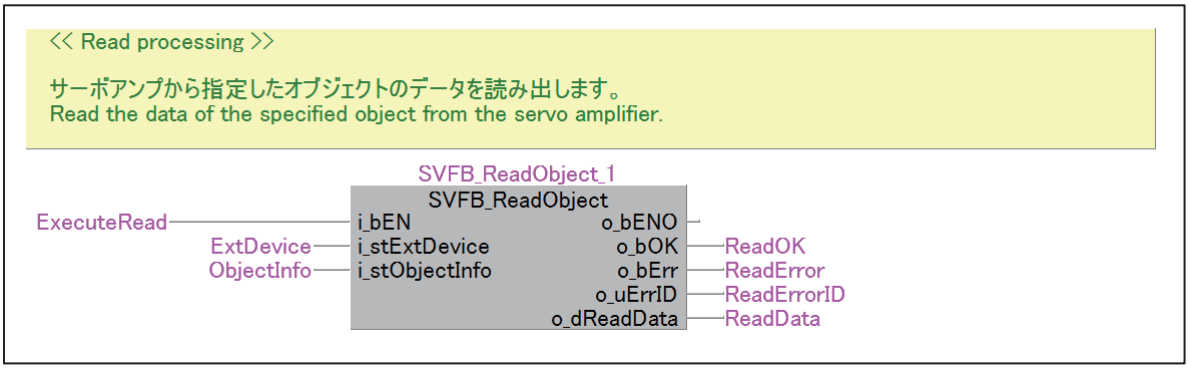
The index number: 607F and the sub index number: 0 are set when the operating status of the CPU module is switched from STOP to RUN.

The size and data are not referred at reading.



3. Read the servo amplifier object.

The value of the specified object is read from the servo amplifier and is output to the ReadData label after the ExecuteRead label is turned ON.



4. Write the servo amplifier object.

The value of the specified object of the servo amplifier is changed after the ExecuteWrite label is turned ON.

Example) When changing the maximum velocity command (607Fh: 0h) to 1800.00 r/min

After the following values are set in the Object information structure (ObjectInfo), the ExecuteWrite label is turned ON.

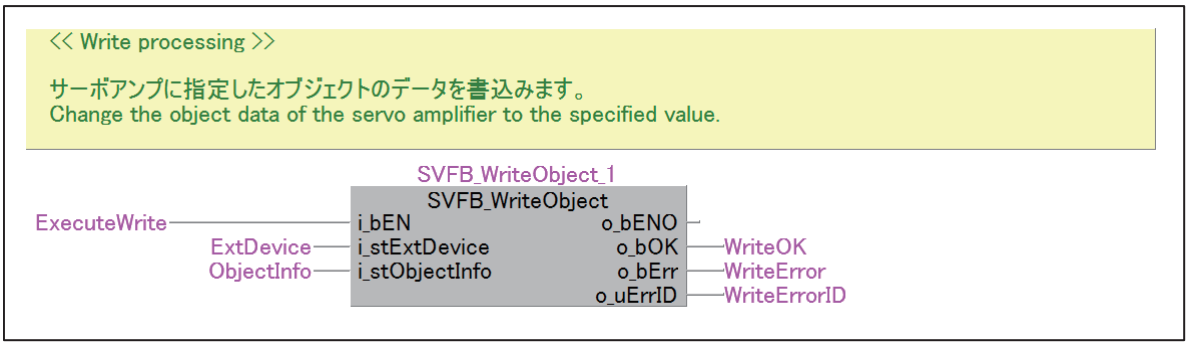
Index number: 607Fh, sub index number: 0h, size: 4 (bytes), data: 1800

ObjectInfo.wIndex := H607F;

ObjectInfo.wSubIndex := H0;

ObjectInfo.wSize := 4;

ObjectInfo.wdData := 1800;



3 FB LIBRARY

3.1 Function Overview of the FB Library

List of FBs

The following table lists the FBs used in the MELSEC-Q series QnUDVCPU module.

Item	Description	Version
SVFB_ReadObject	Reads an object of a servo amplifier.	00A
SVFB_WriteObject	Writes an object of a servo amplifier.	00A
SVFB_ReadMultiObject	Reads multiple objects of a servo amplifier.	00A
SVFB_WriteMultiObject	Writes multiple objects of a servo amplifier.	00A

Restrictions and precautions for all FBs

Description
The following describes restrictions and precautions common to all FBs. The restrictions and precautions specific to each FB are separately described. Refer to ☞ Page 14 Details of the FB Library. • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB does not detect an alarm or a warning that has occurred in the servo amplifier. Program the processing to monitor alarms and warnings in the servo amplifiers. For the alarms and warnings that have occurred in the servo amplifiers, refer to the instruction manual of the servo amplifiers in use. • The FB cannot be used in an interrupt program. • Please ensure that Execution command (i_bEN) can be turned OFF with a program. Do not use this FB in programs that are only executed once, such as a FOR-NEXT loop because Execution command (i_bEN) cannot be turned OFF in these programs. • The number of FB steps in a program varies depending on the CPU model to be used and I/O definitions. • A duplicated coil warning may occur during compilation. However, the warning does not generate any problems. • When Execution command (i_bEN) is turned ON, the FB reads data of the input label. Thus, set the input label before turning ON Execution command (i_bEN). • The FB cannot be used for multiple axes (stations) at the same time. Create a program so that the FB is executed for each axis.

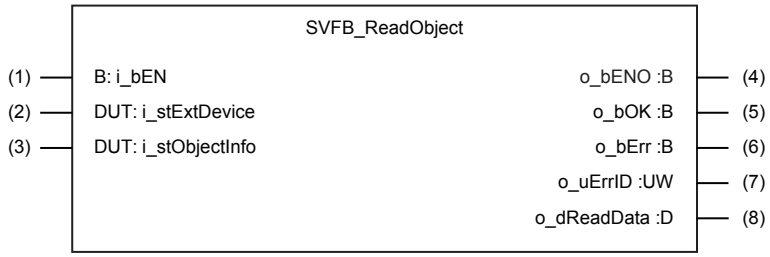
3.2 Details of the FB Library

SVFB_ReadObject (Object reading)

Name

SVFB_ReadObject

Overview

Item	Description
Function overview	Reads the data of the specified object from the servo amplifier.
Symbol [Structured Ladder]	

Labels

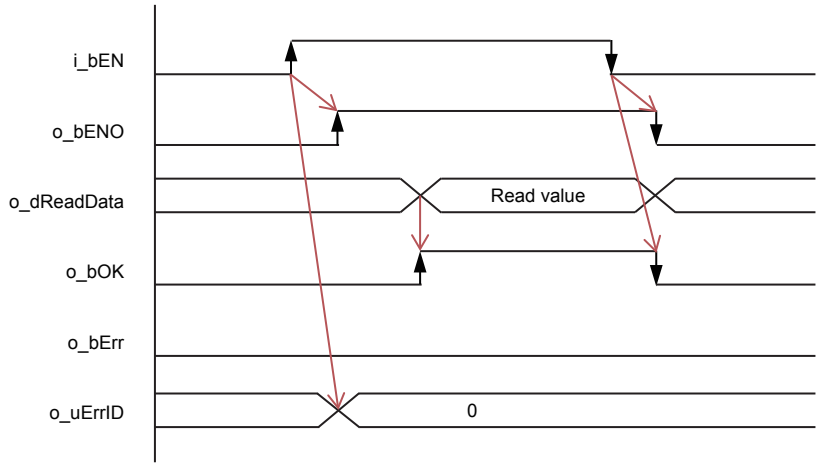
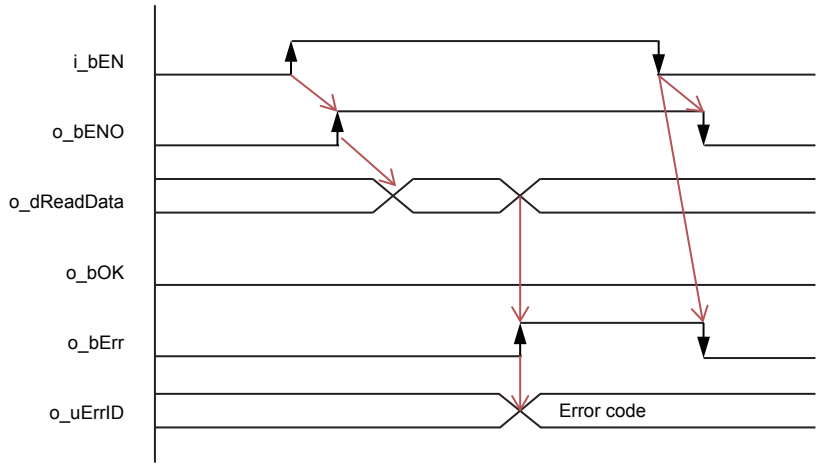
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(1)	i_bEN	Execution command	Bit	↑	ON, OFF	The FB is executed.
(2)	i_stExtDevice	External device	EXTERNAL_DEVICE structure	↑	—	The information of the target servo amplifier is set.
(3)	i_stObjectInfo	Object information	SERVO_OBJECT structure	↑	—	The object information of the target servo amplifier is set.

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	It indicates the FB execution status.
(5)	o_bOK	Normal completion	Bit	OFF	It indicates the normal completion status.
(6)	o_bErr	Error completion	Bit	OFF	It indicates the error completion status.
(7)	o_uErrID	Error code	Word [unsigned]	0	When reading completes with an error, an error code is output.
(8)	o_dReadData	Read data	Double word [signed]	0	The read data is output.

Function overview

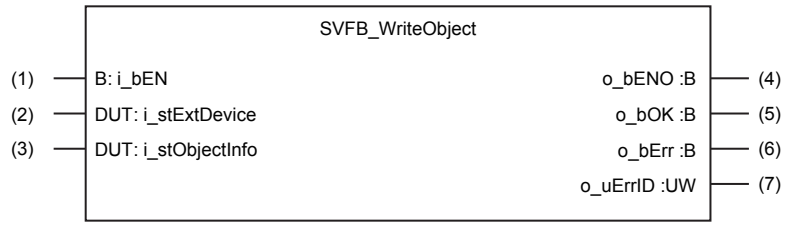
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	222 steps	
Function description	This FB reads the object from the target servo amplifier specified in External device (i_stExtDevice). Set the object to be read in Object information (i_stObjectInfo). Data with size of four bytes or smaller can be read. When data with size exceeding four bytes is read, the first four bytes of the data is read. When Execution command (i_bEN) is turned ON, SLMP frames are created based on the external device information and object information, and are sent. When the object has been read normally, Normal completion (o_bOK) turns ON, and the data is stored in Read data (o_dData). When an error has occurred in the FB, Error completion (o_bErr) turns ON, and error details are stored in Error code (o_uErrId). For details of error codes, refer to ☞ Page 23 Troubleshooting.	
Restrictions and precautions	Set the information in External device and Object information before executing this FB.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

SVFB_WriteObject (Object writing)

Name

SVFB_WriteObject

Overview

Item	Description
Function overview	Changes the specified object data of the servo amplifier.
Symbol [Structured Ladder]	

Labels

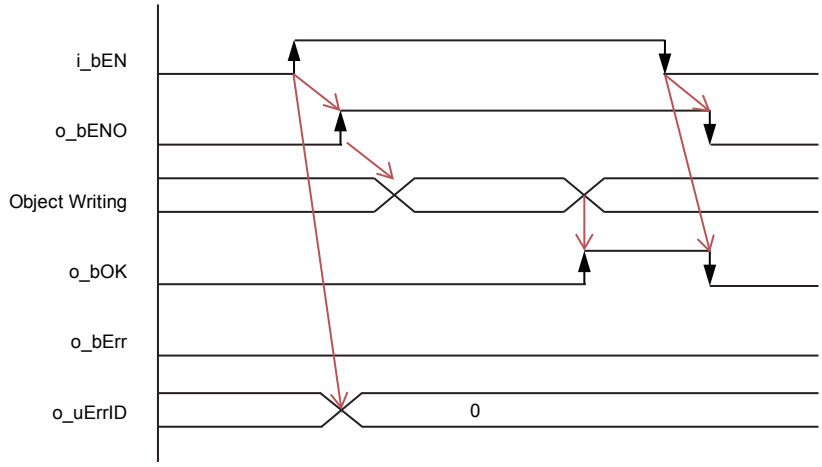
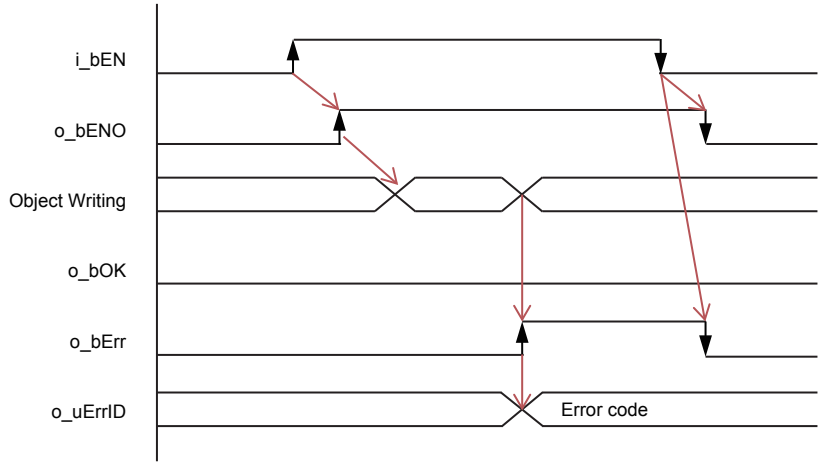
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(1)	i_bEN	Execution command	Bit	↑	ON, OFF	The FB is executed.
(2)	i_stExtDevice	External device	EXTERNAL_DEVICE structure	↑	—	The information of the target servo amplifier is set.
(3)	i_stObjectInfo	Object information	SERVO_OBJECT structure	↑	—	The object information of the target servo amplifier is set.

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	It indicates the FB execution status.
(5)	o_bOK	Normal completion	Bit	OFF	It indicates the normal completion status.
(6)	o_bErr	Error completion	Bit	OFF	It indicates the error completion status.
(7)	o_uErrID	Error code	Word [unsigned]	0	When writing completes with an error, an error code is output.

Function overview

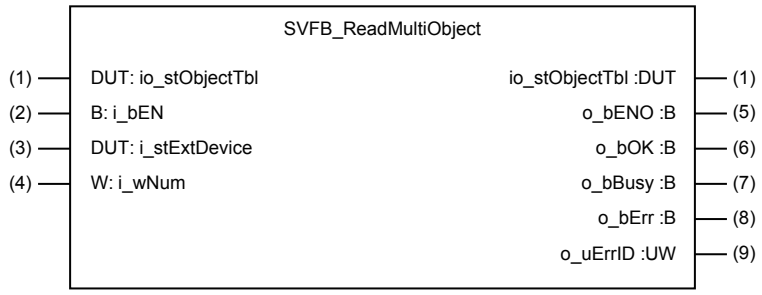
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	212 steps	
Function description	This FB writes the object to the target servo amplifier specified in External device (i_stExtDevice). Set the object to be written in Object information (i_stObjectInfo). Data with size of four bytes or smaller can be written. When Execution command (i_bEN) is turned ON, SLMP frames are created based on the external device information and object information, and are sent. When the object has been written normally, Normal completion (o_bOK) turns ON. When an error has occurred in the FB, Error completion (o_bErr) turns ON, and error details are stored in Error code (o_uErrId). For details of error codes, refer to ☞ Page 23 Troubleshooting.	
Restrictions and precautions	Set the information in External device and Object information before executing this FB.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion] 	

SVFB_ReadMultiObject (Reading multiple objects)

Name

SVFB_ReadMultiObject

Overview

Item	Description
Function overview	Reads multiple object data from the servo amplifier.
Symbol [Structured Ladder]	

Labels

■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(1)	io_stObjectTbl	Object table	SERVO_OBJECT structure (0..33)	Π	—	The object to be read is set in the index number and sub index number. In addition, the read data is stored.

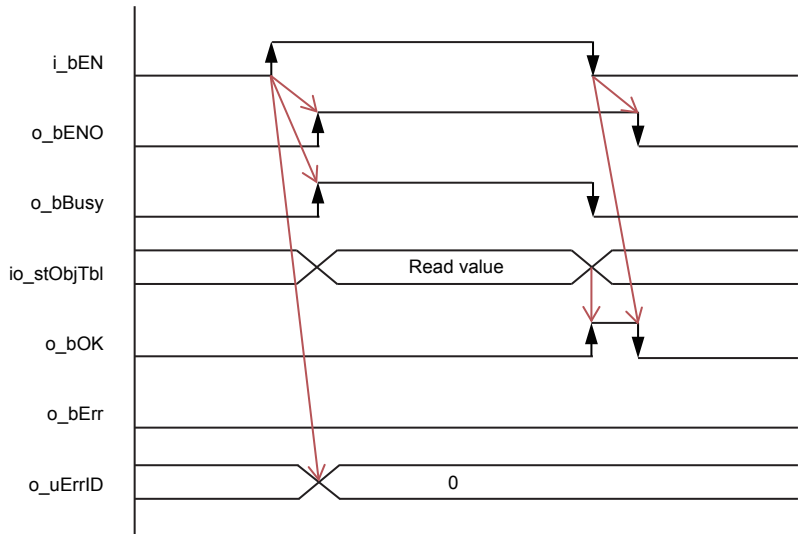
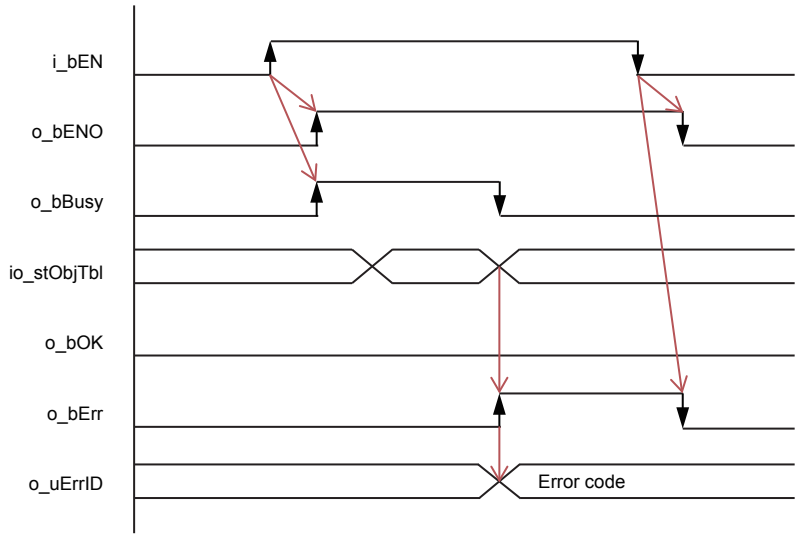
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(2)	i_bEN	Execution command	Bit	↑	ON, OFF	The FB is executed.
(3)	i_stExtDevice	External device	EXTERNAL_DEVICE structure	Π	—	The information of the target servo amplifier is set.
(4)	i_wNum	Number registered	Word [unsigned]	↑	1 to 34	The value set in the object information table is specified.

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	It indicates the FB execution status.
(6)	o_bOK	Normal completion	Bit	OFF	It indicates the normal completion status.
(7)	o_bBusy	Busy	Bit	OFF	It indicates that the FB is in execution.
(8)	o_bErr	Error completion	Bit	OFF	It indicates the error completion status.
(9)	o_uErrID	Error code	Word [unsigned]	0	When reading completes with an error, an error code is output.

Function overview

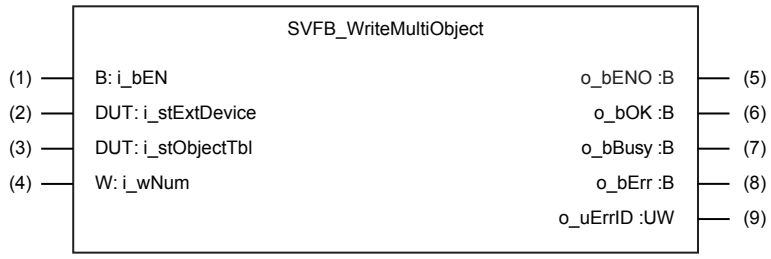
Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	431 steps	
Function description	This FB reads multiple objects by using Object reading (SVFB_ReadObject) of the servo amplifier. The FB reads the objects set in Object table (io_stObjectTbl) from the target servo amplifier specified in External device (i_stExtDevice). The objects specified by Number registered (i_wNum) are read in order from the beginning. Up to 34 objects can be read. When Execution command (i_bEN) is turned ON, SLMP frames are created based on the external device information and object information, and are sent. Busy (o_bBusy) is ON while the objects are being read. When the objects have been read normally, Normal completion (o_bOK) turns ON and Busy (o_bBusy) turns OFF. When an error has occurred in the FB, Error completion (o_bErr) turns ON and error details are stored in Error code (o_uErrId). Not all objects specified by Number registered (i_wNum) may be read because the FB stops the processing when an error occurs. For details of error codes, refer to ☞ Page 23 Troubleshooting.	
Restrictions and precautions	• This FB uses SVFB_ReadObject. Do not execute the FB of SVFB_ReadObject while this FB is in execution. • Set the information in External device and Object table before executing this FB. • This FB always refers to External device and Object table while Busy is ON. Do not change the data.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

SVFB_WriteMultiObject (Writing multiple objects)

Name

SVFB_WriteMultiObject

Overview

Item	Description
Function overview	Changes multiple object data of the servo amplifier.
Symbol [Structured Ladder]	

Labels

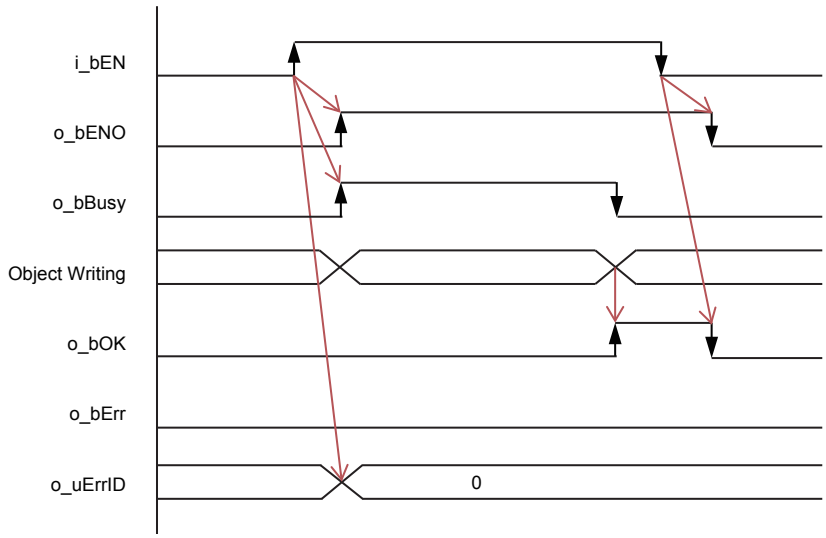
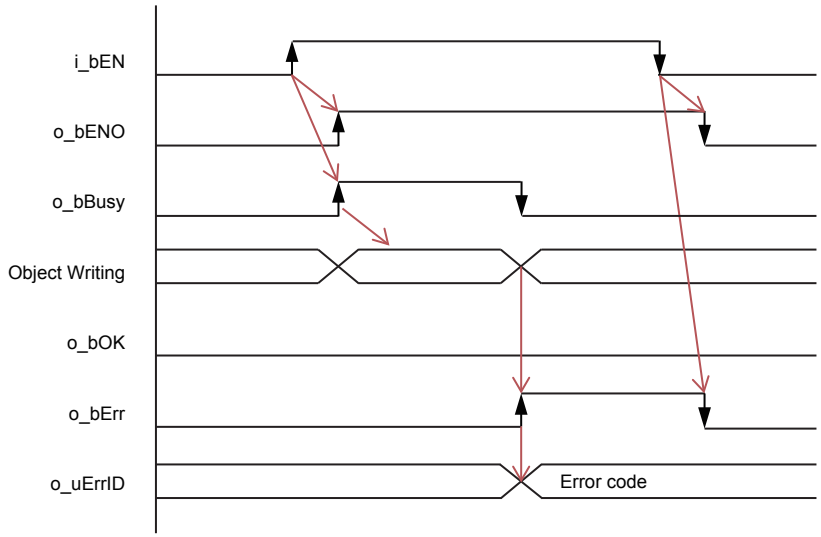
■Input labels (Load: Π: Always, ↑: Only at start)

No.	Variable name	Name	Data type	Import	Setting range	Description
(1)	i_bEN	Execution command	Bit	↑	ON, OFF	The FB is executed.
(2)	i_stExtDevice	External device	EXTERNAL_DEVICE structure	Π	—	The information of the target servo amplifier is set.
(3)	i_stObjectTbl	Object table	SERVO_OBJECT structure (0..33)	Π	—	The object information of the target servo amplifier is set.
(4)	i_wNum	Number registered	Word [unsigned]	↑	1 to 34	The value set in the object information table is specified.

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	It indicates the FB execution status.
(6)	o_bOK	Normal completion	Bit	OFF	It indicates the normal completion status.
(7)	o_bBusy	Busy	Bit	OFF	It indicates that the FB is in execution.
(8)	o_bErr	Error completion	Bit	OFF	It indicates the error completion status.
(9)	o_uErrID	Error code	Word [unsigned]	0	When writing completes with an error, an error code is output.

Function overview

Item	Description	
Applicable hardware and software	Applicable CPU	QnUDVCPU
	Applicable engineering tool	GX Works2
Language	Structured Text	
Number of basic steps	407 steps	
Function description	This FB writes multiple objects by using Object writing (SVFB_WriteObject) of the servo amplifier. The FB writes the objects set in Object table (i_stObjectTbl) to the target servo amplifier specified in External device (i_stExtDevice). The objects specified by Number registered (i_wNum) are written in order from the beginning. Up to 34 objects can be written. When Execution command (i_bEN) is turned ON, SLMP frames are created based on the external device information and object information, and are sent. Busy (o_bBusy) is ON while the objects are being written. When the objects have been written normally, Normal completion (o_bOK) turns ON and Busy (o_bBusy) turns OFF. When an error has occurred in the FB, Error completion (o_bErr) turns ON and error details are stored in Error code (o_uErrId). Not all objects specified by Number registered (i_wNum) may be written because the FB stops the processing when an error occurs. For details of error codes, refer to ☞ Page 23 Troubleshooting.	
Restrictions and precautions	• This FB uses SVFB_WriteObject. Do not execute the FB of SVFB_WriteObject while this FB is in execution. • Set the information in External device and Object table before executing this FB. • This FB always refers to External device and Object table while Busy is ON. Do not change the data.	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	[Normal completion]  [Error completion]  	

3.3 List of Structures

The following table lists the structures used in each library.

Structure name	Description	Version
EXTERNAL_DEVICE	External device information	00A
SERVO_OBJECT	Object information	00A

Structure

EXTERNAL_DEVICE (External device information)

■Name

EXTERNAL_DEVICE

■Labels

Label name	Data type	Access Type	Description
wIPaddress	Word [signed] (0..1)	Read/Write	Sets the IP address of the external device in hexadecimal. [0]: First and second octets [1]: Third and fourth octets Example) For the IP address: 192.168.3.1 [0]: HC0A8 [1]: H0301
wPortNo	Word [signed]	Read/Write	Sets the port number of the external device. For the MR-JE-C, set 5010.
wResendNum	Word [signed]	Read/Write	Sets the number of resends of the SLMP frame send. If a value out of the range is set, the SLMP frame is resent for three times. [Setting range] 0 to 15 (times)
wMonitoringTime	Word [signed]	Read/Write	Sets the arrival monitoring time of the SLMP frame send. If a value out of the range is set, the arrival monitoring time is set as 0 (10 seconds). [Setting range] 0: 10 seconds 1 to 32767: 1 to 32767 seconds

SERVO_OBJECT (Object information)

■Name

SERVO_OBJECT

■Labels

Label name	Data type	Access Type	Description
wIndex	Word [signed]	Read/Write	Sets the index number of the servo amplifier object.
wSubIndex	Word [signed]	Read/Write	Sets the sub index number of the servo amplifier object.
wSize	Word [signed]	Read/Write	Sets the data of the object at writing. This setting is ignored at reading. [Setting range] At writing: 1 to 4 (byte) At reading: 0
dData	Double word [signed]	Read/Write	Sets the data of the object at writing. This setting is ignored at reading. Example) For the data of "ABC", set H00434241.

3.4 Troubleshooting

List of error codes

The following table lists the error codes to be output in this program.

For the errors caused by the SLMPSND instruction, refer to the following.

QCPU User's Manual (Hardware Design, Maintenance and Inspection)

For other errors, refer to the error codes of the module.

Error code	Description	Remedy
100	Data size error	A value out of the range is set as a data size of the written object. Set a value within the setting range and then execute the FB again. [Setting range] 1 to 4
101	Registered number error	A value out of the range is set as the number of registered objects. Set a value within the setting range and then execute the FB again. [Setting range] 1 to 34
200	SLMP error completion	The SLMPSND instruction has completed with an error. Check the completion status of the SLMP frame send instruction or the error information of the response frame. Eliminate the error cause and then execute the FB again.

MEMO

INSTRUCTION INDEX

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MEMO

REVISIONS

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

Revision date	*Manual number	Description
May 2017	BCN-B62005-828-A	First edition

Japanese manual number: BCN-B62005-827-A

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