OMRON

Sysmac Library

User's Manual
for MC Test Run Library

SYSMAC-XR001

sysmac
always in control

W546-E1-04

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Introduction

Thank you for purchasing an NJ/NX-series CPU Unit or an NY-series Industrial PC.

This manual provides information required to use the function blocks in the MC Test Run Library. (“Function block” is sometimes abbreviated as “FB.”) Please read this manual and make sure you understand the functionality and performance of the NJ/NX-series CPU Unit before you attempt to use it in a control system.

This manual provides function block specifications. It does not describe application restrictions or combination restrictions for Controllers, Units, and components.

Refer to the user's manuals for all of the products in the application before you use any of the products.

Keep this manual in a safe place where it will be available for reference during operation.

Features of the Library

The MC Test Run Library is used to perform a test run that the MC Function Module is used.

In this library, a processing to operate axes that an MPG (i.e. a manual pulse generator) was used is provided.

You can use this library to reduce manpower of programming when creating a test run program that an MPG was used.

You can use this library together with motion control instructions of the NJ/NX/NY-series Controller. Refer to the motion control instructions reference manual for details on motion control instructions of the NJ/NX/NY-series Controller.

Intended Audience

This manual is intended for the following personnel, who must also have knowledge of electrical systems(an electrical engineer or the equivalent).

- Personnel in charge of introducing FA systems.
- Personnel in charge of designing FA systems.
- Personnel in charge of installing and maintaining FA systems.
- Personnel in charge of managing FA systems and facilities.

For programming, this manual is intended for personnel who understand the programming language specifications in international standard IEC 61131-3 or Japanese standard JIS B 3503.

Applicable Products

This manual covers the following products.

Item	Product name	Model numbers	Version
Sysmac Library	MC TestRun Library	SYSMAC-XR001	Version 1.1.0 or higher
Automation Software	Sysmac Studio	SYSMAC-SE□□□□	Version 1.14 or higher
Device	CPU Unit	NX701-□□□□ NJ101-10□□[*1]	Version 1.10 or later
		NJ501-□□□□ NJ301-□□□□	Version 1.10 or later
		NX1P2-□□□□□□(1)[*2]	Version.1.13 or later
	Industrial PC	NY5□□-1□□□	Version 1.12 or later

[*1] You cannot use this function block with the NJ101-90□□.

[*2] You cannot use this function block with the NX1P2-90□□□□.

Part of the specifications and restrictions for the CPU Units are given in other manuals. Refer to *Related Manuals* on page 11.

Manual Structure

Special Information

Special information in this manual is classified as follows:

Precautions for Safe Use

Precautions on what to do and what not to do to ensure safe usage of the product.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Additional Information

Additional information to read as required.
This information is provided to increase understanding or make operation easier.

Version Information

Information on differences in specifications and functionality for CPU Units and Industrial PCs with different unit versions and for different versions of the Sysmac Studio are given.

Note References are provided to more detailed or related information.

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Terms and Conditions Agreement

Warranty, Limitations of Liability

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Safety Precautions

Definition of Precautionary Information

The following notation is used in this user's manual to provide precautions required to ensure safe usage of an NJ/NX-series CPU Unit and an NY-series Industrial PC.

The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

The following notation is used.

⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. Additionally, there may be severe property damage.
⚠ **Caution**	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Symbols

⊘	The circle and slash symbol indicates operations that you must not do. The specific operation is shown in the circle and explained in text. This example indicates prohibiting disassembly.
⚡	The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a precaution for electric shock.
⚠	The triangle symbol indicates precautions (including warnings). The specific operation is shown in the triangle and explained in text. This example indicates a general precaution.
❗	The filled circle symbol indicates operations that you must do. The specific operation is shown in the circle and explained in text. This example shows a general precaution for something that you must do.

Cautions

⚠ Caution

Read all related manuals carefully before you use this library.	⚠
Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits.	⚠
Check the user program, data, and parameter settings for proper execution before you use them for actual operation.	⚠
When you perform a test run, hold an emergency stop switch in your hand or otherwise prepare for rapid motor operation.	⚠

Precautions for Correct Use

Using the Library

- When you use the library, functions or function blocks that are not described in the library manual may be displayed on the Sysmac Studio. Do not use functions or function blocks that are not described in the manual.

Using Sample Programming

- The sample programming shows only the portion of a program that uses the function or function block from the library.
- When using actual devices, also program safety circuits, device interlocks, I/O with other devices, and other control procedures.
- Create a user program that will produce the intended device operation.
- Check the user program for proper execution before you use it for actual operation.

Operation

- When you use a function block that changes an *Enabled* output variable to TRUE while the processing result is output normally, confirm that *Enabled* is TRUE before you use the processing result.
- If the Counter Mode is Rotary Mode for the master axis, this function block will always use the shortest way to judge positioning.
- If you use the processing result of this function block to output a command position to a motor, always specify the shortest way specification.

Related Manuals

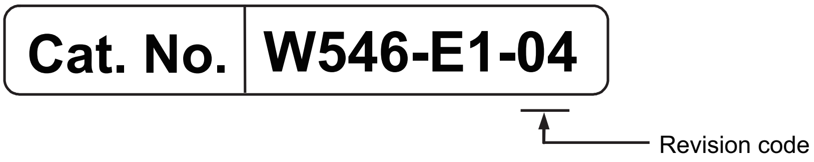
The following are the manuals related to this manual. Use these manuals for reference.

Manual name	Cat. No.	Model numbers	Application	Description
NX-series CPU Unit Hardware User's Manual	W535	NX701-□□□□	Learning the basic specifications of the NX-series NX701 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided	An introduction to the entire NX701 CPU Unit system is provided along with the following information on the CPU Unit. Features and system configuration Overview Part names and functions General specifications Installation and wiring Maintenance and inspection
NX-series NX1P2 CPU Unit Hardware User's Manual	W578	NX1P2-□□□□	Learning the basic specifications of the NX-series NX1P2 CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided	An introduction to the entire NX1P2 CPU Unit system is provided along with the following information on the CPU Unit. Features and system configuration Overview Part names and functions General specifications Installation and wiring Maintenance and Inspection
NJ-series CPU Unit Hardware User's Manual	W500	NJ501-□□□□ NJ301-□□□□ NJ101-□□□□	Learning the basic specifications of the NJ-series CPU Units, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided	An introduction to the entire NJ-series system is provided along with the following information on the CPU Unit. Features and system configuration Overview Part names and functions General specifications Installation and wiring Maintenance and inspection
NY-series IPC Machine Controller Industrial Panel PC Hardware User's Manual	W557	NY532-□□□□	Learning the basic specifications of the NY-series Industrial Panel PCs, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided	An introduction to the entire NY-series system is provided along with the following information on the Industrial Panel PC. Features and system configuration Introduction Part names and functions General specifications Installation and wiring Maintenance and inspection
NY-series IPC Machine Controller Industrial Box PC Hardware User's Manual	W556	NY512-□□□□	Learning the basic specifications of the NY-series Industrial Box PCs, including introductory information, designing, installation, and maintenance. Mainly hardware information is provided	An introduction to the entire NY-series system is provided along with the following information on the Industrial Box PC. Features and system configuration Introduction Part names and functions General specifications Installation and wiring Maintenance and inspection

Manual name	Cat. No.	Model numbers	Application	Description
NJ/NX-series CPU Unit Software User's Manual	W501	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning how to program and set up an NJ/NX-series CPU Unit. Mainly software information is provided	The following information is provided on a Controller built with an NJ/NX-series CPU Unit. CPU Unit operation CPU Unit features Initial settings Programming based on IEC 61131-3 language specifications
NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Software User's Manual	W558	NY532-□□□□ NY512-□□□□	Learning how to program and set up the Controller functions of an NY-series Industrial PC	The following information is provided on NY-series Machine Automation Control Software. Controller operation Controller features Controller settings Programming based on IEC 61131-3 language specifications
NJ/NX-series Instructions Reference Manual	W502	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning detailed specifications on the basic instructions of an NJ/NX-series CPU Unit	The instructions in the instruction set (IEC 61131-3 specifications) are described.
NY-series Instructions Reference Manual	W560	NY532-□□□□ NY512-□□□□	Learning detailed specifications on the basic instructions of an NY-series Industrial PC	The instructions in the instruction set (IEC 61131-3 specifications) are described.
NJ/NX-series CPU Unit Motion Control User's Manual	W507	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning about motion control settings and programming concepts of an NJ/NX-series CPU Unit.	The settings and operation of the CPU Unit and programming concepts for motion control are described.
NY-series IPC Machine Controller Industrial Panel PC / Industrial Box PC Motion Control User's Manual	W559	NY532-□□□□ NY512-□□□□	Learning about motion control settings and programming concepts of an NY-series Industrial PC.	The settings and operation of the Controller and programming concepts for motion control are described.
NJ/NX-series Motion Control Instructions Reference Manual	W508	NX701-□□□□ NJ501-□□□□ NJ301-□□□□ NJ101-□□□□ NX1P2-□□□□	Learning about the specifications of the motion control instructions of an NJ/NX-series CPU Unit.	The motion control instructions are described.
NY-series Motion Control Instructions Reference Manual	W561	NY532-□□□□ NY512-□□□□	Learning about the specifications of the motion control instructions of an NY-series Industrial PC.	The motion control instructions are described.
Sysmac Studio Version 1 Operation Manual	W504	SYSMAC -SE2□□□	Learning about the operating procedures and functions of the Sysmac Studio.	Describes the operating procedures of the Sysmac Studio.

Revision History

A manual revision code appears as a suffix to the catalog number on the front and back covers of the manual.



Cat. No. W546-E1-04

Revision code

Revision code	Date	Revised content
01	April 2015	Original production
02	December 2015	Corrected mistakes.
03	July 2016	Changed the manual name.
04	November 2016	Changed the manual name.

Procedure to Use Sysmac Libraries

Procedure to Use Sysmac Libraries Installed Using the Installer

This section describes the procedure to use Sysmac Libraries that you installed using the installer.

There are two ways to use libraries.

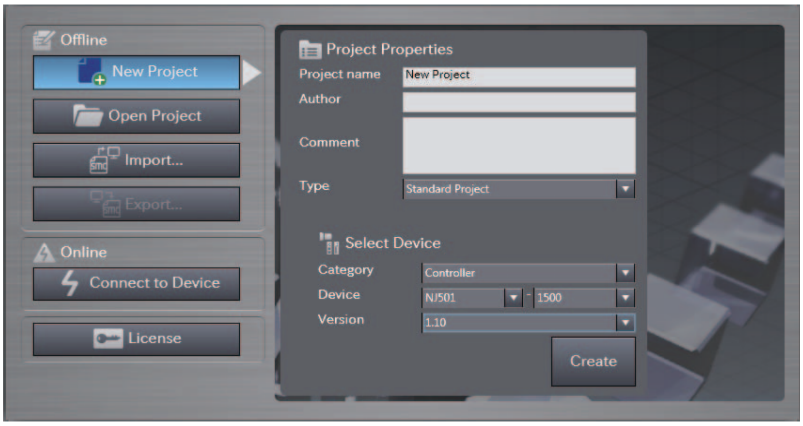
- Using newly installed Sysmac Libraries
- Using upgraded Sysmac Libraries

Version Information

To use Sysmac Libraries, you need the Sysmac Studio version 1.14 or higher.

Using Newly Installed Libraries

1 Start the Sysmac Studio and open or create a new project in which you want to use Sysmac Libraries.



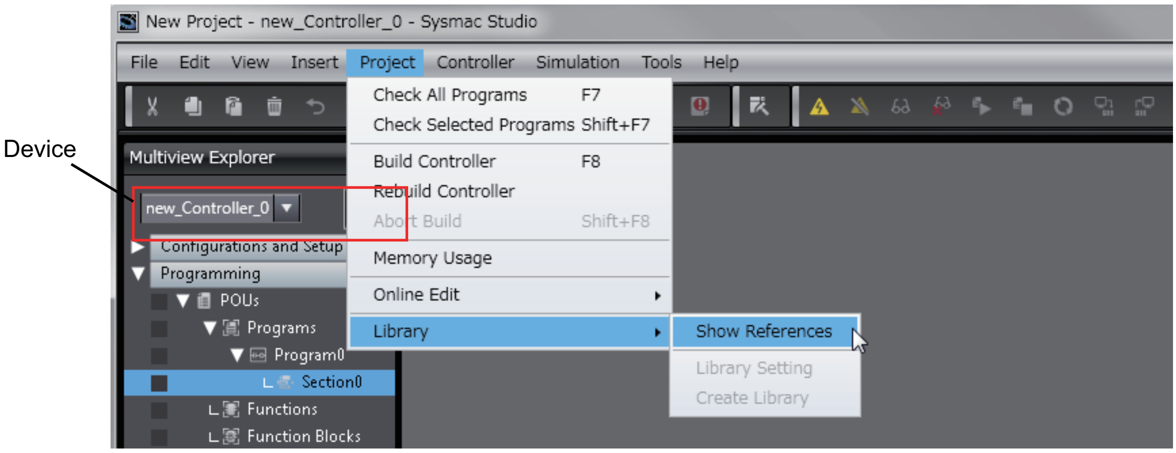
Project name: New Project
Author:
Comment:
Type: Standard Project
Category: Controller
Device: NJ501 - 1500
Version: 1.10

Precautions for Correct Use

If you create a new project, be sure to configure the settings as follows to enable the use of Sysmac Libraries. If you do not configure the following settings, you cannot proceed to the step 2 and later steps.

- Set the project type to Standard Project or Library Project.
- Set the device category to Controller.
- Set the device version to 1.01 or later.

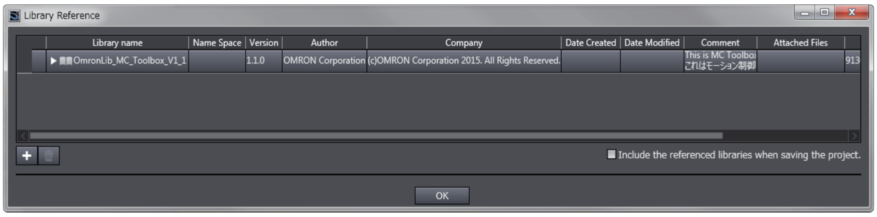
2 Select **Project** – **Library** – **Show References**.



Precautions for Correct Use

If you have more than one registered device in the project, make sure that the device selected currently is an NJ/NX-series CPU Unit or an NY-series Industrial PC. If you do not select an NJ/NX-series CPU Unit or an NY-series Industrial PC as the device, Library References does not appear in the above menu. When the device selected currently is an NJ/NX-series CPU Unit or an NY-series Industrial PC, the device icon ▮▮ is displayed in the Multiview Explorer.

3 Add the desired Sysmac Library to the list and click the **OK** Button.



Library name	Name Space	Version	Author	Company	Date Created	Date Modified	Comment	Attached Files	
▶ OmronLib_MC_Toolbox_V1_1		1.1.0	OMRON Corporation	(c)OMRON Corporation 2015. All Rights Reserved.			This is MC Toolbo これはモーション制御		913

□ Include the referenced libraries when saving the project.

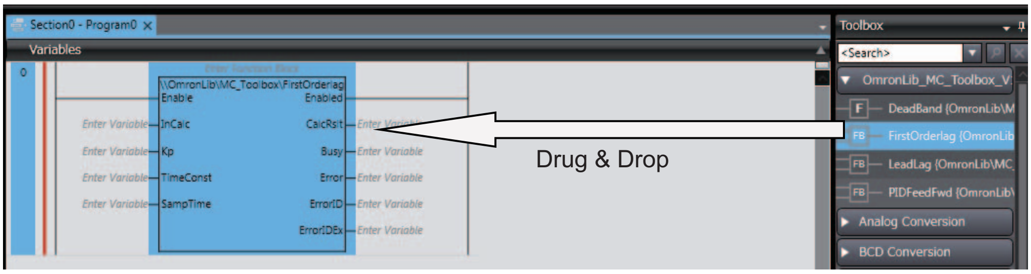
The Sysmac Library file is read into the project.

Now, when you select the Ladder Editor or ST Editor, the function blocks and functions included in a Sysmac Library appear in the Toolbox.

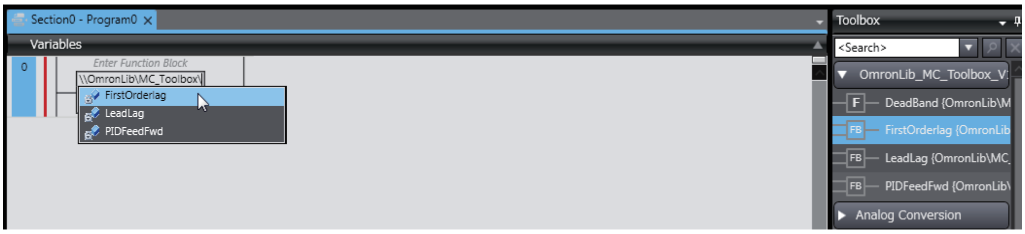
For the procedure for adding and setting libraries in the above screen, refer to the *Sysmac Studio Version 1 Operation Manual* (Cat. No. W504).

4 Insert the Sysmac Library's function blocks and functions into the circuit using one of the following two methods.

- Select the desired function block or function in the Toolbox and drag and drop it onto the programming editor.



- Right-click the programming editor, select **Insert Function Block** in the menu, and enter the fully qualified name (\\name of namespace\name of function block).



Precautions for Correct Use

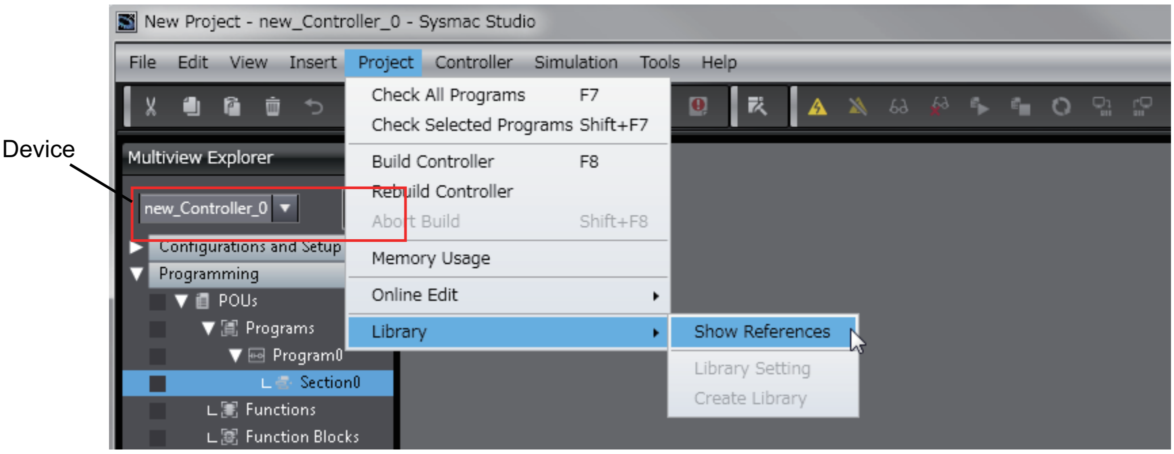
After you upgrade the Sysmac Studio, check all programs and make sure that there is no error of the program check results on the Build Tab Page.

Select **Project** – **Check All Programs** from the Main Menu.

Using Upgraded Libraries

1 Start the Sysmac Studio and open a project in which any old-version Sysmac Library is included.

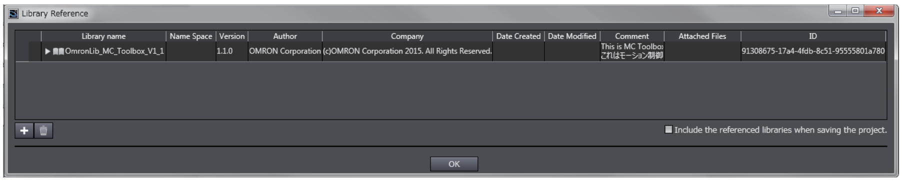
2 Select **Project** – **Library** – **Show References**.



Precautions for Correct Use

If you have more than one registered device in the project, make sure that the device selected currently is an NJ/NX-series CPU Unit or an NY-series Industrial PC. Otherwise, Library References does not appear in the above menu. When the device selected currently is an NJ/NX-series CPU Unit or an NY-series Industrial PC, the device icon is displayed in the Multiview Explorer.

3 Select an old-version Sysmac Library and click the **Delete Reference** Button.

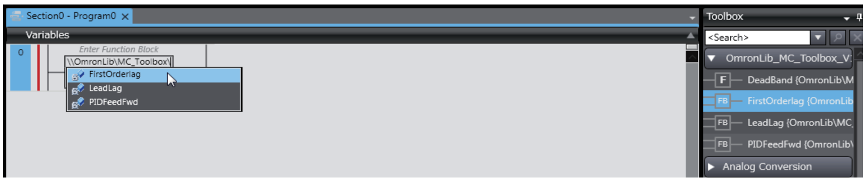

Library Reference

Library name	Name Space	Version	Author	Company	Date Created	Date Modified	Comment	Attached Files	ID
▶ OmronLib_MC_Toolbox_V1_1		1.1.0	OMRON Corporation	(c)OMRON Corporation 2015. All Rights Reserved.			This is MC Toolbo これはモーション制御		91308675-17a4-4fdb-8c51-95555801a780

□ Include the referenced libraries when saving the project.

OK

4 Add the desired Sysmac Library to the list and click the **OK** Button.



Procedure to Use Sysmac Libraries Uploaded from a CPU Unit or an Industrial PC

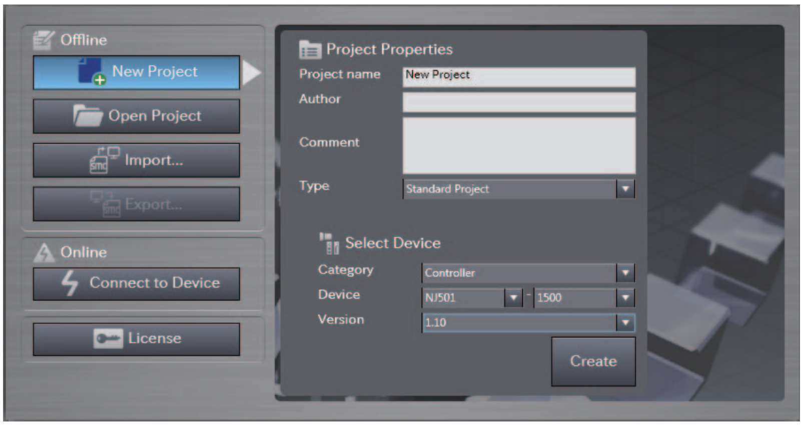
You can use Sysmac Libraries uploaded from a CPU Unit or an Industrial PC to your computer if they are not installed.

The procedure to use uploaded Sysmac Libraries from a CPU Unit or an Industrial PC is as follows.

Version Information

To use Sysmac Libraries, you need the Sysmac Studio version 1.14 or higher.

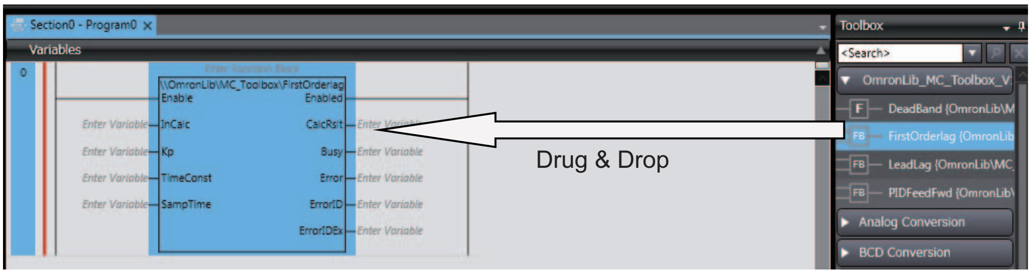
1. Start the Sysmac Studio and create a new project in which you want to use Sysmac Libraries.



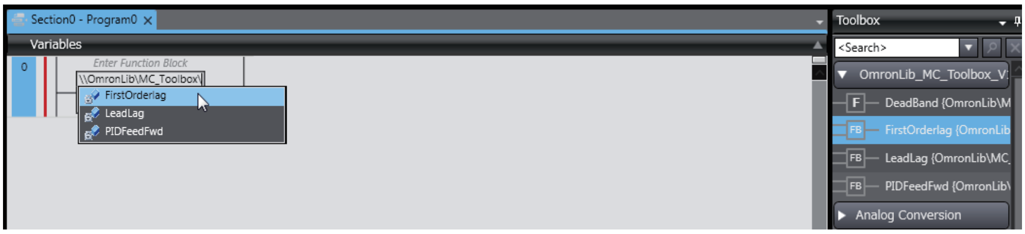
Project name: New Project
Author:
Comment:
Type: Standard Project
Category: Controller
Device: NJ501 - 1500
Version: 1.10

2. Connect the computer to the CPU Unit or the Industrial PC and place it online.
3. Upload POUs in which any Sysmac Library is used to the computer.

   Now, when you select the Ladder Editor or ST Editor, the function blocks and functions included in the Sysmac Library used in the uploaded POUs appear in the Toolbox.
4. Insert the Sysmac Library's function blocks and functions into the circuit using one of the following two methods.
   - Select the desired function block or function in the Toolbox and drag and drop it onto the Ladder Editor.



- Right-click the programming editor, select **Insert Function Block** in the menu, and enter the fully qualified name (\\name of namespace\name of function block).



Precautions for Correct Use

- The Sysmac Studio installs library files of the uploaded Sysmac Stutio to the specified folder on the computer if they are not present. However, the Sysmac Studio does not install library files to the specified folder on the computer if they are present.

  The specified folder here means the folder in which library files are installed by the installer.
- Note that uploading Sysmac Libraries from a CPU Unit or an Industrial PC does not install the manual and help files for the Sysmac Libraries, unlike the case where you install then using the installer. Please install the manual and help files using the installer if you need them.

Common Specifications of Function Blocks

Common Variables

This section describes the specifications of variables (*EN*, *Execute*, *Enable*, *Abort*, *ENO*, *Done*, *CalcRslt*, *Enabled*, *Busy*, *CommandAborted*, *Error*, *ErrorID*, and *ErrorIDEx*) that are used for more than one function or function block. The specifications are described separately for functions, for execute-type function blocks, and for enable-type function blocks.

Definition of Input Variables and Output Variables

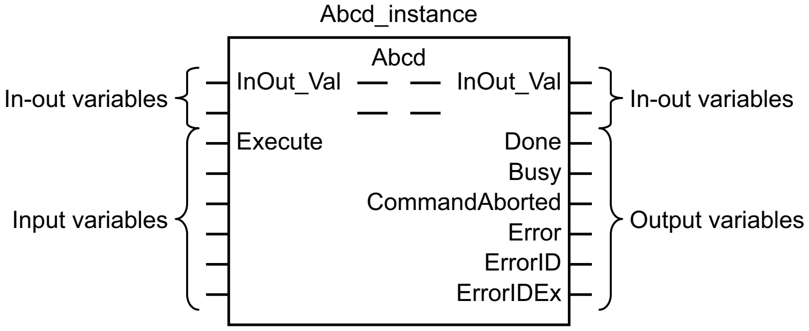
Common input variables and output variables used in functions and function blocks are as follows.

Variable	I/O	Data type	Function/function block type to use			Meaning	Definition
			Function block		Function		
			Execute-type	Enable-type			
EN	Input	BOOL			OK	Execute	The processing is executed while the variable is TRUE.
Execute			OK			Execute	The processing is executed when the variable changes to TRUE.
Enable				OK		Run	The processing is executed while the variable is TRUE.
Abort		BOOL	OK			Abort	The processing is aborted. You can select the aborting method.

Variable	I/O	Data type	Function/function block type to use			Meaning	Definition
			Function block		Function		
			Execute-type	Enable-type			
ENO	Output	BOOL			OK	Done	The variable changes to TRUE when the processing ends normally. It is FALSE when the processing ends in an error, the processing is in progress, or the execution condition is not met.
Done		BOOL	OK			Done	The variable changes to TRUE when the processing ends normally. It is FALSE when the processing ends in an error, the processing is in progress, or the execution condition is not met.
Busy		BOOL	OK	OK		Executing	The variable is TRUE when the processing is in progress. It is FALSE when the processing is not in progress.
CalcRslt		LREAL		OK		Calculation Result	The calculation result is output.
Enabled		BOOL		OK		Enabled	The variable is TRUE when the output is enabled. It is used to calculate the control amount for motion control, temperature control, etc.
Command Aborted		BOOL	OK			Command Aborted	The variable changes to TRUE when the processing is aborted. It changes to FALSE when the processing is re-executed the next time.
Error		BOOL	OK	OK		Error	This variable is TRUE while there is an error. It is FALSE when the processing ends normally, the processing is in progress, or the execution condition is not met.
ErrorID		WORD	OK	OK		Error Code	An error code is output.
ErrorIDEx		DWORD	OK	OK		Expansion Error Code	An expansion error code is output.

Execute-type Function Blocks

- Processing starts when *Execute* changes to TRUE.
- When *Execute* changes to TRUE, *Busy* also changes to TRUE. When processing is completed normally, *Busy* changes to FALSE and *Done* changes to TRUE.
- When continously executes the function blocks of the same instance, change the next *Execute* to TRUE for at least one task period after *Done* changes to FALSE in the previous execution.
- If the function block has a *CommandAborted* (Instruction Aborted) output variable and processing is aborted, *CommandAborted* changes to TRUE and *Busy* changes to FALSE.
- If an error occurs in the function block, *Error* changes to TRUE and *Busy* changes to FALSE.
- For function blocks that output the result of calculation for motion control and temperature control, you can use the BOOL input variable *Abort* to abort the processing of a function block. When *Abort* changes to TRUE, *CommandAborted* changes to TRUE and the execution of the function block is aborted.

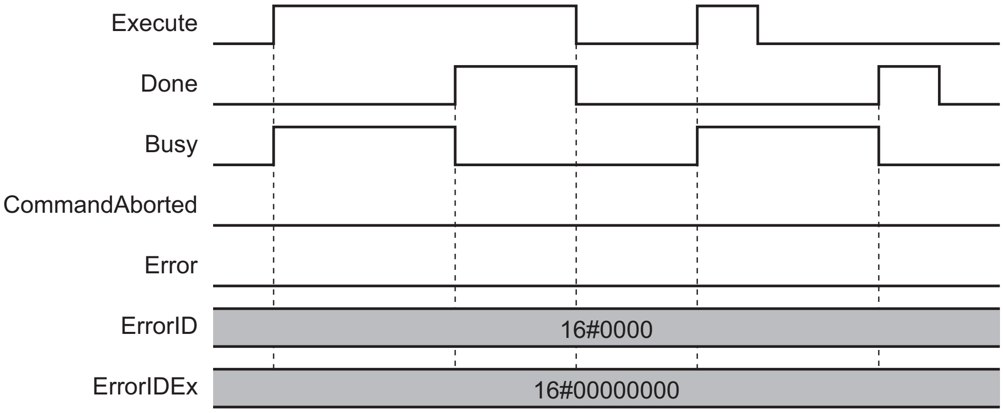


- If *Execute* is TRUE and *Done*, *CommandAborted*, or *Error* changes to TRUE, *Done*, *CommandAborted*, and *Error* changes to FALSE when *Execute* is changed to FALSE.
- If *Execute* is FALSE and *Done*, *CommandAborted*, or *Error* changes to TRUE, *Done*,*CommandAborted*, and *Error* changes to TRUE for only one task period.
- If an error occurs, the relevant error code and expansion error code are set in *ErrorID* (Error Code) and *ErrorIDEx* (Expansion Error Code). The error codes are retained even after *Error* changes to FALSE, but *ErrorID* is set to 16#0000 and *ErrorIDEx* is set to 16#0000 0000 when *Execute* changes to TRUE.

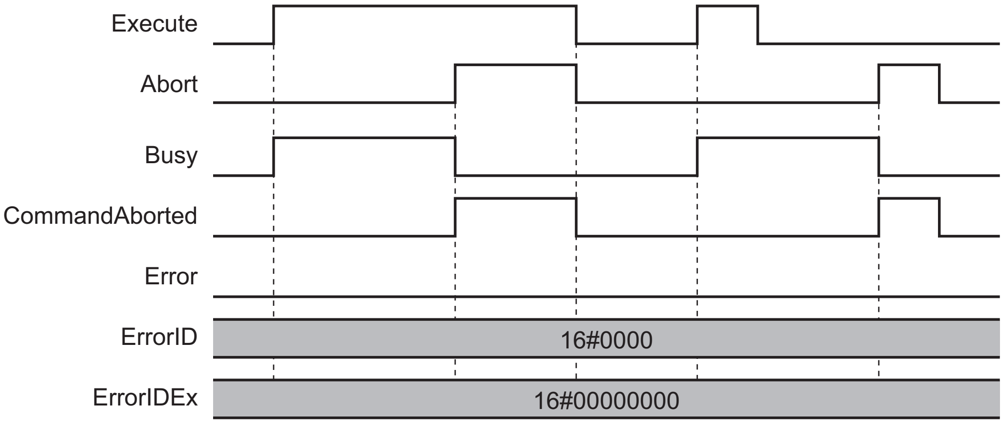
Timing Charts

This section provides timing charts for a normal end, aborted execution, and errors.

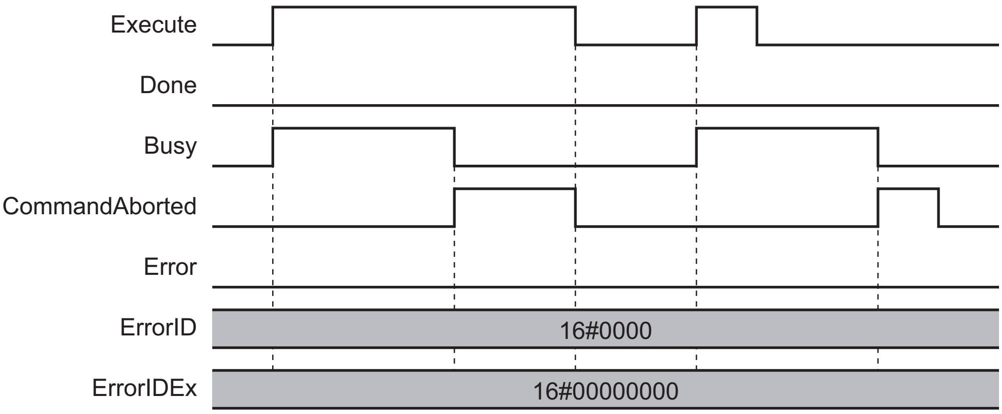
● Normal End



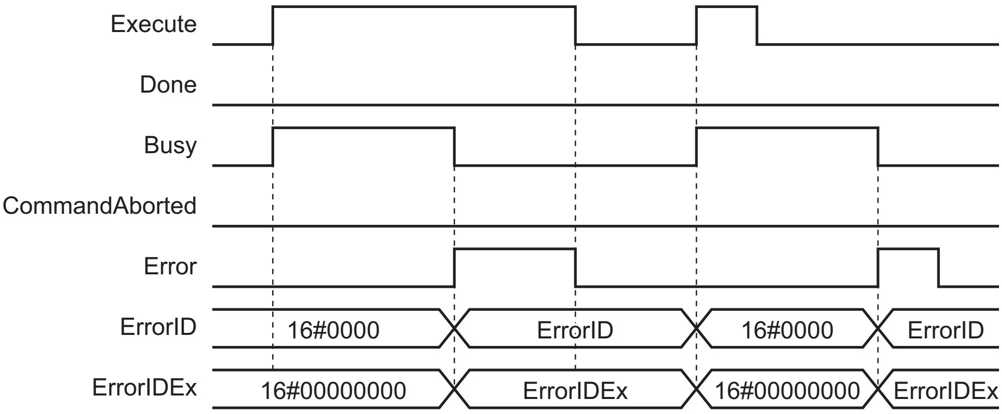
● Canceled Execution



● Aborted Execution

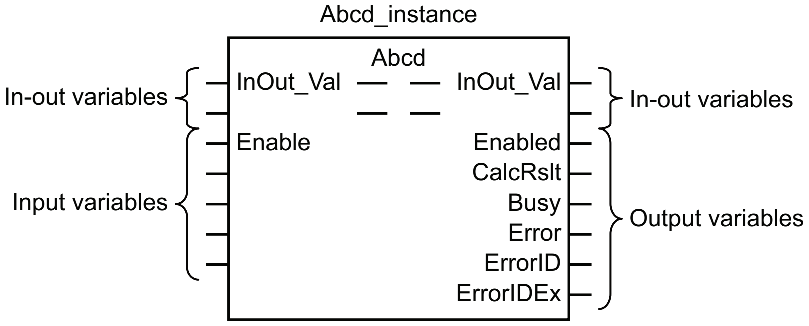


● Errors



Enable-type Function Blocks

- Processing is executed while *Enable* is TRUE.
- When *Enable* changes to TRUE, *Busy* also changes to TRUE. *Enabled* is TRUE during calculation of the output value.
- If an error occurs in the function block, *Error* changes to TRUE and *Busy* and *Enabled* change to FALSE. When *Enable* changes to FALSE, *Enabled*, *Busy*, and *Error* change to FALSE.

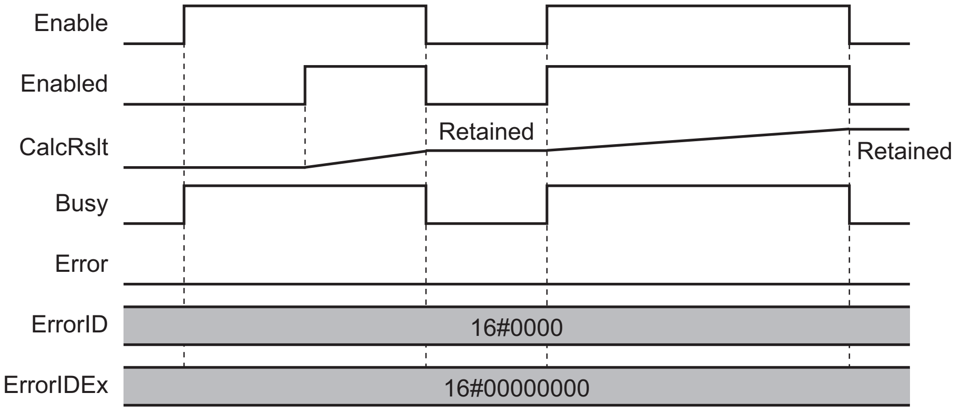


- If an error occurs, the relevant error code and expansion error code are set in *ErrorID* (Error Code) and *ErrorIDEx* (Expansion Error Code). The error codes are retained even after *Error* changes to FALSE, but *ErrorID* is set to 16#0000 and *ErrorIDEx* is set to 16#0000 0000 when *Enable* changes to TRUE.
- For function blocks that calculate the control amount for motion control, temperature control, etc., *Enabled* is FALSE when the value of *CalcRslt* (Calculation Result) is incorrect. In such a case, do not use *CalcRslt*. In addition, after the function block ends normally or after an error occurs, the value of *CalcRslt* is retained until *Enable* changes to TRUE. The control amount will be calculated based on the retained *CalcRslt* value, if it is the same instance of the function block that changed *Enable* to TRUE. If it is a different instance of the function block, the control amount will be calculated based on the initial value.

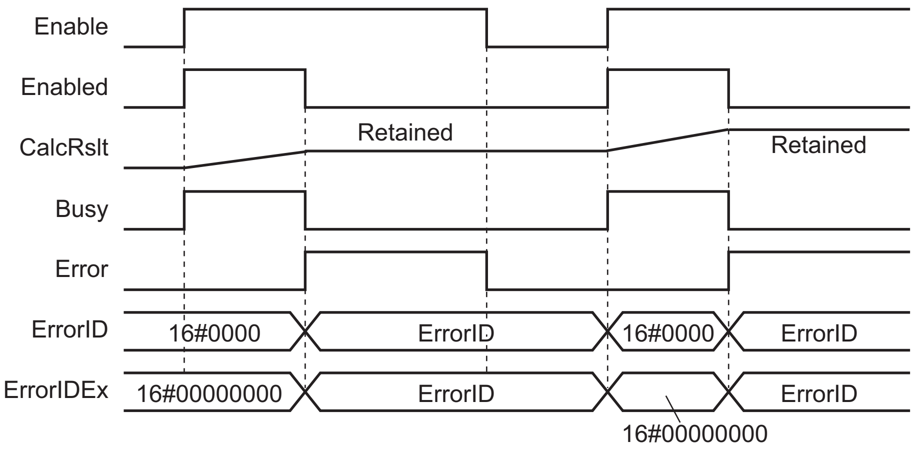
Timing Charts

This section provides timing charts for a normal end and errors.

● Normal End



● Errors


Enable
Enabled
CalcRslt
Retained
Retained
Busy
Error
ErrorID
16#0000
ErrorID
16#0000
ErrorID
ErrorIDEx
16#00000000
ErrorID
ErrorID
16#00000000

Precautions

This section provides precautions for the use of this function block.

Nesting

You can nest calls to this function block for up to four levels.

For details on nesting, refer to the software user’s manual.

Instruction Options

You cannot use the upward differentiation option for this function block.

Re-execution of Function Blocks

Execute-type function blocks cannot be re-executed by the same instance.

If you do so, the output value will be the initial value.

For details on re-execution, refer to the motion control user’s manual.

Specifications of Individual Function Blocks

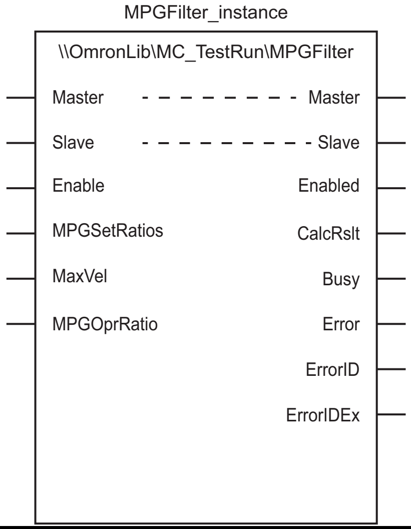
Function block name	Name	Page
MPGFilter	MPG Filter	P. 32

MPGFilter

The MPGFilter function block creates a command position for the specified axis according to an MPG input.

MPG is an acronym for manual pulse generator. An MPG is sometimes called a manual handle.

Function block name	Name	FB/ FUN	Graphic expression	ST expression

MPGFilter	MPG Filter	FB	 MPGFilter_instance
			\\OmronLib\MC_TestRun\MPGFilter
			Master
			Master
			Slave
			Slave
			Enable
			Enabled
			MPGSetRatios
			CalcRslt
			MaxVel
			Busy
			MPGOprRatio
			Error
			ErrorID
			ErrorIDEx
				MPGFilter_instance(
				Master:=*parameter*,
				Slave:=*parameter*,
				Enable:=*parameter*,
				MPGSetRatios:=*parameter*,
				MaxVel:=*parameter*,
				MPGOprRatio:=*parameter*,
				Enabled=>*parameter*,
				CalcRslt=>*parameter*,
				Busy=>*parameter*,
				Error=>*parameter*,
				ErrorID=>*parameter*,
				ErrorIDEx=>*parameter*);

Function Block and Function Information

Item	Description
Library file name	OmronLib_MC_TestRun_V1_1.slr
Namespace	OmronLib\MC_TestRun
Function block and function number	00001
Source code published/not published	Not published
Function block and function version	1.01

Compatible Models

Item	Name	Model numbers	Version
Devices	Encoder input device	NX-EC□□□□ GX-EC0211/EC0241	Version 1.1 or later
	AC Servo Drive	R88D-KN□□□-ECT	Version 2.1 or later
	NX-series Pulse Output Unit	NX-PG0□□□	Version 1.1 or later

Variables

Input Variables

	Meaning	Data type	Description	Valid range	Unit	Initial value
Enable	Enable	BOOL	TRUE: Execute FALSE: Stop	TRUE or FALSE	---	FALSE
MPGSetRatios	MPG Set Gear Ratios	OmronLib\MC_TestRun\sMPG_SET_RATIOS	Set the four gear ratios used by the MPG.	---	---	---
MaxVel	Maximum Velocity	LREAL	Set the maximum velocity.	Positive number or 0.0	---	0.0[*1]
MPGOprRatio	MPG Gear Ratio	UINT	Specify the MPG gear ratio to use during execution.	1: First gear ratio 2: Second gear ratio 3: Third gear ratio 4: Fourth gear ratio	---	1

[*1] A maximum velocity is not applied for a setting of 0.0.

Output Variables

	Meaning	Data type	Description	Valid range	Unit	Initial value
Enabled	Enabled	BOOL	Changes to TRUE when the function block is executed.	TRUE or FALSE	---	---
CalcRslt	Processing Result	LREAL	Outputs the position data calculated by the function block.	Depends on data type.	---	---
Busy	Executing	BOOL	TRUE when the instruction is acknowledged.	TRUE or FALSE	---	---
Error	Error End	BOOL	Outputs TRUE while there is an error.	TRUE or FALSE	---	---
ErrorID	Error Code	WORD	Contains the error code when an error occurs.	[*1]	---	---
ErrorIDEx	Expansion Error Code	DWORD	Contains the expansion error code when an error occurs.	[*1]	---	---

[*1] Refer to *Troubleshooting* on page 40 for details.

In-Out Variables

	Meaning	Data type	Description	Valid range	Unit	Initial value
Master	Master Axis	_sAXIS_REF	Specify the encoder axis connected to the MPG.	---	---	---
Slave	Slave Axis	_sAXIS_REF	Specify the servo axis to drive.	---	---	---

Function

The MPGFilter function block outputs to *CalcRslt*, a command position for the specified Slave Axis (*Slave*) according to the input value from the MPG that is set as the Master Axis (*Master*).

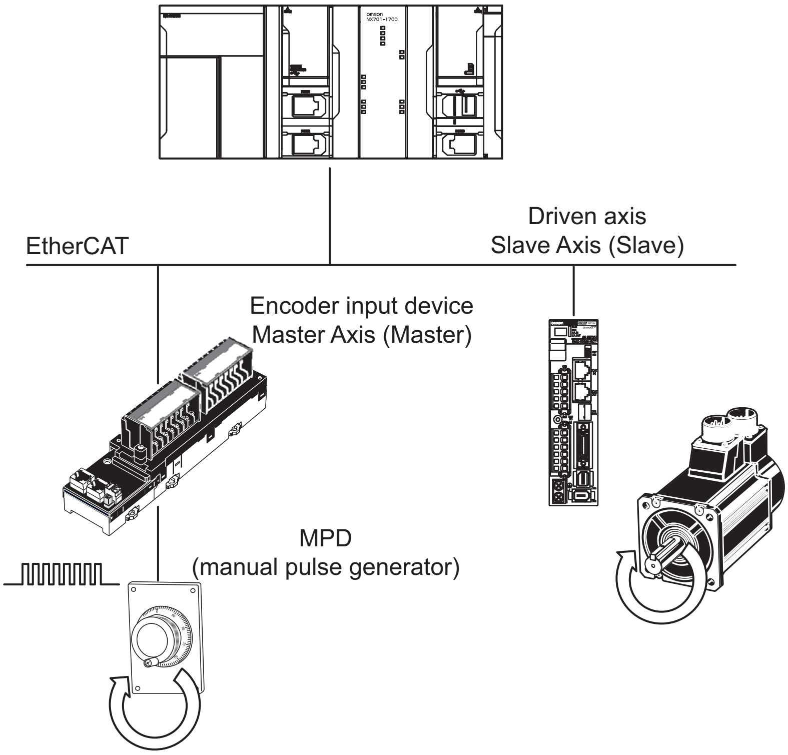
- When *Enabled* is TRUE, the actual current position of the master axis is output to *CalcRslt*.
- If an error occurs in this function block or if *Enable* changes to FALSE, the current value of *CalcRslt* is retained.
- If you use the processing result of this function block to output a command position to a slave axis (*Slave*) in Rotary Mode with a motion control instruction, set *Direction* to the shortest way (1: _mcShortestWay).
- Position information input to this function block from the master axis (*Master*) is managed by an input ring counter that operates for the shortest way. Therfore, if an MPG travel distance that is larger than half of the ring counter range is input in one task period, the motor may turn in an unexpected direction.
  Set the size of the input ring counter of the master axis (*Master*) to a value that is larger than the minimum ring counter size calculated with the following formula.

  Minimum ring counter size = MPG pulse resolution × Maximum MPG travel distance per millisecond × Period of task in which this function block is executed

  Here, the ring counter size is the travel distance from the Modulo Minimum Position Setting Value to the Modulo Maximum Position Setting Value in the position count settings in the axis parameters of the MC Function Module.
  For details on the position count settings and ring counter, refer to the motion control user's manual.
  As an example, the minimum ring counter size is 40 pulses under the following conditions. Therfore, set the distance from the Modulo Minimum Position Setting Value to the Modulo Maximum Position Setting Value in the position count settings in the axis parameters of the MC Function Module to a value that is greater than 40 pulses.

Item	Set value
MPG pulse resolution	2,000 pulses/rotation
Maximum MPG travel distance per millisecond	0.001 rotations/ms = 1 rotation/s
Period of task in which this function block is executed	10 ms

Minimum ring counter size = 2,000 pulses/rotation × 0.001 rotations/ms ×10 ms × 2 = 40 pulses



Precautions for Correct Use

- Confirm that *Enabled* is TRUE before you assign the Processing Result (*CalcRslt*) of this function block to the command position of the slave axis.
- If an error occurs in the Motion Control Function Module, reset the error in the Motion Control Function Module. For details, refer to the motion control user’s manual.

MPG Set Gear Ratios (*MPGSetRatios*)

You can set four ratios in MPG Set Gear Ratios (*MPGSetRatios*). The values that are set in *MPGSetRatios* when *Enable* changes to TRUE are used.

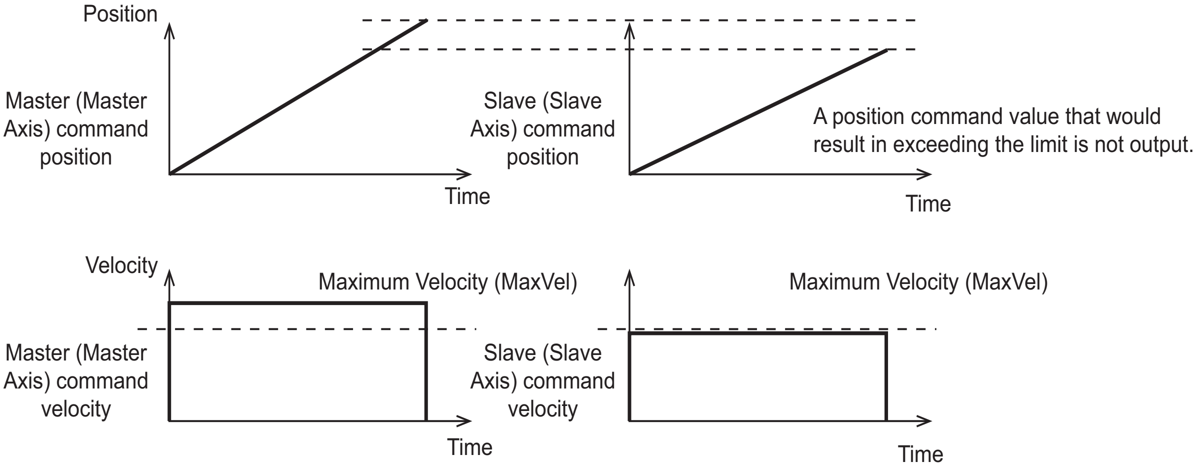
The default values in *MPGSetRatios* are 0. Always set values before you use *MPGSetRatios*.

Select the gear ratio with MP Gear Ratio (*MPGOprRatio*). If the numerator or denominator of the gear ratio selected with *MPGOprRatio* is 0, an error will occur. You can change the value of *MPGOprRatio* at any time while this function block is enabled.

Name	Meaning	Description	Data type	Valid range	Unit	Initial value
MPGSetRatios	MPG Set Gear Ratios	Set the four gear ratios used by the MPG.	OmronLib\MC_TestRun\sMPG_SET_RATIOS	---	---	---
Ratio1_Num	First Gear Ratio Numerator	Set the numerator of the first gear ratio.	DINT	-10,000 to 10,000		0
Ratio1_Den	First Gear Ratio Denominator	Set the denominator of the first gear ratio.	DINT	1 to 10,000		0
Ratio2_Num	Second Gear Ratio Numerator	Set the numerator of the second gear ratio.	DINT	-10,000 to 10,000		0
Ratio2_Den	Second Gear Ratio Denominator	Set the denominator of the second gear ratio.	DINT	1 to 10,000		0
Ratio3_Num	Third Gear Ratio Numerator	Set the numerator of the third gear ratio.	DINT	-10,000 to 10,000		0
Ratio3_Den	Third Gear Ratio Denominator	Set the denominator of the third gear ratio.	DINT	1 to 10,000		0
Ratio4_Num	Fourth Gear Ratio Numerator	Set the numerator of the fourth gear ratio.	DINT	-10,000 to 10,000		0
Ratio4_Den	Fourth Gear Ratio Denominator	Set the denominator of the fourth gear ratio.	DINT	1 to 10,000		0

Restriction to Processing Result

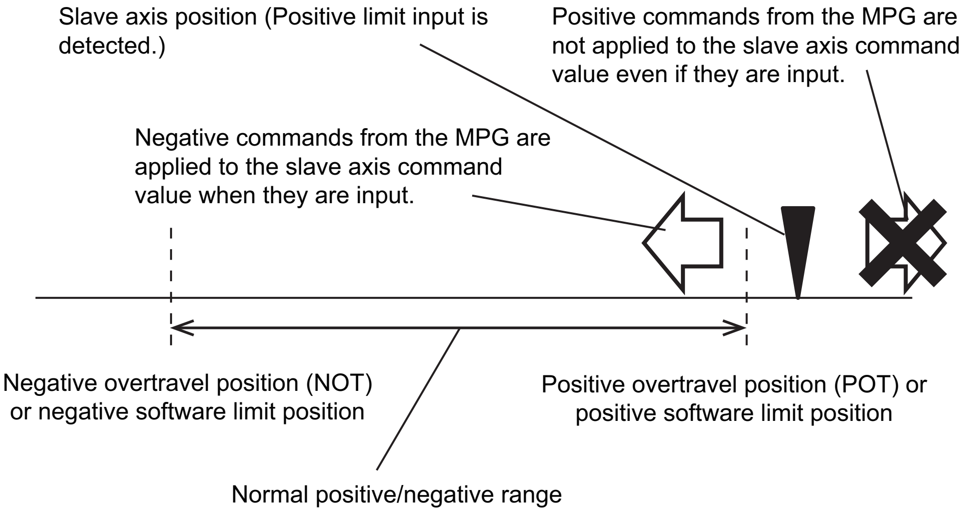
- If the result of multiplying the master axis velocity by the gear ratio exceeds the Maximum Velocity (*MaxVel*), *MaxVel* is used as the upper limit to the command speed for the slave axis.
- If a value that exceeds the maximum jog velocity of the slave axis is set for *MaxVel*, the maximum jog velocity is used as the upper limit to the command speed for the slave axis. The maximum jog velocity is set in the axis parameters. For details, refer to the motion control user's manual.
- Travel distances that cause *MaxVel* to be exceeded are ignored.



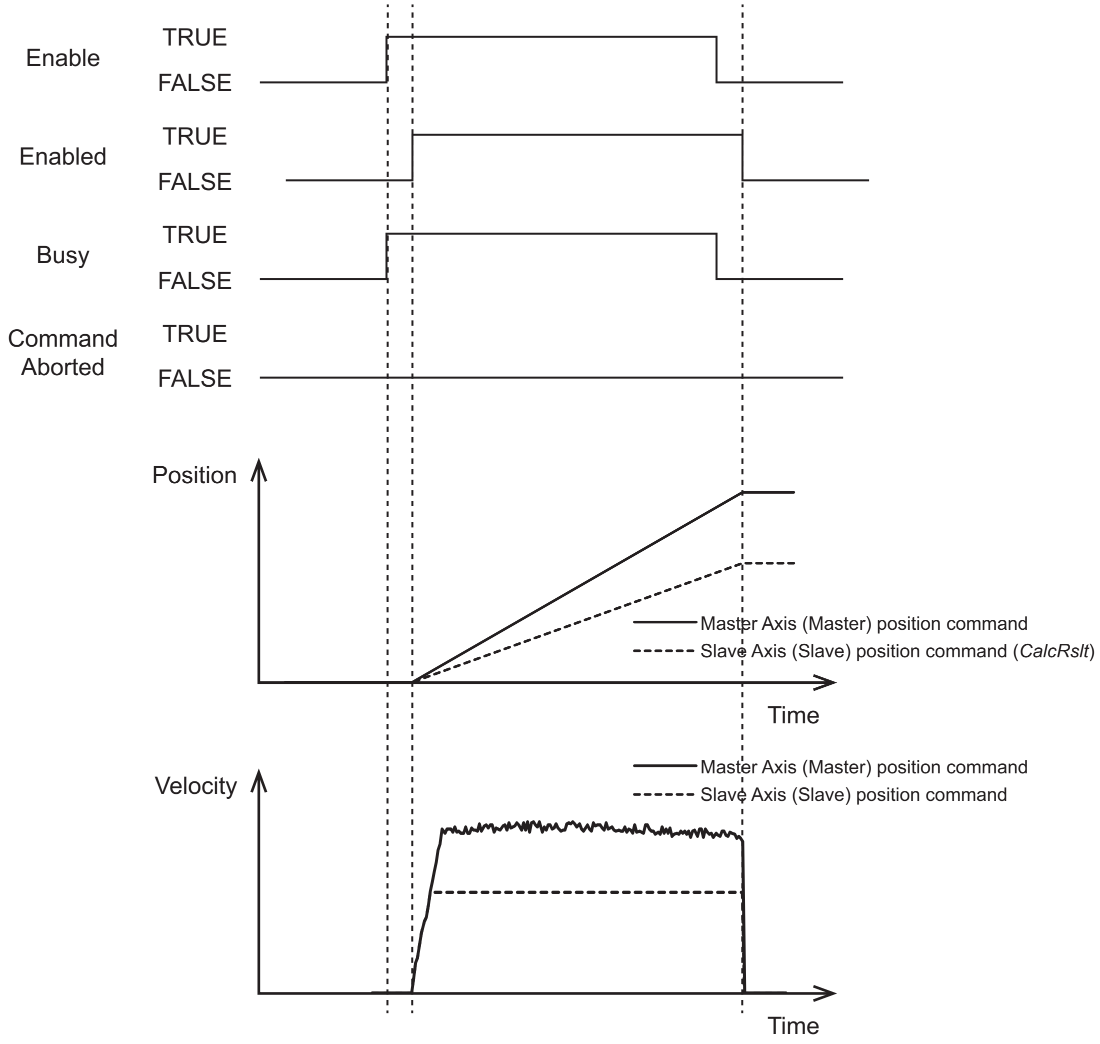
Prohibiting Outputs Outside of the Operating Range

If an error for a limit occurs in the MC Function Module, reset the error in the MC Function Module and then use the MPG to move the axis to within the normal range. You cannot move the axis in the opposite direction. Operation in the direction of the limit becomes possible when the normal range is entered from outside the software limit or limit input.

- Positive/Negative Software Limit Exceeded (16#64450000 or 16#64460000)
- Positive/Negative Limit Input Detected (16#644A0000 or 16#644B0000)


Slave axis position (Positive limit input is detected.)
Positive commands from the MPG are not applied to the slave axis command value even if they are input.
Negative commands from the MPG are applied to the slave axis command value when they are input.
Negative overtravel position (NOT) or negative software limit position
Positive overtravel position (POT) or positive software limit position
Normal positive/negative range

Timing Charts

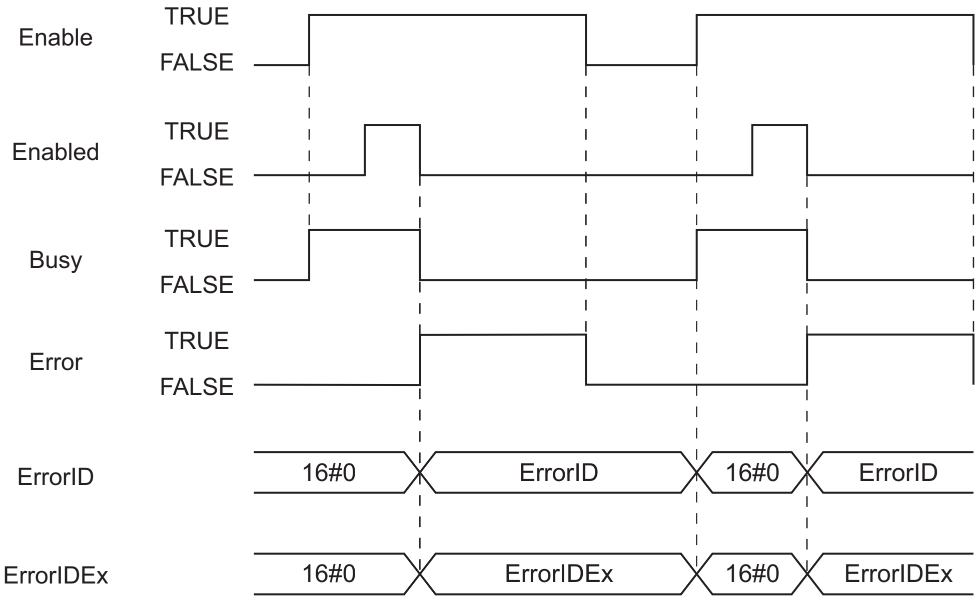


Precautions for Correct Use

- You can use only the Rotary Mode for the Count Mode of the Master Axis (*Master*) input to this function block. An error occurs when the function block is executed if Linear Mode is set for the Count Mode of the Master Axis (*Master*). You can use either Linear Mode or Rotary Mode as the Count Mode of the Slave Axis (*Slave*).
- If you specify the same axis for the master axis (*Master*) and slave axis (*Slave*), a Master and Slave Defined as Same Axis minor fault (error code: 16#3C0E, expansion error code: 16#00000010) will occur.

Errors

If an error occurs during function block execution, *Error* will change to TRUE. You can find out the cause of the error by referring to the values output by *ErrorID* (Error Code) and *ErrorIDEx* (Expansion Error Code). *Error* is cleared when *Enable* to this function block changes to TRUE.



Precautions for Correct Use

- This function block uses the MC_ReadAxisParameter (Read Axis Parameters) instruction. Before you use this function block, read the precautions for correct use for the MC_ReadAxisParameter (Read Axis Parameters) instruction. Refer to the motion control instructions reference manual for information on the MC_ReadAxisParameter instruction.
- The axis parameters that are set when this function block is enabled are used by the function block. If you write the axis parameters with the MC_Write (Write MC Setting) instruction or MC_WriteAxisParameter (Write Axis Parameters) instruction, the written axis parameters are read.
- During execution of an instance, do not execute the same instance.

For details, refer to information on the MC_ReadAxisParameter instruction in the motion control instructions reference manual.

Troubleshooting

Error code	Expansion error code	Status (event name)	Description	Correction
16#0000	16#00000000	Normal end	---	---
16#3C0E	16#00000001	Input Value Out of Range	The *MPGSetRatios* input parameter for this function block exceeded the valid range for the input variable.	Correct the value set for *MPGSetRatios* so that it is within the valid range.
16#3C0E	16#00000002	Input Value Out of Range	The *MaxVel* input parameter for this function block exceeded the valid range for the input variable.	Correct the value set for *MaxVel* so that it is within the valid range.
16#3C0E	16#00000003	Instruction Execution Error Caused by Count Mode Setting	A Counter Mode other than Rotary Mode was specified for the axis specified with *Master*.	Set the axis specified with *Master* to Rotary Mode.
16#3C0E	16#00000004	Master Axis Type Error	The axis type of the axis specified with *Master* is not set to an encoder axis or a virtual encoder axis.	Specify an encoder axis or a virtual encoder axis for the axis type of the axis specified with *Master*.
16#3C0E	16#00000005	Slave Axis Type Error	The axis type of the axis specified with *Slave* is not set to a servo axis or a virtual servo axis.	Set the axis specified with *Slave* to a servo axis or a virtual servo axis.
16#3C0E	16#00000007	MPG Gear Ratio Error	The axis specified for the *MPGOprRatio* input variable to the function block is out of range.	Correct the value set for *MPGOprRatio* so that it is within the valid range.
16#3C0E	16#00000008	MPG Output Position Overflow	An overflow occurred in the processing result (i.e., the slave axis command position) for this function block.	Make corrections so that the slave axis position does not overflow.
16#3C0E	16#00000009	MPG Output Position Underflow	An underflow occurred in the processing result (i.e., the slave axis command position) for this function block.	Make corrections so that the slave axis position does not underflow.
16#3C0E	16#00000010	Master and Slave Defined as Same Axis	The same axis is specified for the *Master* and *Slave* input variables to this function block.	Correct the parameters so that different axes are specified for the *Master* and *Slave* input variables to the instruction.
16#3C0E	16#00000011	Master Axis Parameter Read Failure	A failure occurred in reading the master axis parameters for the MC_ReadAxisParameter instruction that is used in this function block.	Remove the cause of the error according to the event code for the MC_ReadAxisParameter (Read Axis Parameters) instruction.
16#3C0E	16#00000012	Slave Axis Parameter Read Failure	A failure occurred in reading the slave axis parameters for the MC_ReadAxisParameter instruction that is used in this function block.	Remove the cause of the error according to the event code for the MC_ReadAxisParameter (Read Axis Parameters) instruction.

Sample Programming

This sample programming operates a servomotor based on a pulse signal input from an MPG.

Precautions for Correct Use

- The sample programming shows only the portion of a program that uses the function or function block from the library.
- When using actual devices, also program safety circuits, device interlocks, I/O with other devices, and other control procedures.
- Create a user program that will produce the intended device operation.
- Check the user program for proper execution before you use it for actual operation.

Conditions

- An MPG is assigned to an encoder axis in the Motion Control Function Module. It is used as the master axis. The Axis Variable is MC_Axis000.
- The servomotor is assigned to a servo axis and used as the slave axis. The Axis Variable is MC_Axis001.
- The first to fourth gear ratios are set to the following values (numerator, denominator) = (1,1), (10,1), (100,1), and (1000,1).
- The Second Gear Ratio (10,1) is used.

Processing

1. Confirm that the slave axis can communicate and then turn ON the servo for the slave axis.
2. Confirm that the master axis can communicate and that an error has not occurred in the slave axis, and then enable the MPGFilter function block.
3. If the MPGFilter function block is enabled and the slave axis status is *Standstill*, execute the MC_SyncMoveAbsolute instruction for the slave axis. Assign the processing result CalcPosition from the MPGFilter function block to the command position.
4. If an error occurs in the MPGFilter function block, execute the MC_ImmediateStop instruction for the slave axis.
5. If an error occurs in the slave axis, receive the reset command and execute the MC_Reset instruction for the slave axis.

Ladder Diagram

● **External Variables**

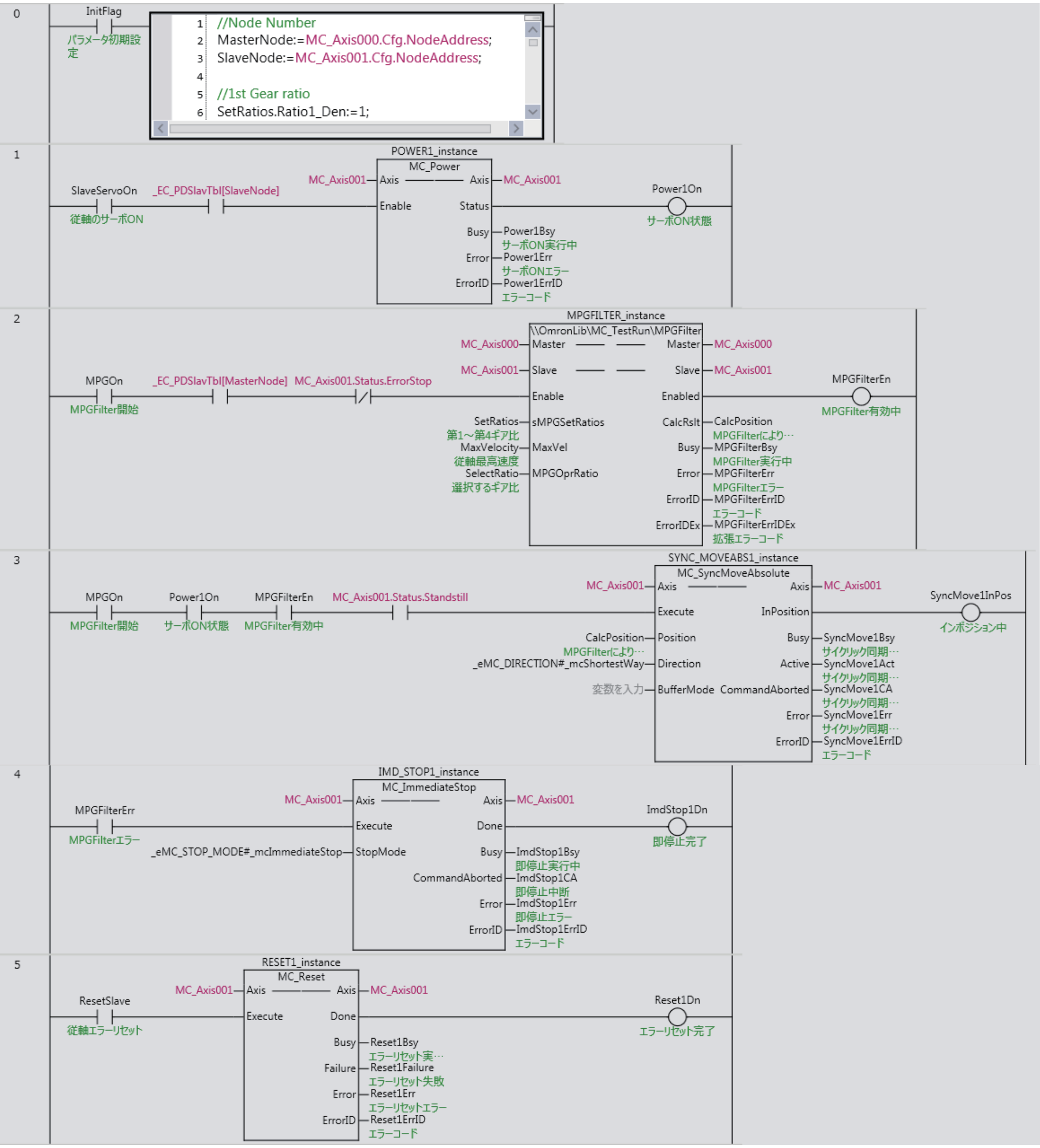
Name	Data type	Constant	Comment
MC_Axis000	_sAXIS_REF	✓	Axis 0 (Master Axis)
MC_Axis001	_sAXIS_REF	✓	Axis 1 (Slave Axis)
_EC_PDSlavTbl	ARRAY[1..512] OF BOOL[*1]	✓	Checking activity of process data communications

[*1] The data type is ARRAY[1..192] OF BOOL for the NJ501-□□□□ or NJ301-□□□□ and ARRAY[1..64] OF BOOL for the NJ101-10□□.

Internal Variables

Name	Data type	Initial value	Comment
MPGFILTER_instance	Omron-Lib\MC_TestRun\MPGFilter		
POWER1_instance	MC_Power		
SYNC_MOVE-ABS1_instance	MC_SyncMoveAbsolute		
IMD_STOP1_instance	MC_ImmediateStop		
RESET1_instance	MC_Reset		
InitFlag	BOOL	FALSE	Parameters initialization
MasterNode	UINT	1	Master axis node address
SlaveNode	UINT	2	Slave axis node address
SetRatios	Omron-Lib\MC_TestRun\sMPG_SET_RATIOS		First to fourth gear ratios
SelectRatio	UINT	0	Selected gear ratio
MaxVelocity	LREAL	0.0	Maximum slave axis velocity
SlaveServoOn	BOOL	FALSE	Servo ON for slave axis
CalcPosition	LREAL	0.0	Position calculated by MPGFilter function block
MPGOn	BOOL	FALSE	Start of MPGFilter function block
MPGFilterEn	BOOL	FALSE	MPGFilter function block enabled state
MPGFilterErr	BOOL	FALSE	MPGFilter function block error
ResetSlave	BOOL	FALSE	Slave axis error reset

● Programming



```
//Node Number
MasterNode:=MC_Axis000.Cfg.NodeAddress;
SlaveNode:=MC_Axis001.Cfg.NodeAddress;

//1st Gear ratio
SetRatios.Ratio1_Den:=1;
```

The contents of the inline ST are given below.

```
//Node Number
MasterNode:=MC_Axis000.Cfg.NodeAddress;
SlaveNode :=MC_Axis001.Cfg.NodeAddress;

//1st Gear ratio
SetRatios.Ratio1_Den:=1;
SetRatios.Ratio1_Num:=1;

//2st Gear ratio
SetRatios.Ratio2_Den:=10;
SetRatios.Ratio2_Num:=1;

//3st Gear ratio
SetRatios.Ratio3_Den:=100;
SetRatios.Ratio3_Num:=1;

//4st Gear ratio
SetRatios.Ratio4_Den:=1000;
SetRatios.Ratio4_Num:=1;

MaxVelocity:=1000.0;
SelectRatio:=2;

InitFlag:=FALSE;
```

Structured Text (ST)

External Variables

Name	Data type	Constant	Comment
MC_Axis000	_sAXIS_REF	✓	Axis 0 (Master Axis)
MC_Axis001	_sAXIS_REF	✓	Axis 1 (Slave Axis)
_EC_PDSlavTbl	ARRAY[1..512] OF BOOL[*1]	✓	Checking activity of process data communications

[*1] The data type is ARRAY[1..192] OF BOOL for the NJ501-□□□□ or NJ301-□□□□ and ARRAY[1..64] OF BOOL for the NJ101-10□□.

Internal Variables

Name	Data type	Initial value	Comment
MPGFILTER_instance	Omron-Lib\MC_TestRun\MPGFilter		
POWER1_instance	MC_Power		
SYNC_MOVE-ABS1_instance	MC_SyncMoveAbsolute		
IMD_STOP1_instance	MC_ImmediateStop		
RESET1_instance	MC_Reset		
InitFlag	BOOL	FALSE	Parameters initialization
MasterNode	UINT	1	Master axis node address
SlaveNode	UINT	2	Slave axis node address
SetRatios	Omron-Lib\MC_TestRun\sMPG_SET_RATIOS		First to fourth gear ratios
SelectRatio	UINT	0	Selected gear ratio
MaxVelocity	LREAL	0.0	Maximum slave axis velocity
SlaveServoOn	BOOL	FALSE	Servo ON for slave axis
Power1On	BOOL	FALSE	Servo ON status
CalcPosition	LREAL	0.0	Position calculated by MPGFilter function block
MPGOn	BOOL	FALSE	Start of MPGFilter function block
MPGFilterEn	BOOL	FALSE	MPGFilter function block enabled state
Power1Enable	BOOL	FALSE	MC_Power instance execution
MPGFilter1Enable	BOOL	FALSE	MPGFilter instance execution
SyncMove1Execute	BOOL	FALSE	MC_SyncMoveAbsolute instance execution
ImdStop1Execute	BOOL	FALSE	MC_ImmediateStop instance execution
Reset1Execute	BOOL	FALSE	MC_Reset instance execution

Programming

```
// Set Parameters
IF ( InitFlag=FALSE ) THEN
    MasterNode:=MC_Axis000.Cfg.NodeAddress;    // Master Axis's node number
    SlaveNode:=MC_Axis001.Cfg.NodeAddress;     // Slave Axis's node number

    // 1st Gear Ratio
    SetRatios.Ratio1_Num:=1;
    SetRatios.Ratio1_Den:=1;
    // 2nd Gear Ratio
    SetRatios.Ratio2_Num:=10;
    SetRatios.Ratio2_Den:=1;
    // 3rd Gear Ratio
    SetRatios.Ratio3_Num:=100;
    SetRatios.Ratio3_Den:=1;
    // 4th Gear Ratio
    SetRatios.Ratio4_Num:=1000;
    SetRatios.Ratio4_Den:=1;

    // Max Velocity
    MaxVelocity:=1000.0;
    // Select Ratio
    SelectRatio:=2;                            // 2nd Gear Ratio
    // Flag Reset
    InitFlag:=FALSE;
END_IF;

// Slave's Servo On
// Check the Slave's EtherCAT process data communication available before it's Servo
On will be started.
IF ( (SlaveServoOn=TRUE) AND (_EC_PDSlavTbl[SlaveNode]=TRUE) ) THEN
    Power1Enable:=TRUE;
ELSE
    Power1Enable:=FALSE;
END_IF;

// Calculate MPG data
// Check both the Master's EtherCAT process data communication and the Slave's status
available,
// before MPGFilter will be started.
IF ( (MPGOn=TRUE) AND (_EC_PDSlavTbl[MasterNode]=TRUE) AND (MC_Axis001.Status.Error-
Stop=FALSE) ) THEN
    MPGFilterEn:=TRUE;
ELSE
    MPGFilterEn:=FALSE;
END_IF;

// Output calculated MPG data to the Slave Axis using MC_SyncMoveAbsolute.
IF ( (MPGOn=TRUE) AND (Power1On=TRUE) AND (MPGFilterEn=TRUE) AND (MC_Axis000.Sta-
tus.Disabled=TRUE) ) THEN
    SyncMove1Execute:=TRUE;
ELSE
    SyncMove1Execute:=FALSE;
END_IF;

// If the MPGFilter will be occurred Error event, the Slave Axis have to be stopped
immediately.
IF (MPGFilterErr=TRUE) THEN
    ImdStop1Execute:=TRUE;
ELSE
    ImdStop1Execute:=FALSE;
END_IF;
```

```
// Reset the Slave Axis when it is Error Status
IF ( (ResetSlave=TRUE) AND (MC_Axis001.Status.ErrorStop=TRUE) ) THEN
    Reset1Execute:=TRUE;
ELSE
    Reset1Execute:=FALSE;
END_IF;

// Instance of MC_Power
POWER1_instance(
    Axis   :=MC_Axis001,
    Enable :=Power1Enable,
    Status =>Power1On,
    Busy   =>Power1Bsy,
    Error  =>Power1Err,
    ErrorID=>Power1ErrID);

// Instance of MPGFilter
MPGFILTER_instance(
    Master       :=MC_Axis000,
    Slave        :=MC_Axis001,
    Enable       :=MPGFilterEn,
    sMPGSetRatios:=SetRatios,
    MaxVel       :=MaxVelocity,
    MPGOprRatio  :=SelectRatio,
    Enabled      =>MPGFilterEn,
    CalcRslt     =>CalcPosition,
    Busy         =>MPGFilterBsy,
    Error        =>MPGFilterErr,
    ErrorID      =>MPGFilterErrID,
    ErrorIDEx    =>MPGFilterErrIDEx);

// Instance of MC_SyncMoveAbsolute
SYNC_MOVEABS1_instance(
    Axis          :=MC_Axis001,
    Execute       :=SyncMove1Execute,
    Position      :=CalcPosition,
    Direction     :=_mcShortestWay,
    BufferMode    :=_mcAborting,
    InPosition    =>SyncMove1InPos,
    Busy          =>SyncMove1Bsy,
    Active        =>SyncMove1Act,
    CommandAborted=>SyncMove1CA,
    Error         =>SyncMove1Err,
    ErrorID       =>SyncMove1ErrID);

// Instance of MC_ImmediateStop
IMD_STOP1_instance(
    Axis          :=MC_Axis001,
    Execute       :=ImdStop1Execute,
    StopMode      :=_mcImmediateStop,
    Done          =>ImdStop1Dn,
    Busy          =>ImdStop1Bsy,
    CommandAborted=>ImdStop1CA,
    Error         =>ImdStop1Err,
    ErrorID       =>ImdStop1ErrID);

// Instance of MC_Reset
RESET1_instance(
    Axis   :=MC_Axis001,
    Execute:=Reset1Execute,
    Done   =>Reset1Dn,
    Busy   =>Reset1Bsy,
    Failure=>Reset1Failure,
    Error  =>Reset1Err,
    ErrorID=>Reset1ErrID);
```

Appendix

Referring to Library Information

When you make an inquiry to OMRON about the library, you can refer to the library information to identify the library to ask about.

The library information is useful in identifying the target library among the libraries provided by OMRON or created by the user.

The library information consists of the attributes of the library and the attributes of function blocks and functions contained in the library.

- Attributes of libraries
  Information for identifying the library itself
- Attributes of function blocks and functions
  Information for identifying the function block and function contained in the library

Use the Sysmac Studio to access the library information.

Attributes of Libraries, Function Blocks and Functions

The following attributes of libraries, function blocks and functions are provided as the library information.

● Attributes of Libraries

No.*1	Attribute	Description
(1)	Library file name	The name of the library file
(2)	Library version	The version of the library
(3)	Author	The name of creator of the library
(4)	Comment	The description of the library*2

*1. These numbers correspond to the numbers shown on the screen images in the next section, *Referring to Attributes of Libraries, Function Blocks and Functions* on page 51.

*2. It is provided in English and Japanese.

● Attributes of Function Blocks and Functions

No.*1	Attribute	Description
(5)	FB/FUN name	The name of the function block or function
(6)	Name space	The name of name space for the function block or function
(7)	FB/FUN version	The version of the function block or function
(8)	Author	The name of creator of the function block or function
(9)	FB/FUN number	The function block number or function number
(10)	Comment	The description of the function block or function*2

*1. These numbers correspond to the numbers shown on the screen images in the next section, *Referring to Attributes of Libraries, Function Blocks and Functions* on page 51.

*2. It is provided in English and Japanese.

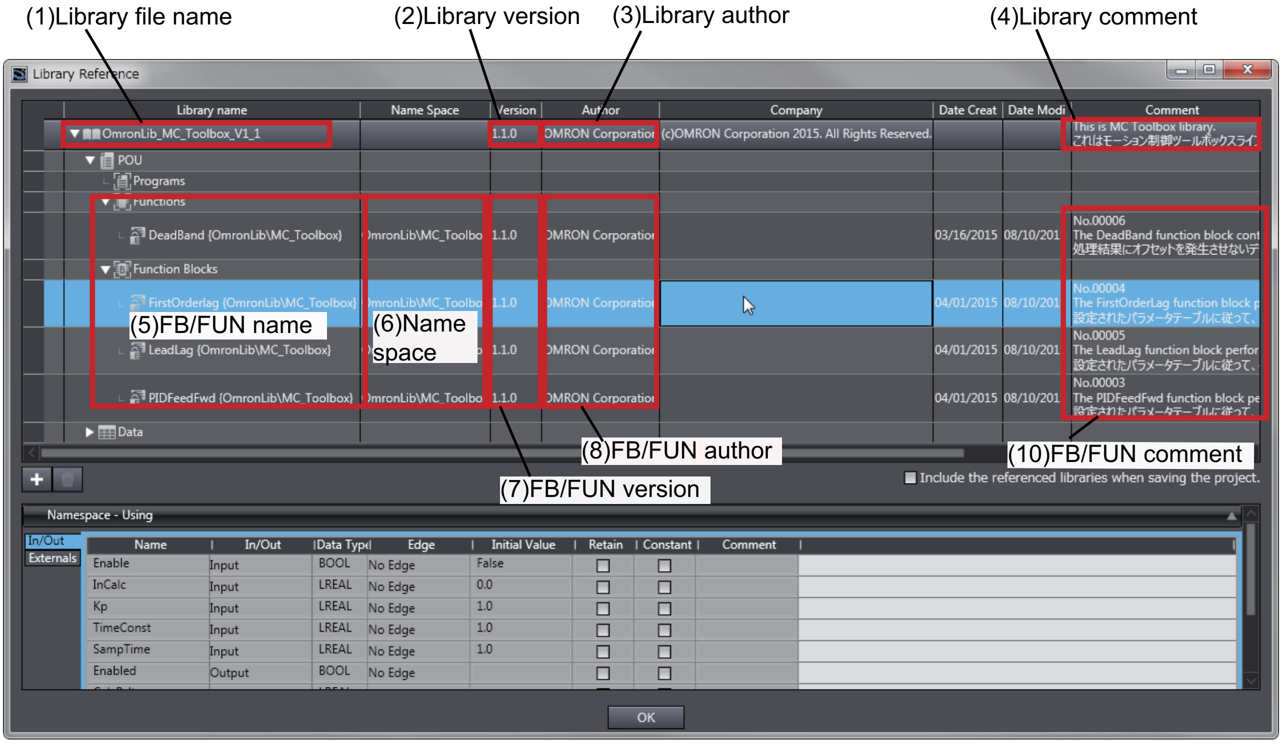
Referring to Attributes of Libraries, Function Blocks and Functions

You can refer to the attributes of libraries, function blocks and functions of the library information at the following locations on the Sysmac Studio.

- Library Reference Dialog Box
- Toolbox Pane
- Ladder Editor

(a) Library Reference Dialog Box

When you refer to the libraries, the library information is displayed at the locations shown below.



Library name	Name Space	Version	Author	Company	Date Creat	Date Modi	Comment
OmronLib_MC_Toolbox_V1_1		1.1.0	OMRON Corporatio	(c)OMRON Corporation 2015. All Rights Reserved.			This is MC Toolbox library. これはモーション制御ツールボックスライ
POU							
Programs							
Functions							
DeadBand {OmronLib\MC_Toolbox}	)mronLib\MC_Toolbo	1.1.0	OMRON Corporatio		03/16/2015	08/10/201	No.00006 The DeadBand function block cont 処理結果にオフセットを発生させないデ
Function Blocks							
FirstOrderlag {OmronLib\MC_Toolbox}	)mronLib\MC_Toolbo	1.1.0	OMRON Corporatio		04/01/2015	08/10/201	No.00004 The FirstOrderLag function block p 設定されたパラメータテーブルに従って、
LeadLag {OmronLib\MC_Toolbox}		1.1.0	OMRON Corporatio		04/01/2015	08/10/201	No.00005 The LeadLag function block perfor 設定されたパラメータテーブルに従って、
PIDFeedFwd {OmronLib\MC_Toolbox}	)mronLib\MC_Toolbo	1.1.0	OMRON Corporatio		04/01/2015	08/10/201	No.00003 The PIDFeedFwd function block pe 設定されたパラメータテーブルに従って、
Data							

□ Include the referenced libraries when saving the project.

Namespace - Using

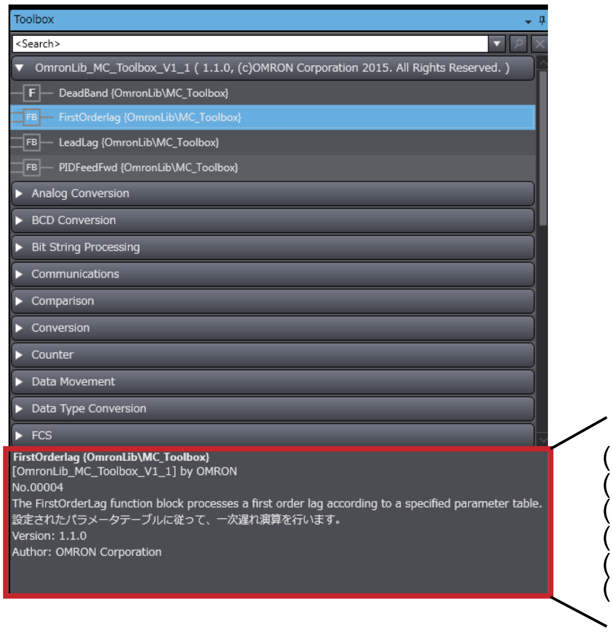
In/Out
Externals

Name	In/Out	Data Type	Edge	Initial Value	Retain	Constant	Comment
Enable	Input	BOOL	No Edge	False	□	□	
InCalc	Input	LREAL	No Edge	0.0	□	□	
Kp	Input	LREAL	No Edge	1.0	□	□	
TimeConst	Input	LREAL	No Edge	1.0	□	□	
SampTime	Input	LREAL	No Edge	1.0	□	□	
Enabled	Output	BOOL	No Edge		□	□	

(b) Toolbox Pane

Select a function block and function to display its library information at the bottom of the Toolbox Pane.

The text “by OMRON” which is shown on the right of the library name (1) indicates that this library was provided by OMRON.

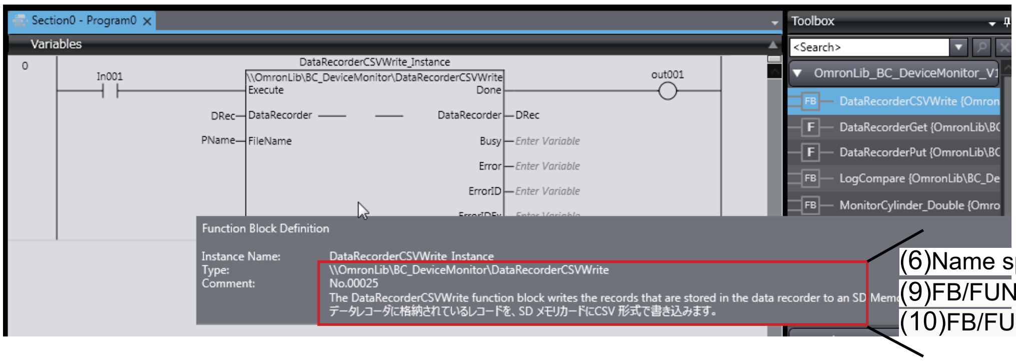

Toolbox
<Search>
OmronLib_MC_Toolbox_V1_1 (1.1.0, (c)OMRON Corporation 2015. All Rights Reserved.)
F DeadBand {OmronLib\MC_Toolbox}
FB FirstOrderlag {OmronLib\MC_Toolbox}
FB LeadLag {OmronLib\MC_Toolbox}
FB PIDFeedFwd {OmronLib\MC_Toolbox}
Analog Conversion
BCD Conversion
Bit String Processing
Communications
Comparison
Conversion
Counter
Data Movement
Data Type Conversion
FCS

FirstOrderlag {OmronLib\MC_Toolbox}
[OmronLib_MC_Toolbox_V1_1] by OMRON
No.00004
The FirstOrderLag function block processes a first order lag according to a specified parameter table.
設定されたパラメータテーブルに従って、一次遅れ演算を行います。
Version: 1.1.0
Author: OMRON Corporation

(5)FB/FUN name (6)Name space
(1)Library file name
(9)FB/FUN number
(10)FB/FUN comment
(7)FB/FUN version
(8)FB/FUN author

(c) Ladder Editor

Place the mouse on a function block and function to display the library information in a tooltip.


Section0 - Program0
Variables
0
In001
DataRecorderCSVWrite_Instance
\\OmronLib\BC_DeviceMonitor\DataRecorderCSVWrite
Execute
Done
out001
DRec
DataRecorder
DataRecorder
DRec
PName
FileName
Busy
Enter Variable
Error
Enter Variable
ErrorID
Enter Variable
Toolbox
<Search>
OmronLib_BC_DeviceMonitor_V1
FB DataRecorderCSVWrite {Omron
F DataRecorderGet {OmronLib\BC
F DataRecorderPut {OmronLib\BC
FB LogCompare {OmronLib\BC_De
FB MonitorCylinder_Double {Omro

Function Block Definition

Instance Name: DataRecorderCSVWrite_Instance
Type: \\OmronLib\BC_DeviceMonitor\DataRecorderCSVWrite
Comment: No.00025
The DataRecorderCSVWrite function block writes the records that are stored in the data recorder to an SD Mem
データレコーダに格納されているレコードを、SD メモリカードにCSV 形式で書き込みます。

(6)Name space (5)FB/FUN name
(9)FB/FUN number
(10)FB/FUN comment

Referring to Function Block and Function Source Codes

You can refer to the source codes of function blocks and functions provided by OMRON to customize them to suit the user's environment.

User function blocks and user functions can be created based on the copies of these source codes.

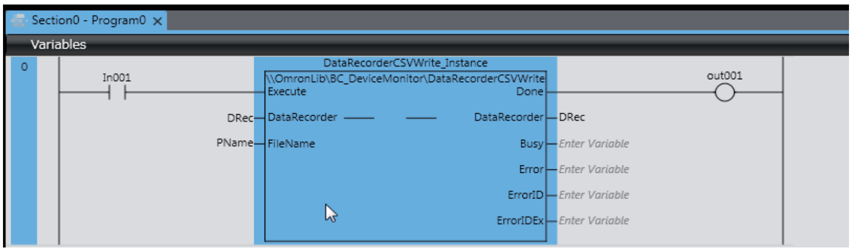
The following are the examples of items that you may need to customize.

- Customizing the size of arrays to suit the memory capacity of the user's Controller
- Customizing the data types to suit the user-defined data types

Note that you can access only function blocks and functions whose Source code published/not published is set to Published in the library information shown in their individual specifications.

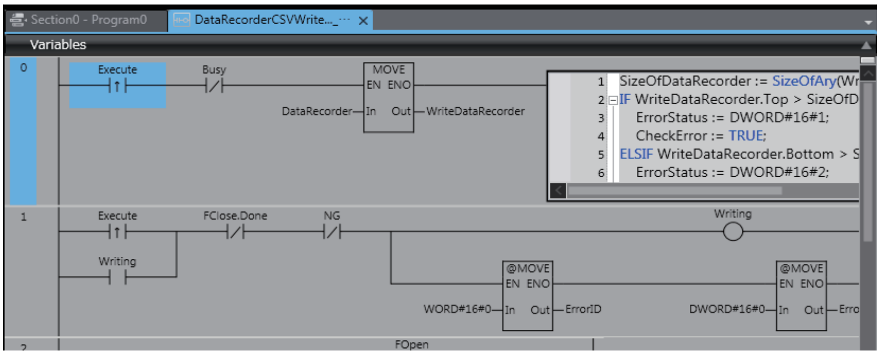
Use the following procedure to refer to the source codes of function blocks and functions.

1 Select a function block or function in the program.



2 Double-click or right-click and select **To Lower Layer** from the menu.

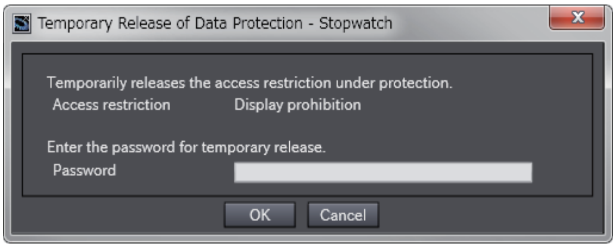
The source code is displayed.



```
SizeOfDataRecorder := SizeOfAry(Wr
IF WriteDataRecorder.Top > SizeOfD
    ErrorStatus := DWORD#16#1;
    CheckError := TRUE;
ELSIF WriteDataRecorder.Bottom > S
    ErrorStatus := DWORD#16#2;
```

Precautions for Correct Use

For function blocks and functions whose source codes are not published, the following dialog box is displayed in the above step 2. Click the **Cancel** button.



Temporary Release of Data Protection - Stopwatch

Temporarily releases the access restriction under protection.
Access restriction   Display prohibition

Enter the password for temporary release.
Password

OMRON Corporation **Industrial Automation Company**

Kyoto, JAPAN

Contact: www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.
Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands
Tel: (31)2356-81-300/Fax: (31)2356-81-388

OMRON ASIA PACIFIC PTE. LTD.
No. 438A Alexandra Road # 05-05/08 (Lobby 2),
Alexandra Technopark,
Singapore 119967
Tel: (65) 6835-3011/Fax: (65) 6835-2711

OMRON ELECTRONICS LLC
2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.
Tel: (1) 847-843-7900/Fax: (1) 847-843-7787

OMRON (CHINA) CO., LTD.
Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China
Tel: (86) 21-5037-2222/Fax: (86) 21-5037-2200

Authorized Distributor:

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