MELSOFT

MITSUBISHI ELECTRIC

Engineering Software

GX Works3 Operating Manual

-SW1DND-GXW3-E

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

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

The precautions given in this manual are concerned with this product only. For the safety precautions for the programmable controller system, refer to the user's manual for the module used and MELSEC iQ-R Module Configuration Manual.

In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

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

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.

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

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

[Design Precautions]

⚠ WARNING

- When data change, program change, or status control are performed from a personal computer to a running CPU module, create an interlock circuit outside the programmable controller to ensure that the whole system always operates safely.
  Furthermore, for the online operations performed from a personal computer to a programmable controller CPU, the corrective actions against a communication error due to such as a cable connection fault should be predetermined as a system.
- To maintain the safety of the programmable controller system against unauthorized access from external devices via the network, take appropriate measures.
  To maintain the safety against unauthorized access via the Internet, take measures such as installing a firewall.

[Startup and Maintenance Precautions]

⚠ CAUTION

- The online operations performed from a personal computer to a running CPU module (program change while a CPU module is in RUN, operating status changes such as RUN-STOP switching, and remote control operation) must be executed after the manual has been carefully read and the safety has been ensured.
- When changing a program while a CPU module is in RUN (online program change), it may cause a program corruption in some operating conditions. Fully understand the precautions before use.
- The positioning test functions such as OPR, JOG, inching, or testing positioning data for positioning module must be executed with the CPU module set to STOP after the manual has been carefully read and the safety has been ensured.
  Specially when executing the function on the network system, ensure the safety thoroughly since the machinery whose operation cannot be checked by an operator may be activated. The operation failure may cause the injury or machine damage.

CONDITIONS OF USE FOR THE PRODUCT

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

INTRODUCTION

Thank you for purchasing the engineering software, MELSOFT series.

This manual describes the programming and functions required when using GX Works3.

Before using this product, please read this manual carefully, and develop familiarity with the functions and performance of GX Works3 to handle the product correctly.

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RELEVANT MANUALS

Manual name [manual number]	Description	Available form
GX Works3 Operating Manual [SH-081215ENG] (this manual)	Explains the system configurations, parameter settings, and operation methods for the online function in GX Works3.	e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- Hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Built-in Ethernet CPU	A generic term for CPU modules with Ethernet ports.
Control CPU	A CPU module to control a connected I/O module and an intelligent function module. In a multiple CPU system, CPU modules to be controlled can be set for each module.
Direct connection	A connection using a USB/serial/Ethernet port of a CPU module.
Execution program	A converted program that can be executed on a CPU module.
FB instance	A function block pasted on a sequence program.
FX5CPU	A generic term for FX5UCPU and FX5UCCPU.
GX Configurator	A generic product name for GX Configurator-AD/DA/SC/CT/TC/TI/FL/PT/AS/QP.
GX Developer	A generic product name for SWnD5C-GPPW, SWnD5C-GPPW-A, SWnD5C-GPPW-V, and SWnD5C-GPPW-VA. ('n' indicates its version.)
GX LogViewer	A product name for SWnDNN-VIEWER-M. ('n' indicates its version.)
GX Works2	A generic product name for SWnDND-GXW2 and SWnDNC-GXW2. ('n' indicates its version.)
GX Works3	A generic product name for SWnDND-GXW3. ('n' indicates its version.)
High-speed universal model QCPU	A generic term for Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q13UDVCPU, and Q26UDVCPU.
Intelligent function module	A generic term for modules which have functions other than input and output, such as A/D converter modules and D/A converter modules.
iQ AppPortal	A generic product name for SWnDND-IQAPL-M. ('n' indicates its version.)
MELSOFT Library	A generic term for components (FB library, sample programs, drawing data) which provide easy operation of programmable controller related modules, GOTs, and other devices that are connected to the modules and GOTs. To obtain components of MELSOFT Library, please consult your local Mitsubishi representative.
MELSOFT Navigator	A product name for the integrated development environment included in SWnDND-IQWK (MELSOFT iQ Works). ('n' indicates its version.)
Member	A local label defined in a structure or a function block.
Personal computer	A generic term for personal computers on which Windows® operates.
Program restoration information	Information to be used for reading GX Works3 project from a programmable controller and restoring it. It includes drawing information of a program and definition information of a local label. It is equivalent to the source information in GX Works2 and included in each program in GX Works3.
QnPRHCPU	A generic term for Q12PRHCPU and Q25PRHCPU.
RCPU	A generic term for RnCPUs, RnENCPUs, RnPCPUs, RnPSFCPUs, and RnSFCPUs.
Remote head module	An abbreviation for RJ72GF15-T2 CC-Link IE Field Network remote head modules.
RnCPU	A generic term for R00CPU, R01CPU, R02CPU, R04CPU, R08CPU, R16CPU, R32CPU, and R120CPU.
RnENCPU	A generic term for R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, and R120ENCPU.
RnPCPU	A generic term for R08PCPU, R16PCPU, R32PCPU, and R120PCPU.
RnPSFCPU	A generic term for R08PSFCPU, R16PSFCPU, R32PSFCPU, and R120PSFCPU.
RnSFCPU	A generic term for R08SFCPU, R16SFCPU, R32SFCPU, and R120SFCPU.

Term	Description
Slave station	Stations (such as a local station, remote I/O station, remote device station, and intelligent device station) other than a master station.
Universal model QCPU	A generic term for Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q03UDECPU, Q04UDHCPU, Q04UDEHCPU, Q06UDHCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU.
Windows Vista® or later	A generic term for Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1, and Windows® 10.
Windows® 7 or later	A generic term for Windows® 7, Windows® 8, Windows® 8.1, and Windows® 10.
Windows® 8 or later	A generic term for Windows® 8, Windows® 8.1, and Windows® 10.

For the terms of data, refer to the following section.

☞ Page 82 Data configuration

For a process control system

Term	Description
Assignment information data	Assignment information on the tag data assigned to a file register. Device information of a CPU module is stored.
Faceplate	The gauge window that displays an image of a controller and an indicator. On this window, tag data can be monitored and a current value can be changed.
FB property	A label of VAR_PUBLIC' class or 'VAR_PUBLIC_RETAIN' class in a local label defined in an FB. For a tag FB, the member of tag data is included in the member of tag FB. Operation of a function block can be changed by setting the initial value of an FB property, or changing the current value of an FB property while running a program.
FBD/LD program for process control	An FBD/LD program with extended functions for process control.
Process control	To automatically control a variation such as flow rate, temperature, pressure, and density in a process.
Process control engineering	To develop, adjust, and maintain a process control program for a process control system.
Process control extension	To extend functions of GX Works3 for process control engineering.
Process control function block	A manufacturer-provided process control function block that is available in an FBD/LD program with the process control extension enabled in a GX Works3 project used for an RnPCPU and an RnPSFCPU. A process control instruction for an RnPCPU and an RnPSFCPU is executed in the function block.
Process control system	A system equipped with various devices such as for measuring, controlling, and monitoring to automatically control a product process.
Tag access FB	A usable process control function block in a user-defined tag FB The processing is executed by accessing tag data of a user-defined tag FB.
Tag data	Refers to data that a process condition and process status in a tag FB are contained. Tag data is created as a structure in GX Works3.
Tag FB	A function block to work as a device such as a controller and indicator for process control. A structure defined as a global label (tag data) is used.
Tag type	Classification of tag FBs that work as a device such as a controller and indicator for process control. The tag data structure type and the type of a faceplate is defined depending on the tag type.
User-defined tag FB	A function block to customize the process control processing of a manufacturer-defined tag FB. Tag data in a user-created FB program can be referred by combining a function, a function block, and a process control function block.

For a redundant system

Term	Description
Connective system	Refers to the system of a CPU module specified in the "Specify Connection Destination" screen.
Other system	Refers to the system connected to the connective system with a tracking cable.

For definitions of other terms for a redundant system, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

For a system using an RnPSFCPU and a safety system

For definitions of terms for an RnPSFCPU and an RnSFCPU, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

PART 1 FUNDAMENTALS OF GX Works3

This part explains the screen configuration and basic operations of GX Works3.

1 BEFORE USING THIS PRODUCT

2 SCREEN CONFIGURATION AND BASIC OPERATIONS

1 BEFORE USING THIS PRODUCT

GX Works3 is an engineering tool for configuring settings, programming, debugging, and performing the maintenance for programmable controllers such as MELSEC iQ-R series/MELSEC iQ-F series.
By comparing with conventional GX Works2, the functions are enhanced and their operability have been improved.

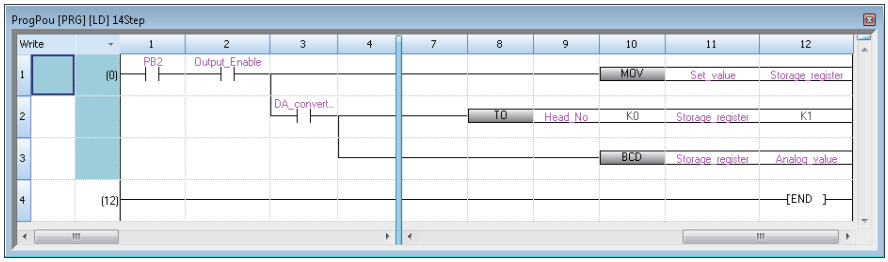
1.1 Main Functions of GX Works3

GX Works3 manages programs and parameters in each project for each CPU module.
GX Works3 functions are shown below.

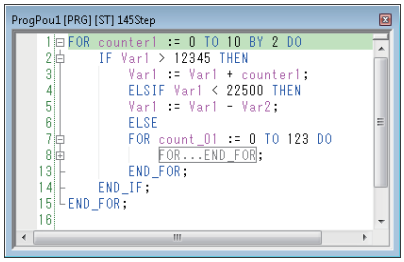
Program creation function

Programs can be created in a programming language appropriate for the processing contents.

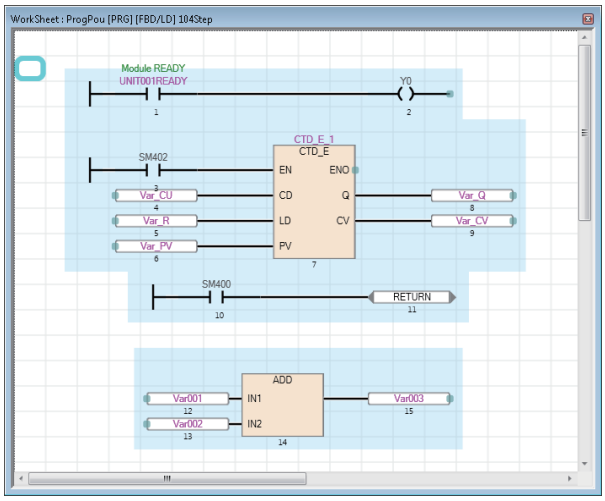
<Ladder program>



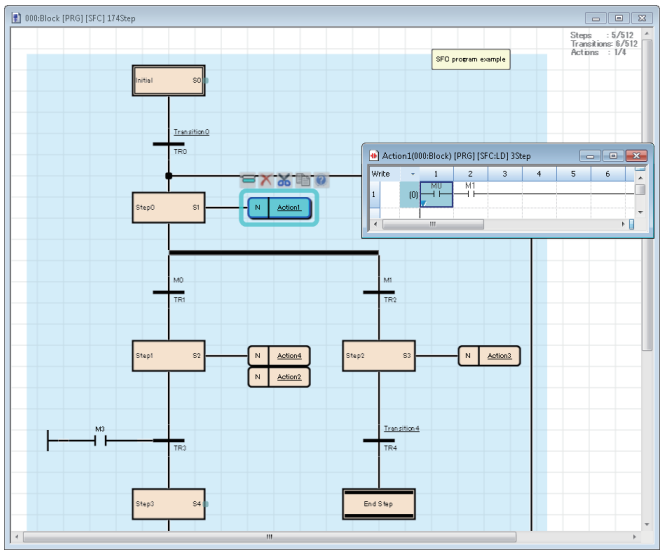
<ST program>



<FBD/LD program>

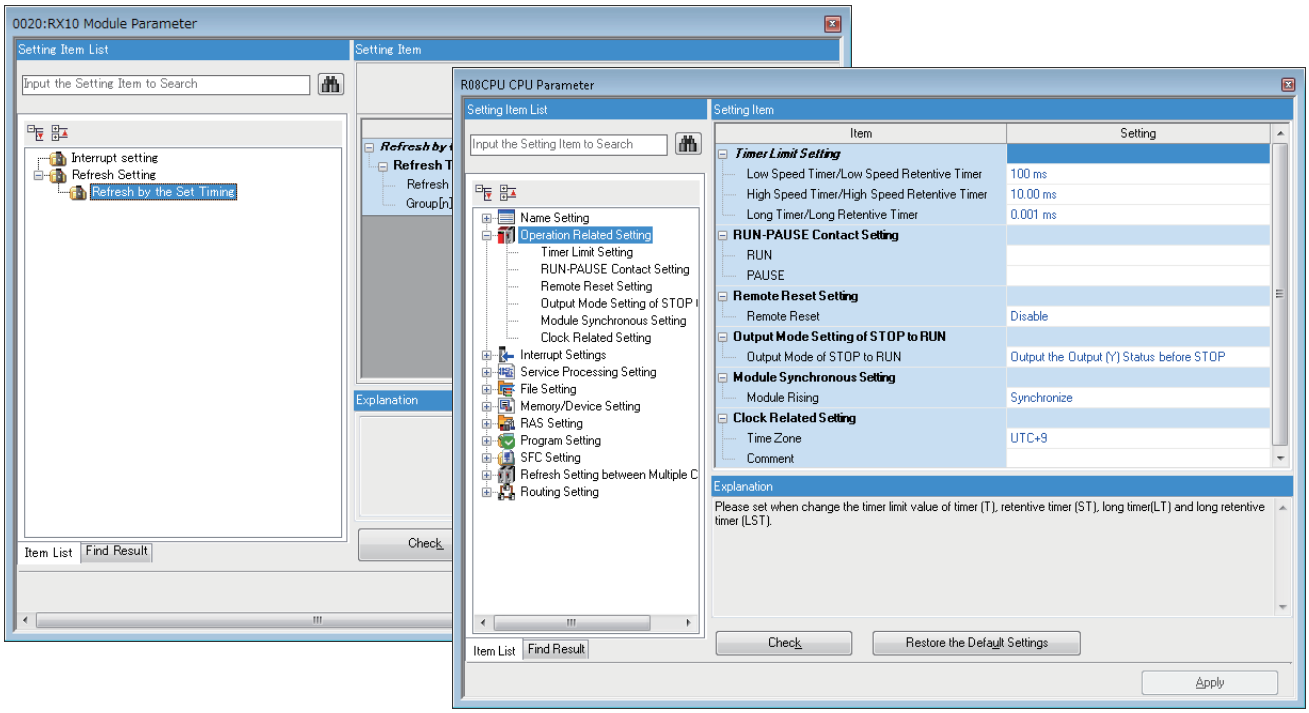


〈SFC program〉



Parameter setting function

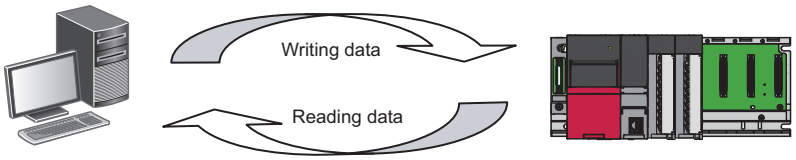
Parameters of CPU modules, I/O modules, and intelligent function modules can be set.



Write to/Read from PLC function

Created sequence programs can be written to or read from a CPU module with the 'Write to PLC' function or the 'Read from PLC' function.

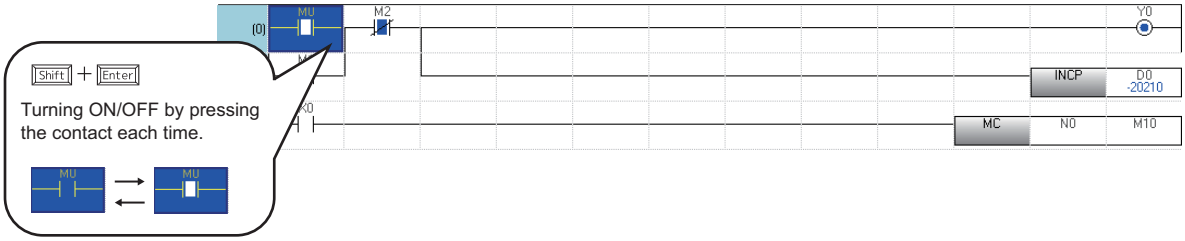
In addition, sequence programs can be modified by using the online program change function while a CPU module is running.



Monitor/debug function

Data such as device values can be monitored while sequence programs that were written to a CPU module are executed.

Even when an CPU module is not connected, programs can be debugged by using a virtual programmable controller (simulation function).

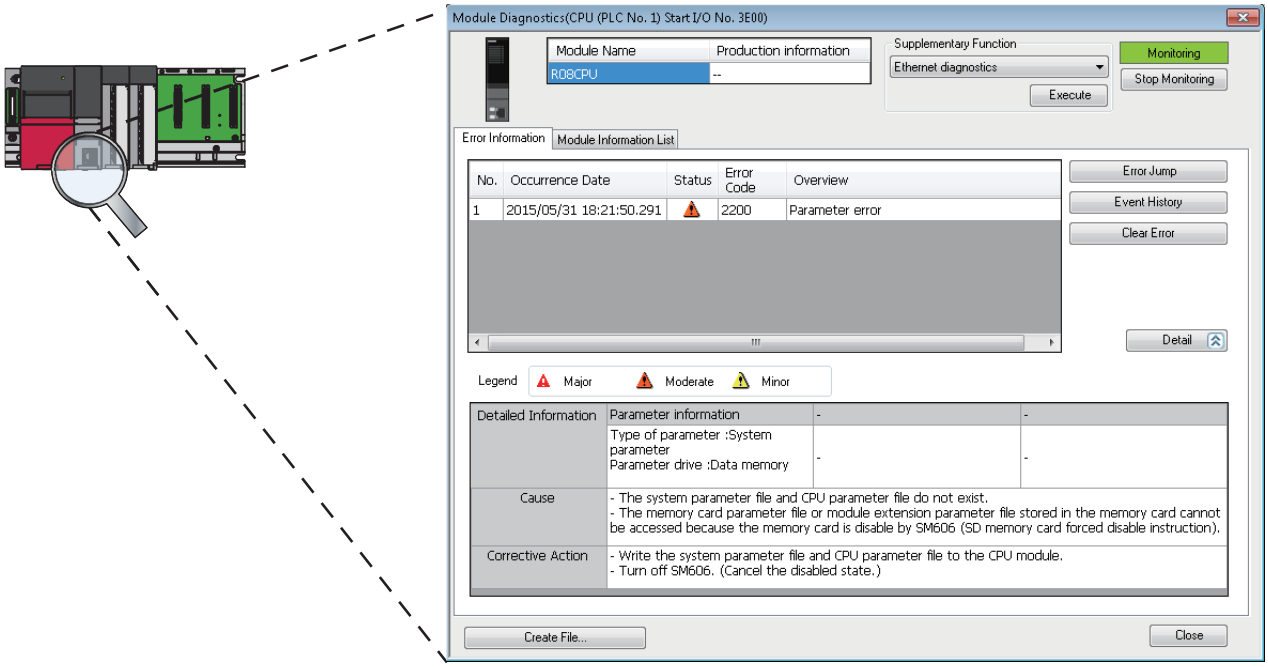


Diagnostic function

The current error status and error history of a CPU module or network can be diagnosed. The recovery time will be shortened by this function.

Detailed information on a module, such as an intelligent function module, can be acquired by using the system monitor function. The recovery time will be much shortened by this function when an error occurs.

■CPU module diagnostic ("Module Diagnostics" screen)



1.2 RnPCPU

GX Works3 supports both MELSEC iQ-R series RnPCPUs constructing a process control system and a redundant system and process control programs.

In RnPCPUs, two operation modes are available: process mode and redundant mode. The type of project which can be created differs depending on the selected mode.

Mode	Description	Reference
Process	To create a project for process control programs.	This section
Redundant	To create a project for process control programs and the functions for a redundant system.	This section Page 24 Redundant system

Process Control System

Refer to the following manual as well as the contents of this manual.

MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

List of functions supporting a process control system

GX Works3 includes functions to create process control programs, adjust and maintain a process control system (process control functions). By programming a sequence control and a process control with a single engineering tool, those controls can seamlessly be combined into one.

Function	Description	Reference
Tag FB setting	To register tag FB instances and tag data used in an FBD/LD program for process control in a batch.	Page 169 Registration of tag FBs
User-defined tag FB	To create a function block to refer tag data. It can be created by combining a function, function block, and process control function block.	Page 321 Creating a user-defined tag FB
FB property	To display and change the initial values of labels of 'VAR_PUBLIC' class and 'VAR_PUBLIC_RETAIN' class in an FB and a tag FB.	Page 233 Display/setting an FB property
Pause FB/restart FB	To pause and restart the execution of a process control function block in a running program. The operation of a program can be checked by pausing the operation of the preceding process control function block and changing the current value of the output variable of the paused process control function block.	Page 440 Pausing/Restarting the Operation of Function Blocks
Faceplate	To display tag data contents in an image of a device such as a controller. The values of each unit of tag data can be changed. To use this function, the latest PX Developer is required to be installed in a personal computer.	Page 448 Checking tag data on the gauge window (faceplate)
Initial FB property value update/FB property management	To save the current value of an FB property that were read from a programmable controller as the initial value of the property.	Page 452 Initial FB property value update/FB property management
Interaction with PX Developer Monitor Tool	To manage, monitor, and control the operations of FBD/LD programs for process control, which were created in GX Works3, in PX Developer Monitor Tool. Moreover, a GOT screen project can be created using the GOT screen generator of PX Developer Monitor Tool.	Page 451 Interaction with PX Developer Monitor Tool

Settings for using process control functions

The following are required to be set for using process control functions. For other settings, set them in the same manner as a normal project.

■Enabling of the process control extension

Set the following to enable the process control extension for a program file.

- Open the "Properties" screen of a program file for which the process control extension is to be enabled in the "Navigation" window, then select "Yes" for "Use the process control extension".
  (it can be set by dragging and dropping a process control function block and tag FB from the "Element Selection" window.)

The process control extension can be enabled only for program files of the scan execution type and the fixed cycle execution type.

For the scan execution type, only one program file with the process control extension enabled can be created.

To divide a program with the process control extension enabled into multiple programs, create multiple program blocks in the program file or multiple worksheets in the program block.

■Option setting of the process control extension (required)

Check and set the following options.

Option item	Setting content	Reason for the setting
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting"	Check and set each item to fit a project to be created. (☞ Page 72 Process control extension setting)	To use a process control function in a project to be used.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" ⇨ "Enable Rebuild All (Retain)"	Select "No".	By 'Rebuild All' and 'Convert', only labels added after data was written to a programmable controller cannot be initialized when rewriting the data next time.*1
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" ⇨ "Enable Conversion"		

*1 To initialize added/changed labels only, perform the online program change function.

■CPU parameter setting

Set the following items of "CPU Parameter".

Parameter item	Setting content	Reason for the setting
"File Setting" ⇨ "File Register Setting" ⇨ "Use Or Not Setting"	Select "Use Common File Register in All Programs".	Tag FBs use file registers.
"Memory/Device Setting" ⇨ "Device/Label Memory Area Setting" ⇨ "Device/Label Memory Area Detailed Setting" ⇨ "Device Setting"	Set 'ZR(R)' in the [Latch (2)] tab in the "Latch Range Setting" screen.*1,*2	File registers used in tag FBs need to be latched.
"File Setting" ⇨ "Label Initial Value Reflection Setting" ⇨ "Label Initial Value Reflection Setting at STOP to RUN"	Select "Disable".	To apply initial label values only once to the current values at the timing when the status of a CPU module switches from STOP to RUN after writing the data.
"Memory/Device Setting" ⇨ "Index Register Setting" ⇨ "Points Setting" ⇨ "Total Points" ⇨ "Index Register (Z)"	Set seven points or higher.	'Z0' to 'Z6' are used for system data (system header and system footer) to extend a process control.

*1 The "Latch Range Setting" screen appears by selecting in "Device Setting" ⇨ [...] button of "Detailed Setting" ⇨ [...] button on the "Latch (2)" column

*2 It can also be set by clicking the [Yes] button in the screen that appears when setting the following parameter item.
"File Setting" ⇨ "File Register Setting" ⇨ "Use Common File Register in All Programs" for "Use Or Not Setting"

■Execution cycle setting

Set the execution cycle of a program with the process control extension enabled to fit the processing.

Execution type	Setting content
Scan	Set the execution cycle in the "Properties" screen of a program block.
Fixed scan	Set the fixed cycle interval in the program setting of CPU parameters.

■Process control extension toolbar

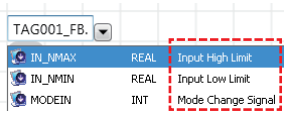
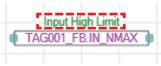
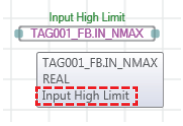
The following toolbar appears in a project for which the process control functions are usable.

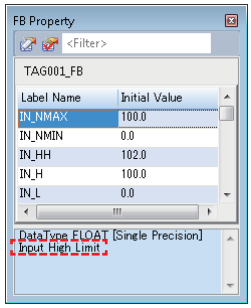
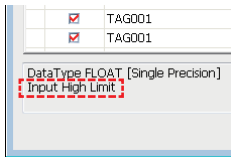
■Multiple comment display setting

Descriptions of the labels in a tag FB and in the structure members of tag data are displayed by setting "English" for "Target" in the "Multiple Comments Display Setting" screen.*1

*1 The "Multiple Comments Display Setting" screen will appear by selecting the following menu.
[View] ⇨ [Multiple Comments Display Setting]

The following table shows the display examples.

Function	Display location	Display example
FBD/LD editor	Option in the edit box	
	Label comment	
	Tool hint	

Function	Display location	Display example
FB property	Explanation column in the "FB Property" window	
Initial FB property value update/FB property management	Explanation column in the "FB Property Initial Value Updater" screen Explanation column in the "FB Property Management" screen	

Precautions

Note the following when the process control extension is enabled for a program file.

Target project/ program	Item	Consideration
Program with the process control extension enabled (including a function and a function block used in the program)	Timer device	Time cannot be counted properly if timers, retentive timers, or timer function blocks (TIMER_□_M) are used. To measure time, use long timers, long retentive timers, pulse timers (TP(_E)), on delay timers (TON(_E)), and off delay timers (TOF(_E)).
	Counter device and counter function block	The rises of the count input signals of counters, long counters, or counter function blocks cannot be detected when they are turned ON or OFF in intervals shorter than the execution cycles. Therefore, the values of those devices may be different from expected ones. Turn the count input signal ON or OFF at an interval longer than the execution cycle.
	Special relay	The values of special relays may be different from expected ones. The values will be ones acquired in the target program.
Project including a program with the process control extension enabled	QDRSET(P) instruction	Do not use the QDRSET(P) instruction. If the file name of a file register is changed with the QDRSET(P) instruction, the program will not run properly.
	Label class	To hold the values of labels in process control programs when a programmable controller is turned OFF or reset, specify 'VAR_RETAIN', 'VAR_OUTPUT_RETAIN', or 'VAR_PUBLIC_RETAIN' as a class for each label.
	Writing of global label setting (file register) to a programmable controller	When writing global labels to a programmable controller, follow the procedure below. ❶ Write CPU parameters to a programmable controller. ❷ Reset or cycle the power of the programmable controller. ❸ Write the global label setting (file register)*1.
	System resource (file register: ZR or R)	File registers in the range set in the option*2 are used for the system area and a tag data assignment. Therefore, do not use the file registers in programs. However, they can be used for tag data items which are made public. Refer to 'Tag Data List' in the following manual to use file registers. 📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)
	System resource (index register: Z)	Index registers in the range displayed in the option*3, Z0 to Z6, are used for the internal processing. Therefore, do not use the index registers in programs with the process control extension enabled and within its programs of the functions/functions.
Program with the process control extension disabled	Function block	Do not use the following function blocks. The program will not run properly. • Process control function block • User-defined tag FB • User-defined FB using a process control function block or user-defined tag FB

*1 When writing the global label setting to a programmable controller, data of file registers in the range set in the following option is automatically written.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource" ⇨ "File Register: ZR"

*2 [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource" ⇨ "File Register: ZR"

*3 [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting "⇨ "System resource" ⇨ "Index Register: Z"

Differences in terms between GX Works3 and PX Developer

There are differences in terms related to the process control functions between PX Developer and GX Works3 that are engineering tools used to create process control programs. The following table shows the terms in PX Developer and GX Works3 to compare each other.

Terms for PX Developer	Terms for GX Works3
Cold-start compile	Rebuild all (reassignment)
Compile (online change)	Online program change
Constant	VAR_CONSTANT
Device variable	Device
Entry variable monitor	Watch
General function, general FB	Standard function, function block
Global variable	Global label
Hot-start compile	Rebuilt all (retain), convert
I/O simulation setting	[Tool] ⇨ [I/O System Setting] or [Start I/O System Setting] in GX Simulator3 screen
Input variable	VAR_INPUT
Internal variable	VAR, VAR_RETAIN
Local variable	Local Label
Module FB	Module label and module FB
Output variable	VAR_OUTPUT, VAR_OUTPUT_RETAIN
Process function, process FB	Process control function block
Program execution setting	Execution type of a program file
Project parameter	[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting"
Public variable	VAR_PUBLIC, VAR_PUBLIC_RETAIN
Reading the current value of an FB property	Initial FB property value update
Tag FB variable	Tag FB instance and tag data

Redundant system

A project used for a CPU module in a redundant system configuration can be created by selecting "Redundant" for the operation mode when creating a new project.
In addition, both the control system and the standby system are managed in one project used for CPU modules in a redundant system configuration.

List of functions supporting a redundant system

GX Works3 includes functions to operate CPU modules in a redundant system configuration.

Function name	Description	Reference
Operation mode change	To change the operation modes (backup mode or separate mode)	Page 511 Operation mode change
System A/B setting	To set system A or system B.	Page 512 System A/B setting
System switching	To switch the control system to the standby system.	Page 511 System switching
Memory copy	To transfer the memory contents of the control system to the standby system.	Page 512 Memory copy from the control system to the standby system
Control system forced start while waiting for the other system started	To start a CPU module as the control system while waiting for another system to start.	Page 512 Control system forced start while waiting for the other system started
Redundant function module communication test	To test the communication of a redundant function module (R6RFM only).	Page 512 Redundant function module communication test

Operation modes of RnPCPUs (redundant mode)

There are two operation modes in an RnPCPU (redundant mode): backup mode and separate mode.
The following table shows the operations of each mode in GX Works3.

Operation mode	Description
Backup mode	An online operation is performed in both systems. When writing data, same data is written to both systems.
Separate mode	An online operation is performed only in the connective system.

1.3 RnSFCPU

GX Works3 supports MELSEC iQ-R series RnSFCPUs constructing a safety system.

Safety system

In this manual, a project for an RnPSFCPU and an RnSFCPU is defined as a 'safety project', and a project other than one for an RnPSFCPU and an RnSFCPU is defined as a 'standard project'.

There are two types of data in a safety project: safety data and standard data.

Both a safety program and a standard program can be created in a safety project.

Name		Description
Data	Safety data	Safety program, safety FB/FUN, safety global label, and parameter for RnPSFCPUs and RnSFCPUs.
	Standard data	Standard program, standard FB/FUN, standard global label, standard/safety shared label, and parameter for CPU modules other than RnPSFCPUs and RnSFCPUs.
Program, FB/FUN	Safety program, safety FB/FUN	Program for a safety control.
	Standard program, standard FB/FUN	Program for a general control.
Label	Safety global label	Global label that can be used only in safety programs.
	Standard global label	Global label that can be used only in standard programs.
	Standard/safety shared label	Global label that can be used in both safety programs and standard programs. When using a standard/safety shared label in a safety program, create the program so that a safety condition can be checked.

Usable devices, labels, and FBs/FUNs

Usable devices, labels, and FBs/FUNs are different between a safety project and a standard project.

■Usable devices/labels

Project	Safety device	Safety global label	Standard/safety shared label	Standard device	Standard global label
Safety program	○	○	○	×	×
Standard program	×	×	○	○	○

For details on the usable devices in each project, refer to the following section.

☞ Page 541 Applicable Devices in GX Works3

■Usable FBs/FUNs

Project	Safety FB	Safety FUN	Standard FB	Standard FUN
Safety program	○	○	×	×
Standard program	×	×	○	○

List of functions supporting a safety system

GX Works3 includes functions to create a safety project.

Function name	Description	Reference
Safety operation mode switching	To switch the safety operation modes of CPU modules.	Page 513 Safety operation mode switching
User authentication	To perform the user authentication before opening a project in order to prevent illegal access from users with no authority.	Page 467 Preventing Illegal Access to Project
	To perform the user authentication before accessing a CPU module in order to prevent illegal access from users with no authority.	
Identification check for safety data	To check if data in a CPU module is the one written by the user.	Page 515 Identification check for safety data

Safety operation modes

There are two safety operation modes: safety mode and test mode.

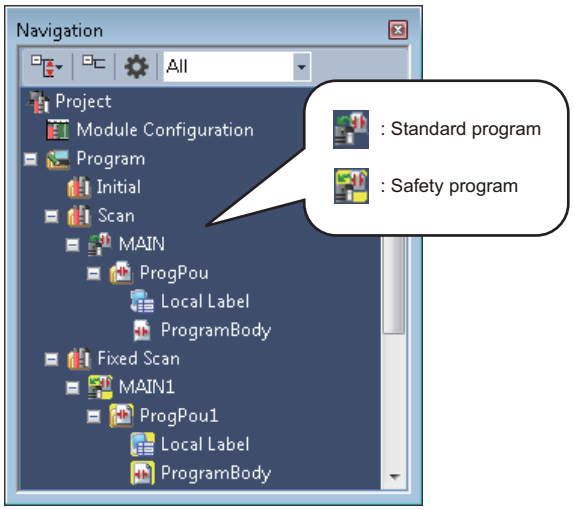
The following table shows the operations of each mode in GX Works3.

Operation mode	Description
Safety mode	A mode used when running a system. This mode prohibits operations which change the control of a CPU module such as data writing to a CPU module, current value change, CPU memory operation, and settings for a security key and a file password.
Test mode	A mode used when starting a system or performing maintenance. All functions can be used. (The available functions differ depending on the access level of user who is logging on to the personal computer.)

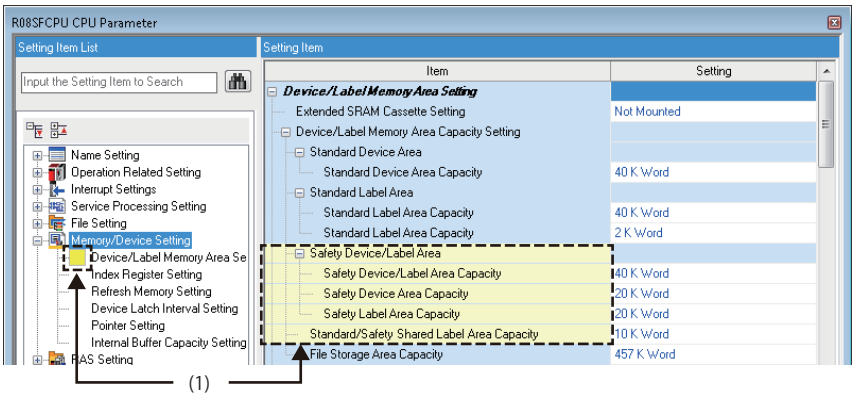
Safety data identification display

In safety data, an icon and the background color are emphasized.

■Icon



■Grid background color



(1): Setting and items for safety

Point

The data category (standard/safety) can be checked on the "Properties" screen of each piece of data.

(☞ Page 112 Properties)

1.4 RnPSFCPU

GX Works3 supports MELSEC iQ-R series RnPSFCPUs constructing a process control system, a safety system, and a redundant system.

For details on an RnPSFCPU system, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

Process control system

Two types of programs, safety program and standard program, can be created in a project used for RnPSFCPUs.

Process control programs can only be created in a standard program.

For a process control system, refer to the following section.

Page 19 Process Control System

Safety system

For a safety system, refer to the following section.

Page 25 Safety system

List of functions supporting a safety system using an RnPSFCPU

For the functions common to a safety system using an RnSFCPU, refer to the following section.

Page 25 List of functions supporting a safety system

The following functions can be used only in a system using an RnPSFCPU.

Function name	Description	Reference
User authentication	To log off from a CPU module that the user authentication is performed.	Page 473 Logging off from a CPU module
	To copy user information to the other system to match it between both systems.	Page 473 Copying user information to the other system
Safety module operation	To set whether or not to enable the safety communication function for modules used in a system using an RnPSFCPU.	Page 516 Safety module operation

Redundant system

Only the redundant mode can be selected for the operation mode of an RnPSFCPU.

For a redundant system, refer to the following section.

Page 24 Redundant system

Operation modes of RnPSFCPUs

Only the backup mode can be selected for the operation mode of an RnPSFCPU.

An online operation is performed in both systems in the backup mode.

1.5 Remote Head Module

GX Works3 supports MELSEC iQ-R series remote head modules.

And, a remote head module supports a redundant system configuration.

When creating a new project, a module type needs to be selected according to the system configuration to be created.

Project	System configuration
RJ72GF15-T2	Configuration other than that for a redundant system
RJ72GF15-T2(SR)	Redundant system configuration (single line)
RJ72GF15-T2(LR)	Redundant system configuration (redundant line)

For details on a redundant system configuration, refer to the following manual.

MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Any programs cannot be created for a project of a remote head module.

Therefore, a program needs to be created for a project of a CPU module on the master station.

List of functions supporting remote head modules in a redundant system configuration

GX Works3 includes functions to operate remote head modules in a redundant system configuration.

Function name	Description	Reference
System switching	To switch the control system of a remote head module to the standby system.	Page 511 System switching

1.6 NCCPU

GX Works3 supports MELSEC iQ-R series NCCPUs.

In an NCCPU project, ladder programs including devices can be applied. Data of labels and parameters can be edited but they are not written.

For details on NCCPUs, refer to the manual of NCCPUs.

1.7 Procedure from Project Creation to CPU Module Operation

The operating procedure from program creation to a CPU module operation in GX Works3 is shown below.

For the operation methods of a CPU module, refer to the following manuals.

📖MELSEC iQ-R CPU Module User's Manual (Application)

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

📖MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Standard project

Target module type: RnCPUs, RnENCPUs, RnPCPUs (with the process control extension disabled)

Start

⇩

1. Create a project.
Start GX Works3.
Create a new project.

☞ Page 39 Start
☞ Page 85 Creating a project

⇩

2. Set the parameters.

☞ Page 137 Setting Parameters

⇩

3. Create a program.
Create a Program Organization Unit (POU).
Set an execution order and an execution type.
Set the global labels/local labels.
Edit the program of each POU.
Perform conversion.

☞ Page 108 Creating data
☞ Page 180 Program Execution Order and Execution Type Settings
☞ Page 157 Registering Labels
☞ Page 182 Creating a Ladder Program, Page 217 Creating an ST Program, Page 223 Creating an FBD/LD Program, Page 240 Creating an SFC Program, Page 317 Creating a Function Block, Page 328 Creating a Function
☞ Page 279 Converting Programs

⇩

4. Perform debugging with the simulator.

☞ Page 342 PROGRAM SIMULATION

⇩

5. Connect a personal computer to a CPU module, and set the connection destination.

☞ Page 371 SETTING ROUTE TO CPU MODULE

⇩

6. Write parameters/programs to the CPU module.

☞ Page 392 Writing data to a programmable controller

7. Check the operation.

Monitor the execution status and device contents of the program to check the operation.

Check the error occurrence in the CPU module.

☞ Page 421 Checking Execution Programs on Program Editor
☞ Page 483 Module Diagnostic

8. Operate the system.

Process control project

Target module type: RnPCPUs (with the process control extension enabled)

For the creation method of programs, refer to the following manual as well as the contents of this manual.

📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

Start

1. Create a project.

Start GX Works3.

Create a new project.

☞ Page 39 Start
☞ Page 85 Creating a project

2. Set the parameters.

☞ Page 137 Setting Parameters

3. Set the settings for using process control functions.

Enable the process control extension of a program file.

Set the option setting of the process control extension.

Set the option setting of the conversion operation.

Set the CPU parameters.

☞ Page 20 Settings for using process control functions

4. Create a program.
Register a tag FB.
Create an FBD/LD program for process control.
Set the initial value of an FB property.
Create a program for sequence control.
Perform conversion.

☞ Page 169 Registration of tag FBs
☞ Page 108 Creating data
☞ Page 233 Display/setting an FB property
☞ Page 223 Creating an FBD/LD Program, Page 317 Creating a Function Block, Page 233 Utilizing a tag FB, Page 321 Creating a user-defined tag FB, Page 328 Creating a Function
☞ Page 279 Converting Programs

5. Connect a personal computer to a CPU module, and set the connection destination.

☞ Page 371 SETTING ROUTE TO CPU MODULE

6. Write parameters/programs to the CPU module.

☞ Page 392 Writing data to a programmable controller

7. Check the operation.
Monitor the execution status and device contents of the program to check the operation.
Check the error occurrence in the CPU module.
Check the control status of a tag FB on a faceplate.
Change the current value of an FB property on the watch window.
Set the current value of an FB property as the initial value of the FB property.

☞ Page 421 Checking Execution Programs on Program Editor, Page 440 Pausing/Restarting the Operation of Function Blocks
☞ Page 483 Module Diagnostic
☞ Page 434 Checking Current Values by Registering Devices/Labels
☞ Page 448 Checking tag data
☞ Page 452 Initial FB property value update/FB property management

8. Operate the system.

Safety project

Target module type: RnSFCPUs, RnPSFCPUs (with the process control extension disabled)

Start

⇩

1. Create a project.
Start GX Works3.
Create a new project.
Register user information.
Save the project.

☞ Page 39 Start
☞ Page 85 Creating a project
☞ Page 469 User management
☞ Page 105 Saving a project

⇩

2. Set the parameters.
Setting the safety device/label area is required.

☞ Page 137 Setting Parameters

⇩

3. Create a program.
Create a Program Organization Unit (POU).
Set an execution order and an execution type.
Set the global labels/local labels.
Edit the program of each POU.
Perform conversion.

☞ Page 108 Creating data
☞ Page 180 Program Execution Order and Execution Type Settings
☞ Page 157 Registering Labels
☞ Page 182 Creating a Ladder Program, Page 317 Creating a Function Block, Page 328 Creating a Function
☞ Page 279 Converting Programs

⇩

4. Connect a personal computer to a CPU module, and set the connection destination.

☞ Page 371 SETTING ROUTE TO CPU MODULE

⇩

5. Write parameters/programs to the CPU module.

☞ Page 392 Writing data to a programmable controller

⇩

6. Check the operation. (Test mode)
Monitor the execution status and device contents of the program to check the operation.
Check the error occurrence in the CPU module.

☞ Page 421 Checking Execution Programs on Program Editor
☞ Page 483 Module Diagnostic

7. Switch the safety operation modes.
Check whether the written project is correct.
Switch it the safety mode.

☞ Page 515 Identification check for safety data
☞ Page 513 Safety operation mode switching

8. Operate the system.

Safety project for which the process control extension is set to be used

Target module type: RnPSFCPUs (with the process control extension enabled)

For the creation method of programs, refer to the following manual as well as the contents of this manual.

📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

Start

1. Create a project.
Start GX Works3.
Create a new project.
Register user information.
Save the project.

☞ Page 39 Start
☞ Page 85 Creating a project
☞ Page 469 User management
☞ Page 105 Saving a project

2. Set the parameters.
Setting the safety device/label area is required.

☞ Page 137 Setting Parameters

3. Set the settings for using process control functions.
Enable the process control extension of a program file.
Set the option setting of the process control extension.
Set the option setting of the conversion operation.
Set the CPU parameters.

☞ Page 20 Settings for using process control functions

4. Create a program.
Register a tag FB.
Create an FBD/LD program for process control.
Set the initial value of an FB property.
Create a program for sequence control.
Perform conversion.

☞ Page 169 Registration of tag FBs
☞ Page 108 Creating data
☞ Page 233 Display/setting an FB property
☞ Page 223 Creating an FBD/LD Program, Page 317 Creating a Function Block, Page 233 Utilizing a tag FB, Page 321 Creating a user-defined tag FB, Page 328 Creating a Function
☞ Page 279 Converting Programs

5. Connect a personal computer to a CPU module, and set the connection destination.

☞ Page 371 SETTING ROUTE TO CPU MODULE

6. Write parameters/programs to the CPU module.

☞ Page 392 Writing data to a programmable controller

7. Check the operation. (Test mode)
Monitor the execution status and device contents of the program to check the operation.
Check the error occurrence in the CPU module.
Check the control status of a tag FB on a faceplate.
Change the current value of an FB property on the watch window.
Set the current value of an FB property as the initial value of the FB property.

☞ Page 421 Checking Execution Programs on Program Editor, Page 440 Pausing/Restarting the Operation of Function Blocks
☞ Page 483 Module Diagnostic
☞ Page 434 Checking Current Values by Registering Devices/Labels
☞ Page 448 Checking tag data
☞ Page 452 Initial FB property value update/FB property management

8. Switch the safety operation modes.
Check whether the written project is correct.
Switch it the safety mode.

☞ Page 515 Identification check for safety data
☞ Page 513 Safety operation mode switching

9. Operate the system.

Remote head module project

Start

1. Create a project.

Start GX Works3.

Create a new project.

☞ Page 39 Start
☞ Page 85 Creating a project

2. Set the parameters.

☞ Page 137 Setting Parameters

3. Set the labels.

Set the global labels.

☞ Page 157 Registering Labels

4. Connect a personal computer to a Remote head module, and set the connection destination.

☞ Page 371 SETTING ROUTE TO CPU MODULE

5. Write parameters/labels to the Remote head module.

☞ Page 392 Writing data to a programmable controller

6. Check the operation.

Monitor the execution status and device contents of the sequence program to check the operation.

☞ Page 483 Module Diagnostic

7. Operate the system.

1.8 Learning Operation Methods of GX Works3

This section explains the operation methods of GX Works3.

Displaying Help

Use Help to learn about operations and functions, and check error codes of a CPU module.

Operating procedure

Select [Help] ⇨ [GX Works3 Help] ( ).
e-Manual Viewer starts and the manual appears.

Find Help

Enter a search term in on the toolbar and press the Enter key to start searching it in e-Manual Viewer. The search is executed in the manuals registered in e-Manual Viewer.

Help of an instruction/FB and a special relay/special register

The corresponding location in this manual can be displayed from each program editor or screen.

■Program editor

- Place the cursor on the instruction (ladder editor: the cell with the instruction, ST editor: the character string of the instruction), press the F1 key.
- Place the cursor on the element on the FBD/LD editor, and press the F1 key.
- Place the cursor on the FB cell on the ladder editor, and press the F1 key
- Place the cursor on the element on the SFC diagram editor, and press the F1 key.

A help file set for a function and a function block is displayed by placing the cursor on the element and pressing the F1 key.

■"Enter Ladder" screen and argument editing screen

Click the [Manual] button on each screen.

■"Element Selection" window

Select the instruction or the module FB in the list, and press the F1 key.

Help of a function

The corresponding location in this manual can be displayed on the following function.

■Faceplate

Press F1 on a faceplate.

Connecting to MITSUBISHI ELECTRIC FA Global Website

Open the MITSUBISHI ELECTRIC FA Global Website in a web browser.
Make sure your personal computer connect to the Internet in advance.

Operating procedure

Select [Help] ⇨ [Connection to MITSUBISHI ELECTRIC FA Global Website].

Checking the version of GX Works3

Display information such as the software version of GX Works3.

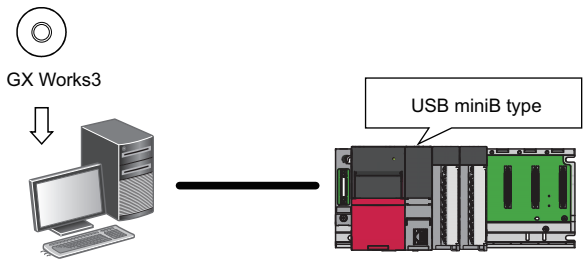
Operating procedure

Select [Help] ⇨ [Version Information].

1.9 Connection Configurations between a Personal Computer and a CPU Module

The following section shows the configurations when connecting a personal computer and a CPU module or remote head module.

Connection through USB ports



The USB cables, of which the operations are ensured by Mitsubishi Electric Corporation, are shown below.
When using a USB cable for the first time, install the USB driver.
For details, refer to the following section.
☞ Page 591 USB Driver Installation Procedure

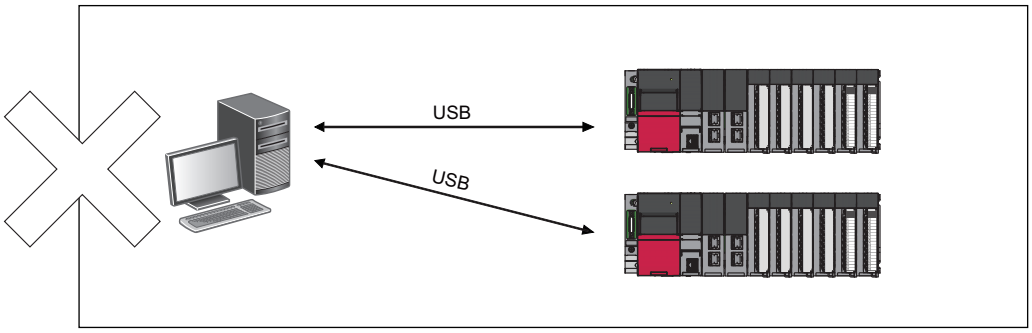
Product name	Model	Manufacturer
USB cable (USB A type — USB miniB type)	KU-AMB530	SANWA SUPPLY INC.
	KU-AMB550	
USB adapter (USB B type — USB miniB type)	AD-USBBFTM5M	ELECOM Co., Ltd.

For the considerations when accessing a CPU module, refer to the following section.
☞ Page 389 Communication with the CPU module using a USB cable
FX5CPUs do not support this connection.

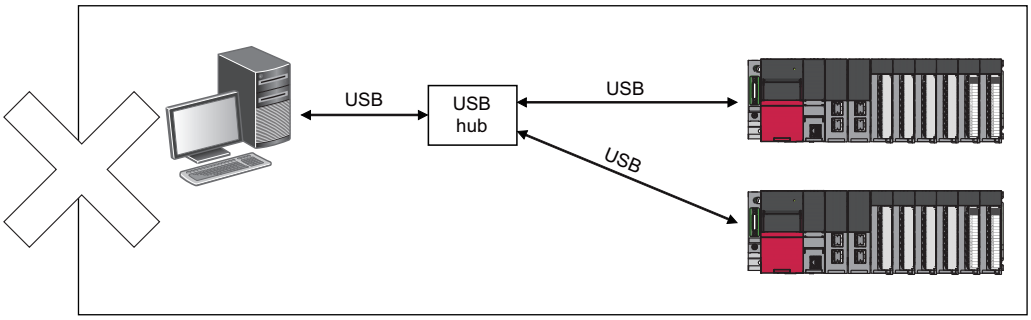
■Configuration of USB connection

Only one CPU module can be connected to a personal computer at the same time.
Connection with a CPU module in the following configurations is not applied.

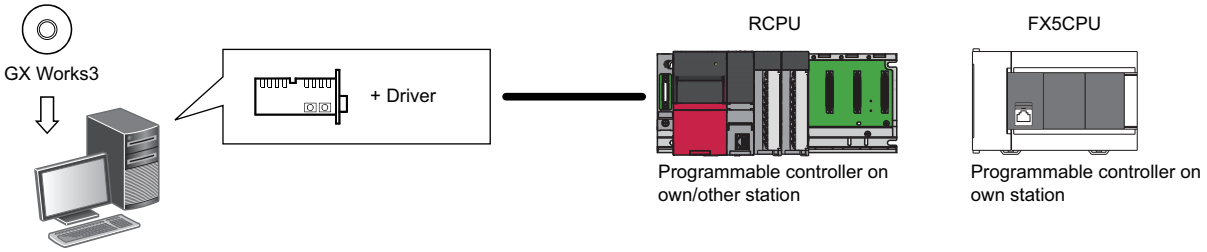
■Connection to multiple CPU modules from a personal computer with multiple USB ports



■Connection to multiple CPU modules via a USB hub



Connection through I/F boards

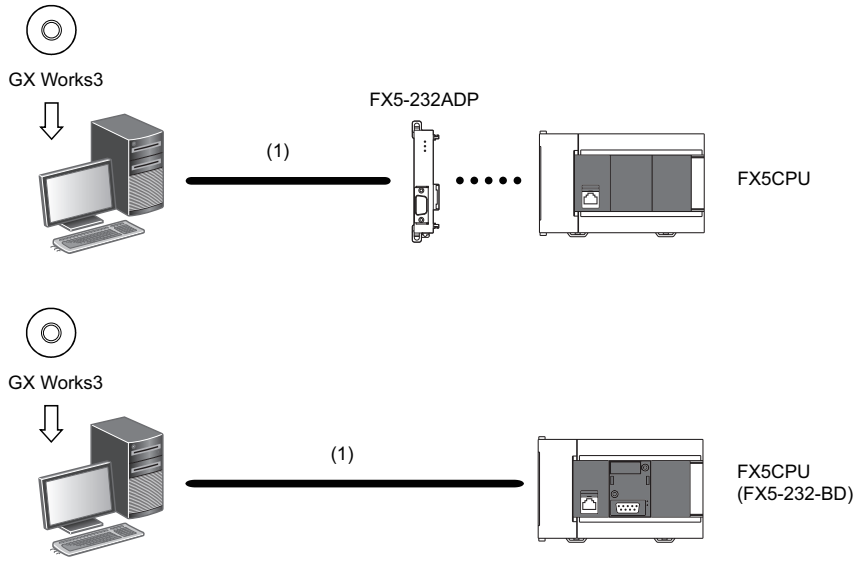


The following I/F boards are supported.

- Ethernet board[*1]: built-in to a personal computer or commercially available
- CC-Link IE Controller Network interface board[*1], CC-Link IE Field Network interface board, CC-Link Ver.2 board[*1]: refer to the manuals of each I/F board for details.

*1 FX5CPUs and remote head modules do not support it.

Connection through serial ports



Product name	Model	Manufacturer
(1) RS-232 cable	FX-232CAB-1	Mitsubishi Electric Corporation

RCPUs and remote head modules do not support this connection.

2 SCREEN CONFIGURATION AND BASIC OPERATIONS

This chapter explains the screen configuration and basic operations of GX Works3.

2.1 Start and End

This section explains the methods for starting and ending GX Works3.

Start

Operating procedure

Select [MELSOFT] ⇨ [GX Works3][*2] ⇨ [GX Works3] from Windows® Start[*1].

*1 Select [All apps] in the Start screen or [Start] ⇨ [All Programs]/[All apps].
*2 Does not appear in Windows® 8 or later.

End

Operating procedure

Select [Project] ⇨ [Exit].

Point

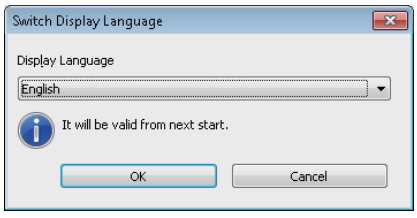
GX Works3 can also be started or ended in MELSOFT Navigator.

2.2 Display Language Switching

GX Works3 supports multiple languages, and therefore the display language such as one on the menu can be switched on a personal computer.

Window

[View] ⇨ [Switch Display Language]



Precautions

- If the display language differs from the one for the operating system, texts may not displayed properly in the screen. (Displayed texts may get cut.)
- When switching the display language in Windows® 10, supplemental fonts of the target language are required. The fonts can be added by the following procedure.
  Select [Settings] ⇨ [System] ⇨ [Apps & features] ⇨ [Manage optional features] ⇨ [Add a feature] from Windows® Start.

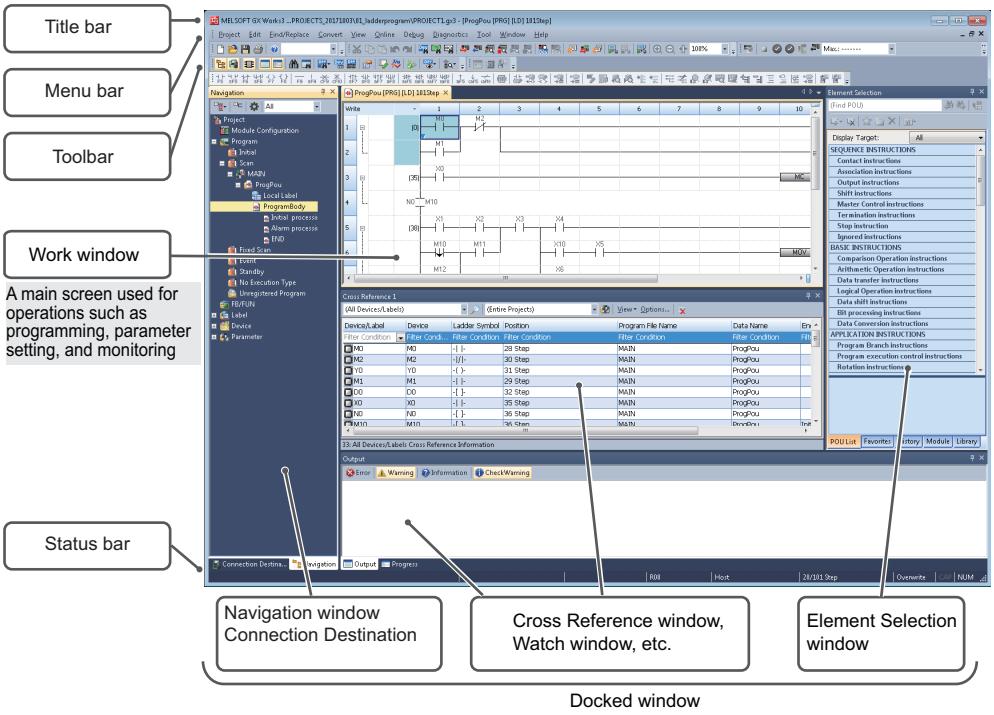
2.3 Screen Configuration

This section explains the screen configuration when starting GX Works3.

Main frame

The main frame configuration is shown below.

The following screen includes a work window and docked windows displayed.



Window operation

■Displaying docked windows

[View] ⇨ [Docking Window] ⇨ [(target item)]

Point

When the docked window is not displayed by selecting it from the menu, select [Window] ⇨ [Return Window Layout to Initial Status].

■Switching docked windows and a work window

Various windows or files can be switched by pressing the Ctrl + Tab keys.

Select a particular window or file by pressing the Ctrl + ← / → / ↑ / ↓ keys.

■Arranging work windows

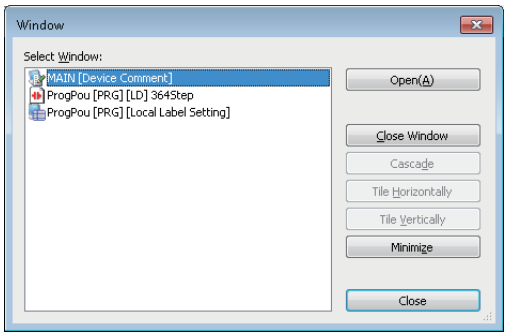
The list of open windows appears.

A specified window can be opened and arranged.

When multiple windows are open, they can efficiently be displayed by arranging them

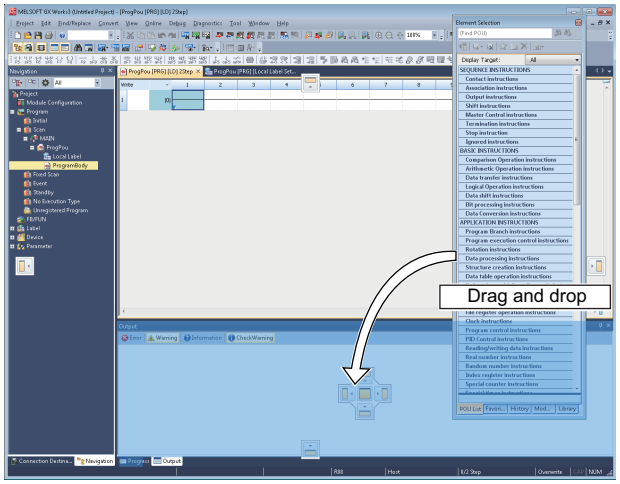
Window

[Window] ⇨ [Window]

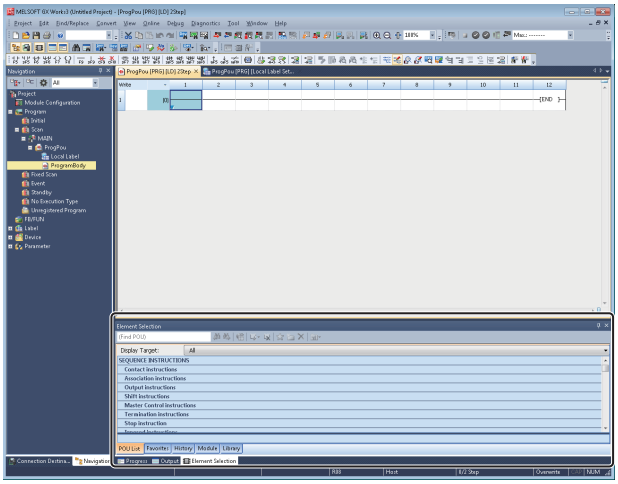


■Docking/floating dockable windows

- Docked display: Drag the title bar of a floating dockable window and drop it to the displayed icon (guidance) to dock the main frame.



Drag a dockable window to the guidance



A new tab appears after the window is docked.

- Floating display: Drag the title bar of a docked window and drop it to the arbitrary position to float from the main frame.

■Docking/floating work windows

- Docked display: Select the floating work window and select [Window] ⇨ [Docking].
- Floating display: Select the docked work window and select [Window] ⇨ [Floating].

Point

Docked windows can be switched between the docked display and the floating display by double-clicking the title bar.

Customizing/resetting toolbars

Set the types of tool buttons to be displayed on each toolbar.

The selected tool buttons on the list are displayed on the toolbar.

Operating procedure

■Customizing toolbar

1. Click on the toolbar, and select [Show/Hide Buttons] ⇨ [(toolbar name)].
2. Select the tool button to be displayed from the list.

■Resetting toolbar

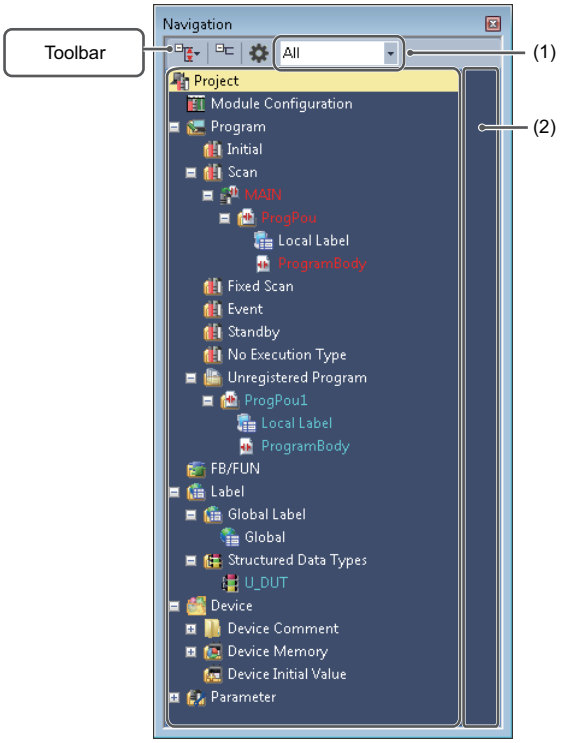
Click on the toolbar, and select [Show/Hide Buttons] ⇨ [Reset].

Navigation window

The "Navigation" window displays contents of a project in a tree format.
Operations such as creating new data and displaying editing screens can be performed on the tree.
For details, refer to the following section.
☞ Page 80 PROJECT MANAGEMENT

Window

[View] ⇨ [Docking Window] ⇨ [Navigation] ( )



POUs, global labels, and structures are displayed in the following color.

Color	Data
White	Converted data
Red	Unconverted data Unused data before conversion
Light blue	Unconverted data*1

*1 Data that failed in conversion is displayed as unused data before conversion.

Displayed items

Name	Description	Reference
(1) Filter	Data displayed in a tree format can be filtered. • ALL: All the items in the "Navigation" window are displayed. • Parameter: Module Configuration and Parameter are displayed. • Program: Program, FB/FUN, Label, and Device are displayed.	—
(2) Status icons	To display icons indicating the status of a project.	Page 44 Status icons

Point

The font color and the background color can be changed.
☞ Page 65 Checking and Changing Colors and Fonts

Sorting data

Sort data displayed in the tree format.

Operating procedure

Select a program file, then right-click and select [Sort] ⇨ [(sort type)] from the shortcut menu.

Point

Data can be sorted by dragging and dropping the data or selecting [Order] ⇨ [Move Up]/[Move Down] from the shortcut menu.

Creating folders

A folder for grouping and managing the created data can be created.

Operating procedure

1. Select a program file and select [Project] ⇨ [Data Operation] ⇨ [New Folder].
2. Change a folder name.
3. Select a program to be stored and drag and drop it onto the created folder.

Simple display

An unused folder can be hidden by clicking on the toolbar.

Status icons

The following table shows icons indicating the status of a project.

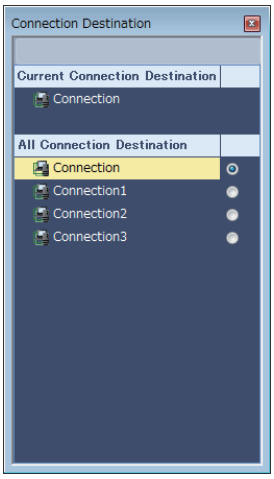
Icon	Status	Display timing	Item	Description
	Parameter mismatched	Offline	Module folder	This icon is displayed when a mismatch was detected between the system parameters and the property of a module.
	Unconfirmed required settings		Module parameter	This icon is displayed when the [Apply] button has never been pressed on the module parameter (network) setting screen that includes a required setting.

Connection destination window

The "Connection Destination" window displays the connection destination for a programmable controller in a list format.

Window

[View] ⇨ [Docking Window] ⇨ [Connection Destination] ( )



For setting methods of a connection destination, refer to the following section.

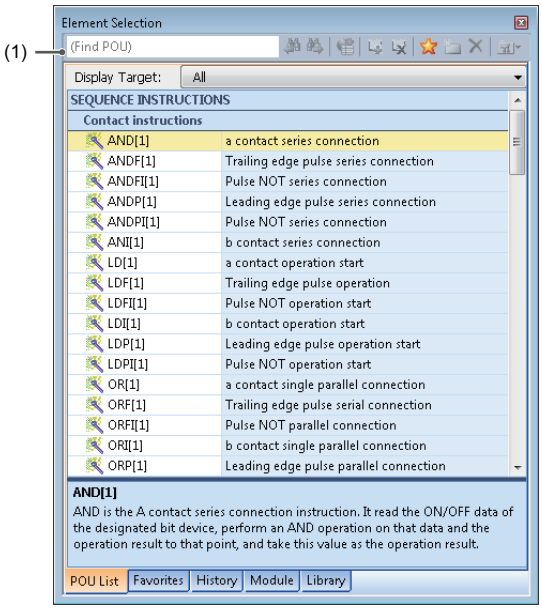
☞ Page 371 SETTING ROUTE TO CPU MODULE

Element selection window

The "Element Selection" window displays elements used for creating programs, such as instructions and standard functions/ function blocks, in a list format.

Window

[View] ⇨ [Docking Window] ⇨ [Element Selection] ( )



- The focus will move to an element with a character that matches with an entered term, such as a keyword included in an element name or element instruction, on the toolbar (1).
- By selecting a category in the "Display Target", the elements only ,which are included in it, can be displayed.

Pasting elements

■Pasting elements in a program

When a program editor is active, elements which can be pasted are displayed in the "Element Selection" window.
Elements can be pasted by dragging and dropping them from the list onto a program.

Point

For ST editor, the selected element is pasted at the cursor position by pressing the Enter key.

■Pasting objects in a module configuration diagram

When a module configuration diagram is active, elements which can be pasted are displayed in the "Element Selection" window.
Elements can be pasted by dragging and dropping them from the list onto the module configuration diagram.

Favorites

Frequently used modules and elements/SFC elements (devices, labels, instructions, FB instances, functions) can be registered in the [Favorites] tab for each category.
A new folder, which is for classification of elements, can be created by clicking on the toolbar. The created folder can be moved by dragging and dropping and the folder name can also be changed.
When a module configuration diagram is active, only modules are displayed.
When a program editor is active, elements which can be used in the editor are displayed.

Operating procedure

■Adding elements from the element list

Modules, instructions, functions, and function blocks can be added to the [Favorites] tab.

1. Select an element to add from the list in the "Element Selection" window, and click on the toolbar.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the "Navigation" window

Functions and function blocks can be added to the [Favorites] tab.

1. Select an element to add in the "Navigation" window, and drag and drop it onto the "Element Selection" window.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the ladder editor

Devices, labels, instructions, and FB instances can be added to the [Favorites] tab.

1. Select the cell of an element to add, and drag the border of the cell and drop it onto the "Element Selection" window.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the ST editor

Devices, labels, and FB instances can be added to the [Favorites] tab.

1. Select the token of a part to add, and drag and drop it onto the "Element Selection" window.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the FBD/LD editor

Devices, labels, and FB instances can be added to the [Favorites] tab.

1. Select an element to add, and drag and drop it onto the "Element Selection" window with the Ctrl key held down.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the SFC diagram editor

Devices and labels can be added to the [Favorites] tab.

1. Select an SFC element to add, and drag and drop it onto the "Element Selection" window.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding from the label editor

Labels can be added to the [Favorites] tab.

1. Select the line header of a label to add, and drag and drop it onto the "Element Selection" window.
2. Select a registration destination in the "Register to Favorites" screen, and click the [OK] button.

■Adding templates classified by purpose

GX Works3 provides templates for registering elements classified by purpose to the [Favorites] tab at once. ("Category by Target Template")

By deleting unnecessary elements after registering the templates, the elements can be placed efficiently.

1. Select the [Favorites] tab in the "Element Selection" window.
2. Select on the toolbar in the "Element Selection" window ⇨ [Import Favorites] ⇨ [Category by Target Template].

■Adding module templates

GX Works3 provides templates for registering frequently-used modules to the [Favorites] tab. ("Module Template")

Module templates can be imported when a module configuration diagram is active.

1. Select the [Favorites] tab in the "Element Selection" window.
2. Select on the toolbar in the "Element Selection" window ⇨ [Import Favorites] ⇨ [Module Template].

Point

By importing an exported file (*.xml), elements registered in the [Favorites] tab can be used on other personal computers.

Select on the toolbar ⇨ [Export Favorites]/[Import Favorites]

History

By selecting the [History] tab, elements used previously are displayed in the order by date.

The order can be changed to the descending order of used count from the pull-down list.

Module

Module labels and module FBs, which are registered in a project, are displayed by selecting the [Module] tab.

For details on the registration methods, refer to the following section.

☞ Page 168 Registering Module Labels, Page 326 Importing module FBs in project

Library

POUs, which are registered in a library file, are displayed by selecting the [Library] tab.

For details on the registration methods, refer to the following section.

☞ Page 335 Registering user libraries in the library list

2.4 Menu List

Basic menus

[Project]	
⇨ [New]	Page 85 Creating a project
⇨ [Open]	Page 87 Opening a project
⇨ [Close]	—
⇨ [Save]	Page 106 Overwriting projects
⇨ [Save As]	Page 105 Saving projects under the specified name
⇨ [Delete]	Page 106 Deleting a project
⇨ [Project Verify]	Page 116 Verifying Projects
⇨ [Project Revision] ⇨ [Register Revision]	Page 122 Registering histories
⇨ [Project Revision] ⇨ [Revision List]	Page 123 Displaying a history list
⇨ [Change Module Type/Operation Mode]	Page 114 Changing the Module Type and Operation Mode of Projects
⇨ [Data Operation] ⇨ [New Data]	Page 108 Creating data
⇨ [Data Operation] ⇨ [Add New Worksheet]	Page 110 Adding worksheets
⇨ [Data Operation] ⇨ [New Folder]	Page 44 Creating folders
⇨ [Data Operation] ⇨ [Rename]	Page 109 Changing a data name
⇨ [Data Operation] ⇨ [Delete Data]	Page 110 Deleting data
⇨ [Data Operation] ⇨ [Copy Data]	Page 109 Copying/pasting data
⇨ [Data Operation] ⇨ [Paste Data]	
⇨ [Data Operation] ⇨ [Add New Module]	Page 141 Setting parameters for an I/O module and intelligent function module Page 149 Simple Motion Module Setting function
⇨ [Data Operation] ⇨ [Property]	Page 112 Properties
⇨ [Data Operation] ⇨ [Help]	Page 111 Associating data with help files
⇨ [Intelligent Function Module] ⇨ [Module Parameter List]	Page 145 Checking/changing the number of intelligent function module parameters
⇨ [Open Other Format File] ⇨ [GX IEC Developer Format] ⇨ [Open ASC Format File]	Page 97 Opening a GX IEC Developer format project
⇨ [Open Other Format File] ⇨ [GX IEC Developer Format] ⇨ [Open SUL Format User Library]	Page 333 Creating a library in GX Works3 format from a library in GX IEC Developer format
⇨ [Open Other Format File] ⇨ [GX Works2 Format] ⇨ [Open Project]	Page 89 Opening a GX Works2 format project
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⇨ [Cascade]	—
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[Online]	
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[Edit]	
⇨ [Set Maximum Value]	The menus to be displayed differ depending on the module.
⇨ [Set Minimum Value]	
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⇨ [Paste Positioning Data]	
⇨ [Channel Copy]	
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⇨ [Refresh Batch Setting] ⇨ [Enable All]	
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⇨ [Automatic Device Assignment]	
⇨ [Setting Method] ⇨ [Start/End]	
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⇨ [Change TC Setting Value]	Page 199 Changing TC setting values
⇨ [Ladder Edit Mode] ⇨ [Read Mode]	Page 184 Read mode/Write mode/Monitor read mode/ Monitor write mode
⇨ [Ladder Edit Mode] ⇨ [Write Mode]	
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[Edit]	
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⇨ [Ladder Symbol] ⇨ [Close Branch]	
⇨ [Ladder Symbol] ⇨ [Coil]	
⇨ [Ladder Symbol] ⇨ [Application Instruction]	
⇨ [Ladder Symbol] ⇨ [Vertical Line]	
⇨ [Ladder Symbol] ⇨ [Horizontal Line]	
⇨ [Ladder Symbol] ⇨ [Delete Vertical Line]	
⇨ [Ladder Symbol] ⇨ [Delete Horizontal Line]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Branch]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Branch]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close Branch]	
⇨ [Ladder Symbol] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close Branch]	
⇨ [Ladder Symbol] ⇨ [Invert Operation Results]	—
⇨ [Ladder Symbol] ⇨ [Operation Result Rising Pulse]	
⇨ [Ladder Symbol] ⇨ [Operation Result Falling Pulse]	
⇨ [Inline Structured Text] ⇨ [Insert Inline Structured Text Box]	Page 192 Inserting inline structured text
⇨ [Inline Structured Text] ⇨ [Display Template]	Page 221 Displaying syntax templates
⇨ [Inline Structured Text] ⇨ [Mark Template (Left)]	
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⇨ [Documentation] ⇨ [Edit Statement]	Page 195 Entering/editing statements
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⇨ [Easy Edit] ⇨ [Connect Horizontal Line to Left-Side Ladder Symbol]	
⇨ [Easy Edit] ⇨ [Enter/Delete Horizontal Line to Rightward]	
⇨ [Easy Edit] ⇨ [Enter/Delete Horizontal Line to Leftward]	
⇨ [Easy Edit] ⇨ [Enter/Delete Vertical Line to Downward]	
⇨ [Easy Edit] ⇨ [Enter/Delete Vertical Line to Upward]	
⇨ [Easy Edit] ⇨ [Switch Ladder Symbol Invert]	Page 186 Switching methods for contacts/instructions
⇨ [Easy Edit] ⇨ [Switch Pulse/Switch SET and RST Instruction]	
⇨ [Easy Edit] ⇨ [Switch Statement/Note Type]	—
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⇨ [Open Label Setting of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Program Body of Selected Element] ⇨ [Open in Front]	
⇨ [Open Program Body of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Label Setting] ⇨ [Open in Front]	
⇨ [Open Label Setting] ⇨ [Tile Horizontally]	
⇨ [Open Device Comment Setting] ⇨ [Open in Front]	Page 270 Displaying the device comment editor in a program editor
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Available menus when editing an ST program

[Edit]	
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⇨ [Disable Comment Out of Selected Range]	
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⇨ [Mark Template (Right)]	
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⇨ [Jump]	Page 222 Jump
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⇨ [Toolbar] ⇨ [ST]	—
⇨ [Open Label Setting of Selected Element] ⇨ [Open in Front]	
⇨ [Open Label Setting of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Program of Selected Element] ⇨ [Open in Front]	
⇨ [Open Program of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Label Setting] ⇨ [Open in Front]	
⇨ [Open Label Setting] ⇨ [Tile Horizontally]	
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⇨ [Outline] ⇨ [Expand/Collapse of All Outlines]	
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Available menus when editing an FBD/LD program

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[Edit]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Open Contact]	Page 228 Inserting from the menu or on the toolbar
⇨ [Add Element (Ladder Symbol)] ⇨ [Close Contact]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Open Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Close Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Coil]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Left Power Rail]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close Branch]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Open Contact and Coil]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Variable]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Connector]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Jump]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Jump Label]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Return]	
⇨ [Add Element (Ladder Symbol)] ⇨ [Comment]	
⇨ [Change Name]	—
⇨ [Change FB/FUN Data]	Page 230 Replacing function elements/function block elements
⇨ [Update FB/FUN]	Page 230 FB/FUN whose definition is unclear
⇨ [Edit Mode] ⇨ [Element Auto-connect]	Page 229 Common operations of elements
⇨ [Edit Mode] ⇨ [Use Assigned Device for Label Input]	Page 228 Entering programs
⇨ [I/O Argument] ⇨ [Increment Argument]	Page 230 Adding/deleting arguments
⇨ [I/O Argument] ⇨ [Delete Argument]	
⇨ [Easy Edit] ⇨ [Invert Contact (Open/Close)]	Page 228 Switching methods for contacts/instructions
⇨ [Easy Edit] ⇨ [Switch Pulse]	
⇨ [Easy Edit] ⇨ [Switch SET and RST]	
⇨ [Easy Edit] ⇨ [Link Comment]	Page 236 Linking a single comment element with a single element
⇨ [Easy Edit] ⇨ [Unlink Comment]	Page 236 Releasing links
⇨ [Easy Edit] ⇨ [Comment Batch Link]	Page 236 Linking comment elements and elements in a batch
⇨ [Order Comment] ⇨ [Bring to Front]	Page 230 Order of comment elements
⇨ [Order Comment] ⇨ [Bring Forward]	
⇨ [Order Comment] ⇨ [Send Backward]	
⇨ [Order Comment] ⇨ [Send to Back]	
⇨ [Process Control Extension] ⇨ [Add Structured Data Type Label for Tag Data Reference]	Page 321 Creating a user-defined tag FB
[Find/Replace]	
⇨ [FBD Network Block List]	Page 238 Displaying FBD network blocks in a list
[View]	
⇨ [Toolbar] ⇨ [FBD/LD]	—
⇨ [Comment Display]	Page 223 Configuration of FBD/LD editor
⇨ [Device Display]	
⇨ [FBD Network Block No. Display]	
⇨ [Display Execution Order]	
⇨ [Grid Display]	
⇨ [Display Page Break]	

[View]	
⇨ [Open Label Setting of Selected Element] ⇨ [Open in Front]	—
⇨ [Open Label Setting of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Program Body of Selected Element] ⇨ [Open in Front]	
⇨ [Open Program Body of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Label Setting] ⇨ [Open in Front]	
⇨ [Open Label Setting] ⇨ [Tile Horizontally]	
⇨ [Open Device Comment Setting] ⇨ [Open in Front]	Page 270 Displaying the device comment editor in a program editor
⇨ [Open Device Comment Setting] ⇨ [Tile Horizontally]	
⇨ [Open Zoom Source Block]	Page 263 Creating/displaying Zooms (action/transition)
⇨ [Switch Between Worksheets] ⇨ [Switch to Previous Worksheet]	—
⇨ [Switch Between Worksheets] ⇨ [Switch to Next Worksheet]	
[Online]	
⇨ [Monitor] ⇨ [Faceplate]	Page 448 Checking tag data on the gauge window (faceplate)

Available menus when editing an SFC program (SFC diagram)

[Edit]	
⇨ [Delete]	—
⇨ [Select SFC Network Block]	Page 253 Common operations of SFC elements
⇨ [Change TC Setting Value]	Page 199 Changing TC setting values
⇨ [Modify] ⇨ [Name]	Page 246 Changing a step name/step No./step attribute/step attribute target Page 247 Changing a transition name/Transition No.
⇨ [Modify] ⇨ [Direct Expression for Transition]	Page 248 Creating a transition
⇨ [Modify] ⇨ [Qualifier]	—
⇨ [Modify] ⇨ [End Step/Jump]	Page 243 SFC element
⇨ [Modify] ⇨ [Step Attribute]	Page 246 Changing a step name/step No./step attribute/step attribute target
⇨ [Modify] ⇨ [No Step Attribute]	
⇨ [Modify] ⇨ [SC: Coil HOLD Step]	
⇨ [Modify] ⇨ [SE: Operation HOLD Step (without Transition Check)]	
⇨ [Modify] ⇨ [ST: Operation HOLD Step (with Transition Check)]	
⇨ [Modify] ⇨ [R: Reset Step]	
⇨ [Modify] ⇨ [BC: Block Start Step (with END Check)]	
⇨ [Modify] ⇨ [BS: Block Start Step (without END Check)]	
⇨ [Modify] ⇨ [Step Attribute Target]	
⇨ [Modify] ⇨ [Device]	Page 246 Changing a step name/step No./step attribute/step attribute target Page 247 Changing a transition name/Transition No.
⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line]	Page 250 Switching a jump/connection line
⇨ [Insert] ⇨ [Step]	Page 246 Inserting a normal step
⇨ [Insert] ⇨ [Transition]	Page 247 Inserting a transition
⇨ [Insert] ⇨ [Action]	Page 249 Inserting an action
⇨ [Insert] ⇨ [Jump]	Page 250 Inserting a jump
⇨ [Insert] ⇨ [Selection Branch]	Page 252 Inserting a branch below a step/transition
⇨ [Insert] ⇨ [Simultaneous Branch]	
⇨ [Insert] ⇨ [Selection Branch Leg]	Page 252 Adding a selection branch on the right side of a transition/selection condition
⇨ [Insert] ⇨ [Simultaneous Branch Leg]	Page 252 Adding a simultaneous branch on the right side of a step/simultaneous branch

[Edit]	
⇨ [Insert FBD/LD Element] ⇨ [Left Power Rail]	—
⇨ [Insert FBD/LD Element] ⇨ [Open Contact]	
⇨ [Insert FBD/LD Element] ⇨ [Close Contact]	
⇨ [Insert FBD/LD Element] ⇨ [Open Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Close Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Rising Pulse Close Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Pulse Contact Symbol] ⇨ [Falling Pulse Close Branch]	
⇨ [Insert FBD/LD Element] ⇨ [Variable]	
⇨ [Insert FBD/LD Element] ⇨ [Connector]	
⇨ [Insert FBD/LD Element] ⇨ [Comment]	
⇨ [I/O Argument] ⇨ [Increment Argument]	Page 230 Adding/deleting arguments
⇨ [I/O Argument] ⇨ [Delete Argument]	
⇨ [Easy Edit] ⇨ [Invert Contact (Open/Close)]	Page 228 Switching methods for contacts/instructions
⇨ [Easy Edit] ⇨ [Switch Pulse]	
⇨ [Easy Edit] ⇨ [Link Comment]	Page 236 Linking a single comment element with a single element Page 262 Linking a comment
⇨ [Easy Edit] ⇨ [Unlink Comment]	Page 236 Releasing links
⇨ [Easy Edit] ⇨ [Comment Batch Link]	Page 236 Linking comment elements and elements in a batch
⇨ [Order Comment] ⇨ [Bring to Front]	Page 230 Order of comment elements
⇨ [Order Comment] ⇨ [Bring Forward]	
⇨ [Order Comment] ⇨ [Send Backward]	
⇨ [Order Comment] ⇨ [Send to Back]	
⇨ [Edit Step/Transition]	Page 262 Editing Step No./Transition No.
⇨ [Properties]	—
[Convert]	
⇨ [Convert Block]	Page 262 Converting a block
[View]	
⇨ [Toolbar] ⇨ [SFC]	—
⇨ [Comment Display]	Page 241 Configuration of SFC diagram editor
⇨ [Device Display]	
⇨ [Display Step/Transition]	
⇨ [Switch Ladder Display] ⇨ [Detailed Expression]	
⇨ [Switch Ladder Display] ⇨ [MELSAP-L (Instruction Format)]	
⇨ [Grid Display]	
⇨ [Open SFC Block List]	Page 265 Displaying an SFC block list
⇨ [Open Zoom List]	Page 264 Displaying a Zoom list
⇨ [Open Label Setting of Selected Element] ⇨ [Open in Front]	—
⇨ [Open Label Setting of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Program Body of Selected Element] ⇨ [Open in Front]	
⇨ [Open Program Body of Selected Element] ⇨ [Tile Horizontally]	
⇨ [Open Label Setting] ⇨ [Open in Front]	
⇨ [Open Label Setting] ⇨ [Tile Horizontally]	
⇨ [Open Device Comment Setting] ⇨ [Open in Front]	Page 270 Displaying the device comment editor in a program editor
⇨ [Open Device Comment Setting] ⇨ [Tile Horizontally]	
⇨ [Open Zoom/Start Destination Block]	Page 241 Configuration of SFC diagram editor

[View]	
⇨ [Open Start Source Block]	Page 246 Creating a step that makes another block activated

[Debug]	
⇨ [Control SFC Steps] ⇨ [Activate the Selected Steps]	Page 429 Changing the active status
⇨ [Control SFC Steps] ⇨ [Deactivate the Selected Steps]	
⇨ [Control SFC Steps] ⇨ [Activate the Selected Steps Only]	

Available menus when editing an SFC program (block list)

[Edit]	
⇨ [Delete]	—

[Find/Replace]	
⇨ [Jump]	Page 266 Jump
⇨ [Block Information Find Device]	Page 266 Searching for block information

[View]	
⇨ [SFC Block List Comment]	Page 265 Displaying an SFC block list
⇨ [Display Device]	
⇨ [Open SFC Body]	Page 266 Displaying SFC diagrams
⇨ [Open Label Setting]	Page 266 Displaying local label editor

Available menus when displaying a label editor

[Edit]	
⇨ [Delete]	—
⇨ [Select All]	
⇨ [New Declaration (Before)]	Page 158 Editing a row
⇨ [New Declaration (After)]	
⇨ [Delete Row]	
⇨ [Import File]	Page 167 Importing/exporting files
⇨ [Export to File]	
⇨ [System Label] ⇨ [Reservation to Register System Label]	Page 174 Registering labels in system label database
⇨ [System Label] ⇨ [Reservation to Release System Label]	Page 174 Releasing system labels
⇨ [System Label] ⇨ [Import System Label]	Page 174 Importing system labels in system label database to GX Works3
⇨ [System Label] ⇨ [Reflect to System Label Database]	Page 174 Registering labels in system label database
⇨ [System Label] ⇨ [Check the changes of the System Label Database]	Page 175 Importing the changes of system label database
⇨ [System Label] ⇨ [Execute Verification Synchronous with System Label]	Page 175 Verifying system label information
⇨ [Copy Device Comment]	Page 166 Copying device comments
⇨ [Delete Blank Rows]	Page 158 Deleting a blank row

[View]	
⇨ [Toolbar] ⇨ [Label]	—
⇨ [Show/Hide of Label Item]	
⇨ [Display Program Editor]	

Available menus when displaying the Device Memory editor

[Edit]	
⇨ [Delete]	—
⇨ [Enter Character String]	Page 293 Setting character strings
⇨ [Clear All (All Devices)]	Page 293 Clearing whole memory of device memory
⇨ [Clear All (Displayed Devices)]	
⇨ [FILL]	Page 292 Setting values in batch
⇨ [Register/Import Device Initial Value]	Page 294 Interaction with device initial value
[View]	
⇨ [Display Format Detailed Setting]	—

Available menus when editing a device comment

[Edit]	
⇨ [Delete]	—
⇨ [Select All]	
⇨ [Detect the Mismatched Comment]	Page 271 Detecting devices with empty cell
⇨ [Read from Sample Comment]	Page 275 Reading sample comments
⇨ [Delete Unused Device Comment]	Page 272 Deleting unused device comments
⇨ [Clear All (All Devices)]	Page 272 Clearing all device comments
⇨ [Clear All (Displayed Devices)]	
⇨ [Import File]	Page 273 Importing to/exporting from device comments
⇨ [Export to File]	
⇨ [Hide All Bit Specification Information]	—
⇨ [Show All Bit Specification Information]	
⇨ [Cut the Range Including Hidden Bit Specification Information]	Page 271 Creating device comments
⇨ [Copy the Range Including Hidden Bit Specification Information]	
⇨ [Paste the Range Including Hidden Bit Specification Information]	

Available menus when displaying the Verify Result window

[Edit]	
⇨ [Export to File]	Page 121 Exporting data to file
[Find/Replace]	
⇨ [Next Unmatched]	Page 118 Checking a verification result
⇨ [Previous Unmatched]	
[View]	
⇨ [Return to Result List]	—
⇨ [Close Detailed Result]	
⇨ [Close All Detailed Result]	

Available menus when displaying the Device/Buffer Memory Batch Monitor window

[View]	
⇨ [Display Format Detailed Setting]	—

Available menus when displaying the tag FB setting editor

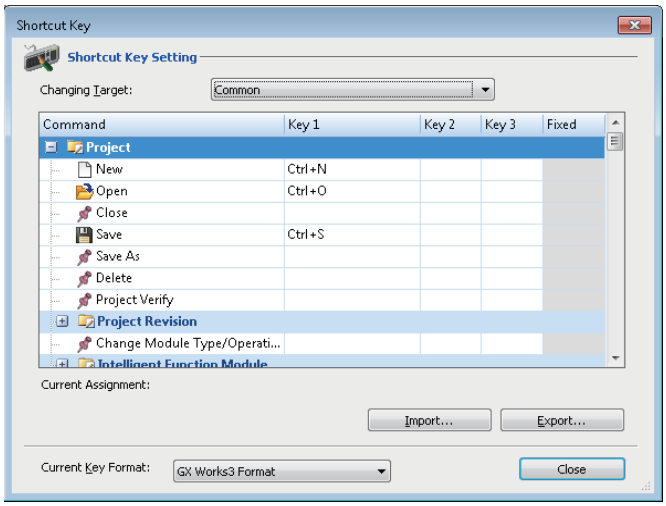
[Edit]	
⇨ [Delete]	—
⇨ [Select All]	
⇨ [New Declaration (Before)]	
⇨ [Delete Row]	
⇨ [Export Assignment Information Database File]	

2.5 Checking and Changing Shortcut Keys

Shortcut keys of each function can be checked and changed in the "Shortcut Key" screen.
Up to three shortcut keys can be assigned to one command.

Window

[Tool] ⇨ [Shortcut Key]



Operating procedure

1. Double-click a command cell to change the shortcut key.
2. Press a key to assign on the keyboard.

■Changing the default setting

The shortcut key assignment set to the default can be changed by selecting a format from the pull-down list for "Current Key Format"

The available formats are as follows:

- GX Works3 format: Select this to reset the shortcut key assignment to the original one. Keys same as GX Works2 are included.
- GPPA format: Select this to change the shortcut key assignment for all commands to one same as GPPA in a batch.
- GPPW format: Select this to change the shortcut key assignment for all commands to one same as GX Developer in a batch.
- MEDOC format: Select this to change the shortcut key assignment for all commands to one same as MELSEC MEDOC in a batch.

Point

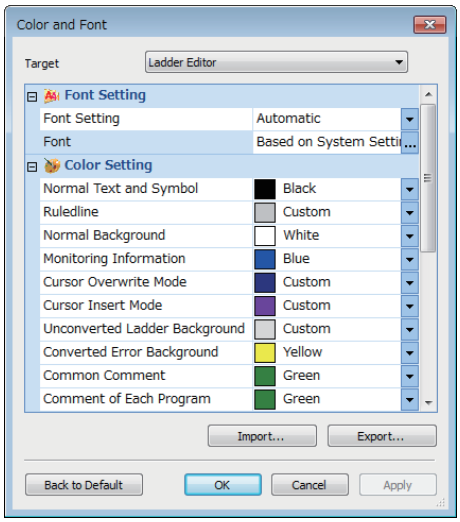
By importing an exported file (*.gks), the setting can be utilized on other personal computers.
Setting files exported in GX Works2 can also be imported.

2.6 Checking and Changing Colors and Fonts

Colors and fonts used in each editor can be checked and changed in the "Color and Font" screen.
The changed color and font settings are saved for each user.

Window

[View] ⇨ [Color and Font]



Operating procedure

1. Select an editor from the pull-down list for "Target".
2. Select "User Setting" from the pull-down list for "Font Setting".
3. Set each item in the "Font" screen, and click the [OK] button.
4. Select a color to change in "Color Setting", and click the [Apply] button.
5. Click the [OK] button.

Point

By importing an exported file (*.gcs), the setting can be utilized on other personal computers.
Setting files exported in GX Works2 can also be imported. However, color names may differ.

Precautions

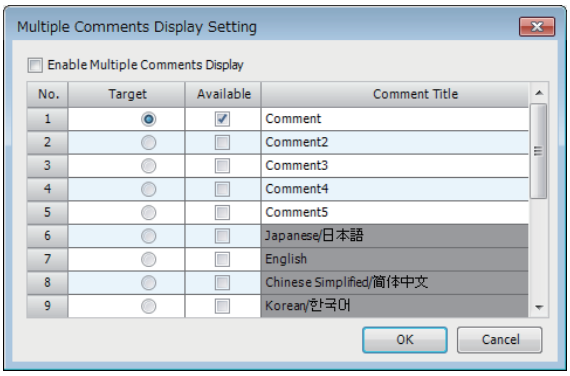
Some fonts may be displayed as garbled characters.
If this happens, change the setting to another font.

2.7 Comment Display Setting

Multiple comments are used in a project.
Comments which are used in a project and which are displayed in each editor and monitor screen can be set in the "Multiple Comments Display Setting" screen.
Up to five comment titles (comment No.1 to 5) can be set.
Comment No.6 to 12 are used for entering comments in predefined language.
Do not use comment No.13 to No.16 (Reserved1 to Reserved4).

Window

[View] ⇨ [Multiple Comments Display Setting]



Operating procedure

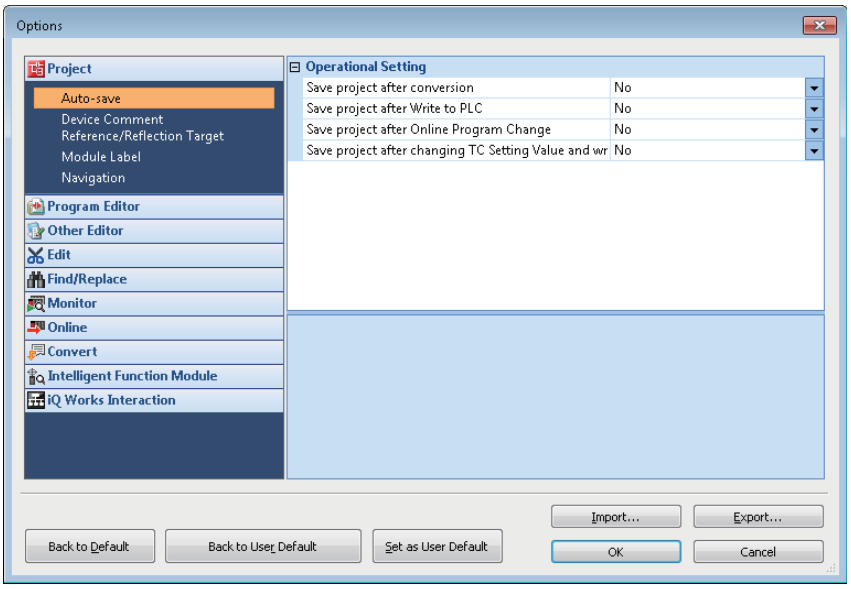
1. Select "Enable Multiple Comments Display".
2. Select "Available", and enter a comment title.
3. Select a comment to display in a program editor or each monitor screen in the "Target" column, and click the [OK] button.
4. Enter a comment in each row in the device comment editor.

2.8 Option Setting for Each Function

Some functions and editors include the option settings. By changing the option settings, the screen display format can be changed and the detailed operation settings for each function can be set.

Window

[Tool] ⇨ [Options]



Operating procedure

Set each item and click the [OK] button.

Point

By importing an exported file (*.gos), the setting can be utilized on other personal computers.
Note that the setting items set for "Project" ⇨ "Device Comment Reference/Reflection Target" are not exported.

Precautions

■Converting programs

After changing the following option setting, converting all programs is required.

- [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Data Type Setting"
- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting"

As a precautionary measure, perform the following operation before switching the CPU module to RUN.

1. Reset the CPU module.
2. Clear values of devices/labels to '0' (Including latch).
3. Clear values of file registers to '0'.

■Number of program steps

Depending on the following option setting or the version of GX Works3, the number of steps of a program, module FB, and library (with the "mslm" extension) may be changed from the value mentioned in each manual.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Optimize the Number of Steps."

■Project for which "Yes" is selected for "Optimize the Number of Steps."

A conversion error may occur in a project that satisfies the following two conditions. In that case, a subroutine program or interrupt program must be changed to a program using an FB or inline structured text box.

- "Yes" is selected for "Optimize the Number of Steps."*1 in [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting".
- Any of the data in the following table is used in a subroutine program or an interrupt program.

*1 "Collectively Allocate Temporary Area to Optimize the Number of Steps" is also displayed for a project used for an FX5CPU.

No.	Data
1	A label for which two or more devices or labels are used as an array index (Example) A label whose data type is structure array  (Example) A label whose data type is two-dimensional array 
2	A subroutine type function block in which EN/ENO is used
3	Standard function DINT_TO_BCD(_E), BCD_TO_DINT(_E), MUL(_E), DIV(_E), MOD(_E), XOR(_E), MAX(_E), MIN(_E), MUX(_E), LT(_E), LE(_E), EQ(_E), GE(_E), GT(_E), MID(_E), CONCAT(_E), INSERT(_E), MUL_TIME(_E), DIV_TIME(_E)

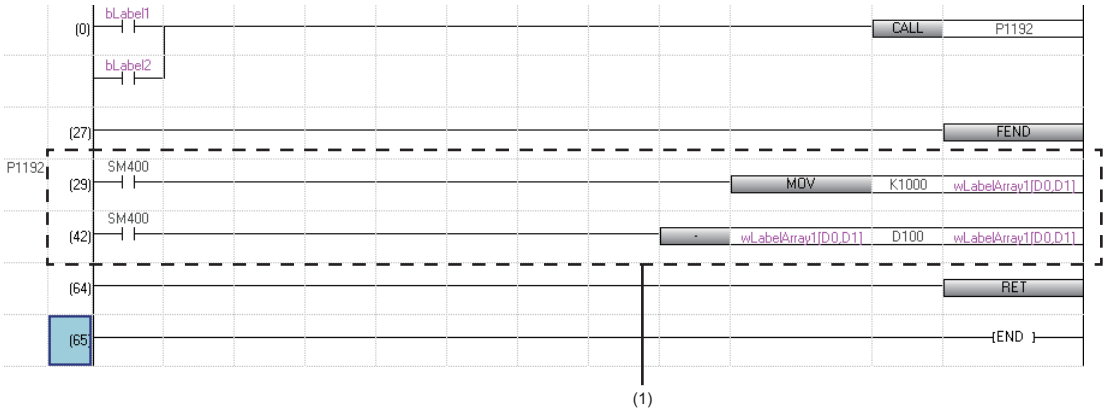
Modify a subroutine program or an interrupt program by any of the following methods.

(1) Change a program to a function block.

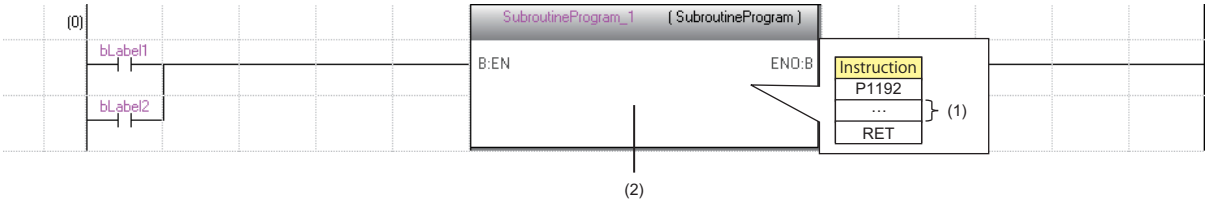
Subroutine program

- Change the subroutine program (1) to the function block (2), and change the program to call the created function block (2).

(Example) Program before modification



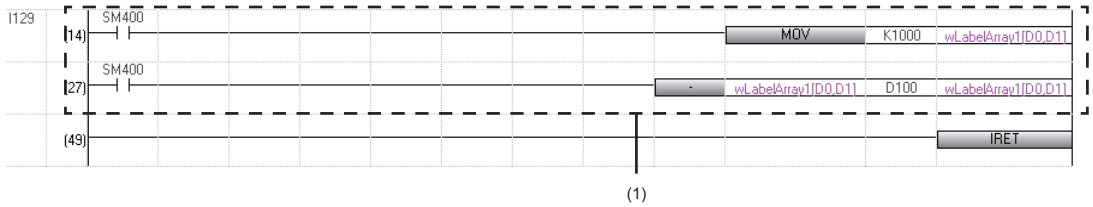
(Example) Program after modification



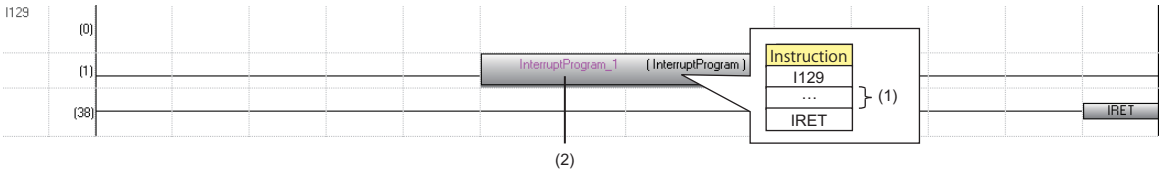
Interrupt program

• Change the interrupt program (1) to the function block (2).

(Example) Program before modification



(Example) Program after modification

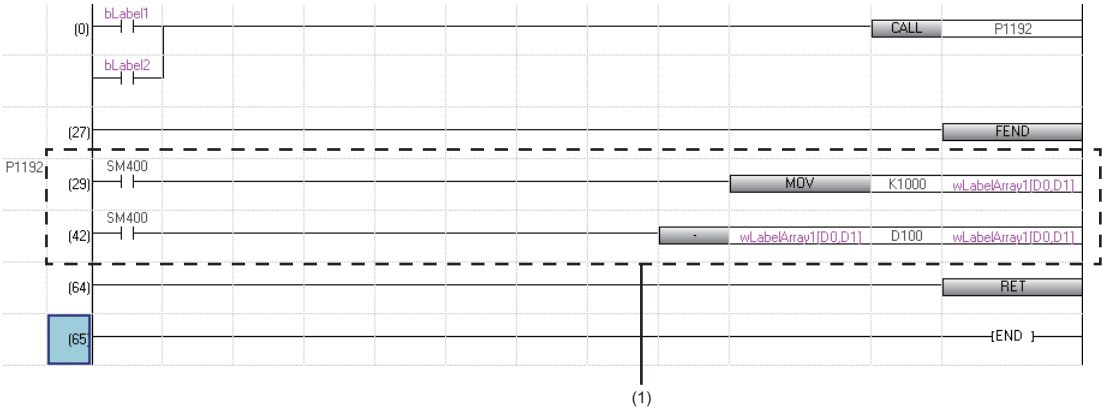


(2) Change a program to an inline structured text box.

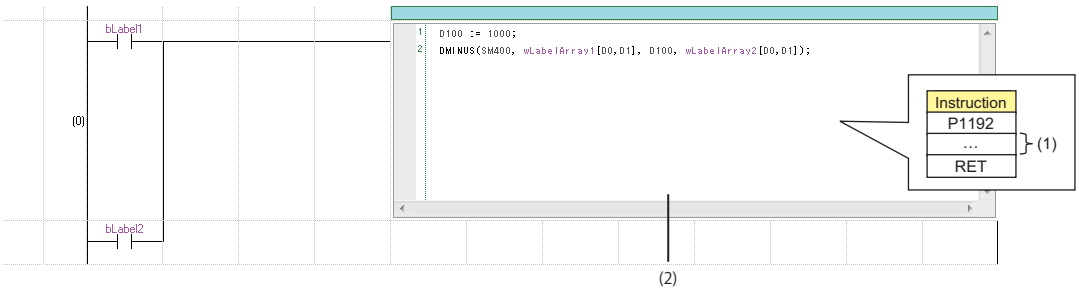
Subroutine program

• Create the subroutine program (1) to the inline structured text (2), and change the program to call the created inline structured text (2).

(Example) Program before modification



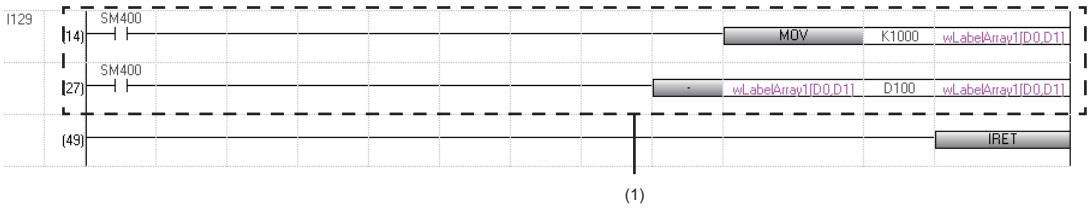
(Example) Program after modification



Interrupt program

• Change the interrupt program (1) to the inline structured text (2).

(Example) Program before modification



(Example) Program after modification

■An error 'Temporary area exceeded' occurs in an FX5CPU

A temporary area is used for passing and receiving the arguments of function blocks and functions, and calculating operations.

The memory capacity for a temporary area that can be allocated for each program block in a program file is limited. If a program file including a program block exceeding the capacity is written to a CPU module, an error 'Temporary area exceeded' will occur.

In that case, reduce the usage of the temporary area for one program block by any of the following actions.

- Set "No" for "Collectively Allocate Temporary Area to Optimize the Number of Steps" in [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting"
- Divide one program block into some program blocks

Process control extension setting

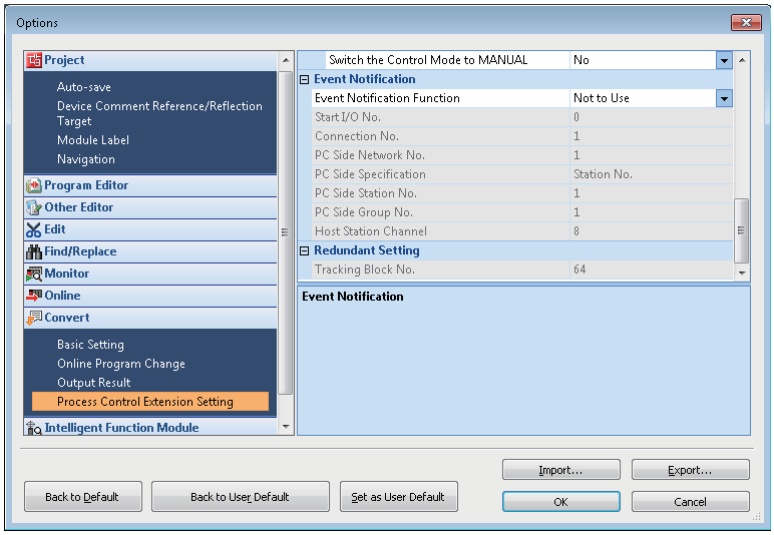
⚠CAUTION

■To set the event notification, confirm the setting contents carefully.
If there is no module set in "Event Notification" or the setting contents is incorrect, the following phenomena may result when an event occurs.
- The CPU module stopped due to the error.
- The network module communication error occurs.
- No event notification is received.

When adjusting the system, after confirming that nothing affects of the actual system, it is recommended to check that the above phenomena do not result when an event occurs by an operation such as switching the control modes of a faceplate (example: MANUAL → AUTO, AUTO → MANUAL).

Window

[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting"



■Event notification

The following table shows the options of "Event Notification Function".

Options	Description
Not to Use	No event is notified to PX Developer Monitor Tool even though an event occurs (including an alarm) in a CPU module.
Built-in Ethernet Port CPU	Events (including an alarm) occurred in a CPU module are notified to PX Developer Monitor Tool via an Ethernet port.
Ethernet Q Compatible Ethernet	Events (including an alarm) occurred in a CPU module are notified to PX Developer Monitor Tool via Ethernet. Specify the connection number of port 1 for "Connection No.". When using an Ethernet module (Port 1 network type: Q-compatible Ethernet) , select "Q Compatible Ethernet". For details on Q-compatible Ethernet, refer to the following manual. MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup)
CC-Link IE Controller Network	Events (including an alarm) occurred in a CPU module are notified to PX Developer Monitor Tool via CC-Link IE Controller Network.

Precautions

■For CC-Link IE Controller Network

Do not use the following channel numbers for the link dedicated instructions in a ladder program.

- Channel number used by the own station: Channel number set in "Event Notification"
- Channel number of a target station used for storing data: 1 (number for PX Developer Monitor Tool)

For details on channel numbers, refer to the manual of a network module used.

■For an Ethernet module/built-in Ethernet CPU

Broadcast in UDP/IP is used for sending data.

The UDP connection device number (broadcast) that was added in the following parameter is required to be set for "Connection No." in "Event Notification".

- Ethernet module: "Module Information" ⇨ "(module name)" ⇨ "(module parameter)" ⇨ "Basic Settings" ⇨ "External Device Configuration"
- Built-in Ethernet CPU: "(CPU model name of the project)" ⇨ "Module Parameter" ⇨ "Basic Settings" ⇨ "External Device Configuration"

The same number needs to be set for "Port No." of "Sensor/Device" and "Event Notification UDP Port No.(HEX)" in PX Developer Monitor Tool.

For details, refer to the following manual.

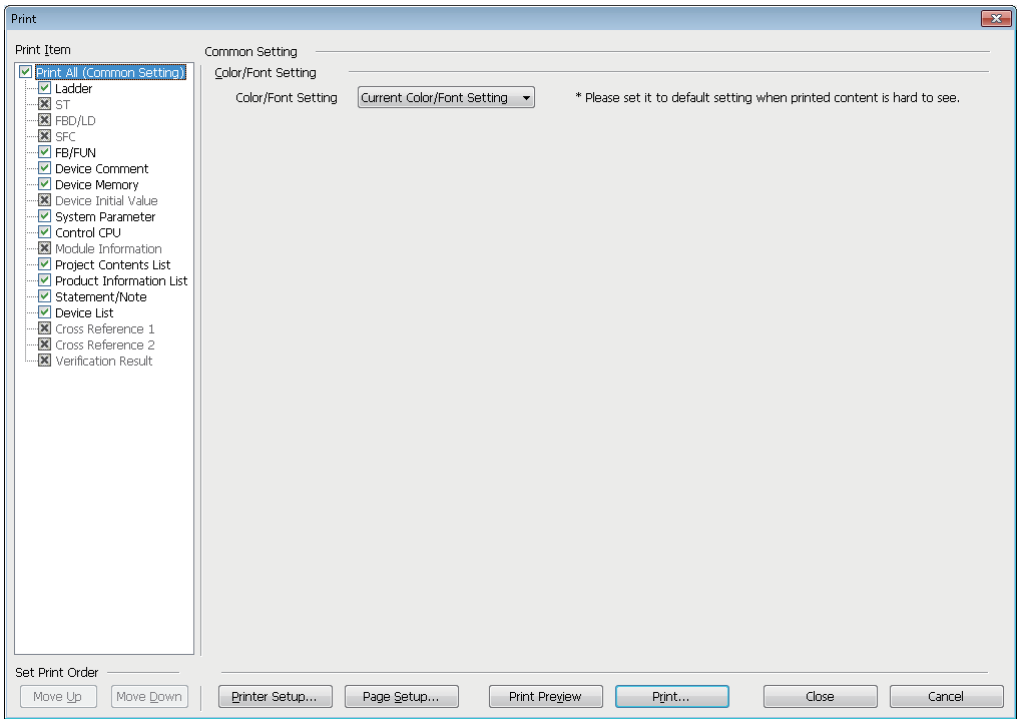
📖 PX Developer Version 1 Operating Manual (Monitor Tool)

2.9 Printing Data

This section explains the printing method of data created in GX Works3.

Window

[Project] ⇨ [Print] ( )



When no data exist or only read-protected data exist in "Print" and "Do Not Print" lists, × is shown on the checkbox of print items.

Operating procedure

1. Select data to print and set each setting.
2. Change the printer by clicking the [Printer Setup] button and set the page setting by clicking the [Page Setup] button.
3. Click the [Print] button.

Point

If the print result is hard to see, it will be more visible by changing its colors and fonts to the defaults when printing. (Example: When the background color of an editor is set to black, the background color in print result can be changed to white.)

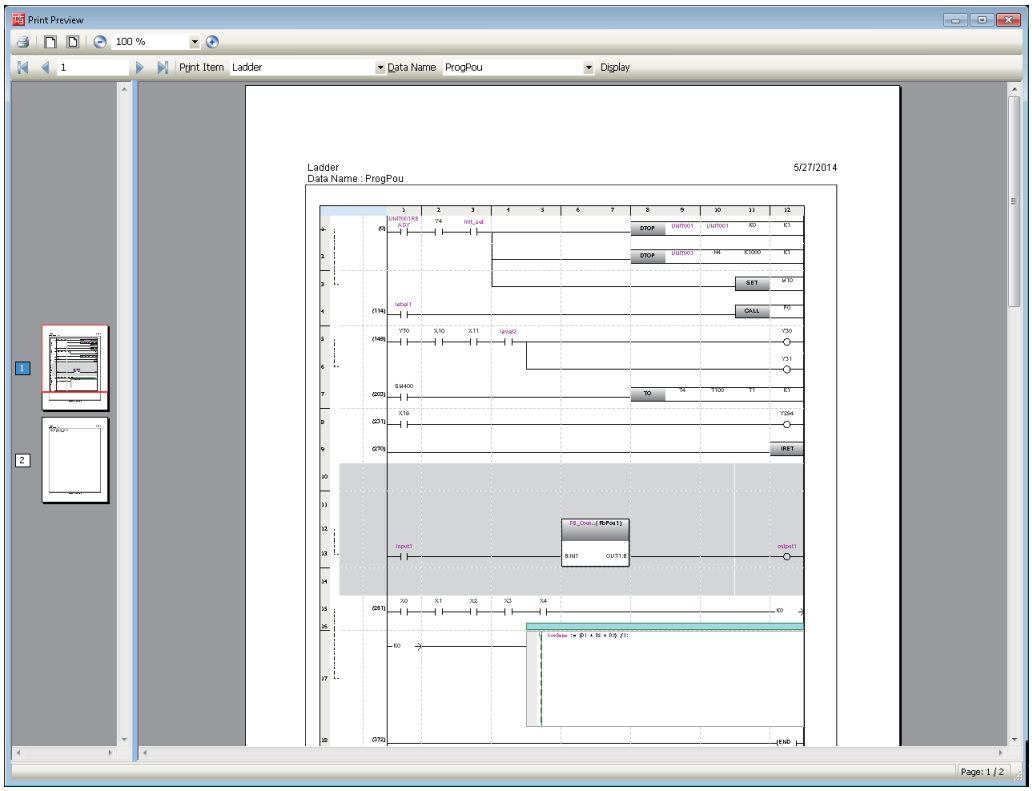
By setting the following option, the color and font for the printing can be changed.

• "Print All (Common Setting)" ⇨ "Common Setting" ⇨ "Color/Font Setting" in the "Print" screen

Print image preview

The print image of each data can be checked.

Window



Operating procedure

1. Select [Project] ⇨ [Print Preview].
2. Click the [Print Preview] button in the "Print" screen.
3. To change data to preview, select "Print Item" and "Data Name", and click the [Display] button.

Considerations

■Displaying print previews and printing data

While the following functions are being performed, neither displaying print preview nor printing data can be performed.

- Monitor
- Simulation
- Offline monitor

■Printing a large amount of data

Large amount of data may not be printed at all or printed half way due to the limitations of printer driver or Windows® print spooler. In this case, print the data by any of the following methods.

- Split the data by setting a print range
- Select "Print directly to the printer" in the [Advanced] tab of the property screen (select [Control Panel] ⇨ [Devices and Printers] from Windows® Start*1)
- Set "Output by Item" for the print job output in the "Printer Setup" screen.

*1 On the Start screen or from the Start menu.

■Outputting the print contents on a file

- When print contents are output to a file, the "Save As" screen may appear in the background of other screens.
  Press the Alt + Tab keys or Alt + Esc keys to bring the screen in the foreground.
- GX Works3 will not respond if it is operated while the "Save As" screen is being displayed.
  When the message appears, select "Wait for the program to respond". Selecting "Close the program" results in loss of unsaved data.

■Printing ladder programs

For "Start Row" and "--End Row" of "Specify Print Range", specify the rows that is shown when a whole program is displayed in a ladder editor.

Depending on the following setting and menu selection, the number of rows in print result may differ from that of the range specified.

- Print screen setting: "Ladder" ⇨ "Setting by Item (Ladder)" ⇨ "Additional Information" ⇨ "Statement/Note" in the "Print" screen
- View menu: [View] ⇨ [Statement Display] and [Note Display]

○: Selected, —: Unselected

Print screen setting	View menu		Print result
Statement/Note	Statement	Note	
○	○	○	Matched
	○	—	Mismatched
	—	○	
	—	—	
—	○	○	
	○	—	
	—	○	
	—	—	Matched

The display magnification of a print result is 100%.

If the display magnification*1 of a ladder editor is set to a value other than 100%, some characters may get cut in a print result. In this case, set the display magnification*1 of a ladder editor to 100%, and adjust the column width as necessary.

*1 The display magnification of a ladder editor can be set in the following menu.
[View] ⇨ [Zoom] ⇨ [Set Zoom Factor]

■Printing FBD/LD programs

In the FBD/LD editor, elements can be placed arbitrarily. Therefore, the elements will be printed across multiple pages as shown below.

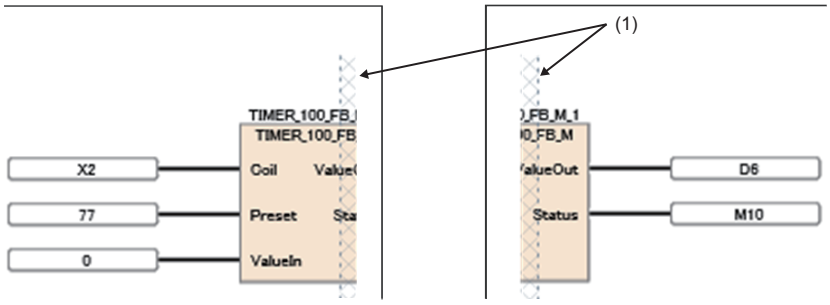
Check where the page breaks are by any of the following methods before printing.

- Select [View] ⇨ [Display Page Break].
- Click the [Print Preview] button in the "Print" screen.

The paper setting different from one in the page setting can be set in "FBD/LD" in the "Print" screen.

Ex.

The shaded area (1) indicates the partially overlapped area between the pages.

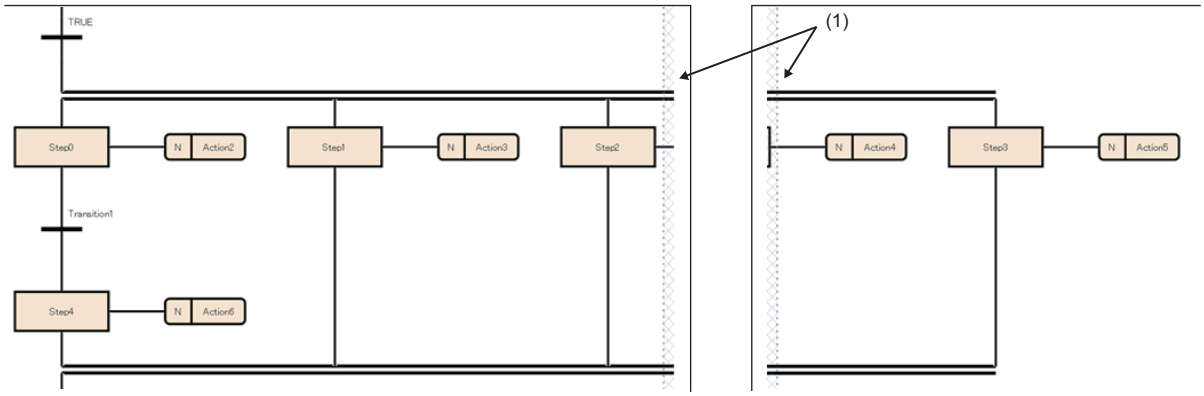


■Printing SFC programs

- When printing statements and notes, ones in a Zoom will not be printed.
- In the SFC diagram editor, SFC elements will be printed across multiple pages as shown below. Check the layout in the print preview before printing.

Ex.

The shaded area (1) indicates the partially overlapped area between the pages.



■Printing the product information list

The information in a specified CSV file is printed out within the range of 500 rows × 20 columns.

MEMO

PART 2 SYSTEM DESIGN AND SETTINGS

This part explains the system design such as project management and parameter/label settings.

3 PROJECT MANAGEMENT

4 CREATING MODULE CONFIGURATION DIAGRAM AND SETTING PARAMETERS

5 REGISTERING LABELS

3 PROJECT MANAGEMENT

This chapter explains basic operations and management of a project.

3.1 Project File and Data Configuration

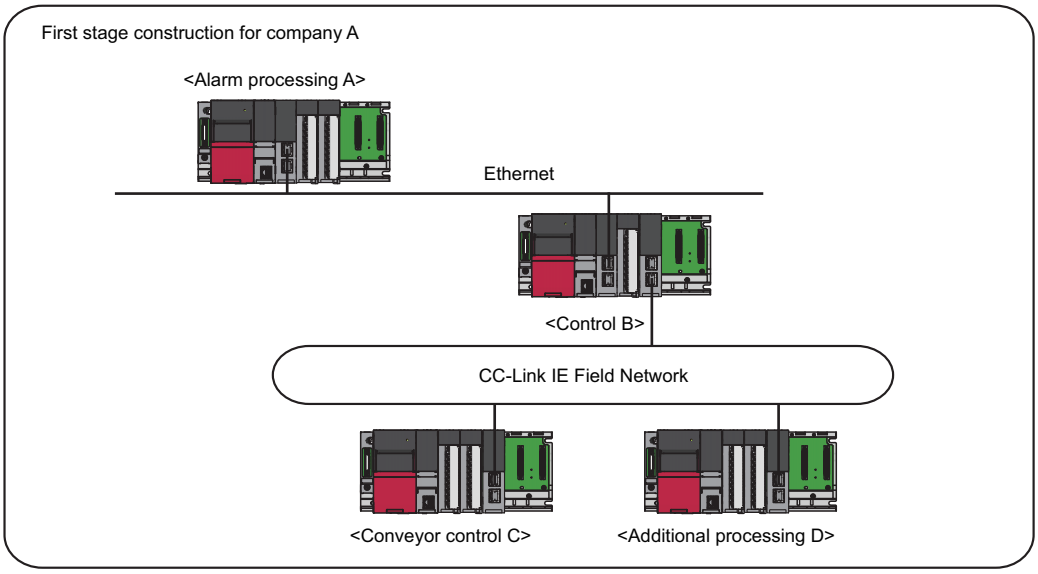
Projects created in GX Works3 are saved as a workspace format or single file format.
The data created for projects is displayed in the "Navigation" window.

File format

Workspace format

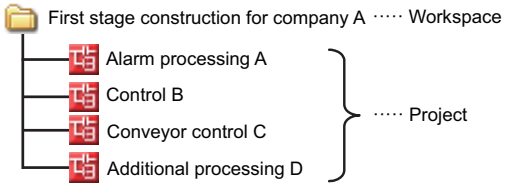
A workspace manages multiple projects at once.
When constructing a system composed with multiple CPU modules, a project file needs to be created for each CPU module.
Multiple project files in a same system can be managed by saving them as a workspace format.

<System configuration example>

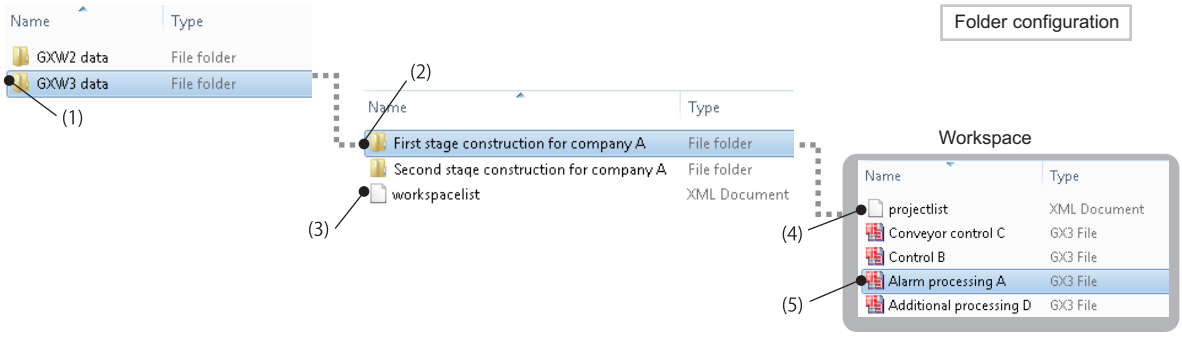


Batch-manage projects in the workspace format

<GX Works3 project management>



■Workspace/project configuration



(1) Save destination folder
(2) Workspace name folder
(3) workspacelist.xml
(4) projectlist.xml
(5) GX Works3 project file (same format as single file format)

● Editing a configuration or name

Do not change or delete a workspace configuration or project name by using an application such as Windows® Explorer. A project that does not contain actual data may remain in the project list displayed in the "Open Project" screen. (Select [Project] ⇨ [Delete] to delete the project.)

● Copying a project

When copying a project by using an application such as Windows® Explorer, perform any of the following operations. By doing so, a project can be copied without collapsing the configuration of the workspace/project.

- Copy an entire save destination folder ((1) in the above figure).
- Copy a workspace name folder and "workspacelist.xml" ((2) and (3) in the above figure).
- Copy a GX Works3 project with the same name.

Single file format

A single file format does not need a workspace.

Projects can be managed regardless of the folder configuration and the file configuration by saving projects as a single file format.

Thereby, operations such as changing a project name, copying and pasting a project, and sending and receiving data can easily be performed using an application such as Windows® Explorer.

Safety project backup

A system administrator needs to back up a safety project and save the data securely to restore it anytime.

To back up a project , be sure to use the menu [Project] ⇨ [Save As] in GX Works3.

Data configuration

Data displayed in the "Navigation" window

The following shows the data displayed in the "Navigation" window in a tree. (Default data names are used.)

■Module configuration data

Creation method: ☞ Page 127 Creating a Module Configuration Diagram

Figure	Item	Description
	Module configuration diagram	Data that displays a target system of a project graphically.

■Program data

Creation method: ☞ Page 107 Creating Data

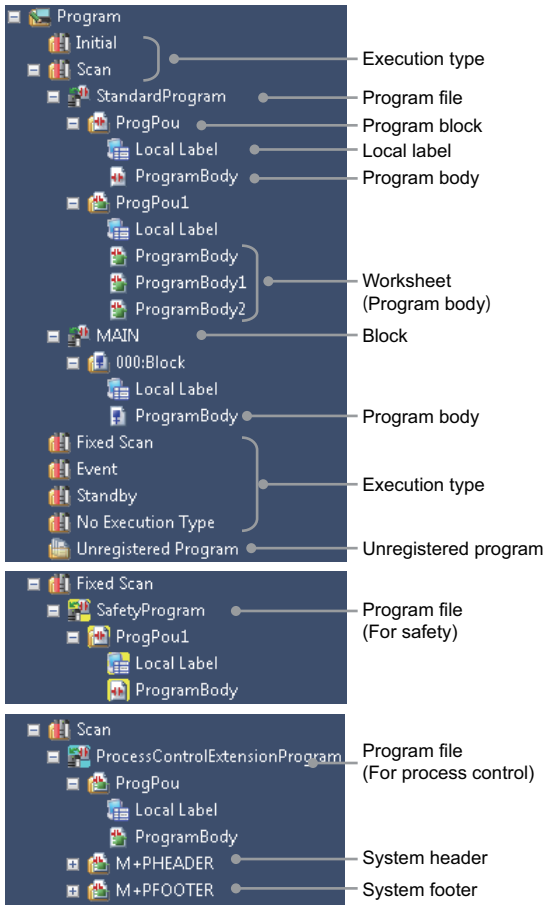
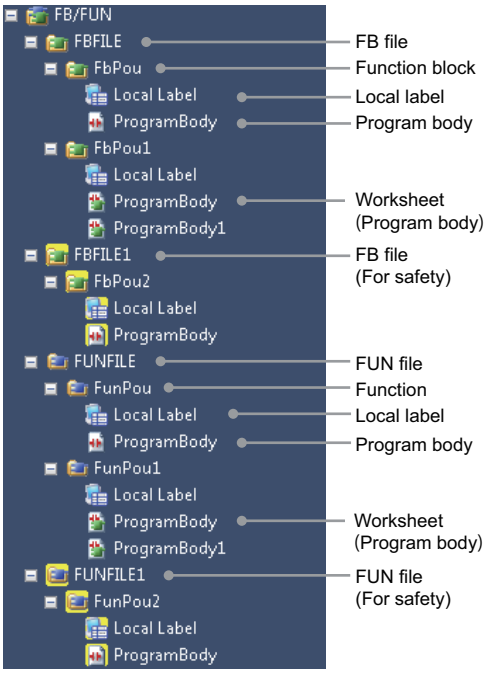
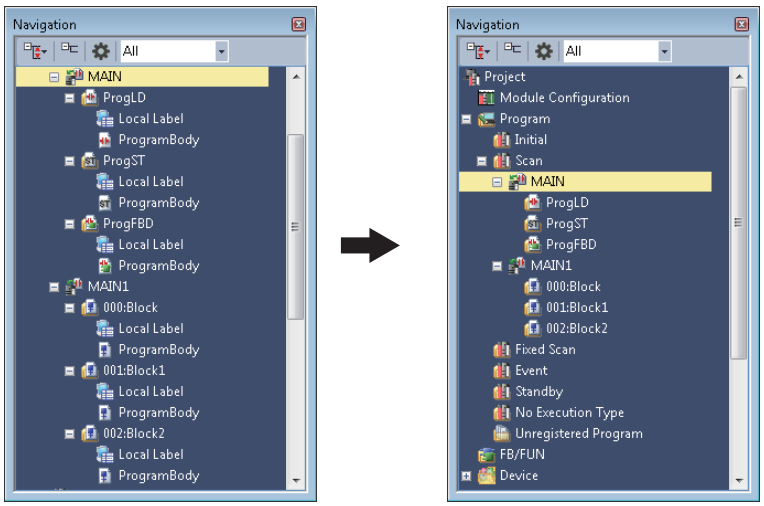
Figure	Item	Description
	Execution type	A setting for when a program operates. To execute programs in a CPU module, the programs need to be assigned to any of the execution types. ☞ Page 181 Setting method
	Program file	A file that manages programs. It should be created for each execution process. Created files are written to a CPU module individually.
	Program block (POU)	Data that composes programs.
	Local label	Label data that can be used only in a defined program block.
	Program body	Program data that is created in Ladder Diagram language.
	Worksheet (Program body)	Program data that is created in Structured Text or Function Block Diagram/Ladder Diagram language. By using Structured Text or Function Block Diagram/Ladder Diagram language, multiple worksheets (program bodies) can be created in a program block.
	Block	Data that composes SFC blocks.
	Program body	SFC diagram data that is created by using Sequential Function Chart language.
	Program file (For safety)	A file that manages safety programs.
	Unregistered program	A folder that temporarily stores program files with no execution type determined. Stored program files will not be executed if they are written to a programmable controller.
	Program file (For process control)	A program file with the process control extension enabled.
	System header	A program block required to execute a process control program of the scan execution type. No editing is allowed. ☞ Page 282 System header and system footer
	System footer	

Figure	Item	Description
	FB file	A file that manages function blocks. FB files are written to a CPU module individually. ☞ Page 317 Creating a Function Block
	Function block (POU)	Data that composes the programs of function blocks.
	Local label	Label data that can be used only in defined function blocks.
	Program body	Function block data that is created in Ladder Diagram language. This data is referred to as an 'FB program' in this manual.
	Worksheet (Program body)	Function block data that is created in Structured Text or Function Block Diagram/Ladder Diagram language. By using Structured Text or Function Block Diagram/Ladder Diagram language, multiple worksheets (program bodies) can be created in a function block. This data is referred to as an 'FB program' in this manual.
	FB file (For safety)	A file that manages a function block of a safety program.
	FUN file	A file that manages functions. The function files are written to a CPU module for each FUN file. ☞ Page 328 Creating a Function
	Function (POU)	Data that composes a program of a function.
	Local label	Label data that can be used only in defined functions.
	Program body	Function data that is created in Ladder Diagram language. This data is referred to as a 'FUN program' in this manual.
	Worksheet (Program body)	Function data that is created in Structured Text or Function Block Diagram/Ladder Diagram language. By using Structured Text or Function Block Diagram/Ladder Diagram language, multiple program bodies can be created in a function. This data is referred to as a 'FUN program' in this manual.
	FUN file (For safety)	A file that manages functions of safety programs.

Point

When a label or a program body is set to be hidden, a program block, function block, and function is displayed at the lowermost layer (i.e. the layer of them in the tree is not displayed). Therefore, some data items, which are usually displayed on the lower part of the tree, can be seen without scrolling.

- Select "No" for "Display Labels" and "Display the Program Body" from [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Navigation" ⇨ "Display Setting".

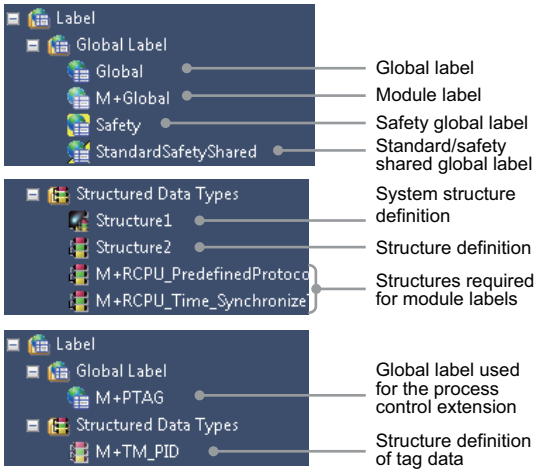


Display Labels: Yes
Display the Program Body: Yes

Display Labels: No
Display the Program Body: No

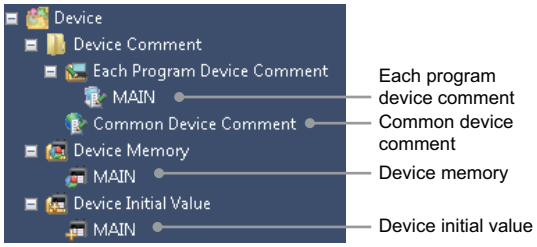
■Label data

Creation method: ☞ Page 107 Creating Data

Figure	Item	Description
	Global label	A label that can be accessed from all program blocks and function blocks in a project. ☞ Page 157 Registering Labels
	Module label	A label that is used to access an I/O signal or buffer memory of a module. ☞ Page 168 Registering Module Labels
	Safety global label	A global label for safety programs.
	Standard/safety shared label	A global label that can be used in both standard programs and safety programs.
	System structure definition	A structure registered in the system label database.
	Structure definition	Data that defines structure as a data type. This can be used as a data type of all labels which can be defined in a project except for a recursive definition in the defined structure.
	Structure definition required for module labels	Data that automatically registers a structure required for a module label.
	Global label used for the process control extension	A global label that is automatically registered as "M+PTAG" at the time of registration of tag FBs. A tag FB instance and tag data are created. ☞ Page 169 Registration of tag FBs
	Structure definition of tag data	Structure definition of tag data that is automatically registered at the time of registration of tag FBs.

■Device data

Creation method: ☞ Page 107 Creating Data

Figure	Item	Description
	Each program device comment	Device comment data that is used in a program file which have a same name. ☞ Page 268 Registering Device Comments
	Common device comment	Device comment data that is commonly used in multiple programs. ☞ Page 268 Registering Device Comments
	Device memory	Data that includes a value to be written to/read from a device in a CPU module. ☞ Page 289 SETTING DEVICE MEMORY
	Device initial value	Data that defines a value which is set to a device when a CPU module is in RUN. ☞ Page 295 SETTING DEVICE INITIAL VALUES

■Parameter data

The structure of the tree and the creation methods: ☞ Page 137 Setting Parameters

■Other data

Figure	Item	Description
	Remote password	By setting a password to a CPU module, access from the module other than specified RJ71EN71, serial communication module, and built-in Ethernet CPU can be prohibited. ☞ Page 477 Restricting Access from Other Than Specific Communication Route

3.2 Creating Project Files

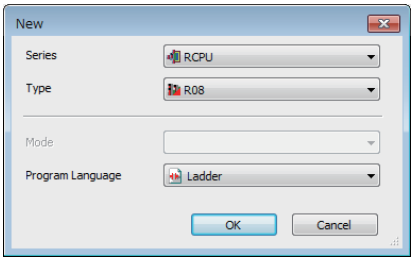
This section explains basic operations of GX Works3 such as creating, opening, and saving projects.

Creating a project

For a safety project, registering a user is required when creating a new project since a user information for the User Authentication function is needed. (☞ Page 469 User management)

Window

[Project] ⇨ [New] ( )



Operating procedure

Set each item and click the [OK] button.

Precautions

When creating a safety project, set a screen saver in Windows ® to lock the personal computer automatically if the non-operated state has been continued for a certain time.
For details, refer to Windows® Help and Support.

■Selecting QCPUs (Q mode), LCPUs, or FXCPUs

When a QCPU (Q mode), an LCPU, or an FXCPU is selected, GX Works3 is started in the Q/L/FX series compatibility mode.
When GX Works2 is installed on the personal computer, it will be started up automatically.
If it is not installed, execute the "setup.exe" in the installation DVD-ROM (Disk2) of GX Works3.

■Creating projects used for RnENCPUs

An RnENCPU consists of the two slots; CPU part and network part.
The CPU part only is placed after creating a new project.
Place the network part any of the following methods.

- Place a CPU extension module (_RJ71EN71) in the "Module Configuration" window.
- Set a CPU extension module (_RJ71EN71) in "I/O Assignment Setting" in "System Parameter".

■Specifying model names of FX5CPUs

A model name of an FX5CPU can be specified by any of the following methods.

- Right-click on a CPU module on the module configuration diagram, and click [Change CPU Model Name] from the shortcut menu.
- Select the specific model name of a CPU module in "I/O Assignment Setting" on the [I/O Assignment] tab on the "System Parameter" screen.

Creating new projects by reading data from programmable controllers

When data is read from a programmable controller without creating a new project, a new project is created based on the data from a CPU module and intelligent function module.

When a QCPU (Q mode), an LCPU, or an FXCPU is selected, GX Works3 is started in the Q/L/FX series compatibility mode and a new project can be created.

When user information is registered to a project, user authentication is required. (☞ Page 472 Logging on to CPU module)

Operating procedure

1. Start GX Works3 and select [Online] ⇨ [Read from PLC] ( ).
2. Select the series to be read on the "Series Selection" screen, and click the [OK] button.
3. Set the communication route to access the CPU module on the "Specify Connection Destination" screen, and click the [OK] button.
4. Perform the Read from PLC function on the "Online Data Operation" screen.

For the method for performing the Read from PLC function on the "Online Data Operation" screen, refer to the following section.

☞ Page 398 Reading data from a programmable controller

Precautions

When parameters are not read from the programmable controller with data to create a new project, default parameters will be set. Check the parameter setting.

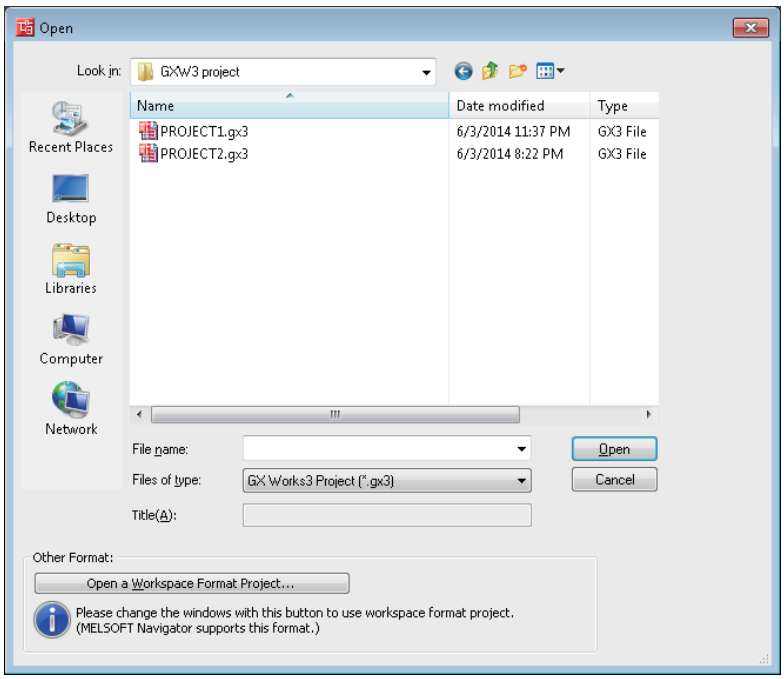
Opening a project

Read a project saved on a personal computer or another data storage device.

When user information is registered to a project, user authentication is required. (☞ Page 472 Logging on to CPU module)

Window

[Project] ⇨ [Open] ( )



Operating procedure

Set each item and click the [Open] button.

Precautions

■Changing workspace names and folder configuration

Do not change a storage location and a file name for folders and files of a workspace/project by using an application such as Windows® Explorer.

■Opening a project being edited by another user

The project can be opened as a read-only project. However, the following functions cannot be used.

- Overwriting projects
- Changing the module type/operation mode

■Projects saved on a network drive or removable media

Do not open the project directly. Open it after saving it to a personal computer.

■Opening a safety project

Set the screen saver in Windows® to lock a personal computer when no operation has been performed for a certain time.

For details, refer to Windows® Help and Support.

■Opening projects used for QCPUs (Q mode), LCPUs, or FXCPUs

When one of the following project is selected, the project is opened with the Q/L/FX series compatibility mode in GX Works3.

- GX Works2 project saved as a single file format
- GX Works2 project saved in a workspace format
- GX Works3 project created in the Q/L/FX series compatibility mode which was saved as a single file format

When opening a project which was compressed in GX Works2, decompress the project in GX Works2 in advance.

Opening a GX Works2 format project

A project created in GX Works2 can be opened by changing the module type in GX Works3.

This is applicable for a project of universal model QCPUs/high-speed universal model QCPUs/FXCPUs (FX3U/FX3UC and FX3G/FX3GC) only.

The module type of each project is changed as listed below.

Module type before change	Module type after change
Universal model QCPU/high-speed universal model QCPU	R120CPU
FXCPU(FX3U/FX3UC and FX3G/FX3GC)	FX5UCPU

The supported versions of GX Works3 differs depending on the module type. For details, refer to the following section.

☞ Page 519 Additions and Changes from Previous Version

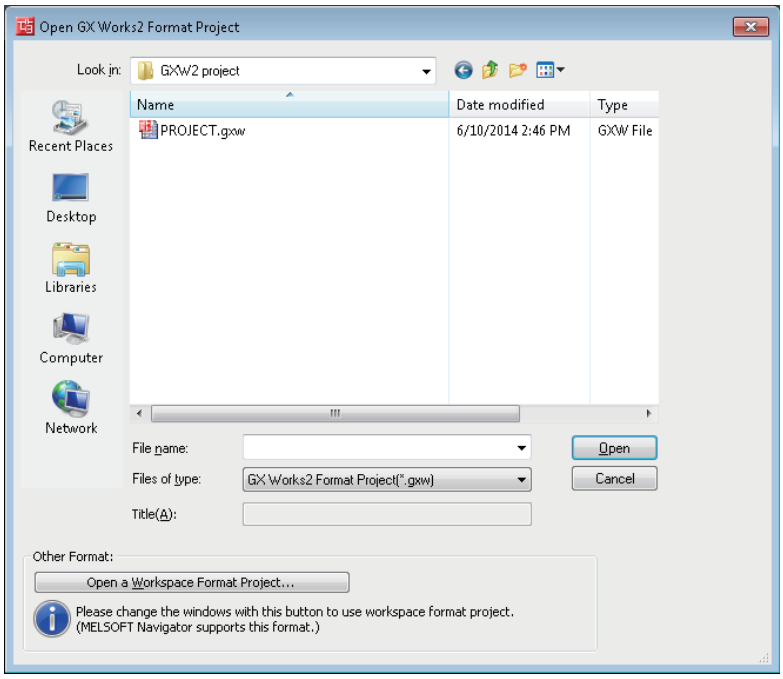
For details on the replacement of GX Works2 format projects, refer to the following section.

☞ Page 592 Replacement of GX Works2 format projects

To use this function, the latest GX Works2 is required to be installed in a personal computer.

Window

[Project] ⇨ [Open Other Format File] ⇨ [Open GX Works2 Format Project] ⇨ [Open Project]



Operating procedure

1. Select a project and click the [Open] button.
2. Read the displayed message, and click the [OK] button. *1

The changes of project data are displayed in the "Output" window.

*1 For FX5CPUs, the operating procedure differs in version 1.040S or later. For details, refer to the following manual.
Transition from MELSEC FX3U, FX3UC Series to MELSEC iQ-F Series Handbook

Precautions

- If a program that contains a compilation error exists in GX Works2, the project cannot be opened. Check if the program can be compiled in GX Works2.
- A project in which user management setting or access authority setting is configured cannot be opened. Clear the setting in GX Works2.
- If a project file of GX Works2 is compressed (*.gwz), open the file in GX Works3 after decompressing it.
- The check processing at a conversion of GX Works3 is enhanced by comparing with GX Works2. Therefore a conversion error may occur in a program in GX Works3 even if it does not occur in GX Works2. In that case, check the error content and correct the program.

■Data to be changed when changing the module type

The following table shows data to be retained, returned to the default, or deleted when changing the module type.
Data in a module will be deleted if there is no module to replace with a module in MELSEC iQ-R series or MELSEC iQ-F FX5 series.

Operation in module type change	Setting content in GX Works2		Remarks
Changing in accordance with the target module type	• PLC parameter[*1]	PLC name	Check the settings after the change.
		PLC system[*2,*3]	
		PLC file[*2]	
		PLC RAS[*2,*3]	
		Boot file	
		Program[*3]	
		SFC[*4]	
		Device[*2]	
		I/O assignment[*2,*3]	
		Multiple CPU[*2]	
		Built-in Ethernet port[*2,*3]	
	• Network parameter	CC-Link IE Field[*1]	
		CC-Link IE Control[*1,*3]	
		Ethernet[*1,*2,*3]	
		CC-Link[*2,*5]	
	• Intelligent function module parameter[*1]	Input	
		Output	
		I/O	
		Interrupt input	
		Analog input	
		Analog output	
		Temperature input	
		Temperature control	
		Simple motion	
		Positioning	
		High-speed counter	
		Serial communication	
	• FB/FUN • Structured ladder/FBD program[*6] • SFC program[*1,*3,*4] • Device comment for devices other than SM/SD[*7] • ST programs • Device/label automatic-assign		
Returning to the default/ deleting the data	• Options (other than "Device Comment Reference/Reflection Target") • System label • Device comments of SM/SD • Connection destination • Remote password		Set them in GX Works3.

Operation in module type change	Setting content in GX Works2		Remarks
Deleting	• PLC parameter	Communication head	Not supported by GX Works3.
		Built-in I/O function	
		Serial communication	
		Built-in serial	
		Adapter serial	
		Memory capacity	
		Special function block	
		Positioning	
		Operation	
	• Redundant parameter	Operation mode	
		Tracking	
	• Programs of user library that are not registered to the program setting • Task • Project revision • Device memory (only when the module type is changed to an FX5UCPU)		

*1 The data returns to the default or is deleted when the module type is changed to an FX5UCPU.
*2 The items which are not supported by GX Works3 are deleted.
*3 Some items return to the default or their data are deleted. Check/set them in GX Works3 after the change.
*4 To read SFC programs, GX Works2 of which version is 1.535H or later is required to be installed in a personal computer.
*5 When a local station is set in the "CC-Link Configuration", it will be changed to an intelligent device station. Check the station type.
*6 To read Structured Ladder/FBD programs, GX Works2 of which version is 1.519R or later is required to be installed in a personal computer.
*7 When changing the module type to an FX5UCPU, the data of M8000 or higher/D8000 or higher will change to SM8000 or higher/SD8000 or higher. For details, refer to the following handbook.
Transition from MELSEC FX3U, FX3UC Series to MELSEC iQ-F Series Handbook

■Opening projects used for QnPRHCPUs in GX Works3

A project used for a QnPRHCPU can be opened in GX Works3 according to the following procedure.

1. Change the PLC type of a project from a QnPRHCPU to a QnUDPVCPU in GX Works2.
2. Open the project used for QnUDPVCPU by selecting [Project] ⇨ [Open Other Format File] ⇨ [GX Works2 Format] ⇨ [Open Project] in GX Works3.
3. Select [Project] ⇨ [Change Module Type/Operation Mode], then change the module type to an RnPCPU and the operation mode to the redundant mode.
4. Set parameters. After changing the module type and operation mode, redundant parameters are not retained.

Opening a PX Developer format project

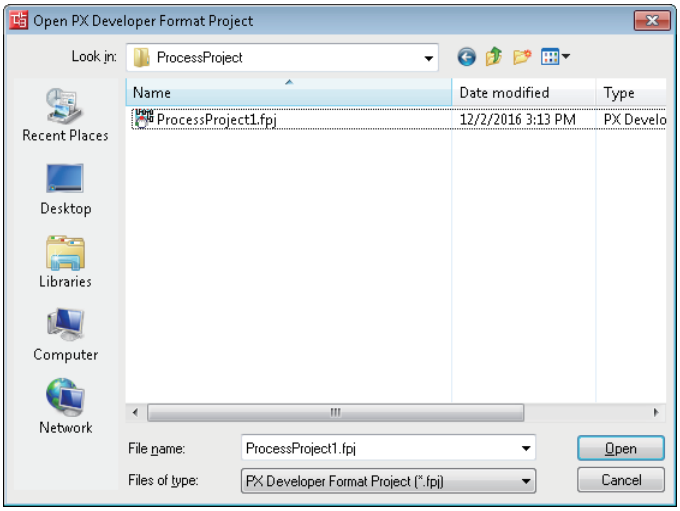
Projects created in PX Developer and GX Works2 can be opened by changing the module type in GX Works3.
This is applicable for a project of universal model process CPUs only.
The module type of each project is changed as listed below.

Module type before change	Module type after change
Universal model process CPU	R120PCPU

For details on the replacement of PX Developer format projects, refer to the following section.
☞ Page 604 Replacement from a PX Developer format project
To use this function, the latest PX Developer and GX Works2 are required to be installed in a personal computer.

Window

[Project] ⇨ [Open Other Format File] ⇨ [PX Developer Format] ⇨ [Open Project]



Operating procedure

1. Select a project and click the [Open] button.
2. Read the displayed message, and click the [OK] button.
3. Read the displayed message, and select whether to read the initial values of FB properties.

The changes of project data are displayed in the "Output" window.

Precautions

- A GX Works2 project stored in the same folder where a PX Developer project is stored is converted.
- When multiple GX Works2 projects are used in a PX Developer project, only a GX Works2 project with the same name as the PX Developer project is converted.
- To open a project for which GX Developer is specified as the GX project type, change the project type to a GX Works2 project with the function to open a project of PX Developer Programming Tool. For details, refer to the following manual.
  PX Developer Version 1 Operating Manual (Programming Tool)
- To open a project used for a CPU other than a universal model process CPU, change the PLC type of the project to a universal model process CPU with the PLC type change function of PX Developer Programming Tool. For details, refer to the following manual.
  PX Developer Version 1 Operating Manual (Programming Tool)

■Data to be changed when changing the module type (PX Developer)

The following table shows data to be retained, returned to the default, or deleted when changing the module type.

Some units of PX Developer project data are not supported by GX Works3. Set them in GX Works3 after changing the module type.

☞ Page 604 Replacement from a PX Developer format project

Operation in module type change	Setting content in PX Developer	Remarks
Changing in accordance with the target module type	Tag FB*1	Check/set them in GX Works3 after the change.
	Global variable*2	
	GX Works2 label assignment*3,*4	
	Program*5,*6	
	User-defined FB*5,*6	
	User-defined tag FB*5,*6,*7	
	User-defined structure	
	Program execution setting*5,*8,*9	
	Inline ST part*10	
	Function element/FB element*11	
	Project parameter*12	
	Initial value of an FB property*13	
Deleting	Module FB declaration*14	Set them in GX Works3.
	I/O simulation setting	

*1 The tag FB setting is not applied in the following cases. Click the [Check] button on the tag FB setting editor in GX Works3, then check and set the data.
A tag name which cannot be set in GX Works3 is used.
Any one of "PFC_INT", "PFC_SF", or "PFC_SS" is used for the tag type.

*2 It is converted as a global label "Global_PX" of GX Works3.

*3 It is converted as a global label "GXW2LabelAssignment_PX" of GX Works3.

*4 Replace a global label name used in GX Works2 in a program with a global variable name used in PX Developer.

*5 The execution condition setting of a program and an FBD sheet is converted as a comment element on the corresponding program editor.
A comment element is displayed in the installed PX Developer language.

*6 For comment elements, the color set in the "Color and Font" screen of GX Works3 is applied.

*7 The tag type "PFC_INT", "PFC_SF", and "PFC_SS" are not supported.

*8 A process control function block is added to a project.

*9 A program to execute the interrupt pointer is converted as "No Execution Type".

*10 It is converted as an undefined FB element and comment element.
A comment element is displayed in the installed PX Developer language.

*11 The following process functions in a PX Developer project are read as function blocks.
P_HS, P_HS_E, P_LS, P_LS_E, P_MID, P_MID_E, P_AVE, P_AVE_E, P_ABS, P_ABS_E

*12 The items which are not supported by GX Works3 are deleted.

*13 When the initial values of FB properties are not read, the initial values of the FB properties will be returned to default.

*14 A module FB element in an FBD program is read to an FBD/LD program in GX Works3.
After changing the module type, delete a module FB in an FBD/LD program.

■Registration destination of a program

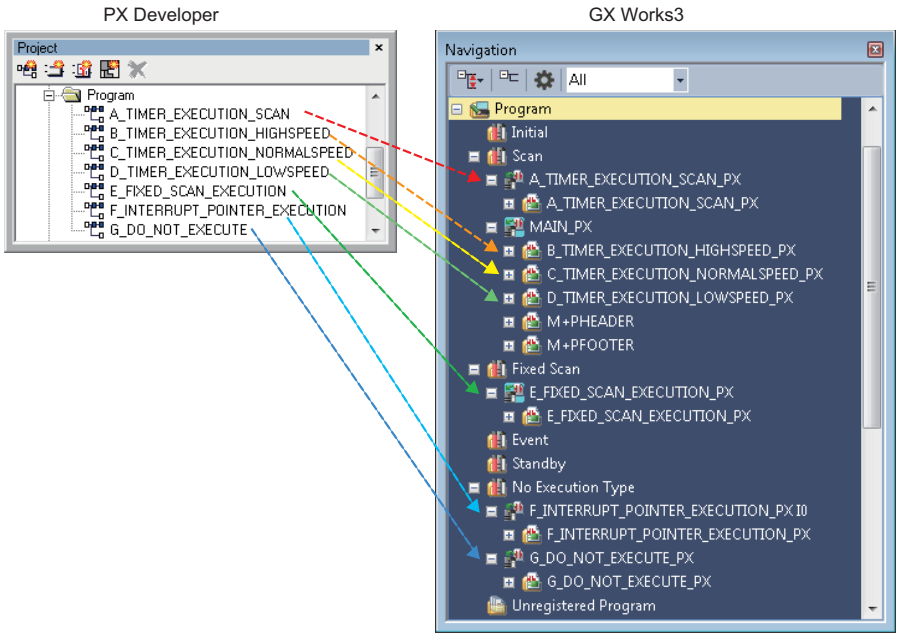
For a program of a PX Developer project, the registration destination in GX Works3 differs depending on the execution state/execution type.

Setting content in PX Developer		Registration destination in GX Works3		
Execution state	**Execution type**	**Execution type**	**Setting for "Use the process control extension"**	**Program file name**
Execute/execute conditionally	Timer execution (scan)	Scan	No	Program name + '_PX'
	Timer execution (high-speed/normal speed/low-speed)	Scan	Yes	MAIN_PX
	Fixed scan execution	Fixed scan	Yes	Program name + '_PX'
	Interrupt pointer execution*1	No execution type	No	Program name + '_PX'
Do not execute	—	No execution type	No	Program name + '_PX'

*1 An interrupt pointer set in PX Developer is registered as a title of a program file. (☞ Page 112 Title)

Ex.

The following figure shows a registration example.



■Execution condition setting of a program and an FBD sheet

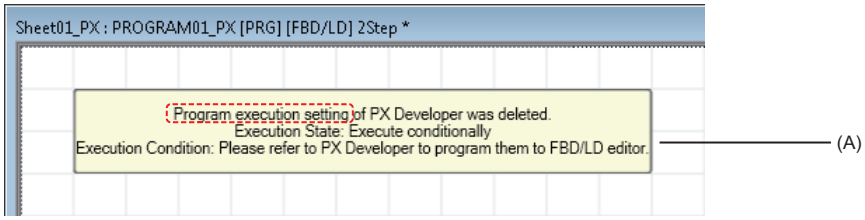
The execution condition setting of a program and an FBD sheet is converted as a comment element.

(1) Execution condition setting of a program

It is converted as a comment element (A) on the upper left of the first worksheet.

Ex.

The following figure shows a conversion example.

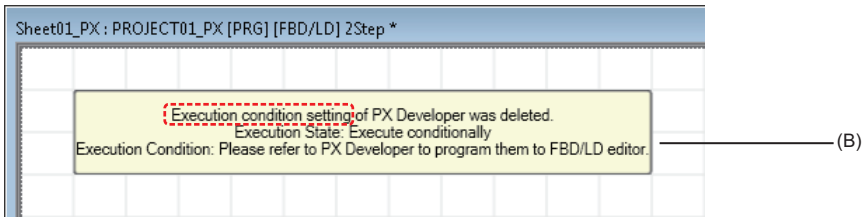


(2) Execution condition setting of an FBD sheet

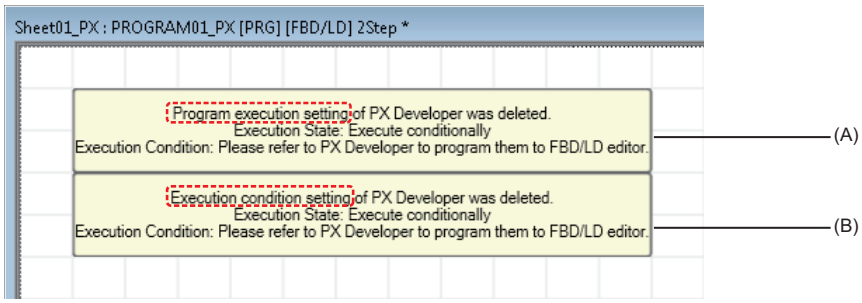
It is converted as a comment element (B) on the upper left of a worksheet.

Ex.

The following figure shows a conversion example.



When both (1) and (2) are set, a comment element of the execution condition setting of an FBD sheet (B) is displayed under a comment element of the execution condition setting of a program (A).

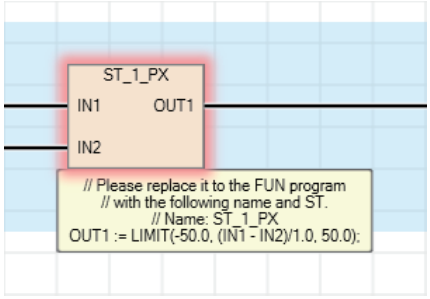


■Inline ST part

An inline ST part is converted as an FB element or a comment element.

Ex.

The following figure shows a conversion example.



■Label area capacity

The following data is applied to "Label Area Capacity" or "Latch Label Area Capacity" in the CPU parameter of a GX Works3 project

Parameter in GX Works3	Capacity
Label area capacity	Capacity that is calculated based on the capacity in a PX Developer project*1 + Capacity that is calculated based on the capacity in a GX Works2 project*2
Latch label area capacity	Capacity that is calculated based on the capacity in a PX Developer project*1 + Capacity that is calculated based on the capacity in a GX Works2 project*3

*1 Capacity that is calculated based on the number of points for file registers and timers set in the system resource of the project parameter in a PX Developer project.

*2 Capacity that is calculated based on the total number of points for each device (for VAR) set in the device/label automatic-assign in a GX Works2 project

*3 Capacity that is calculated based on the total number of points for each device (for VAR_RETAIN) set in the device/label automatic-assign in a GX Works2 project

Precautions

When a PX Developer format project is opened in GX Works3, "0 K Word" may be set for "Label Area Capacity" and "Latch Label Area Capacity".

For details, refer to the following section.

☞ Page 609 Label area capacity

■Data to be changed when changing the module type (GX Works2)

To retain data in a GX Works2 project used in a PX Developer project, refer to the following section.

☞ Page 90 Data to be changed when changing the module type

The following data are deleted.

Setting content in GX Works2	Remarks
Program file	Deleted when the data name starts with "#FBDQ".
Program block	
Program setting	
Global label	Deleted when the data name matches "#FBDQ".

Precautions

■Tag names that cannot be set for GX Works3

Some tag names set in a PX Developer project are not applied to a tag FB setting in GX Works3; therefore, the FB property initial value is returned to the default.

In that case, change the tag name in PX Developer to the one available in GX Works3.

After changing the tag name, open the PX Developer format project in GX Works3 again.

For details, refer to the following section.

☞ Page 608 Tag names that cannot be set in GX Works3

■Data name overlapping

When changing the module type, the data name of a PX Developer project is changed.

Therefore, the data name may be duplicated and the module type change may be canceled.

Correct the data name of PX Developer format project, and change the module type again.

For details, refer to the following section.

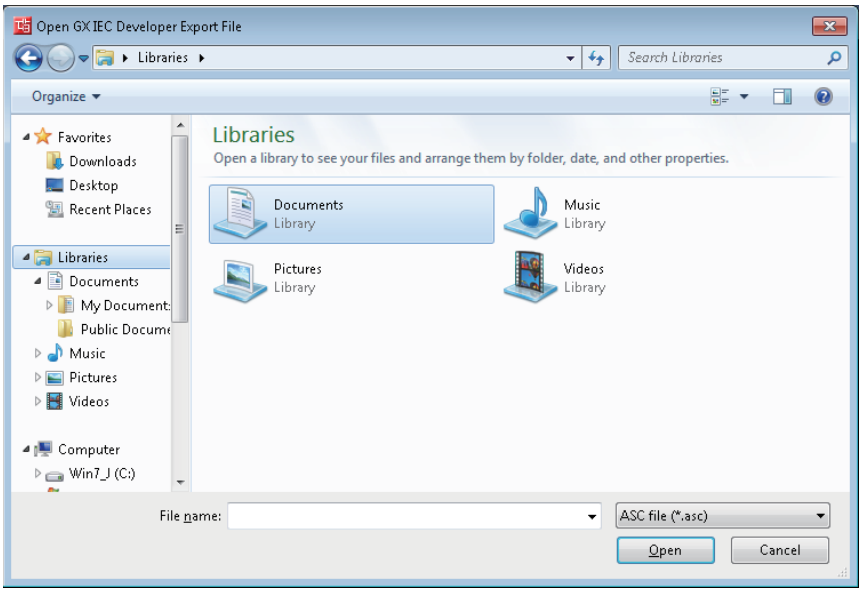
☞ Page 609 Data name overlapping

Opening a GX IEC Developer format project

A project created in GX IEC Developer can be opened by changing the module type in GX Works3.
An ASCII format file and an SUL format file created in GX IEC Developer version 7.04 is supported.
To use this function, execute "GIDImport.exe" in the installation DVD-ROM (Disk1\GXW3\Others) of GX Works3.
Log on to the personal computer as a user with Administrator privileges, and run "GIDImport.exe" with GX Works3 closed.
For a GX IEC Developer format project opened in GX Works3, "Imported from GX IEC Developer project: "(name of an ASCII format file).asc"" is entered on the [Comment] tab in "Properties" of the project.
For an IL/MELSEC IL program, "Imported from GX IEC Developer (IL/MELSEC IL)" is inserted as a comment element on the left side of the first worksheet.

Window

[Project] ⇨ [Open Other Format File] ⇨ [GX IEC Developer Format] ⇨ [Open ASC Format File]



Operating procedure

■A GX Works3 project is open

1. Select a project in the "Open GX IEC Developer Export File" screen, and click the [Open] button.

2. Read the displayed message, and click the [OK] button.

The GX IEC Developer format project data is imported to the open project.
The changes of project data by the module type change are displayed in the "Progress" window and the "Output" window.
After changing the module type, check the logic of the project and the program before and after the change, and modify them as necessary.

■A GX Works3 project is not open

1. Select a project in the "Open GX IEC Developer Export File" screen, and click the [Open] button.

2. Read the displayed message, and click the [OK] button.

The "New" screen appears.

3. Set each items in the "New" screen, and click the [OK] button.

The GX IEC Developer format project data is imported to the newly created GX Works3 project.
The changes of project data by the module type change are displayed in the "Progress" window and the "Output" window.
Check the logic of the project and the program before and after the change, and modify them as necessary.

Precautions

- POUs in Sequential Function Chart language for FX series are not imported.
- Devices and instructions used for POUs need to be modified.
- Devices in address representation (such as %MX0.1) will be converted into device representation. Inconvertible devices into address representation will be read as they are.
- Functions/Function blocks used in a GX IEC Developer format project will be changed to undefined ones when the module after changing the module type does not support them.
- When an IL/MELSEC IL program is converted into an FBD/LD program in GX Works3, the numbers of parameters of functions may not match between the GX IEC Developer project and the GX Works3 project.
  In this case, the function keeps the number of parameters of the GX IEC Developer project and is converted as one whose definition is unclear.
- Module type change will be cancelled if the [Cancel] button in the progress dialog is clicked during processing.
  Data which has already been replaced in GX Works3 project before the cancellation will not be deleted.

■Data to be changed when changing the module type

Operation in module type change	Setting content in GX IEC Developer	Remarks
Changing in accordance with the target module type	Program POU*1	Check the settings after the change.
	Function POU*1	
	Function Block POU*1	
	POU (FBD)	
	POU (LD)	
	POU (ST)	
	POU (SFC)*2	
	POU (IL/MELSEC IL)	
	SFC action (FBD)*2	
	SFC action (LD)*2	
	SFC action (ST)*2	
	SFC action (IL/MELSEC IL)*2	
	SFC transition (FBD)*2	
	SFC transition (LD)*2	
	SFC transition (ST)*2	
	SFC transition (IL/MELSEC IL)*2	
	Data Unit Type/Structured Data Type*1	
	Global variables*3	
	Task*1/Program File	
	User Library	When creating a library in GX Works3 format from a library in GX IEC Developer format, refer to the following section. ☞ Page 333 Creating a library in GX Works3 format from a library in GX IEC Developer format
Returning to the default/ deleting the data	CPU Parameter	Set them in GX Works3.
	System Parameter	
	Network Parameter	
	Module Parameter	
	Connection Settings	
	Entry Data Monitor/Watch	
	Options	

*1 When the same data name as that included in a GX IEC Developer format project exists in a GX Works3 project, the name of the data in the GX IEC Developer format project is incremented. (Example: Item_1→Item_2)

*2 For FX series, data is deleted.

*3 The global variables of GX IEC Developer are defined as global labels in "Global" only when no global label exists in "Global (Global Label Setting)" in a GX Works3 project.
When any global label exists in "Global", a new global label setting is created.

IL/MELSEC IL programs

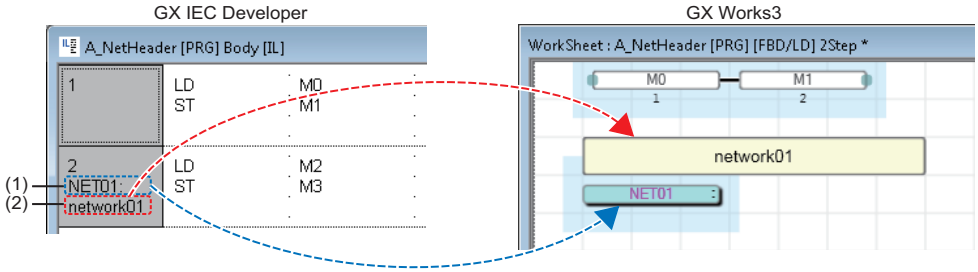
An IL/MELSEC IL program is converted into an FBD/LD program of a GX Works3 project.

The following figures show the conversion processing of each element in module type change.

■Network header

A network label set in an IL/MELSEC IL program (1) is converted into a jump label element.

The title of a network header (2) is converted into a comment element.

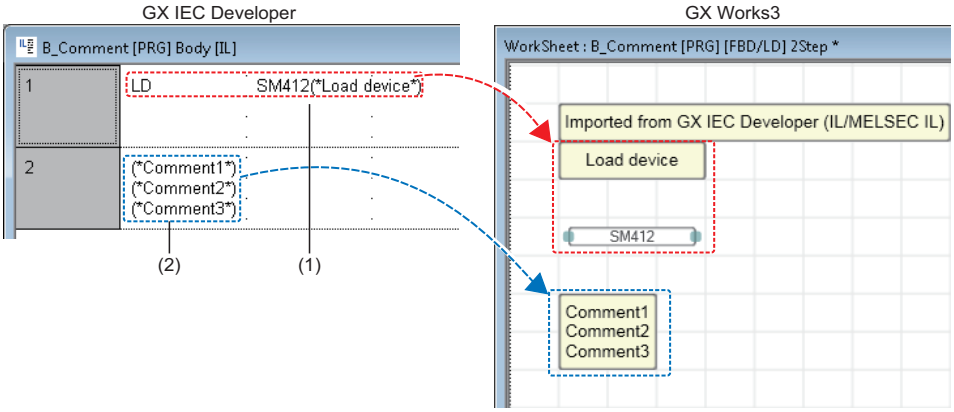


■Comment

A comment described in the same row as an instruction (1) is converted into a comment element on a variable element.

Sequential comments in a network (2) are converted into one comment element.

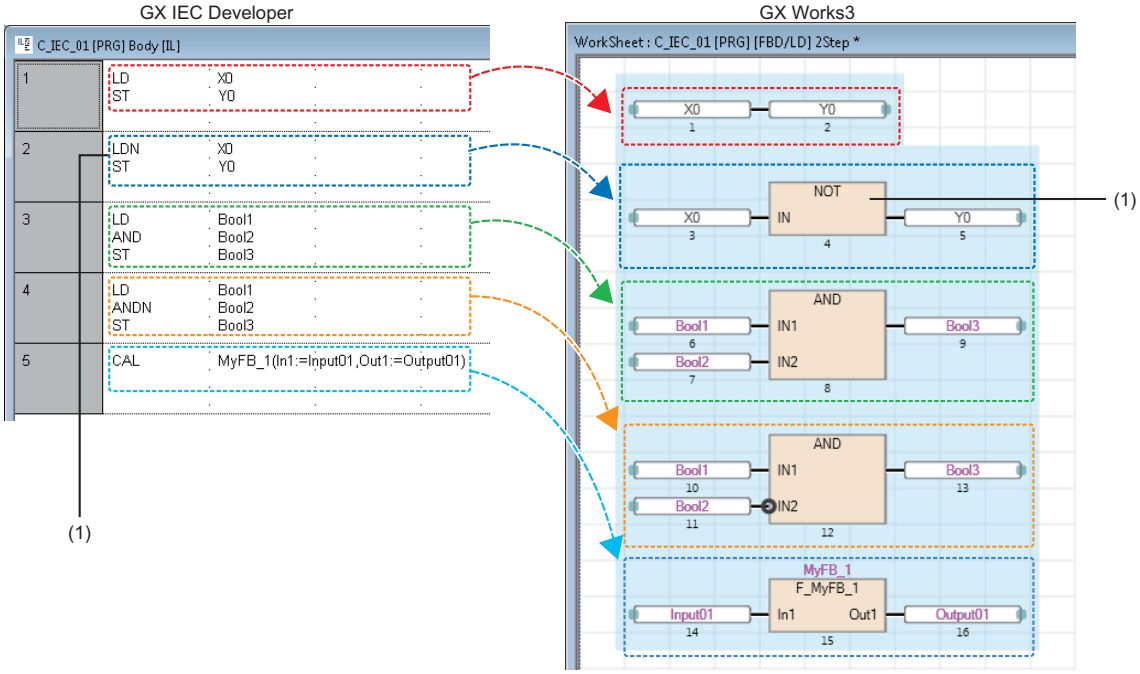
At the time, '(*' and '*)' enclosing a comment are deleted. (Example: (*Comment*) → Comment)



■Programming instructions

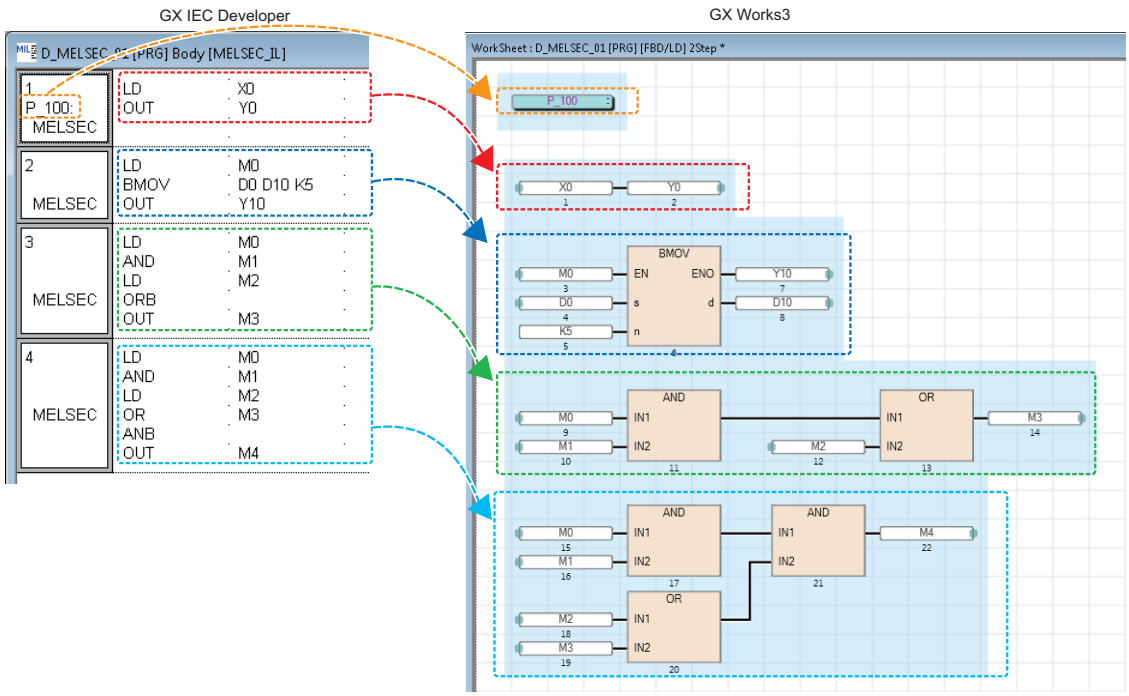
The following figures show a conversion example of programming instructions.

- IEC programming instructions



For an LDN instruction (1), the function 'NOT' is added only when an output variable is connected.

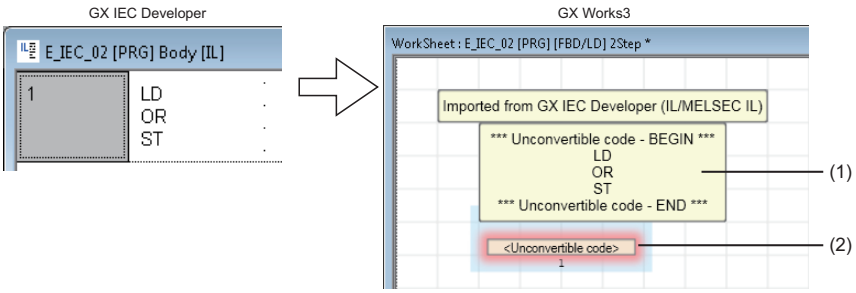
- MELSEC programming instructions



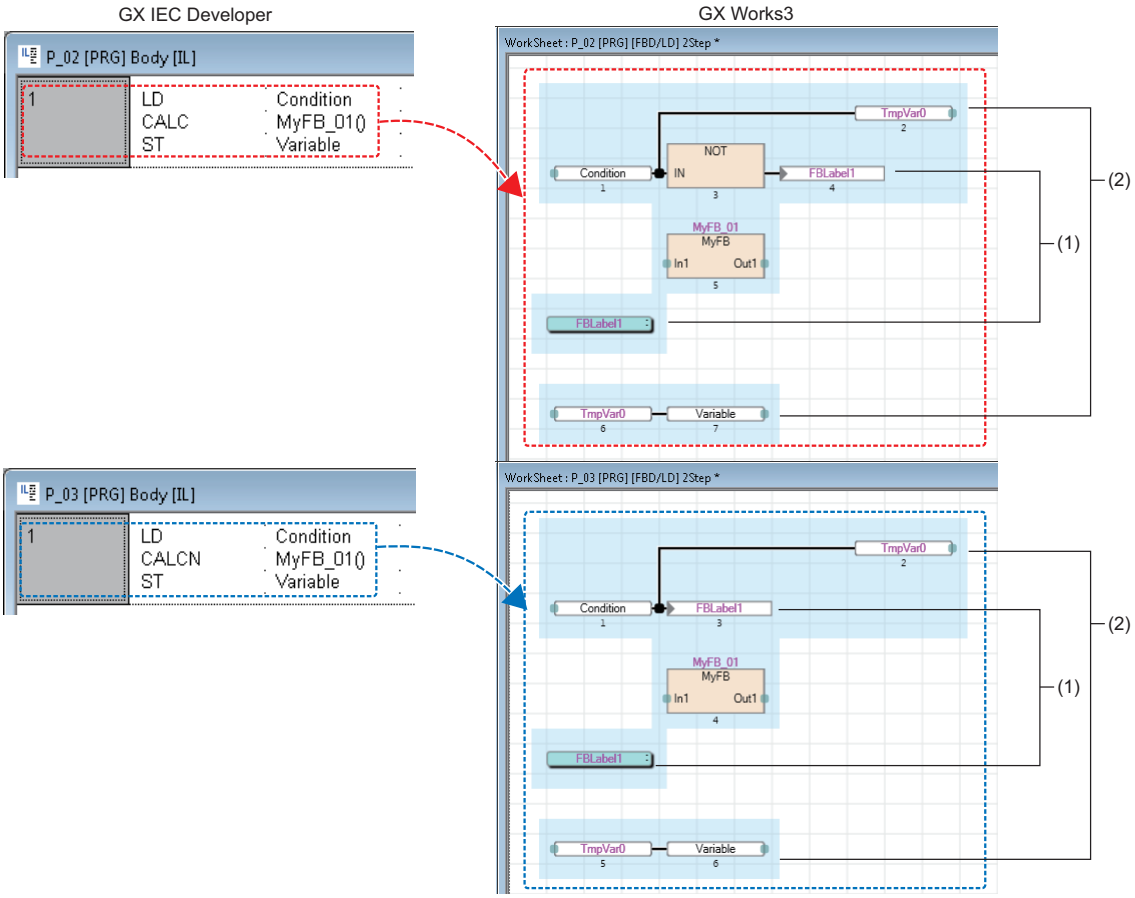
Precautions

When an error occurs in a program, POUs may not be converted properly.
After changing the module type, modify the program.

- When there is no operand/variable of a programming instruction, the instruction is converted into a comment element (1) and a undefined POU (2).



- When there is a CALC/CALCN instruction, a label (1) and a temporary variable element (2) are registered in local labels automatically.



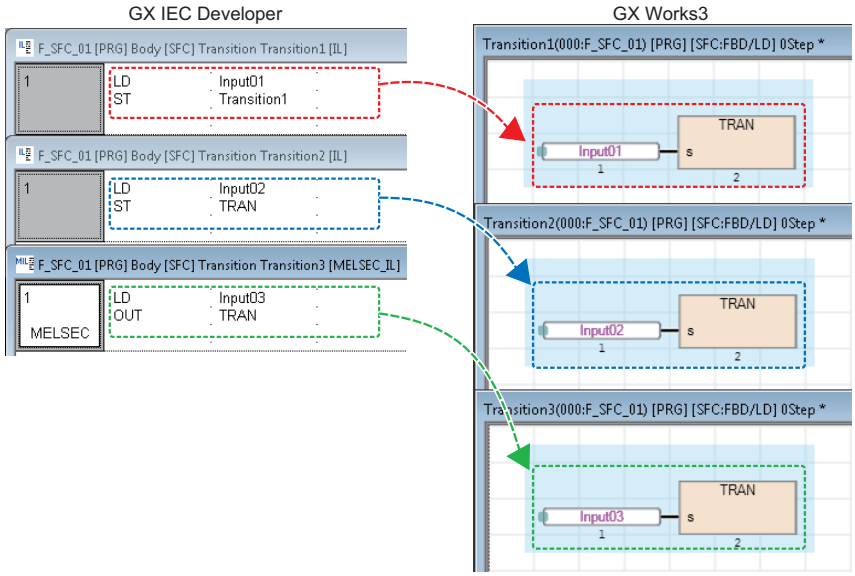
Actions/transitions (IL/MELSEC IL)

Actions/transitions of an SFC program created in IL/MELSEC IL language are converted into ones of an SFC program created in Function Block Diagram/Ladder Diagram language.

To convert actions/transitions, the following instructions are required at the end of the program.

- IL program: ST instruction that a transition name or the SFC dedicated instruction "TRAN" is used for the variable
- MELSEC IL program: OUT instruction that the SFC dedicated instruction "TRAN" is used for the variable

The programs of the actions/transitions are converted into ones to call the function "TRAN".



Global variables

Add global variables set in a GX IEC Developer format project to the global label setting of GX Works3.

Operating procedure

1. In GX IEC Developer, export "Global_Vars" to an ASCII format file.
2. Open the ASCII format file exported in step 1 in a GX Works3 project by changing the module type.

Up to 20480 global variables are added to the global label setting in GX Works3.

To add 20480 or more global variables to the global label setting of GX Works3, follow the procedure below.

3. Change the name of the global label setting added in step 2. (Example: Global→Global_1)
4. Open the ASCII format file exported in step 1, and delete 20480 global variables which ware added to the global label setting of GX Works3.
5. Open the ASCII format file exported in step 4 in a GX Works3 project by changing the module type.

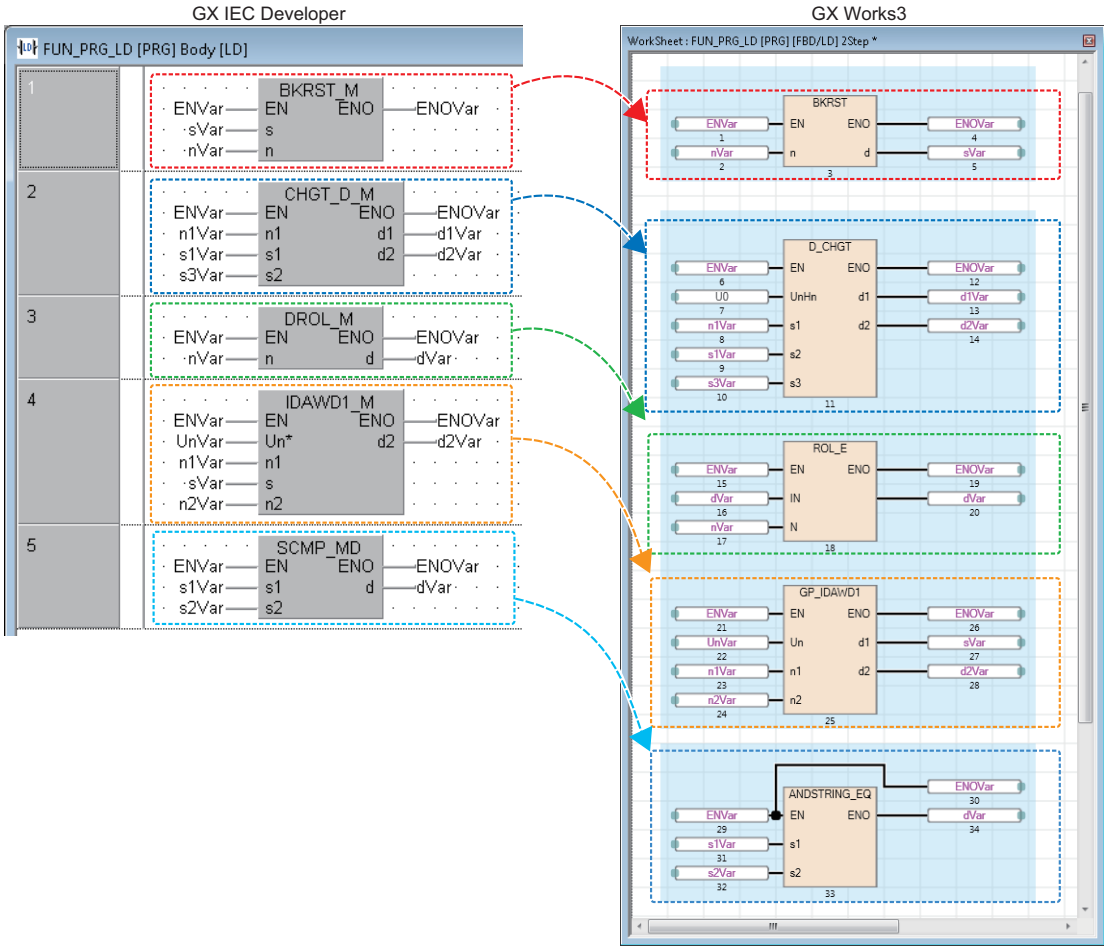
Function

The order or position of input arguments and output arguments may differ between the function used in a GX IEC Developer format project and that in a GX Works3 project after the module type is changed.

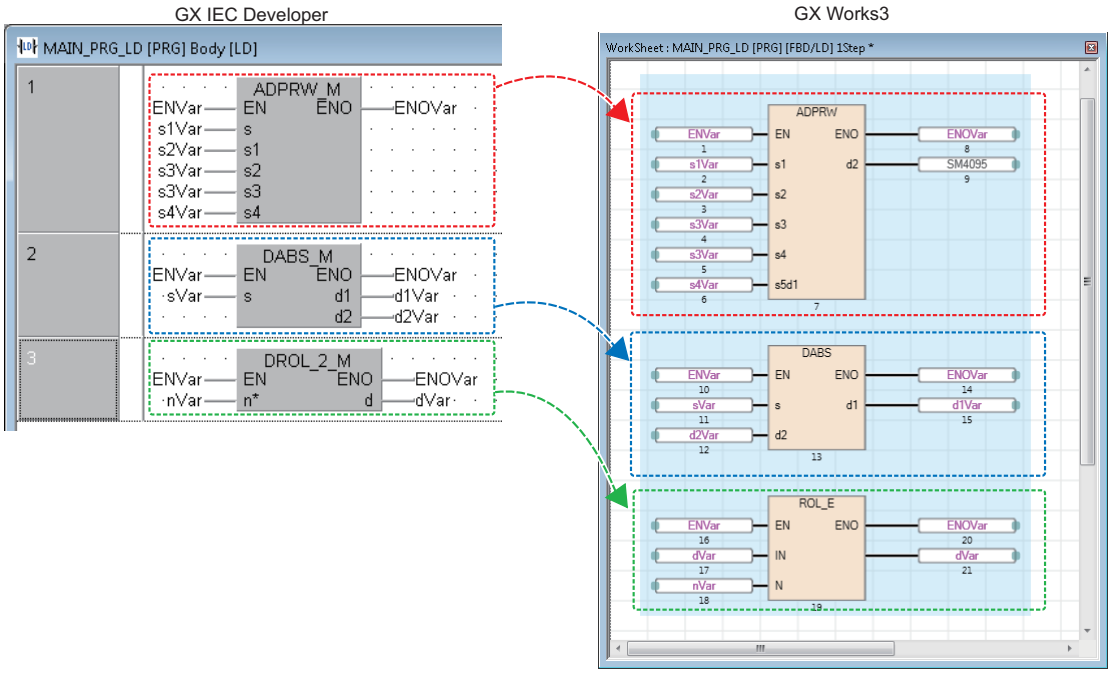
The changes of each function can be checked in the information in the "Output" window which is displayed after changing the module type.

The conversion example of functions used in "Ladder Diagram(LD)" in GX IEC Developer is as follows.

- Functions of MELSEC-Q series



• Functions of MELSEC iQ-F series



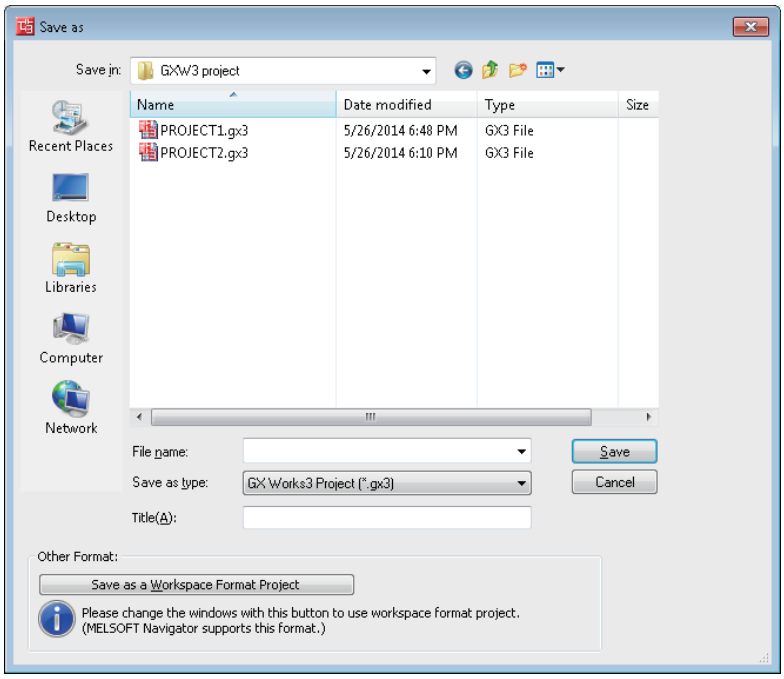
Saving a project

Save the project on the personal computer or another data storage device.
Depending on the setting for "MELSOFT iQ AppPortal information file output when saving project", an iQ AppPortal information file can be output when saving a project.
For details, refer to the following section.
☞ Page 113 Settings for iQ AppPortal

Saving projects under the specified name

Window

[Project] ⇨ [Save As]



When saving the project with the workspace format, click the [Save as a Workspace Format Project] button to switch the screen.

Operating procedure

Set each item and click the [Save] button.

Point

When saving a project that has been opened in the Q/L/FX series compatibility mode in GX Works3, any of the following format can be selected in "Save as type" in the "Save as" screen.

- GX Works3 Project (*.gx3)
- GX Works2 Project (*.gxw)

Precautions

For the unusable character strings for a project, workspace, or path name, refer to the following section.
☞ Page 538 Unusable Character String (Reserved Word)

Overwriting projects

Operating procedure

Select [Project] ⇨ [Save] ( ).

Point

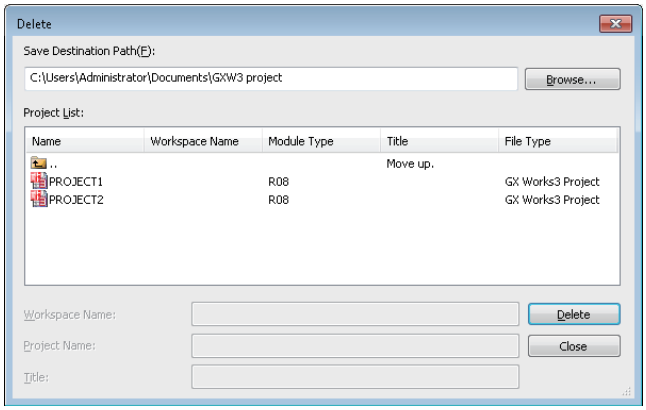
A project are automatically saved by setting the following option.
[Tool] ⇨ [Options] ⇨ "Project" ⇨"Auto-save" ⇨ "Operational Setting"

Deleting a project

Delete a project saved on the personal computer or another data storage device.

Window

[Project] ⇨ [Delete]



Operating procedure

Select a project ( ) to be deleted, and click the [Delete] button.

Precautions

When a project file does not exist after deleting a workspace format project, the message appears to confirm whether to delete the workspace itself. If the project is deleted, the workspace folder is deleted, but 'workspacelist.xml' remains.
In addition, when deleting a project, the corresponding iQ AppPortal information file is also deleted.

3.3 Creating Data

This section explains the creation method of each unit of data.

Data

■Unusable character strings

Refer to the following section.

☞ Page 538 Unusable Character String (Reserved Word)

■Maximum number of data that can be created in one project

The following table shows the number of pieces of data that can be created in each data type:

Data type name	RCPU	FX5CPU
Program block	2048	2048
Function block and function	8192	960
FB file	256	15
Other data	800	800

Precautions

For data names, use the characters in the Unicode Basic Multilingual Plane.

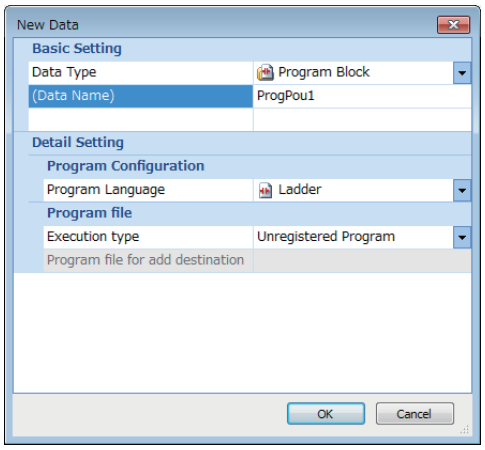
If the characters outside the Unicode Basic Multilingual Plane are specified, the program may not operate properly.

Creating data

Create new data in a project.

Window

Select data in the "Navigation" window, then select [Project] ⇨ [Data Operation] ⇨ [New Data] ( ), or right-click in the "Navigation" window and select [New Data] ( ) from the shortcut menu.



In a safety project, the "Category" column to select "Standard", "Safety", or "Standard/Safety Shared" is displayed. For details on the data to select, refer to the following section.

☞ Page 25 Safety system

Operating procedure

Set each item and click the [OK] button.

For the setting items when "Function Block" or "FB File" is selected for "Data Type", refer to the following section.

☞ Page 317 Creating a function block

For the setting items when "Function" is selected for "Data Type", refer to the following section.

☞ Page 328 Creating a function

Precautions

- When function block and function data are added by the above method, the FB file and FUN file will be in the unconverted state.
- SFC data and program blocks written in programming languages except for SFC (Ladder, ST, FBD/LD) cannot exist in a same program file.

Editing data

Changing a data name

Operating procedure

1. Select the data to change its name in the "Navigation" window.
2. Select [Project] ⇨ [Data Operation] ⇨ [Rename], or right-click in the Navigation window and select [Rename] from the shortcut menu.
3. Change the data name and press the Enter key.

Copying/pasting data

Utilize the data of project being edited or other projects.
Elements can be pasted only to the place where is able to create the same type of data.
Data cannot be copied/pasted between projects with different module type.

Operating procedure

1. Select the data of the copy source in the "Navigation" window.
2. Select [Project] ⇨ [Data Operation] ⇨ [Copy Data] (), or right-click in the Navigation window and select [Copy Data] () from the shortcut menu.
3. Select a folder to paste the data (one-level upper hierarchy of the copy source data) in the "Navigation" window or other projects.
4. Select [Project] ⇨ [Data Operation] ⇨ [Paste Data] (), or right-click in the Navigation window and select [Paste Data] () from the shortcut menu.

If the same data name exists in the folder where the data is to be pasted, the pasted data is named automatically.

Point

If the module type is different between the copy source and the copy destination, it can be utilized by opening each editor and copy the corresponding data.

Precautions

- The pasted program will be in the unconverted state.
- The structures/function blocks used in the global label cannot be copied.
  If the same structure/function block name does not exist in the folder where the data is to be pasted, the pasted data will be an undefined data type.
- Pasting of global label data is canceled when the maximum number of labels (20480) is exceeded. Adjust the number of global labels in the copy destination and the copy source, and retry pasting data.

■Program files

A program block under the selected program file is copied when copying a program file.
A common device comment can also be copied by setting the following option when pasting the data to other projects.
Set it in the project of a copy source.

- [Tool] ⇨ [Options] ⇨ "Edit" ⇨ "Copy" ⇨ "Operational Setting"

■Copying a program body

For an ST program and FBD/LD program, a program body can be copied and pasted onto the data created in the same programming language.
Even if the data type of a copy destination and source differ, the program can be pasted.

Adding worksheets

A worksheet (program body) of a POU (program block, function block, and function) can be added.
This operation is applied to a POU used in an ST program and FBD/LD program.

Operating procedure

1. Select a POU to which the worksheet is to be added in the "Navigation" window.
2. Select [Project] ⇨ [Data Operation] ⇨ [Add New Worksheet], or right-click in the Navigation window and select [Add New Worksheet] from the shortcut menu.

Deleting data

Data can be deleted from the open project.

Operating procedure

1. Select data to delete in the "Navigation" window.
2. Select [Project] ⇨ [Data Operation] ⇨ [Delete Data], or right-click in the Navigation window and select [Delete Data] from the shortcut menu.

Associating data with help files

Data can be associated with help files (such as PDF files).

The associable data is listed below.

- Project
- POUs (Program block, Function block, Function)
- Global labels, structures

Associated help files are displayed in the "Navigation" window or on a program editor.

Setting for a help file

The path information of a help file can be set for data by the following procedure.

Operating procedure

1. Select the project or data in the "Navigation" window, then select [Project] ⇨ [Data Operation] ⇨ [Property] ( ) or right-click and select [Property] ( ) from the shortcut menu.
2. Set the path of the help file in the "Help Path Information", and click the [OK] button.

Point

To use Help in multiple languages, prepare a help file that has been added the following text corresponding to each language to the end of the file name. (Example: help_ja-JP.pdf, help_en-US.pdf)

- Japanese: _ja-JP
- English: _en-US
- Simplified Chinese: _zh-CN
- Korean: _ko-KR
- Traditional Chinese: _zh-TW

For the "Help Path Information" in the property, specify the file name with no text described above. (Example: c:\library\help.pdf)

Displaying a help file

A help file associated with data can be displayed by the following procedure.

Operating procedure

■Opening a help file in the "Navigation" window

1. Select a project or data in the "Navigation" window.
2. Press the F1 key.

■Opening a help file on a program editor

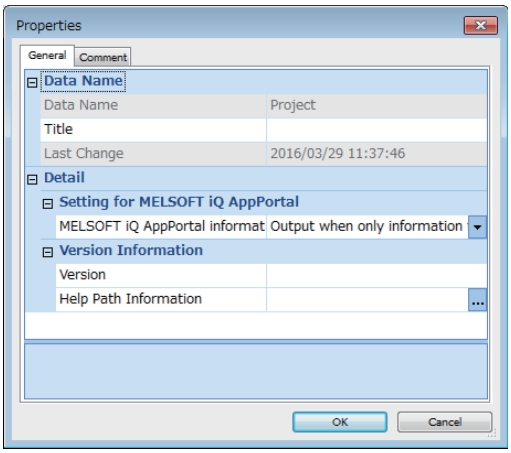
1. Select a function or function block on a program editor.
2. Press the F1 key.

Properties

Display the properties of data such as a folder, parameter, and program.
A title and comment can be added to each data.

Window

Select data in the "Navigation" window, then [Project] ⇨ [Data Operation] ⇨ [Property] ( ), or right-click in the "Navigation" window and select [Property] ( ) from the shortcut menu.

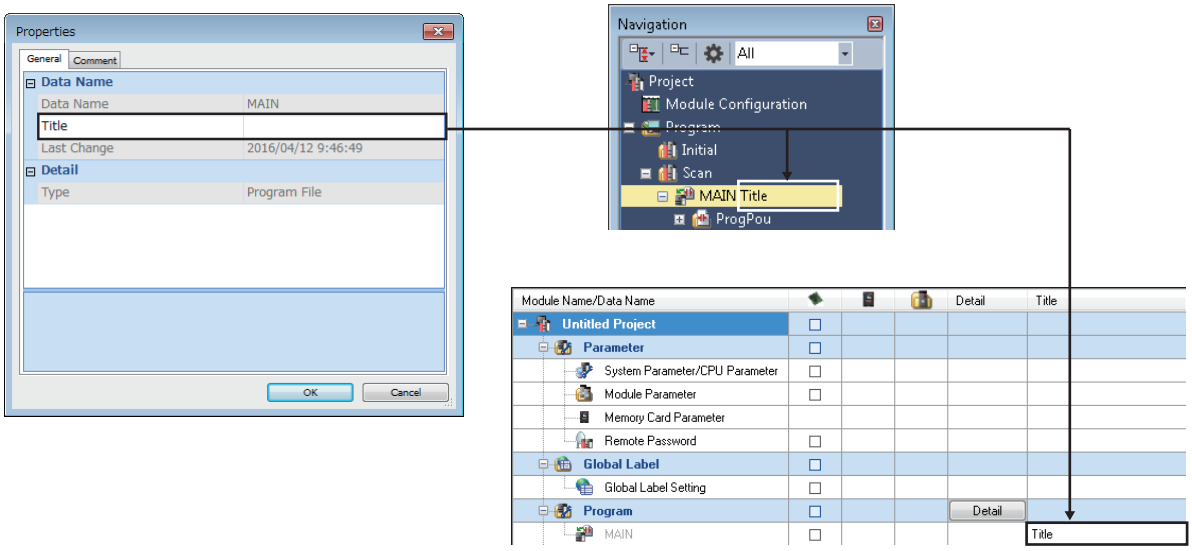


Operating procedure

Set each item and click the [OK] button.

Title

A title set to data is displayed with a data name in the "Navigation" window.
The title is also displayed on the "Online Data Operation" screen when writing/reading data to/from the programmable controller.



Settings for iQ AppPortal

An iQ AppPortal information file can be output by setting the following item.
It is output when saving a project or exporting a library.
For iQ AppPortal, refer to the following manual.
iQ AppPortal Operating Manual

Operating procedure

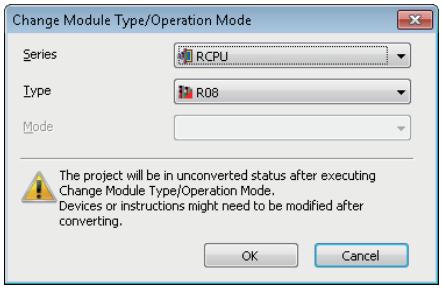
1. Select the project in the "Navigation" window, then select [Project] ⇨ [Data Operation] ⇨ [Property] ( ) or right-click in the "Navigation" window and select [Property] ( ) from the shortcut menu.
2. Select "Always output" for "MELSOFT iQ AppPortal information file output when saving project", and click the [OK] button.

3.4 Changing the Module Type and Operation Mode of Projects

The module type and operation mode of a project can be changed to another while editing the project.
A history registered in the project revision history is retained after changing the module type and operation mode.
For RnPCPUs, the operation mode only can be changed.
For remote head modules, both module type and operation mode cannot be changed.

Window

[Project] ⇨ [Change Module Type/Operation Mode]



Operating procedure

1. Select a new module type and operation mode, and click the [OK] button.
2. Compare the projects before and after the change to check the changed contents.
3. Edit each unit of data according to the new module type and operation mode.

Precautions

- Since data cannot be restored after changing the module type and operation mode, the project data needs to be saved in advance.
  Note that, the project status after the change is changed to unsaved state.
- A module label of a CPU module, used before the module type change, is deleted, and a module label after the change is added. Therefore, the program may need to be modified after the change.

Combinations of CPU series that module types are changeable

○: Changeable, △: Changeable (restricted), ×: Not changeable
For the restricted contents, refer to the displayed message.

CPU series before change	CPU series after change					
	RCPU	RCPU (RnPCPU)	RCPU (RnSFCPU)	RCPU (RnENCPU)	RCPU (RnPSFCPU)	FX5CPU
RCPU	○	○	○	△	△	×
RCPU (RnPCPU)	○	○	○	△	△	×
RCPU (RnSFCPU)	×	×	○	×	△	×
RCPU (RnENCPU)	△	△	△	○	△	×
RCPU (RnPSFCPU)	×	×	△	×	○	×
FX5CPU	○*1	×	×	×	×	×

*1 It can be changed to R04CPU.

Point

To utilize data to a different module type of CPU module, open each editor and copy the data.

Considerations for combinations of CPU series

■Changing the module type from an RnENCPU to a CPU module that occupy one slot

When the setting items in "I/O Assignment Setting" on the [I/O Assignment] tab on the "System Parameter" screen were set, the network part is not placed and the same network type module "RJ71EN71" is placed after changing the module type.

■Changing the module type from a CPU module that occupies one slot to an RnENCPU

When the setting items in "I/O Assignment Setting" on the [I/O Assignment] tab on the "System Parameter" screen were set, any of the following modules is required to be mounted on the right side of the CPU module.

- RJ71EN71 (CCIEC)
- RJ71EN71 (CCIEF)
- RJ71EN71 (E+CCIEC)
- RJ71EN71 (E+CCIEF)

After changing the module type, 'RJ71EN71' will not be placed, and the same network type CPU extension module '_RJ71EN71' will be placed.

■Changing the module type from an RnPCPU and an RnPSFCPU to another CPU module

The following contents related to process control set for an RnPCPU and an RnPSFCPU are deleted.

- Tag FB setting
- For a program file, the setting which was set for "Use the process control extension" on the "Properties" screen
- For a program block, the setting which was set for "Execution Interval"/"Phase" on the "Properties" screen
- For a function block, the setting which was set for "Use as Tag FB"/"Tag Type" on the "Properties" screen
- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting"
- System header and system footer
- Global label setting 'M+PTAG'

■Changing the module type from an FX5CPU to an RCPU

By changing the module type from an FX5CPU to an RCPU, a project revision history is deleted.

Project data needs to be saved in advance.

For details on other modifications that are required before and after module type change, refer to the following section.

☞ Page 610 Considerations for Changing from FX5CPUs to RCPUs

Combinations of changeable operation modes

○: Changeable, △: Changeable (restricted)

For the restricted contents, refer to the displayed message.

Operation mode before change	Operating mode after change		
	No specification	Process	Redundant
No specification	○	○	△
Process	△	○	△
Redundant	△	○	○

3.5 Verifying Projects

Verify a open project with the data of another project.

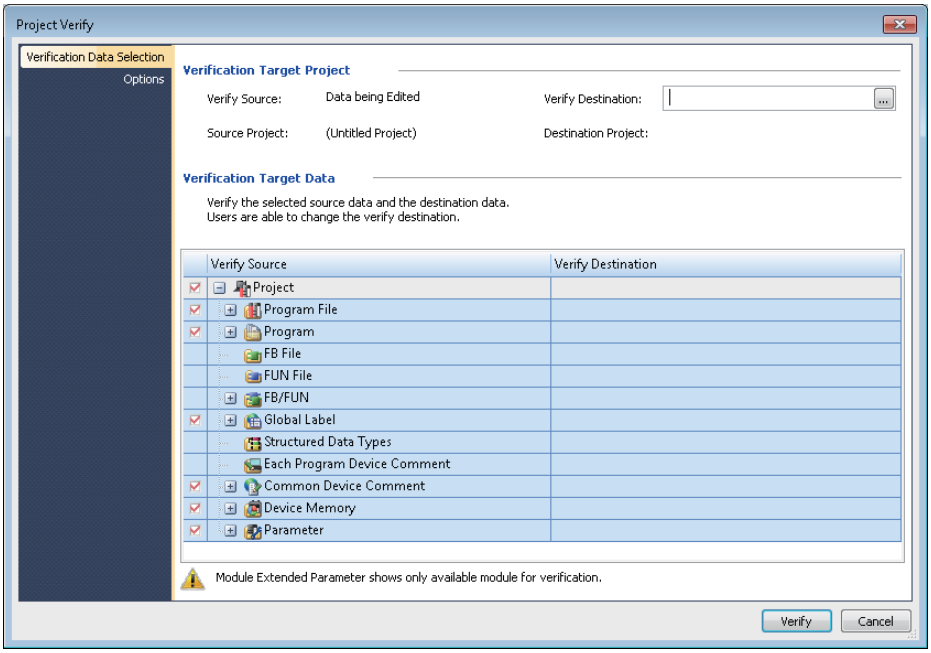
Use this function to check whether the program contents are consistent, or the modifications are reflected etc.

When user information is registered to a project, user authentication is required. (☞ Page 468 Logging on to project)

Verification

Window

[Project] ⇨ [Project Verify]



Operating procedure

1. Specify a project for "Verify Destination" on the [Verification Data Selection] tab.
2. Select the data to be verified, and click the [Verify] button.

Point

The target project file can be specified by dragging and dropping.

Precautions

- A GX Works2 or GX Developer project cannot be verified.
- A project for which a security is set can be verified when both data of the verification source and verification destination are not read-protected.
- Verification is stopped by clicking the [Stop] button on the "Verification Progress" screen.
  After stopping, the verification result before stopping is displayed in the verification result on the [Module Parameter] tab.
- The link of a comment in an FBD/LD program and SFC program is not verified.
- Module extended parameters can be verified when the start I/O No. and the module names match between the verification source and the verification destination.
  For a simple motion module, module extended parameters for which the module names mismatch can be selected as the verification targets.

Parameters

■Verification target

Module extended parameters are excluded from a verification.

However, the module extended parameters of a simple motion module can be verified.

For a project used for an FX5CPU, parameters except for ones of the following modules cannot be verified.

- FX5-232ADP, FX5-485ADP, FX5-4AD-ADP, FX5-4AD-PT-ADP, FX5-4AD-TC-ADP, FX5-4DA-ADP
- FX5-16ET/ES-H, FX5-16ET/ESS-H, FX5-40SSC-S, FX5-80SSC-S, FX5-CCLIEF, FX5-CCL-MS
- FX5-4LC, FX5-4LC(FX3), FX5-8AD, FX5-8AD(FX2N), FX5-20PG-P, FX5-ASL-M, FX5-4AD, FX5-4DA

■Verification levels

A parameter verification level can be selected from the [Options] tab of the "Project Verify" screen.

■Verifying only specific intelligent function modules on RCPUs

Procedure is as follows:

1. Select "Module Parameter" in the [Result List] tab in the "Verify Result" window after verifying projects, and double-click it or press the Enter key.
2. Click the [Stop] button on the "Verification Progress" screen immediately after verification starts.
3. Select a module to verify in the [Module Parameter] tab in the "Verify Result" screen, and double-click it or press the Enter key.

Checking a verification result

Check the details of mismatched data in the "Verify Result" window.*1

*1 Only mismatched device types are displayed for verification of device comments and device memories.

Operating procedure

1. Select and double-click a row of data to display its detail in the "Verify Result" window.
2. Select [Find/Replace] ⇨ [Next Unmatched] ( )/[Previous Unmatched] ( ).

Point

- A font color, background color, and font can be changed. (☞ Page 65 Checking and Changing Colors and Fonts)
- The latest data is always applied to a verification source. Therefore, the verification result can be checked with the latest data in the verification source without verifying again after mismatched data is modified.

Precautions

■When the versions of GX Works3 that converted program files/FB files/FUN files are different

For verification of program files/FB Files/FUN files, when the versions of GX Works3 that converted the program files of a verification source and verification destination are different, there may be a difference in the conversion result, and the verification result also may be mismatched. In this case, convert all programs in both verification source and verification destination with the same version of GX Works3, then verify them again.

■When a function block with EN/ENO is used in a ladder program

When a project that satisfies the following two conditions is verified with a programmable controller, another project, or a history, program files, FB files, or FUN files in a ladder or SFC may be mismatched. In this case, convert all programs in both verification source and verification destination with the same version of GX Works3, and verify them again.

- The function block, to which "Yes" has been selected for "Use EN/ENO" on the "Properties" screen, is used in a ladder program or Zoom created in a ladder.
- The project that contains a program described above is written to a CPU module, and all programs are converted with the setting that retains the label assignment after reading the program from the CPU module

■When a function is used

Even if the project configurations of a verification source and verification destination are same, the program files/FUN files may be mismatched due to the difference of the order in which a function was added.

■When block passwords are set to POUs

- When specifying a program file/FB file/FUN file including a POU, for which a block password is set, as a verification destination, the locked POU is not displayed in the verification result.
  If the block password is set only for the POU of the verification destination, the locked POU is displayed in the verification result by unlocking the password. (☞ Page 458 Authenticating a block password)
- When specifying a program file/FB file/FUN file including a POU, for which a block password is set, as a verification destination, the detailed verification result screen of each file does not appear.
  If the block password is set only for the POU of the verification destination, the screen appears by unlocking the password. (☞ Page 458 Authenticating a block password)

■When a security is set for a program file

When specifying a program file/ FB file/FUN file including a program file, for which a security is set, as a verification destination, the detailed verification result screen of each file does not appear.
The detailed verification result screen of each file appears by changing the setting of the locked program file to accessible.(☞ Page 460 Procedure for making locked program files accessible)

■When verifying projects of which the system locales are different

When the system locale (or display language) for a project differs between the verification source and verification destination, the verification result of program files/FB files/FUN files may be mismatched.
The system locales for projects of the verification destination and verification source need to be matched to verify their data.

■Considerations for verification of program files

- When the program files mismatched but the programs in the program files matched, it may be caused by the difference of the execution orders of programs in the program files. Check the program file setting.
- In a program including a subroutine type function block, arguments of the FBCALL instruction (LFBCALL, LSAFBCALL) may be mismatched.
  The FBCALL instruction is automatically created to call a subroutine type function block by a system.
  Arguments of the FBCALL instruction indicate an FB file of a function block to be called, POU, and the addresses of memory reserved area (label area, latch label area, signal flow area).
  Therefore, even if a project configurations are same, the arguments of FBCALL instruction may differ due to the order to create programs. However, operations of the verification source and verification destination have no difference.

■When verifying device comments or device memories

Device comments or device memories with a different data name can be verified.

Projects can be verified between different module types of a same series.

The following results are displayed on the detailed verification result screen.

- Source only
- Dest. only

Projects cannot be verified between a remote head module and a CPU module other than it.

■When the number of mismatched parameters exceeds 1000

Up to 1000th mismatched parameters are displayed on the detailed verification result screen, and verification for 1001st or later is interrupted.

To verify parameters after interruption, correct the mismatched data before verifying again.

Restriction

The following restrictions apply when a parameter item was added to the verification destination with upgrade of an intelligent function module.

- The added parameter item is excluded from a verification because the verification source that has not been upgraded cannot identify the item. Therefore, other parameters will be verified, and when those parameters matched, it is applied to the verification result in each module.

Program file/FB file/FUN file

The details of the execution program of a verification target are displayed in a list format by double-clicking the file name displayed in the verification result.

■Detailed display (list format)

- The cursor jumps to a corresponding row in a program editor by double-clicking an instruction in the list.
- When "Hide System Generated Items" is selected in the pull-down list of a Verify Result screen (detailed display), the following instruction codes are omitted in display.
  _TMALLOC, _TMFREE, JMPO, NOP H0, EXEFBDUMMY, FBRET, NOP, LD TMP, OUT TMP

Ladder programs

The details of verification target ladder program are displayed by double-clicking the program displayed in the verification result.

A display format, "Ladder Diagram" or "List", can be selected from the pull-down list in a Verify Result screen (detailed display).

A matched ladder block is not displayed.

Precautions

When there is no program in a macro type function block, the cursor is moved to the top of the ladder block.

■Detailed display (ladder diagram format)

The cursor is jumped to the corresponding instruction on the ladder editor by double-clicking a instruction in a ladder diagram.

Precautions

- When an instruction which cannot be displayed in a ladder diagram format (such as NOP) is mismatched, it is displayed as it had been matched. (Only "Mismatch" is displayed in the status bar). Check it by displaying in a list format.
- A background color is highlighted for each instruction. However, the background of a cell, in which a horizontal line only is written on a ladder block, may also be changed (such as the next cell of an input argument (BOOL value) for function block).
- The background of a ladder block, that contains a function block including an input/output label (VAR_IN_OUT), may highlighted even without a change.

■Detailed display (list format)

- The cursor is jumped to a corresponding instruction on the ladder editor by double-clicking an instruction on the list.
- When the program that contains the inline structured text is verified, "STB" is displayed on the row of the inline structured text.
  The cursor is jumped to the corresponding row of the inline structured text by double-clicking the "STB".
- When programs containing a functions and/or function blocks are verified, the result is displayed as follows:
  Function: row from "*;FUN BLK START" to "*;FUN BLK END"
  Function block: row from "*;FB BLK START" to "*;FB BLK END"

ST programs

■Detailed display

The cursor jumps to a corresponding row in the ST editor by double-clicking a row in the verification result.

FBD/LD programs

The details of verification target FBD/LD program are displayed in a list format by double-clicking the program displayed in the verification result.

Precautions

When the versions of GX Works3 used for editing programs of a verification destination and source are different, the verification result may be mismatched due to the difference of position information of elements. In this case, edit, convert, and save the programs in both the verification source and the verification destination with a same version of GX Works3, and perform the verification again[*1].

*1 When verifying with a programmable controller, perform the "Write to PLC" or "Online Program Change" in advance.

■Detailed display (list format)

- The cursor is jumped to a corresponding instruction on the FBD/LD editor by double-clicking an instruction on the list.
- When programs containing a functions and/or function blocks are verified, the result is displayed as follows:
  Function: row from "*;FUN BLK START" to "*;FUN BLK END"
  Function block: row from "*;FB BLK START" to "*;FB BLK END"
  It can be hidden by setting the following option.
  [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ FBD/LD Editor" ⇨ "Verify" ⇨ "Verify Setting"

Precautions

- When a step of the verification source is displayed with "-", it cannot jump to the FBD/LD editor.
- When any of the following operations are applied to a verification source program or a verification destination program, "Mismatch" is displayed in the "Verification Result" column, and "Element arrangements do not match" is displayed in the "Caution" column. In that case, the mismatched element is not highlighted and a cursor is not jumped to the mismatched element.
  ·The position of an element is changed (position change in which the processing order is not changed).
  · A comment element is edited.

SFC programs

The verification result of the block (verification result of the block information, program, and Zoom) are displayed in a list format by double-clicking the program displayed in the verification result.
The details of the verification result is displayed in a list format by double-clicking the program or Zoom from the verification result of a displayed block.
It is not possible to verify in a Zoom and display the details in a list format when verifying with a programmable controller or the SFC program which has been read from a CPU module without converting all programs.

■Detailed display of programs (list format)

The cursor is jumped to a corresponding instruction on the SFC editor by double-clicking an instruction on the verification result.

■Detailed display of Zoom

For the detailed display of programs, refer to the detailed display for each programming language.

Precautions

- Even if the SFC diagram, displayed for the verification destination, looks totally same as the one for the verification source, the verification result may be mismatched because of the difference of the internal data which occurs depending on the creation procedure.
- When a step of the verification source is displayed with "-", it cannot jump to a program editor.
- When any of the following operations are applied to a verification source program or a verification destination program, "Mismatch" is displayed in the "Verification Result" column, and "Element arrangements do not match" is displayed in the "Caution" column. In that case, the mismatched element is not highlighted and a cursor is not jumped to the mismatched element.
  ·The data name of a step is changed.
  · A comment element is edited.
  · The positions of a contact, left power rail, variable, and connector, which are used for the direct expression of a transition, is changed.

Parameters

When the same profiles are not registered to the verification destination and source, the verification result may be mismatched.
The details of verification target parameter are displayed in a table format by double-clicking the parameter displayed in the verification result.

■Detailed display (table format)

The cursor is jumped to a corresponding setting items on the parameter editor by double-clicking a parameter in a table.

Exporting data to file

Export data, which is displayed in the "Verify Result" window, to a file.

Operating procedure

Select [Edit] ⇨ [Export to File] ( ).

3.6 Project Revision History

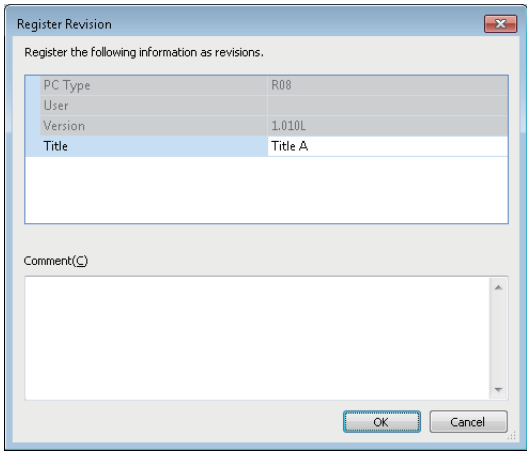
History information can be managed by registering a project history.
By doing so, a project can be restored to the previous condition with registered history information.

Registering histories

A project can be registered by backing-up the project and adding history information.

Window

[Project] ⇨ [Project Revision] ⇨ [Register Revision]



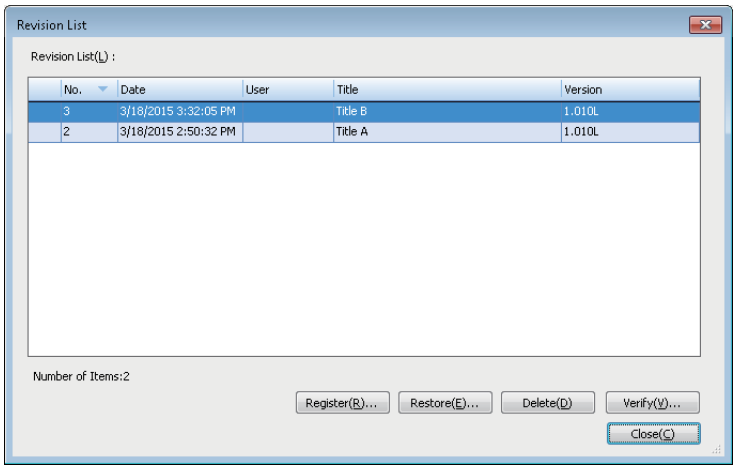
Operating procedure

Set each item and click the [OK] button.

Displaying a history list

Window

[Project] ⇨ [Project Revision] ⇨ [Revision List]



Select and right-click on history information, then select [Details] in the shortcut menu. The "Detailed Revision Information" screen appears, so check the information such as comments entered at the time of registration.

Registering histories

A project history can be registered by clicking the [Register] button.
This time, information for iQ AppPortal is not registered.

Precautions

It may take time to register a history for a large project that the size of project file exceeds 10 MB.

Restoring histories

Only registered history information can be restored.

Operating procedure

1. Select a history to be restored, and click the [Restore] button.
2. Click the [OK] button on the "Restore Revision" screen.

After restoring the project, ✅ is displayed at the head of restored history information on the "Revision List" screen.

Precautions

- Before restoring a project, register a history of the project being edited. Otherwise, the project before the restoration is overwritten if another history is restored and overwritten first.
- The added/changed/deleted user information is not restored if the history is restored.

Deleting histories

Registered history information can be deleted.

Operating procedure

Select a history to be deleted, and click the [Delete] button.

Verifying histories

History information can be verified with other history information or a project being edited.

Operating procedure

Select a history to be verified, and click the [Verify] button.

If only one history is selected for verification, the history is verified with a project being edited. To verify histories, two histories need to be selected.

The operation method for displaying the verification result is the same as that of project verification. For more details, refer to the following section.

☞ Page 118 Checking a verification result

3.7 Managing Profiles

The registration status of a profile (such as CSP+[*1]) can be managed.
A profile is data that stores information of a connected device (such as a model name.)
A profile is managed by each personal computer, and shared within GX Works3 and other MELSOFT products. Therefore, a profile registered in GX Works3 is applied to other MELSOFT products.
Before registering/deleting a profile, log on a personal computer as the user with the administrator authority, and close the project in advance.

*1 For CSP+, refer to the CC-Link Partner Association website (www.cc-link.org).

Registration

A profile can be registered in GX Works3.

Operating procedure

1. Select [Tool] ⇨ [Profile Management] ⇨ [Register].
2. Select a file on the "Register Profile" screen, and click the [Register] button.

Precautions

A profile is a compressed file (such as *.zip, *.ipar, and *.cspp). Register a profile without decompressing.

Deletion

A profile registered in GX Works3 can be deleted.

Operating procedure

1. Select [Tool] ⇨ [Profile Management] ⇨ [Delete].
2. Select a model name to be deleted on the "Profile Delete" screen, then click the [Delete] button.

4 CREATING MODULE CONFIGURATION DIAGRAM AND SETTING PARAMETERS

In GX Works3, parameters of a programmable controller can be set in the "Module Configuration" window, as if to configure the actual system.
Parameters can also be set in the "Navigation" window in the same way as GX Works2.

Module configuration window

The following operations can easily be performed in the "Module Configuration" window.

Item	Reference
Displaying the configuration of an actual programmable controller system visually	Page 127 Creating a Module Configuration Diagram
Setting the parameters of various modules	Page 131 Setting parameters on a module configuration diagram
Entering the start XY in a batch*1	Page 136 Inputting the start XY in a batch
Entering the default points in a batch*1	Page 136 Inputting default points in a batch
Checking the power supply capacity and I/O points	Page 136 Checking a power supply capacity and I/O points
Checking a system configuration	Page 136 Checking system configurations

*1 FX5CPUs do not support it.

Parameter settings

Parameters can be set by any of the following methods.

Method	Reference
Setting parameters in the "Input the Configuration Detailed Information" window that is displayed from the "Module Configuration" window.	Page 131 Setting parameters on a module configuration diagram
Setting parameters in a parameter editor that is displayed from the "Navigation" window.	Page 137 Setting Parameters

4.1 Creating a Module Configuration Diagram

A module part (object) can be placed in the "Module Configuration" window in the same configuration as an actual system. In the "Module Configuration" window of GX Works3, a module configuration diagram can be created in the range of a system that is controlled by a CPU module in a project.

Editor configuration when creating a module configuration diagram

Point

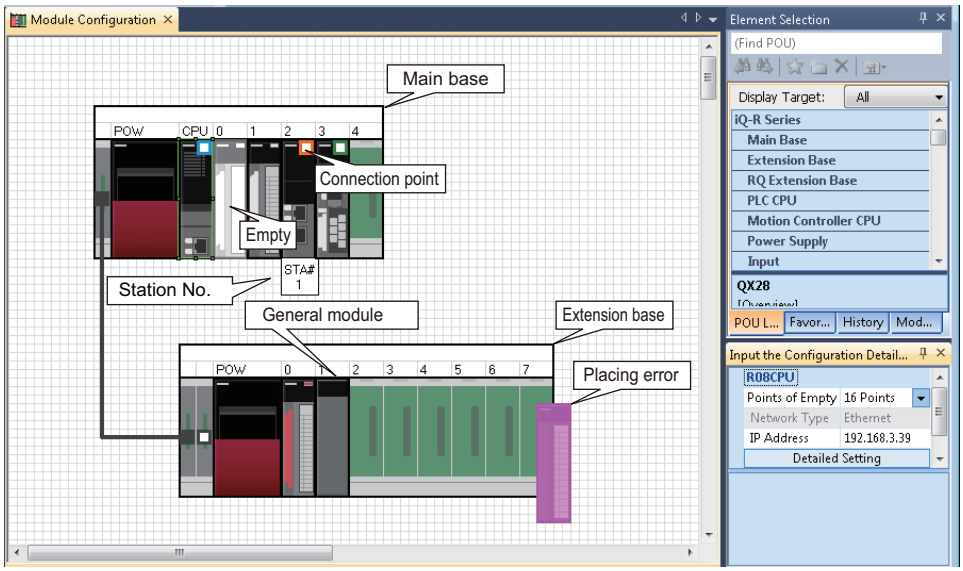
The display setting can be changed by setting the following option.
[Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Module Configuration Diagram"

Window

Double-click "Module Configuration" in the "Navigation" window.

■Toolbar

■"Module Configuration" window



Displayed items

Window name	Item	Description
Module Configuration	iQ-R series	An object of a MELSEC iQ-R series module supported by GX Works3.
	FX5 series	An object of a MELSEC iQ-F FX5 series module supported by GX Works3.
	Q series	An object of a Q series module supported by GX Works3.
	General module	An object of a module for which the start XY and point can be set arbitrarily for each module type. The same points as empty slot points will be assigned to an initial value. Select this when using a module which is not included in the "Element Selection" window.
	Figure (Straight Line, Rectangle, Ellipse, Text Box)	An object that is used when adding information such as description on a module configuration diagram.
	Connection line	An object of a bus cable to be connected to a base unit.
	Connection point	A point to be connected with a connection line. The connection point located at the upper right on a module is used when importing a project in MELSOFT Navigator. It is not used in GX Works3.
	Module status setting (empty)	A module to set when running a system only on the module configuration diagram without using actual modules. A module placed on the module configuration diagram and its related parameters will also be set as 'Empty'. (Reserved status)
	Object placement error	A module object which is not placed properly is highlighted.
	Station No.	The station number set for a module is displayed. The station number of the following modules is not displayed. • A remote head module on a standby system • A module controlled by another CPU module
Element Selection		A list of objects which can be used on the module configuration diagram.
Input the Configuration Detailed Information		A window to enter the information such as start XY or station number of the module placed on the Module Configuration Diagram.

Placing objects

Placing module objects

Operating procedure

1. Select a main base in the "Element Selection" window, and drag and drop it onto the "Module Configuration" window.
2. Select a module in the "Element Selection" window, and drag and drop it onto the base unit placed in step 1.

The available locations are highlighted while dragging the module.

Point

The names of module objects can be changed in the "Properties" screen. It makes easy to distinguish modules with the same model names.

Precautions

- The following are not supported: GOT2000/GOT1000 series, general modules, image diagrams, and link files supported by MELSOFT Navigator
- Only bus cables are available. Network connection and serial connection are not available.
- For FX5CPUs, select a module directly and drag and drop it onto the "Module Configuration" window.

■Moving placed modules

If a module is removed from the main base or extension base, the object information such as start I/O and parameter information is retained. Therefore, when the removed module is placed on the base unit again, the retained parameter information will be set automatically.

A module removed from the base unit will be deleted in "I/O Assignment Setting" of "System Parameter."

For FX5CPU, the setting cannot be fixed in the state where a module has been removed from the CPU module.

■Deleting placed modules

When a module is deleted, the module information displayed in the "Navigation" window after fixing parameters will be deleted as well.

For a single CPU configuration, a CPU module object cannot be deleted.

For a multiple CPU configuration, the host CPU cannot be deleted.

■Copying and pasting modules

Copy source parameter information is utilized.

If a CPU module placed on the base unit in a multiple CPU configuration is copied, the CPU number will be unknown.

The objects can be copied to the "Module Configuration" window of other projects.

Placing figure objects

A figure and text box can be placed in the "Module Configuration" window.

A figure placed in the "Module Configuration" window is not written to a CPU module. It is saved only in a project.

Operating procedure

Select a figure in "Figure" in the "Element Selection" window, and drag and drop it onto the "Module Configuration" window.

The font and color of a figure object can be changed on the "Properties" screen.

Changing the model name of CPU modules

The model name of a CPU module placed on the module configuration diagram can be changed.

RCPUs do not support it.

Operating procedure

1. Select a placed CPU module. Right-click and select [Change CPU Model Name] from the shortcut menu.
2. Select the model name after the change on the "Change CPU" screen.

Module status setting (empty)

Set this when operating a system without mounting actual modules.

The module is highlighted in a pale color.

FX5CPUs do not support it.

Operating procedure

Select a module to be set to empty, and [Edit] ⇨ [Module Status Setting (Empty)].

Reading the module configuration from an actual system

The Module Configuration Diagram can be configured by using the information read from a CPU module.

For an FX5CPU, a module, of which the model name cannot be identified, is placed as a general module on the Module Configuration Diagram.

If a module except for CPU No.1 is set as the connection destination when reading information from a remote head module in a redundant system configuration, the CPU No.1 is read as the host module.

Operating procedure

Select [Online] ⇨ [Read Module Configuration from PLC].

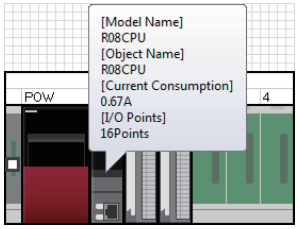
Precautions

The module configuration cannot be read when the number of extension base unit was set incorrectly.

Checking the module information

Check on a balloon help

Place the cursor on a object (such as module or figure) to display the balloon help on the "Module Configuration" window.

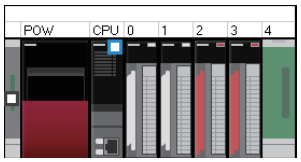


Check model names on module objects

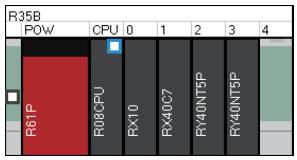
Operating procedure

Select [Edit] ⇨ [Display Module Information] ( ).

Normal display

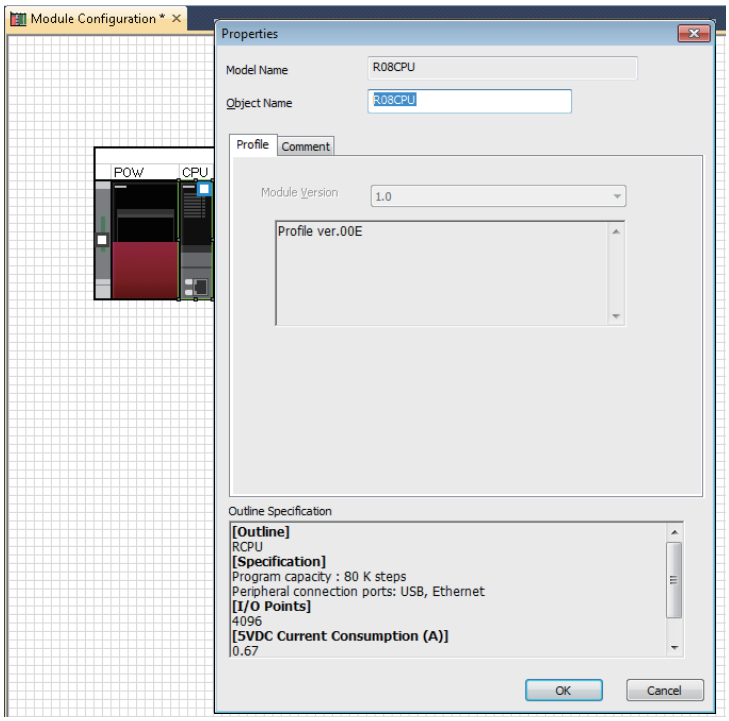


Module information display



Check on the property screen

A model name, object name, and outline of a specification can be checked on the "Properties" screen.
Additionally, a comment can be entered.



Operating procedure

Select a module object on the module configuration diagram, and right-click and select [Property] in the shortcut menu.

Setting parameters on a module configuration diagram

Parameters of a module placed onto a module configuration diagram can be set in the "Input the Configuration Detailed Information" window.

Operating procedure

1. Select a module object to edit the parameters.
2. Click [Edit] ⇨ [Parameter] ⇨ [Input Detailed Configuration Information Window]( ).

The "Input the Configuration Detailed Information" window appears.

3. Set each item in the "Input the Configuration Detailed Information" window.
4. Select [Edit] ⇨ [Parameter] ⇨ [Fix] ( ).

To set details of the module, click the [Detailed Setting] button in the "Input the Configuration Detailed Information" window and set details in the parameter editor.

Operations that make parameters unfix

When an object is edited in the "Module Configuration" window, the status of parameters may be unfixed.
The following shows the list of operations that make parameters unfixed.

- Connecting modules
- Setting the Module status setting (empty)
- Performing undo/redo
- Performing the Start XY Batch Input function
- Performing the Default Points Batch Input function
- Operations in the "Input the Configuration Detailed Information" window
- Adding or deleting a module
- Cutting and pasting modules
- Changing the property of a module
- Removing a module, or placing the same module to the slot of a base unit again.
  For FX5CPU, removing a module or connecting the same module to a CPU module.

Data updated after fixing parameters

The following data is updated after fixing parameters.

- "Navigation" window
  (For new module information, the module information is added in the "Navigation" window.)
- Parameter editor
- "I/O Assignment Setting" of "System Parameter"

Application of parameter information

The parameter information of a cut or copied module object can be utilized by pasting the module object onto the "Module Configuration" window and fixing the parameters.

Precautions

Parameter information cannot be utilized by the following operations. The parameter information of the pasted module object is returned to the default.

- Paste a cut or copied module object onto the "Module Configuration" window in another project.
- Before fixing parameters, change the station type of the module object in the "Input the Configuration Detailed Information" window.

List of the changed location of start XY number

When the start XY number of a module is changed on the Module Configuration Diagram, the list of data which will be affected by the change is displayed on the "Module Start I/O No. Related Area" window. Check the details and correct the data.

- Affected data: Program, FB program, system parameter, CPU parameter, module parameter, global label (including a structure), and module label
- Affected device: Start XY devices specified for the arguments of FROM(P), DFROM(P), TO(P), or DTO(P) instructions

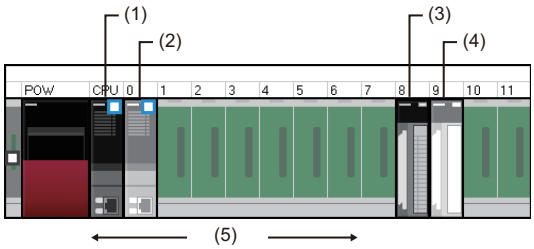
FX5CPUs do not support it.

Multiple CPU configuration

RnPCPUs (redundant mode), RnPSFCPUs, FX5CPUs, and remote head modules can not be used for configuring a multiple CPU system.

Display for a multiple CPU configuration

The multiple CPU configuration can be set on the Module Configuration Diagram.



Item	Description
(1) Host CPU module	For a multiple CPU configuration, only one project which is set as a host CPU can be set.
(2) Another CPU module	Set a CPU module which is not set as a host CPU to another station. The module is highlighted in a pale color, same as when the module state setting (empty) is set.
(3) Module controlled by the host CPU module	A module that is controlled by the CPU module set as a host CPU.
(4) A module controlled by another CPU module	A module that is controlled by the CPU module set as another CPU. The module is highlighted in a pale color, same as when the module state setting (empty) is set.
(5) Available slots for CPU modules	Up to four CPU modules can be placed on the CPU slot and slot 0 to 6. The placed CPU modules are assigned a number, CPU No.1 to CPU No.4 starting from the left.

Settings of the multiple CPU configurations

In a multiple CPU configuration, place two or more CPU modules on the base unit.

The control CPU module of a module can be changed in the "Input the Configuration Detailed Information" window.

The following explains the method for changing a single CPU configuration to/from a multiple CPU configuration.

■Changing a single CPU configuration to a multiple CPU configuration

Drag and drop a CPU module from the "Element Selection" window in a single CPU configuration (a state where one CPU is placed on the base unit), and place the second CPU module on the base unit.

■Changing a multiple CPU configuration to a single CPU configuration

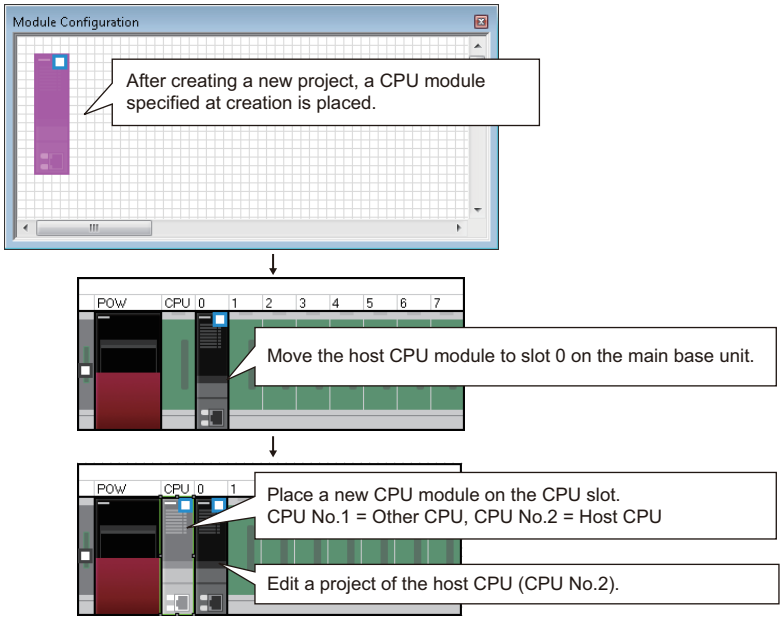
Delete one CPU module (or remove it from the slot) in a multiple CPU configuration (a state where two or more CPU modules are placed on the base unit), and keep only one CPU module on the base unit.

Changing CPU number of the CPU module set as a host CPU

For a multiple CPU configuration, the CPU number of a CPU module placed on the base unit is set in order from the left.
To change the CPU number, change the position of the CPU module.

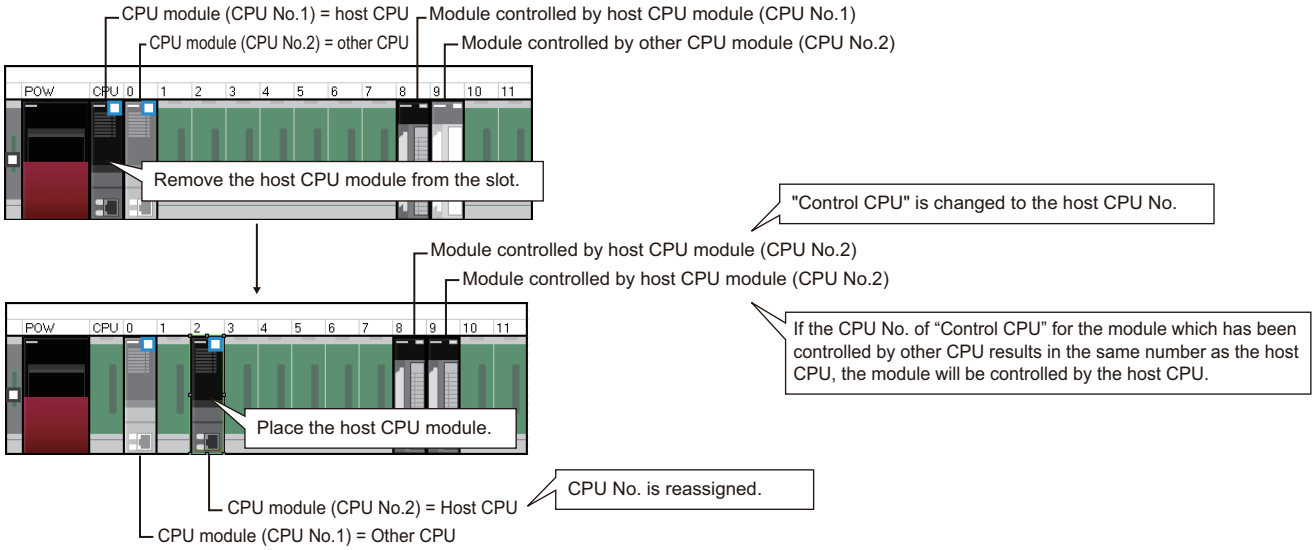
■Operation for single CPU configuration

Move the CPU module placed on the CPU slot to an empty slot, and place a new CPU module on the empty slot.



■Operation for multiple CPU configurations

Exchange the CPU module on the CPU slot and the CPU module on other slot.
Since the parameter information of the modules removed from the base unit is retained, the retained information is succeeded when the removed modules are placed again.



Display for a multiple CPU configuration using an RnENCPU

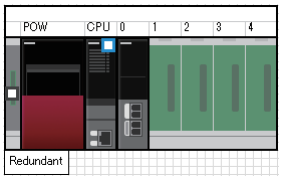
When constructing a multiple CPU system where an RnENCPU is set as CPU No.1, the display of the configuration on the module configuration diagram in GX Works3 differs from the actual module configuration.
For details on the multiple CPU configuration using an RnENCPU, refer to the following manual.
MELSEC iQ-R Module Configuration Manual

Redundant system configurations

Display for an RnPCPU (redundant mode) configuration

For an RnPCPU (redundant mode) configuration, the configuration of either the control system or standby system can be created on the Module Configuration Diagram.

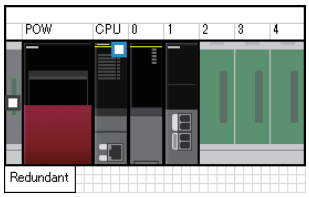
When an RnPCPU (redundant mode) and a redundant function module (R6RFM) are placed on a module configuration diagram, "Redundant" is displayed at the bottom left of the base unit to indicate that it is a redundant system.



Display for an RnPSFCPU configuration

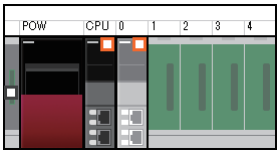
For an RnPSFCPU configuration, the configuration of either the control system or standby system can be created on the Module Configuration Diagram.

When an RnPSFCPU, a SIL2 function module (R6PSFM), and a redundant function module (R6RFM) are placed in this order, "Redundant" is displayed at the bottom left of the base unit to indicate that it is a redundant system.



Display for remote head module configuration

For a redundant system configuration of remote head modules, two remote head modules need to be placed onto the CPU slot and slot 0 on the Module Configuration Diagram.



Inputting the start XY in a batch

The start XY of each module can be set in order of the slot number in a batch.
FX5CPUs do not support it.

Operating procedure

Select [Edit] ⇨ [Start XY Batch Input] ( ).

Inputting default points in a batch

For all modules and empty slots on the Module Configuration Diagram, points including empty slots and on the empty slot side (for a module which occupies two or more slots) can be changed to the default in a batch.
FX5CPUs do not support it.

Operating procedure

Select [Edit] ⇨ [Default Points Batch Input].

XY assignment display

Input and output number assignment for each module can be displayed.
RCPUs do not support it.

Operating procedure

Select [Edit] ⇨ [XY Assignment Display].

Checking a power supply capacity and I/O points

Whether the power supply capacity and I/O points in the configuration on the Module Configuration Diagram exceed the upper limit can be checked.

Operating procedure

1. Select [Edit] ⇨ [Check] ⇨ [Power Supply Capacity and I/O Points] ( ).
2. Check the result displayed on the "Result of Power Supply Capacity and I/O Points Check" window.

Checking system configurations

Whether the place of each module on the module configuration diagram is correct can be checked. The result is displayed on the "Output" window.

Operating procedure

1. Select [Edit] ⇨ [Check] ⇨ [System Configuration] ( ).
2. Check the result displayed on the "Output" window.

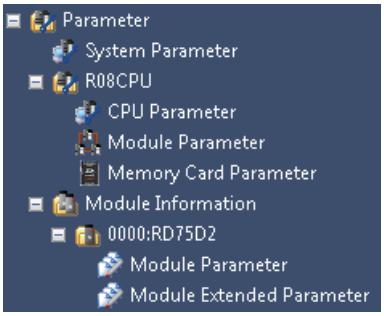
Operation for Write to PLC/Read from PLC

Only parameters of the modules in the information of Module Configuration Diagram can be read/written.
After reading data from a programmable controller, the coordinate position of the modules on the Module Configuration Diagram are displayed by default status.
The figure information is deleted.

4.2 Setting Parameters

To operate a programmable controller, setting parameters for the modules is required.

The following shows the settings of parameters in the "Navigation" window.

Image	Item	Description	Reference
	System Parameter	Parameters to set the items required to configure a system such as a module configuration. The term 'System' here indicates the following contents. • RCPU: A series of system which consists of a base unit, an extension base unit, and an RQ extension base unit which are connected with extension cables • FX5CPU: A system which consists of modules and adapters which are attached to a CPU module	Page 139 Setting system parameters
	(Parameter of control CPU)	Parameters to set the self operation function of a CPU module. This includes the file setting, memory/device setting, and program setting.	Page 140 Setting parameters of control CPU
	Module Information	Parameters that are set for I/O modules and intelligent function modules. This includes initial values and refresh settings of each module. There are two kinds of parameters, module parameter and module extended parameter. • Module parameter: A parameter that is set to an I/O module and an intelligent function module. The initial setting values and refresh settings of each module are included. • Module extended parameter: A parameter used to set specific intelligent function module. The parameters are read/written separately with module parameters.	Page 141 Setting parameters for an I/O module and intelligent function module

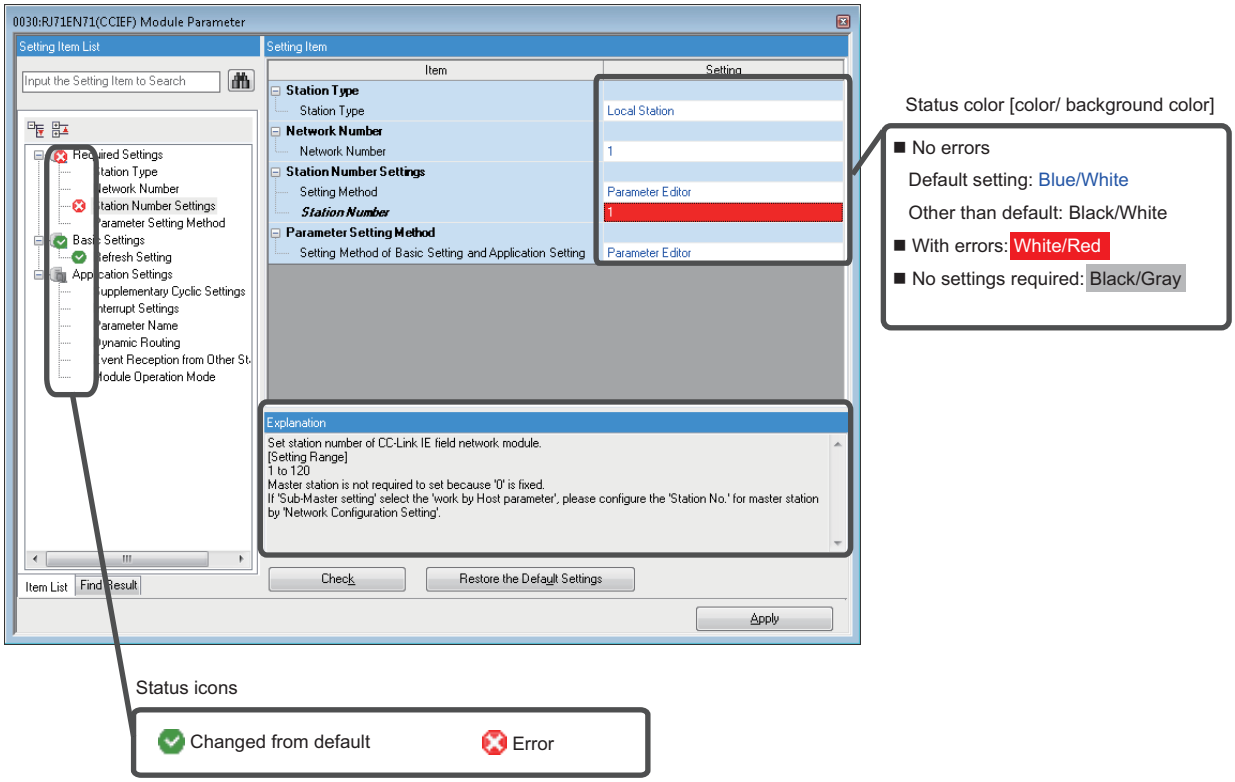
Common operations for parameter settings

Operation for a parameter editor

The items of the system parameter, control CPU parameter, and module information are displayed.

Set each item by referring to the information displayed in "Explanation."

By entering a keyword, setting items and explanations can be searched.



Checking parameters

There are two methods for checking parameters as follows:

- Check if there is an input error in the parameter editor
  Click the [Check] button in the parameter editor.
- Check if there is an error related to parameter setting in the project
  Select [Tool] ⇨ [Check Parameter].

Setting system parameters

Set the parameters relating to whole system such as the I/O assignment setting, the multiple CPU setting, and the inter-module synchronization setting.

For details on the setting items of the parameters, refer to the following manuals.

- I/O assignment setting: MELSEC iQ-R Module Configuration Manual, MELSEC iQ-F FX5 User's Manual (Application)
- Multiple CPU setting: MELSEC iQ-R CPU Module User's Manual (Application)
- Inter-module synchronization setting: MELSEC iQ-R Inter-Module Synchronization Function Reference Manual

RnPCPUs (redundant mode), RnPSFCPUs, FX5CPUs, and remote head modules do not support the multiple CPU setting.

Remote head modules in the redundant system configuration, RnPCPUs (redundant mode), RnPSFCPUs, and FX5CPUs, and do not support the inter-module synchronization setting.

Setting parameters

Operating procedure

1. Double-click "Parameter" ⇨ "System Parameter" in the "Navigation" window.
2. Select the items to be set in the [I/O Assignment] tab, [Multiple CPU Setting] tab, or [Inter-module Synchronization Setting] tab.
3. Set each item and click the [OK] button.

■When a module is deleted in the I/O assignment setting

"Unset" is displayed for the parameter of the deleted module in the "Navigation" window. To restore the settings (to display them in the I/O assignment setting), select the mount position in the "Properties" screen.

■When the I/O assignment setting is read from the read mounting status

For an extension base unit in which the number of extension bases was set incorrectly, the mounting status (number of CPU modules, the I/O assignment setting (module name/point), and the base/power/extension cable setting) cannot be read properly.

Point

The mounting status can be read to the I/O assignment setting by clicking the [Read Mounting Status] button.

Utilizing system parameters

System parameters of another project can be utilized.

Operating procedure

1. Double-click "Parameter" ⇨ "System Parameter" in the "Navigation" window.
2. Click the [System Parameter Diversion] button.
3. Read the displayed message, and click the [OK] button.
4. Select a project and click the [Open] button.

■Project in which system parameters cannot be utilized

Note that utilizing system parameters of another project is not allowed to RnPCPUs (redundant mode), RnPSFCPUs, and FX5CPUs.

■Utilizing system parameters in a project used for an R00CPU, R01CPU, or R02CPU

To utilize system parameters of a project used for an RnCPU except for R00CPU, R01CPU, or R02CPU, change the module type any of 'R00CPU', 'R01CPU', or 'R02CPU', then save the project.

By doing so, system parameters can be utilized from the saved project to a project used for an R00CPU, R01CPU, or R02CPU.

Setting parameters of control CPU

Set the parameters related to a CPU module (the host CPU for a multiple CPU configuration).

For details on the setting items of the parameters, refer to the following manuals.

- CPU parameter: MELSEC iQ-R CPU Module User's Manual (Application), MELSEC iQ-F FX5 User's Manual (Application), MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)
- Memory card parameter: MELSEC iQ-R CPU Module User's Manual (Application), MELSEC iQ-F FX5 User's Manual (Application)
- Module parameter: MELSEC iQ-R Ethernet User's Manual (Application), MELSEC iQ-F FX5 User's Manual (Application)

Setting parameters

Operating procedure

1. Double-click "Parameter" ⇨ "(CPU model name of the project)" ⇨ "CPU Parameter"/"Module Parameter"/"Memory Card Parameter" in the "Navigation" window.
2. Set each item on the parameter editor.
3. Click the [Apply] button or [OK] button.

Point

The setting screen can also be opened by double-clicking the object of a module on the Module Configuration Diagram.

Precautions

For the setting values of the parameters, use the characters in the Unicode Basic Multilingual Plane.

If the characters outside the Unicode Basic Multilingual Plane are specified, the program may not operate properly.

- File register setting of the file setting: file name
- Initial value setting of the file setting: name of an initial value file of global labels
- Program setting of the program setting: program name
- FB/FUN file setting of the program setting: FB/FUN file name

Setting parameters for an I/O module and intelligent function module

Set the parameters of an I/O module and intelligent function module of MELSEC iQ-R series, MELSEC iQ-F series/Q series supported by GX Works3.

Set the switch settings and refresh settings of MELSEC-Q series module on the parameter editor.

For details on the parameter items, refer to the user's manual of each module.

For details on the MELSEC iQ-F series high speed pulse input/output modules, refer to the following manual.

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

MELSEC iQ-F FX5 User's Manual (Positioning Control - CPU module built-in, High-speed pulse input/output module)

Setting parameters

Operating procedure

1. Select "Parameter" ⇨ "Module Information" in the "Navigation "window, and select [Project] ⇨ [Data Operation] ⇨ [Add New Module] or right-click and select [Add New Module] from the shortcut menu.
2. Select each item on the "Add New Module" screen.
3. Double-click the created parameter.

Precautions

The following table shows the modules in which a parameter error occurs by default.

Series	Module type	Model name
Q series	Temperature control module	Q64TCRTBWN
		Q64TCRTN
		Q64TCTTBWN
		Q64TCTTN

Setting network configuration and target devices

Set a network configuration and a target device of Ethernet, AnyWireASLINK, CC-Link IE Field, CC-Link IE Field Network Basic, and CC-Link on the configuration setting screen.
For details on the setting, refer to each user's manual.

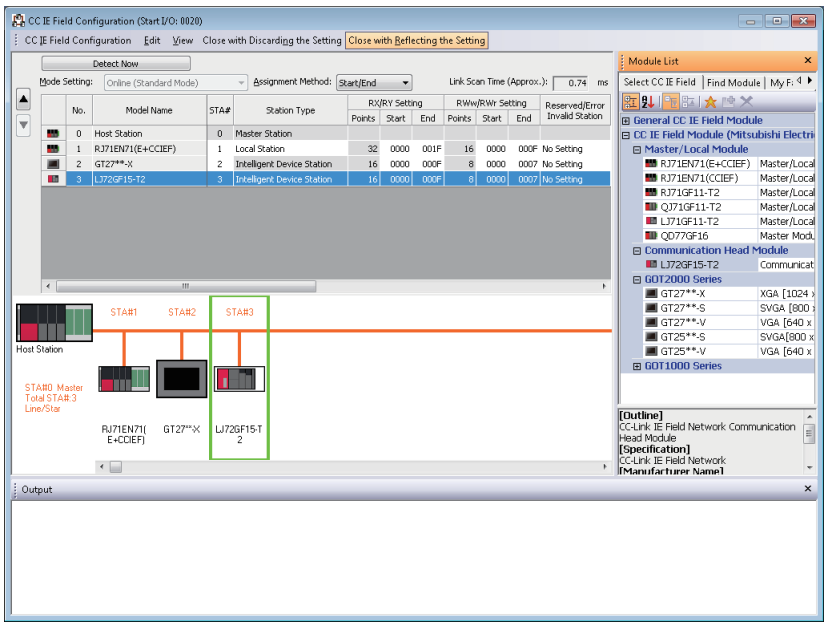
Window

The configuration setting screen appears by selecting the following items in "Parameter" in the "Navigation" window.

- Ethernet (CPU module): "(CPU model name of the project)" ⇨ "Module Parameter" ⇨ "Basic Settings" ⇨ "External Device Configuration"*1
- Ethernet (Ethernet module): "Module Information" ⇨ "(module name)" ⇨ "(module parameter)" ⇨ "Basic Settings" ⇨ "External Device Configuration"
- AnyWireASLINK: "Module Information" ⇨ "(module name)" ⇨ "AnyWireASLINK Configuration"
- CC-Link IE Field (master station)*2: "Module Information" ⇨ "(module name)" ⇨ "(module parameter)" ⇨ "Basic Settings" ⇨ "Network Configuration Settings"
- CC-Link IE Field Network Basic*3: "(CPU model name of the project)" ⇨ "Module Parameter" ⇨ "Basic Settings" ⇨ "CC-Link IEF Basic Settings" ⇨ "Network Configuration Settings"
- CC-Link (master station): "Module Information" ⇨ "(module name)" ⇨ "(module parameter)" ⇨ "Basic Settings" ⇨ "Network Configuration Settings"

*1 For FX5CPU, set in the parameter setting ("Module Parameter") for a control CPU.
*2 FX5CPUs do not support it.
*3 RnCPUs, RnENCPUs, and FX5CPUs support it.

The following screen is an example for the CC-Link IE Field configuration setting.



Precautions

The AnyWireASLINK configuration setting is not written to a programmable controller.
Therefore, the AnyWireASLINK configuration setting returns to the default after reading a module parameter from a programmable controller.

■Automatic detection of connected devices

For the following network configurations, connected devices are automatically detected and the information is applied to the configuration setting by clicking the [Detect Now] button on the configuration setting screen.

- Ethernet (CPU module)
- AnyWireASLINK
- CC-Link IE Field Network
- CC-Link IE Field Network Basic
- CC-Link
- CC-Link—AnyWireASLINK bridge

For details, refer to the following table.

Network	Reference
• Ethernet (CPU module) • AnyWireASLINK (RCPU) • CC-Link IE Field Network • CC-Link • CC-Link—AnyWireASLINK bridge	iQ Sensor Solution Reference Manual
• AnyWireASLINK (FX5CPU)	MELSEC iQ-F FX5 User's Manual (ASLINK)
• CC-Link IE Field Network Basic	CC-Link IE Field Network Basic Reference Manual

■Backup and restoration of devices supporting iQSS

In the following network configurations, setting data of devices supporting iQSS is bucked up and restored in the configuration setting screen.

- Ethernet (CPU module)
- AnyWireASLINK
- CC-Link IE Field Network
- CC-Link

For details on a backup/restoration of devices supporting iQSS, refer to the following manual.

📖iQ Sensor Solution Reference Manual

■Property

The image diagram can be changed using "Properties" for the particular selected module. Right-click and select [Property] from the shortcut menu.

Configuration applications, setting files, and manuals can be linked to the modules. Double-click the added module to open the linked application or file.

Checking refresh devices assigned to modules

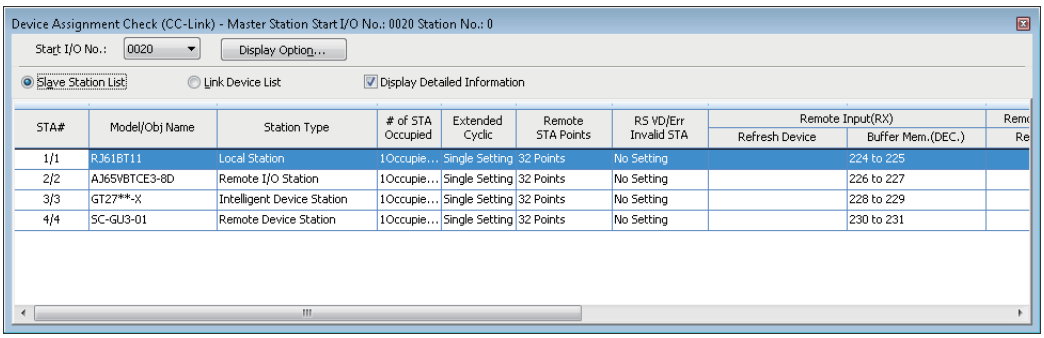
Display the refresh devices assigned to each CC-Link module in a list.

Set the CC-Link configuration from the parameter of CC-Link module in advance.

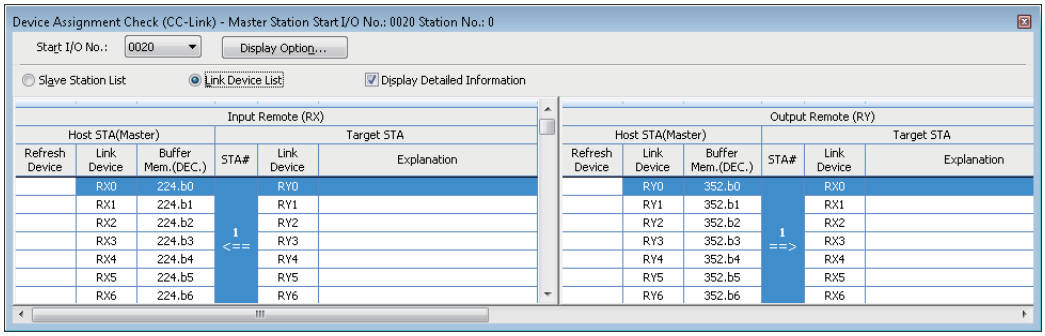
Window

[View] ⇨ [Docking Window] ⇨ [Device Reference] ( )

■Slave station list



■Link device list



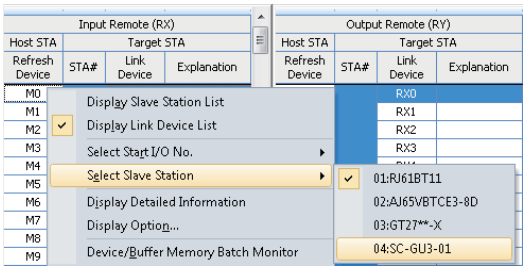
"Displayed Content for Model Name" and "Buffer Memory Display Format" can be selected by clicking the [Display Option] button.

Displayed items

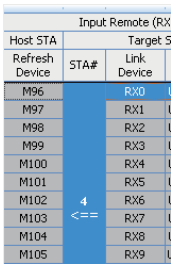
Item	Description
Start I/O No./Mounting Position No.	• RCPU: "Start I/O No." is shown. Select the start I/O number of the master station or a local station to be displayed on the list. • FX5CPU: "Mounting Position No." is shown. Select the mounting position number of the master station or an intelligent device station to be displayed on the list.
Slave Station List	Displays the information of the slave stations and the range of the refresh devices assigned to the own station. Multiple devices are displayed in accordance with the link refresh settings of the Module Parameter. When refresh devices are not assigned, the cells of the refresh device range will be blank.
Link Device List	Displays the assignment status of refresh devices on the own station and link devices on the target station. When link devices are not assigned, the cells of the link device range will be blank. The cells of "Explanation" will be blank when profile is not registered.

Point

- The arbitrary slave station can be displayed on top of the cell by right-clicking on the list of link devices and selecting [Select Slave Station] from the shortcut menu.



Select the station number 4 of the slave station.



The station number 4 is displayed at the top.

- The "Device/Buffer Memory Batch Monitor" window appears by selecting and right-clicking a refresh device or buffer memory in the link device list, and selecting [Device/Buffer Memory Batch Monitor] from the shortcut menu.

Checking/changing the number of intelligent function module parameters

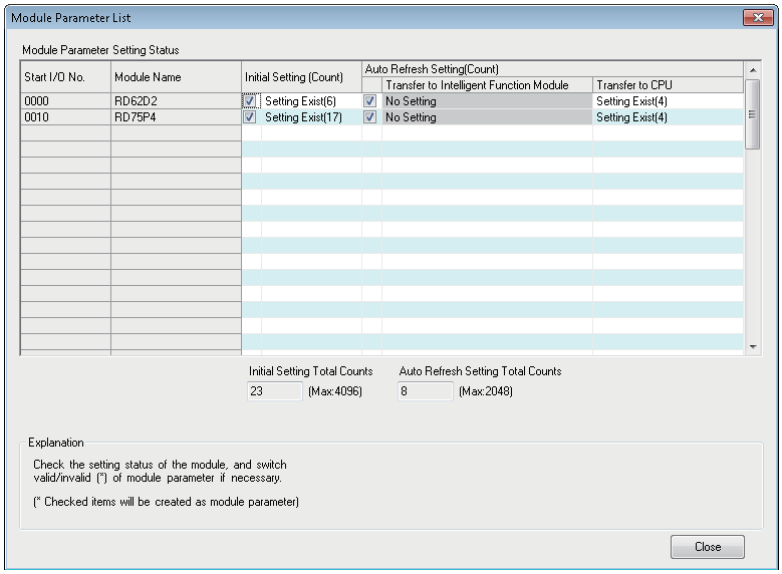
Display the setting information of the start XY addresses, initial settings, and auto refresh settings of intelligent function modules in a list.

After intelligent function module parameters are written to a CPU module, the following operations are performed.

- Initial setting: The parameters of the individual intelligent function module data are set as an initial setting.
  The data is registered in a CPU module parameters and written to the intelligent function module automatically when the CPU module changed to RUN.
- Auto refresh: For the buffer memory of an intelligent function module set to auto refresh, the data is written to/read from the specified devices automatically when the END instruction is executed on the CPU module.

Window

- [Project] ⇨ [Intelligent Function Module] ⇨ [Module Parameter List]
- Select "Parameter" ⇨ "Module Information" in the "Navigation" window, right-click and select [Module Parameter List] from the shortcut menu.



■Enabling/disabling parameters

Set whether to enable/disable the initial setting and auto refresh of intelligent function module parameter.

The number of parameters that can be set has limits depending on the intelligent function module to be used. Check the setting information using this function and accordingly enable/disable the parameters so that the number of set parameters is within the allowable range.

For details on the number of the parameter settings, refer to the manuals of relevant intelligent function module.

Operating procedure

Set each item and click the [Close] button.

Item		Description
Initial Setting (Count)		Unselect the item if it is not set as an intelligent function module parameter. For a module with no initial settings, "-" is displayed.
Auto Refresh Setting (Count)	Transfer to Intelligent Function Module	Unselect the item if it is not set as an intelligent function module/CPU module parameter. For a module for which auto refresh is not set, "No Setting" is displayed.
	Transfer to CPU	
Initial Setting Total Counts		Displays the number of initial settings set as intelligent function module parameters.
Auto Refresh Setting Total Counts		Displays the number of auto refreshes set as intelligent function module parameters.

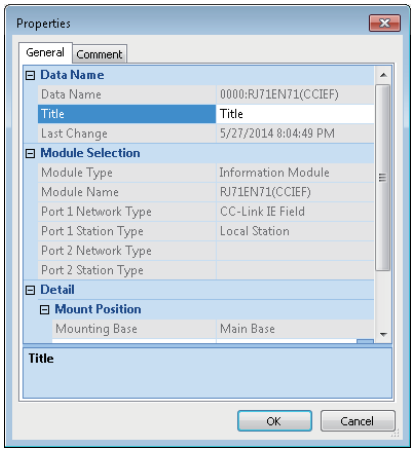
Checking property information

Check the setting information of an intelligent function module.

By this operation, the mounting slot number, start I/O number, and title (up to 32 characters) for RCPU, and the mounting position number and title (up to 32 characters) for FX5CPU can be changed.

Window

Select "Parameter" ⇨ "Module Information" ⇨ "(module name)" in the "Navigation" window, then select [Project] ⇨ [Data Operation] ⇨ [Properties] ( ) or right-click and select [Properties] ( ) from the shortcut menu.



Operating procedure

Set each item and click the [OK] button.

Module-specific menus for the parameter editor

Depending on the setting items of each module, the input format and device assignment method can be selected from one of the following menus.

- [Edit] ⇨ [IP Address Input Format] ⇨ [Decimal]/[Hexadecimal]
- [Edit] ⇨ [Device Assignment Method] ⇨ [Start/End]/[Points/Start]
- [Edit] ⇨ [Word Device Setting Value Input Format] ⇨ [Decimal]/[Hexadecimal]

Parameter interaction with MELSOFT Navigator

By using the parameter interaction function of MELSOFT Navigator, the parameter consistency can be ensured between MELSOFT Navigator and GX Works3.
This function is operated in MELSOFT Navigator. For details, refer to MELSOFT Navigator Help.

4.3 Other Settings of Intelligent Function Modules

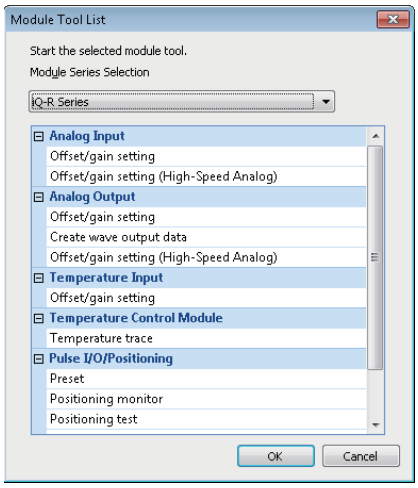
The settings except for the parameter setting of an intelligent function module can be configured with a module tool or dedicated tool.

Setting with a module tool/drive tool

Displaying the module tool list

Window

[Tool] ⇨ [Module Tool List]

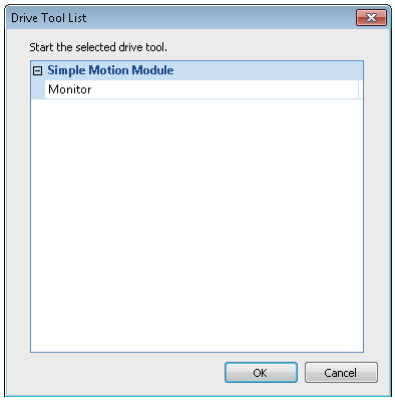


For the functions of each module tool, refer to the user's manual of a target module.

Displaying the drive tool list

Window

[Tool] ⇨ [Drive Tool List]



For the functions of the drive tool, refer to the user's manual of a target module.

Simple Motion Module Setting function

The parameter and positioning data of a simple motion module can be set by using the Simple Motion Module Setting function.
For details on the operation methods and setting items, refer to the help of Simple Motion Module Setting function.

Operating procedure

1. Select "Parameter" ⇨ "Module Information" in the "Navigation" window, and select [Project] ⇨ [Data Operation] ⇨ [Add New Module].
2. Select each item on the "Add New Module" screen.
3. Double-click the "Simple Motion Module Setting" or "Module Extended Parameter".

Precautions

The settings of simple motion module are also saved when saving the GX Works3 project.

4.4 Predefined Protocol Support Function

Start the Predefined Protocol Support Function from GX Works3, and set the protocol and read/write data from/to a module.
For details, refer to the following manuals.
📖MELSEC iQ-R Serial Communication Module User's Manual(Application)
📖MELSEC iQ-R Ethernet User's Manual (Application)
📖MELSEC iQ-F FX5 User's Manual (Serial Communication)
📖MELSEC iQ-F FX5 User's Manual (Ethernet Communication)
For RnPCPUs (redundant mode), this function can be used when the modules are in the separate mode and "Not Specified" is selected for "Specify Redundant CPU."
For RnPSFCPUs, this function can be used only when "Not Specified" is selected for "Specify Redundant CPU."

Point

The files saved in GX Works2 can be read using the Predefined Protocol Support Function of GX Works3.

Start and End

Start and end the predefined protocol support function.

Start

Operating procedure

1. Select GX Works3 menu [Tool] ⇨ [Predefined Protocol Support Function].
2. Set each item on the "Predefined Protocol Support Function" screen and click the [OK] button.

End

Operating procedure

Select [File] ⇨ [Exit] on the protocol setting screen.

4.5 Circuit Trace Function

Trace the send/receive data and communication control signal between C24 and a target device.

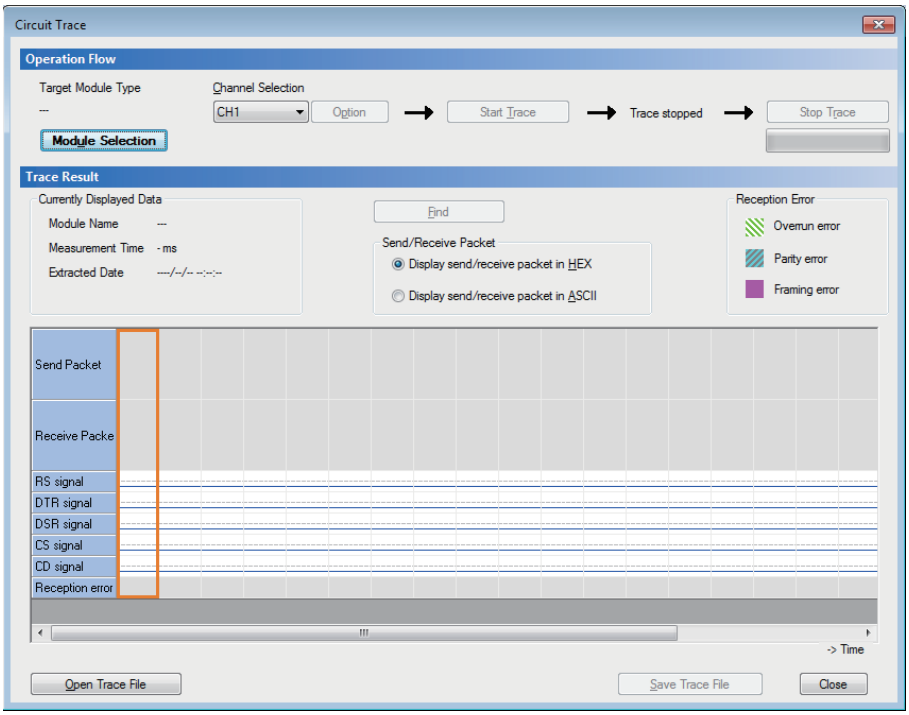
For details, refer to the following manual.

📖MELSEC iQ-R Serial Communication Module User's Manual(Application)

FX5CPUs do not support it.

Window

[Tool] ⇨ [Circuit Trace]



4.6 Change Module

A module type, module name, and station type of the module set in a project can be changed.

Module

The combinations of module types, module names, and station types that can be changed for each of the following modules are as follows.

■Another CPU module

Module type	Module name
PLC CPU	R00CPU, R01CPU, R02CPU, R04CPU, R08CPU, R16CPU, R32CPU, R120CPU
Process CPU	R08PCPU, R16PCPU, R32PCPU, R120PCPU
Safety CPU	R08SFCPU, R16SFCPU, R32SFCPU, R120SFCPU
Motion CPU	R16MTCPU, R32MTCPU, R64MTCPU
NCCPU	R16NCCPU
Robot CPU	R16RTCPU

■CC-Link IE built-in Ethernet module

Module type	Module name	Station type
Information Module	RJ71EN71 (E+CCIEC)	Control station, normal station, extended mode (control station), extended mode (normal station)
	RJ71EN71 (E+CCIEF)	Master station, local station, sub-master station
	RJ71EN71 (E+E)	—

■CPU extension module

Module type	Module name	Station type
CPU Extension	_RJ71EN71(E+IEC)	Control station, normal station, extended mode (control station), extended mode (normal station)
	_RJ71EN71(E+IEF)	Master station, local station, sub-master station

Operating procedure

1. Select "Parameter" ⇨ "Module Information" ⇨ "(module name)" in the "Navigation" window.
2. Right-click the selected module, and select [Change Module] in the shortcut menu.

A change module screen appears.

3. Set each item in the change module screen, and click the [OK] button.

Precautions

■When changing a CC-Link IE built-in Ethernet module or CPU extension module

- A module controlled by another CPU module cannot be changed.
- After changing a module, (required settings unchecked) appears in the "Navigation" window.
  Select [Tool] ⇨ [Check Parameter] to check parameters. (☞ Page 138 Checking parameters)

Data to be changed

The following tables show the data that is changed by changing a module.

■Another CPU module

Item		Description
"Parameter" ⇨ "Module Information" in the Navigation window		The setting is updated according to the changed module.
Module configuration diagram		
System parameter	I/O assignment	
	Multiple CPU setting	The setting before the change is applied.
Properties	Title	
	Comment	
	Others	The setting is updated according to the changed module.

■CC-Link IE built-in Ethernet module

Item		Description
"Parameter" ⇨ "Module Information" in the Navigation window		The setting is updated according to the changed module. • Module parameter (port 1): The module parameter (port 1) of the module before the change is applied. • Module parameter (port 2): The setting is returned to the default.
Module configuration diagram		The setting is updated according to the changed module.
Module label		The module labels of the module before the change are deleted. Besides, the data types and classes of global labels assigned to this module label are also deleted.
		According to the setting contents of the following options, module labels of the module after the change are registered to the global label. • [Tool] ⇨ [Options] ⇨ "Project" ⇨"Module Label" ⇨ "Operational Setting" ⇨ "Use Module Label" • [Tool] ⇨ [Options] ⇨ "Project" ⇨"Module Label" ⇨ "Message" ⇨ "Show the confirmation message in adding module"
Module FB		• Ladder editor: Module FBs, local labels including a module FB, and ladder blocks including a module FB of the module before the change are deleted. • Other than ladder editor: Only module FBs of the module before the change are deleted.
		Module FBs of a module after the change are added to the "Element Selection" window.
System parameter	I/O assignment setting	The setting is updated according to the changed module.
	Multiple CPU setting	The setting before the change is applied.
	Redundant module group setting	Only the setting of the module before the change is deleted.
Module Parameter	Interlink transmission settings	The setting is returned to the default.
Properties	Title	The setting before the change is applied.
	Comment	
	Others	The setting is updated according to the changed module.

■CPU extension module

Item		Description
"Parameter" ⇨ "Module Information" in the Navigation window		The setting is updated according to the changed module. • Module parameter (port 1): The module parameter (port 1) of the module before the change is applied. • Module parameter (port 2): The setting is returned to the default.
Module configuration diagram		The setting is updated according to the changed module.
Module label		Module labels of a module before the change are deleted. Besides, the data types and classes of global labels assigned to this module label are also deleted.
		According to the setting contents of the following options, module labels of the module after the change are registered to the global label. • [Tool] ⇨ [Options] ⇨ "Project" ⇨"Module Label" ⇨ "Operational Setting" ⇨ "Use Module Label" • [Tool] ⇨ [Options] ⇨ "Project" ⇨"Module Label" ⇨ "Message" ⇨ "Show the confirmation message in adding module"
Module FB		• Ladder editor: Module FBs, local labels including a module FB, and ladder blocks including a module FB of the module before the change are deleted. • Other than ladder editor: Only module FBs of the module before the change are deleted.
		The module FBs of the module after the change are added to the "Element Selection" window.
System parameter	I/O assignment	The setting is updated according to the changed module.
	Multiple CPU setting	The setting before the change is applied.
Module parameter	Interlink transmission settings	The setting is returned to the default.
Properties	Title	The setting before the change is applied.
	Comment	
	Others	The setting is updated according to the changed module.

5 REGISTERING LABELS

This chapter explains the overviews and registration methods of labels.

5.1 About Labels

There are four types of label; labels registered on the label editor (global label and local label), a module label which is prepared as the dedicated label for each module (global label), and a system label which is interacted with MELSOFT Navigator.

Global labels can be registered as system labels.

Type	Description	Creation method	Number of creatable labels	Reference
Local label	Labels that can be used in each program.	Create them on the local label editor.	• 5120 in a program file (maximum)	Page 157 Registering Labels
Global label	Labels that can be used in all programs in a project. There are two types of global label; global labels that can be used either in standard programs or in safety programs, and standard/safety shared labels that can be used in both programs.	Create them on the global label editor.	• 20480 in a file (maximum) • 16384000 in a project (maximum)	
System label	Labels that can be shared among iQ Works supported products. These labels are controlled by MELSOFT Navigator.	Register standard global labels as system labels on the global label editor.		Page 173 Registering System Label
Module label	Labels in which the I/O signals and buffer memory of a module to be used are already defined. By using the module labels, easy-to-use programs can be created without considering the internal address in the module. These labels can be used in standard programs only.	Add module labels when adding the module information. These labels are created as standard global labels.		Page 168 Registering Module Labels

• Numbers of characters of labels and label comments

Type	Number of characters of a label	Number of characters of a label comment
Local label	256 (maximum)	1024 (maximum)
Global label		
System label		
Module label	Not changeable	Not available

For details on the label types, classes, and data types, refer to the following manuals.

MELSEC iQ-R CPU Module User's Manual (Application)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Auto refresh and direct access for module labels

There are two types of module labels for each purpose: auto refresh and direct access. For direct access, '_D' is added to a label name.

The difference between auto refresh and direct access is as follows.

Type	Description	Access timing
Auto refresh	The value written to/read from a module label is applied to a module in a batch when auto refresh is performed. By using the auto refresh, the execution time of a program can be shortened. To use the auto refresh, select "Module Label" in "Target" under the refresh setting of the module parameter.	When auto refresh is performed
Direct access	The value written to/read from a module label is immediately applied to a module. Compared with the auto refresh, the execution time of a program will be extended; however, responsiveness will be increased. To use the direct access, select the item other than "Module Label" in "Target" under the refresh setting of the module parameter. When "Module Label" is selected in "Refresh", values of module labels are overwritten by a refresh when an END processing is executed or a program in which a refresh timing is specified is executed.	When reading from/writing to a module label

5.2 Registering Labels

This section explains the registration methods of global labels and local labels.
A global label can be created maximum 20480 in a file and maximum 16384000 in a project. A local label can be registered maximum 5120 in a program file.

Configuration of label editor

This section explains the configuration of the label editor.
The editor to be displayed will differ depending on the label types.

Point

The display format and details of operation settings for each function can be set by setting the following option.
[Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common"

Window

■Global label

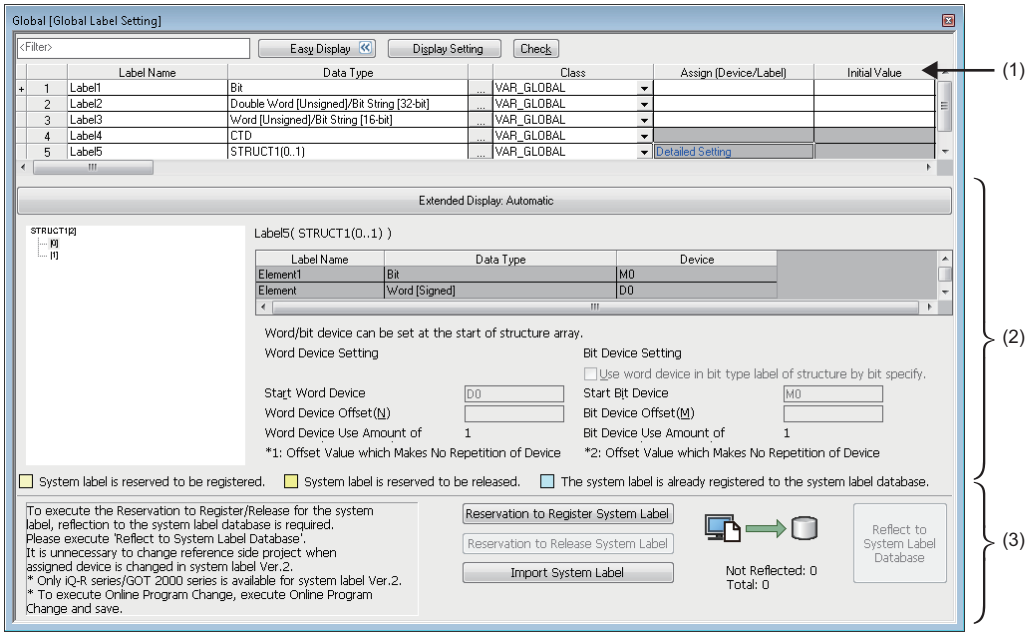
"Label" ⇨ "Global Label" ⇨ "(global label)" in the "Navigation" window

■Local label

"Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(program block)" ⇨ "Local Label" in the "Navigation" window

■Toolbar

■Label editor (global label editor)



- The items in the label list (1), extension display area (2), and system label area (3) can be displayed or hidden on the "Display Setting" screen that appears by clicking the [Display Setting] button.
- Click the [Check] button to check errors before converting programs.
- When the data type is structure or function block, the hierarchy of labels is displayed in the extension display area.

Point

Font color, background color, and font can be changed.
☞ Page 65 Checking and Changing Colors and Fonts

Editing a row

■Adding a row

When using the New Declaration (After) function, the selected label is copied and added it to the row right after the specified row, with a value appended.

If a value is already appended after the label name, the data is copied with an incremented value.

When devices are set for global labels, the data is copied with an incremented device number.

For adding blank rows or setting increment regulation (decimal/hexadecimal), set the following option.

- [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Editor Setting"

Operating procedure

Select [Edit] ⇨ [New Declaration (Before)]( )/[New Declaration (After)]( ).

■Deleting rows (deleting labels)

Operating procedure

Select [Edit] ⇨ [Delete Row]( ).

■Deleting a blank row

A blank row automatically is deleted and the following row moves upward on the label editor.

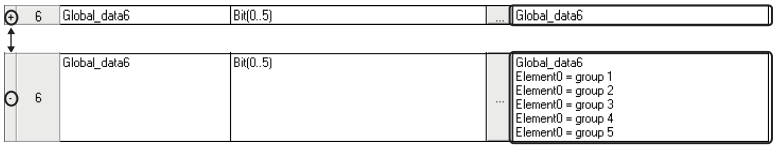
Operating procedure

Select [Edit] ⇨ [Delete Blank Rows]. ( )

■Displaying all lines or first line of comments

For the "Comment" columns, data can be entered in multiple lines.

Double-click "+" or "-" to switch the display between all lines or only the first line.



■Sorting labels

Labels can be sorted by clicking a title name of label editor.

For ascending order, is displayed, and as for descending order, is displayed in the title name.

■Filtering display

- A wild card (such as '*' and '?') is not applied as a filtering condition. A character string including the wild card is displayed.
- When filtering columns by selecting "Access from External Device", specify '1' after selecting "Access from External Device". As for it is not selected, specify '0'.

Entering information

Label name

Set a name with avoiding the following conditions:

- A label name that includes a space.
- A label name starting with a number
- A same label name as one for a device

For the unusable character strings to a label name, refer to the following section.

☞ Page 539 Unusable character string for label name

Precautions

For label names, constants, and device initial values, use the characters in the Unicode Basic Multilingual Plane.

The label names and constants that specifies the characters other than the Unicode Basic Multilingual Plane cannot be used in programs.

A program including an initial value using the characters outside the Unicode Basic Multilingual Plane may not operate properly.

■Alias

By entering an existing label name for the "Assign (Device/Label)" column in a label editor, a label can be set as an alternative label name of the existing one.

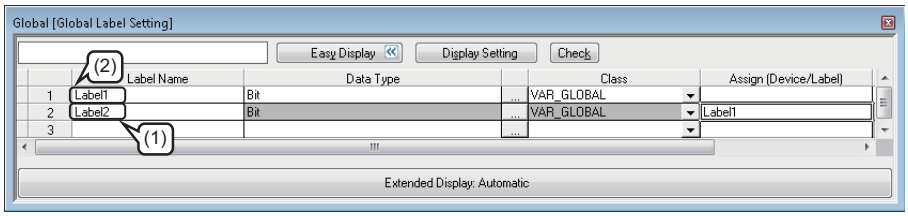
A label to which an existing label is assigned is referred to as 'alias'.

An existing label that is assigned to an alias is referred to as 'alias source'.

The following information of an arias source will be succeeded: data types, classes, initial values, and constants.

For an alias, a label with the same category (standard, safety, and standard/safety shared) as an alias source can only be set.

Ex.



(1): Alias

(2): Alias source

Precautions

- For an arias, do not assign an instance of a function block or module FB.
- In the "Assign (Device/Label)" column of a label editor, enter the same text as that in the "Label Name" column.
- For an alias, a structure member and a label in a function block can not be assigned.
- The following error occurs at conversion when a structure member or a label used in a function block is entered in the "Assign (Device/Label)" column of an alias, and the alias is used in the program editor.
  Content: An invalid device or an invalid constant is being used.
  Error code: 0x12011067

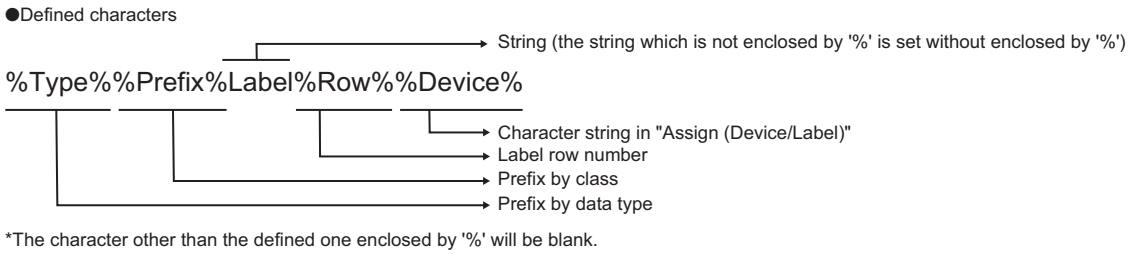
■Automatic naming rule

By setting the data type and the class when the label name is blank , a label name will be set automatically.

Set the automatic naming rules in the following option setting.

• [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Editor Setting"

The automatic naming rules are as follows.



*The character other than the defined one enclosed by '%' will be blank.

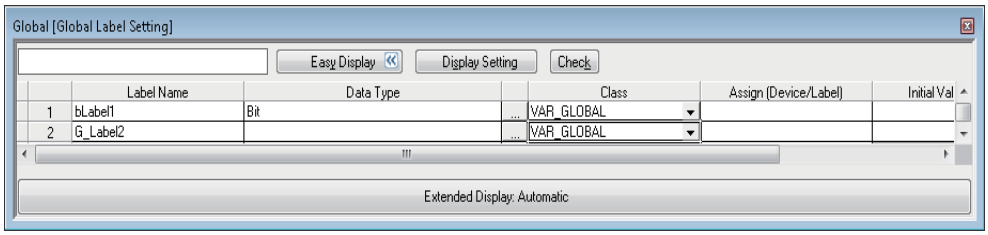
The prefixes for each data type are as follows.

Data type	Prefix
Bit	b
Word [Unsigned]/Bit String [16-bit]	u
Double Word [Unsigned]/Bit String [32-bit]	ud
Word [Signed]	w
Double Word [Signed]	d
FLOAT [Single Precision]	e
FLOAT [Double Precision]	le
Time	tm
String	s
String [Unicode]	ws
Pointer	pd
Timer	td
Counter	cd
Long Counter	lcd
Retentive Timer	std
Long Retentive Timer	lstd
Long Timer	ltd
Structure	st
FB	fb

The prefixes that are added depending on the selected class are as follows.

Class	Prefix
VAR_GLOBAL	G_
VAR_GLOBAL_RETAIN	GR_
VAR_GLOBAL_CONSTANT	GC_
VAR	Not added.
VAR_RETAIN	r_
VAR_CONSTANT	c_
VAR_INPUT	i_
VAR_OUTPUT	o_
VAR_IN_OUT	io_
VAR_OUTPUT_RETAIN	or_
VAR_PUBLIC	pb_
VAR_PUBLIC_RETAIN	pbr_

■Setting example



- When "Bit" is selected in the "Data Type" column: bLabel1
  Prefix 'b' that indicates the bit type + character string 'Label' + label row number '1'
- When "VAR_GLOBAL" is selected in the "Class" column: G_Label2
  Prefix 'G_' that indicates the class + character string 'Label' + label row number '2'
- When 'D0' is specified in the "Assign (Device/Label)" column: Label3
  Character string 'Label' + label row number '3'

■Automatic synchronization

When label names/alias names are changed on the label editor, the label names/alias names used on the editor (program editors such as ST editor, FBD/LD editor, and SFC editor) will also be replaced automatically.

- Select "Yes" for "Track label name automatically in program editor" from [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Operational Setting"

The labels are distinguished between global labels and local labels in the automatic synchronization. (☞ Page 179 Entering global labels/local labels)

The programs in which the replaced labels are used will be in the unconverted state.

If labels names/alias are changed, check if the change affects control programs using the Cross Reference function.

■Label synchronization

The contents edited on the global label editor are immediately applied on the ladder editor by setting the following option.

When labels undefined on the ladder editor are newly added on the label editor, they will be in the defined state.

- Set "Synchronize" for "Operation on Editing Label Editor" in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Label Synchronization" ⇨ "Operational Setting".

Local labels always synchronize with the data on the label editor regardless of the option setting.

Data type

A data type can be selected in the "Data Type Selection" screen displayed by clicking [...] in the "Data Type" column on each label editor as well as the direct input.

There are three kinds of data types: "Simple Types", "Structured Data Type", and "Function Block". A data type that can be selected differ.

An array can be set for the selected data type.

For details on the data types, structures, and arrays, refer to the following manuals.

MELSEC iQ-R CPU Module User's Manual (Application)

MELSEC iQ-F FX5 Programming Manual (Program Design)

■Simple types

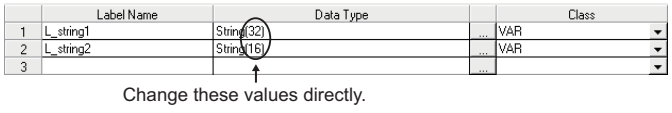
Data types that can be set for each label are as follows.

○: Available, ×: Not available

Data type	Standard label	Safety label	Standard/safety shared label
Bit	○	○	○
Word [Unsigned]/Bit String [16-bit]	○	○	○
Double Word [Unsigned]/Bit String [32-bit]	○	○	○
Word [Signed]	○	○	○
Double Word [Signed]	○	○	○
FLOAT [Single Precision]	○	×	×
FLOAT [Double Precision]	○	×	×
Time	○	○	○
String	○	×	×
String [Unicode]	○	×	×
Pointer	○	×	×
Timer	○	○	○
Counter	○	○	○
Long Counter	○	×	×
Retentive Timer	○	○	○
Long Retentive Timer	○	×	×
Long Timer	○	×	×

Point

The data length for the String or String [Unicode] type can be changed by editing the value in "( )" directly.



The initial value of the data length for the String or String [Unicode] type can be set in the option setting.

• [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Data Type Setting"

When "( )" is deleted from the name for the String or String [Unicode] type, the data length in the option described above is regarded as being set.

■Structure

When specifying a structure data as a data type, creating a definition of the structure is required in advance. (☞ Page 167 Creating a defined structure)

After creating a defined structure, specify the structure name in "Data Type".

■Function block

When specifying a function block data as a data type, creating a function block is required in advance.

For details, refer to the following section.

☞ Page 317 Creating a Function Block

After creating a function block, specify the function block name in "Data Type".

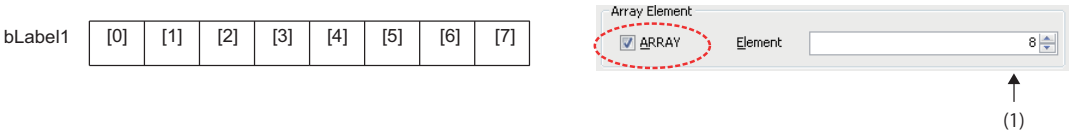
■Setting arrays for data type

Select "ARRAY", and enter the number of elements.

Ex.

Setting example for a one-dimensional array

■To set a bit type array whose number of elements is 8



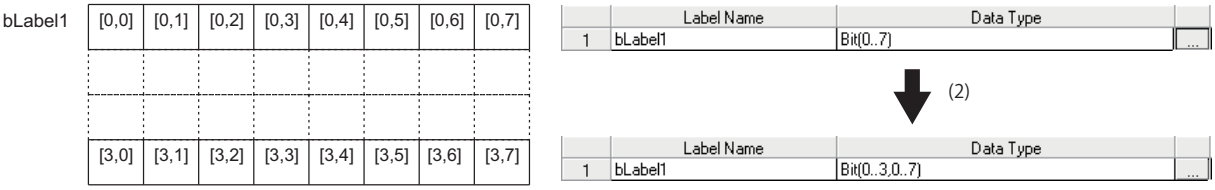
(1): Set '8'.

Ex.

Setting example for a two-dimensional array and a three-dimensional array

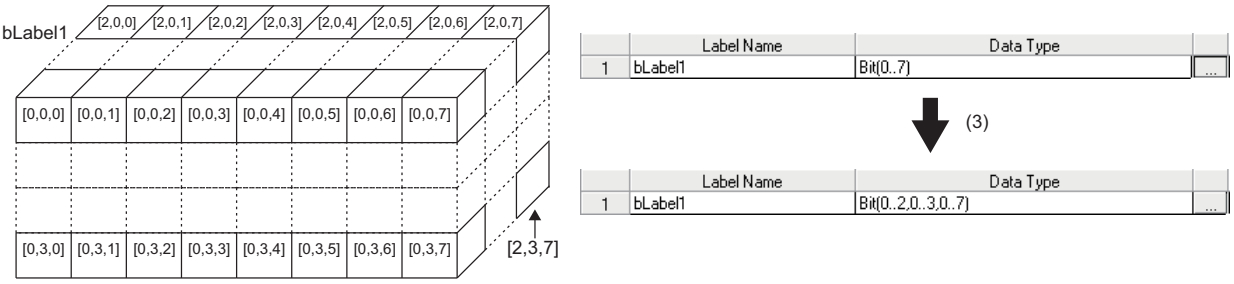
After creating a one-dimensional array, the number of dimensions can be changed to two-dimension or three-dimension by modifying the number of elements in a bracket.

■To change a bit type array to a two-dimensional array whose number of elements is 4 × 8



(2): Bit (0..7) → bit (0..3,0..7)

■To change a bit type array to a three-dimensional array whose number of elements is 3 × 4 × 8



(3): Bit (0..7) → bit (0..2,0..3,0..7)

Point

A value other than '0' (minus value, for example) can be specified as an offset ([array start value]...[array end value]).

	Label Name	Data Type		Class
1	Initial Setting_A	Bit(-5..2)	...	VAR_GLOBAL
2	Initial Setting_B	Bit(2..6)	...	VAR_GLOBAL
3	Initial Setting_C	String(32)	...	VAR_GLOBAL

Class

Select a class from the pull-down list of "Class".

Safety global labels, standard/safety shared labels, local labels of a safety program, and local labels of a safety FB do not support latch type classes ('RETAIN' is included in a name).

For details on the classes, refer to the following manuals.

MELSEC iQ-R CPU Module User's Manual (Application)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Assignment (devices/labels)

Set this item when assigning an arbitrary device or label to a global label.

Devices and labels that can be assigned vary depending on the assignment target label.

The following devices and labels can be assigned for the global label.

- Digit-specified bit devices (example: K4M0)
- Bit-specified word devices (example: D0.1)
- Module labels

However, a device name with a device type specifier suffixed (D0: U, for example) cannot be assigned.

If do not assign a device/label to the label, a label memory is assigned instead. For details on the label memory, refer to the following manuals.

MELSEC iQ-R CPU Module User's Manual (Application)

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

■Safety project

Devices and labels that can be assigned vary depending on the assignment target label.

○: Can be assigned, ×: Cannot be assigned

Global label to be assigned	Assignment target				
	Standard device	Standard global label	Safety device	Safety global label	Standard/safety shared label
Standard global label	○	○	×	×	×
Safety global label	×	×	○	○	×
Standard/safety shared label	×	×	×	×	○

Precautions

- When specifying a timer or counter device to "Assign (Device/Label)", the assigned device is regarded as a contact (TS, STS, CS) if a bit type device is specified to "Data Type".
  When the data type is a word type, the specified device is regarded as a current value (TN, STN, CN).
- An assigned device may not be displayed automatically on a program editor when it is changed to another device. The change is applied to a program editor by converting any or all programs.
- For RCPU, when specifying the step relay(S) which does not specify a block No. (BL□) in "Assign (Device/Label)", the assigned label operates in the same way as the step relay(S) which does not specify a block No. (BL□). Therefore, the same labels operate differently depending on the location of use. For details on the step relay(S) , refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

■When data type is structure

A device can be assigned for each structure member in the "Structure Device Setting" screen displayed by clicking the "Detailed Setting" button.

(The color of "Detailed Setting" is displayed in pink when no setting exists, and is displayed in blue when the settings have been done.)

When structure array is set for the data type of a label, a device can be assigned to the member of every elements in the structure array with a specific interval by specifying "Structure Array Offset Value" in the "Structure Device Setting" screen.

When '0' is entered for "Structure Array Offset Value", a device assigned to the head of the member of the element is assigned to all the members of the element.

Precautions

If a structure member is changed after assigning devices to the structure member, the assignment status of devices may be changed.

In that case, assign devices to the structure member in the "Structure Device Setting" screen or in the extension display area in the label editor.

Initial value

Set an initial value to the label.

However, if a device is assigned to a global label, the label does not operate with the initial value of the label.

The availability of initial values differs depending on the data types and classes.

The entry method of an initial values is the same as that of the constants of labels. For details, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

In addition, the initial values of safety global labels, local labels for a safety program, and standard/safety shared labels cannot be set.

FX5CPUs do not support it.

■Applicable range

Initial values of labels will be set when the CPU module is at STOP to RUN. If the values of labels are changed by program, the program operates with the changed initial values.

■Initial values of label of which data type is array

Different initial values for the respective array elements cannot be set. When setting the different values for each array, set the initial value by program.

Constant

Constant can be set when "VAR_GLOBAL_CONSTANT" or "VAR_CONSTANT" is specified to the class.

The availability of the constants differs depending on the data type and class.

For details on how to enter the constants, refer to the following manuals.

MELSEC iQ-R CPU Module User's Manual (Application)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Comment

Append a comment to the defined labels.

When entering comments on the label editor, press the Ctrl + Enter keys to insert a line feed (two characters are used) in a cell.

Two or more comments can be set for one label. Set the display settings of the multiple comments on the "Multiple Comments Display Setting" screen.

For details, refer to the following section.

☞ Page 66 Comment Display Setting

■Copying device comments

The comment of the device assigned to the selected label can be copied to the label editor.

Operating procedure

Select [Edit] ⇨ [Copy Device Comment] ( ).

Accessing from external devices

Select this to monitor devices/labels from external devices connected to a CPU module.

If the selection status of "Access from External Device" is changed, the change will not be reflected to the assigned devices/labels.

An error occurs when accessing from an external device to the CPU module in any of the following condition.

- Data type is pointer type/FB
- Class is "VAR_GLOBAL_CONSTANT"
- Index-modified devices

This setting is not available for safety global labels nor standard/safety shared labels.

FX5CPUs do not support it.

Creating a defined structure

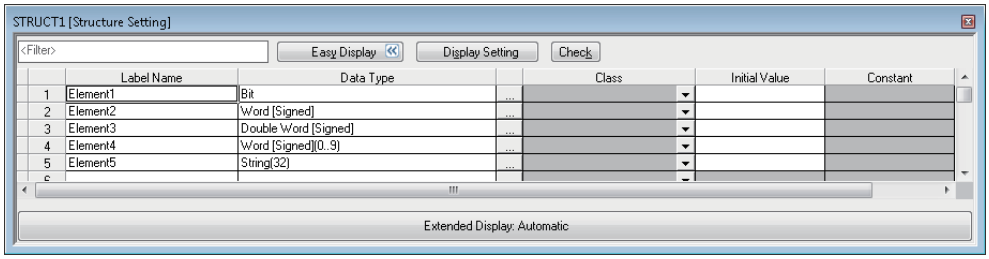
A structure member can be added to a structure definition.

Up to 5120 structure members can be added.

Be sure to create data of a defined structure in advance. (☞ Page 108 Creating data)

Window

"Label" ⇨ "Structured Data Types" ⇨ "(structure)" in the "Navigation" window



- Click the [Display Setting] button to select the items to be displayed.
- Click the [Check] button to check errors before converting programs.

Importing/exporting files

Import/export the data of the label editor to/from a file.

Operating procedure

1. Open the label editor.
2. Select [Edit] ⇨ [Import File] ( )/[Export to File] ( ).

Formatting CSV files

The header titles (Class, Label Name, Data Type, etc.) of a label editor and a CSV file are linked.

- The data of which header title matches with that of the CSV file is imported to the label editor. When excluding the specific data, delete the column from the CSV file.
- When importing the CSV file exported from GX Works3 with different language, edit the header title name of the CSV file to match to the header title displayed on the label editor of the import target GX Works3.
- The data can be imported even when the column order in CSV file does not match with that in the label editor.
- When "Access from External Device" is selected, '1' is output. As for it is not selected, '0' is output. When editing a CSV file, set '1' or '0'.

Point

The files exported from GX Works2 can be imported to GX Works3.
Before importing the CSV file exported from GX Works2, edit the header title name of the CSV file to match the header title on the label editor of GX Works3.

5.3 Registering Module Labels

This section explains the registration methods of module labels.

Registering to global label

The module label is registered when the module setting has been set as "Module Label: Use" on the confirmation screen displayed after performing either of the following operations.

- Place a module on the Module Configuration Diagram and fix the parameters.
- Add a new module in the "Navigation" window.

The registered module labels are displayed in "Global Label" in the "Navigation" window and in the [Module] tab in the "Element Selection" window.
When using a module label in a program, enter a module label name directly or drag and drop it from the "Element Selection" window.

Point

To use a module label under arbitrary name, set alias to the module label.

Precautions

■Considerations when registering module labels

Since all the registered module labels are written to a CPU module, the memory capacity of the CPU module may be exceeded. In this case, perform any of the following operations.

- Change the write target of the global labels to SD memory card.
- For FX5CPU, the writable capacity is the same as that of the CPU module even when data is written to an SD memory card.

■Module label with the name that starts with 'zReserve'

Do not write data to the module label with the label name that starts with 'zReserve' among the module labels. Doing so may cause malfunction of the programmable controller systems.

Ex.
'Instance name'_'Module number'.'Label name' GF11_1.zReserveAreaSB00007

Editing module labels

A module label (M+Global) which has been registered into the global label can only be deleted by selecting a row on the label editor.
Do not edit and add a label on the label editor.

Re-registering deleted module labels

When registering the module labels which are once deleted from the global label editor, select a module name displayed in the [Module] tab in the "Element Selection" window, then right-click it and select [Add Module Label] from the shortcut menu.

Editing structures

Once module labels are registered, the definitions of the structures in the module labels are registered into "Structured Data Types" in the "Navigation" window.
A defined structure can be copied in the "Navigation" window. The copied defined structure of the module label is changed from "+" to "_".

5.4 Registration of tag FBs

In a project used for an RnPCPU and an RnPSFCPU, tag FBs can be used in an FBD/LD program with the process control extension enabled.

To use tag FBs, they are required to be registered on the tag FB setting editor in advance.

Enter a tag name, tag FB type, and comment, then click the [Apply] button.

Up to 480 tag FBs can be registered in a project.

For details on tag FBs, refer to the following manual.

MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

Precautions

To use tag FBs, it is recommended to register and apply them on the tag FB setting editor before adding data of a program block, function block, function, global label, and structure definition.

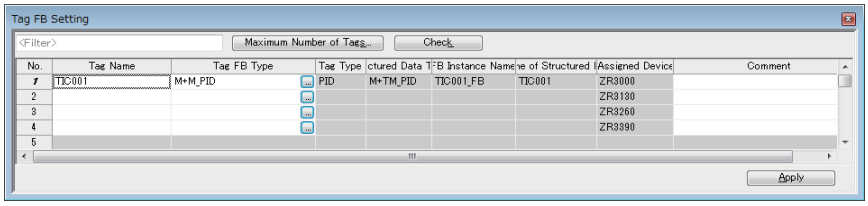
When a lot of data mentioned above is registered in a project, it may take time to apply the tag FB setting.

Configuration of the tag FB setting editor

The following shows the screen configuration of the tag FB setting editor.

Window

Click "Tag FB Setting" ( ) on the toolbar.



Displayed items

○: Editable, ×: Not editable

Item	Editability	Description
Tag Name	○	Enter a tag FB name.
Tag FB Type	○	Select the tag FB type of a tag FB instance.
Tag Type	×	The tag type of a tag FB instance is displayed.
Structured Data Type	×	A structure definition name of tag data is displayed.
FB Instance Name	×	A tag FB instance name is displayed.
Label Name of Structured Data Type	×	A tag data name is displayed.
Assigned Device	×	The following device is assigned. • The start device of a system resource + 3000 + ((row number -1)*130) Set the system resource in [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource"⇨ "File Register: ZR".
Comment	○	Enter a comment that is applied to a comment of a tag FB instance and tag data.

- The following option can be checked and set by clicking the [Maximum Number of Tags] button.
  [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "Tag FB" ⇨ "Maximum Number of Tags"
- Click the [Check] button to check an error before applying.

Editing a row

■Adding a row

A row can be added above a selected row. (Multiple selections allowed.)

Assigned devices in each tag FB setting is changed after the addition.

Operating procedure

Select [Edit] ⇨ [New Declaration (Before)]( ).

■Deleting a row

A selected row can be deleted. (Multiple selections allowed.)

Assigned devices in each tag FB setting is changed after the deletion.

Operating procedure

Select [Edit] ⇨ [Delete Row]( ).

■Copying a row

By clicking the [Apply] button after copying or cutting a row and pasting, the initial value of the FB property in the copy source is retained. However, it will not be retained if the tag FB type is changed after pasting.

■Setting an applicable/inapplicable row

The number of rows set in [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "Tag FB" ⇨ "Maximum Number of Tags" will be applicable and other rows will be inapplicable as follows:

- Applicable row: Included in checking and applying the tag FB setting
- Inapplicable row: Excluded from checking and applying the tag FB setting. In addition, the information cannot be edited.

The option can be checked and set by clicking the [Maximum Number of Tags] button on the tag FB setting editor.

■Filtering display

A wild card (such as '*' and '?') is not applied as a filtering condition. A character string including the wild card is displayed.

Entering information

Tag name

Set a name with avoiding the following conditions:

- A label name starting with a number
- A same label name as one for a device
- A label name including a unusable character (reserved word) (☞ Page 539 Unusable character string for label name)

Use only alphanumeric characters when monitoring data on a faceplate or exporting an assignment information database file.

Tag FB type

Select a tag FB in the "Select Tag FB Type" screen displayed by clicking the [...] button in the "Tag FB Type" column.

For details on manufacturer-defined tag FB types, refer to the following manual.

📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

For details on user-defined tag FBs, refer to the following section.

☞ Page 321 Creating a user-defined tag FB

Comment

Use only alphanumeric characters when monitoring data on a faceplate or exporting an assignment information database file.

Online program change

The following table shows whether to perform the online program change function and initialize data with change for tag FBs
○: Performed, ×: Not performed

Change for tag FBs		Online program change	Initialization
FB property	Changing an initial value	○	Not initialized
Tag FB setting	adding a tag FB	○	Initialized
	Changing a tag name*1	○	Not initialized
	Changing the tag FB type*1	×*2	—
	Changing a tag type*1	×*2	—
	Changing a declaration position*1	×*2	—
	Changing a comment*1	○	Not initialized
	Deleting the tag FB setting*1	○	Not initialized

*1 For change for an applied tag FB
*2 When changing data, all programs are required to be converted (reassigned).

Data to be added with tag FB registration

By applying the data after entering a tag name and selecting the tag FB type on the tag FB setting editor, the tag FB instance and tag data are created in "M+PTAG" under "Global Label".
The definition of a tag FB and the structure definition of tag data are added in the "Navigation" window as a read-only definition.

Ex.
When the tag name is 'TIC001' and the tag FB type is 'M+M_PID'

Data/definition to be added	Name	Location
Tag FB instance	TIC001_FB	"Label" ⇨ "Global Label" ⇨ "M+PTAG" in the "Navigation" window
Definition of a tag FB	M+M_PID	FB/FUN ⇨ (FB file name) in the "Navigation" window
Tag data	TIC001	"Label" ⇨ "Global Label" ⇨ "M+PTAG" in the "Navigation" window
Structure definition of tag data	M+TM_PID	"Label" ⇨ "Structured Data Types" in the "Navigation" window
Definition of a function block referred from tag FB	M+P_MCHG M+P_IN M+P_PHPL M+P_PID M+P_OUT1	FB/FUN ⇨ (FB file name) in the "Navigation" window

Precautions

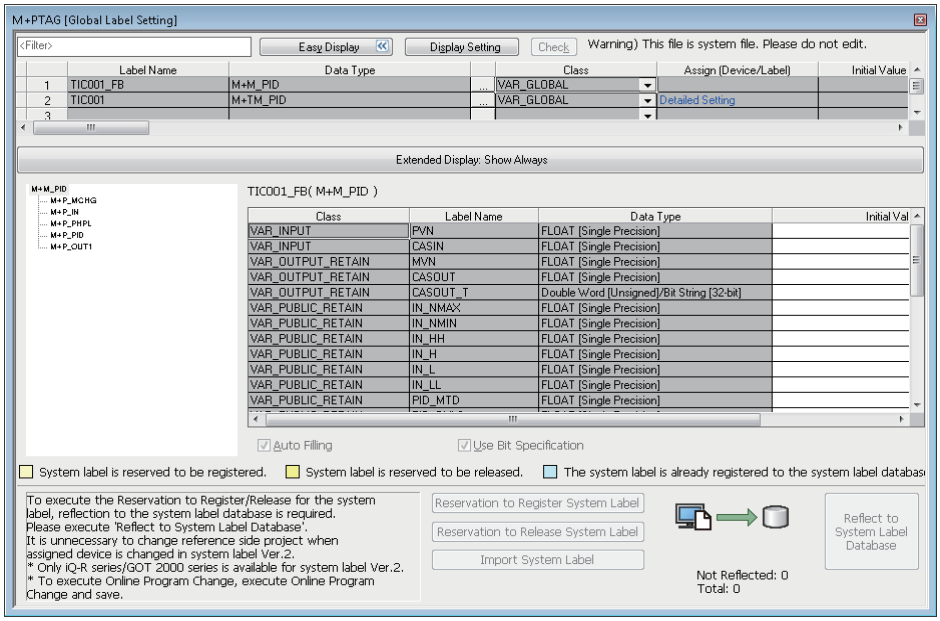
If the definition of a tag FB, the structure definition of tag data, and the definition of a user-defined tag FB are deleted in the "Navigation" window, the project may be incorrect.
Before deleting the definition of a tag FB, the structure definition of tag data, and the definition of a user-defined tag FB, search a project for an FB definition name and a structure name by using the character string search function to check that they are not used.

Tag FB instance and tag data registered in "M+PTAG"

Only the initial value can be set for a tag FB instance registered in the global label setting "M+PTAG".

Window

"Label" ⇨ "Global Label" ⇨ "M+PTAG" in the "Navigation" window



Precautions

Do not delete "M+PTAG" from a project.

Display/setting an FB property

The initial value of a tag FB instance can also be set in the "FB Property" window.

The display contents in the "FB Property" window is linked with the contents in the selected row on the FB setting editor.

For details on the "FB Property" window, refer to the following section.

☞ Page 233 Display/setting an FB property

In the "FB Property" window, the initial value of a tag FB instance which has already been applied on the tag FB editor is displayed. A tag FB which is not applied, excluded from applying, or for which setting contents are changed after application is not displayed.

5.5 Registering System Label

This section explains the method to register global labels as system labels.
Only standard global labels support system labels.

System label

Using the system labels controlled by MELSOFT Navigator enables programming with the same label names among the iQ Works supported products (GX Works3, MT Developer2, GT Designer3).
Once a workspace is saved with MELSOFT Navigator, a database to manage system labels is created in the workspace.
System labels cannot be used in a workspace without the system label database.

Precautions

Since module labels are read only, they cannot be registered as system label.

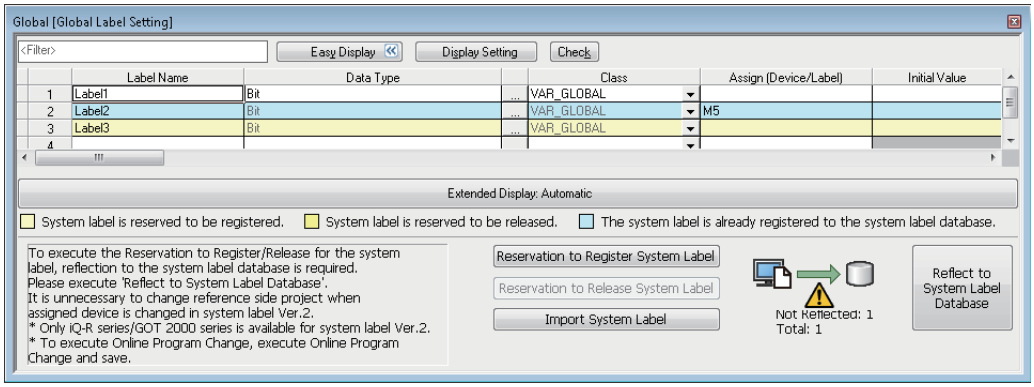
System label version

There are two types of system labels for MELSOFT Navigator: system label ver.1 and system label ver.2.
FX5CPU only supports system label ver.1.
For more details on the differences between system label ver.1 and system label ver.2, and creation methods of each system label database, refer to MELSOFT Navigator Help.

Configuration of label editor

Window

"Label" ⇨ "Global Label" ⇨ "(global label)" in the "Navigation" window



Displayed items

Item	Description
System Label Relation	Displays the relation between the global label and the system label. • Disclose: The status in which the global labels are open as the system labels • Reference: The status in which the system labels opened by other projects are imported in the global labels • Blank: The status in which the global labels is not related to the system labels
System Label Name	Displays the system label name related to the global labels.
Attribute	Displays the attribute of the system label which is related to the global labels.

Registering labels in system label database

Disclose standard global labels created with GX Works3 as system labels.
When registering in the system label database at the first time, create a workspace with MELSOFT Navigator and save projects of GX Works3 in the workspace in advance.

Operating procedure

1. Display the global label editor.
2. Select the labels to be registered as system label, and click the [Reservation to Register System Label] button.
3. Click the [Reflect to System Label Database] button.

The "Check before registering in system label data base" screen is displayed.

4. Check the list of labels to be registered, and click the [Register] button.

Precautions

The structure array type global labels for which "Structure Array Offset Value" has been set cannot be registered as system labels.

Importing system labels in system label database to GX Works3

Import the system labels registered with MELSOFT Navigator or other projects to a project.

Operating procedure

1. Display the global label editor.
2. Click the [Import System Label] button.

The "Import System Labels to Project" screen is displayed.

3. Select the system labels to be imported, and click the [Import] button.

Releasing system labels

Release the relation with the system label database, and restore system labels to normal global labels.

Operating procedure

1. Display the global label editor.
2. Select the labels of which relation is to be released from the labels registered as system labels.
3. Click the [Reservation to Release System Label] button.
4. Click the [Reflect to System Label Database] button.

The "Check before registering in system label data base" screen is displayed.

5. Check the list of labels to be released, and click the [Register] button.

Verifying system label information

Compare the system label information of GX Works3 projects to the system label database, and check if there is any difference.
If differences exist, correct the system label information of the GX Works3 projects, and synchronize the information with the system label database.

Operating procedure

1. Select [Edit] ⇨ [System Label] ⇨ [Execute Verification Synchronous with System Label].
2. Check and correct information on the "Execute Verify and Synchronize with system label" screen.
3. Click the [Reflection] button.

Importing the changes of system label database

Import the changed contents to the GX Works3 projects when the system labels used in a project have been changed in other projects.

Importing the changes automatically

Operating procedure

Click the [Yes] button on the message to confirm whether or not import the changed contents, which appears when any of the following operations is performed in a state where a system label change notification has been received.

- Opening a project
- Saving a project
- Reflecting labels to system label database
- Displaying the "Online Data Operation" screen
- Starting the Simulation function

Click the [No] button to import them after checking the changed contents. (☞ Page 175 Importing after checking the changes)

Importing after checking the changes

When the system label information in the GX Works3 projects is different from the system label database, the icon to notify the changes is displayed at the lower-left corner of the GX Works3 screen.
Check the contents that have been changed when the icon is displayed. In addition, import the changed contents to the GX Works3 projects.

Operating procedure

1. Select [Edit] ⇨ [System Label] ⇨ [Check the changes of the System Label Database]( ).
2. Check the information on the "Import Change Contents of System Label Database" screen.
3. Click the [Import] button.

MEMO

PART 3 PROGRAMMING

This part explains the functions of the editor to edit a sequence program and the settings of device memory/ device initial values.

6 CREATING PROGRAMS

7 SETTING DEVICE MEMORY

8 SETTING DEVICE INITIAL VALUES

9 SEARCHING DATA

10 SEGMENTING PROGRAMS

6 CREATING PROGRAMS

This chapter explains the creation method of a program.
Remote head modules do not support creating a program.

6.1 Programming Function

Features and types of programming language

The following table shows the programming languages supported by GX Works3.

Programming language	Name	Description	Creation method of a program	Language specification
Ladder*1	Ladder Diagram	A graphic language using ladder programs composed of contacts and coils. The inline structured text functions to edit ST programs on the ladder editor can be used.	Page 182 Creating a Ladder Program	📖MELSEC iQ-R Programming Manual (Program Design) 📖MELSEC iQ-F FX5 Programming Manual (Program Design)
ST	Structured Text	Control syntax such as selection branch by conditional syntax or repetitions by iterative syntax can be controlled, as in the high-level language such as C language. By using these syntax, concise programs can be written.	Page 217 Creating an ST Program	
FBD/LD	Function Block Diagram/Ladder Diagram	A graphic language for creating a control program only by placing and connecting an element.	Page 223 Creating an FBD/LD Program	
SFC*2	Sequential Function Chart	A graphic language for clarifying the execution order and the execution condition of a program.	Page 240 Creating an SFC Program	

*1 Safety programs are supported.
*2 FX5CPUs do not support it.

Features and the type of POUs

The following table shows the usable POUs in a program.

POU	Description	Reference
Function block	An element that has the internal memory and output an operation result according to values in the memory and the input value.	Page 317 Creating a Function Block
Function	An element that has no internal memory and output always the same operation result for an same input value.	Page 328 Creating a Function

Entering global devices/local devices

To use global devices and local devices individually, enter the devices as follows:

- Standard global device: Enter a device name (Example: D10)
  Safety global device: Prefix 'SA\' to the device name (Example: SA\D10)
- Standard local device: Prefix '#' to the device name (Example: #D10)
  Safety local device: Prefix 'SA\#' to the device name (Example: SA\#D10)

For details of the global device/local device, refer to the following manual.
📖MELSEC iQ-R CPU Module User's Manual (Application)
Note that FX5CPUs do not support local devices.

Entering global labels/local labels

When a label with the same name exists in both global labels and local labels, the label in a program is handled as follows:

- After a global label and a local label are registered, the label names are entered in the program: Treated as a local label.
- After a global label is registered, the label name is entered in the program, and then a local label with the same name is registered: Treated as a global label.
- After a local label is registered, the label name is entered in the program, and then a global label with the same name is registered: Treated as a local label.

The global labels and local labels can be distinguished by setting the different color on the "Color and Font" screen.

Creation procedure

1. Create data of a program block. (☞ Page 108 Creating data)
2. Set the execution order and the execution type. (☞ Page 180 Program Execution Order and Execution Type Settings)
3. Create a program. (☞ Page 182 Creating a Ladder Program, Page 217 Creating an ST Program, Page 223 Creating an FBD/LD Program, Page 240 Creating an SFC Program)
4. Check the created program. (☞ Page 276 Checking a program)
5. Convert the program. (☞ Page 279 Converting Programs)

6.2 Program Execution Order and Execution Type Settings

This section explains the setting method of the execution order and the execution type of a program.

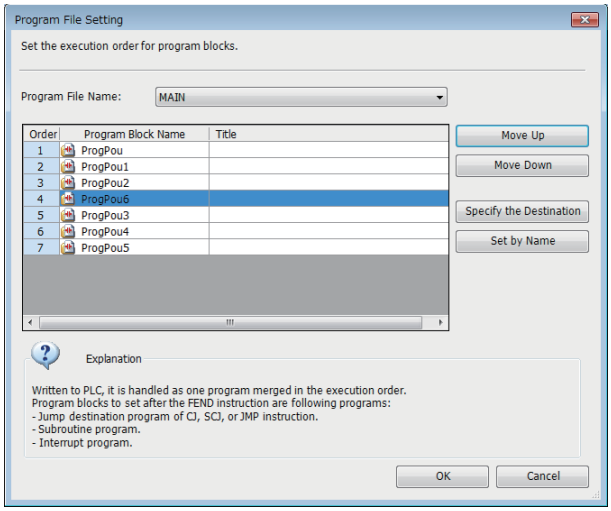
Program execution order setting

Set the execution order of program blocks in a program file.

An SFC program is executed according to the block numbers. Check the block numbers on an SFC block list.

Window

- [Convert] ⇨ [Program File Setting]
- Select a program file in the "Navigation" window, then right-click and select [Program File Setting] from the shortcut menu.



Operating procedure

1. Select a program file name.
2. Set an execution order of program blocks, then click the [OK] button.

Point

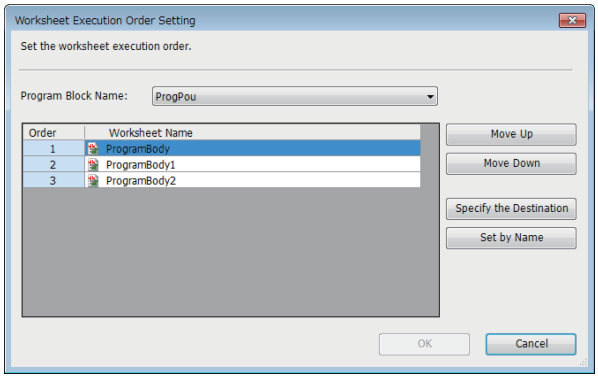
Program files can be sorted in the execution order specified in the program file setting. Select a file in the "Navigation" window, and right-click and select [Sort] ⇨ [Execution Order] from the shortcut menu.

Worksheet execution order setting

When multiple program bodies are included in a POU, the execution order of the program bodies can be set.
This setting is allowed to POUs used in an ST program and FBD/LD program.

Window

- [Convert] ⇨ [Worksheet Execution Order Setting]
- Select a POU in the "Navigation" window, then right-click and select [Worksheet Execution Order Setting] from the shortcut menu.



Operating procedure

1. Select a program body.
2. Set the execution order of programs, then click the [OK] button.

Point

Program bodies can be sorted in the execution order specified in the worksheet execution order setting.
Select a POU in the "Navigation" window, and right-click and select [Sort] ⇨ [Execution Order] from the shortcut menu.

Program execution type change

One of the following execution types can be specified to a program: Initial, Scan, Fixed Scan, Event, Standby, or No Execution Type.
For details, refer to the following manuals.
📖MELSEC iQ-R CPU Module User's Manual (Application)
📖MELSEC iQ-F FX5 User's Manual (Application)
Only 'Fixed Scan' can be specified in safety programs.

Setting method

To set the execution type, right-click on a target program in the "Navigation" window and select [Register Program] from the shortcut menu, or drag the program and drop it onto the target execution type.
The set execution type will be applied to "Program Setting" of "CPU Parameter".

Execution control of a process control program

There are two methods for executing the program: timer execution and interrupt execution.
For details, refer to the following manual.
📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

6.3 Creating a Ladder Program

This section explains the creation method of a ladder program.

Detailed specifications of a ladder program are described in the following manuals. Please read them in advance.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Point

The display format and detailed operation settings for each function can be set by setting the following option.

[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor"

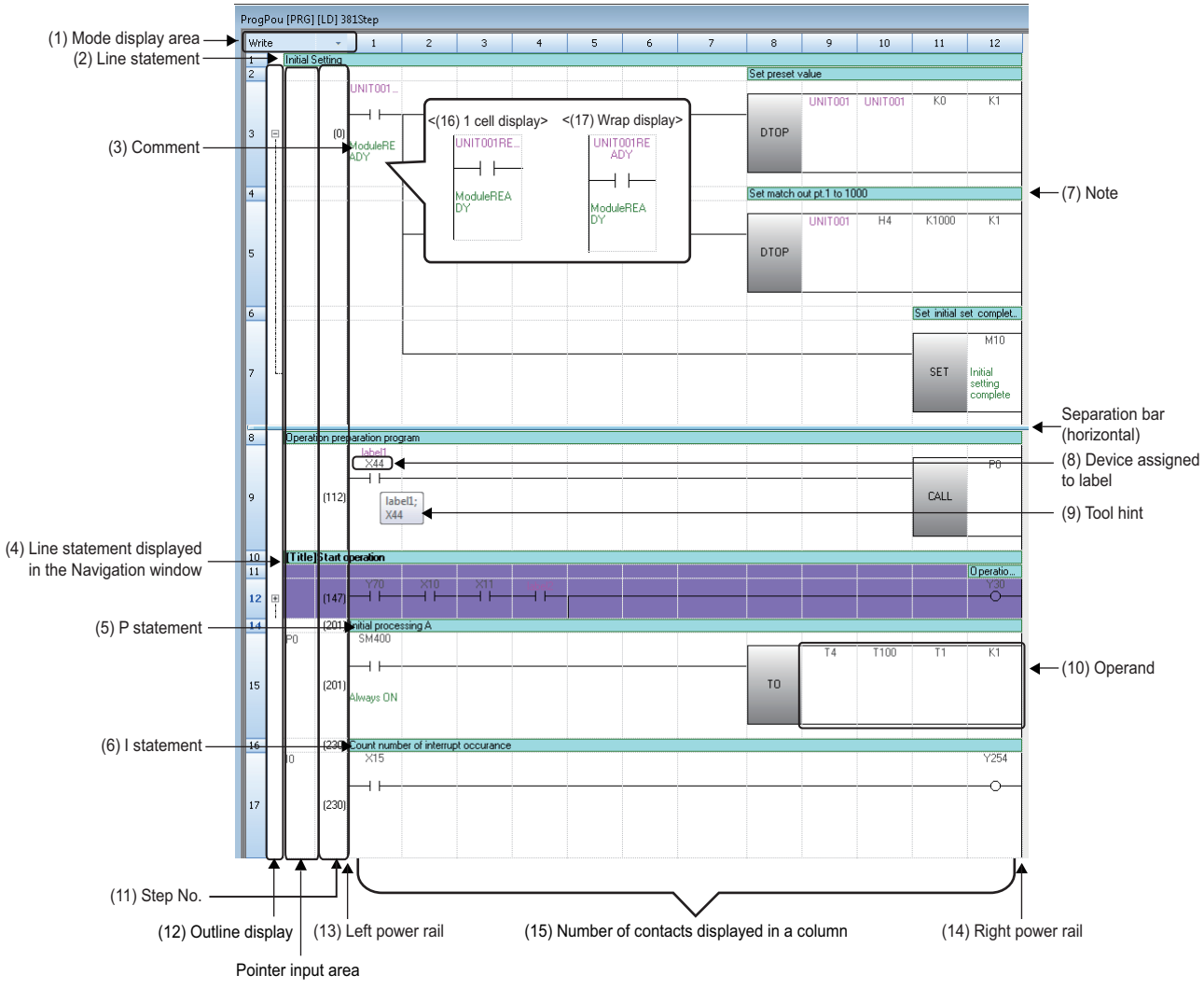
Configuration of the ladder editor

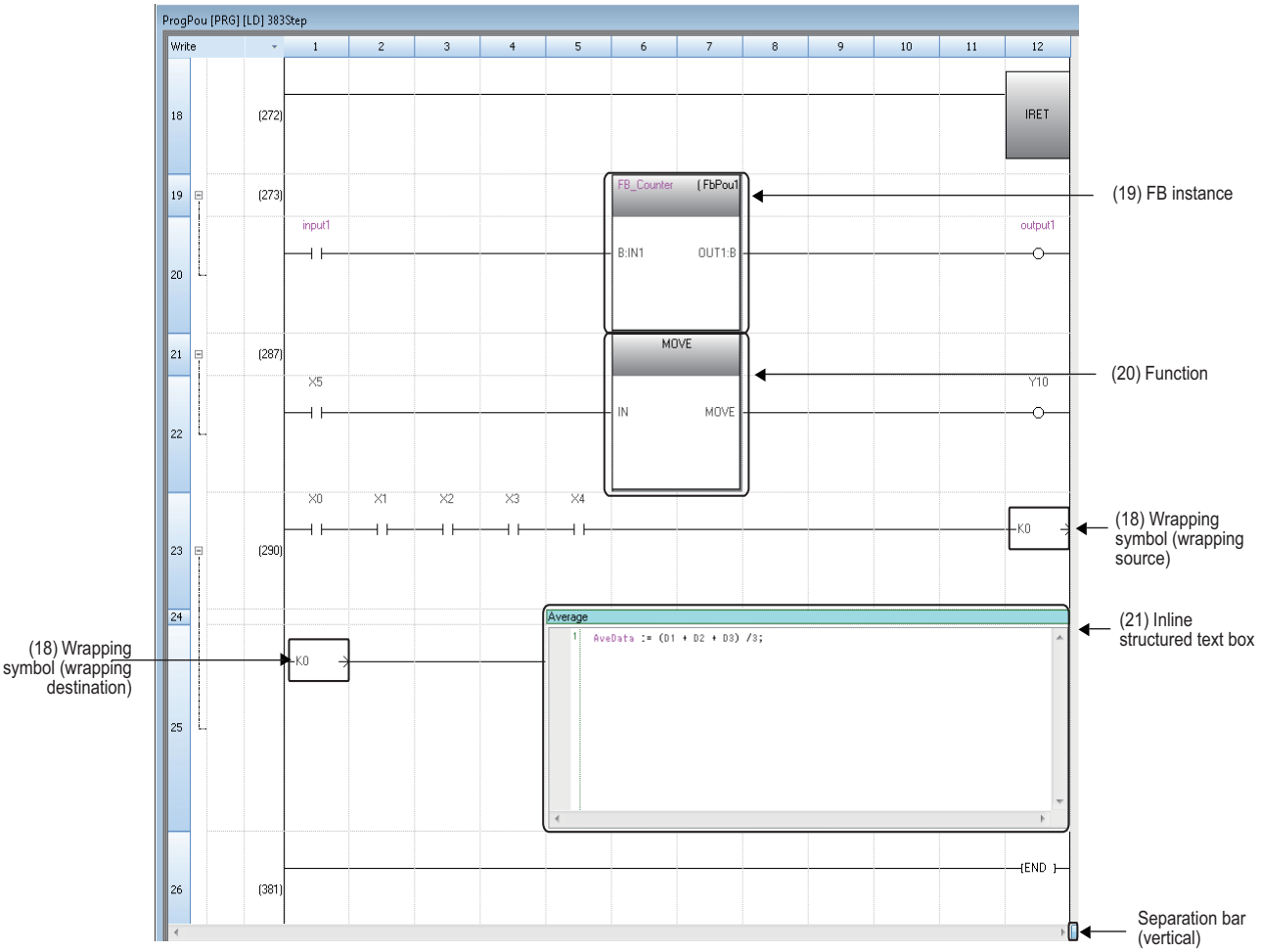
Window

"Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(program block)" ⇨ "ProgramBody" in the "Navigation" window

■Toolbar

■Ladder editor





Displayed items

Item	Description	Related operation
(1) Mode display area	An area that displays mode such as Write/Read/Write Mntr/Read Mntr.	■Switching mode ☞ Page 184 Read mode/Write mode/Monitor read mode/Monitor write mode
(2) Line statement	A comment that is appended to a ladder block.	■Entering elements ☞ Page 194 Entering comments/statements/notes ■Show/Hide [View] ⇨ [Comment Display]/[Statement Display]/[Note Display]
(3) Comment	A comment set to a device/label.	
(4) Line statement displayed in the Navigation window	A line statement that is displayed in the tree in the "Navigation" window.	
(5) P statement	A comment that is appended to a pointer number.	
(6) I statement	A comment that is appended to an interrupt pointer number.	
(7) Note	A comment that is appended to a coil/application instruction in the program.	
(8) Device assigned to label	A device assigned to a label. A label displayed on the ladder editor can be edited, searched and replaced. A device with any of the following conditions is not displayed. • A device that is assigned by converting the program • A device that is assigned to a label used for an array index • A device that is assigned to a structure type label	■Settings ☞ Page 157 Registering Labels ■Show/Hide [View] ⇨ [Display Device] ( )
(9) Tool hint	The information on device/label where the mouse cursor is placed over is displayed.	■Changing display contents [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Tool Hint"
(10) Operand	A value or label name/device name to be operated.	—
(11) Step No.	The start Step No. of a ladder block.	—

Item	Description	Related operation
(12) Outline display	A symbol that indicates the status (collapse/expand) of a ladder block.	■Show/Hide • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" • [View] ⇨ [Outline] ⇨ [Show/Hide of Outlines]
(13) Left power rail	The power rails of a ladder program.	—
(14) Right power rail		
(15) Number of contacts displayed in a column	The maximum number of cells which are occupied with contacts, coils, and instructions. When the maximum number of contacts is exceeded, the line will be wrapped automatically.	■Changing number of contacts [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format"
(16) 1 cell display	The rest of a device/label name is omitted by ellipses "..." in order for the name to be fit in one cell.	■Switching display [View] ⇨ [Change Display Format of Device/Label Name] ⇨ [1 Cell Display]/[Wrapping Ladder Display]
(17) Wrap display	A long device/label name is wrapped to be fit in one cell. If the label name still cannot be displayed in one cell, the rest of the name is omitted by ellipsis "...".	
(18) Wrapping symbols	The wrapping symbols are displayed at wrapping source and wrapping destination. The same numbers (serial numbers) are assigned to the wrapping source symbol and the wrapping destination symbol that are created in pairs. Wrapping symbols cannot be connected to the output circuits of an FB instance or a function.	—
(19) FB instance	An entity of a function block used in a ladder program.	■Insertion ☞ Page 187 Inserting function blocks
(20) Function	An entity of a function used in a ladder program.	■Insertion ☞ Page 191 Inserting functions
(21) Inline structured text box	An area that can edit ST programs on the ladder editor.	■Insertion ☞ Page 192 Inserting inline structured text

Point

Font color, background color, and font can be changed.
☞ Page 65 Checking and Changing Colors and Fonts

Read mode/Write mode/Monitor read mode/Monitor write mode

The program cannot be edited directly when the mode is switched to the Read mode/Monitor read mode.
However, performing any of the following operations changes the programs.

- The name of source function block is changed or the function block is deleted.
- Input/output labels of source function block are changed and converted.
- Devices/labels are replaced in a batch by specifying the whole project with the replacement function.

To prohibit editing the program, use the security function.

Point

- The mode can be changed from the pull-down list on the mode display area.
- When "No" is selected in the following option, the ladder editor can be edited directly same as the write mode in the read mode.
  [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))"

Entering ladders

This section explains the entering method of a ladder.

For details of ladder symbols, refer to the following manuals.

MELSEC iQ-R Programming Manual (Program Design)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Inserting contacts, coils, instructions, arguments

Operating procedure

■Inserting on the element entry dialog

Select a cell to enter or edit[*1], and double-click on it or press the Enter key. Then, enter an instruction and argument on the displayed element entry dialog[*2].

*1 For the "Insert mode" (press the Insert key to switch to the Overwrite mode), instructions are inserted on the cursor position. Therefore, if an instruction is already inserted in the selected cell, the existing instruction will be moved back.

*2 The cursor position on the ladder editor can be moved by pressing the Ctrl + ←/→/↑/↓ keys.
To select an instruction/argument, press the Alt+←/→ keys.
Options of instructions/labels are displayed by pressing the Ctrl+Space keys.

■Inserting from the "Enter Ladder" screen with description

Select an instruction[*1] and enter an argument on the "Enter Ladder" screen displayed by clicking the [Extd Dspl] button on the element entry dialog.

*1 Frequently used instructions can be registered as "Favorites" by right-clicking on the instruction and selecting [Add to Favorites] from the shortcut menu. After the addition, "Favorites" can be selected in the lowest cell of the pull-down list in "List".

■Inserting from the menu or on the toolbar

Select a cell to add an element on the ladder editor, then select [Edit] ⇨ [Ladder Symbol] ⇨ [(element)]. It can also be added by selecting the icon on the toolbar.

■Inserting from the "Element Selection" window

Select a contact, coil, or instruction displayed in the "Element Selection" window, then drag and drop it onto the ladder editor. After the insertion, edit the argument.

■Editing arguments directly

Select a cell where an argument is inserted, and press the F2 key to edit the argument.

■Displaying a global label entered by using an assigned device

By entering a device which was assigned as a global label to a program, the global label of the device can be displayed in the program.

Note that, only global labels whose data type is the simple type with no array can be displayed.

Enter an assigned device after changing the entering method by one of the following option, then the global label is displayed.

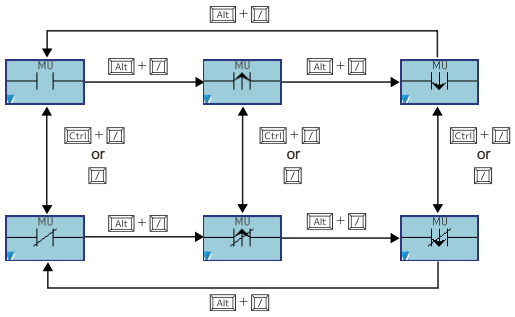
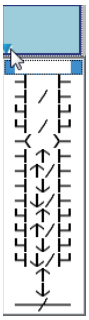
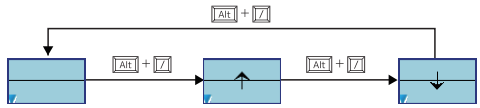
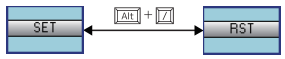
- [Edit] ⇨ [Edit Mode] ⇨ [Use Assigned Device for Label Input]()
- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Comment" ⇨ "Operational Setting" ⇨ "Use assigned device for label input"

Point

- A device number/label name can be incremented (+1)/decremented (-1) by pressing the Alt+↑/↓ keys.
- When inserting an instruction without entering an argument, '?' is displayed automatically. ('?' can be entered as an argument.
  Arguments can also be entered later.

■Switching methods for contacts/instructions

Select a contact/instruction to be switched, and select [Edit] ⇨ [Easy Edit] ⇨ [Switch Ladder Symbol Invert]/[Switch Pulse/Switch SET and RST Instruction] or follow the methods shown below.

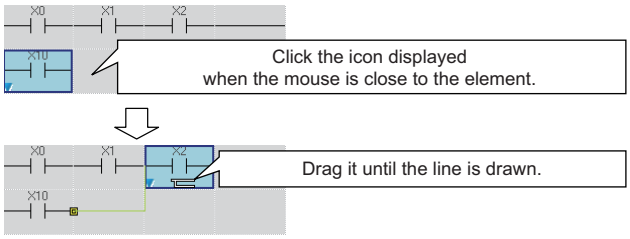
Switching contacts and instructions	Shortcut key	Pull-down list
Switching open/close contact, raising/falling pulse		Select a symbol from the pull-down list displayed when clicking the blue triangle at the bottom left in the cell.*1 
Switching operation result rising/falling pulse		
Switching SET/RST instructions		—

*1 Whether to enable or disable the ladder editing by mouse operation can be switched by setting the following option.
[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Enable the ladder editing by mouse operation"

Drawing a line

Draw a line in the program.

If a line has already been drawn, the line will be deleted.

Operation	Drawing a line
Drag and drop*1	
Keyboard	Ctrl + ←/→/↑/↓ keys
	Press the Ctrl + Shift + ←/→ keys to enter horizontal lines consecutively from a cursor position to the next contact/coil/line connection point.

*1 Whether to enable or disable the ladder editing by mouse operation can be switched by setting the following option.
[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Enable the ladder editing by mouse operation"

Inserting function blocks

Paste a function block as a part, and then name (FB instance name) and insert it into a sequence program.
For the creation method of a program in a function block, refer to the following section.
☞ Page 317 Creating a Function Block

Operating procedure

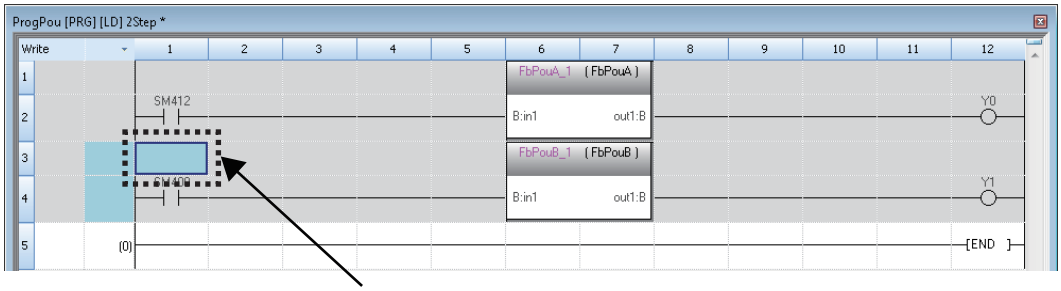
1. Drag a function block element in the "Navigation" window or "Element Selection" window and drop it onto an arbitrary cell in the sequence program.
2. Select the target label (local label or global label) in the pull-down list on the "FB Instance Name" screen, and enter an instance name.

When the function block is pasted, the FB instance name is automatically registered as a label on the selected label setting screen.

3. Connect the input and output to the FB instance.

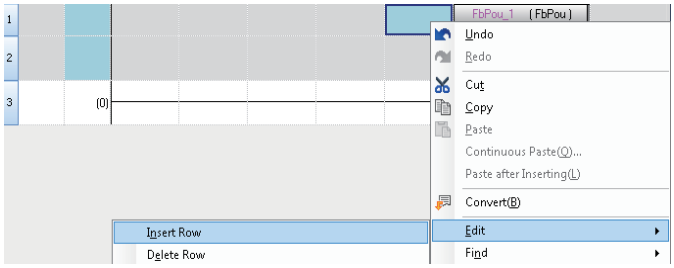
Point

- By entering 'fb.' in the element entry dialog, the options of function block elements are displayed. A function block element can be entered by selecting it from the options.
- To insert a function block between two consecutive FB instances, select [Edit] ⇨ [Insert Row] above the second FB instance first, and then insert the function block on the inserted row.



Place the cursor in the row on which the second FB instance exists, and insert a row.

- To insert a row above an FB instance, select the cell of a row where the FB instance name is displayed, and select [Edit] ⇨ [Insert Row].



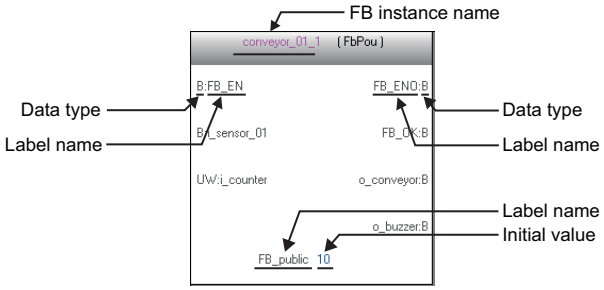
- To insert a row above an FB instance that is connected to an input argument or output argument whose data type is other than BOOL, change the data type of the argument to BOOL and insert a row, then change the data type to the original one.

Precautions

Pasting a function block to a sequence program causes the file size to increase.
Pasting the same function blocks to one sequence program repeatedly also causes the size increase of the sequence program in accordance with the number of pasted function blocks.

■Displaying FB instance

On the pasted FB instance, label names of I/O variables and their corresponding data types are displayed.



Each data type is displayed as follows:

Data type	
B	Bit
UW	Word [Unsigned]/Bit String [16-bit]
UD	Double Word [Unsigned]/Bit String [32-bit]
W	Word [Signed]
D	Double Word [Signed]
E	FLOAT [Single Precision]
L	FLOAT [Double Precision]
TM	Time
S	String
US	String [Unicode]
DUT	Structure

The initial values set on the label editor when creating FB program are also displayed. The initial values set to each FB instance are not displayed.

■Editing FB instance names

Operating procedure

1. Move the cursor on an FB instance.
2. Select [Edit] ⇨ [Edit FB Instance].
3. Enter a new FB instance name.

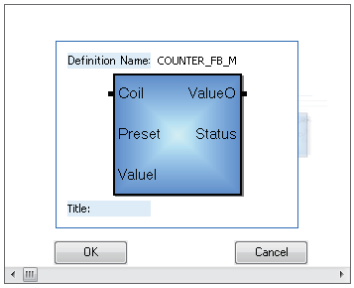
Point

- The name can be changed directly by moving the cursor on the FB instance and pressing the F2 key.
- The data of the function block can be edited directly by moving the cursor on the FB instance and pressing the / key.

■Replacing FB instances

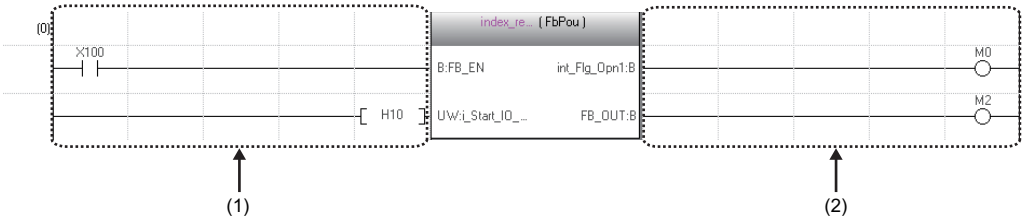
Operating procedure

1. Move the cursor on an FB instance.
2. Select [Edit] ⇨ [Change FB/FUN Data].
3. Scroll the displayed screen and select the function block to be replaced, and click the [OK] button.



■Creating input and output circuit parts of an FB instance

Create input circuits (1) and output circuits (2) of an FB instance pasted to a sequence program.



The number of cells occupied by input circuits or output circuits of an FB instance differs depending on the setting of the following option.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Display Connection of Ladder Diagram"

Setting of the number of displayed contacts	Number of cells in input circuit	Number of cells in output circuit
9 contacts	4 cells	4 cells
11 contacts	5 cells	5 cells
13 contacts	6 cells	6 cells
17 contacts	8 cells	8 cells
21 contacts	10 cells	10 cells
33 contacts	16 cells	16 cells
45 contacts	22 cells	22 cells

Instructions that exceed the number of cells occupied by input circuits or output circuits cannot be entered.
When instructions cannot be placed by changing the number of displayed contacts, the ladder block may not be displayed properly.

Operating procedure

1. Select [Convert] ⇨ [Convert] ( ).

The ladder block is converted, and lines are connected to the input and output labels of the FB instance.

2. Edit the input circuits.

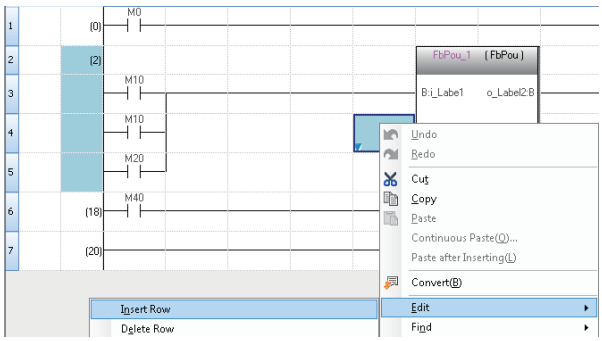
Enter an element to the input circuit in the same manner as creating normal ladder programs. Create a program in accordance with the data type of input variable.

3. Enter elements to the output circuit in the same manner as the input circuit.

Edit the program other than function blocks as well. After complete editing, convert the program.

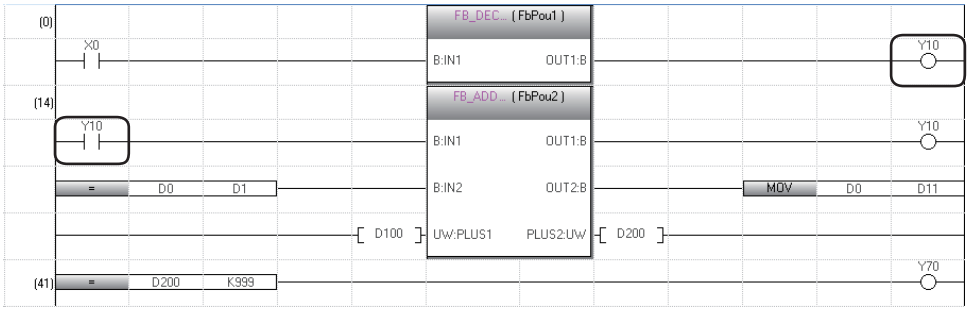
Point

A parallel circuit can be created in a input circuit on a FB instance.
To add an element between a parallel circuits, select a cell under the second row in the input circuit as shown below, and select [Edit] ⇨ [Insert Row] to enter an element in the added row.



■Considerations for using function block

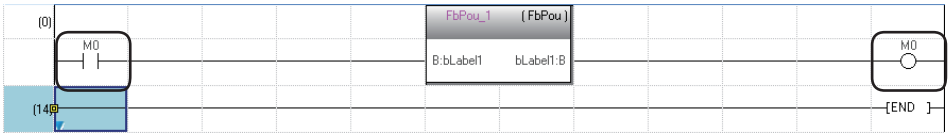
- A single function block can be pasted to a single ladder block.
  The output of an FB instance cannot be directly connected to the input of another FB instance.
  When connecting function blocks each other, use a coil to initially receive the output of a single function block, and then connect the contact of the coil to the input of the other function block.



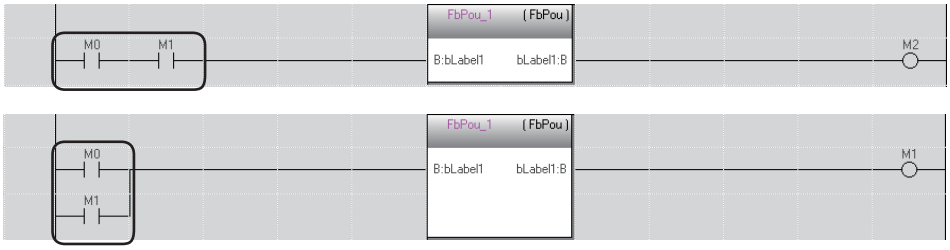
- When the label settings of a function block is changed, convert the program or all programs.

■Considerations for using function block that the class of label is "VAR_IN_OUT"

- If the version of GX Works3 is 1.011M or earlier, use the same device/label to both the input and output which are connected to the label of 'VAR_IN_OUT' ,otherwise, the program does not execute properly.



- The subroutine type function blocks that the devices/labels for the input and the output connecting to the label of 'VAR_IN_OUT' are not same, the verification result is mismatched. It is due to the difference of the version of GX Works3 which was used for converting all programs (version 1.011M or earlier, and version 1.015R or later). In that case, convert all programs using the same version of GX Works3.
- For GX Works3 version 1.015R or later, a conversion error occurs when one or more instructions or coils are set to the left side of "VAR_IN_OUT" of a function block.



■Consideration when an FB instance is connected directly to the left power rail

In the input circuit of an FB instance, if an EN or input variable (bit type) is directly connected to the left power rail, the ON/OFF state will not be changed.

To change the ON/OFF status of an EN and input variable (bit type), use a contact or an instruction equivalent to a contact.

Inserting functions

Insert a function in a ladder program.

For the creation method of a function, refer to the following section.

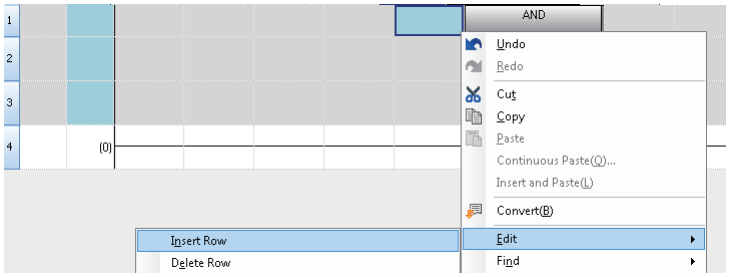
☞ Page 328 Creating a Function

Operating procedure

1. Drag a function element in the "Navigation" window or "Element Selection" window and drop it onto an arbitrary cell in the sequence program.
2. Connect an input and an output to the function.

Point

- By entering 'fun.' in the element entry dialog, the options of function elements are displayed. A function element can be entered by selecting it from the options.
- To insert a row above a function, select the cell of a row where the function name is displayed, and select [Edit] ⇨ [Insert Row].



- To insert a row above a function that is connected to an input argument or output argument whose data type is other than BOOL, change the data type of the argument to BOOL and insert a row, then change the data type to the original one.

■Adding/deleting arguments

Only for a function of which the number of arguments can be changed, an argument can be added/deleted.

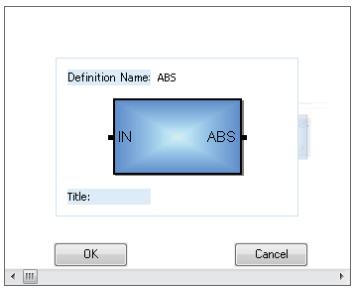
Operating procedure

1. Move the cursor on a function.
2. Select [Edit] ⇨ [I/O Argument] ⇨ [Increment Argument] ( )/[Delete Argument] ( ).

■Replacing functions

Operating procedure

1. Move the cursor on a function.
2. Select [Edit] ⇨ [Change FB/FUN Data].
3. Scroll the screen and select the function block to be replaced, and click the [OK] button.



Inserting inline structured text

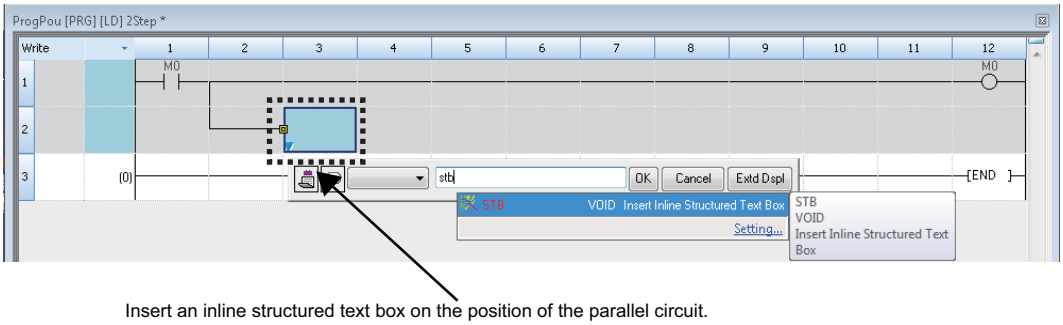
Inline structured text is a function to edit/monitor a program by creating an inline structured text box that displays an ST program, at the coil instruction area on the ladder editor.
With this function, a numeric value operation or a character string process can be created easily in the ladder program.
Up to 2048 characters can be entered in an inline structured text box. (Two characters are used as the line feed.)
Note that this function cannot be used in a safety program and a safety FB/FUN.

Operating procedure

Select [Edit] ⇨ [Inline Structured Text] ⇨ [Insert Inline Structured Text Box] ( ).
The editing method of the inline structured text program is the same as that of Structured Text. (☞ Page 219 Entering programs)

Point

- Enter 'STB' on the element entry dialog to insert an inline structured text box.
- When inserting inline structured text as a parallel circuit, draw lines for the parallel circuit first, and then insert the inline structured text box.



Insert an inline structured text box on the position of the parallel circuit.

Precautions

- Of the FB instance, function, and inline structured text box, only one can be placed in a single row.
- An inline structured text box cannot be connected to the input and output circuit parts of an FB instance or a function.
- The label of which data type is pointer cannot be used in the inline structured text.
- When a row including an inline structured text box is deleted, the whole ladder block is deleted.

■Instructions which do not run properly in an inline structured text program

The following instructions may not run properly in an inline ST program.

Instruction	
Contact instruction	LDP, LDF, ANDP, ANDF, ORP, ORF, LDPI, LDFI, ANDPI, ANDFI, ORPI, ORFI
Association instruction	MEP, MEF, EGP, EGF
Output instruction	OUT, OUTH, SET F, RST F, PLS, PLF, FF
Instruction with 'P'	□P(such as INCP and MOVP), SP.□, ZP.□, GP.□, JP.□, DP.□, MP.□
Other instructions	UDCNT1, UDCNT2, TTMR, STMR, RAMPQ, SPD, PLSY, PWM, MTR, SORTD(_U), DSORTD(_U), LEDR, DUTY, LOGTRG, LOGTRGR, TIMCHK, HOURM, DHOURM, PID, XCALL, SCJ

Pasting from each screen

Paste a label name/device name by dragging and dropping in an editor such as label editor and device comment editor.
By dragging and dropping a bit type label/device in a blank cell, a contact is inserted automatically and its label name/device name is displayed.
Additionally, when dragging and dropping a bit type label/device to the right end of the cell, a coil is inserted automatically and its label name/device is displayed.
A word type device/label can be pasted by dragging and dropping on the operand of an instruction.

Registering undefined labels

When an undefined label is entered, the "Undefined Label Registration" screen is displayed and it can be registered on the label editor.

Checking the duplicated coils

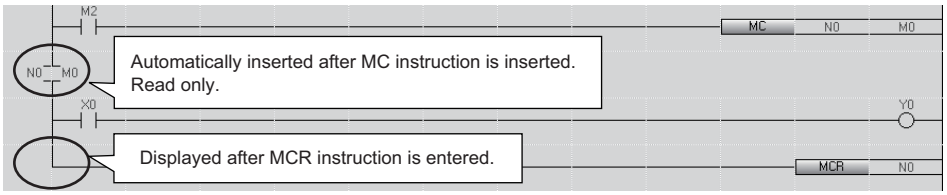
Check the duplicated coils in the same program when entering a coil in the program.
Whether to check the duplication can be set by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter Ladder" ⇨ "Operational Setting"

For the check target instructions/devices of duplicated coils, refer to the following section.
☞ Page 277 Check targets for duplicated coil

Displaying MC/MCR instructions

When the MC instruction is inserted to a ladder program, the double-line symbol is displayed on the left vertical line. As for MCR instruction, the left vertical line is delimited.



Entering comments/statements/notes

This section explains the basic operations for editing comments, statements, and notes.

Entering/editing comments

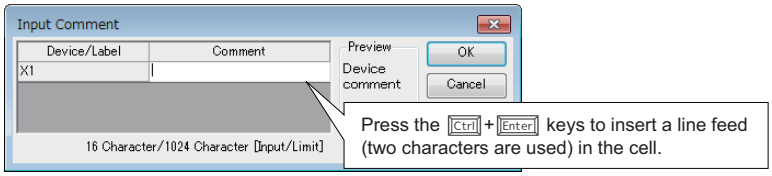
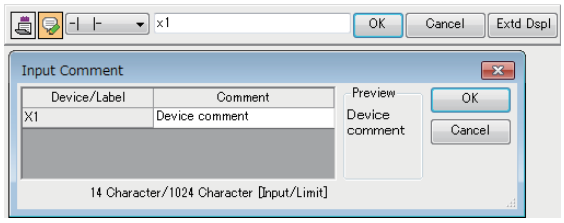
Enter or edit a device/label comment.

To check the entered comments on the ladder editor, change the setting to display comments.

- [View] ⇨ [Comment Display]

The device comments edited or added on the ladder editor are applied to the device comments set to the following option.

- [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target"

Entering/editing method	Operating procedure
On the "Input Device Comment" screen	1. Select [Edit] ⇨ [Documentation] ⇨ [Edit Device/Label Comment] ( ). 2. Select the cell and press the Enter key or double-click it. 3. Enter a comment in the "Comment" column.  After entering comments is completed, select [Edit] ⇨ [Documentation] ⇨ [Edit Device/Label Comment] ( ) again.
On the element entry dialog	1. Select a cell and press the Enter key. 2. Click on the element entry dialog and click the [OK] button. 3. Enter the comment to "Comment" column. 
With the keyboard	1. Display the comments. 2. Select the cell and press the F2 key twice. 3. Enter a comment directly.
From each editor	Label editor: ☞ Page 157 Configuration of label editor Device comment editor: ☞ Page 271 Creating device comments

Entering/editing statements

Add a comment to a ladder block using the statement (line statement, P statement, or I statement) in order to make the processing flow easy to understand.

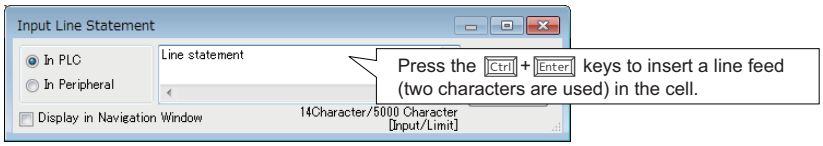
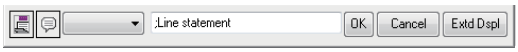
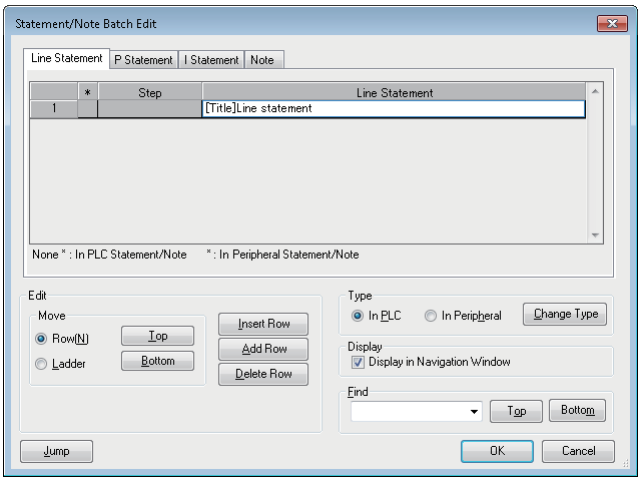
To check the entered statements on the ladder editor, change the setting to display the statements.

• [View] ⇨ [Statement Display]

For details on the statements, refer to the following manuals.

MELSEC iQ-R Programming Manual (Program Design)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Entering/editing method	Operating procedure
On the Enter Statement screen	1. Select [Edit] ⇨ [Documentation] ⇨ [Edit Statement] ( ). 2. Select the cell and press the Enter key or double-click it. 3. Enter a statement. Before entering P statement/I statement, select the cell of a pointer number or interrupt pointer number.  When "Display in Navigation Window" is selected, "[Title]" is added in front of the line statement. After entering statements is completed, select [Edit] ⇨ [Documentation] ⇨ [Edit Statement] ( ) again.
On the element entry dialog	1. Select a cell and press the Enter key. 2. Enter a statement after entering ';' for 'In PLC' and ';*' for 'In Peripheral'. When displaying a statement in the "Navigation" window, enter [Title] after ';' or ';*'. For P statement/I statement, enter a statement following the entry of the displayed pointer number or interrupt pointer number. 
On the "Statement/Note Batch Edit" screen	1. Select [Edit] ⇨ [Documentation] ⇨ [Statement/Note Batch Edit] ( ). 2. Enter a statement.  [Insert Row] button: Inserts a row above the cursor position. [Add Row] button: Inserts a row below the cursor position.
With the keyboard	1. Select the cell of a statement, and press the F2 key. 2. Enter a statement directly.

Precautions

';' cannot be prefixed to a line statement.

■Editing statements

After editing a statement, the same as when a ladder program is edited, the program will be in unconverted state.

If any statement is edited in an FB program body or FUN program body, a program part where the edited function block or function is used may also be in unconverted state.

For details on the conversion of a function block or function, refer to the following sections.

☞ Page 320 Converting function blocks

☞ Page 329 Converting functions

■Displaying a list

Line statements used in a ladder program are displayed in a list format.

The cursor is moved to a location, where the selected line statement is used, from the list.

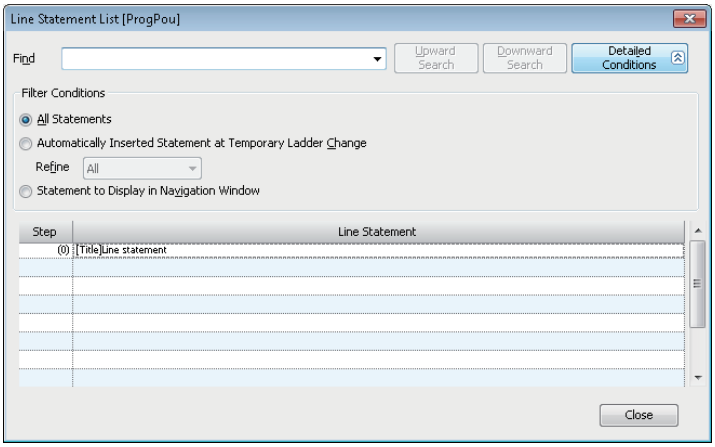
Only line statements inserted automatically with temporary ladder change can be displayed.

For details on temporary ladder change, refer to the following section.

☞ Page 202 Changing ladder blocks temporarily

Window

[Find/Replace] ⇨ [Line Statement List] ( )

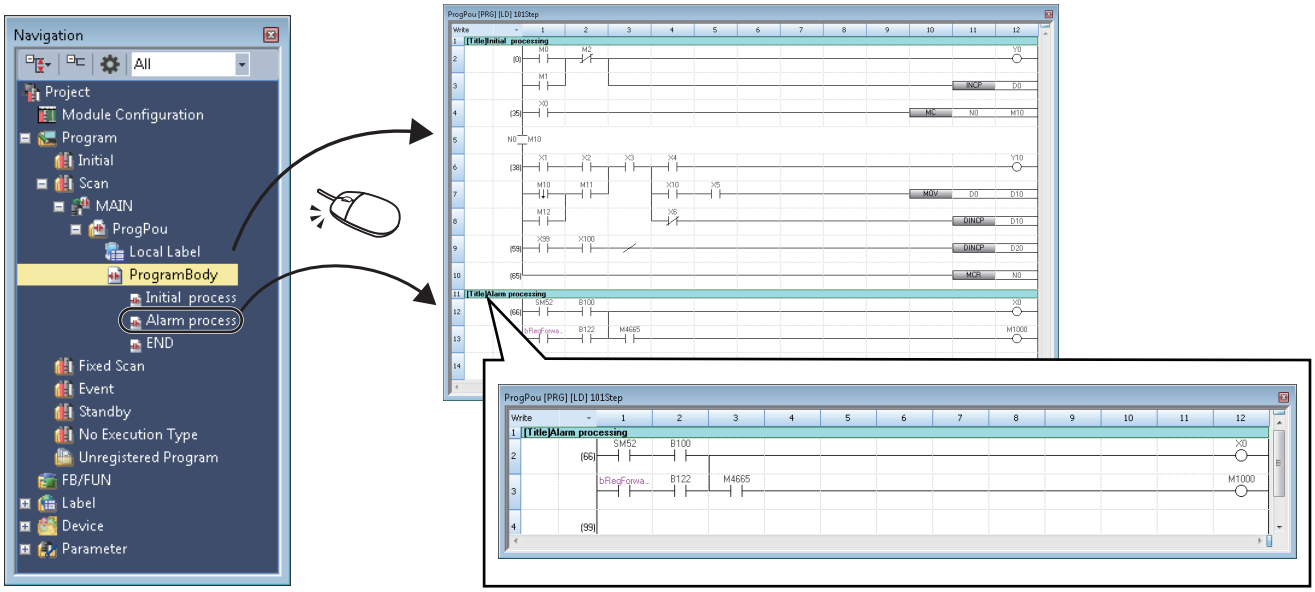


■Line statement to be displayed in the "Navigation" window

Select a line statement and select [Edit] ⇨ [Documentation] ⇨ [Show/Hide of Navigation Window] to switch showing or hiding the line statement in the "Navigation" window.

When copying/deleting a line statement displayed in the "Navigation" window, the range of ladder blocks from the ladder block including the selected line statement to the ladder block immediately before the next line statement displayed in the "Navigation" window is copied/deleted.

The cursor is moved to the corresponding ladder block by double-clicking the line statement in the "Navigation" window.



Entering/editing notes

Append a comment to coils/application instructions using Note in the program in order to make it easier to understand the content of program.

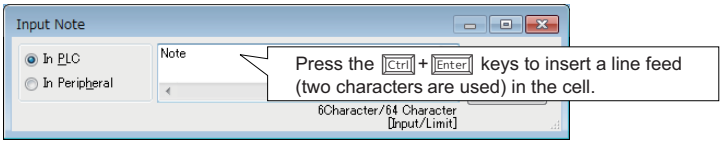
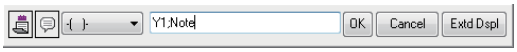
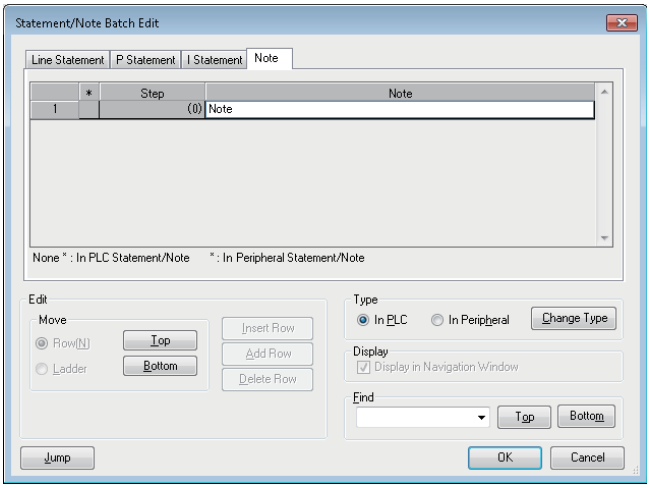
To check the entered notes on the ladder editor, change the setting to display the notes.

• [View] ⇨ [Note Display]

For details on the notes, refer to the following manuals.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Entering/editing method	Operating procedure
On the "Enter Note" screen	1. Select [Edit] ⇨ [Documentation] ⇨ [Edit Note] ( ). 2. Select the cell and press the Enter key or double-click it. 3. Enter a note.  After entering notes is completed, select [Edit] ⇨ [Documentation] ⇨ [Edit Note] ( ) again.
On the element entry dialog	1. Press the Enter key. 2. Enter notes following the displayed device/instruction after entering ';' for 'In PLC' and ';*' for 'In Peripheral'. 
On the "Statement/Note Batch Edit" screen	1. Select [Edit] ⇨ [Documentation] ⇨ [Statement/Note Batch Edit] ( ). 2. Enter a note. 
With the keyboard	1. Select the cell of a note, and press the F2 key. 2. Enter a note directly.

■Edit

After editing a note, the same as when a ladder program is edited, the program will be in unconverted state.

If any note is edited in an FB program or FUN program, a POU where the edited function block or function is used may also be in unconverted state.

For details on the conversion of a function block or function, refer to the following sections.

☞ Page 320 Converting function blocks

☞ Page 329 Converting functions

Inserting/deleting NOP instruction

Insert or delete a NOP instruction to adjust Step No. of a program.
The Step No. changed by the NOP instruction is applied to the ladder editor after converting the program.

Operating procedure

■Batch insertion

1. Select a cell to be insert.
2. Select [Edit] ⇨ [NOP Batch Insert].
3. Set the number of NOPs on the "NOP Batch Insert" screen and click the [OK] button.

■Batch deletion

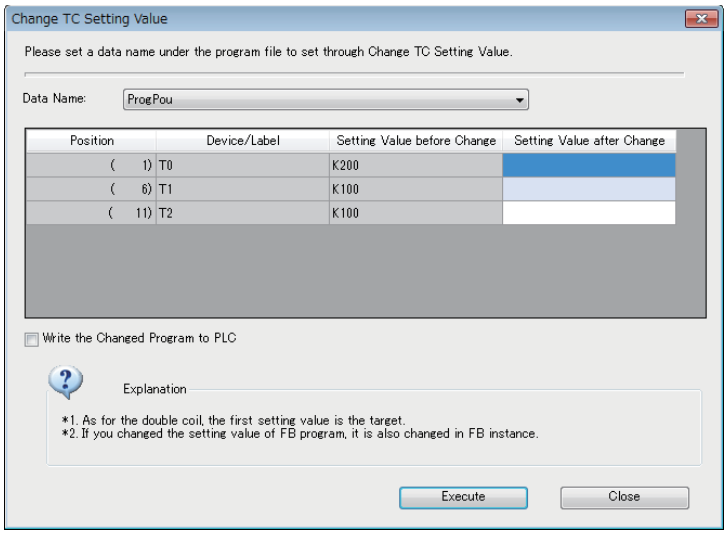
Select [Edit] ⇨ [NOP Batch Delete].

Changing TC setting values

The setting value of a timer and a counter used in a ladder program can be changed in a batch.
When a setting value is changed, the program will be in the unconverted state.
By selecting the checkbox of "Write the Changed Program to PLC", a program is converted after changing a setting value and the online module change function is performed.
An inline structured text of a ladder program is not supported.

Window

[Edit] ⇨ [Change TC Setting Value]



Operating procedure

1. Set the items on the screen.

When performing the online program change after changing the setting value, select the checkbox of "Write the Changed Program to PLC".

2. Click the [Execute] button.

Precautions

■When an error occurs during the online program change

The TC setting value of a program is changed but it is not written to a programmable controller.

■When specifying "MELSAP-L (Instruction Format)" for the display format of an SFC program

The TC setting value of an SFC (Zoom) cannot be changed in the following settings:

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Ladder Display Method"
- [View] ⇨ [Switch Ladder Display]

Targets for changing TC setting values

■Target instruction

The following shows the instructions that can be set on the "Change TC Setting Value" screen.

- OUT: Timer/retentive timer output, long timer/long retentive timer output, counter/long counter output
- OUTH: High-speed timer/high-speed retentive timer
- OUTHS: High-speed timer/high-speed retentive timer*1

*1 RCPUs do not support it.

■Target device

The following table shows the devices that can be set on the "Change TC Setting Value" screen.

Instruction argument	Device	Global device	Local device
Timer/counter/retentive timer	T, ST, LT, LST, C, LC, SA\T, SA\ST, SA\C	○	○
Setting value	D, SD, W, SW, Jn\W, Jn\SW, Un\G, U3En\G, U3En\HG, RD, R, ZR, K, FD, SA\D, SA\SD, SA\W	○	○

Copying/pasting a ladder

Cutting/coping

Select an instruction, range, or ladder block, and cut/copy it.

Select a row when copying a function/function block.

Pasting

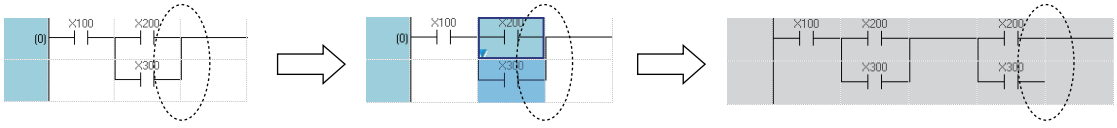
Paste a cut/copied ladder.

For 'Insert mode' (press the Insert key to switch to 'Overwrite mode'), one row will be inserted above the line where the cursor placed over and the copied ladder will be pasted.

Even in 'Overwrite mode', a row/column will be inserted automatically and the copied ladder will be pasted by selecting [Edit] ⇨ [Insert and Paste].

Precautions

If the range to cut/copy is selected on a ladder as shown below, the vertical line on the right side cannot be pasted.



In this case, draw a vertical line after the pasting.

Pasting device number/label name consecutively

Paste device numbers and label names that exist in the cut/copied ladder consecutively while incrementing the device numbers (+1).

The menu [Edit] → [Continuous Paste] is not available for pasting device names and label names onto the input/output circuit parts of a function/function block.

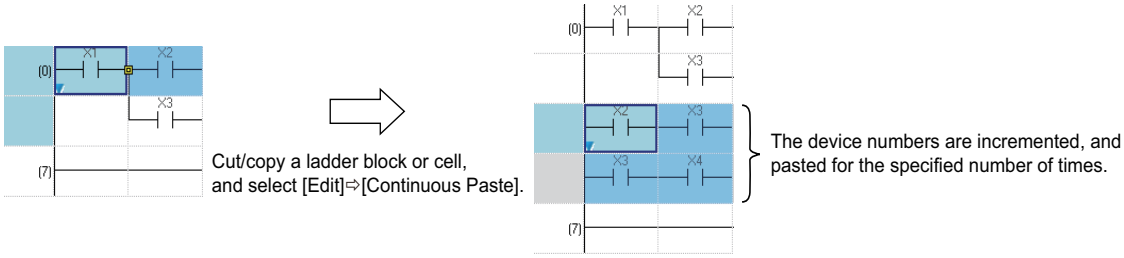
Operating procedure

1. Select [Edit] ⇨ [Continuous Paste].
2. Set each item on the "Continuous Paste" screen and click the [Execute] button.

Ex.

Set the following on the "Continuous Paste" screen.

Number of Continuous Pastings: 2, Increment Value: 1, Paste direction: Down



Returning ladder diagrams to the condition before editing

A ladder diagram being edited can return to the condition before starting editing.

Among the following operations, it returns to the operation that was performed just before editing the program.

- Opening a project
- Overwriting a project or saving a project with a new name
- Deleting a label
- Closing the ladder editor
- Converting a program

Operating procedure

Select [Edit] ⇨ [Revert to Start Editing Circuit].

Changing ladder blocks temporarily

Change the operation of specific ladder block temporarily. This function can be used to a ladder program belonging to the standard program (excluding a Zoom).
Using the Temporarily Change Ladders function, the program for debugging can be changed without losing the source program, therefore the debug process will be improved efficiently.
FX5CPUs do not support it.

Precautions

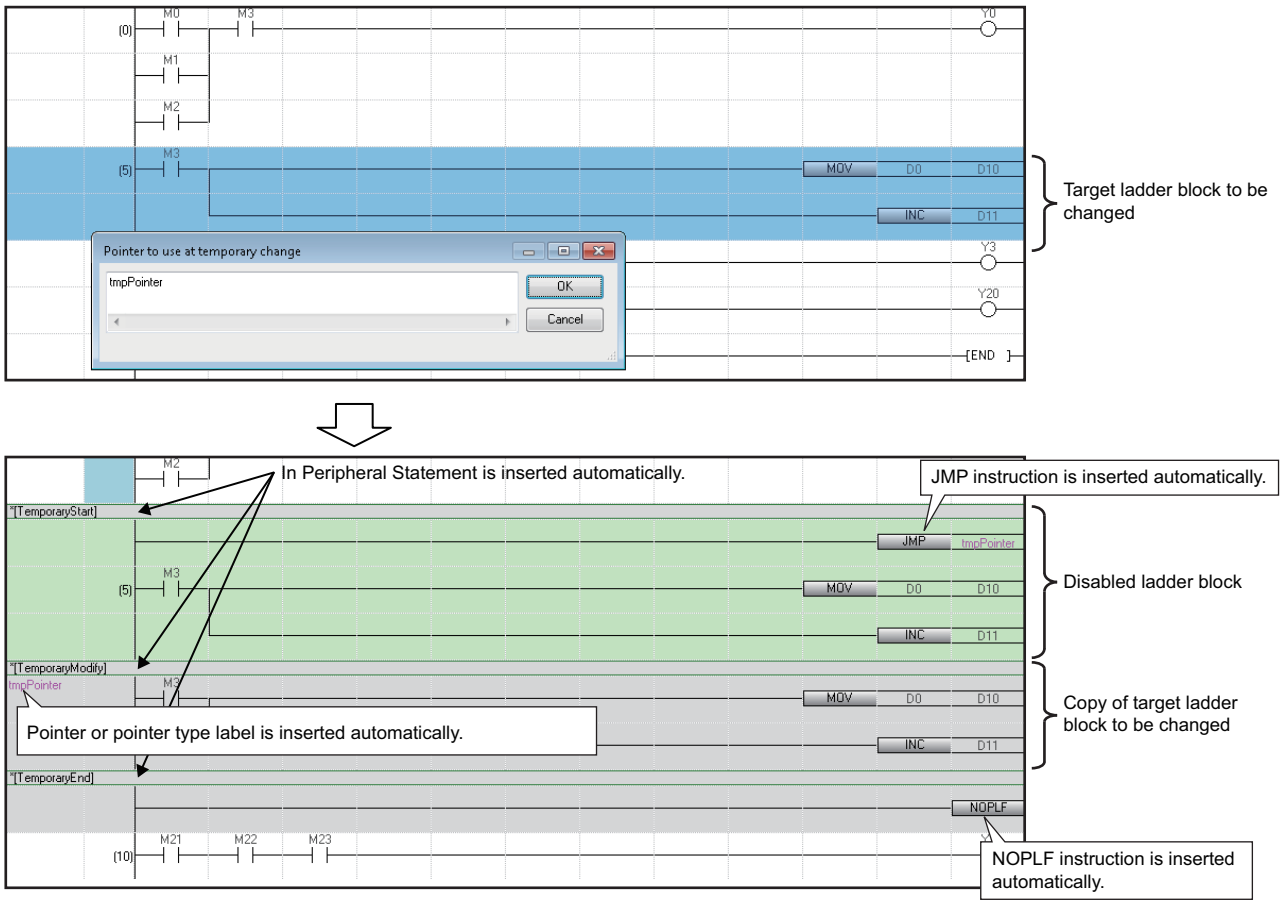
When opening a project, which contains a temporarily changed ladder program, in GX Works3 version 1.008J or earlier, the background color of disabled ladder block is not changed. Besides, 'Apply the Changes' and 'Restore the Changes' can not be performed.

Temporary changing

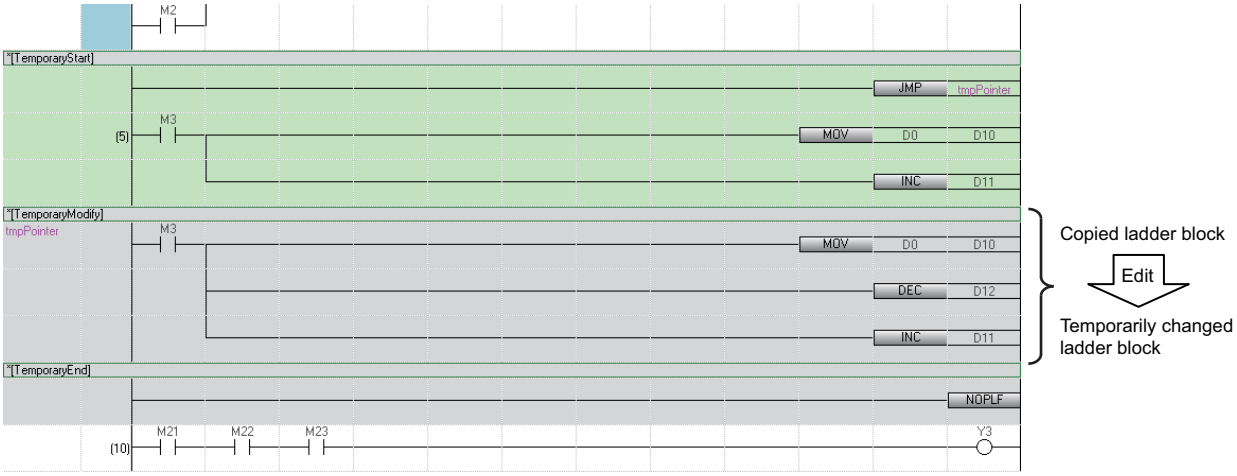
Operating procedure

1. Select the ladder block to change, then select [Edit] ⇨ [Temporarily Change Ladders] ⇨ [Temporarily Change Ladders] ( ).
2. Enter a pointer or pointer type label to be used.

A peripheral statement, JMP instruction, NOPLF instruction, or pointer device (or pointer type label) is automatically inserted as shown below.
The selected ladder block is disabled and a copy of the selected ladder blocks is inserted immediately below the disabled ladder block.

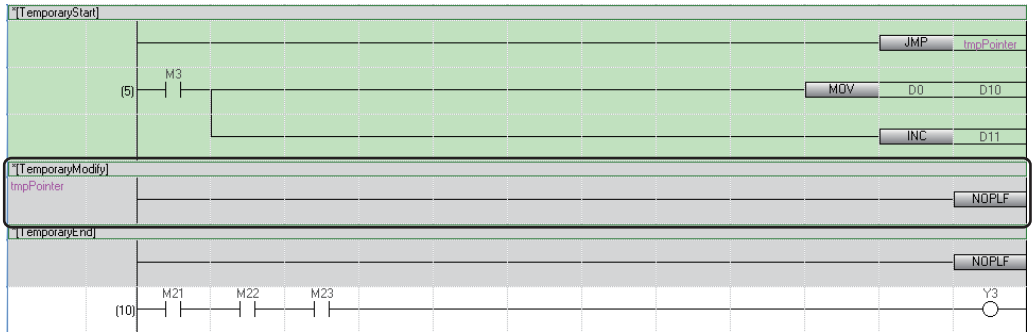


3. Edit the copied ladder block.



Point

By changing the copied ladder block to the NOPLF instruction, the specified ladder block is disabled temporarily.



Precautions

In a program of function/function block, a pointer device can not be used temporarily. Only pointer type label is applicable.

Applying/restoring the changes

The changed ladder program is applied if no problem is found with the operation. If any problems are found, the change is restored.

Operating procedure

Select the ladder block from [TemporaryStart] statement to [TemporaryEnd] statement, and then select [Edit] ⇨ [Temporarily Change Ladders] ⇨ [Apply the Changes] ( )/[Restore the Changes] ( ).

Displaying ladder blocks changed temporarily in a list

The list of ladders changed temporarily can be displayed on the active ladder editor.

Operating procedure

Select [Edit] ⇨ [Temporarily Change Ladders] ⇨ [Temporarily Changed Ladder List] ( ).
The list of the line statements, that includes only the statements inserted automatically by the Temporarily Change Ladders function, is displayed.

Considerations for editing ladder blocks changed temporarily

When the temporarily changed ladder block was edited with the contents listed in the following table, the program may not be performed normally.

Description	
Statement	Delete/cut a statement.
	Insert a ladder block between the [TemporaryModify] statement row and the ladder block changed temporarily (which is the row setting a pointer).
	Delete the [TemporaryEnd] statement row and NOPLF instruction.
	Insert a ladder block/a statement/NOPLF instruction between the [TemporaryEnd] statement row and NOPLF instruction.
	Insert a statement before and after the [TemporaryStart] statement row.
JMP instruction, Pointer	Edit/delete a JMP instruction or a pointer.
Ladder block	Edit a disabled ladder block.
	Delete a ladder block disabled/changed temporarily.
	Copy and paste a ladder block disabled/changed temporarily.

Searching/replacing data in a program

The search functions that can be used in a ladder editor are as follows.

Function name	Description	Reference
Simple search	Searches instructions, devices, labels, statements, and notes.	Page 204 Simple search
Jump	Moves the cursor on a specified step No.	Page 205 Jump
Cross reference	Checks a declaration location and a reference location of a device and a label in a list.	Page 299 SEARCHING DATA
Device list	Checks the usage of devices being used.	
Find and replace	• Searches for and replaces a device name, label name, instruction name, and character strings. • Changes open/close contact. • Replaces devices in a batch.	

Simple search

Instructions, devices, labels, statements, and notes can be searched by entering a text in the "Find" screen.

Operating procedure

1. Press the Space key on the ladder editor.
2. Enter a text, and click the [Find] button in the "Find" screen.

■Search options

A search option can be set by adding the following commands at the end of a text for search.

Command	Item name in the filed/ replace window	Description
/K (Example: M0/K)	Digit	The entered device and digit-specified bit devices that include the entered device are searched.
/D (Example: D0/D)	Multiple Word	The entered device and the double-word format word devices that include the entered device are searched.
; (Example: ;statement)	—	Statements or notes are searched.

For examples for searching devices using a search option, refer to the following section.

☞ Page 302 Examples of device search

Jump

Specify a Step No., and move the cursor on the ladder editor.

Operating procedure

1. Select [Find/Replace] ⇨ [Jump].
2. Specify a Step No. on the "Jump" screen, and click the [OK] button.

Point

On the program editor, pressing a numeric key on the keyboard enables to display the "Jump" screen.

Displaying instruction help

Check the instructions used in the ladder program on e-Manual Viewer.

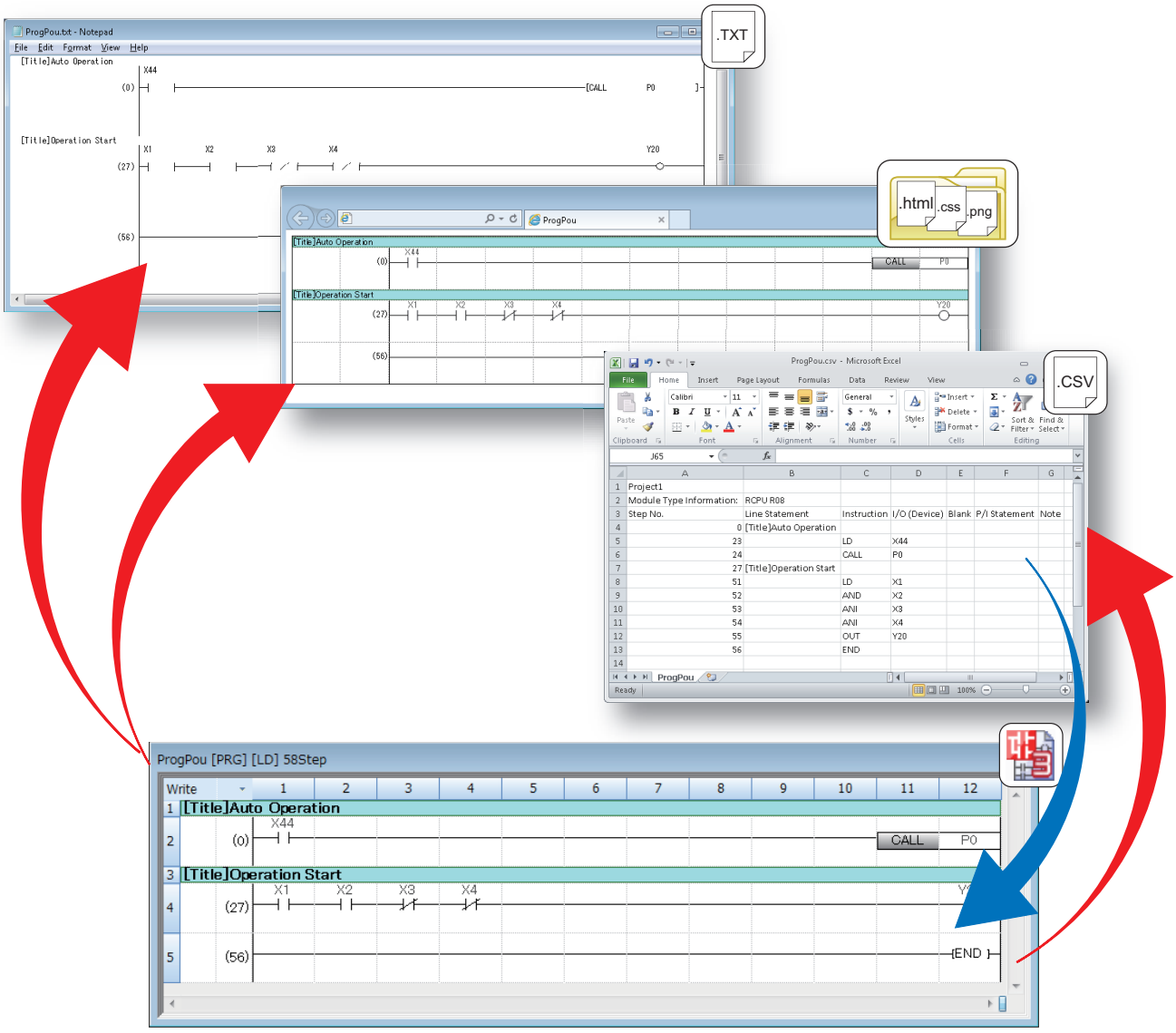
To check the instructions, the files of the corresponding programming manual requires to be registered to e-Manual Viewer.

Operating procedure

1. Select the cell where the target instruction is entered.
2. Press the F1 key.

Importing/exporting ladder programs

A ladder program can be imported from a CSV file and exported to a CSV file, HTML file, or text file.



Importing CSV files

A listed instruction in a CSV file can be imported into a ladder program.
When a CSV file is imported, the program will be in the unconverted state.

Operating procedure

1. Open the ladder editor, and select [Edit] ⇨ [Import File]( ).
2. Select a file to import on the "Import File" screen.
3. Specify "CSV (tab delimited)(*.csv)" for the file type, and click the [Open] button.
4. Select "Convert to 'OUT SM4095'" or "Convert to line statement" for "Conversion Method for Incorrect Instruction" on the screen to confirm import, and click the [Yes] button.

Precautions

When a program is being monitored or simulated, a file cannot be imported.

■Restrictions on data to be imported

The following restrictions apply to data to be imported.

- Data in the eighth column or later in a CSV file is not imported
- When a language of data to be imported is different from that of a project, some characters may be garbled
- When data is imported, the existing program in the import destination is deleted

■Import of a program in which a function clock or function is used

When importing a program including a function block or function, if the function block, function, or FB instance is undefined, an error will occur.
Before importing a program, check that the following conditions are satisfied.

- Any FB/FUN exists in a project. (Except for standard FB/FUN.)
- The names, the data types, and the order of input/output labels (including the return value of an EN/ENO) of FB/FUN are consistent with those of the definition in a project.
- An FB instance is defined.

■Import of a program in version 1.038Q or earlier

In version 1.038Q or earlier, an error occurs when importing a program including the following elements from a CSV file.
Import a program in version 1.040S or later.

- Label
- Inline structured text
- Function block function

■File format

For the file formats when importing, follow the formats listed below:

Item	Format	Example
Header	A project name and a module type are displayed. The header of each column is also displayed.	Project1 Module Type Information: RCPU R08 Step No. | Line Statement | Instruction | I/O (Device) | Blank | P/I Statement | Note
Instruction and argument (4 formats)	❶ Describe an instruction and an argument in each column, and multiple arguments in the I/O (device) column in a different row. ❷ Describe an instruction and an argument in the same instruction column. ❸ Describe multiple arguments in the same I/O (device) column. ❹ Describe arguments in the instruction column and the I/O (device) column separately.	❶ 0 MOV D0 1 D1 ❷ — 2 MOV D0 D1 ❸ — 3 MOV D0 D1 ❹ — 4 MOV D0 D1
Statement*1, *2 (2 formats)	❶ Describe a statement in the line statement column. ❷ Describe a statement with ";" in the instruction column.	❶ — 5 *state ❷ — 6 ;state
PI statement*1 (4 formats)	❶ Describe a pointer or interrupt pointer in the instruction column, and a PI statement in the PI statement column in the next row. ❷ Describe a PI statement in the PI statement column in the same row as a described pointer or interrupt pointer. ❸ Describe a PI statement with ";" following a described pointer or interrupt pointer. ❹ Describe a pointer or interrupt pointer in the instruction column, and a PI statement with "[" in the instruction column in the next row.*3	❶ 7 P0 8 PIstate ❷ — 9 P0 PIstate ❸ — 10 P0;PIstate ❹ 11 P0 12 [PIstate
Note*1 (5 formats)	❶ Describe the last argument of an instruction in the I/O (device) column, and a note in the note column in the next row. ❷ Describe the last argument of an instruction in the I/O (device) column, and a note in the note column in the same row. ❸ Describe a note with ";" following a described instruction and argument in the instruction column. ❹ Describe a note with ";" following a described argument in the I/O (device) column. ❺ Describe an instruction in the instruction column, and a note with "<" in the instruction column in the next row.*4	❶ 13 OUT Y0 14 note ❷ — 15 OUT Y0 note ❸ — 16 OUT Y0;note ❹ — 17 MOV D0 D1;note ❺ 18 OUT Y0 19 <note
Inline structured text	Refer to the following section. ☞ Page 210 Format for inline structured text	
FB/FUN	Refer to the following section. ☞ Page 211 Format for function and function block For the format of a listed instruction for input circuits and output circuits, refer to the listed instruction in a CSV file exported from a program in which the same FB/FUN is used.	
END instruction	Make sure to describe the END instruction at the end of listed instructions.	20 END

1 "" representing a peripheral statement or a peripheral note can be used.
*2 "[Title]" displayed in the "Navigation" window can be used.
*3 "]" at the end is not imported.
*4 ">" at the end is not imported.

- A tab (\t) or a comma (,) can be used for delimiting items
- Enclose an item including a delimiter or a line feed code with double quotes
- When importing a program including a ladder block changed temporarily, the temporary change of the ladder block will be canceled

• The range of a character string in a line statement to be imported differs depending on a line feed format in a CSV file

Line feed format	Import in GX Works2	Import in GX Works3
Line feed character "\r\n" is used	A character string in a single row including the line feed character "\r\n" is imported as a statement.	A character string in which a line feed is inserted is imported as a statement.
A CSV file is edited directly and a line feed is inserted in a character string	A character string up to the first line feed is imported as a statement.	

• The following table shows the constants that the devices are changed when importing.

Type	Example		Description
	CSV file	Import in GX Works3	
Boolean	TRUE	SM400	Replaced with SM400
	FALSE	SM401	Replaced with SM401
Binary	2#1111	H0F	Imported as "H (hexadecimal)" (a value is same)
	2#1111_1111	H0FF	
Octal	8#10	H8	
	8#1_1	H9	
Hexadecimal	16#1A	H1A	
	16#1_A		
Decimal	30	K30	Imported as "K (decimal)" (a value is same)
	3_0		
Real number	0.3	E0.3	Imported as "E (real number)" (a value is same)
	3.14_15	E3.1415	
	1.00E+06	E1.0+6	
String	'ABC'	"ABC"	Replaced with double quotes

Exporting to a CSV file

A ladder program can be converted into a listed instruction format and exported to a CSV file.

Operating procedure

1. Open the ladder editor, and select [Edit] ⇨ [Export to File]( ).
2. Enter a file name to export in the "Export to File" screen.
3. Specify "CSV (tab delimited)(*.csv)" for the file type, and click the [Save] button.

Precautions

Programs including an unconverted ladder cannot be exported.

If more than 5000 inline structured texts exist in a program, an error will occur.

■File format

A saved CSV file opened in Excel® is displayed as follows:

	A	B	C	D	E	F	G
1	Project1						
2	Module Type Information:	RCPU R08					
3	Step No.	Line Statement	Instruction	I/O (Device)	Blank	P/I Statement	Note
4	0	[Title]Auto Operation					
5	23		LD	X44			
6	24		CALL	P0			
7	27	[Title]Operation Start					
8	51		LD	X1			
9	52		AND	X2			
10	53		ANI	X3			
11	54		ANI	X4			
12	55		OUT	Y20			
13	56		END				

(1)
(2)

Precautions

The following describes the detailed formats of a CSV file.

- The file format is Unicode (UTF-16 Little Endian with BOM).
- Items are delimited by a tab (\t).
- Each item is enclosed with double quotes (").
- When a double quote (") is included in an item, two double quotes ("") are displayed for the double quote (") in the item.
- A line feed in a line statement is converted into "\r\n".
- A line feed is inserted at the end of a row. The line feed code is CR+LF.
- The items for the module type information (1) and the header (2) are output in a CSV file format in a language set for the display language.

■Format for inline structured text

A saved CSV file which includes an inline structured text is displayed in Excel® as follows:

	A	B	C	D	E	F	G
1	PROJECT1_0901						
2	Module Type Information:	RCPU R08					
3	Step No.	Line Statement	Instruction	I/O (Device)	Blank	P/I Statement	Note
4	0		LD	X0			
5	1		AND	X1			
6	2		AND	X2			
7	3		AND	X3			
8	4		AND	X4			
9	5		STB1				
10							Average
11	91		END				
12	<STB1>						
13	AveData := (D1 + D2 + D3) / 3;						
14	</STB1>						

(1)
(2)
(3)

No.	Item	Description	Format
(1)	Instructions for inline structured text	The position of an inline structured text and the inline structure text number*1 (1 to 5000) in the program are displayed.	STB (inline structured text number)
(2)	Title of an inline structured text	The title of an inline structured text is displayed.	(Text of an inline structured text title)
(3)	Texts of an inline structured text	The programs of an inline structured text are displayed.	<STB (inline structured text number)> (Inline structured text program) </STB (inline structured text number)>

*1 Inline structured text number indicates the number that is added to each inline structured text in order from the top in a program.

■Format for function and function block

The display example of CSV file in the format of function blocks is as follows.

A saved CSV file that includes a function block opened in Excel® is displayed as follows:

	A	B	C	D	E	F	G	
1	PROJECT1_0901							
2	Module Type Information:	RCPU R08						
3	Step No.	Line Statement	Instruction	I/O (Device)	Blank	P/I Statement	Note	
4	0	*;FB BLK START						(1)
5	0		LD	input1				(2)
6	1		OUT	FB_Counter.IN1				
7	2		FBCALL FbPou (FB Counter)					(3)
8			IN1 IN:BOOL					(4)
9			OUT1 OUT:BOOL					(5)
10	12		LD	FB_Counter.OUT1				(6)
11	13		OUT	output1				
12	14	*;FB BLK END						(7)
13	14		END					

No.	Item		Description	Format
(1)	Starting position		The starting position of a ladder block in which a function block is used is displayed.	*;FB BLK START
			The starting position of a ladder block in which a function is used is displayed.	*;FUN BLK START
(2)	Input circuit part		An input circuit of an FB instance or a function is displayed.	Depends on an instruction (listed instruction format) ☞ Page 208 File format
(3)	FB instance/ function	Program starting position	The starting position of an FB program is displayed.	FBCALL (FB data name)(FB instance name)
			The starting position of the program of a function is displayed.	FUNCALL (FUN data name)
(4)		Input label definition	A label name, IN, and data type of an input label is displayed.	(Label name) IN: (data type)
(5)		Output label definition	A label name, OUT, and data type of an output label is displayed.	(Label name) OUT: (data type)
(6)	Output circuit part		The output circuit of an FB instance or a function is displayed.	Depends on an instruction (listed instruction format) ☞ Page 208 File format
(7)	End position		The end position of a ladder block in which a function block is used is displayed.	*;FB BLK END
			The end position of a ladder block in which a function is used is displayed.	*;FUN BLK END

Exporting to an HTML file

A ladder diagram of a ladder program can be exported to an HTML file.
Data in an HTML file cannot be imported in a ladder program.

Operating procedure

1. Open the ladder editor, and select [Edit] ⇨ [Export to File]( ).
2. Enter a file name to export in the "Export to File" screen.
3. Specify "HTML(*.html)" for the file type, and click the [Save] button.

Precautions

Programs including an unconverted ladder cannot be exported.
The following items are not exported:

- Line number of an inline structured text
- "*" added when entering a peripheral statement
- Data type of an argument of a function/function block

■Operating environment

The following table shows the operating environment.

Item		Description
Operating system	Tablet, smartphone	Android® 4.0 or later iOS® 8 or later
	Personal computer	Microsoft® Windows® 10 Microsoft® Windows® 8.1 Microsoft® Windows® 8 Microsoft® Windows® 7 SP1 or higher
Browser	Tablet, smartphone	A browser supporting HTML5 and CSS3 The following browsers are recommended. • Google Chrome™ (for Android) (version 4.3 or later) • Safari® 8.0 or later
	Personal computer	A browser supporting HTML5 and CSS3 The following browsers are recommended. Microsoft Edge™ Internet Explorer® 11 or later Safari® 8.0 or later Google Chrome™ 4.3 or later

An HTML file to which a ladder diagram is exported may not open properly in a web browser not supporting HTML5.
Use Google Chrome™ for Windows Vista® or earlier.

■File configuration

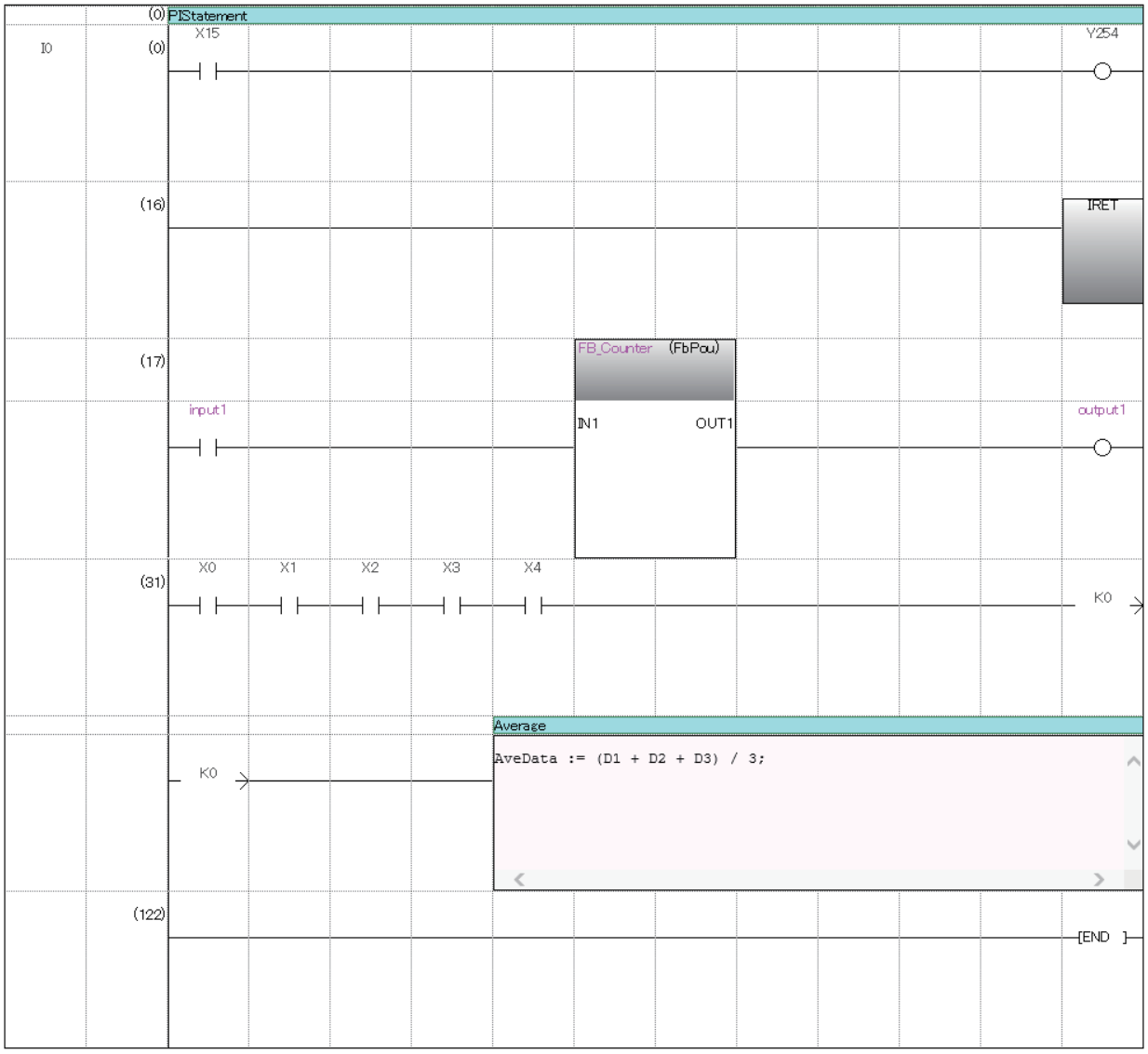
A ladder diagram is exported to an HTML file in the following file configuration.

Folder	Subfolder	File name	Description
Folder specified on the "Export to File" screen	—	(character strings specified on the "Export to File" screen).html	The following information on ladder elements of a ladder diagram is exported. • Picture name to be displayed • Label/device name • Character strings of comment/statement/note • Tag for assigning style information in a css file
	css	(character strings specified on the "Export to File" screen)BaseStyle.css	The following style information is exported. • Color and font settings configured when exporting • Layout information to display as a ladder diagram
	img	(ladder element name).png	A same picture as that of a ladder diagram displayed on the ladder editor is exported.*1

*1 The conditions for exporting are as follows:
・A ladder element in a ladder diagram displayed on the selected editor is exported as a picture
・A cell width set individually on a ladder editor is not applied
・The wrap row of the first column and the icon row of the second column are not exported

■File format

A saved HTML file opened in a web browser is displayed as follows:



- A line feed is not inserted for statements and comments.
- When closing ladder blocks in an outline display, they are exported in the closed state.
- Ladder blocks displayed in an editor can only be exported. (Example: When only a ladder block including a line statement is displayed)

Precautions

- When the magnification of a character in a web browser is not same, a file is not displayed properly.
- Some characters may get cut depending on the fonts used in a web browser.
- The number of characters and rows to display the character string data, such as a device name and a comment, may not match between the ladder editor and a web browser.
- When displaying a program with a large number of steps in an inline structured text, the line of the left ladder may be cut off.
- The position of a command name may differ between a ladder editor and a web browser.
- When character strings are not displayed all, "..." is added to the end for a device, data name of a function/function block, FB instance name, statement, note, VAR_PUBLIC, and VAR_PUBLIC_RETAIN.

Exporting to a text file

A ladder diagram of a ladder program can be exported to a text file.
Data in a text file cannot be imported in a ladder program.
This function supports programs within 260 KB.

Operating procedure

1. Open the ladder editor, and select [Edit] ⇨ [Export to File]( ).
2. Enter a file name to export in the "Export to File" screen.
3. Specify "Text (*.txt)" for the file type, and click the [Save] button.

Precautions

Programs including an unconverted ladder cannot be exported.
In addition, the following items are not exported also.

- Line number of an inline structured text

■Operating environment

When characters are not displayed on the text editor or the display width of ladder diagrams is not uniform, check the operating environment.
It is considered to occur in the following cases.

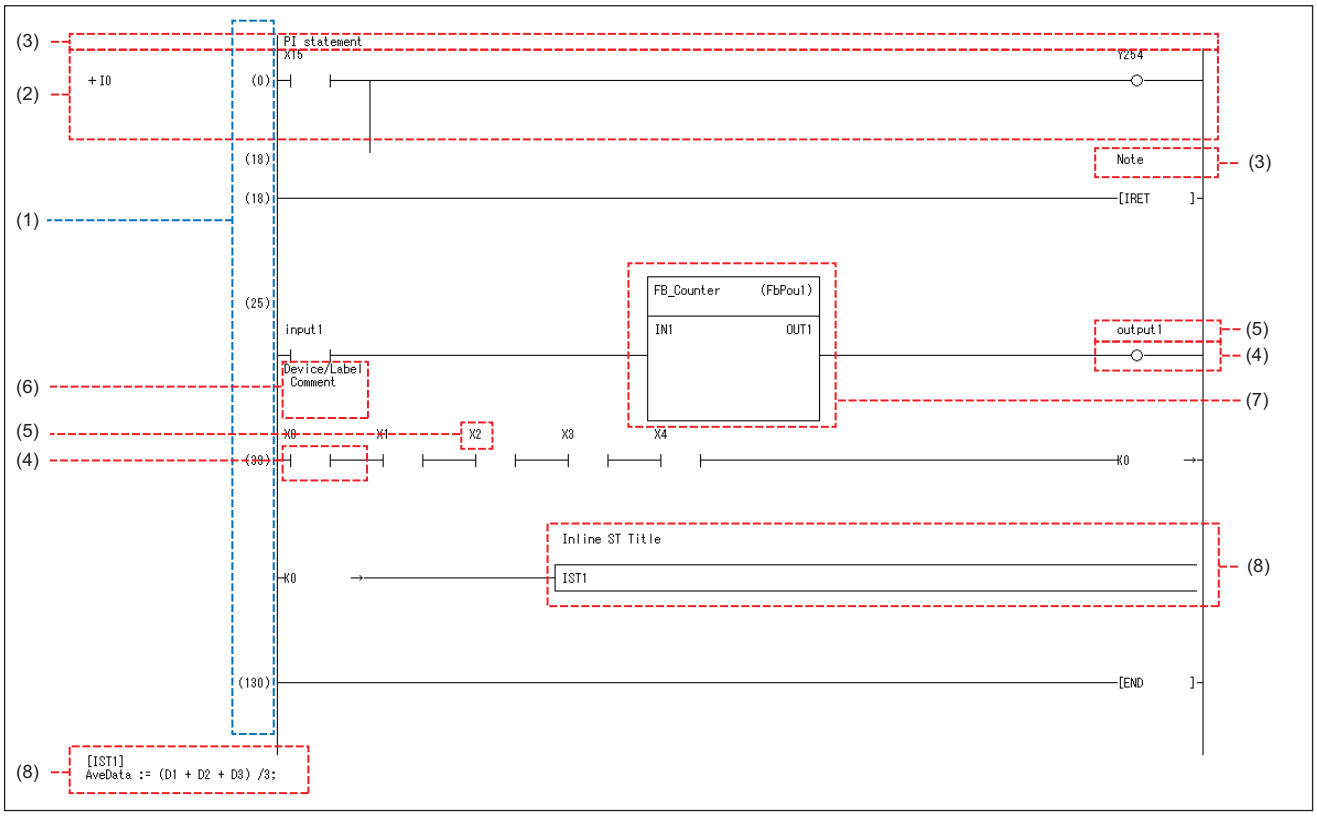
- A non-Japanese version of operating system is used.
- Japanese fonts are not installed.
- Fonts that are not supported by Shift JIS are used.

To display an exported text file normally, set the following settings.

- Install Japanese fonts and set the system locale as Japanese.
- Set the used fonts to monospaced fonts on the text editor.

■File format

A saved text file opened on the text editor is displayed as follows:



No.	Item	Description
(1)	Step No.	Step numbers are displayed. When do not output step No. select "No" in the following option. • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Export to File" ⇨ "Text Format" ⇨ "Output Step No.".
(2)	Outline display	When closing a ladder block in an outline display, it is exported in the closed state. Functions/function blocks closed in an outline display, only the function names or the label names of function blocks are displayed.
(3)	Statement*1	No line feed: It is displayed in one line. Line feed used: The line feed is applied.
	PI statement*1	
	Note*1	The following option is not applied. • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Contact Display Width"
(4)	Contact/coil	Contacts/coils in a ladder program are displayed.
(5)	Device/label*2,*3	It is displayed in six lines for one cell. The number of rows to display differs depending on the following option. • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Numbers of Wrapping Rows for Device/Label Name"
(6)	Device comment*2	It is displayed in four lines under the ladder diagram. The following option is not applied. • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Comment" ⇨ "Device Comment Display Format" ⇨ "Number of Characters"
(7)	Function	The names and the titles of functions are displayed.
	Function block	The label names of function blocks and the function block names are displayed.
(8)	Inline structured text	Inline structured texts in a ladder program are displayed as the character string 'ISTn'*4. The titles of inline structured texts are displayed one line upper than the ones for the character string 'ISTn'.
	Inline structured text (program)	Programs in an inline structured text are displayed under the row for the END instruction.

1 For peripheral statements or peripheral notes, "" added is added in the beginning of the character strings.

*2 Up to 12 characters

*3 Characters exceeding the display range are displayed as '...'.

*4 'n' indicates an integer that is added in the output order of inline structured texts.

Precautions

- Up to 12 characters for one cell, and up to 14 characters for one line
- The file format is Unicode (UTF-16 Little Endian with BOM).
- Grids are not displayed.
- Ladder blocks displayed in an editor can only be exported. (Example: When only a ladder block including a line statement is displayed)

Exporting to all files

The following explains the procedure to export ladder programs to a CSV file, HTML file, and text file simultaneously.
For the format of each file and a method to export ladder programs to each format file, refer to the following sections.

☞ Page 209 Exporting to a CSV file
☞ Page 212 Exporting to an HTML file
☞ Page 214 Exporting to a text file

Operating procedure

1. Open the ladder editor, and select [Edit] ⇨ [Export to File]( ).
2. Enter a file name to export in the "Export to File" screen.
3. Specify "All File Formats(*.csv;*.html;*.txt)" for the file type, and click the [Save] button.

6.4 Creating an ST Program

This section explains the creation method of an ST program.

The details on the specification of ST program are described in the following manual. Please read it in advance.

MELSEC iQ-R Programming Manual (Program Design)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Point

The display format and detailed operation settings for each function can be set by setting the following option.

[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "ST Editor"

Configuration of ST editor

ST editor is a language editor in text format for creating programs in Structured Text.

Spaces, tabs, and line feeds can be entered between keywords and variable names of a control syntax.

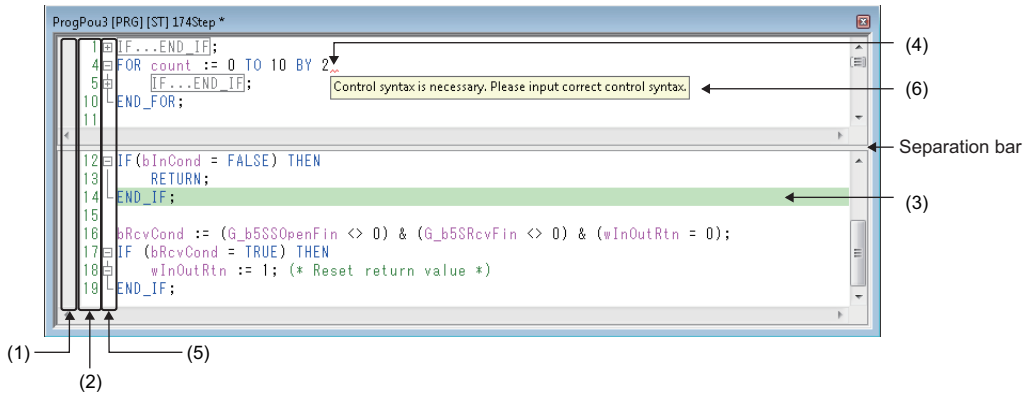
Terms and symbols that configure the program is referred to as a token.

Window

"Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(program block)" ⇨ "ProgramBody" in the "Navigation" window

■Toolbar

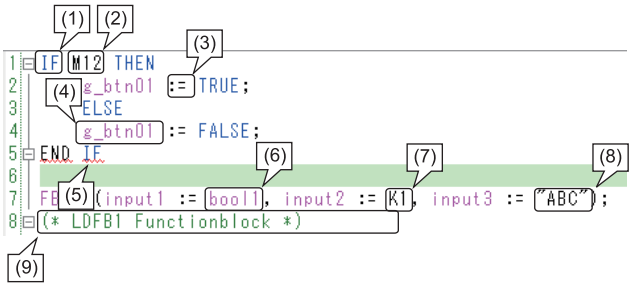
■ST editor



Displayed items

Item	Description	Related operation
(1) Icon display area	The area to display icons.	■Icon type ☞ Page 218 Icon type
(2) Line number	The line numbers of a program.	■Changing display contents [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "ST Editor" ⇨ "Editor Display Items"
(3) Highlighted display	The line on which the cursor is placed is highlighted.	
(4) Error display	A syntax error of the program is displayed.	
(5) Outline display	Symbols to display/hide the text blocks are displayed.	■Show/Hide • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "ST Editor" ⇨ "Editor Display Items" • [View] ⇨ [Outline] ⇨ [Show/Hide of Outlines]
(6) Tool hint	Information where the mouse cursor is placed over is displayed.	■Changing display contents [Tool] ⇨ [Options] ⇨ [Program Editor] ⇨ "ST Editor" ⇨ "Tool Hint"

■Colors of programs (default)

Figure	Description	Default color
	(1) Control syntax	Blue
	(2) Device	Black
	(3) Operator	Black
	(4) Global label	Magenta
	(5) Error	Red
	(6) Local label	Magenta
	(7) Constant	Black
	(8) String constant	Black
	(9) Comment	Green

Point

Font color, background color, and font can be changed.

☞ Page 65 Checking and Changing Colors and Fonts

■Icon type

Icon	Description
	This icon is displayed on the line jumped from the cross reference window.
	This icon is displayed on the error line jumped from the "Output" window.

■Keywords for collapse and automatic indent

A line can be outlined and displayed collapsed by using the keywords shown below. Additionally, pressing the Enter key in a control syntax inserts an indent automatically.

Category	Start	End	Automatic indent
Comment texts	(*	*)	×
	/*	*/	×
Selection statement	IF	END_IF	○
	CASE	END_CASE	○
While loop	FOR	END_FOR	○
	WHILE	END_WHILE	○
	REPEAT	END_REPEAT	○

Entering programs

This section explains the entering method of an ST program.

For the functions/instructions used in ST programs, refer to the following manuals.

MELSEC iQ-R Programming Manual (Program Design)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Point

Press the Ctrl + Shift + = keys to enter an assignment operator (:=).

Precautions

When an ST editor is set to read-only or monitoring, the program cannot be edited.

Inserting instructions, functions, and control syntax

There are two methods for entering instructions, functions, and control syntax: entering texts using keyboard and dragging and dropping them in the "Element Selection" window.

The input control syntax, operators, devices, and TRUE/FALSE are changed to the upper-case characters automatically.

Labels can be entered with aliases.

■Specification method for data type of device

Normally, the data type of a word device is handled as INT (Word [Signed]) on the ST editor.

By adding a device type specifier, which indicates a device type, to a device name, a device storing 32-bit integer or real number can be described directly in an operation formula.

For details, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

MELSEC iQ-F FX5 Programming Manual (Program Design)

Inserting function blocks

Insert a function block to an ST program.

For the creation method of a program in a function block, refer to the following section.

☞ Page 317 Creating a Function Block

Operating procedure

1. Drag a function block in the "Navigation" window or "Element Selection" window and drop it onto an arbitrary position in the ST editor.
2. Enter the information of a label (FB instance) on the "Undefined Label Registration" screen.
3. Enter the values for the input variables and output variables.

Ex.

When the defined function block is "MYTIMER"

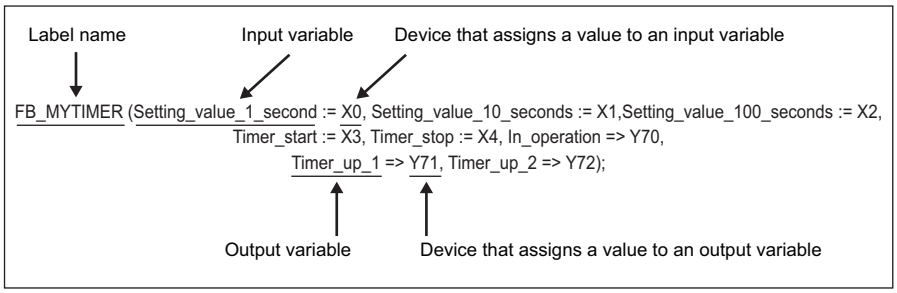
[Details of defined function block]

Label name: FB_MYTIMER

Input variable: Setting_value_1_second, Setting_value_10_seconds, Setting_value_100_seconds, Timer_Start, Timer_Stop

Output variable: In_operation, Timer_up_1, Timer_up_2

The example of entering ST program are shown below.



The output of the function block can be obtained by specifying the output variable name with a period (.) suffixed to the function block name.

Enter an instruction to obtain the output after performing the function block call.

```
Y70: = FB_MYTIMER. In operation;
```

Inserting functions

Insert a function in an ST program.

For the creation method of a FUN program, refer to the following section.

☞ Page 328 Creating a Function

Operating procedure

1. Drag a function in the "Navigation" window or "Element Selection" window and drop it onto an arbitrary position in the ST editor.
2. Enter the arguments.

Inserting indention

A tab is inserted as an indentation at the head of a new line automatically when a line feed is inserted during program editing.

The tabulator length can be set in the following option setting.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "ST Editor" ⇨ "Edit Operation"

Inserting comments

Enter a comment which does not affect the program processing. Or, comment out/uncommented the already entered programs in a batch.

Operating procedure

■Entering comments

- When the line is one: Enter a comment after entering slashes '//'.
- When specifying the range: Enclose the comment in '/*' and '*/', or '(*' and '*)'.

■Batch comment out/uncomment of a program

1. Select a range to be commented out or uncommented. (Multiple lines can be selected.)
2. [Edit] ⇨ [Comment Out of the Selected Range] ( )/[Disable Comment Out of Selected Range] ( )

Registering undefined labels

Register an undefined label on the label editor.

Operating procedure

1. Enter the label name to be registered on the ST editor.
2. Select the token of a label name, and select [Edit] ⇨ [Register Label] ( ).
3. Set each item on the "Undefined Label Registration" screen and click the [OK] button.

Displaying syntax templates

Syntax template is a format that defines data type of arguments and format of control syntax which are defined in each instruction, function, and operator.
The syntax template of the inserted instruction can be displayed on the ST editor.

Operating procedure

1. Select the token of which syntax is to be displayed.
2. Select [Edit] ⇨ [Display Template] ( ).
3. Enter the arguments in accordance with the displayed template.

Delete the data type name enclosed with '?', and enter a label name or device corresponding to its data type.

Point

Select [Edit] ⇨ [Mark Template (Left)] ( )/[Mark Template (Right)] ( ), or press the Ctrl + Alt + ←/→ keys to select an argument of the template one by one.

Searching/replacing data in a program

The search functions that can be used in ST editor are as follows.

Function name	Description	Reference
Jump	Specifies a line number on the ST editor, and move to the corresponding line.	Page 222 Jump
Cross reference	Checks a declaration location and a reference location of a device[*1] and a label in a list.	Page 299 SEARCHING DATA
Device list	Checks the usage of devices being used[*1].	
Find and replace	• Searches for and replaces a device name[*1], label name, instruction name, and character strings. • Changes open/close contact. • Replaces devices in a batch.	

*1 It is searched with a device name excluding a device type specifier.

Jump

Specify a line number and move the cursor on the ST editor.

Operating procedure

1. Select [Find/Replace] ⇨ [Jump].
2. Enter a line number of the program on the "Jump" screen, and click the [OK] button.

Displaying instruction help

Check the instructions used in an ST program on e-Manual Viewer.

To check the instructions, the files of the corresponding programming manual requires to be registered to e-Manual Viewer.

The applicability of help display is shown below.

Token type	Applicability
Operator	×
Control syntax	×
FB	×
Function	○
Constant, variable, comment	×

Operating procedure

1. Place the cursor on the token of the target instruction.
2. Press the F1 key.

6.5 Creating an FBD/LD Program

This section explains the creation method of an FBD/LD program.

The details on the specification of FBD/LD program are described in the following manual. Please read it in advance.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

In the FBD/LD program with the process control extension enabled, the process control function blocks can be used.

For details, refer to the following section.

☞ Page 20 Settings for using process control functions

Point

The display format and detailed operation settings for each function can be set by setting the following option.

[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor"

Configuration of FBD/LD editor

FBD/LD editor is a graphical language editor to create programs by combining Function Block Diagram language with Ladder Diagram language.

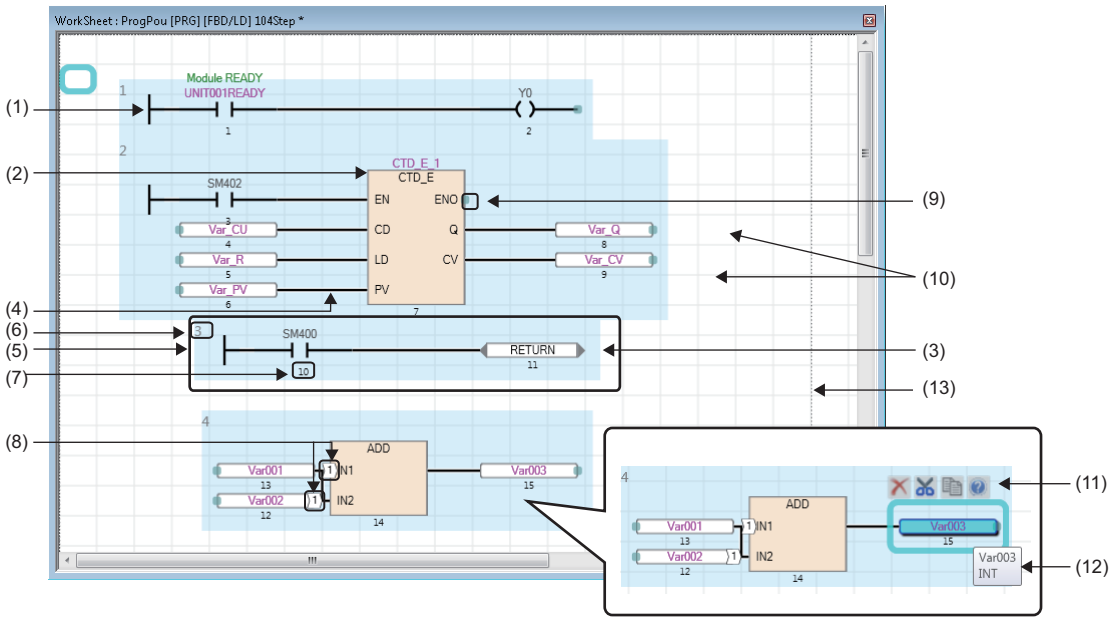
Programs can be created only by placing the prepared elements vertically and horizontally, and connecting them.

Window

"Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(program block)" ⇨ "(worksheet)" in the "Navigation" window

■Toolbar

■FBD/LD editor



Displayed items

Item	Description	Editing operation
(1) LD element	An element that constitutes a ladder program. ☞ Page 225 LD element	■Editing method: Page 228 Entering programs
(2) FBD element	An element that constitutes an FBD program. ☞ Page 226 FBD element	
(3) Common element	A common element used regardless of program language. ☞ Page 227 Common element	
(4) Connector	A line that connects the connection points between elements. It is displayed by placing an element to be connected closer to the connection point on the connection target.	—
(5) FBD network block	A single FBD network block composed of all elements connected each other or elements that perform any processing independently (such as a function block and a jump label). Maximum 4096 FBD network blocks can be created in a program.	■Release from an FBD network block: Select an element to be released, and move it with the Shift key held down. ■Layout adjustment: Page 231 Layout correction
(6) FBD network block No.*1,*2	A number assigned for each FBD network block in order from upper left to lower right on the editor is displayed.	—
(7) Execution order*1,*2	The program execution order is displayed.	—
(8) Automatic connector	When a connector cannot be displayed due to the conditions where an element is placed, a number is displayed automatically. The same number of automatic connector indicates that they are connected.	—
(9) Connection point	A terminal point to connect elements with a connector. By adding an element while a connection point is being selected, the element can be added with it connected already.	■Inverting: Page 228 Switching methods for contacts/ instructions
(10) Grid*1,*2	A grid line that serves as makers to place the elements.	—
(11) Smart tag*2	An operation button displayed around the selected element. Relevant functions can be performed by clicking the button.	—
(12) Tool hint*2	The information on device/label and FB/FUN where the mouse cursor is placed over is displayed.	—
(13) Page break*1	A line that indicates a page break for printing.	—

*1 It is shown or hidden by selecting in the [View] menu.

*2 It is shown or hidden according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

Point

Font color, background color, and font can be changed.

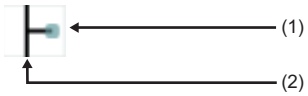
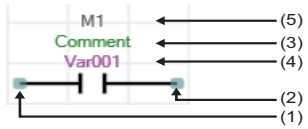
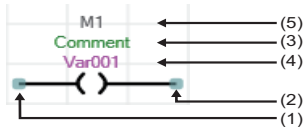
However, for a comment element, only font color and background color can be changed.

☞ Page 65 Checking and Changing Colors and Fonts

Elements

The following tables show the usable elements in an FBD/LD program.

■LD element

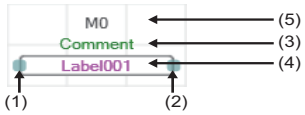
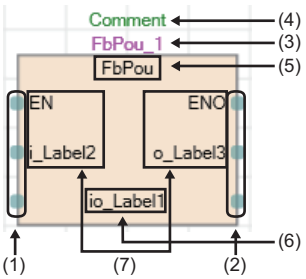
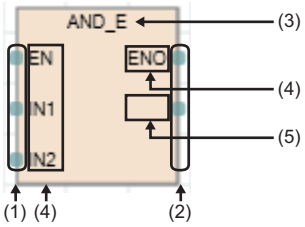
Element	Name of each part	Description
Left power rail element 	(1) Output connection point (2) Left power rail	The position of a left power rail can be placed at will, and it will be the starting point for creating a ladder program.
Contact element 	(1) Input connection point (2) Output connection point (3) Label comment/device comment[*1,*2,*3] (4) Device/label[*3] (5) Assigned device[*1,*2] (Only for global labels to which devices are assigned)	Specify the device/label. It transmits the ON/OFF signal according to the specified information. For details on the element, refer to the following manuals. MELSEC iQ-R Programming Manual (Program Design) MELSEC iQ-F FX5 Programming Manual (Program Design)
Coil element 		Specify the device/label. It outputs the signal to the specified device/label according to the transmitted ON/OFF signal. For details on the element, refer to the following manuals. MELSEC iQ-R Programming Manual (Program Design) MELSEC iQ-F FX5 Programming Manual (Program Design)

*1 It is shown or hidden by selecting in the [View] menu.

*2 It is shown or hidden according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

*3 A comment or others can be wrapped according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

■FBD element

Element	Name of each part	Description
Variable element 	(1) Input connection point (2) Output connection point (3) Label comment/device comment*1,*2,*3 (4) Device/label (5) Assigned device*1,*2 (Only for global labels to which devices are assigned)	Specify the device/label. Information can be obtained/stored in the specified device/label. It is switched to a constant element by entering a constant.
Constant element 	(1) Output connection point (2) Constant value	Specify a constant. The specified constant can be output. It is switched to a variable element by entering a device/label.
Function block element 	(1) Input connection point (2) Output connection point (3) FB instance name (label) (4) Label comment*1,*2,*3 (5) Data type (6) Input/output label (VAR_IN_OUT) (7) Input/output label (other than VAR_IN_OUT)	Indicates a block for function corresponding to the data type. It is used with an FB instance name assigned to each element. For details on the element, refer to the following section. ☞ Page 315 SEGMENTING PROGRAMS
Function element 	(1) Input connection point (2) Output connection point (3) Data type (4) Input/output label (argument) (5) Return value	Indicates a block for function corresponding to the data type. The name is not displayed in the return value. For details, refer to the following section. ☞ Page 315 SEGMENTING PROGRAMS

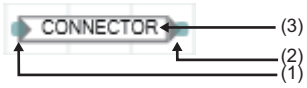
*1 It is shown or hidden by selecting in the [View] menu.

*2 It is shown or hidden according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

*3 A comment or others can be wrapped according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

■Common element

For a jump element and a return element, inverting contact on its connection point is not available.

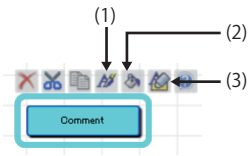
Element	Name of each part	Description
Jump element 	(1) Input connection point (2) Label*1	It is used to jump the execution processing from a jump element to a jump label element.
Jump label element 	(1) Label*1	Enter a label to be specified as the jump destination.
Connector element 	(1) Input connection point (2) Output connection point (3) Connector label	It is used instead of a connector when placing an FBD network block in the display range/print range on the editor. The same connector label indicates that they are connected.
Return element 	(1) Input connection point (2) Character string, "RETURN" (Not editable)	It is used to suspend the processing in the middle of processing.
Comment element 	(1) Comment display area	It is used to enter a comment. Up to 2000 characters can be entered in a comment element. The frame size of a comment can be adjusted for the comment length by placing the mouse cursor on the frame and double-clicking it.

*1 Only local label that "Pointer" is selected for "Data Type" can be used. In addition, the members of a structure cannot be used.

Point

The color setting of a comment element can individually be changed by using smart tags.

- To set font color, click the smart tag (1).
- To set a background color, click the smart tag (2).
- To clear color settings that individually changed, click the smart tag (3).



(1): Font color

(2): Background color

(3): Clear format

Precautions

When the following settings are changed by operating from the menu or setting an option, the display of a label name/device/comment/assigned device of an element may overlap with those of another element. Adjust the position of the element.

- Whether or not to display a device/label comment
- Number of rows to display a device/label comment
- Whether or not to display an assigned device
- Number of rows to display a device/label name by wrapping it around

Entering programs

This section explains the entering method of an FBD/LD program.

Adding elements

Operating procedure

■Using the edit box

Select[*1] a cell that the element is to be added, then enter a label name or data type of FB/FUN directly.

An element name and label name can be edited directly by selecting a placed element and pressing the F2 key.

The following items can be entered:

- Device
- Label/assigned device (☞ Page 229 Displaying a global label entered by using an assigned device)
- Constant
- FB/FUN

*1 Options of instructions/labels are displayed by pressing the Ctrl + Space keys.

■Inserting from the menu or on the toolbar

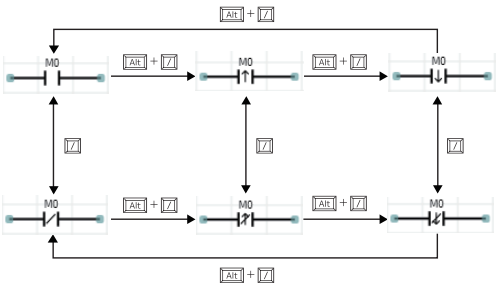
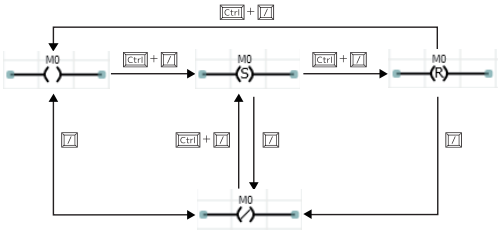
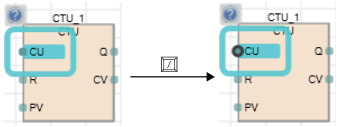
Select a cell to which an element is to be added on the FBD/LD editor, then select [Edit] ⇨ [Add Element (Ladder Symbol)] ⇨ [(element)]. It can also be added by selecting from the toolbar.

■Inserting from the "Element Selection" window

Select an element in the "Element Selection" window, and drag and drop it onto the FBD/LD editor.

■Switching methods for contacts/instructions

Select a contact/instruction to be switched, and select [Edit] ⇨ [Easy Edit] ⇨ [Invert Contact (Open/Close)]( )/[Switch Pulse]( )/[Switch SET and RST]( ) or follow the methods shown below.

Switching contacts and instructions	Shortcut key	Remarks
Switching open/close contact, raising/falling pulse		—
Inverting contact, switching SET/RST instructions		—
Inverting contact on connection point of FB/FUN		Only when the data type of the connection point is one of the following: • Bit • Word [Unsigned]/Bit String [16-bit] • Double Word [Unsigned]/Bit String [32-bit] • ANY_BIT • ANY_BOOL

■Displaying a global label entered by using an assigned device

By entering a device which was assigned as a global label to a program, the global label of the device can be displayed in the program.

Note that, only global labels whose data type is the simple type with no array can be displayed.

Enter an assigned device after changing the entering method by one of the following option, then the global label is displayed.

- [Edit] ⇨ [Edit Mode] ⇨ [Use Assigned Device for Label Input]()
- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Use assigned device for label input"

■Specification method for data type of device

In an FBD/LD editor, data type can be specified for a word device by adding a device type specifier, which indicates a data type, to a device name.

For details, refer to the following manual.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Common operations of elements

Operation		Operating procedure	
		Mouse	Keyboard
Select	To select a single element	Click an element to be selected.	Move the cursor on an element to be selected.
	To select multiple elements	• Click multiple elements with the Ctrl/Shift key held down. • Click the background of the FBD/LD editor, and drag the mouse diagonally around all elements to be selected.	Select multiple elements by moving the cursor with the Shift key held down.
	To select an FBD network block*1	Click an element, and select [Edit] ⇨ [Select FBD Network Block].	Select an element and press the Ctrl+Shift+A keys.
	To select all elements	The operation is the same as that for selecting multiple elements.	Press the Ctrl+A keys.
Change a name		Double-click an element of which the name is to be changed, and enter a new name.	Select an element of which the name is to be changed, and press the Enter*2 or F2 key, then enter a new name.
Move		Drag and drop an element. (By moving an element with the Shift key held down, it can be separated moved from the FBD network block. The elements that were connected to the moved element are automatically connected.*3)	Select the element to be moved, and press the Ctrl+Shift+←/→/↑/↓ keys.
Copy		Drag and drop an element to be copied with Ctrl held down.	Press the Ctrl+C keys, then select the copy destination and press the Ctrl+V keys. (Copy + paste)
Delete		—	Select an element to delete, and press the Delete key. The elements that were connected to the deleted elements are automatically connected.*3)
Connector	To connect	Click a connection point, and drag it to a target connection point.	—
	To connect automatically*3	Click an element to be connected, and drag it closer to a target connection point.	—
	To replace	Select a connector with the Shift key held down, and drag and drop it on a connection point of an element.	—
	To insert an element	Click an element, and drag and drop it to a connector with the Shift key held down. (Only an element which has a connection point on the same level at the input/output side)	—

*1 Multiple FBD network blocks can be selected by selecting an FBD network block after selecting multiple elements. For an element which is not connected another element, the selection is canceled.

*2 For function element and function block element, this follows the operation for double-clicking, which is selected from [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor".

*3 A function to connect elements automatically using a connector. Enabling or disabling this function can be changed in [Edit] ⇨ [Edit Mode] ⇨ [Element Auto-connect]().

Replacing function elements/function block elements

Operating procedure

1. Select a function element/function block element.
2. Select [Edit] ⇨ [Change FB/FUN Data], and enter the data type to be changed.

Point

An element can also be replaced by dragging it from the "Element Selection" window and dropping it onto the element to be replaced.
For function elements, similarly, the data type can be changed by selecting a function element and entering a new data type directly.

Adding/deleting arguments

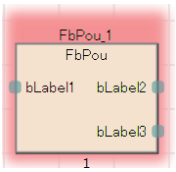
Only for a function of which the number of arguments can be changed, an argument can be added/deleted.

Operating procedure

1. Move the cursor on a function element.
2. Select [Edit] ⇨ [I/O Argument] ⇨ [Increment Argument] ( )/[Delete Argument] ( ).

FB/FUN whose definition is unclear

When the definition is unclear due to the deletion or change of pasted element, an error occurs and the element is displayed as shown below.



When the definition is changed, select the element, and select [Edit] ⇨ [Update FB/FUN] to update the definition information.
When there is no definition, select the element, and select [Edit] ⇨ [Change FB/FUN Data] to change the data.

Adjusting position automatically

When an element is added or moved, the position is adjusted automatically to avoid the overlap with others.
When a rectangular area of an FBD network block (area comprises elements connected with connectors and additional one cell to each direction) overlaps with another area, the position is automatically adjusted so that the entire block does not overlap.
However, comment elements can be superimposed since it is not subject for the automatic adjustment.

Order of comment elements

When comment elements are overlapped, the comment element added later is displayed at the front.
The order of comment elements can be changed in [Edit] ⇨ [Order Comment] ⇨ [Bring to Front]/[Bring Forward]/[Send Backward]/[Send to Back].
After changing the order of comment elements, the elements will be in the unconverted state.

Layout correction

Operating procedure

■Inserting a row

Select a cell in a row to be inserted, then select [Edit] ⇨ [Layout] ⇨ [Insert Row].

A new row is inserted on the selected cell.

■Deleting a row

Select a cell in a row to be deleted, then select [Edit] ⇨ [Layout] ⇨ [Delete Row].

The row including the selected cell is deleted. When the row includes any elements, the row cannot be deleted.

■Inserting/deleting a column

Move the cursor onto an FBD network block in which a column will be inserted/deleted, then select [Edit] ⇨ [Layout] ⇨ [Insert Column(in FBD network block)]/[Delete Column(in FBD network block)].

A column is inserted/deleted in the range of the FBD network block.

■Inserting multiple rows

Select a cell in a row to be inserted, then select [Edit] ⇨ [Layout] ⇨ [Insert Multiple Rows].

Enter the number of rows to be inserted on the "Insert Multiple Rows" screen.

A new row is inserted on the selected cell.

■Deleting multiple rows

Select a cell in a row to be deleted, then select [Edit] ⇨ [Layout] ⇨ [Delete Multiple Rows].

Enter the number of rows to be deleted on the "Delete Multiple Rows" screen.

The number of rows that has been set above is deleted from the row under the selected cell.

When the rows to be deleted include any element, a row upper than the row in which the element exists is deleted.

■Correcting layout in an FBD network block

Select an FBD network block including elements to be corrected, and select [Edit] ⇨ [Layout] ⇨ [Layout Correction in FBD Network Block].

The layout in the selected FBD network block is corrected.

■Correcting layout in an FBD network block in a batch

Select [Edit] ⇨ [Layout] ⇨ [Batch Correction of Layout in FBD Network Block].

The layout of all the FBD network blocks in the worksheet is corrected.

■Deleting a blank row between FBD network blocks

Select [Edit] ⇨ [Layout] ⇨ [Delete the Blank Row Between FBD Network Blocks].

The row between an FBD network block or elements will be deleted.

■Aligning FBD network blocks to the left side in a batch

Select [Edit] ⇨ [Layout] ⇨ [Batch Alignment of All FBD Network Blocks to the Left].

All FBD network blocks can be aligned to the left side of the FBD/LD editor.

When multiple FBD network blocks are included on the same line, the blank column between the blocks are retained.

Point

The details of 'Layout Correction in FBD Network Block' and 'Batch Correction of Layout in FBD Network Block' can be set in the following option.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor" ⇨ "FBD Network Block" ⇨ "Layout Correction in FBD Network Block"

Precautions

■Execution order after correcting layout

When 'Layout Correction in FBD Network Block' or 'Batch Correction of Layout in FBD Network Block' is performed, the size or position of FBD network blocks is changed and that may cause the change of execution order.

Display the execution order to check if the order is changed before and after the layout change.

If the execution order is changed, move the position of the elements manually.

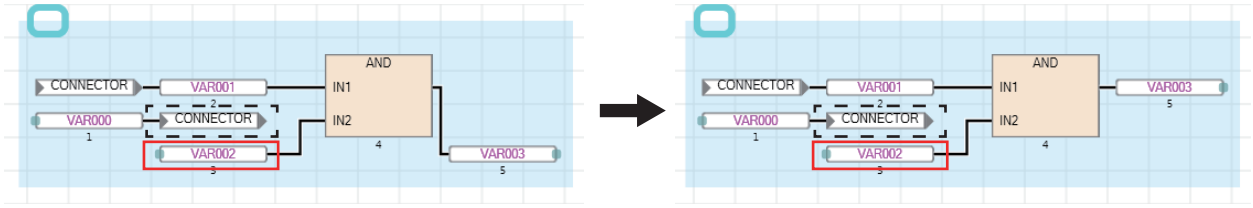
■Situations where the layout cannot be corrected

Depending on the position of elements or option settings, 'bent connectors' and 'variable element that is connected to a function block or function' may not be arranged even when 'Layout Correction in FBD Network Block' or 'Batch Correction of Layout in FBD Network Block' is performed.

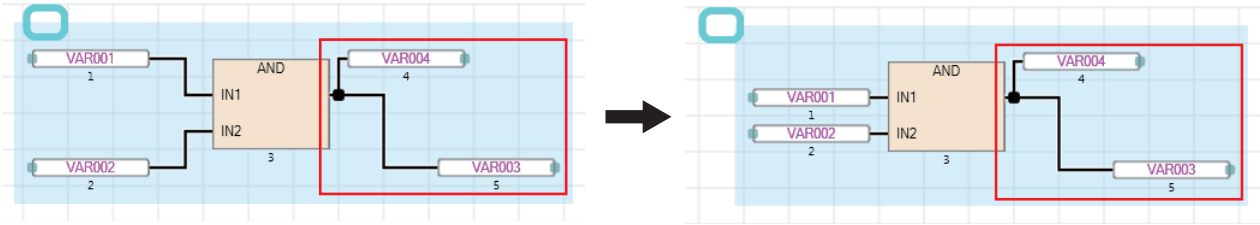
If the layout is not corrected after 'Layout Correction in FBD Network Block' is performed repeatedly, the elements should be moved manually.

A variable element[*1] is not corrected in the following situations.

- Another element was already placed in the position where an element is to be moved



- Two or more variable elements are connected to one input or output argument.



*1 Whether or not to move a variable element can be set in the following option.
[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "FBD/LD Editor" ⇨ "FBD Network Block" ⇨ "Layout Correction in FBD Network Block" ⇨ "Move the Position of Variable Elements to Connect to FB/FUN"

Pasting from each screen

A label name/device name can be pasted by dragging and dropping in the label editor and the device comment editor.

Registering undefined labels

When an undefined label is entered, the "Undefined Label Registration" screen is displayed and it can be registered on the label editor.

Utilizing a tag FB

This section explains the method for utilizing a tag FB in an FBD/LD program for process control.

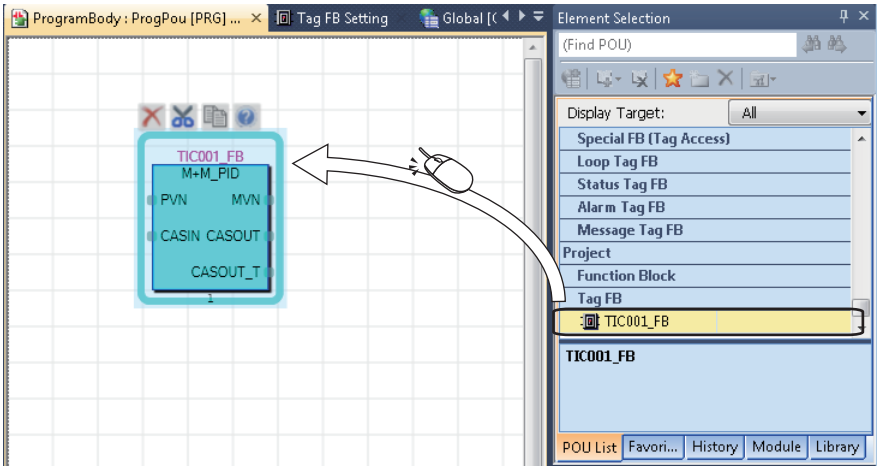
A tag FB is required to be registered on the tag FB setting editor in advance.

For details on registration of tag FBs, refer to the following section.

☞ Page 169 Registration of tag FBs

Operating procedure

1. Select an FB instance in the "Element Selection" window, then drag and drop it onto the FBD/LD editor.
2. Connect the tag FB instance to an input variable and a output variable.



Display/setting an FB property

In the "FB Property" window,, an FB property can be displayed and set.

In both FBs and tag FBs, the initial values of labels of 'VAR_PUBLIC' or 'VAR_PUBLIC_RETAIN' class can be displayed and set.

For tag FBs, the initial values of labels in the structure members of tag data can be displayed and set.

Initial values in the "FB Property" window synchronize with ones in the label editor for each label.

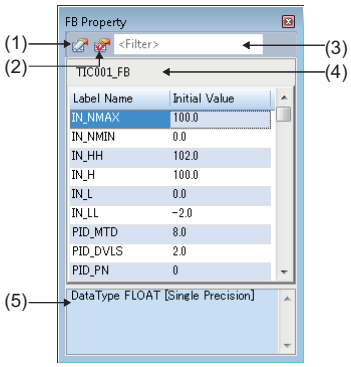
Initial values changed in the "FB Property" window are applied only for the project data. To change the initial values in an actual CPU module, use the watch function.

Configuration of the FB property window

The following shows the screen configuration of the "FB Property" window.

Window

[View] ⇨ [Docking Window] ⇨ [FB Property] ( )



Displayed items

Item	Description
(1) Initialize	To initialize all initial values of FB properties with the manufacturer-defined ones.
(2) Check	To check the initial values set in the FB property list. If an error is found in the check result, the background color of the item will be highlighted in red.
(3) Filter	To filter label names.
(4) FB instance name	To display the FB instance name of an target FB or tag FB.
(5) Explanation column	To display the data type of a label selected in the FB property list and a label comment. A label comment can be displayed in the explanation column by setting the comment title of the comment as the display target on the "Multiple Comments Display Setting" screen*1. (☞ Page 66 Comment Display Setting)

*1 The "Multiple Comments Display Setting" screen will appear by selecting the following menu.
[View] ⇨ [Multiple Comments Display Setting]

Displaying an FB property

By selecting any of the following items, the FB property of the selected FB or tag FB is displayed.

Editor	Item
FBD/LD editor (program block)	FB element
Tag FB setting editor	Tag FB

When an initial value is blank on the label editor, the manufacturer-defined initial value is displayed in the "FB Property" window. When a manufacturer-defined initial value is blank, the default initial values of each data type are displayed.
In the explanation column, the data type and comment of a selected FB property are displayed.

■Data type displayed in the "FB Property" window

The following table shows whether labels of each data type are displayed in the "FB Property" window.
○: Displayed, ×: Not displayed

Data type	Display	Default initial value
Bit	○	FALSE
Word [Unsigned]/Bit String [16-bit]	○	0
Double Word [Unsigned]/Bit String [32-bit]	○	0
Word [Signed]	○	0
Double Word [Signed]	○	0
FLOAT [Single Precision]	○	0.0
FLOAT [Double Precision]	○	0.0
Time	○	T#0d0h0m0s0ms
String	○	''
String [Unicode]	○	''
Pointer	×	—
Timer	×	—
Counter	×	—
Long counter	×	—
Retentive Timer	×	—
Long Retentive Timer	×	—
Long timer	×	—
Structure	×	—
FB	×	—
Array	×	—

Changing initial values

Values displayed in the "Initial Value" column can be changed.
When initial values differ from the manufacturer-defined ones*1, they will be displayed in bold in the "FB Property" window.
When initial values input in the "FB Property" window are same as manufacturer-defined ones, the cell in "Initial Value" column corresponding to the labels will be blank in the label editor.

*1 Initial values displayed in the "FB Property" window and the manufacturer-defined ones are compared as character strings. (Example: 1.0 and 1.00 are considered as different values. FALSE and 0 are also considered as different values.)

Linking a comment

A comment element is simultaneously moved with an element by linking them.
The link of a comment can be set for an element except for a connector, an input/output argument of an FB/FUN, and a comment element.
Multiple comment elements can be linked with a single element.
The link of a comment element can be set only for a single element.
To change the link of a comment element to another, release the link first.

Linking a single comment element with a single element

Set a link between a comment element and an element.

Operating procedure

1. Select a comment element and an element.
2. Select [Edit] ⇨ [Easy Edit] ⇨ [Link Comment].

After this setting, the background of the linked comment element is changed.

Releasing links

Releasing the links between a comment element and an element.
All links can be released by selecting an element linking with multiple comment elements and releasing them.

Operating procedure

1. Select a comment element linking with an element.
2. Select [Edit] ⇨ [Easy Edit] ⇨ [Unlink Comment].

After the setting, the link between a comment element and an element is released and the background color of the comment element is restored.

Linking comment elements and elements in a batch

Set the links of unlinked comment elements in a batch in the active FBD/LD editor.

Operating procedure

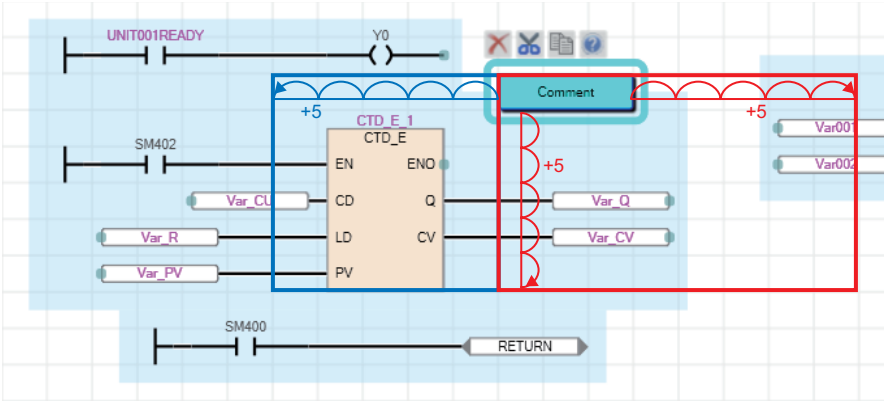
Select [Edit] ⇨ [Easy Edit] ⇨ [Comment Batch Link].
After this setting, the background of the linked comment element is changed.

■Conditions for determining the link target of a comment in a batch linking

In a batch linking, a comment element is automatically linked with an element that satisfies the following conditions in the order mentioned below.

1. The link is set to the closest element that is found by searching in the red frame (range with a width of one comment element and five cells to the right and the depth of the comment element and five cells downward). It is searched from the upper left of the range to lower right.
2. When no element is found in the procedure above, the link is set to the closest element that is found by searching in the blue frame (range with five cells to the left from one comment element and a depth of the comment element and five cells downward). It is searched from the upper right of the range to lower left.

Any link is not set if no element that is to be the link target is found in the conditions above.



Operation when linking comments

■Selecting a single element in ones with links

By selecting an element with a link, all elements linking with it are selected.

To select one element without releasing the link, click the target element twice or select it with Ctrl held down.

■Editing an element with a link

When copying a comment element and element that link each other, the link is remained after the copy.

When deleting a comment element or element that link each other, the link is released.

■Correcting the element layout

When arranging the element layout by the following menu, the comment element linking with the element does not synchronize with it.

- [Edit] ⇨ [Layout] ⇨ [Insert Row]
- [Edit] ⇨ [Layout] ⇨ [Delete Row]
- [Edit] ⇨ [Layout] ⇨ [Insert Column(in FBD Network Block)]
- [Edit] ⇨ [Layout] ⇨ [Delete Column(in FBD Network Block)]
- [Edit] ⇨ [Layout] ⇨ [Insert Multiple Rows]
- [Edit] ⇨ [Layout] ⇨ [Delete Multiple Rows]

Displaying FBD network blocks in a list

FBD network blocks in the active FBD/LD editor are displayed in a list.

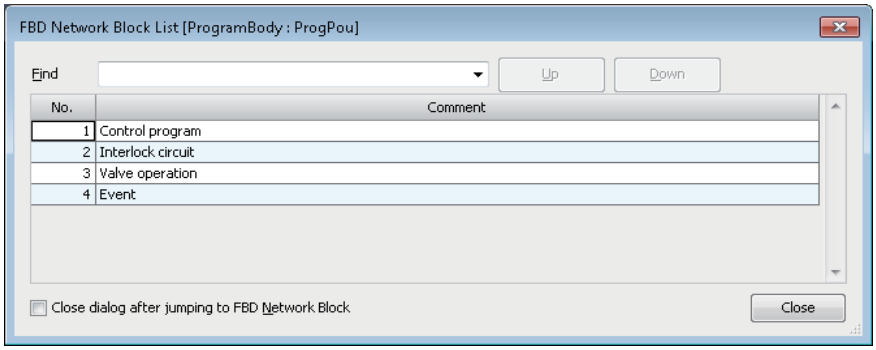
To display a comment in the FBD network block list, the comment needs to link with the element of the FBD network block.

For details on the link of comments, refer to the following section.

☞ Page 236 Linking a comment

Window

[Find/Replace] ⇨ [FBD Network Block List]



Displayed items

Item	Description
No.	An FBD network block number*1 is displayed.
Comment	An element in the FBD network block and a comment linking with the element are displayed. When multiple comments are set to the linking element, the comment placed at the uppermost in the left side is displayed. Up to 500 characters can be displayed.

*1 Select the following menu to display an FBD network block number on the FBD/LD editor.
[View] ⇨ [FBD Network Block No. Display]

Operating procedure

■Jumping to an FBD network block

Double-click the row of an FBD network block to jump.

To close the "FBD Network Block List" screen after the jump, select the checkbox of "Close dialog after jumping to Network.".

■Searching an FBD network block

Enter an FBD network block No. or a comment to search, click the [Upward Search]/[Downward Search] button.

Searching/replacing data in a program

The search functions that can be used in FBD/LD editor are as follows.

Function name	Description	Reference
Cross reference	Checks a declaration location and a reference location of a device and a label in a list.	Page 299 SEARCHING DATA
Device list	Checks the usage of devices being used.	
Find and replace	• Searches for and replaces a device name, label name, instruction name, and character strings. • Changes open/close contact. • Replaces devices in a batch.	

Displaying Help

Check the elements used in the FBD/LD program on e-Manual Viewer.

To check, the files of the corresponding programming manuals requires to be registered in e-Manual Viewer.

Operating procedure

1. Select the element to be checked.
2. Press the F1 key.

6.6 Creating an SFC Program

This section explains the creation method of SFC program.

The details on the specification of SFC program are described in the following manual. Please read it in advance.

MELSEC iQ-R Programming Manual (Program Design)

FX5CPUs do not support it.

Point

The display format and detailed operation settings for each function can be set by setting the following option.

[Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor"

Creation procedure

1. Set the point of step relay (S) in "Device Setting" of "CPU Parameter". (The default is set as 0 points.)
2. Create new SFC data. (☞ Page 108 Creating data)
3. Configure the following settings if needed.

- "SFC Setting" in "CPU Parameter"
- 'Act at Block Multi-Activated' which is set for a program file
- 'SFC information device' which is set for a block (block information)

For details, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

4. Open the SFC diagram editor, then create an SFC diagram. (☞ Page 245 Creating SFC diagrams)
5. Edit a program of action/transition. (☞ Page 263 Creating/displaying Zooms (action/transition))

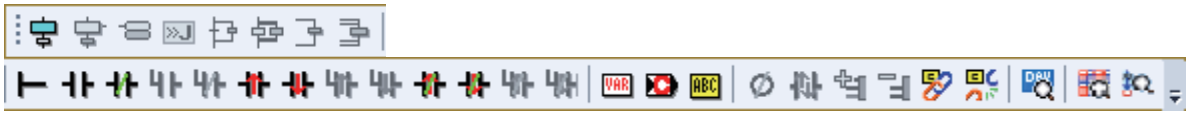
Configuration of SFC diagram editor

The SFC diagram editor is a graphical language editor to show a sequence control as a state transition diagram.
By simply inserting the prepared SFC elements along the operation flow, the each element is connected automatically and a program can be created.

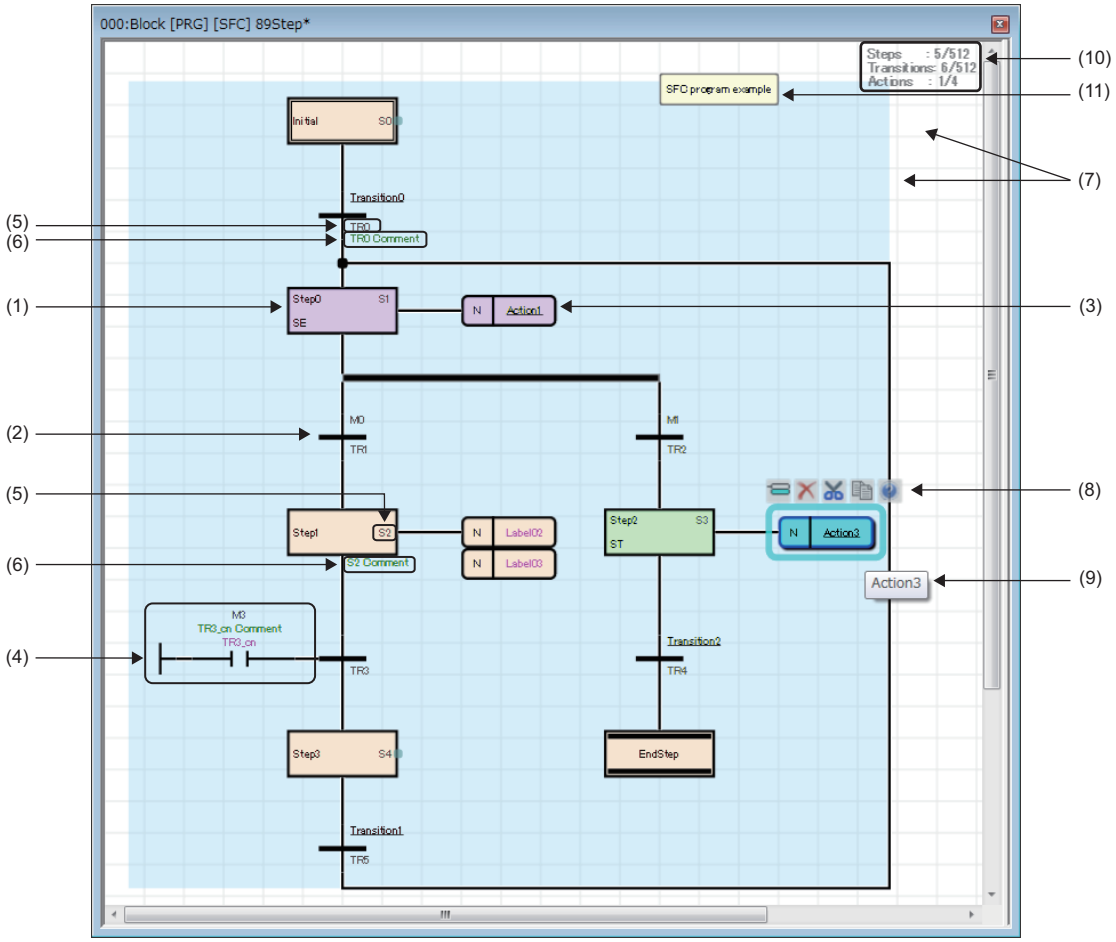
Window

Select "Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(block)" ⇨ "ProgramBody" in the "Navigation" window.
Immediately after creating a program, SFC elements that are necessary to create a program such as an initial step and end step are placed.

■Toolbar



■SFC diagram editor



Displayed items

Item		Description	Editing operation
SFC element	(1) Step	Indicates one processing of a program.	—
	(2) Transition	Indicates a condition (transition conditions) to move to the next step. Transitions are written in a Zoom or on an SFC diagram, and they can be displayed in multiple formats. For details, refer to the following section. ☞ Page 244 Display format of action/transition	■Entering: Page 248 Creating a transition ■Displaying a start destination block: [View] ⇨ [Open Zoom/Start Destination Block]
	(3) Action	Indicates an assigned operation output to a step. Actions are written in a Zoom or an SFC diagram, and they can be displayed in multiple formats. For details, refer to the following section. ☞ Page 244 Display format of action/transition	■Entering: Page 249 Creating an action ■Displaying a start destination block: [View] ⇨ [Open Zoom/Start Destination Block]
(4) FBD/LD element		An FBD/LD element that can be used only for a transition. ☞ Page 225 Elements The elements that can be used on an SFC diagram differs from the one for the FBD/LD editor. For details, refer to the following manual. 📖MELSEC iQ-R Programming Manual (Program Design)	■Editing method: Page 228 Entering programs
(5) Step No./Transition No.*1		An assigned number to a step/transition automatically by conversion. 'S' (step relay) of a CPU module is assigned to a step. A step number (S☐) is used for SFC control instructions, the current value change with the monitor function or in a Watch window, and the data logging/memory dump function. The assigned number can be changed.	■Changing an assigned number: Page 262 Editing Step No./Transition No.
(6) Device comment*1		The device comment of a Step No. (S☐)/Transition No. (TR☐) is displayed. The device comment which was set to transitions/actions is not displayed.	■Entering: Page 246 Entering comments of Step No., Page 248 Entering comments of Transition No.
(7) Grid*1		A grid line that serves as makers to place the elements.	—
(8) Smart tag*2		An operation button displayed around a selected element. Relevant functions can be performed by clicking the button.	—
(9) Tool hint*2		Information where the mouse cursor is placed over is displayed.	—
(10) Information area		"Number of used/maximum number" of SFC elements are displayed. The font color is changed in red when the number of used reached to the maximum number. SFC elements cannot be created once the number reached to the maximum number. In that case, arrange the number of elements, for example, by deleting.	—
(11) Comment element		Comments can be put on an SFC editor. The comments does not affect to the program. The frame size of a comment can be adjusted for the comment length by placing the mouse cursor on the frame and double-clicking it.	—

*1 It is shown or hidden by selecting in the [View] menu.

*2 It is shown or hidden according to the setting in [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor".

Point

Font color, background color, and font can be changed.

However, for a comment element, only font color and background color can be changed.

☞ Page 65 Checking and Changing Colors and Fonts

Precautions

When the following settings are changed by operating from the menu or setting an option, the display of a label name/device/comment/assigned device of an element may overlap with those of another element. Adjust the position of the element.

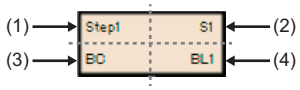
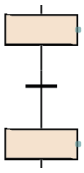
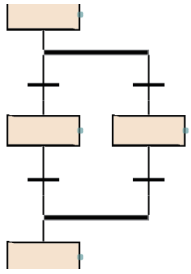
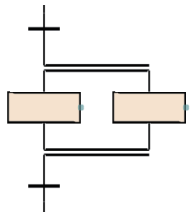
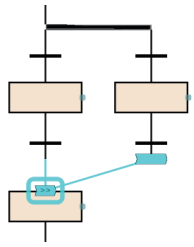
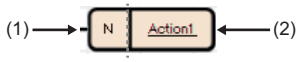
- Whether or not to display a device/label comment
- Number of rows to display a device/label comment
- Whether or not to display an assigned device
- Number of rows to display a device/label name by wrapping it around

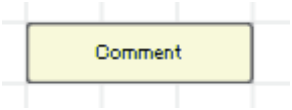
SFC element

The following shows elements which can be used in an SFC program.

For details on creatable numbers of block/each element, action, and each element, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

Item		Description
Step  (1) Step name (2) Step No. (S□) (3) Step attribute (4) Step attribute target	■Initial step  	Indicates the head of a block. One initial step is necessary for a block. Multiple initial steps can be created to perform multiple processes in parallel. The operation of a step can be changed by specifying the step attribute. For details, refer to the following manual. MELSEC iQ-R Programming Manual (Program Design)
	■Normal step  	Once a transition that places under a step is satisfied, the next step is activated. The operation of a step can be changed by specifying the step attribute. For details, refer to the following manual. MELSEC iQ-R Programming Manual (Program Design)
	■End Step  	Indicates the end of a block. Step No. is not assigned to an end step.
Transition  (1) Transition name (2) Transition No. (TR□)	■Series transition 	Moves the processing to a next step.
	■Selection branch 	Indicates a branch displayed with a single line for selecting one processing.
	■Simultaneous branch 	Indicates a branch displayed with a double line and performs multiple processes in parallel.
	■Jump 	Makes the execution processing jump to the specified step in the same SFC block. A jump and a connection line can be switched.
Action  (1) N: Qualifier (2) Action name		Once the steps are activated, the assigned action will be executed. 'N' indicates that an action perform when the step is activated. Other than 'N' cannot be set.

Item	Description
Comment element 	It is used to enter a comment. Up to 2000 characters can be entered in a comment element. The frame size of a comment can be adjusted for the comment length by placing the mouse cursor onto the frame and double-clicking it. For setting color for individual comment elements, refer to the following section. ☞ Page 227 Common element

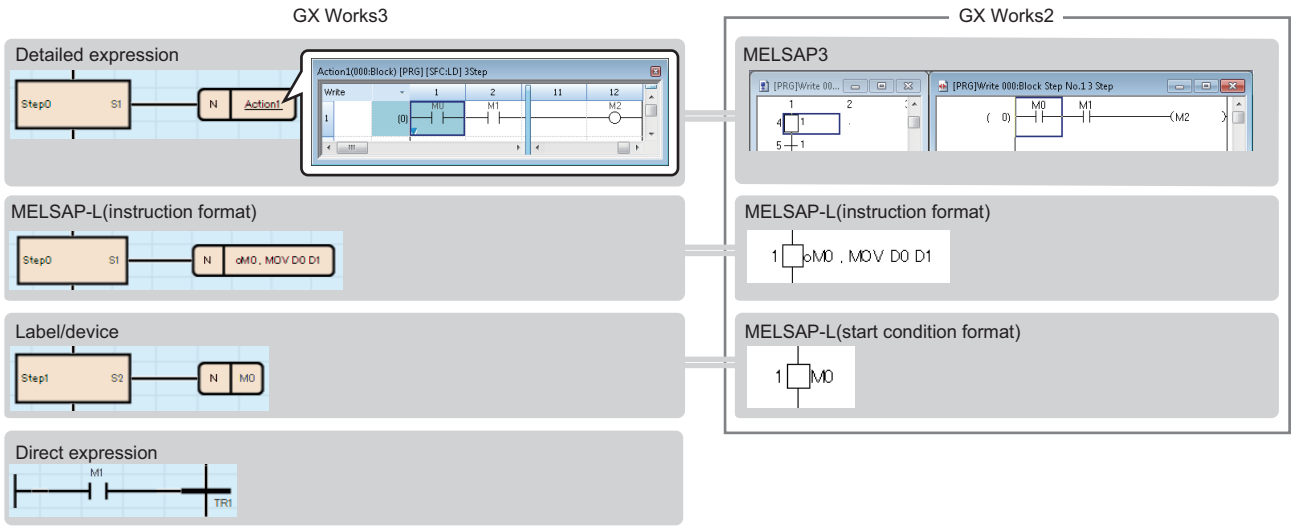
Display format of action/transition

There are multiple display formats (types) for actions/transitions on the SFC editor in GX Works3.

Programs can be shown in the equivalent display formats to MELSAP3, MELSAP-L (instruction format), and MELSAP-L (start condition format) in GX Works2 by changing the display formats (type).

Target SFC element	Display format in GX Works3 (type)			Display format in GX Works2	Reference
Action, transition	Detailed expression (create a Zoom)	Ladder*1	Detailed expression	MELSAP3	Page 248 Creating a transition Page 249 Creating an action
			MELSAP-L (instruction format)	MELSAP-L (instruction format)	
		ST, FBD/LD		—	
	Label/device			MELSAP-L (start condition format)	
Transition	Direct expression			—	

*1 Switch in [View] ⇨ [Switch Ladder Display].



- Action name/transition name is underlined when selecting the detailed expression in the switch ladder display.
- For the direct expression, "*" is displayed to the transition name that an FBD/LD element is not connected.
- When changing from "Detailed Expression" to "MELSAP-L (Instruction Format)" in [Switch Ladder Display], "????????" is displayed for an instruction which cannot be treated in MELSAP-L (instruction format).
- When a Zoom does not exist in MELSAP-L (instruction format), "?" is displayed.

Creating SFC diagrams

This section explains the creation method of an SFC diagram.
Elements which can be inserted differ depending on selected places.
Since the size or place of each element/connection line are placed automatically, it cannot be freely changed.

Precautions

When the contents shown below were entered/selected, a red frame appears in the edit box and the settings cannot be configured.

- Duplicate step name/Step No./Transition No.
- Unusable step attribute
- Step name which cannot be specified as a jump destination

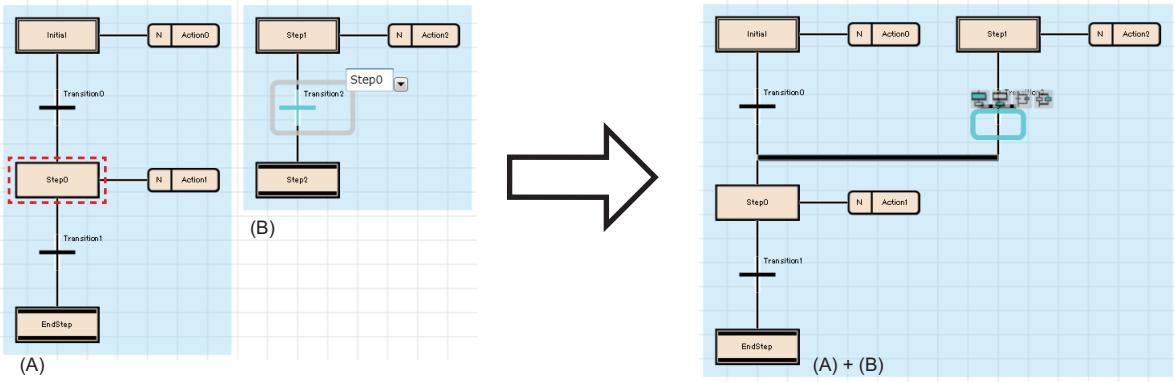
Inserting initial steps

An initial step is inserted when creating a new SFC program.
Add an initial step to perform multiple processes in parallel.

■Adding initial steps

Select [Edit] ⇨ [Insert] ⇨ [Step] ( ) on a blank cell.
An SFC diagram that consists of an initial step, transition, and end step is inserted.
When connecting multiple SFC diagrams (A, B), perform the following operation.

1. Select the transition in the SFC diagram (B), and select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].
2. Select the step name to be connected on the SFC diagram (A).
3. Select a jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].



For the connection method to a simultaneous branch, refer to the following section.
☞ Page 250 Inserting/editing jumps (connection lines)
For the editing method of steps, refer to the following section.
☞ Page 246 Inserting/editing normal steps

Inserting/editing normal steps

■Inserting a normal step

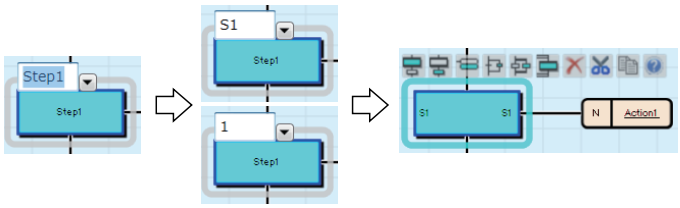
Select a step/transition/jump, then select [Edit] ⇨ [Insert] ⇨ [Step] ( ).

■Changing a step name/step No./step attribute/step attribute target

- Using a shortcut key (Step names only can be changed):
  Select a step, and press the F2 key.
- On the "Step Properties" screen:
  Select a step, then select [Edit] ⇨ [Properties].
- From the menu:
  Select a step, then select [Edit] ⇨ [Modify] ⇨ [(each item)].
- Double-click:
  Double-click a step. The target to be changed differs depending on the place double-clicked (☞ Page 243 SFC element).

Point

By entering a Step No./number to the edit box for changing a step name, the entered number is set as the step name or the Step No.



■Changing a normal step to an end step

Select a step to be changed, then select [Edit] ⇨ [Modify] ⇨ [End Step/Jump].
All SFC diagram written below the changed step are deleted.

■Entering comments of Step No.

Enter a comment on the "Step Properties" screen/the device comment editor.

■Creating a step that makes another block activated

A step that activates another block when a step was activated (block start step) is creatable.

1. Insert a step.
2. Specify 'BC' or 'BS' for the step attribute.
3. Specify a block No. to be activated for the step attribute target.

To check the step, which is to be the specification source, from the block specified as the step attribute target, select [View] ⇨ [Open Start Source Block].
For details on the performance of step attribute (BC/BS), refer to the following manual.
📖MELSEC iQ-R Programming Manual (Program Design)

■Creating a step that makes a step being held deactivated

A step that deactivates a step being held when a step was activated (reset step) is creatable.

1. Insert a step.
2. Specify 'R' for the step attribute.
3. Specify a step name of which the step is to be deactivated for the step attribute target.
   When 'S999' is specified, all steps being held in the block are the target.

For details on the performance of step attribute (R), refer to the following manual.
📖MELSEC iQ-R Programming Manual (Program Design)

Inserting/editing transitions

■Inserting a transition

Select a step/transition/jump, then select [Edit] ⇨ [Insert] ⇨ [Transition] ().

■Changing a transition name/Transition No.

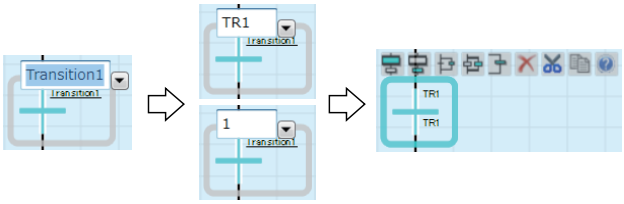
- Using a shortcut key (Transition names only can be changed):
  Select a transition, and press the F2 key.
- On the "Transition Properties" screen:
  Select a transition, then select [Edit] ⇨ [Properties].
- From the menu:
  Select a transition, then select [Edit] ⇨ [Modify] ⇨ [Name]/[Device].
- Double-click:
  By double-clicking a Transition No. (☞ Page 243 SFC element), it can be changed. By double-clicking a transition name, the Zoom is created/displayed.

For a transition that a Zoom has been created, the data name of Zoom will not be changed if the transition name was changed.

Modify the data name to match with the transition name on the "Zoom List" screen. (☞ Page 264 Displaying a Zoom list)

Point

By entering a Transition No./number to the edit box of which the transition name is to be changed, the entered values are set as the transition name and the transition No.



■Creating a transition

There are five ways of creation methods of a transition.

Each transition has a different type. The type can be checked on the "Transition Properties" screen.

"Detailed Expression" or "MELSAP-L (Instruction Format)" for the ladder display method can be switched in [View] ⇨ [Switch Ladder Display].

Creation method	Type	Operating procedure
Create a condition with a program (ladder, ST, FBD/LD). Describe a program in a Zoom.	Detailed expression	☞ Page 263 Creating Zooms (detailed expression)
Create a condition with a program (instruction format of a ladder). Describe a program in the properties.	Detailed expression	☞ Page 263 Creating Zooms (MELSAP-L (instruction format))
Use TRUE/FALSE as conditions. Describe a transition on an SFC diagram.	Label/device	Select a transition, then enter TRUE/FALSE in the transition name.
Use ON/OFF of bit device/bit type label as conditions. Describe a transition on an SFC diagram.	Label/device	Select a transition, then enter a bit device/bit-specified word device, or a bit type label in the transition name.
Create a condition with an FBD/LD element. Describe a transition on an SFC diagram.	Direct expression	Select [Edit] ⇨ [Modify] ⇨ [Direct Expression for Transition], then connect with an FBD/LD element.

When changing the transition type from the direct expression to the detailed expression, the data name of the transition is assigned automatically.

The data name may not be returned when changing the transition type from the detailed expression to the direct transition and changing to the detailed expression again.

(Example: Detailed expression (TRAN1) → direct expression (*) → detailed expression (Transition5))

In this case, select [Edit] ⇨ [Undo], or set the data name again.

■Entering comments of Transition No.

Enter a comment on the "Transition Properties" screen/device comment editor.

Inserting/editing actions

■Inserting an action

Select a step/an action, then select [Edit] ⇨ [Insert] ⇨ [Action] ( ).

Multiple actions can be inserted in a step.

Point

If all actions in a step are deleted, a transition is only checked all the time while a step is activated. Once the transition was satisfied, the next step is activated.

Steps without actions can be used when synchronizing the steps that are performing simultaneously etc.

■Changing an action name

Click the action, then select [Edit] ⇨ [Modify] ⇨ [Name]/press the F2 key.

For an action that a Zoom has been created, the data name of Zoom will not be changed if the action name was changed. Modify the data name to match with the action name on the "Zoom List" screen. (☞ Page 264 Displaying a Zoom list)

■Creating an action

There are three ways of creation method of an action.

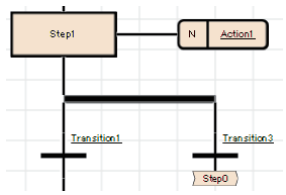
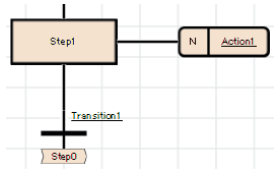
Each action has a different type. The type can be checked on the "Action Properties" screen.

"Detailed Expression" or "MELSAP-L (Instruction Format)" for the ladder display method can be switched in [View] ⇨ [Switch Ladder Display].

Creation method	Type	Operating procedure
Create an action with a program (ladder, ST, FBD/LD). Describe a program in a Zoom.	Detailed expression	☞ Page 263 Creating Zooms (detailed expression)
Create an action with a program (instruction format of a ladder). Describe a program in the properties.	Detailed expression	☞ Page 263 Creating Zooms (MELSAP-L (instruction format))
Use ON/OFF of bit device/bit type label as an action. Describe an action on an SFC diagram.	Label/device	Select an action, then enter a bit device/bit-specified word device, or a bit type label in the action name.

Inserting/editing jumps (connection lines)

■Inserting a jump

Insertion position	Operating procedure
	1. Select a transition, then select [Edit] ⇨ [Insert] ⇨ [Jump] ( ). 2. Select a step name of jump destination.
	1. Select a transition, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line]. 2. Select a step name of jump destination. All SFC diagram written below the inserted jump are deleted.

■Changing a jump destination

1. Select the transition which is immediately before the jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].
Alternatively, select the jump, and press the F2 key.

2. Select the step name of jump destination which is to be changed.

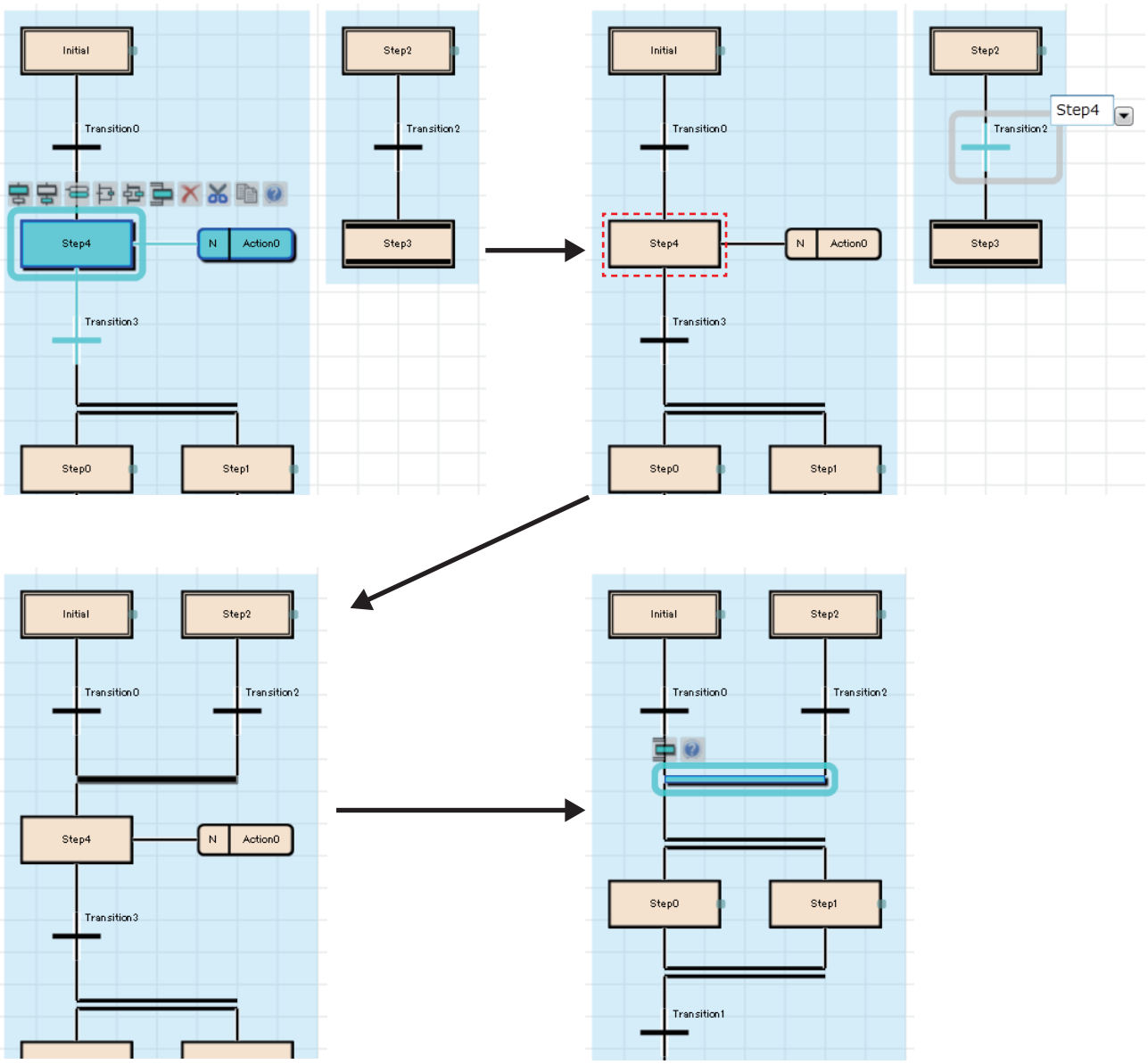
■Switching a jump/connection line

Select a jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].
To restore a connection line to a jump, select the connection line, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].

Precautions

When multiple initial steps are included, a jump cannot be inserted in a step of a simultaneous branch.
To connect a jump with a simultaneous branch, connect it immediately before the simultaneous branch according to the following procedure.

1. Insert a step before a simultaneous branch.
2. Select a transition, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].
3. Select the name of the inserted step.
4. Select a jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].
5. Delete the inserted step.



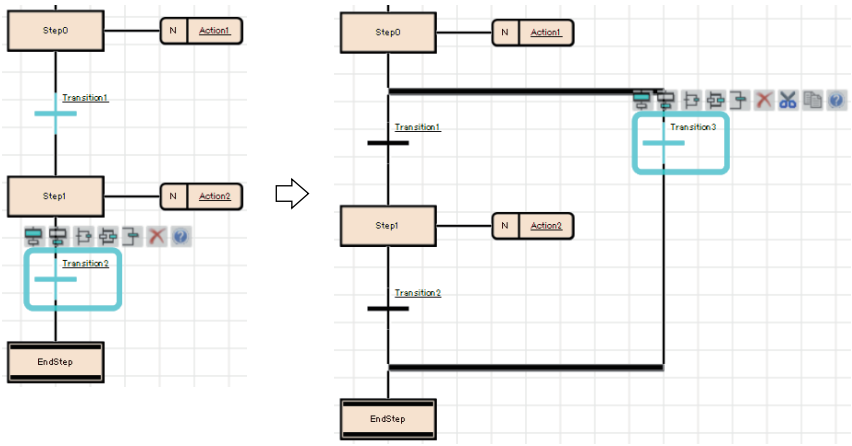
Inserting/adding selection branches and simultaneous branches

■Inserting a branch below a step/transition

Select a step/transition, then select [Edit] ⇨ [Insert] ⇨ [Selection Branch] ( )/[Simultaneous Branch] ( ).
When a selection branch/simultaneous branch was inserted, the lacking SFC elements are inserted automatically to make it be a proper SFC diagram.

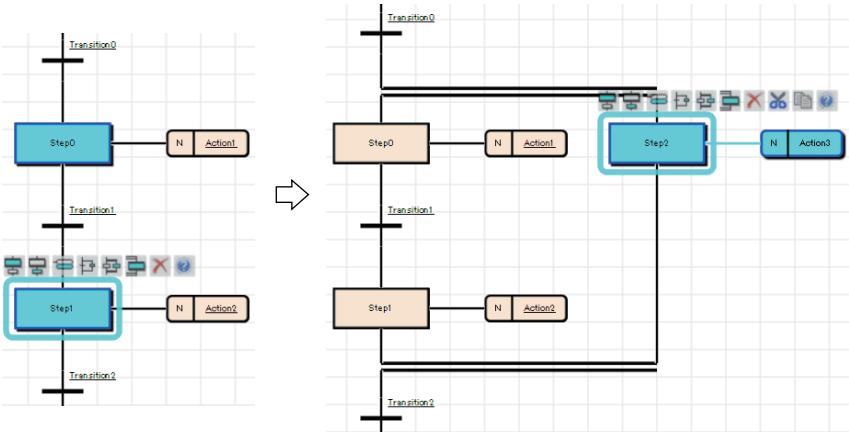
■Adding a selection branch on the right side of a transition/selection condition

Select a transition/selection branch to which a new one will be added, then select [Edit] ⇨ [Insert] ⇨ [Selection Branch Leg] ( ). (Multiple selections allowed.)



■Adding a simultaneous branch on the right side of a step/simultaneous branch

Select a step/simultaneous branch to which a new one is added, then select [Edit] ⇨ [Insert] ⇨ [Simultaneous Branch Leg] ( ). (Multiple selections allowed.)



Common operations of SFC elements

Operation		Operating procedure	
		Mouse	Keyboard
Select	To select a single element	Click an element to be selected.	Move the cursor on an element to be selected.
	To select multiple elements	• Click multiple elements with the Shift key held down. • Click the background of the SFC diagram editor, and drag the mouse diagonally around all elements to be selected.	Select multiple elements by moving the cursor with the Shift key held down.
	To select an SFC network block	Click an element, then select [Edit] ⇨ [Select SFC Network Block].	Select an element, then press the Ctrl + Shift + A keys.
	To select whole elements	The operation is the same as that for selecting multiple elements.	Press the Ctrl + A keys.
Move		Drag and drop an element. *1	—
Copy		Drag and drop an element to be copied with Ctrl held down. *1	Press the Ctrl + C keys, then select the copy destination and press the Ctrl + V keys. (Copy + paste)

*1 Copying a Zoom is followed as the option setting.

Deleting/cutting/copying/pasting/moving SFC elements

Some elements cannot be used by itself on the SFC editor. When SFC elements were deleted/cut/pasted, the other elements, that is not the target for this change, may be deleted/pasted to make a normal SFC diagram.

For the following elements, the previous elements of them also are deleted. For other elements, the next elements are deleted together.

- End step
- Step/transition that are placed immediately before a branch
- The last step/transition in a branch

A selected element cannot be pasted onto the other place where is not connected with a line on an SFC diagram.

For copying FBD/LD elements between editors, only pasting from the FBD/LD editor to the SFC diagram editor is available.

Point

By setting the following, a Zoom can be copied when copying a transition or an action to other blocks or projects. However, when copying them by dragging and dropping, the Zoom is not deleted even if the following has been set.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Operational Setting" ⇨ "Include Zoom in Copying"

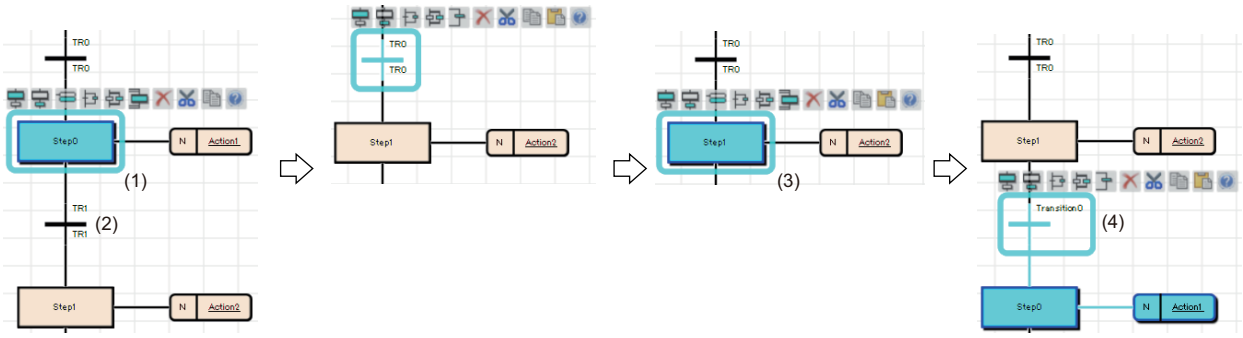
When copying a Zoom from other projects, set the following setting in a project of a copy source.

By setting the following option, when copying steps/transitions, the device comment of BL□\S and BL□\TR can also be copied.

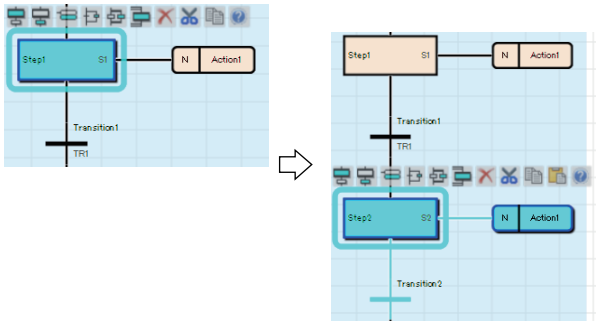
- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Operational Setting" ⇨ "Include Device Comment in Copying"

■Step

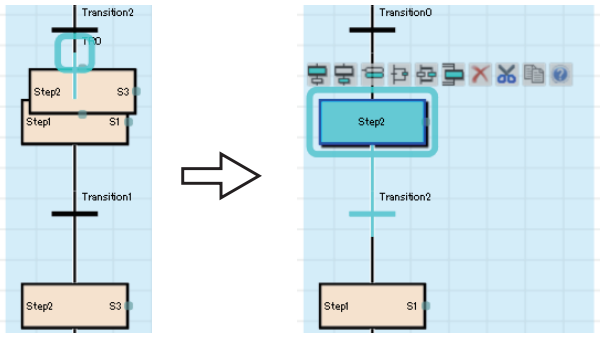
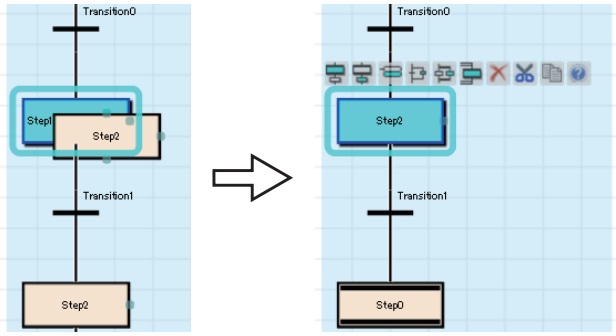
- When deleting an end step, the transition placed immediately before the end step also is deleted. Thereby, the step that connects to the above transition is changed to an end step. If the element above of the end step is a branch, the branch also is deleted.
- Operation examples of cutting/pasting:
  If the step (1) was cut, the next transition (2) is deleted together. If the step is pasted with selecting the step (3), the lacking transition (4) of the step (3) will be inserted.



- The same step names and step numbers cannot be set in a same SFC diagram. When copying a step, the name and number of the copied step are automatically changed and pasted to the copy destination.



A step can be moved by dragging and dropping (Also, It can be copied with Ctrl held down). Note that the operations differ depending on the place where it is dropped.

Operation	Example
Drag and drop a step (Step2) onto the connection line. The step (Step2) is moved there. When an action is connected with a step, the action is moved together.	
Drag and drop a step (Step2) onto another step (Step1). The step (Step1) is replaced. When an action is connected to the dragged step, The step is inserted under the dropped destination.	

An initial step cannot be dragged and dropped. Copy it at a keyboard.

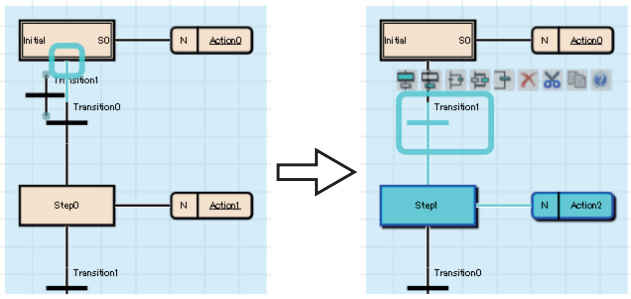
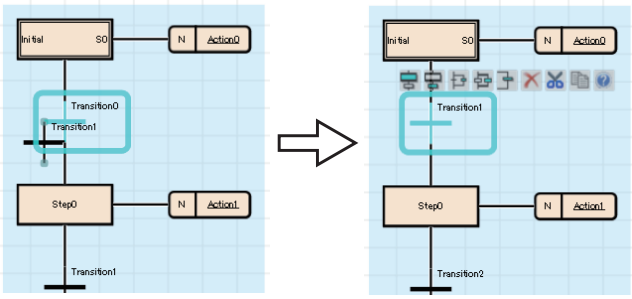
■Transition

Same Transition No. cannot be set in a same SFC diagram.

When copying a transition, the number of the copied transition is automatically changed and pasted to an SFC diagram in the same block.

When a Zoom has already been created, the Zoom is not deleted even if the transition is deleted on an SFC diagram. Delete it on the "Zoom List" screen. (☞ Page 264 Displaying a Zoom list)

A transition can be moved by dragging and dropping (Also, It can be copied with Ctrl held down). Note that the operations differ depending on the place where it is dropped.

Operation	Example
Drag and drop a transition (Transition1) onto the connection line. The transition (Transition1) is moved there. When a transition of the direct expression connects with an FBD/LD element such as a contact, the FBD/LD element can be moved together.	
Drag and drop a transition (Transition1) onto another transition (Transition0). The transition (Transition0) is replaced. When the dropped destination is the direct expression that connects with an FBD/LD element, the connected FBD/LD element is disconnected when replacing it. When the dragged transition is the direct expression that connects with an FBD/LD element, it cannot be moved.	

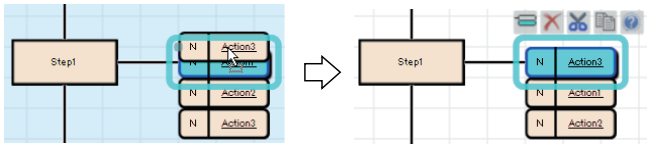
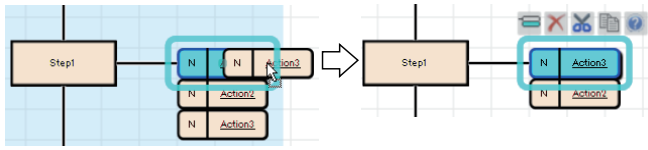
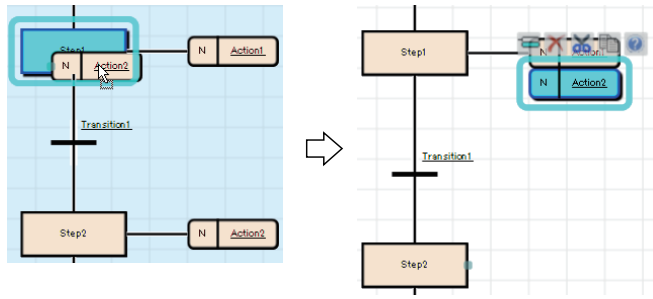
Point

When copying a transition, the transition name of a copy source is copied.
When copying and pasting a transition in a same block, a same Zoom is shared between a copy source and a copy destination.
For copying a transition with a different transition name from that of a copy source, set the following option.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Operational Setting" ⇨ "Paste Data with Different Data Name"

■Action

Cut/copy an action, and paste it selecting a step/action of the destination.
An action can be moved by dragging and dropping (Also, It can be copied with Ctrl held down). Note that the operations differ depending on the place where it is dropped.

Operation	Example
Drag and drop an action (Action3) onto a target action (Action1). The orders of those actions will be switched.	
Drag and drop an action (Action3) onto the same height of a target action (Action1). The action (Action1) is replaced.	
Drag and drop an action (Action2) onto a target step (Step1). The action (Action2) will be moved.	

When a Zoom has already been created, the Zoom will not be deleted if an action is deleted on an SFC diagram. Delete it on the "Zoom List" screen. (☞ Page 264 Displaying a Zoom list)

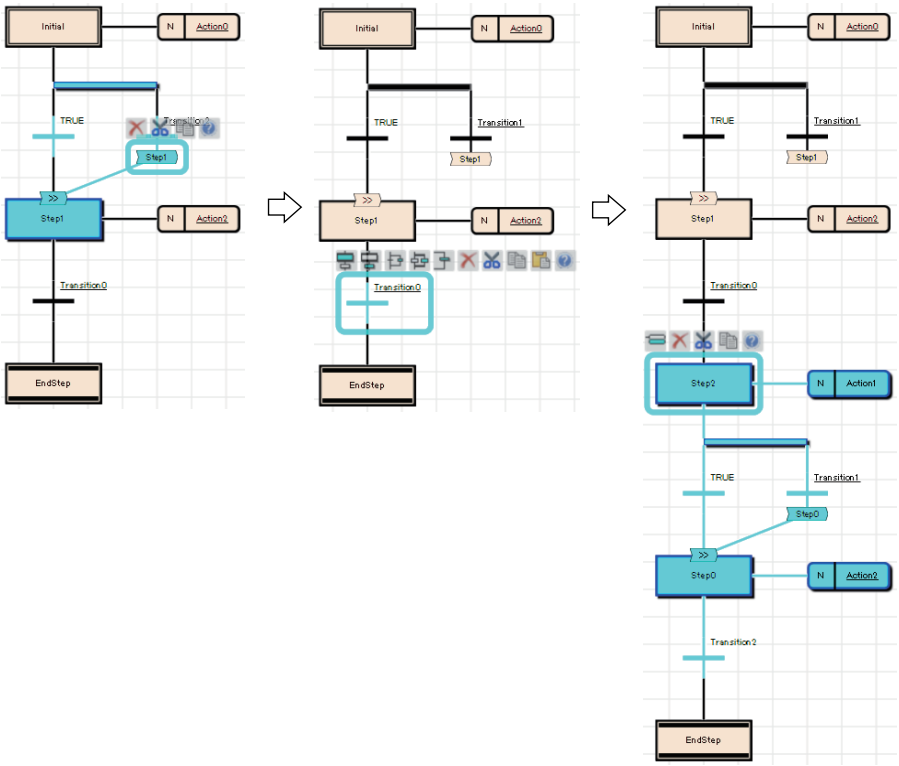
Point

When copying an action, the action name of a copy source is copied.
When copying and pasting an action in a same block, a same Zoom is shared between a copy source and a copy destination.
For copying an action with a different action name from that of a copy source, set the following option.

- [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Operational Setting" ⇨ "Paste Data with Different Data Name"

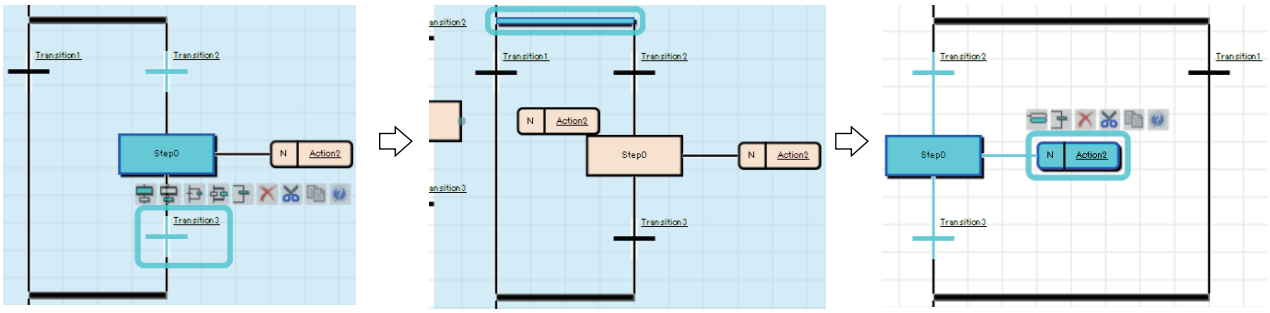
■Jump

- Deleting a jump only is not applicable. Switch the jump to a connection line first. (☞ Page 261 Changing a jump to a selection branch (connection))
- It is not applicable to copy a jump only. Copy a jump source and a jump destination, and paste them.
  The following is an example image when selecting and pasting a transition (Transition0). When selecting an end step, it is pasted as well.



■Selection branch

Drag and drop a step or a transition onto the left/right side of a selection branch. The orders of those branches is switched.

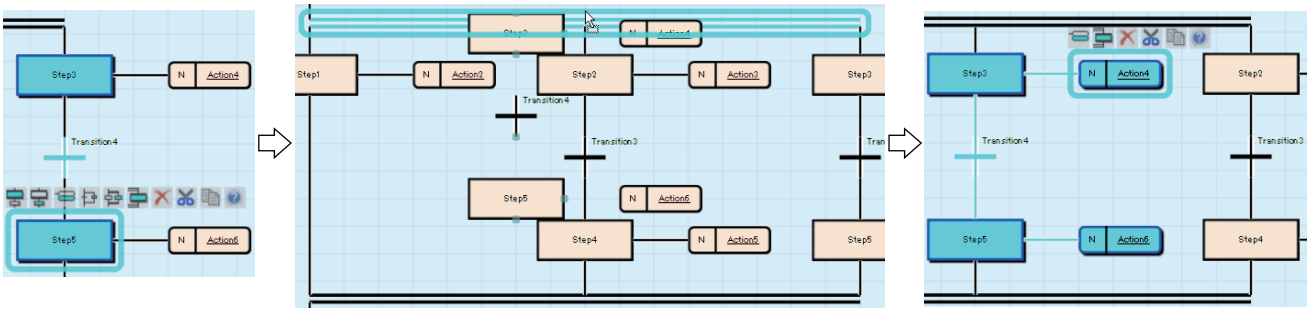


Precautions

The left side of transition is given priority to perform when both side of transitions were satisfied at a same time. Check the operation of SFC program before switching branches.

■Simultaneous branch

Drag and drop a step and a transition onto the simultaneous branch. The orders of those branch will be switched.



■SFC network block

Elements in an SFC network block can be deleted/cut/copied in a batch by selecting the SFC network block.

When the leftmost SFC network block includes multiple initial steps, the SFC network block cannot be copied and cut. Copy and cut for each element.

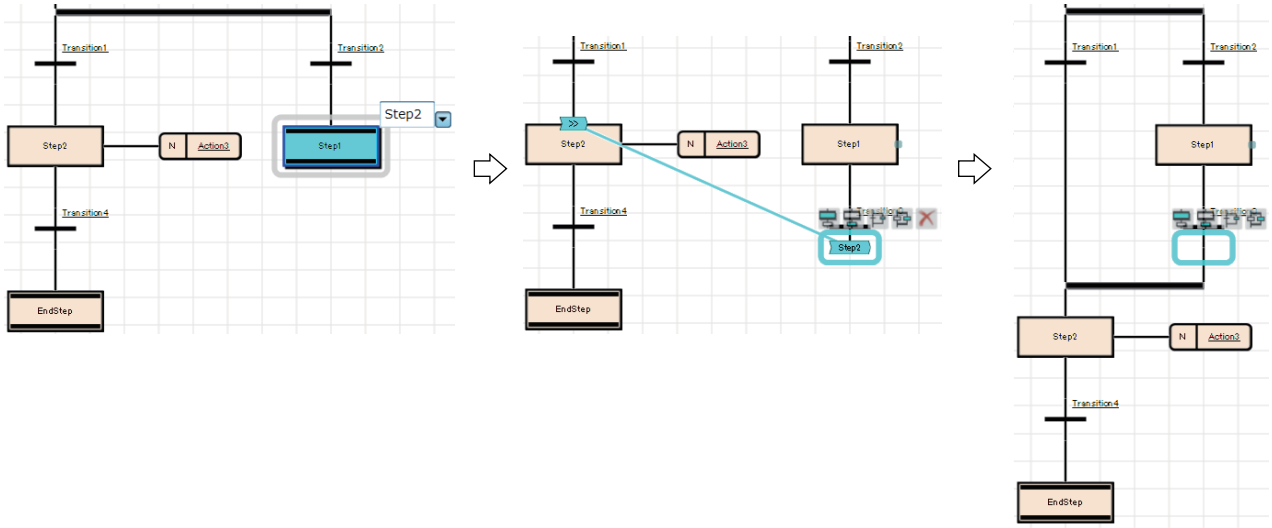
Changing an SFC element

■Changing an end step to a normal step

For restoring a step which has been changed to an end step (example: Step1) once to a normal step, switch it to a jump, then switch the jump symbol to a connection line.

Ex.

1. Select an end step (Step1), and select [Edit] ⇨ [Modify] ⇨ [End Step/Jump]. Then select a step name (Step2) which has been placed under the branch before changing.
2. Select the added jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].

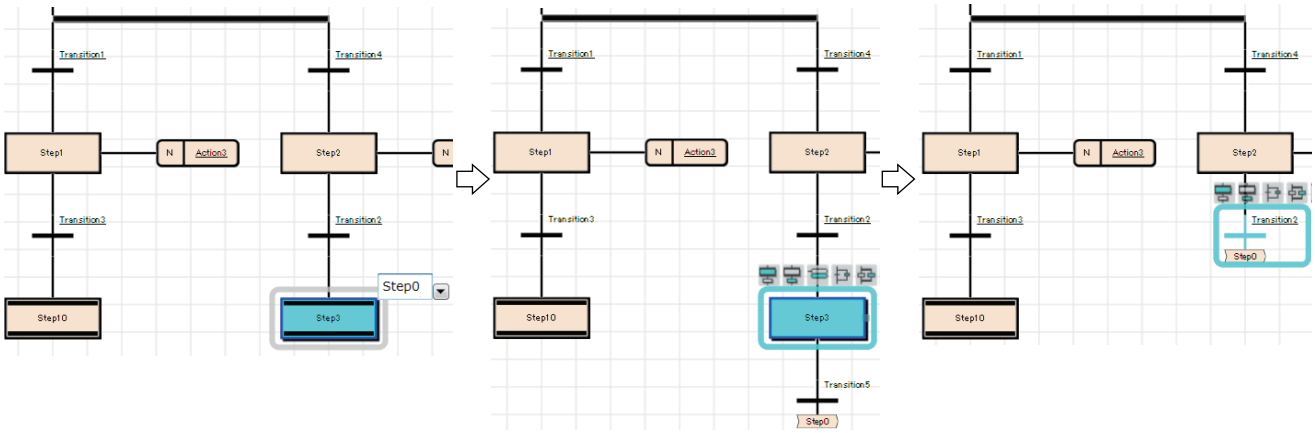


■Changing an end step to a jump

After switching an end step to a jump on the selection branch, delete the unnecessary step.

Ex.

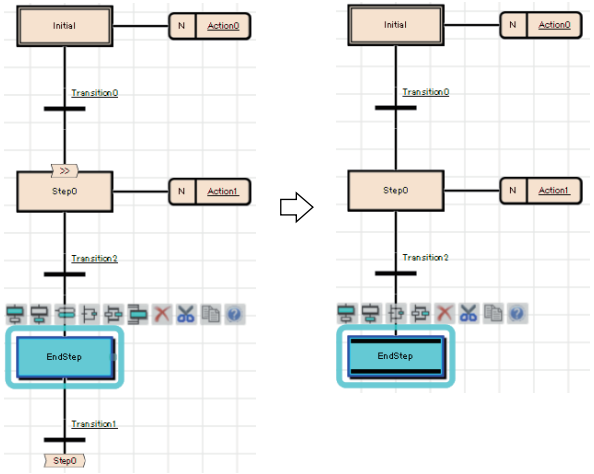
1. Select an end step to be changed (Step3), and select [Edit] ⇨ [Modify] ⇨ [End Step/Jump]. Then select a jump destination (Step0).
2. Delete the unnecessary step (Step3).



■Changing a jump to an end step

Ex.

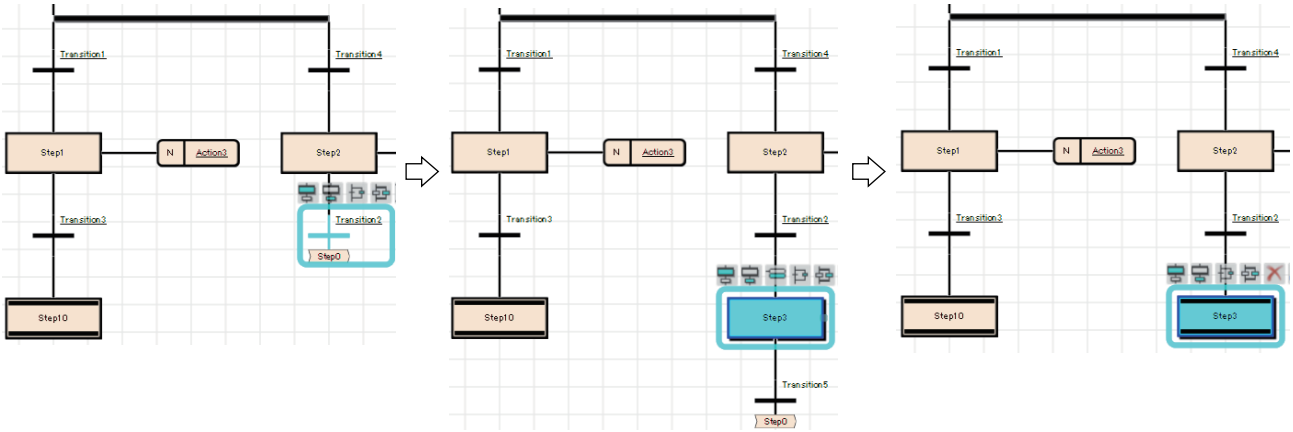
Select a step which places before a jump, then select the [Edit] ⇨ [Modify] ⇨ [End Step/Jump].



For a jump on a selection branch, insert a step before a jump to be changed, and change the step to an end step.

Ex.

1. Insert a step (Step3) before a jump to be changed.
2. Select the inserted step, then select [Edit] ⇨ [Modify] ⇨ [End Step/Jump].

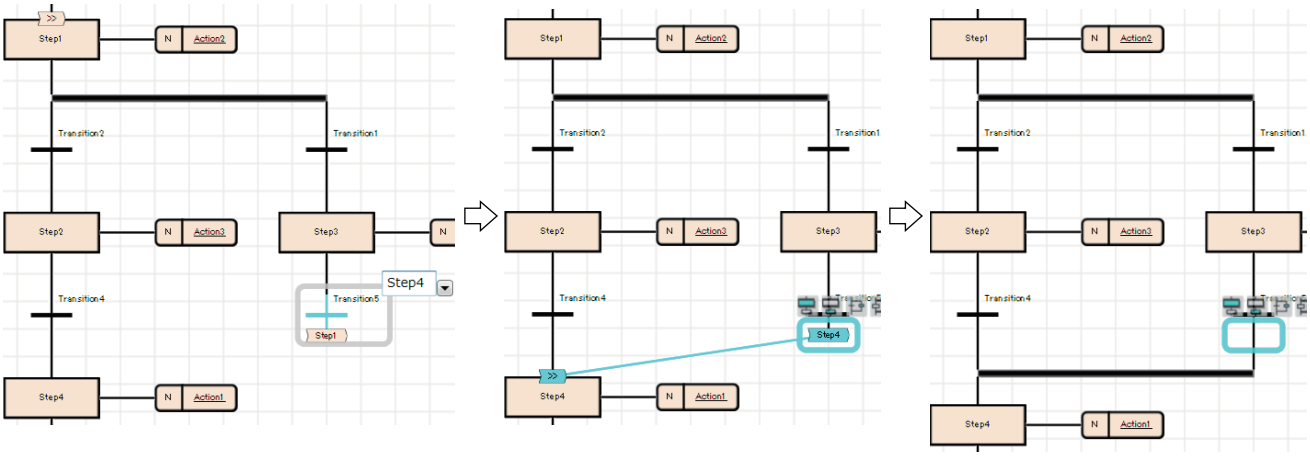


■Changing a jump to a selection branch (connection)

Change a jump destination to the step which is immediately after the branch to be connected, then switch it to a connection line.

Ex.

1. Select the transition (Transition5) that places immediately before a jump to be changed, and select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line]. Then, select the step (Step4) which will be connected with the connection line.
2. Select a jump, then select [Edit] ⇨ [Modify] ⇨ [Switch between Jump Symbol and Connection Line].



Linking a comment

A comment element is simultaneously moved with an element by linking them.

The link of a comment can be set for an SFC element and an FBD/LD element.

It cannot be set for a selection blanch, simultaneous branch, and jump symbol.

For the method for operating a link, refer to the following section.

☞ Page 236 Linking a comment

■Method for moving only a comment element linking with an SFC element

By selecting an element with a link, all elements linking with it are selected.

To move a comment element linking with an SFC element without releasing the link, click the target element twice or select it with Ctrl held down.

In addition, a comment element can be moved by clicking and dragging it.

■Editing an element with a link

When copying a comment element and element that link each other, the link is remained after the copy.

However, the link of a comment element and an SFC element is released even though they are copied together.

When deleting a comment element or element that link each other, the link is released.

■Change of a position for a comment with an SFC element insertion/deletion

With an SFC element insertion or deletion, the position of a comment element with a link is moved.

As a result, if a comment element is not likely to be displayed within the frame of the SFC editor, it is displayed in the first line or the first row.

Converting a block

Whether there is any problem on an active SFC diagram can be checked. The program in a Zoom will not be checked.

Operating procedure

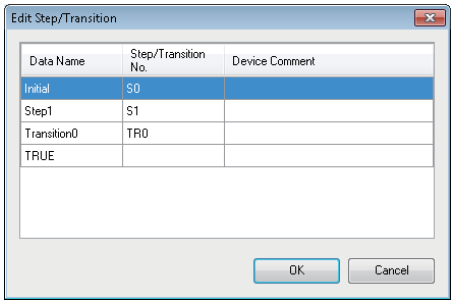
Select [Convert] ⇨ [Convert Block].

Editing Step No./Transition No.

Step No. (S☐)/Transition No. (TR☐) in a block and its device comments can be checked/changed in a list.

Window

[Edit] ⇨ [Edit Step/Transition]



Operating procedure

To change a device, select the cell in the "Step/Transition No." column and click the [OK] button.

Creating/displaying Zooms (action/transition)

Creating Zooms (detailed expression)

Programs of actions/transitions can be created in languages corresponding to contents.

The entering method of a program is same as the one for creating a program body. Some instructions cannot be used for an action/transition. For details, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

To display the SFC diagram which is to be the start source, select [View] ⇨ [Open Zoom Source Block].

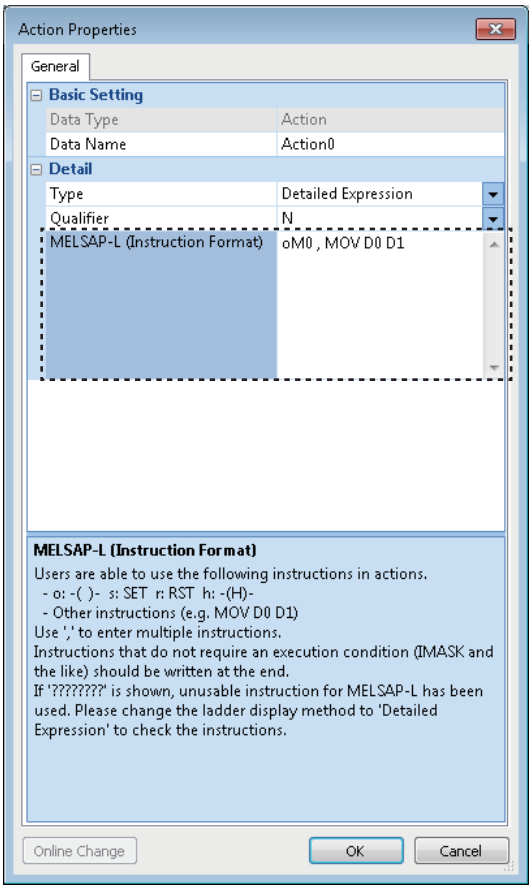
Operating procedure

1. Double-click an action name/transition name on an SFC diagram.
2. Set each item on the "New Data" screen, then click the [OK] button.
3. Enter a program in a Zoom by using Ladder Diagram, Structured Text, or Function Block Diagram/Ladder Diagram language.

Creating Zooms (MELSAP-L (instruction format))

A program of an action/transition can be created in MELSAP-L (instruction format) of a ladder.

Enter a program in the property screen.



For details on MELSAP-L (instruction format), refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

Operating procedure

1. Double-click an action name/transition name on an SFC diagram.
2. Enter a program in the "MELSAP-L (Instruction Format)" column in MELSAP-L (instruction format) on the displayed "Action Properties" screen or "Transition Properties" screen.
3. Click the [OK] button.

The created program is retained as one for a Zoom.

■Online program change after editing a program in MELSAP-L (instruction format)

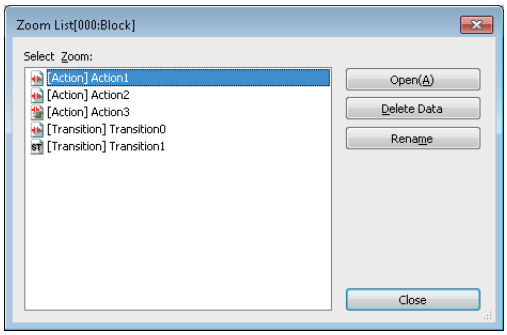
The online program change function can be performed for the edited program on the property screen. The shortcut key for conversion, online program change, and all conversion can be used on the property screen.
Only contents changed on the property screen are written. The online change function can be performed only while the property screen is open.
Online change cannot be performed when closing the screen by clicking the [OK] button after editing.

Displaying a Zoom list

Display a created Zoom in a list.
Displaying/deleting/changing name of Zoom is possible in a list.

Window

- Open the target SFC diagram editor, then select [View] ⇨ [Open Zoom List].
- Select "Program" ⇨ "(execution type)" ⇨ "(program file)" ⇨ "(block)" in the "Navigation" window, then right-click and select [Open Zoom List] from the shortcut menu.

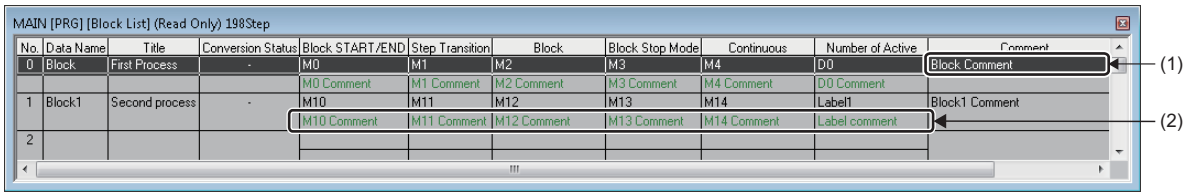


Displaying an SFC block list

Display a data name of a block, title, conversion status, and block information in a program file in a list.
For details on the block information, refer to the following manual.
MELSEC iQ-R Programming Manual (Program Design)

Window

- Open the target SFC diagram editor, then select [View] ⇨ [Open SFC Block List].
- Select "Program" ⇨ "(execution type)" ⇨ "(program file)" in the "Navigation" window, then right-click and select [Open SFC Block List] from the shortcut menu.



Displayed items

Item	Description	Related operation
(1) Comment	Comments set on the "Properties" screen of block.	■Show/Hide [View] ⇨ [SFC Block List Comment]
(2) Device/label comment	Comments for devices/labels which were set to the block information on the "Properties" screen of block.	■Show/Hide [View] ⇨ [Display Device]

Editing/creating blocks on SFC block list

To edit existing blocks, and to create new blocks are applicable on an SFC block list.

Operating procedure

Double-click an editing target block. When creating a new block, select a blank row.

Copying blocks

Operating procedure

1. Select a block to be copied, then select [Edit] ⇨ [Copy] ( ).
2. Select a block to be pasted, then select [Edit] ⇨ [Paste] ( ).
3. Select whether to change or overwrite its block No. on the confirmation screen, then click the [OK] button.
4. Select an item to be pasted on the "Contents to Paste" screen, then click the [OK] button.

Point

Blocks copied in the "Navigation" window can be pasted on a block list.
In that method, multiple blocks can be selected and copied in the "Navigation" window.

Precautions

If "Step/Transition Comment" is selected on the "Contents to Paste" screen, steps/transition comments in the device comment will be pasted after pasting all copied data. Therefore, the steps/transition comments may not be pasted when the [Cancel] button is clicked during the processing even if data pasting has been already completed.

Search

■Searching for block information

Search for block information (device/label) on an SFC block list.

Operating procedure

1. Select [Find/Replace] ⇨ [Block Information Find Device].
2. Enter a device/label to be searched, then click the [Find Next] button.

■Jump

Specify a block No. or a block name, and move the cursor on an SFC block list.

Operating procedure

1. Select [Find/Replace] ⇨ [Jump].
2. Select a block No./block name on the "Jump" screen, then click the [OK] button.

Point

The "Jump" screen can be displayed by pressing a numeric key of the keyboard on an SFC block list.

Displaying SFC diagrams

Display an SFC diagram of block, which is pointed with the cursor, from an SFC block list.

Operating procedure

1. Move the cursor on a block to be displayed.
2. Select [View] ⇨ [Open SFC Body], or double-click a block to be displayed.

Displaying local label editor

Display a local label editor of block, which is pointed with the cursor, from an SFC block list.

Operating procedure

1. Move the cursor on a block to be displayed.
2. Select [View] ⇨ [Open Label Setting].

Searching/replacing data in a program

The search functions that can be used in the SFC diagram editor as follows:

Function name	Description	Reference
Cross reference	Checks a declaration location and a reference location of a device and a label in a list.	Page 299 SEARCHING DATA
Device list	Checks the usage of devices being used.	
Find and replace	• Searches for and replaces a device name, label name, instruction name, and character strings. • Changes open/close contact. • Replaces devices in a batch.	

Precautions

- When a Zoom has been created, the data name of Zoom will not be changed if the character strings of transition name/action name are replaced on an SFC diagram. Change them on the "Zoom List" screen. (☞ Page 264 Displaying a Zoom list)

Displaying Help

Check the elements used in the SFC program on the e-Manual Viewer.

To check, the files of the corresponding programming manuals requires to be registered in e-Manual Viewer.

Operating procedure

1. Select a check target element.
2. Press the F1 key.

6.7 Registering Device Comments

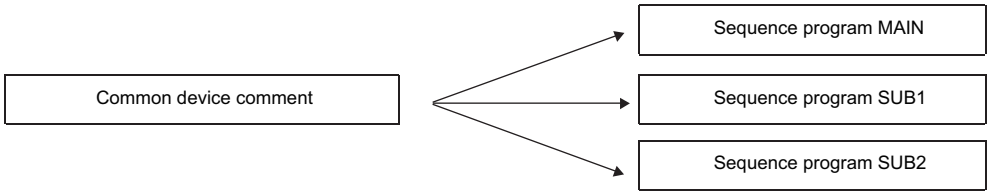
This section explains the features and setting methods for device comments.

Device comments

Two types of device comments can be created: one that can be set in common and one that can be set for each program.
GX Works3 supports global device comments/local device comments of GX Works2, and common comments/comments by program of GX Developer.
Up to 16 comments can be set for one device. (☞ Page 66 Comment Display Setting)
Up to 1024 characters can be set for one comment.
Comments can be set in Japanese, English, Chinese or other languages, and the display language can be switched among these languages.
■ Difference between a device comment and a label comment
'Device comment' refers to a comment that is added to devices, and read from/written to a CPU module.
'Label comment' refers to a comment that is added to a defined label.

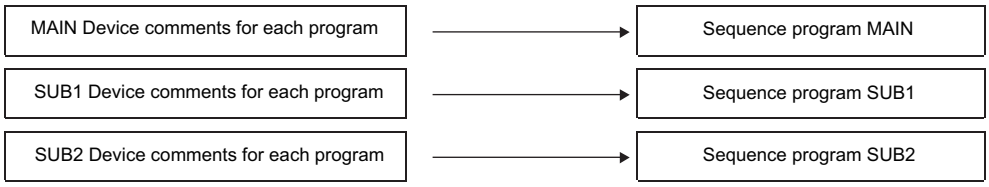
Common device comment

'Common device comment' refers to a device comment that is automatically created when creating a new project.
Set device comment data as a common device comment when using it in multiple programs.
This can be set even if only one program exists.



Device comment for each program

'Device comment for each program' refers to a device comment that can be created arbitrarily.
This device comment can be used by creating it with the same name as a program and being associated with the program.
Create a new each program device comment if necessary. (☞ Page 108 Creating data)



'Each program device comment' can be created under the different data name from the sequence program. However, the comment will not be linked with the sequence program.
To make the comments relate to the sequence program, the comments should have the same data names as the program name.
Remote head modules do not support device comments for each program.

Precautions

For FX5CPUs, device comments set for each program cannot be written to a CPU module.

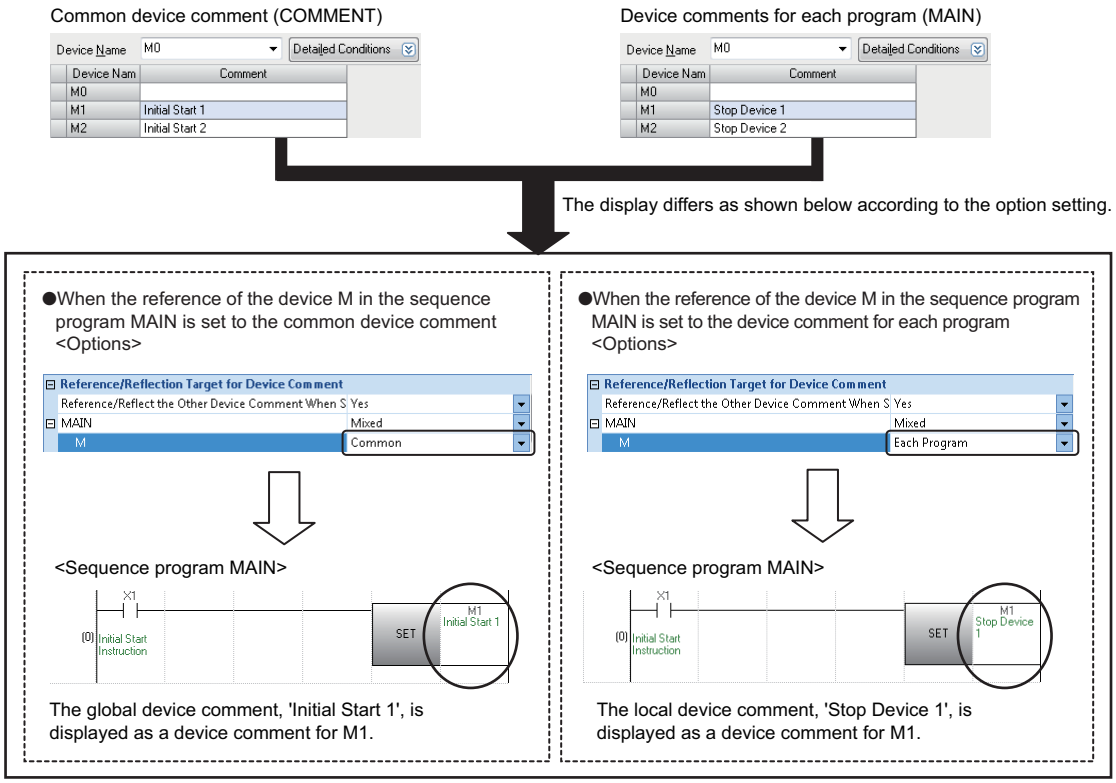
■Setting device comments for each program

When comments are set both in Common Device Comment and in Each Program Device Comment, specify the comment to be displayed on the program editor by setting the following option.

• [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target"

Ex.

When different device comments are set for the same device (M)



When any comments do not exist in the reference that was set in "Device Comment Reference/Reflection Target", the other comment is displayed.

Applicable devices

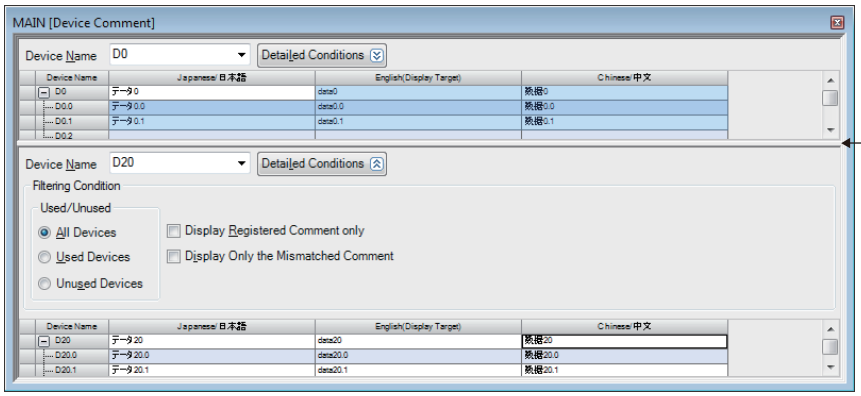
For the device types and comment setting availability, refer to the following section.

☞ Page 541 Applicable Devices in GX Works3

Configuration of device comment editor

Window

- Common device comment: "Device" ⇨ "Device Comment" ⇨ "Common Device Comment" in the "Navigation" window
- Device comment for each program: "Device" ⇨"Device Comment" ⇨ "Each Program Device Comment" ⇨ "(data name)" in the "Navigation" window



A device comment editor can be split into two parallel or horizontal screens.

Pressing the Ctrl + Enter keys creates a line break in a comment column.

Point

- The hidden comment is displayed by double-clicking + in the device name column.

- Fonts can be changed. (☞ Page 65 Checking and Changing Colors and Fonts)

Displaying the device comment editor in a program editor

The device comment editor can be displayed in a program editor.

The device comment editor is displayed according to the setting in the following option.

- [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target"

When any comments do not exist in the reference that was set in "Device Comment Reference/Reflection Target", the other comment editor is displayed.

Operating procedure

1. Open a program editor.
2. Select [View] ⇨ [Open Device Comment Setting] ⇨ [Open in Front]/[Tile Horizontally].

Precautions

When selecting a device on the program editor, the device comment editor corresponding to the selected device will appear.

For the ST editor, place the mouse cursor over a device to select.

When using the menu before selecting an element, the device comment editor to set a common device comment will appear.

Point

In another way to display the program editor and the device comment editor horizontally, press Ctrl + Alt + C keys.

Creating device comments

Comments can be created for each device in the device comment editor.
Adding device comments make it easy to understand the content of program processing.
When less number of characters are entered, the data size to be written to CPU module can be reduced.
Set the applicable number of characters in the following option.

- [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Device Comment Editor" ⇨ "Number of Device Comment Editing/Displaying Characters"

When creating device comments for each program, create a device comment data in advance. (☞ Page 108 Creating data)
The comments can be entered on the ladder editor. For details, refer to the following section.
☞ Page 194 Entering/editing comments

Operating procedure

1. Enter the device of which comment is to be set in "Device Name".
2. Enter a comment for "Comment".

Point

- By selecting two or more consecutive cells in which the comment with number is inserted, and dragging the '+' symbol displayed at the lower right corner of the cell, the data of which number is incremented can be entered.
- When cutting/copying the hidden bit-specified word device comments, select the range and [Edit] ⇨ [Cut the Range Including Hidden Bit Specification Information]/[Copy the Range Including Hidden Bit Specification Information].
  The bit-specified comments can also be pasted regardless of the setting of display/hidden by selecting [Edit] ⇨ [Paste the Range Including Hidden Bit Specification Information].

Creating multiple comments and setting display target

For details, refer to the following section.
☞ Page 66 Comment Display Setting

Detecting devices with empty cell

When comments are set in the multiple rows, detect the devices with empty cells.

Operating procedure

■Detect comments from device data being displayed on the device comment editor

Select "Display Only the Mismatched Comment" in the filter condition on the device comment editor.

■Detect comments from all device data in the device comment data

Select [Edit] ⇨ [Detect the Mismatched Comment].
Double-click "NG" on the displayed "Detect the Matched Comment of All Devices" screen to edit the device comment editor.

Deleting unused device comments

Delete unused comments in a program in a batch. To delete the comments, open the device comment editor.

Operating procedure

Select [Edit] ⇨ [Delete Unused Device Comment].

Deletion target

Device comment type	Deletion target
Common device comment	Unused device comments in all programs
Each program device comment	Unused device comments in the corresponding program
	Device comments in all programs

Clearing all device comments

Delete the comments set to device comment data in a batch.

Operating procedure

■Delete all device data in the device comment data

Select [Edit] ⇨ [Clear All (All Devices)].

■Delete device data being displayed on the device comment editor

Select [Edit] ⇨ [Clear All (Displayed Devices)].

Importing to/exporting from device comments

Import/export a device comment from/to a CSV file.
When multiple comments are set, the comments selected in "Available" on the "Multiple Comments Display Setting" screen are output.

Import

Import a comment in a CSV file to a device comment.
When importing one file only, it will be imported in the selected device comment.
When importing multiple files, they will be imported in the device comments which have the same file names.
If a device comment, which has a same file name, does not exist, a new device comment will be created.

Operating procedure

1. According to the number of files to be imported, perform the following operation.
- One file: Select a device comment to import a file in the "Navigation" window, then right-click and select [Import File] from the shortcut menu.
- Multiple files: Select "Device" ⇨ "Device Comment" in the "Navigation" window, then right-click and select [Import Multiple Files] from the shortcut menu.

2. Set the extended setting as necessary, then click the [Yes] button.
3. Select a file(s) to be installed on the "Import File" screen, and click the [Open] button.

Point

Files exported for each device type can be imported in a batch by selecting [Import Multiple Files] from the shortcut menu.

Precautions

- When exporting files by splitting them for each device type, a device symbol is added to each file name. When importing them, devices defined in the files are read regardless of the device symbols of file names.
- When importing multiple files, they are read in ascending order of the file names. When the same device exist in multiple files, the comment in the file read later are applied.

Export

Write a device comment to a CSV file.
When exporting one file only, the CSV file needs to be saved with an arbitrary name.
When exporting multiple files, CSV files are saved with the same name as device comments in an arbitrary folder.

Operating procedure

1. According to the number of files that will store device comments, perform the following operation.
- One file: Select a device comment to export in the "Navigation" window, then right-click and select [Export to File] from the shortcut menu.
- Multiple files: Select "Device" ⇨ "Device Comment" in the "Navigation" window, then right-click and select [Export to Multiple Files] from the shortcut menu.

2. Set the extended setting as necessary, then click the [Yes] button.
3. Select a folder that will store the exported file(s) on the "Export to File" screen/or "Specify Folder to Export" screen, and click the [Save] or [OK] button.

Point

By selecting "Write comment data to different files sorted by target device types." in the extended setting, files split for each device type can be output.
The file name of a output file is "(data name)" + "(device symbol)" + ".CSV". When "\" is included in a device symbol, it is replaced to "_".

Precautions

- When a device comment, that exceeds the applicable number of characters, is set in the device comment editor, a warning message appears in the "Output" window and the excessive characters are deleted.
- When an error occurs during import or export of multiple files, the processing will terminate with saving the device comments imported/exported until then.
- When no device comment is set for all devices, a file(s) is not output by exporting a device comment(s).

CSV file format

The column headers of device comment editor and header names of a CSV file are linked.
- On the device comment editor, only the data of which column titles matches with header names in the CSV file is imported.
- Data can be imported even when the sorted order of CSV file does not match with the sorted order of the device comment editor.
- When importing a CSV file that is exported from GX Works3 with different language, edit the header title name in the CSV file to match the header title in the device comment editor of the import target GX Works3.

Point

The CSV files exported with GX Works2 can be imported in GX Works3.
When multiple comment display setting is set, import the CSV file after editing the header names in the CSV file exported from GX Works2 to match the header titles in the device comment editor of GX Works3.

Searching device comments

When searching device comments, refer to the following section.
☞ Page 304 Searching/Replacing Character Strings

Reading sample comments

Set the sample comments of special relays/special registers/CPU buffer memory and intelligent function modules automatically.

Open the device comment editor in advance.

FX5CPUs do not support sample comments of CPU buffer memory.

Window

[Edit] ⇨ [Read from Sample Comment]

Precautions

When reading sample comments of an intelligent function module, the data size may exceed the memory capacity of the CPU module and data may not be written to a CPU module. In this case, prepare an SD memory card.

For FX5CPU, the writable capacity is the same as that of the CPU module even when data is written to an SD memory card.

6.8 Checking a program

This section explains the method for checking whether an error exists in a created program.
The following table shows the difference of check contents in the program check and the syntax check.
○: Checked, ×: Not checked

Check point	Syntax check	Program check
Ladder block check (ladder program, FBD/LD program)	○	×
Program syntax check (ST program)	○	×
Use of undefined label check	○	×
Data type of argument check	○	×
Duplicated coils check	×	○
Use of out-of-range device check	×	○
Incorrect pointer check	×	○
Instructions, used in pairs, check (such as (FOR/NEXT, MC/MCR)	×	○

Syntax check

Check the validity of the program syntax.
Ladder, ST, and FBD/LD programs are the targets of this check.
Remote head modules do not support it.

Operating procedure

■Checking all programs

Select [Convert] ⇨ [Check Syntax] ⇨ [ALL POUs].

■Checking programs on activated program editors

Select [Convert] ⇨ [Check Syntax] ⇨ [Current POU].
When any error is found in the check result, the error message appears in the "Output" window. Take corrective actions according to the displayed contents.
When multiple worksheets exist, all programs in the POUs are checked by the this check.

Precautions

- After the check, any operation cannot be undone or redone on the ladder editor.
- When a return element is used in an FBD/LD program, the local label may be changed to the unconverted state and the project may also be changed to the unsaved state.

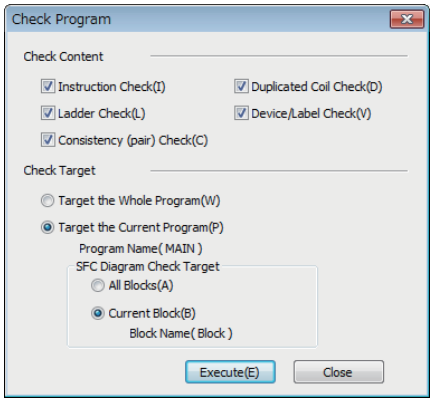
Program check

Check whether improper input or inconsistency of programs exists.

Remote head modules do not support it.

Window

[Tool] ⇨ [Check Program]



When any error is found in the check result, the error message appears in the "Output" window. Take corrective actions according to the displayed contents.

Check targets for duplicated coil

■Target instruction

The following instructions are checked as targets.

- RCPU: EGP, EGF, OUT, OUTH, SET, PLS, PLF, FF, DELTA, DELTAP, SFT, SFTP, MC, pointer, BLKMOVB*1, MOVB*1, CMLB*1
- FX5CPU: OUT, OUTH, SET, PLS, PLF, FF, SFT, SFTP, MC, pointer, BLKMOVB*1, MOVB*1, CMLB*1, OUTHS, UDCNTF

*1 When the device is T/C/ST/LT/LC/LST, it is excluded from the check.

■Target device list

The following devices are checked as targets.

The devices assigned to labels are excluded from the check.

- RCPU

Check range	Type	Device
Check in a project	Device	M, SM, L, F, V, S, TR, X, Y, B, SB, DX, DY, D, SD, R, ZR, RD, W, SW, T(TC), T(TS), T(TN), C(CC), C(CS), C(CN), ST(STC/SC), ST(STS/SS), ST(STN/SN), LT(LTC), LT(LTS), LT(LTN), LC(LCC), LC(LCS), LC(LCN), LST(LSTC/LSC), LST(LSTS/LSS), LST(LSTN/L), P, I, BL
	Link direct device	J□\X, J□\Y, J□\B, J□\SB, J□\W, J□\SW
	Module access device	U□\G, U□\HG
	Safety device	SA\M, SA\SM, SA\X, SA\Y, SA\B, SA\D, SA\SD, SA\W, SA\T(TC), SA\T(TS), SA\T(TN), SA\C(CC), SA\C(CS), SA\C(CN), SA\ST(STC/SC), SA\ST(STS/SS), SA\ST(STN/SN)
	Step No./ Transition No. in an SFC program	BL□\S
Check in file only	Device	#M, #V, #D, #T(TC), #T(TS), #T(TN), #C(CC), #C(CS), #C(CN), #ST(STC/SC), #ST(STS/SS), #ST(STN/SN), #LT(LTC), #LT(LTS), #LT(LTN), #LC(LCC), #LC(LCS), #LC(LCN), #LST(LSTC/LSC), #LST(LSTS/LSS), #LST(LSTN/LSN), #P
	Safety device	SA\#M, SA\#D, SA\#T(TC), SA\#T(TS), SA\#T(TN), SA\#C(CC), SA\#C(CS), SA\#C(CN), SA\#ST(STC/SC), SA\#ST(STS/SS), SA\#ST(STN/SN)

• FX5CPU

Check range	Type	Device
Check in a project	Device	M, SM, L, F, S, X, Y, B, SB, DX, DY, D, SD, R, W, SW, T(TC), T(TS), T(TN), C(CC), C(CS), C(CN), ST(STC/SC), ST(STS/SS), ST(STN/SN), LC(LCC), LC(LCS), LC(LCN), P, I
	Module access device	U□\G

6.9 Converting Programs

This section explains the method for converting a created program into a code that can be executed.
A data name displayed in red in the "Navigation" window indicates that the data is unconverted. The data is required to be converted.
A data name displayed in light blue in the "Navigation" window indicates that the data is unused. The data is not converted.
The name of unused data that is not converted is displayed in red. After the data is converted successfully, it will be displayed in light blue. If an conversion error occurs, all the unused data will be displayed in red.

Converting any or all programs

The program in a project can be converted and a label can be assigned. The program is also checked at verification.
The differences in operation between "Convert" and "Rebuild All" are shown below:

Item	Conversion target	Assignment of labels	Program check
Convert*1	Newly added or changed program and label	The memory is assigned to the newly added and changed label.	Whether to perform the Check Program function can be specified in "Basic Setting" by selecting [Tool] ⇨ [Options] ⇨ "Convert".
Rebuild All	All programs and labels in a project (regardless if changed or not)	Retain: Converts a program without changing the memory assigned to a defined label*2. A newly added label and a label, of which the label name, data type, class, and initial value etc. have been changed, are reassigned again. Reassignment: Converts a program with assigning the memory to all labels. The memory usage can be optimized.	Whether to perform the Check Program function can be specified on the "Rebuild All" screen*3.

*1 Remote head modules do not support it.
*2 A label of which the label name, data type, class, and initial value etc. have not been changed after reassigning the memory in previous conversion of any or all programs.
*3 The instruction check cannot be performed.

Operating procedure

1. Select [Convert] ⇨ [Convert] *1()/[Rebuild All] ().
2. To convert all programs, specify each item for "Label Assignment" and "Check Program""*2 on the "Rebuild All" screen, and click the [OK] button.

*1 When "Yes" is selected in the following option setting, the online program change function is performed instead.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Online Program Change" ⇨ "Operational Setting" ⇨ "Execute Online Program Change in Converting"
*2 If there is no program, the check is not performed even if the check box for "Check Program" is selected.

Point

The unconverted data can be checked. Select a global label, POU, or program file in the "Navigation" window, and right-click and select [Expanded/Collapse Tree] ⇨ [Open Unconverted Data] from the shortcut menu.

■Operations that requires a conversion for all programs

When one of the following operation is performed, converting all programs is required.

- Change of system parameter (Fixed Scan Communication Area Setting)
- Changing CPU parameters (File Register Setting, Device/Label Memory Area Setting, Index Register Setting, Refresh Memory Setting, Pointer Setting, Program Setting, FB/FUN File Setting, Refresh Setting (At I45 Exe))
- Changing the option setting ("Other Editor" ⇨ "Label Editor Common" ⇨ "Data Type Setting", "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting")
- Changing the type of a function block in the "Properties" screen of an FB file (☞ Page 319 Changing the type of a function block)
- Adding a label, of which the data type is the function block, to a local label of converted function block
- Changing reserved area capacities in the "Properties" screen of a function block. (☞ Page 319 Setting reserved area capacities)
- Adding a label which exceeds the reserved area capacity to a local label of converted function block
  For the details on the reserved area capacity, refer to the following manuals (📖MELSEC iQ-R Programming Manual (Program Design), MELSEC iQ-F FX5 Programming Manual (Program Design)).
- Changing the module type/operation mode
- Changing the tag FB setting (tag FB type, tag type, declaration position) of a project used for an RnPCPU and an RnPSFCPU

Considerations for conversion

For details on the conversion of a function block and function, refer to the following sections.

☞ Page 320 Converting function blocks

☞ Page 329 Converting functions

Considerations for conversion or conversion for all programs

■Canceling conversion

The conversion is canceled in a program file unit. Therefore, even when the [Cancel] button is clicked during the conversion, the conversion will not be canceled until the conversion for one program file is completed.

Note that a large-scale program file with multiple FBs/FUNs requires a longer time to cancel the conversion.

■Creating a sequence program with multiple instructions

'LD SM400' may be added in the beginning of the program in order to execute the program.

■No program in a project

Program check is not performed.

Considerations after converting any or all programs (Retain)

A newly added label and a label of which the data type etc. have been changed are reassigned again.

The current (initial) value of a label can be reassigned by any of the following methods.

- Register the label to the Watch window, and set the current value.
- Set the initial value on the label editor.*1

*1 FX5CPU does not support the setting for initial values of labels.

When the current value of a local label needs to be retained, perform the Online Program Change function.

For details, refer to the following manual.

📖MELSEC iQ-R CPU Module User's Manual (Application)

Considerations after converting all programs (Reassignment)

When all programs are converted (reassigned), the label memory area is reassigned to all POUs. If all the converted programs are written to the CPU module and RUN as they are, the programs may be processed with the device values set before the program change.

After converting all programs, initialize the labels by the following procedure.

Operating procedure

1. Switch the CPU module to STOP.
2. Select "Device/Label Memory" in the "CPU Memory Operation" screen displayed by selecting [Online] ⇨ [CPU Memory Operation] to clear the values.
3. Select [Online] ⇨ [Write to PLC] ( ) to write the changed program files. When the initial values are set to the labels used in the program, write the label initial value file as well.
4. Reset the CPU module.

It can also be reset by selecting [Online] ⇨ [Remote Operation].

The labels are reset to '0' or initialized with the values set to the label initial value file.

Converting a program file with the process control extension enabled

Point

Operations of a program with the process control extension enabled can be set in the following option setting.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting"

■Adding/changing the program processing while the system is operating

For process control, when changing/adding the program processing while the system is operating, the current value of a registered label needs to be retained and the current value of a newly added/changed label needs to be initialized to keep the system operating.
However, labels newly added/changed after writing a programmable controller only cannot be initialized by converting any or all programs when writing them to the programmable controller next time.
To initialize only the current value of a newly added/changed label, perform the online program change function.
In addition, set the following option so as not to convert (retain)any or all program after creating a project.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" ⇨ "Enable Conversion"

■System header and system footer

When creating a program file with the process control extension enabled, the system data for the process control extension is generated at conversion.
A program file of the scan execution type with the process control extension enabled, the system header POU (M+PHEADER) and system footer POU (M+PFOOTER) are created in the program file after conversion.
At conversion, the execution order of the system header is set to the start of the program file. As for the system footer, it is set to the end of the program file. (The order can be checked in the program file setting.)
When the process control extension is disabled or the execution type other than scan is set, the system header and system footer will be deleted from the program file at conversion.

■Increase of the number of steps used

The number of steps used increases in a program with the process control extension enabled.
The following table shows the number of extra steps used.

Program execution type	Program block name	Number of extra steps used
Scan	M+PHEADER	Approx. 1400 steps
	M+PFOOTER	Approx. 30 steps
	Others	Approx. 10 steps
Fixed scan	All	Approx. 60 steps

■Device memory

When a program with the process control extension enabled exists and "Use Common File Register in All Programs" is set for "File Register Setting" of "CPU Parameter", the device memory is created at conversion.
In addition, the data in the range set in the following option is overwritten to the device memory.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource"

Project with the process control extension enabled

Note the following for projects used for CPU modules in a redundant system configuration with the process control extension enabled.

■Trucking setting

The following parameters are automatically set when converting a program.

Parameter	Setting content
• "CPU Parameter" ⇨ "Redundant System Settings" ⇨ "Tracking Setting" ⇨ "Tracking Device/Label Setting"	The settings in "Detail Setting" are configured.
• "CPU Parameter" ⇨ "Redundant System Settings" ⇨ "Tracking Setting" ⇨ "Tracking Device/Label Setting" ⇨ "Device/Label Detailed Setting"	The range of a file register that was set in the following option is set for the trucking block No.64*1. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource" ⇨ "File Register: ZR"

*1 This indicates a trucking block number that was set in the following option.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "Redundant Setting" ⇨ "Tracking Block No."

The following device data must be set manually since it is not automatically set in "Device/Label Detailed Setting" of "CPU Parameter".

- Device data other than file registers used for FBD/LD programs for process control
- Device data used for programs other than FBD/LD programs for process control

When setting the device data described above, set them to a trucking block number other than No.64 in "Device/Label Detailed Setting" of "CPU Parameter"

Precautions

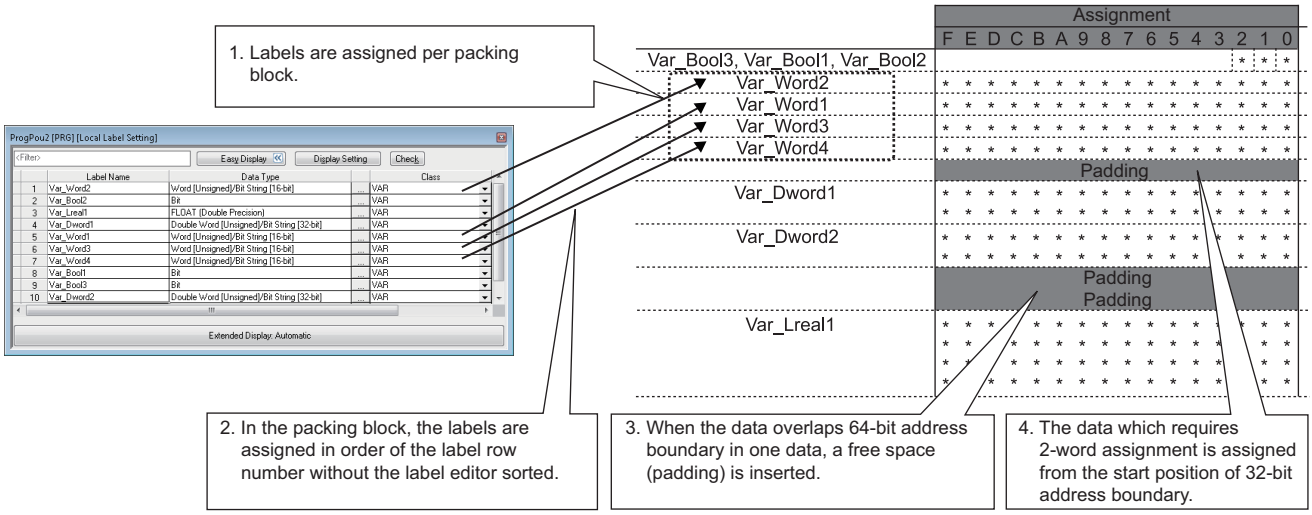
The contents of the tracking block No.64 in "Device/Label Detailed Setting" of "CPU Parameter" cannot be changed manually since they are automatically set when converting a program.

When reading parameters from a CPU module after converting a program, if the parameter is overwritten with a different content from the one that was automatically set as above, convert the program again.

Memory assignment of labels

When converting/converting all programs, the labels declared in the label editor are assigned to the memory in a packing block (which is classified as type and data type, and set them in consecutive order of line numbers) unit. Since it is assigned in POU units, the start position of POU will be 64-bit address boundary.

Ex.



The types of packing blocks and assignment order is shown below.

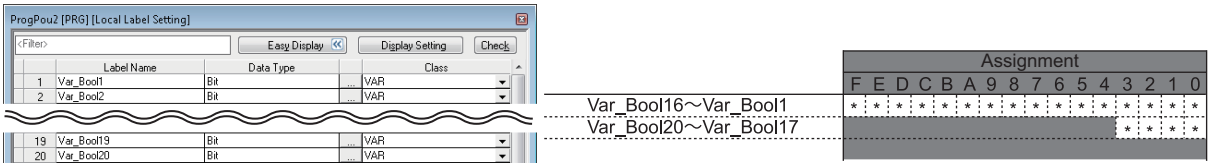
They are arranged in ascending order due to minimize the useless space.

Assignment order	Packing block	Data type	Remarks
1	Bit	Bit	☞ Page 285 Assignment of bit type
2	Word	Word [Unsigned]/Bit String [16-bit] Word [Signed]	—
3	String	String	Padding is not inserted because a packing block is assigned per one word unit, though the assignment amount differs depending on the number of character strings.
4	String [Unicode]	String [Unicode]	
5	Double Word	Double Word [Unsigned]/Bit String [32-bit] Double Word [Signed]	—
6	Time	Time	—
7	FLOAT [Single Precision]	FLOAT [Single Precision]	—
8	Timer	Timer	☞ Page 286 Assignment of timer/retentive timer/counter
9	Retentive Timer	Retentive Timer	
10	Counter	Counter	
11	FLOAT [Double Precision]	FLOAT [Double Precision]	—
12	Long Timer	Long Timer	☞ Page 286 Assignment of timer/retentive timer/counter
13	Long Retentive Timer	Long Retentive Timer	
14	Long Counter	Long Counter	
15	Array	All	☞ Page 285 Assignment of array
16	Structure/FB instance	All	☞ Page 285 Assignment of structure

■Assignment of bit type

If the number of bit type labels exceeds 16, the labels will be assigned to the next memory area consecutively.
For FB instances, the area of EN/ENO is assigned to each head of the FB instances.

Ex.

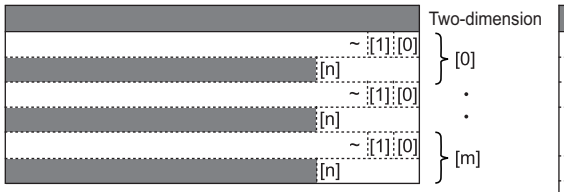


■Assignment of array

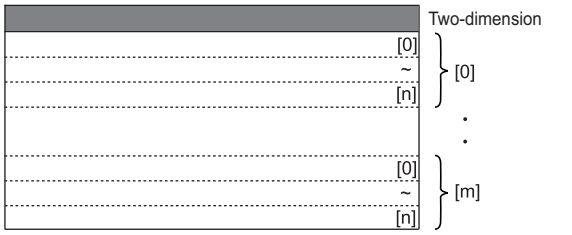
For a bit type array, the memory is assigned from the start address (0 bit) of the array, and continuous bits for one-dimensional element are assigned in word unit. As for the two-dimensional element or later, the same area as the one-dimensional element is assigned for the number of the dimensional elements continuously.
For an array other than bit type, the area which is required for the element is assigned for the memory of the data type continuously. A padding is not inserted between the array elements.

Ex.

<Assignment example of bit type two-dimension array_Bit (0..n, 0..m)>



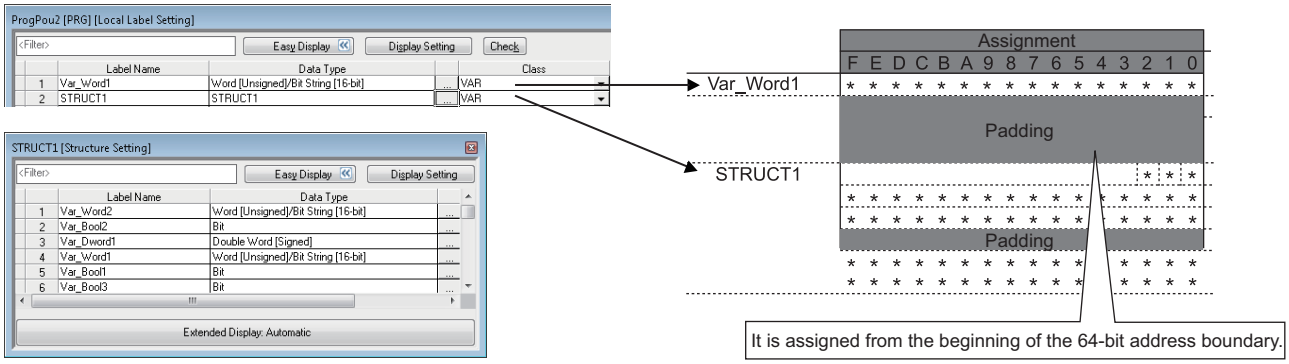
<Assignment example of word type two-dimension array_Word (0..n, 0..m)>



■Assignment of structure

A member of structure is assigned according to the assignment order of packing blocks. When a structure is declared in the member of structure, it will be assigned in a packing block according to the order noted previously. It will be assigned from the start position of 64-bit address boundary.

Ex.



■Assignment of timer/retentive timer/counter

● Timer, retentive timer, counter

Timer type, retentive timer type, and counter type are the maker-defined structures that have the same data type as MELSEC 16-bit timer device (T), bit retentive timer device (ST), and bit counter device(C). The member configurations of each data type are as follows:

Type	Member	Data type	Description
Timer	S	Bit type	The same operation as the contact (TS) of the timer device.
	C	Bit type	The same operation as the coil (TC) of the timer device.
	N	Word [Unsigned]/Bit String [16-bit]	The same operation as the current value (TN) of the timer device.
Retentive timer	S	Bit type	The same operation as the contact (STS) of the retentive timer device.
	C	Bit type	The same operation as the coil (STC) of the retentive timer device.
	N	Word [Unsigned]/Bit String [16-bit]	The same operation as the current value (STN) of the retentive timer device.
Counter	S	Bit type	The same operation as the contact (CS) of the counter device.
	C	Bit type	The same operation as the coil (CC) of the counter device.
	N	Word [Unsigned]/Bit String [16-bit]	The same operation as the current value (CN) of the counter device.

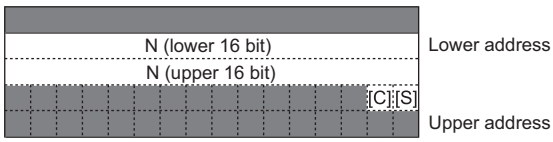
Each of timer, retentive timer, and counter requires 2 words.

● Long timer, long retentive timer, long counter

Long timer type, long retentive timer type, and long counter type are the maker-defined structures that have the same data type as MELSEC 32-bit timer device (LT), bit retentive timer device (LST), and bit counter device(LC). The member configurations of each data type are as follows:

Type	Member	Data type	Description
Long timer	S	Bit type	The same operation as the contact (LTS) of the timer device.
	C	Bit type	The same operation as the coil (LTC) of the timer device.
	N	Double Word [Unsigned]/Bit String [32-bit]	The same operation as the current value (LTN) of the timer device.
Long retentive timer	S	Bit type	The same operation as the contact (LSTS) of the retentive timer device.
	C	Bit type	The same operation as the coil (LSTC) of the retentive timer device.
	N	Double Word [Unsigned]/Bit String [32-bit]	The same operation as the current value (LSTN) of the retentive timer device.
Long counter	S	Bit type	The same operation as the contact (LCS) of the counter device.
	C	Bit type	The same operation as the coil (LCC) of the counter device.
	N	Double Word [Unsigned]/Bit String [32-bit]	The same operation as the current value (LCN) of the counter device.

Each of long timer, long retentive timer, and long counter requires 4 words.



■Assignment of FB instances

For details of the FB instances, refer to the following manuals.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Converting character codes

■Considerations for using an instruction not supporting Unicode

For a string constant set to an argument of an instruction not supporting Unicode, check that the language set in the following option corresponds to that of the string constant and replace it.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Language Used by Instruction Conversion of String Operation"

For a string constant set to an argument of an instruction, create a program by selecting a same language used in a project.

The data type of an instruction not supporting Unicode is "string", "ANYSTRING_SINGLE", or "ANYSTRING_SINGLE_ARRAY" mentioned in the following manual.

📖MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)
📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)
📖MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

Performing the Online Program Change function simultaneously at conversion

For the operation methods for performing the online program change function simultaneously with conversion, refer to the following section.

☞ Page 405 Writing Programs While a CPU Module is in the RUN State

Checking for errors and warnings

When the program is converted, the target programs and label settings are checked and the result is displayed in the "Output" window.

The corresponding error location can be referred in the "Output" window.

Operating procedure

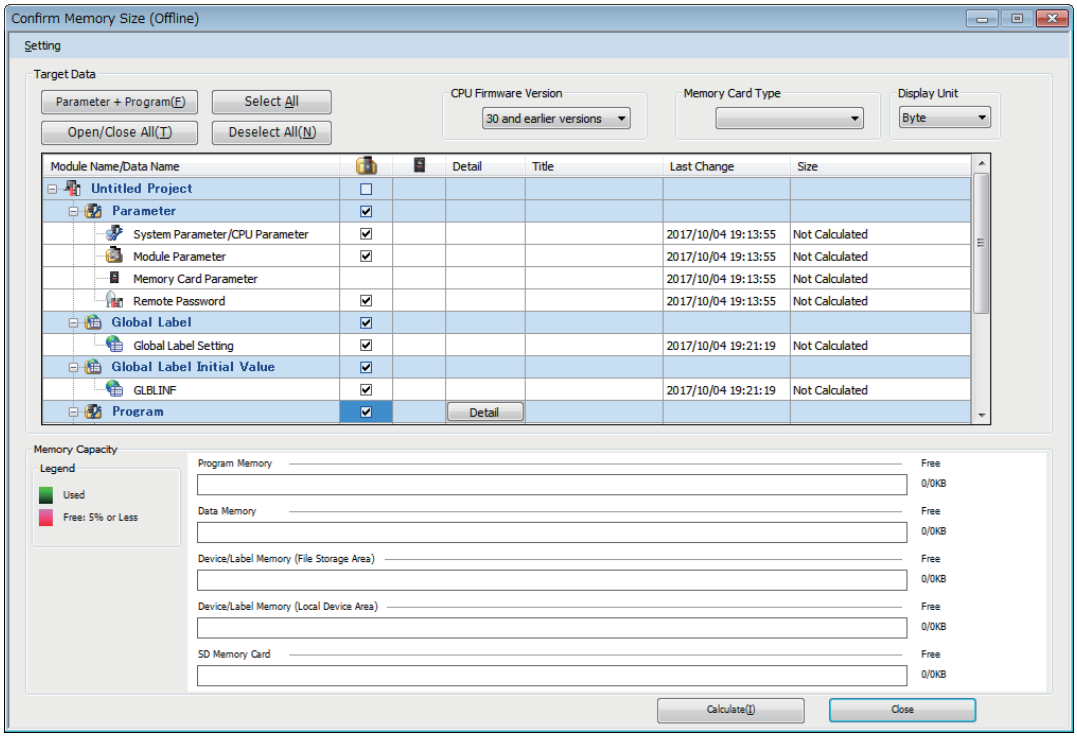
1. Double-click the error/warning message displayed in the "Output" window.
2. Check the corresponding error location and modify the error as instructed by the error/warning message.

6.10 Calculating Memory Size

This section shows how to calculate offline a memory size required when writing data in a project to a CPU module.
Remote head modules do not support it.

Window

[Tool] ⇨ [Confirm Memory Size (Offline)]



Operating procedure

1. Select a version from the pull-down list of "CPU Firmware Version".*1
2. Select "Byte" or "Step" from the pull-down list of "Display Unit".
3. When the data to be written to an SD memory card is included, select the corresponding SD memory card from the pull-down list of "Memory Card Type".
4. Select the file to be written, then click the [Calculate] button.

*1 A version can be displayed in a project for RnCPU (except for R00CPU, R01CPU, and R02CPU), RnENCPU, RnPCPU, or RnSFCPU.

The setting methods for the details of a target file and each data are the same as those on the "Online Data Operation" screen. Refer to the following section.

☞ Page 390 WRITING/READING DATA TO CPU MODULE

Depending on the CPU parameter setting, the used capacity may be displayed after calculation even if any file is not selected. (Example: File Register Setting)

Point

The firmware version of a CPU module can be checked in the "Product Information List" screen which can be displayed from the system monitor.

For details, refer to the following section.

☞ Page 480 Module Status Check of a System

7 SETTING DEVICE MEMORY

This chapter explains the settings for the device memory.

7.1 Device Memory

The device memory managed by GX Works3 is a data that reads/writes values from/to the device memory on a CPU module. By reading device memory, the state of device memory in a CPU module can be checked. It can be used for offline debugging.

In addition, the current values of device memory in a CPU module can be changed in a batch by writing the device memory to a CPU module.

Read/write device memory on the "Online Data Operation" screen.

For details, refer to the following section.

☞ Page 390 Writing/Reading Programmable Controller Data

Applicable devices

For the devices that can be set on the Device Memory editor and its input method, refer to the following section.

☞ Page 541 Applicable Devices in GX Works3

Writing device memory to global devices/local devices

A device memory has no distinction between a global device and local device.

Write a device memory to each device in a CPU module by the following methods.

- Global device: Create device memory data with a different name from the one for the program file, and write it to a CPU module
- Local device: Create device memory with a same name as the one for the program file, and write it to a CPU module

FX5CPUs do not support local devices.

Considerations when the process control extension is enabled

Do not change the value of a device memory in the range set for the system resource in the following option.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource"

7.2 Configuration of Device Memory Editor

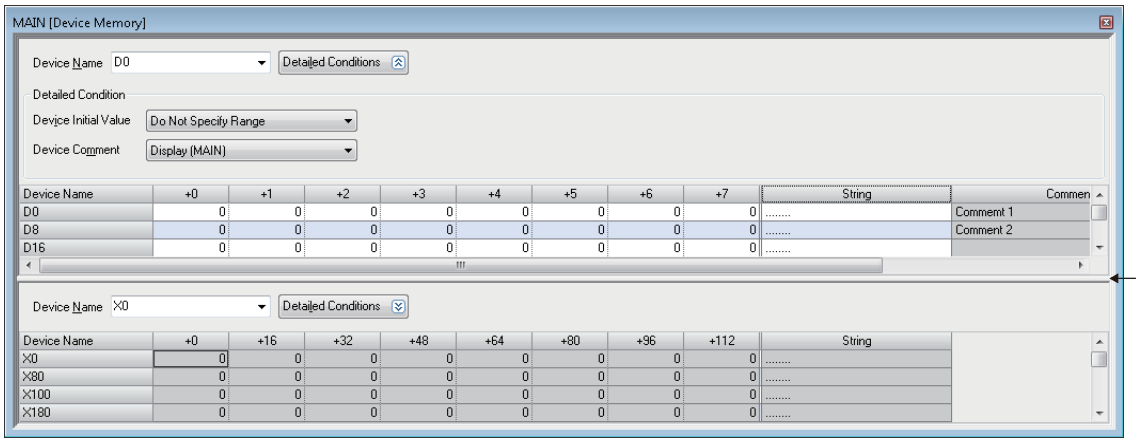
This section explains the screen configuration of the Device Memory editor.

Window

"Device" ⇨ "Device Memory" ⇨ "(data name)" on the Navigation window

■Toolbar

■Device memory editor



Only the range of the device initial value is displayed when selecting "Specify Range" from "Device Initial Value".

Point

Fonts can be changed.

☞ Page 65 Checking and Changing Colors and Fonts

Setting display format

Set the display format (Display Unit Format, Data Display Format, String Display Format, Value, Bit Order, Switch No. of Points) of the device value being displayed.

Operating procedure

1. Select [View] ⇨ [Display Format Detailed Setting] ( ).
2. Set each item on the "Display Format" screen and click the [OK] button.

The setting can also be performed in the toolbar.

Point

When displaying a device value in binary, set the following:

• [View] ⇨ [Display Format Detailed Setting]( ) ⇨ "Display Unit Format" ⇨ "Bit and Word"

7.3 Setting Device Memory

This section explains the setting method of devices and device values.

Precautions

- If a deletion is executed after selecting a cell, the device value is cleared to '0'.
- The entering method by prefixing '#' to a device name to regard it as a local device is not supported.
  Select global labels or local labels when reading the device memory from a CPU module.

Setting device values in units of points

Set a device and device value in units of points.

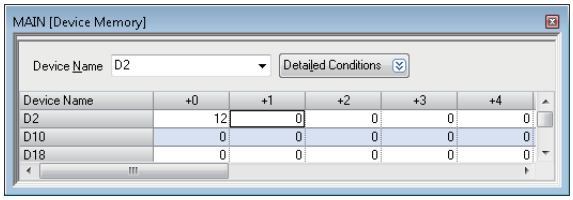
Ex.

Set the following values in a word multi-point format.

Device: D2, Device value: 12

Operating procedure

1. Set the display format. (☞ Page 290 Setting display format)
2. Enter 'D2' in "Device Name".
3. Enter '12' to the device 'D2'.



Copying/pasting

When copying/pasting a value on the Device Memory editor, copy/paste the value being displayed as a tab-delimited character string.

A line feed code is inserted according to the column width displayed on the device memory.

For character strings other than numerical values (decimal, hexadecimal, and real number), "0" is pasted.

When pasting a value to Excel®, select "Text" on the [Number] tab of "Format Cells" in Excel® to display a copied character string as is.

Point

When the display unit format is bit, the device value can be changed by double-clicking a cell.

Setting values in batch

Set the same value to consecutive devices.

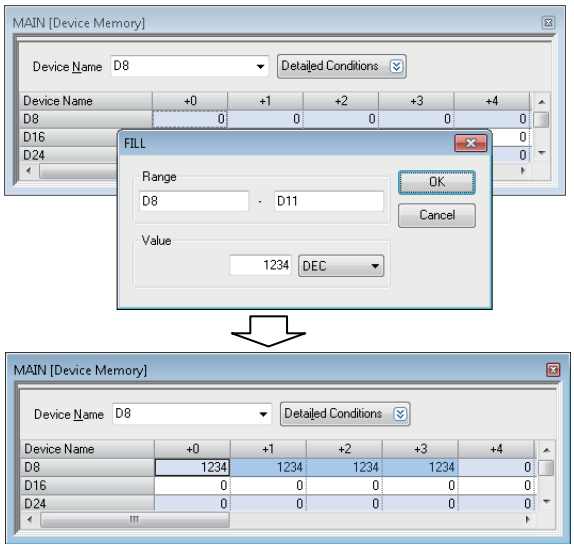
Ex.

Set the following values in a word multi-point format.

Device: D8 to D11, Device value: 1234

Operating procedure

1. Set the display format. (☞ Page 290 Setting display format)
2. Enter 'D8' to "Device Name", and select the range of the device value to be set.
3. Select [Edit] ⇨ [FILL] ( ).
4. Set each item on the "FILL" screen and click the [OK] button.



Setting character strings

Set a character string to a device.

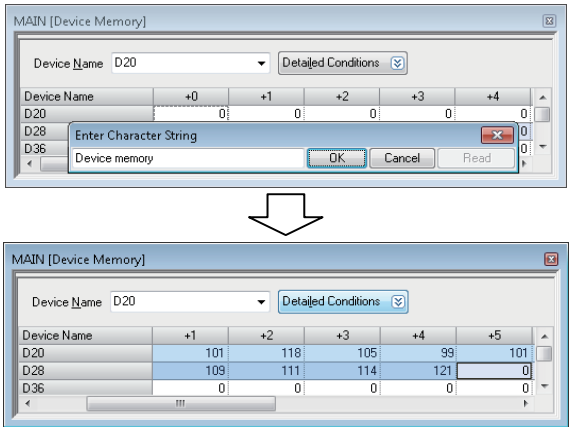
Ex.

Set the following values in a word multi-point format.

Device: D20, Character string: Device memory

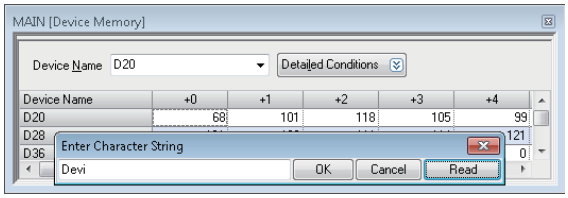
Operating procedure

1. Set the display format. (☞ Page 290 Setting display format)
2. Enter 'D20' to "Device Name", and select [Edit] ⇨ [Enter Character String].
3. Enter a character string on the "Enter Character String" screen, and click the [OK] button.



Point

- Character string can be entered to "String" column directly.
- Click the [Read] button on the "Enter Character String" screen to read the set device values (string) one by one.



Precautions

For device memory, use the characters in the Unicode Basic Multilingual Plane.

If a character outside the Unicode Basic Multilingual Plane is specified, it may not be displayed properly in the program.

Clearing whole memory of device memory

Clear the data set to device memory data to '0' in batch in the project.

Operating procedure

■Delete all data in the device memory data

Select [Edit] ⇨ [Clear All (All Devices)].

■Delete the devices displayed on the Device Memory editor

Select [Edit] ⇨ [Clear All (Displayed Devices)].

Interaction with device initial value

Device memory function registers/utilizes values to/from the device initial value.
Create a device initial value data to be registered in advance.
Remote head modules do not support it.

Operating procedure

1. Click the [Detailed Conditions] button.
2. Select "Specify Range" in the detailed conditions of "Device Initial Value".
3. Select [Edit] ⇨ [Register/Import Device Initial Value].

The Device Initial Value editor is displayed. For details on the Device Initial Value editor, refer to the following sections.

- Registering the value of the device memory to device initial value: ☞ Page 298 Setting device initial values
- Utilizing values from device initial values to device memory: ☞ Page 298 Registering to device memory

7.4 Writing/Reading Data to/from CPU Module

When writing/reading the value of device memory to/from the CPU module, perform them on the "Online Data operation" screen in file units.

8 SETTING DEVICE INITIAL VALUES

This chapter explains how to set the device initial values.

8.1 About Device Initial Values

The device initial value managed by GX Works3 is a data that can be read from/write to the device in a CPU module.
For details of device initial values, refer to the following manuals.
📖MELSEC iQ-R CPU Module User's Manual (Application)
📖MELSEC iQ-F FX5 User's Manual (Application)
Remote head modules do not support it.

Applicable devices

For devices that can be set on the Device Initial Value editor, refer to the following section.
☞ Page 541 Applicable Devices in GX Works3

Writing device initial values to global devices/local devices

A device initial value has no distinction between a global device and local device.
Write a device initial value to each device in a CPU module by the following methods.

- Global device: Create device initial value data with a different name from the one for the program file, and write it to a CPU module
- Local device: Create device initial value data with a same name as the one for the program file, and write it to a CPU module

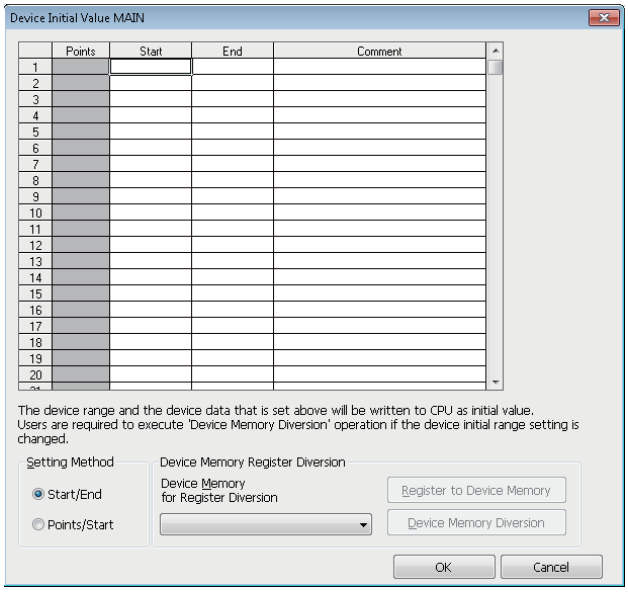
The devices which cannot be used as local devices are not written even when they are set to device initial values.
FX5CPUs do not support local devices.

8.2 Configuration of Device Initial Value Editor

The configuration of the Device Initial Value editor is shown below.

Window

"Device" ⇨ "Device Initial Value" ⇨ "(data name)" in the "Navigation" window



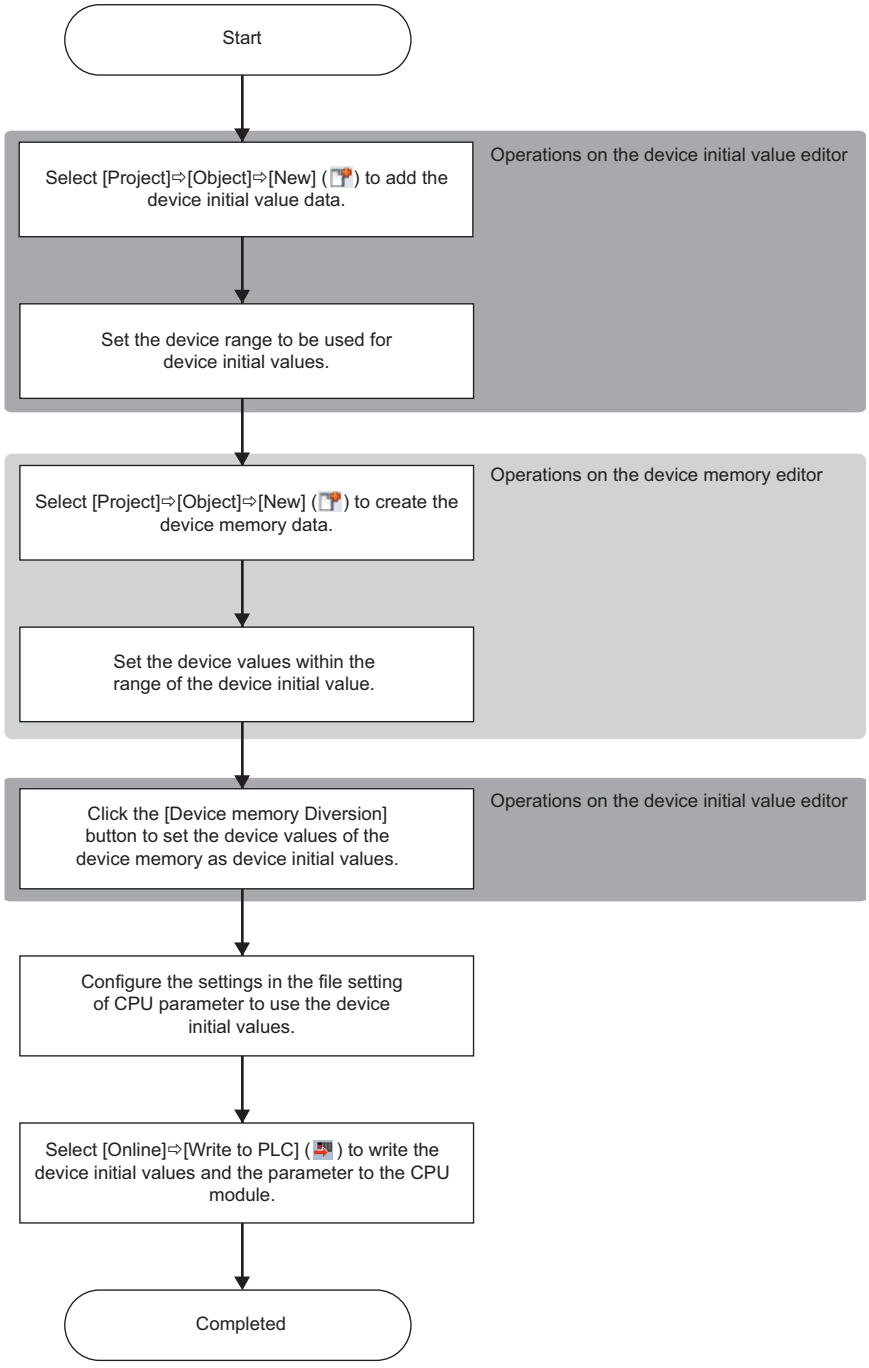
Point

When editing values in "Start"/"Last"/"Comment" column, press the Shift + F10 keys to display the shortcut menu.

8.3 Setting Device Initial Values

This section explains the setting method of device values set in the device memory as device initial values.

Setting procedure for device initial values



Setting device initial values

Set the device values set in the device memory as device initial values.
Create a device initial value data in advance. (☞ Page 108 Creating data)

Operating procedure

1. Set each item on the Device Initial Value editor.
2. Select the data to be utilized from the pull-down list of "Device Memory for Register Diversion", and click the [Register to Device Memory] button.
3. Click the [OK] button.

■Using device initial values

To use the values of each device in the set range as the initial values when starting a CPU module, specify a file name in "File Setting" of "CPU Parameter".

■Device range

Initial values can be set only for the devices in the range set in "File Setting" of "CPU Parameter".

Registering to device memory

The data range set on the Device Initial Value editor is registered to device memory.

Operating procedure

1. Select data from the pull-down list of "Device Memory for Register Diversion".
2. Click the [Register to Device Memory] button.

If the registered data is modified on the device memory, it will not be applied to device initial values. Click the [Device Memory Diversion] button on the Device Initial Value editor again.

Point

To check the values of the device initial values, create a new device memory data and perform "Register to Device Memory" to it.

9 SEARCHING DATA

This section explains how to search for and replace character strings, devices, labels, instructions, etc. in each editor.

Function	Supported editor	Purpose	Reference
Device/label search Device/label replacement	• Ladder editor • ST editor • FBD/LD editor • SFC diagram editor • Label editor	Used for searching/replacing devices or labels in a program.	Page 301 Searching/Replacing Devices/Labels
Instruction search/ replacement	• Ladder editor • ST editor • FBD/LD editor • SFC diagram editor	Used for searching for/replacing instructions in a program.	Page 303 Searching/Replacing Instructions
Character string search/ replacement	• Ladder editor • ST editor • FBD/LD editor • SFC diagram editor • Device comment editor • Label editor	Used for searching for/replacing character strings used in a program, label, and device comment.	Page 304 Searching/Replacing Character Strings
Open/close contact change	• Ladder editor • FBD/LD editor • SFC diagram editor	Used for switching the contact type of a specified device in a program from an open contact to a close contact, or from a close contact to an open contact.	Page 306 Changing Contacts between Open Contact and Close Contact
Device batch replacement	• Ladder editor • ST editor • FBD/LD editor	Used for replacing devices and labels in a program in a batch.	Page 307 Batch Replacing of Devices and Labels
Cross reference	• Ladder editor • ST editor • FBD/LD editor • SFC diagram editor • Label editor • Parameter editor	Used for checking a declaration location and a reference location of a device and label, or a label, which is not used in a program, in a list.	Page 309 Displaying cross reference information
Device list	• Ladder editor • ST editor • FBD/LD editor • SFC diagram editor • Parameter editor	Used to check the usage of devices.	Page 313 Displaying Device Usage List
Search/replacement in a program	• Ladder editor	Used for searching devices and labels, or moving to the corresponding row by specifying a step No. in a ladder program.	Page 204 Searching/replacing data in a program
	• ST editor	Used to move to the corresponding row by specifying a line number on the ST editor.	Page 222 Searching/replacing data in a program
	• SFC diagram editor	Used for searching devices and labels, or moving to the corresponding row by specifying a block number or block name in an SFC block list.	Page 267 Searching/replacing data in a program
Block information device search	• SFC block list	Used for searching block information (devices/labels) in an SFC block list.	Page 266 Searching for block information

- The "Find and Replace" window can also be opened by selecting [View] ⇨ [Docking Window] ⇨ [Find/Replace] ( ).
- 'Find' and 'Replace' can be switched from the pull-down list of the "Find and Replace" window.
- To replace a label, a device which can be replaced is for one point.
- The search starts from the top of the program in the inline structured text box regardless of the cursor position.

Precautions

- The program will be in converted state after the replacement.
- To replace a label name, check whether a name to be replaced has been already used.
- The Replace function cannot be performed during monitoring. Perform the function after ending the monitoring. However, it can be performed when the ladder editor is in the Monitor write mode.
- The Find/Replace function cannot be performed for the read-protected data. Perform the function after setting the data in editable mode by disabling the security.

Range specification in editors

In a ladder editor, FBD/LD editor, and device comment editor, the target range for the All Find function or Replace All function can be specified.

A range that can be specified differ depending on an operation in the editor.

Operation	Range
• Ladder editor/device comment editor: only one cell is selected • FBD/LD editor: only one element is selected	All cells or elements in the editors
• Ladder editor: multiple cells are selected • FBD/LD editor: multiple elements are selected • Device comment editor: a row or multiple cells are selected	Selected cells, elements, or rows
• Device comment editor: a column is selected	Selected row (including undisplayed bit specification information)
• Device comment editor: All the cells are selected (by Ctrl + A)	All (excluding columns which are not displayed in multiple comment display)

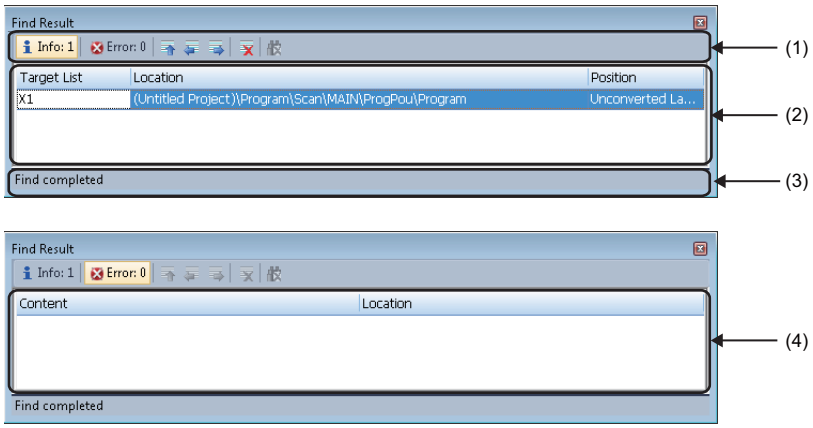
- Multiple cells or elements can be selected by selecting them with the Ctrl held down.
- When multiple device comments are selected by dragging in a device comment editor, bit specification information that is not displayed in the editor are also searched or replaced.

Displaying results and error logs

After All Find/Replace All function is executed, the results and error logs are displayed.

Window

Click the [All Find] button/[Replace All] button in "Find and Replace" window.



Displayed items

Item	Description
(1) Status	Displays the number of error logs and the search error.
(2) Search/replace results	Displays the position information to specify the location where the search/replace function is performed.
(3) Sub status bar	Displays the search/replace result.
(4) Error logs	Displays the errors in search/replace results.

Point

The jump function is used to jump from any row of search/replace results or logs to the corresponding character strings.

To jump, select a row, then right-click and select [Jump to the Selected Location]/[Jump to the Previous Location]/[Jump to the Next Location], or double-click a row.

9.1 Searching/Replacing Devices/Labels

Search for/replace devices/labels in the program.

Supported editor: Ladder editor*1, ST editor, FBD/LD editor*1, SFC diagram editor*1, and label editor

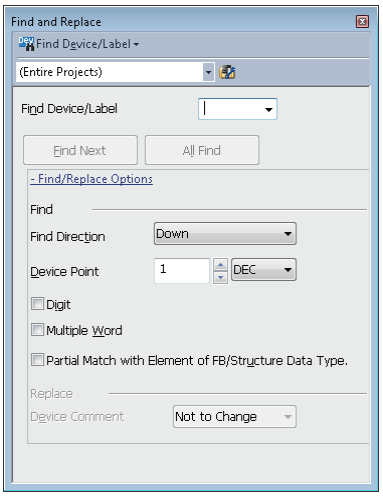
*1 Assigned devices which are set to display in the following menu are not searched for/replaced.
[View] ⇨ [Device Display]

When searching a device name, it is also searched on the global editor where the device is assigned.

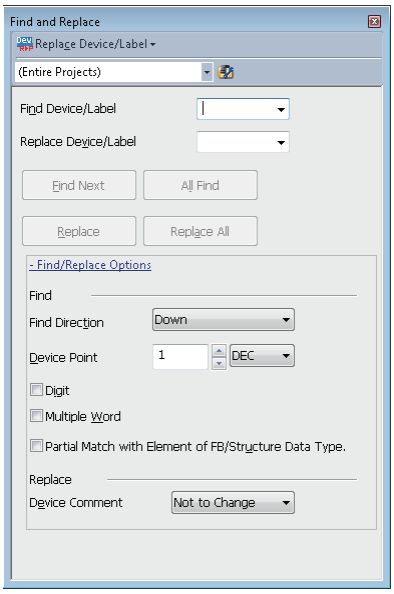
Window

[Find/Replace] ⇨ [Find Device/Label] ( )/[Replace Device/Label]

Find Device



Replace Device



Operating procedure

Set each item on the screen and click the [Find Next] button.

Item			Description
Find/Replace Options	Find	Device Point	Enter the number of points to be searched/replaced, counted from the device entered in the "Find Device/Label" field. When a label is entered for "Find Device/Label" or "Replace Device/Label", enter 1. Example) When X50 for "Find Device", X100 for "Replace Device", 3 for "Device Point", and "DEC" for entered value are set The devices are replaced as follows: X50→X100, X51→X101, X52→X102
		Digit	Select this to search for the entered device and digit-specified bit devices that include the entered device.
		Multiple word	Select this to search for the entered device and the double-word format word devices that include the entered device.
		Partial Match with Element of FB/Structure Data Type.	Select this to search the target used for arguments of function blocks*1, arguments of functions*1, and structure members in a program.
	Replace	Device comment	Select this to copy or move a device comment of "Find Device/Label" to "Replace Device/Label" (excluding S/TR).

*1 A label whose class is "VAR_INPUIT", "VAR_OUTPUT", "VAR_OUTPUT_RETAIN", "VAR_INOUT", "VAR_PUBLIC", or "VAR_PUBLIC_RETAIN" is searched.

Point

When entering a label name, options for labels are displayed.
They can also be displayed by the following operations.

- Press the Ctrl key + Space key.
- Enter '.' after entering a label name of a structure type or an instance name.

Examples of device search

■Options

- Option: None

Device specification	Search result
M0	M0, K4M0, M0Z0, K4M0Z0
K4M0	K4M0, K4M0Z0
D0	D0, D0Z0, D0.1
D0.1	D0.1
J1\B0	J1\B0, J1\B0Z0, J1Z0\B0, J1Z0\B0Z0, J1\K4B0, J1\K4B0Z0, J1Z0\K4B0, J1Z0\K4B0Z0

- Option: Digit

Device specification	Search result
X0 to X3	K1X0
X0 to X0F	K4X0
X0 to X1F	K8X0
X0Z0	X0Z0, K1X0Z0, K4X0Z0, K8X0Z0

- Option: Multiple words

Device specification	Search result
D0 to D1	DMOV K1 D0, EMOV E1 D0, DMOV K1 @D0
D0 to D9	BMOV D0 D100 K10
J1\W0 to J1\W1	DMOV K1 J1\W0
@D0 to @D1	DMOV K1 @D0
T0 to T1	DMOV K1 T0
D0 to D1	D0:D, D0:DU, D0:E
D0 to D3	D0:ED

■Device with device type specifier (for ST editor, FBD/LD editor, and SFC diagram editor only)

Device specification	Search result	Remarks
D100	D100: = 1; D100: D: = 1; D100: E:= 0.1;	Devices are searched regardless of device type specifier.
D100: D	D100: = 1; D100: D: = 1; D100:E := 0.1;	Only devices with a specified device type specifier are searched.

9.2 Searching/Replacing Instructions

Search for/replace instructions in a program.

Supported editor: Ladder editor, ST editor, and FBD/LD editor (LD element and FBD element (FB/FUN) only), and SFC diagram editor

The NOP instructions used in a ladder program cannot be searched.

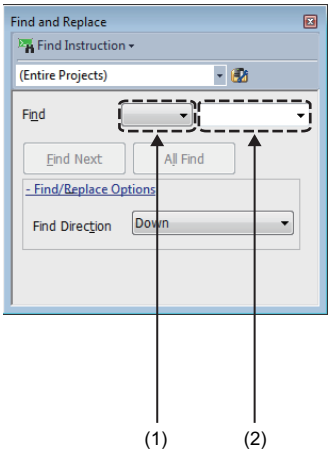
The following application instructions can also be searched as output instructions.

SET, RST, PLS, PLF, FF, SFT, SFTP, and MC

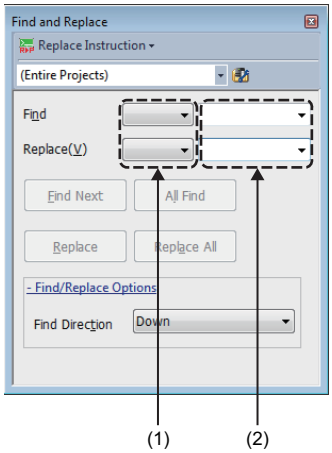
Window

[Find/Replace] ⇨ [Find Instruction] ( )/[Replace Instruction]/[Find Contact or Coil] ( )

Find Instruction



Replace Instruction



(1): Element selection field

(2): Device instruction input field

Operating procedure

Set each item on the screen and click the [Find Next] button.

Examples of instruction search

Example of instruction specification*1	Search result
MOV	MOV, MOVP
MOVP	MOVP
MOV D0 K4Y0	MOV D0 K4Y0, MOVP D0Z1 K4Y0, MOV D0 K4Y0Z1, MOVP D0Z1 K4Y0Z1
MOVP D0 J1\W0	MOVP D0 J1\W0, MOVP D0Z1 J1\W0, MOVP D0 J1Z1\W0Z1, MOVP D0Z1 J1Z1\W0Z1

*1 The search specifying an argument can only be performed in ladder programs.

9.3 Searching/Replacing Character Strings

Search for/replace character strings of the data in the project.

Editor	Searchable character string	Replaceable character string
Ladder editor	Character strings except for the following[*1] • Assigned devices displayed on the editor[*2]	Character strings except for instruction names
ST editor	Character strings except for the following • Monitoring part (displayed on the right side of the screen during monitoring) • The omitted portion of the collapsed display (example: IF...END_IF)	
FBD/LD editor	Character strings except for the following • Assigned devices displayed on the editor[*2]	Character strings except for the following • Data type of a function • Data type of a function block • Input/output label of FB/FUN • Character string, "RETURN" of a return element • Assigned devices displayed on the editor by setting the option[*2]
SFC diagram editor	Character strings except for the following • Assigned devices displayed on the editor[*2]	Character strings except for the following • Qualifier • Comment of Step No./Transition No. • Step name specified to the jump destination
Label editor	Character strings except for class name	Character strings except for the following • Class name, data type, device name
Device comment editor	Character strings in the comment column	

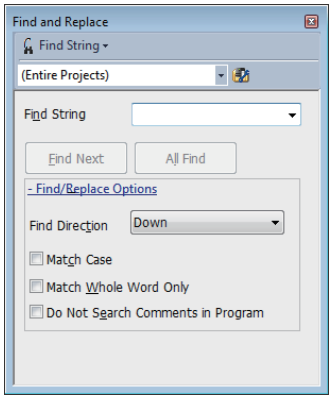
*1 The NOP instructions used in a ladder program cannot be searched.

*2 An assigned device is shown or hidden by setting in the following menu.
[View] ⇨ [Device Display]

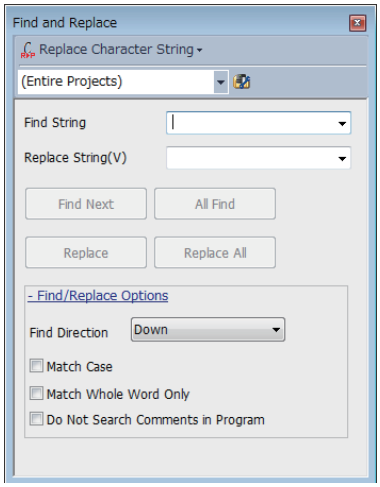
Window

[Find/Replace] ⇨ [Find String]/[Replace Character String]

Find String



Replace String



Operating procedure

Set each item on the screen and click the [Find Next] button.

Point

A note, P statement, and I statement in a ladder editor can be searched or replaced if a coil, instruction, pointer, or interrupt pointer, to which the note or statement is added, is selected.

Search/replace data by matching whole word only

The whole word means a string delimited by the break characters.

The character string which is completely match with the character string entered in "Find String" is searched.

Break characters are shown as below.

- Space
- Tab
- Line feed
- Operator on ST editor

Ex.

Search for a device comment 'abc ; def' by the following character strings.

String to be searched for	Search result	
	Unselected	Selected
a	abc; def	Nothing is found.
abc	abc; def	abc; def
bc	abc; def	Nothing is found.
abc ; def	abc; def	abc; def

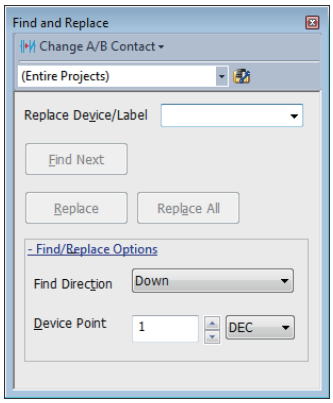
9.4 Changing Contacts between Open Contact and Close Contact

Change contact types from open contact to close contact, and vice versa.

Supported editor: Ladder editor, FBD/LD editor, and SFC diagram editor

Window

[Find/Replace] ⇨ [Change Open/Close Contact]



Operating procedure

1. Set each item on the screen and click the [Find Next] button.

Item		Description
Find/Replace Options	Device Point	Enter the number of points to be replaced, counted from the device/label entered in the "Replace Device/Label" field. When a label is entered for "Replace Device/Label", enter 1. Example) When X100 for "Replace Device", 3 for "Device Point", and "DEC" for entered value are set The open/close contact of X100, X101, and X102 will be replaced.

2. Click the [Replace] or [Replace All] button to change the contact type.

Point

When entering a label name, options for labels are displayed.

They can also be displayed by the following operations.

- Press the Ctrl key + Space key.
- Enter '.' at the end of a label name of structure type or an instance name of a function block.

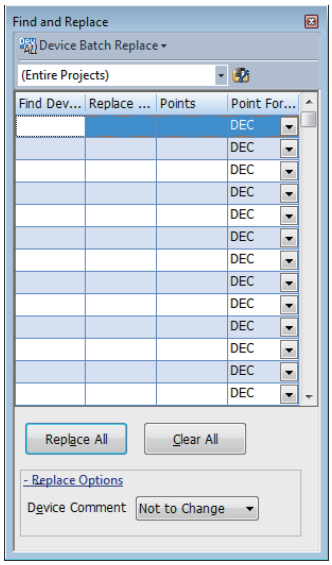
9.5 Batch Replacing of Devices and Labels

Replace devices and labels in a program in a batch.

Supported editor: Ladder editor, ST editor, FBD/LD editor, and SFC diagram editor, label editor (for replacing labels)

Window

[Find/Replace] ⇨ [Device Batch Replace]



Operating procedure

Set each item on the screen, and click the [Replace All] button.

Item		Description
Find Device, Replace Device		Enter a device name and label name which are to be searched and replaced. To replace a structure type label, enter a text including the structure member for "Find Device" or "Replace Device". To replace an array type label, enter a text including an array index for "Find Device" or "Replace Device".
Points, Point Format		Enter the number of points to be replaced from the device specified in the "Find Device". Example) When X0 for "Find Device", X10 for "Replace Device", 5 for "Points", and "DEC" for "Point Format" are set The devices are replaced as: X0 → X10, X1 → X11, X2 → X12, X3 → X13, X4 → X14 When a label is entered for "Find Device" or "Replace Device", it will be treated as '1' entered even if a point other than '1' is entered.
Replace Options	Device Comment	Select whether to copy/move a device comment in "Find Device" to "Replace Device" (excluding S/TR).

Point

- Select a range of device/label on the ladder editor by a drag-and-drop operation to register multiple devices/labels in batch.
- When entering a label name, options for labels are displayed.
  They can also be displayed by any one of the following operation.
  - Press the Ctrl key + Space key.
  - Enter '.' at the end of a label name of structure type or an instance name of a function block.

Precautions

When specifying S☐/TR☐ for "Find Device" and select "(Entire Projects)" for the target, S☐/TR☐ of all blocks are replaced. (Example: when replacing 'TR0', BL0\TR0 and BL1\TR0 also are replaced.)

When copying and pasting a device from other tools such as Excel® to "Find Device" and "Replace Device", the default value '1' is entered to a cell in which no point is entered.

9.6 Displaying Device and Label Reference Information in a List

A project can be searched to identify where a selected device/label is used, and the information is displayed in a list.
A Cross Reference window is displayed horizontally when it is docked on the top or bottom of the main frame, and displayed vertically when it is docked on the left or right of the main frame.

Point

The display format and detailed operation settings for each function can be set by setting the following option.
[Tool] ⇨ [Options] ⇨ "Find/Replace" ⇨ "Cross Reference"

Target data for creating cross reference information

Cross reference information is created based on devices used in the following data.

- Ladder programs
- ST programs
- FBD/LD programs
- SFC programs
- Global label
- Local label
- Structure
- Multiple CPU refresh setting of the CPU parameter
- Refresh setting of module parameters
- Simple CPU Communication Setting in the Module Parameter

For a project used for an FX5CPU, the cross reference information of devices that are used for the CPU built-in functions and that are set in the parameter settings of extension modules and communication adapters are created.

Displaying cross reference information

Create and display the cross reference information of the devices/labels used in the project.

Supported editor[*1]: Ladder editor, ST editor, FBD/LD editor, SFC diagram editor, label editor[*2,*3], and parameter editor[*3]

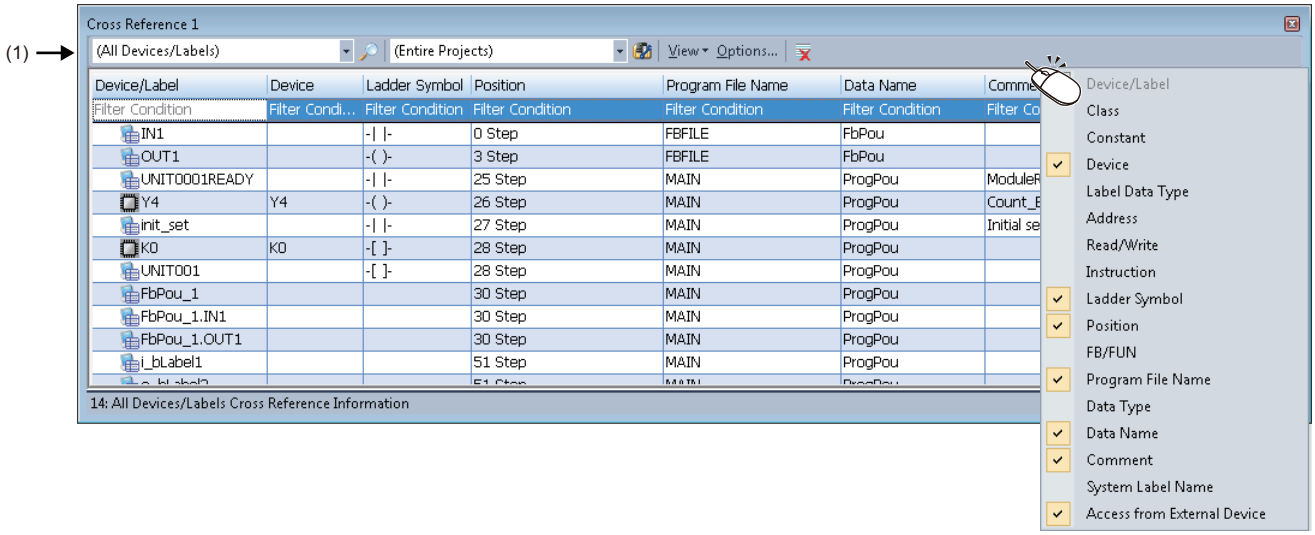
*1 A program editor for a function block and function are not supported.

*2 When "Yes" is selected in the following option setting, data on the label editor is used for this operation.
[Tool] ⇨ [Options] ⇨ "Find/Replace" ⇨ "Cross Reference" ⇨ "Find Condition" ⇨ "Find Label Definition"

*3 When "(Current Window)" is specified, data in the label editor is not used for this operation.

Window

[View] ⇨ [Docking Window] ⇨ [Cross Reference 1/Cross Reference 2] ( )



Up to 2 Find result screens can be displayed at once.

Up to 80000 cross reference information is displayed.

Operating procedure

1. To specify a range to be searched, select the search location of a device/label by clicking in the toolbar (1). (Multiple selections allowed.)
2. Enter a device name or a label name to search for in the column in which "(All Devices/Labels)" is displayed.
3. Click .

When performing a search by selecting "(All Devices/Labels)", it is performed on all devices/labels.

To clear the displayed cross reference information, click .

Point

- By selecting a row in the result list and performing any of the following operation, a cursor jumps to the position where the selected device or label is used.
  - Press the Enter key.
  - Double-click a row
  - Right-click a row, and select [Jump] in the shortcut menu.
- Cross reference information can also be created by right-clicking a device/label on the program editor, and selecting [Cross Reference] from the shortcut menu.
- By pressing the F12 key (Ctrl + .), the focus will move between the editor and a Cross Reference window.
- By pressing the F11 key (Ctrl + .)/Shift + F11 keys (Ctrl + Shift + .), the cursor in a Cross Reference window will move to the previous/next row.

■Automatic synchronization

A function to create the cross reference information of devices/labels selected on the editor automatically.
The Cross Reference window used for displaying the result of automatic synchronization can be specified by selecting "Options" in the window and setting the items in "Option" of "Operational Setting".
When performing automatic synchronization, the timing for updating the cross reference information can also be specified.

■A device assigned to a label

Global labels and devices assigned to the global labels can be searched at the same time.
In the following option, whether or not to search assigned devices can be selected.

- [Option] in the toolbar ⇨ "Find Condition" ⇨ "Include Assigned Device in Finding Label Name"

Displayed information

■Array

When searching a label using a character other than number (such as a constant or a device) for an array index, a device that was assigned to the first element within the array element set for the data type of this label is displayed in the "Device" column.

■Displaying data types of arguments of an FB/FUN

For FBD/LD programs or SFC programs (FBD/LD elements), the data type of an FB/FUN using devices/labels as arguments can be displayed in the "FB/FUN" column.
Contacts, coils, and variable elements are displayed.
Up to 10 data types of an FB/FUN can be displayed for one element.
Whether to display can be selected by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Cross Reference" ⇨ "Find Condition" ⇨ "Find FB/FUN which uses device/label as an argument"

■Displaying and editing comments

- For a ladder, the comments specified in [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target" are displayed as device comments.
- To edit a comment, open the editor where the comment is defined by selecting a row arbitrarily in the search result in a Cross Reference window, and right-clicking and selecting [Comment Edit] from the shortcut menu.

☞ Page 268 Device comments

■Data protected by security

It is not displayed in the Cross Reference window.

Incorrect cross reference information is displayed

- When deleting data after converting, and displaying cross reference information, the deleted data may be displayed in the search result. To display the latest information, convert again and display the cross reference information.
- If a program or the option setting is changed, cross reference information does not correspond with the program.
  In order to update the cross reference information, display it again.

Filtering display

Cross reference information being displayed can be filtered.

Operating procedure

Enter/select the filter condition, and press the Enter key.

■Filtering condition

The previously entered keywords can be selected from the pull-down list.

For "Data Name" and "Program File Name", search results can also be selected from the list as well as previously entered keywords.

■Tree display of filtering condition

Only data of which components match with the filtering conditions are displayed in the tree format when filtering display is performed for the structure data names or the instance names of the function block.

■Deleting filtering condition

Filtering display of the column can be canceled by deleting the keyword entered in each filtering condition column.

■Keywords for filtering condition

The wild card characters can be used in a filtering condition as shown below.

Ex.

When the filtering condition is set for the device/label column.

Wild card	Search target	Example	Search result
*	Specify any character string.	*30*	ready301, K4X30, K1Y30, K4Y30
?	Specify any one character.	K4?30	K4X30, K4Y30
[ ]	Specify any one of those characters.	[XY]8	X8, Y8
[!]	Specify any one of characters except for the characters in the bracket.	K4X[!3]0	K4X40
[-]	Specify character strings within the range in the bracket.	D[0-2]	D0, D1, D2

Sorting display

The columns can be sorted in ascending/descending order by clicking the column header. However, they cannot be sorted if a structure/array/function block is displayed in the tree.

To clear the tree display, unselect [Display Hierarchically] from the pull-down list of [View].

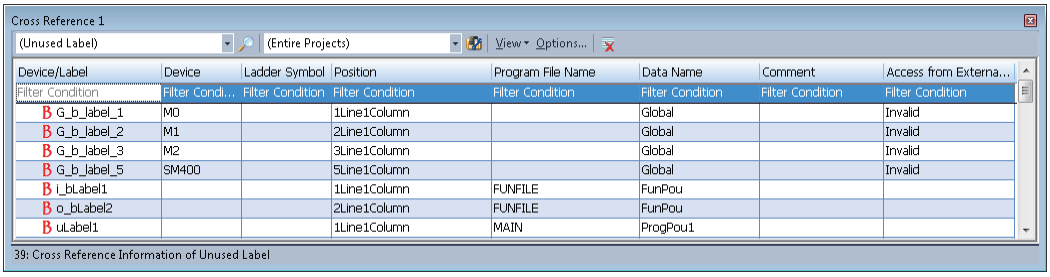
Displaying a list of unused labels

A list of labels unused in a project can be displayed.
Labels also can be deleted from the displayed list of labels.
Supported editor: Label editor

Window

[Find/Replace] ⇨ [Unused Label List]

(1) →



Operating procedure

1. To specify a range to be searched, select the search location of a label by clicking in the toolbar (1). (Multiple selections allowed.)
2. Click .

Global labels which are not used in all POUs in a project and local labels which are not used in POUs within the range to be searched are displayed in a list.

Precautions

- A function block, function, and structure which are not utilized in a program are not searched for.
- A label used in "Block Information" in the "Properties" screen of an SFC block as an array index is regarded as an unused label if it is not used in a program.
- Labels specified as aliases are not detected as unused labels even when these are not used in a program.

Deleting unused labels

Labels can be deleted by specifying it in the list when "(Unused Label)" is selected in the search box in a Cross Reference window.

Operating procedure

1. Select a label in the result list. (Multiple selections allowed.)
2. Right-click and select [Delete Label] from the shortcut menu.

Precautions

- When a label is deleted, the program related to the deleted label will be in the unconverted state.
- When utilizing a function block/function in a program, an input argument and an output argument which are not used in the function block/function are treated as unused ones. Note that the definition of a function block/function is changed when deleting an input argument and an output argument.
- When VAR_PUBLIC and VAR_PUBLIC_RETAIN are not used in the function block of the definition source, these are detected as unused labels even when used in a program other than the function block of the definition source.
- When a label name of an input/output argument of a function block utilized in an ST program corresponds to a local label name in the ST program, it is not detected as an unused label.

9.7 Displaying Device Usage List

Display the usage of the specified devices.

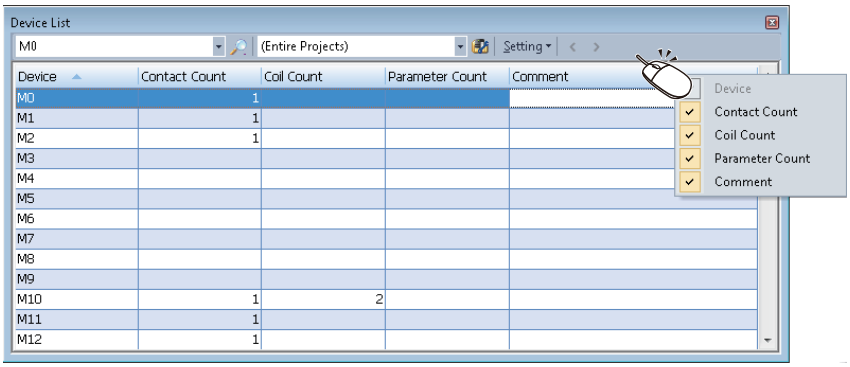
Supported editor: Ladder editor, ST editor, FBD/LD editor, SFC diagram editor, and parameter editor*1

*1 When "(Current Window)" is specified, data in the parameter editor is not used for this operation.

Window

[Find/Replace] ⇨ [Device List].

(1) →



The display format of the device list can be set in the screen displayed by selecting [Setting] ⇨ [Batch Setting] in the tool bar (1).

Operating procedure

Set each item and press the Enter key.

To specify the range to be searched, select the search location of a device/label by clicking in the toolbar. (Multiple selections allowed.)

Considerations for search in Device List

■Searching for coil instructions

As output instructions, the following application instructions can also be the target of search.

SET, RST, PLS, PLF, FF, SFT, SFTP, and MC

■Searching for assigned devices

The following devices cannot be searched even when they are assigned to labels.

- Double-word device (LT, LST, LC, and LZ)
- Indirect-specified device
- Digit-specified device (used in a editor except for the ladder editor)

■Searching for R devices and ZR devices

R devices and ZR devices are searched separately in the Device List.

Specify them separately when searching for R devices or ZR devices.

FX5CPUs do not support ZR devices.

■Checking the locations of devices used

The locations of devices used can be checked by opening a Cross Reference window with a device in "Device List". To open a Cross Reference window, select a row in "Device List" and follow any of the following operations.

- Press the Ctrl+E keys or press the Enter key
- Double-click the row
- Right-click ⇨ select [Cross Reference] from the shortcut menu

For details on the Cross reference function, refer to the following section.

☞ Page 308 Displaying Device and Label Reference Information in a List

■Displaying and editing comments

- To search data by selecting one program, the comments specified by selecting [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target" are displayed. (☞ Page 268 Device comments)
- To search data by selecting multiple programs, common device comments are displayed.
- To edit a comment, open the editor where the comment is defined by selecting a row in the Device List, then right-clicking and selecting [Comment Edit] from the shortcut menu.

■Searching for a step relay (S□)

when searching for a step relay (S□), specify a step relay with a block specification (BL□\S□).

10 SEGMENTING PROGRAMS

By segmenting a process program which is used repeatedly in a program into an element, it can be used in a sequence program.
Efficient program development reduces a program error, thus program quality will be improved.
A segmented program file is referred to as 'POU' (☞ Page 82 Data configuration).
Besides, multiple POUs can be collected into a different file from a project. The file is referred to as 'library'.

POU

There are two types of POUs which can repeatedly be used; function blocks and functions.
Remote head modules do not support it.

■Function block

'Function block' is a program component (POU) created by segmenting a program, which outputs an operation result in accordance with a value of the internal memory and an input value, into components.
It is classified into the following three types.

POU	Description	Reference
Function block (User-created)	A function block which is created from a program including a label defined as an input label, internal label, or an output label. In a project used for an RnPCPU (process mode/redundant mode) and an RnPSFCPU, a function block in which the process control processing of a manufacturer-defined tag FB is customized (user-defined tag FB) can be created.	Page 317 Creating a Function Block Page 321 Creating a user-defined tag FB
Standard function block	A function block which can be used in general. It is prepared in GX Works3 in advance.	Page 45 Element selection window
Process control function block	A function block for process control. It can be used in the following programs. It is prepared in GX Works3 in advance. In addition, process control function blocks can be used in the following program. • FBD/LD program for process control • FB program of a user-defined FB placed in an FBD/LD program (FBD/LD program) • FB program of a user-defined tag FB placed in an FBD/LD program (FBD/LD program)	Page 45 Element selection window
Module FB	A function block which is created by segmenting a dedicated processing for a module. It is prepared in GX Works3 in advance.	Page 326 Enhanced use of module FBs

■Function

'Function' is a program component (POU) created by segmenting a program, which has no internal memory and outputs the same operation result to the same input value always.
It is classified into the following two types.

POU	Description	Reference
Function (User-created)	A function block which is created from a program including a label defined as an input label or an output label.	Page 328 Creating a Function
Standard function	A function which can be used in general. It is prepared in GX Works3 in advance.	Page 45 Element selection window

Library

'Library' is an element collection of multiple POUs and structures. Elements in a library can be used in multiple projects.

■User library

'User library' is an element collection which is composed of created POUs and structures.

For details, refer to the following section.

☞ Page 330 Enhancing Use of User Library

■Application library/MELSOFT Library (sample library)

'MELSOFT Library' (Sample Library) is an element collection provided by a manufacturer.

To obtain the application library/sample library (MELSOFT Library), please consult your local Mitsubishi representative.

For details, refer to the following section.

☞ Page 338 Enhanced Use of Application Library/MELSOFT Library

Remote head modules do not support it.

10.1 Creating a Function Block

This section explains the method to create a sequence program using function blocks.

Function block

For details on function blocks, refer to the following manuals.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Procedure to use

1. Create new function block data. (☞ Page 318 Creating new data)
2. Register a local label to use in a program body of a function block. Up to 5120 local labels can be registered in a function block. (☞ Page 318 Setting labels)
3. Create a program body by using a label. (☞ Page 319 Creating a program)
4. Paste a function block onto a sequence program. (☞ Page 187 Inserting function blocks, Page 220 Inserting function blocks)

Creating a function block

The following explains the method to create a function block.

■ Number of creatable function blocks

RCPU (other than R04CPU): Up to 8192 in conjunction with function data

R04CPU: Up to 4096 in conjunction with function data

FX5CPU: Up to 960 in conjunction with function data

However, the maximum number of data that can be created may not be reached depending on the configuration of FB files and FUN files.

Creating new data

A function block data can be created in a project on the "New Data" screen.

Item			Description
Detail Setting	Inherent Property	Use MC/MCR to Control EN*1	For "Yes", the MC/MCR instructions are used to control 'EN'. For "No", the CJ instruction is used to control 'EN'. Select "Yes" when the raising/falling instructions are used in an FB. The operations of a timer/counter and the OUT instruction used in an FB differ depending the selected item. For details, refer to the following manual. MELSEC iQ-R Programming Manual (Program Design) MELSEC iQ-F FX5 Programming Manual (Program Design)
		Use EN/ENO	For "Yes", a function block with EN/ENO is created, and EN/ENO labels can be used in a program without registering as local labels. For "No", a function block without EN/ENO is created. For details on EN/ENO, refer to the following manuals. MELSEC iQ-R Programming Manual (Program Design) MELSEC iQ-F FX5 Programming Manual (Program Design)
	FB File	FB File of Add Destination	Select a storage destination file of a function block to be created. A new storage destination file can be created by entering a file name directly.
		FB Type	For "Macro Type", the program body of a function block is stored in an FB file that will be the storage destination of the call source program block or program body of the function block. For "Subroutine Type", the program body of a function block is stored in an FB file.

*1 For the conditions to select "Yes", refer to the following section.
☞ Page 318 Conditions to select "Yes" for "Use MC/MCR to Control EN"

■Conditions to select "Yes" for "Use MC/MCR to Control EN"

When all of the following conditions are applied, "Yes" can be selected for "Use MC/MCR to Control EN.

Condition	
1	"Yes" is selected for "Use EN/ENO".
2	Any of the following settings are set. • "Macro Type" is selected for "FB Type". • "Yes" is selected for the following option and "Subroutine Type" is selected for "FB Type". [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Use MC/MCR to Control EN"
3	A CPU module and GX Works3 supporting this setting are used. For the versions supporting this setting, refer to the following manual. MELSEC iQ-R CPU Module User's Manual (Application)

Precautions

- If the function block in which the MC/MCR instruction is used is not executed, the outputs and the current values of timers in the function block will be reset. (If the instruction is not used, the current values are retained).
- When "Yes" is selected for "Use MC/MCR to Control EN", the system uses 'N0' (nesting) for MC/MCR instructions in an FB. Therefore, do not use 'N0' for the MC/MCR instructions in the same FB.

Setting labels

Set a label to use in a program body on the label editor.

The operations on the screen is the same as that of other label editor. For details, refer to the following section.

☞ Page 157 Registering Labels

Operating procedure

Select "FB/FUN" ⇨ "(file name)" ⇨ "(FB)" ⇨ "Local Label" in the "Navigation" window.

Precautions

Do not assign the instance of a function block to an alias. (☞ Page 159 Alias)

Creating a program

Create a program body of a function block by using a label.

Both local labels of the function block and global labels can be used.

The method for entering programs is the same as that of each program.

Operating procedure

1. Select "FB/FUN" ⇨ "(file name)" ⇨ "(FB)" ⇨ "ProgramBody" in the "Navigation" window.
2. Configure the programs.

Changing the type of a function block

Change the type of a function block (macro type/subroutine type).

Operating procedure

1. Select "FB/FUN" ⇨ "(file name)" in the "Navigation" window.
2. Select [Project] ⇨ [Data Operation] ⇨ [Properties].
3. Set the type of the function block for "FB Type" in the "Properties" screen, and click the [OK] button.

Setting reserved area capacities

Set the reserved area capacities of FB instances for each function block.

To apply the set reserved area capacities for programs, all the programs are required to be converted (reassigned).

For details on reserved area capacities, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

Operating procedure

1. Select "Yes" for the following option.

[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Set Reserved Area"

2. Select "FB/FUN" ⇨ "(file name)" ⇨ "(FB)" in the "Navigation" window.
3. Select [Project] ⇨ [Data Operation] ⇨ [Properties].
4. Set a reserved area capacity for "Label Reserved Area" ,"Latch Label Reserved Area", or "Signal Flow Reserved Area", then click the [OK] button in the "Properties" screen.
5. Convert (reassign) all the programs.

Precautions

- For projects used for FX5CPUs, the reserved area capacities of function blocks cannot be changed.
- Only for subroutine type function blocks, the reserved area capacity for "Signal Flow Reserved Area" can be set.

Converting function blocks

- Function blocks (POUs) will not be converted even if a conversion was attempted as long as FB instances have not been created, or FB instances have been created only in unregistered programs.
- When a function block is edited, all the programs in which the FB file and the function block are used will be in unconverted state.

■When editing only the program body of a subroutine type function block

By setting the following option, only the edited FB program or FB file will be in the unconverted state.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Convert, Online Program Change Target Setting"

When an unconverted function block is converted after changing the option from "High-Speed" to "Low-Speed", a POU including the function block is also converted.

Precautions

If the option is set to "High-speed" and any one of the following instruction is used in a subroutine type function block, a conversion error may occur. A conversion is successfully completed by performing the conversion function or online program change function.

- Rising instruction
- Falling instruction
- SCJ instruction
- STMR instruction

Considerations when creating FB programs

■Use of devices

Using labels is recommended for creating FB programs.

If an FB program which uses devices (X10, Y10, etc.) is used at multiple locations, the program may not operate normally. In addition, if an FB program which uses devices for the OUT instruction is used at multiple locations, duplicated coil is resulted. Duplicated coil can be avoided with the SET/RST instruction.

■When using master control instructions

When using a master control instruction in an FB program, use the MC instruction and the MCR instruction together.

■When using function blocks for a sequence program to be executed multiple times in a single scan

If a function block, which contains a rising instruction/falling instruction, or an instruction that requires multiple scans before the execution completion, is used in a sequence program to be executed multiple times in a single scan, the program may not operate normally.

Item	Description
Program type to be executed multiple times in a single scan	• Fixed scan execution type program • Interrupt program • Subroutine program • FOR-NEXT instruction program
Unusable instructions for FBs which are used for above programs	Instructions which require multiple scans before the execution completion (JP.READ/JP.WRITE instruction, SORT instruction, SP.FREAD/SP.FWRITE instruction, etc.)
	Rising instruction (□P instruction (such as MOVP instruction), PLS, etc.)
	Falling instruction (PLF, LDF, ANDF, ORF, MEF, FCALLP, EFCALLP, etc.)

Creating a user-defined tag FB

The control processing of a manufacturer-defined tag FB can be customized by creating a user-defined tag FB.
In the FB program of a user-defined tag FB, the tag data can be referenced by using a tag access FB of a process control function block and a structure label for tag data reference.
A user-defined tag FB can be used only in an FBD/LD program for process control in a project used for an RnPCPU (process mode/redundant mode) and an RnPSFCPU.

Procedure to use

1. Create new function block data. (☞ Page 321 Creating new data)
2. Create a program body of a user-defined tag FB. (☞ Page 321 Creating a program)
3. Register a tag FB for which a user-defined tag FB has been specified on the tag FB setting editor.(☞ Page 169 Registration of tag FBs)
4. Create an FBD/LD program for process control by using a tag FB instance of a registered user-defined tag FB.
5. Set the initial value of an FB property. (☞ Page 233 Display/setting an FB property)
6. Write the program to the programmable controller. (☞ Page 392 Writing data to a programmable controller)
7. Monitor and debug the program by displaying a faceplate.(☞ Page 448 Checking tag data)
8. Apply the initial value of the FB property. (☞ Page 452 Initial FB property value update/FB property management)

Precautions

If the definition of a user-defined tag FB is deleted in the "Navigation" window, the project may be incorrect.
Before deleting a user-defined tag FB, search an FB definition name by using the character string search function and check that it is not used in a project.

Creating new data

A function block data can be created in a project on the "New Data" screen.

Item			Description
Detail Setting	Program Configuration	Program Language	Select a program language to be used in a function block. When creating a user-defined tag FB, select "FBD/LD".
		Use as Tag FB	Select whether to use a function block as a tag FB. When creating a user-defined tag FB, select "Yes".
		Tag Type	Select a tag type.
	FB File	FB File of Add Destination	Select a storage destination file of a function block to be created. A new storage destination file can be created by entering a file name directly.
		FB Type	When creating a user-defined tag FB, "Subroutine Type" is selected automatically.

Creating a program

Create a program body of a user-defined tag FB by combining a function and a function block.
The method for entering programs is the same as that of an FBD/LD program.

Precautions

- Do not use the EI instruction in a user-defined tag FB or a function and function block which is called from a user-defined tag FB
- User-defined tag FBs cannot be utilized in other project by registering to the user library.

■Tag access FB

Tag access FBs can be used in a user-defined tag FB.

However, if a tag access FB to use does not support the tag type of a user-defined tag FB type, the tag access FB cannot be used.

The following table shows the tag access FBs and the supported tag types.

Tag Type	Tag access FB		
	I/O control	Loop control operation	Tag special
PID	M+P_IN, M+P_OUT1, M+P_DUTY	M+P_PID(_T), M+P_PHPL	M+P_MCHG
2PID	M+P_IN, M+P_OUT1, M+P_DUTY	M+P_2PID(_T), M+P_PHPL	M+P_MCHG
2PIDH	M+P_IN, M+P_OUT3_	M+P_2PIDH(_T)_, M+P_PHPL	M+P_MCHG
PIDP	M+P_IN	M+P_PIDP(_T), M+P_PIDP_EX(_T)_, M+P_PHPL	M+P_MCHG
SPI	M+P_IN, M+P_OUT1, M+P_DUTY	M+P_SPI(_T), M+P_PHPL	M+P_MCHG
IPD	M+P_IN, M+P_OUT1, M+P_DUTY	M+P_IPD(_T), M+P_PHPL	M+P_MCHG
BPI	M+P_IN, M+P_OUT1, M+P_DUTY	M+P_BPI(_T), M+P_PHPL	M+P_MCHG
R	M+P_IN, M+P_OUT2	M+P_R(_T), M+P_PHPL	M+P_MCHG
ONF2	M+P_IN	M+P_PHPL, M+P_ONF2(_T)	M+P_MCHG
ONF3	M+P_IN	M+P_PHPL, M+P_ONF3(_T)	M+P_MCHG
PGS	—	M+P_PGS	M+P_MCHG
PGS2	—	M+P_PGS2_	M+P_MCHG
MOUT	M+P_MOUT	—	M+P_MCHG
MONI	M+P_IN	M+P_PHPL	—
SWM	M+P_IN, M+P_MSET_	M+P_PHPL	M+P_MCHG
MWM	M+P_IN, M+P_MOUT	M+P_PHPL	M+P_MCHG
SEL	—	M+P_SEL(_T1)(_T2)(_T3)	M+P_MCHG
BC	M+P_PSUM, M+P_BC	—	—
PSUM	M+P_PSUM	—	—

■Structure label for tag data reference

When using a tag data value (such as the SV value, PV value, MV value) in an program of a user-defined tag FB, use a structure label for tag data reference.

Structure labels for tag data reference can only be used in the FB program of a user-defined tag FB.

The following table shows the structure labels for tag data reference that can be used in each tag type.

Tag type	Structure label for tag data reference	Tag data structure type	Usage example in the FB program of a user-defined tag FB
PID	_PID	M+TM_PID	_PID.MV
2PID	_2PID	M+TM_2PID	_2PID.MV
2PIDH	_2PIDH	M+TM_2PIDH	_2PIDH.MV
PIDP	_PIDP	M+TM_PIDP	_PIDP.MV
SPI	_SPI	M+TM_SPI	_SPI.MV
IPD	_IPD	M+TM_IPD	_IPD.MV
BPI	_BPI	M+TM_BPI	_BPI.MV
R	_R	M+TM_R	_R.MV
ONF2	_ONF2	M+TM_ONF2	_ONF2.MV
ONF3	_ONF3	M+TM_ONF3	_ONF3.MV
MONI	_MONI	M+TM_MONI	_MONI.PV
MWM	_MWM	M+TM_MWM	_MWM.MV
BC	_BC	M+TM_BC	_BC.PV
PSUM	_PSUM	M+TM_PSUM	_PSUM.PV
SEL	_SEL	M+TM_SEL	_SEL.MV
MOUT	_MOUT	M+TM_MOUT	_MOUT.MV
PGS	_PGS	M+TM_PGS	_PGS.MV
PGS2	_PGS2	M+TM_PGS2	_PGS2.PV
SWM	_SWM	M+TM_SWM	_SWM.MV
PVAL	_PVAL	M+TM_PVAL	_PVAL.PV
HTCL	_HTCL	M+TM_HTCL	_HTCL.MV_HT
NREV	_NREV	M+TM_NREV	_NREV.MAN
REV	_REV	M+TM_REV	_REV.MAN
MVAL1	_MVAL1	M+TM_MVAL1	_MVAL1.MAN
MVAL2	_MVAL2	M+TM_MVAL2	_MVAL2.MAN
TIMER1	_TIMER1	M+TM_TIMER1	_TIMER1.MAN
TIMER2	_TIMER2	M+TM_TIMER2	_TIMER2.MAN
COUNT1	_COUNT1	M+TM_COUNT1	_COUNT1.MAN
COUNT2	_COUNT2	M+TM_COUNT2	_COUNT2.MAN
PB	_PB	M+TM_PB	_PB.MAN
ALM	_ALM	M+TM_ALM	_ALM.ALM1
ALM_64PT	_ALM_64PT	M+TM_ALM_64PT	_ALM_64PT.ALM1
MSG	_MSG	M+TM_MSG	_MSG.MSG1
MSG_64PT	_MSG_64PT	M+TM_MSG_64PT	_MSG_64PT.MSG1

Precautions

When the global label setting "M+PTAG" or tag data structure in a project is deleted, a structure label for tag data reference is also deleted. Add a structure label for tag data reference in the FB program of a user-defined tag FB.

- [Edit] ⇨ [Process Control Extension] ⇨ [Add Structured Data Type Label for Tag Data Reference]

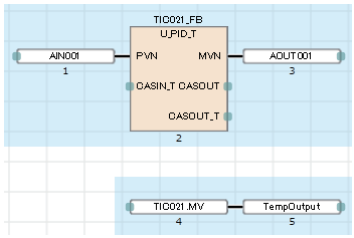
■Usage example of tag data

To use the member of tag data of a user-defined tag FB in an FBD/LD program for process control, create a variable element with a name '(label name of the tag data).(member name of the tag data)'.

Ex.

When using the MV value of user-defined tag FB 'TIC021_FB', create a variable element with the name 'TIC021.MV'.

- Label name of tag data: TIC021
- Member name of tag data: MV



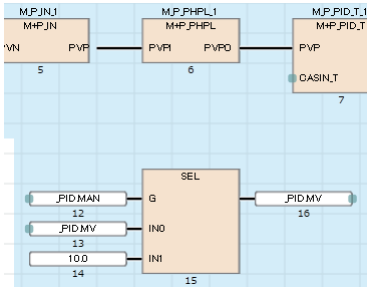
■Usage example of a structure label for tag data reference

To use the member of tag data of a user-defined tag FB in the FB program of a user-defined tag FB, create a variable element with a name '(name of a structure label for tag data reference. member name of the tag data)'.

Ex.

When using the MV value of a user-defined tag FB (tag type: PID), create a variable element with the name '_PID.MV'.

- Structure label for tag data reference: _PID (tag type: PID)
- Member name of tag data: MV



Method for having an operation constant to a user-defined tag FB

The following shows the procedure for directly setting an initial value such as that of an operation constant of a tag access FB used in an user-defined tag FB from the user-defined tag FB in a program.

For details on operation constants, refer to the following manual.

MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

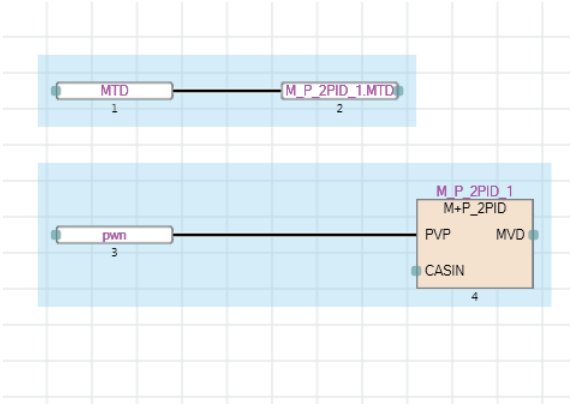
Operating procedure

1. Register a label of VAR_PUBLIC' class or 'VAR_PUBLIC_RETAIN' class to a local label of a user-defined tag FB.
2. Substitute the registered label (step 1) for an operation constant.

To substitute a label for an operation constant of a tag access FB, use a variable element.

Example)

When substituting a label for the operation constant 'MTD' with the tag access FB (label name: M_P_2PID_1), define a variable element with the label name 'M_P_2PID_1.MTD'. Connect the label registered in step 1 and the variable label with the name "M_P_2PID_1.MTD".

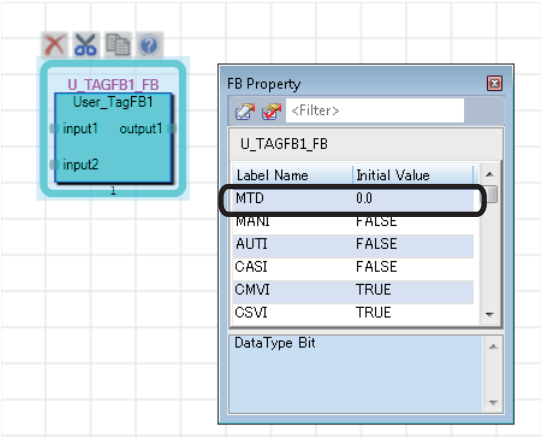


3. Register a user-defined tag FB on the tag FB setting editor.
4. Place the user-defined tag FB (step 3) on an FBD/LD program.
5. Select the placed user-defined tag FB.

The registered label (in step 1) is displayed in the "FB Property" window.

For details on "FB Property" window, refer to the following section.

☞ Page 233 Display/setting an FB property



Enhanced use of module FBs

In GX Works3, 'Module FB', which is composed of the segmented processing for each module (function block), is provided. By using the module FBs, the operation settings can easily be performed without programming the processing of each module.

Note that the module FBs cannot be used in safety programs.

Importing module FBs in project

Module FBs are displayed in the [Module] tab in the "Element Selection" window when one of the following operations is performed.

- Place a module on a module configuration diagram and fix parameters.
- Add a new module in the "Navigation" window.

Point

The manual of a module FB can be displayed from the "Element Selection" window.
Select and right-click a module FB, then select [Help] from the shortcut menu.

Using module FBs in programs

Operating procedure

1. Drag a module FB in the [Module] tab in the "Element Selection" window and drop it onto a program.
2. Select a target label (local label or global label) in the pull-down list in the "FB Instance Name" screen, and enter an FB instance name.

Once an FB instance is created, the created function block (local Label, program body) is registered into "M_FBLIB" in the "Navigation" window.

Precautions

- When using a module FB, registering a module label in advance (at creation of new project) is recommended. Otherwise, it may take time when using the module FB.
- Do not assign the instance of a module FB to an alias. (☞ Page 159 Alias)

■Using a library associated with a module

Depending on a module (simple motion module), a library that is associated with a module can be used.
The following shows the procedure to use the library.

Operating procedure

1. In the [Module] tab in the "Element Selection" window, double-click "(module name)" under the tree of "Module FB".
2. Read the message, and click the [Yes] button.*1

A message with "Environment Setup Procedure" described in is displayed.

3. Obtain a library by following the message.
4. Register the library to the library list. (☞ Page 335 Registering user libraries in the library list)

A shortcut to the library is added as a child item of "(module name)" in the tree expanded (double-clicked) in step 1.

5. Double-click the shortcut to the library.
6. Utilize an element from the library to a project. (☞ Page 335 Utilizing an element)

*1 The message may not appear depending on the module.

Precautions

■Data to be displayed

When a library associated with a module is registered to the library list, the data displayed as child items of the module FB in the tree may differ.

- Only a shortcut to the library is displayed.
- A shortcut to the library and a module FB are displayed.
- Only a module FB is displayed.

■Redisplay of a shortcut to a library

A shortcut to the library disappears once the project is closed.

When opening the project next time, select a module in which a library associated with the module is used.

By clicking the [Yes] button after reading the message[*1], a shortcut to the library is displayed again.

*1 The message may not appear depending on the module.

■Redisplay of a module FB

To redisplay module FBs that are not displayed in the tree, perform any one of the following operations.

No.	Operation
1	Delete the library that is associated with a module from the library list. (☞ Page 335 Deleting libraries/updating display information)
2	❶ Open the project again. ❷ In the [Module] tab of the "Element Selection" window, double-click "(module name)" under "Module FB" in the tree. ❸ Click the [No] button in the confirmation message appeared.

Setting operation parameter of module FB

Operating procedure

1. Open the label editor where the FB instance of the module FB is registered (local label or global label of the program where module FB is used).

2. Select the FB instance and enter the initial value of the label in the extension display area.

However, the initial value of a label whose operation parameter is array cannot be set in a label editor. Set an initial value in a program.

When the operation parameter of module FB set in the label initial value is changed by program, the module FB operates with the changed value. Before changing the label values of a module FB, check the influence of the change using the Cross Reference function.

Editing module FBs

A local label and a program body of a module FB cannot be edited.

However, module FBs can be copied in the "Navigation" window and the copied ones can be edited.

'+' of the copied module FB names will be replaced with '_'.

10.2 Creating a Function

This section explains the method to create a sequence program using functions.

Functions

For details of the functions, refer to the following manuals.

📖MELSEC iQ-R Programming Manual (Program Design)

📖MELSEC iQ-F FX5 Programming Manual (Program Design)

Procedure to use

1. Create new function data. (☞ Page 328 Creating new data)
2. Register a local label to be used in a FUN program. Maximum 5120 local labels can be registered in a function. (☞ Page 328 Setting labels)
3. Create a FUN program using labels. (☞ Page 329 Creating a program)
4. Paste the function onto a sequence program. (☞ Page 191 Inserting functions, Page 220 Inserting functions)

Creating a function

The following explains the method to create a function.

■ Number of creatable functions

RCPU (other than R04CPU): Up to 8192 in conjunction with function block data

R04CPU: Up to 4096 in conjunction with function block data

FX5CPU: Up to 960 in conjunction with function block data

However, the maximum number of data that can be created may not be reached depending on the configuration of FB files and FUN files.

Creating new data

A function block data can be created in a project on the "New Data" screen.

Item			Description
Detail Setting	Use EN/ENO	Yes	Become a function with EN/ENO. EN/ENO labels can be used in a program without registering as local labels. For details on EN/ENO, refer to the following manuals. 📖MELSEC iQ-R Programming Manual (Program Design) 📖MELSEC iQ-F FX5 Programming Manual (Program Design)
		No	Become a function without EN/ENO.
	FUN File of Add Destination		Select the storage destination file of a function to be created. A new storage destination file can be created by entering a file name directly.

Setting labels

Set a label to use in a program body on the label editor.

The operations on the screen is the same as that of other label editor. For details, refer to the following section.

☞ Page 157 Registering Labels

Operating procedure

Select "FB/FUN" ⇨ "(file name)" ⇨ "(Function)" ⇨ "Local Label" in the "Navigation" window.

Creating a program

Create a program body of a function by using a label.

The labels set to the local label of the function can be used.

The method for entering programs is the same as that of each program.

Operating procedure

1. Select "FB/FUN" ⇨ "(file name)" ⇨ "(function)" ⇨ "ProgramBody" in the "Navigation" window.
2. Configure the programs.

Converting functions

- Functions (POUs) will not be in the converted state even if the conversion was attempted as long as functions are not used in the program, or functions are used only in unregistered programs.
- When a function is edited, all the programs in which the FUN file and the function are used will be in unconverted state.

■When editing only the program body of a function

By setting the following option, only an edited FUN program or FUN file will be in unconverted state.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Convert, Online Program Change Target Setting"

When an unconverted function is converted after changing the option from "High-speed" to "Low-speed", a POU including the function is also converted.

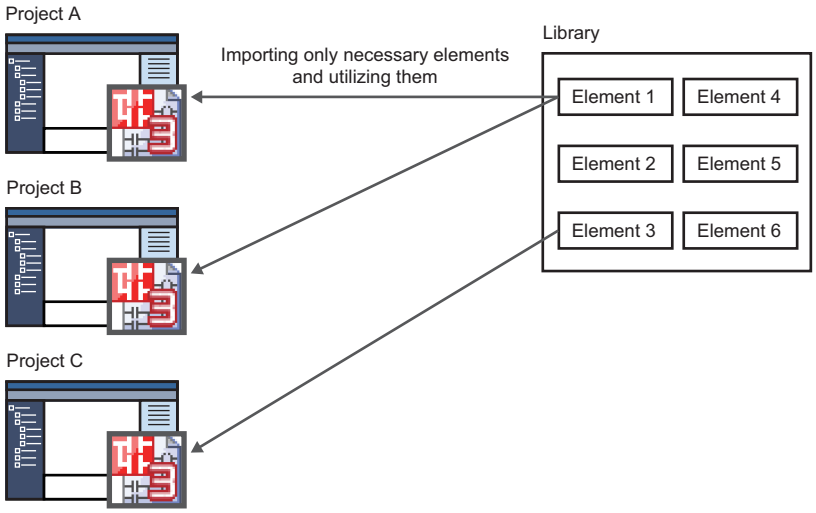
10.3 Enhancing Use of User Library

This section explains the method to store a created element in a library file and utilize it to a sequence program.
In this section, the user library is explained as a library.

User library

The user library collects the elements which are used generally in multiple projects to make them easy to use. It can be used by importing elements of a library to each project.
The following data can be registered in the user library.

- POUs (program block, function block, function)
- Global labels, structures



Procedure to use

1. Create a library file. (☞ Page 331 Creating a library)
2. Register a library in GX Works3. (☞ Page 335 Registering user libraries in the library list)
3. Utilize elements from a library to projects. (☞ Page 335 Utilizing an element)

Precautions

When using the library file which is on a network drive or a removable media, save the file in the hard disk of a personal computer before using.

Creating a library

The following explains the operations such as the creation and editing methods of a library.

Preparing a source project for library

To create a library, a source project is required.

Prepare an existing project or a project that collects the elements to be registered in a library.

Precautions

After registering a library, the registered elements are displayed in the [Library] tab in the "Element Selection" window.

However, the information of global labels (such as label name, and data type) is not displayed.

When creating a library that includes multiple global labels, set comments to distinguish them on the "Properties" screen of global labels.

Creating a library file

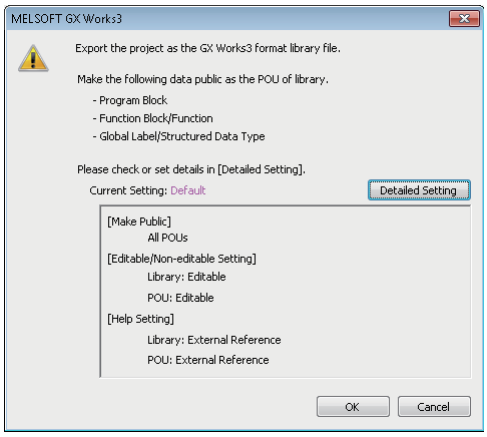
A library file can be created by exporting a project as a library file (*.usl).

The library file is a file that stores the data related with elements in a project.

To prevent libraries and elements from falsification, set a password when exporting them.

Operating procedure

1. After creating elements in a project, select [Project] ⇨ [Library Operation] ⇨ [Export Library].
2. Click the [OK] button on the confirmation screen appeared.



By clicking the [Detailed Setting] button on the screen above, the following can be set on the "Library Export Detailed Settings" screen.

Item	Description
Make Public	Set whether to release or close the data to users who use the library.
Editable/Non-editable Setting	Set whether to set a password to edit to the exported library. When setting a password, the applicability of editing (editable/read-only/read-protected) can be set for each element. Additionally, an individual password can be set to a read-protected POU. By selecting the checkbox of "Disable Password Authentication", editing of a read-protected POU can be disabled. (☞ Page 332 A POU whose password authentication is disabled)
Help Setting	Set whether to import the help file to the library or refer it externally.

Precautions

- For read-only or read-protected elements utilized from other libraries, the reading applicability of the elements can not be changed when exporting them.
- For the unusable character strings to a library name, refer to the following section.
  (☞ Page 538 Unusable character strings for the name of a project/work space/library)

■A POU whose password authentication is disabled

When disabling password authentication for a read-protected POU, note the following on a library file in which a read-protected POU has been registered, and on a project in which the library file was created.

- Do not delete them; otherwise, the POU cannot be opened.
- It may not be determined if they are the latest ones.
  To prevent this, before creating a library file, setting version information to the library file or a project in which the library file is to be created is recommended.

The operating procedure for setting version information is shown below.

Item	Procedure
Project	❶ Select "Project" in the "Navigation" window. ❷ Right-click it and select [Properties] in the shortcut menu. ❸ Enter a text for "Version" in the "Properties" screen. ❹ Click the [OK] button. ❺ Save the project.
Library file	❶ Enter a text for "Version" in the "Export Library" screen, which is displayed when creating a library file. (☞ Page 331 Creating a library file) ❷ Click the [Save] button.

Creating a library in GX Works3 format from a library in GX Works2 format

Remote head modules do not support it.

Operating procedure

1. Select [Project] ⇨ [Open Other Format File] ⇨ [GX Works2 Format] ⇨ [Open User Library], and specify the library to be converted into a GX Works3 project.
2. Select the series on the confirmation screen displayed, then click the [OK] button.
3. Check the project after changing the module type, then edit it if necessary.
4. Export the project as a library file.

Creating a library in GX Works3 format from a library in GX IEC Developer format

This function is supported for the SUL format files which are created with GX IEC Developer version 7.04.

Operating procedure

■A GX Works3 project is open

1. Select [Project] ⇨ [Open Other Format File] ⇨ [GX IEC Developer Format] ⇨ [Open SUL Format User Library], and specify a library to convert to GX Works3 project.
2. Read the displayed message, and click the [OK] button.
3. Check the project after changing the module type, then edit it if necessary.
4. Export the project as a library file.

■A GX Works3 project is not open

1. Select [Project] ⇨ [Open Other Format File] ⇨ [GX IEC Developer Format] ⇨ [Open SUL Format User Library], and specify a library to convert to GX Works3 project.
2. Read the displayed message, and click the [OK] button.

The "New" screen appears.

3. Set each items in the "New" screen, and click the [OK] button.
4. Check the contents of the project after changing the module type, and edit the project as necessary.
5. Export the project as a library file.

■Import of some library POUs

1. Create a library in GX Works3 format from a library in GX IEC Developer format. (☞ Page 333 Creating a library in GX Works3 format from a library in GX IEC Developer format)
2. Open a GX IEC Developer format project in a GX Works3 project by changing the module type. (☞ Page 97 Opening a GX IEC Developer format project)
3. Register the user library exported in step 1 in the library list. (☞ Page 335 Registering user libraries in the library list)
4. Copy the library POUs to the GX Works3 project.
5. Repeat step 1 to step 4 for each GX IEC Developer format library.

Precautions

When a password is set for the user library, entering password is required when importing library elements.
However, when the following option is set in GX IEC Developer, entering a password is not necessary.

- [Edit] ⇨ [User Library] ⇨ [Change Password] ⇨ "Change Password (user library name)" ⇨ "Allow read access for closed library"

Editing libraries

Elements in a library file can be edited, added and deleted same as projects.

The password authentication is required when editing the library protected by password. Besides, the user registration is required for the library file exported from a safety project. (☞ Page 469 User management)

For details on the maximum number that can be created for each data, refer to the following section.

☞ Page 107 Maximum number of data that can be created in one project

Operating procedure

1. Select [Project] ⇨ [Open Other Format File] ⇨ [GX Works3 Format] ⇨ [Open User Library].
2. Edit POUs.

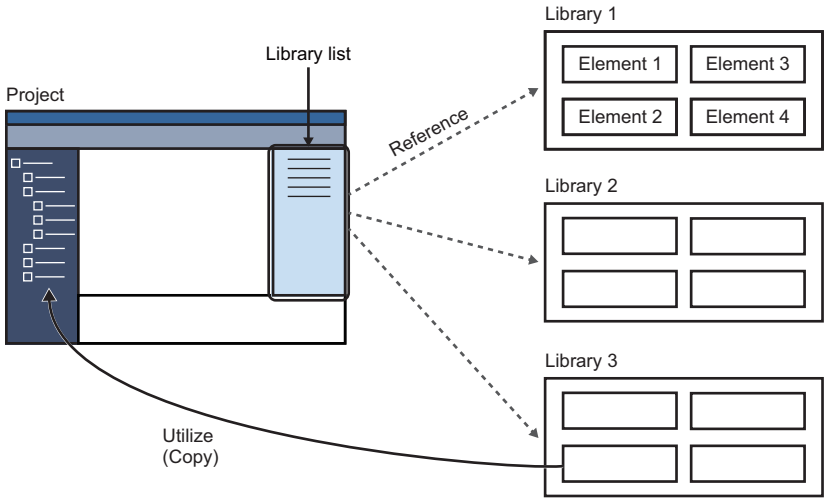
The editing method is same way as elements of the project.

Enhanced use of libraries

An element in a library can be utilized by registering the library in the library list.

The reference to the library file is registered in the library list.

The information of library file is saved not in a project unit but in a logon user unit on personal computer.



For the considerations for utilizing the library file created in the different version of GX Works3, refer to the following section.

☞ Page 546 Using a Project in a Different Version

Registering user libraries in the library list

Register a library containing elements to be utilized in the list.
Up to 64 libraries can be registered.
When the registered library file was edited while GX Works3 is running , updating the display information of library is necessary.

Operating procedure

■Registering libraries to be referenced

1. Select [Project] ⇨ [Library Operation] ⇨ [Register to Library List] ⇨ [User Library].
2. Select a file on the "Register Library to Library List" screen, then click the [Open] button.

For the library/element which is protected by password, the icon will be displayed in a pale color on the [Library] tab.

■Deleting libraries/updating display information

1. Select the [Library] tab in the "Element Selection" window.
2. Select the library to be deleted/updated, then select [Project] ⇨ [Library Operation] ⇨ [Delete from Library List] ( )/ [Update the Display Information of Library].

■Displaying Help

1. Select the [Library] tab in the "Element Selection" window.
2. Select a library or element, and select [Project] ⇨ [Library Operation] ⇨ [Help] or right-click [Help] from the shortcut menu.

Utilizing an element

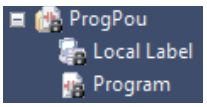
A library POU registered in the "Element Selection" window can be utilized to other projects.
To utilize POUs which were set the read-protection when exporting the library, the password is required before editing.

Operating procedure

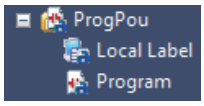
■Pasting elements onto the" Navigation" window

Drag an element from the [Library] tab in the "Element Selection" window and drop it onto the "Navigation" window.
Elements can be dropped onto the place which is able to create the same kind of data only.
Read-protected POUs are displayed in the "Navigation" window as follow.

Read-protected



Authenticated



■Pasting elements onto a program editor (function block/function only)

1. Drag an element from the [Library] tab in the "Element Selection" window and drop it onto a sequence program.
2. For a function block, select a target label (local label or global label) in the pull-down list in the "FB Instance Name" screen, and enter an FB instance name.

■Making the read-protected POUs editable

1. Select the POU which was utilized and read-protected, then right-click and select [Enter the Password to Edit] from the shortcut menu.
2. Enter the password on the "Password Authentication" screen, and click the [OK] button.

The element will be editable until the project is closed.

■Copy of utilized elements

- When the data name of a utilized element has "+", it will be replaced with "_" after a copy.
- A read-protected element cannot be copied. However, it can be copied by entering password to edit.
- For an edit-protected element, the copy of the element can only be editable.

Precautions

■Module label/structure

A module label and structure cannot be utilized. Therefore, if utilizing an element in which a module label and/or structure is used, the module label and/or structure will be changed to undefined.

To use the undefined label in the utilization destination program as a module label and/or structure, add the module label and/or structure to the utilization destination program.

In the following cases, set an alias in the project of utilization destination and set the label name same as the one of the utilized element. (☞ Page 159 Alias)

- An arias is used in a module label and/or structure of an utilized element
- An instance name differ between a module label and/or structure in a utilized element and an added module label and/or structure in a utilization destination

■A POU whose password authentication is disabled

A read protected POU whose password authentication is disabled cannot be edited in the utilization destination project.

When editing the POU, edit a library file in which this POU is included or data in a project in which the library file was created. (☞ Page 334 Editing libraries)

Additionally, the edited POU can be utilized to a project again by the following procedure.

Operating procedure

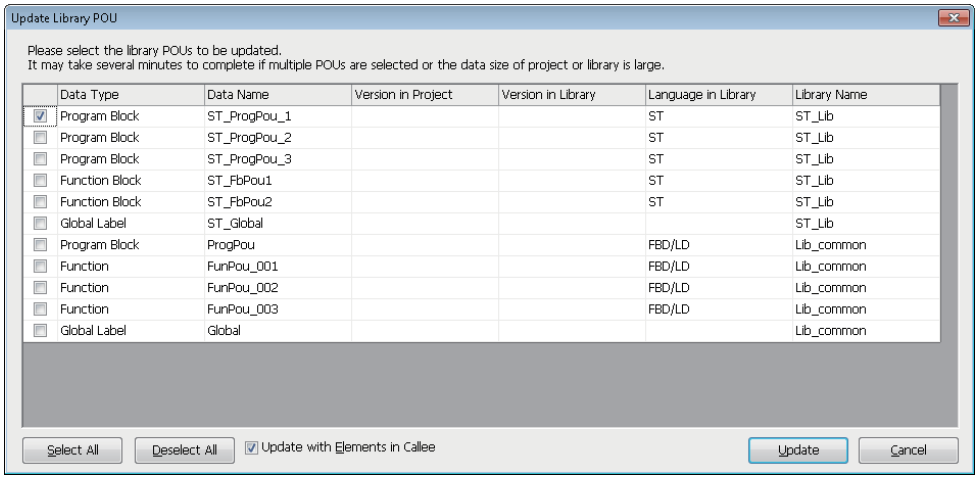
1. Export a library or project in which a POU is edited as a library file. (☞ Page 331 Creating a library file)
2. Register the library file created in step 1 to the library list of the project to be utilized. (☞ Page 335 Registering user libraries in the library list)
3. Utilize the POU to a project from the registered library. (☞ Page 335 Utilizing an element)

Updating library POUs

Update the elements of a library imported to a project.
Multiple libraries and elements can be updated at once.
In addition, an element (call destination element) that is called from a selected element will also be updated at the same time.
When updating them, if an element with the same name does not exist in the project, the elements of the call destination will be added.

Window

1. Select a library or library POU to update in the [Library] tab in the "Element Selection" window.
2. Select [Project] ⇨ [Library Operation] ⇨ [Update Library POU], or right-click a library element, and select [Update Library POU] in the shortcut menu.



Operating procedure

Set each item and click the [Update] button.

■Call destination element

'Call destination element' refers to as an element used in a POU. (Example: A function block used in a program block)
The data types of call destination elements are as follows:

- Function block (Standard and safety)
- Function (Standard and safety)
- Structure
- Global label (standard, safety, and standard/safety shared)

Precautions

This function is provided for projects created in an ST program or an FBD/LD program.
The following restrictions apply when a POU which was created in a ladder program or an SFC program is used in a library.

- A library POU which is created in a ladder program or an SFC program cannot be updated.
- A library POU which is used in a POU created in a ladder program or an SFC program cannot be updated.
- A function block which was registered as a global label cannot be updated.
- Global labels are not updated when an FB instance, which is used in a POU created in a ladder program or an SFC program, is registered as a global label.

Checking for library updates automatically

By selecting "Yes" in the following option, whether or not user libraries are updated is automatically checked.

- [Tool] ⇨ [Options] ⇨ "Project" ⇨"User Library" ⇨ "Library Update Check" ⇨ "Check User Library Date"

10.4 Enhanced Use of Application Library/MELSOFT Library

The application library/MELSOFT Library (sample library) are the element collection of program/function block/function/structure that composed of specific processing.
In this section, the application library/MELSOFT Library (sample library) are explained as a library.
An element in a library can be utilized by registering the library in the library list.
The elements are imported into a project with by registering a library.
The registration method of a library differs depending on the file extension (*.gx3s, *.mslm).
To obtain the library, please consult your local Mitsubishi representative.
Remote head modules do not support it.

Precautions

Before registering a library, confirm that the module type of the current project (CPU module) supports the library.

Registering libraries of which file extensions are 'gx3s'

Operating procedure

1. Select [Tool] ⇨ [Register Sample Library].
2. Select a file on the "Open Sample Library" screen, and click the [Open] button.

The function block of the library is displayed in the "Navigation" window ('M_FBLIB' is for the Mitsubishi Electric FA products, and 'P_FBLIB' is for the partner's products).

Registering libraries of which file extensions are 'mslm'

Operating procedure

■Registering libraries to be referenced

1. Select [Project] ⇨ [Library Operation] ⇨ [Register to Library List] ⇨ [Library].
2. Select a file on the "Register Library to Library List" screen, then click the [Open] button.

The registered library is displayed on the library list.

■Deleting libraries

1. Select the [Library] tab in the "Element Selection" window.
2. Select the library to be deleted, then select [Project] ⇨ [Library Operation] ⇨ [Delete from Library List] ( ).

■Updating libraries

To update a library, refer to the following section.
☞ Page 337 Updating library POUs

Library classification display

Libraries (*.mslm) can be classified by registering them into the library classification definition file.
To obtain the library classification definition file, please consult your local Mitsubishi representative.

Operating procedure

■Classifying libraries

1. Select the [Library] tab in the "Element Selection" window.
2. Click on the toolbar and select [Register the Library Classification Definition].
3. Select a file on the "Register the Library Classification Definition" screen and click the [Open] button.

■Canceling library classifications

1. Select the [Library] tab in the "Element Selection" window.
2. Click on the toolbar and select [Delete the Library Classification Definition].

MEMO

PART 4 DEBUGGING AND OPERATION

This part explains the communication route setting to access a CPU module, reading/writing data, and monitoring the execution status.

11 PROGRAM SIMULATION

12 SETTING ROUTE TO CPU MODULE

13 WRITING/READING DATA TO CPU MODULE

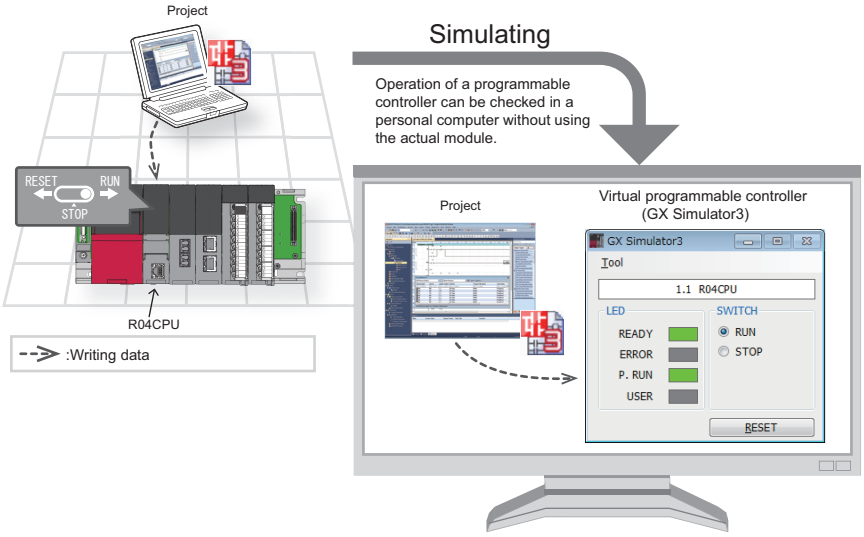
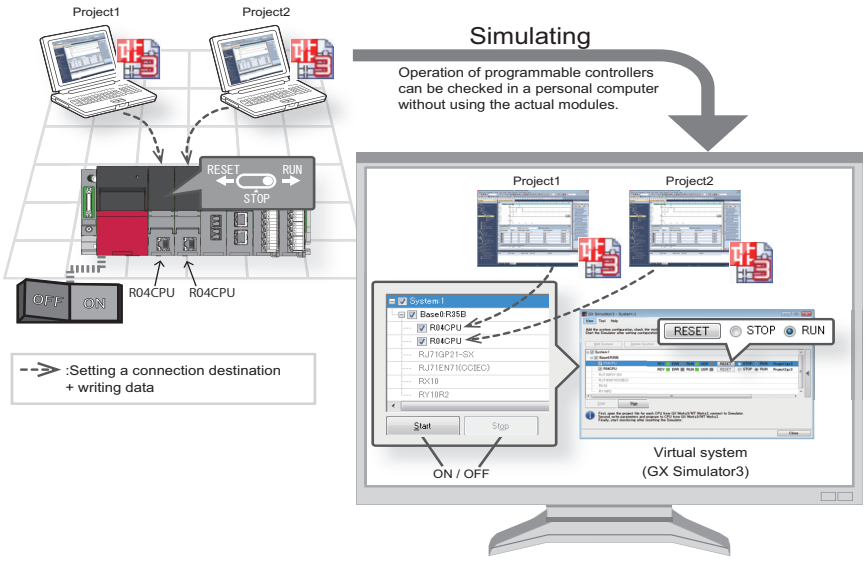
14 CHECKING OPERATION OF PROGRAMS

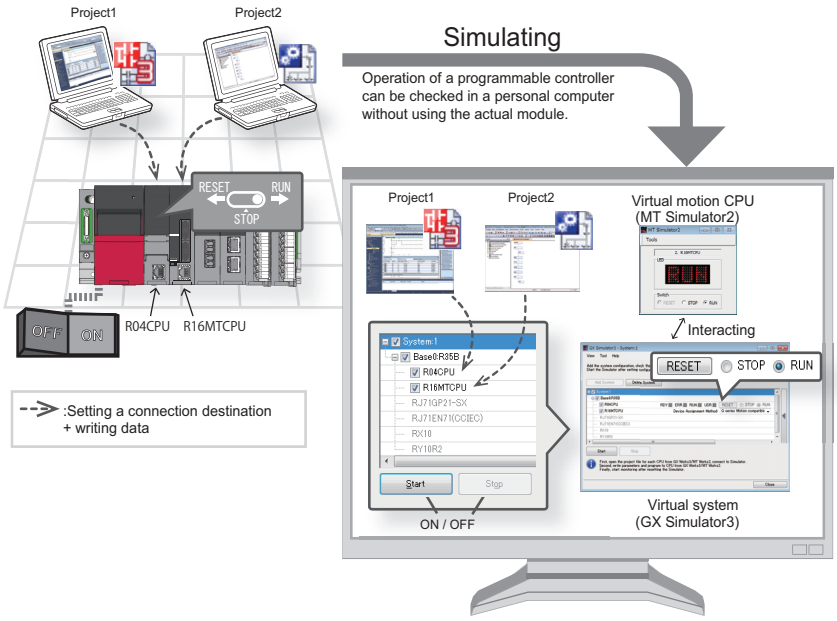
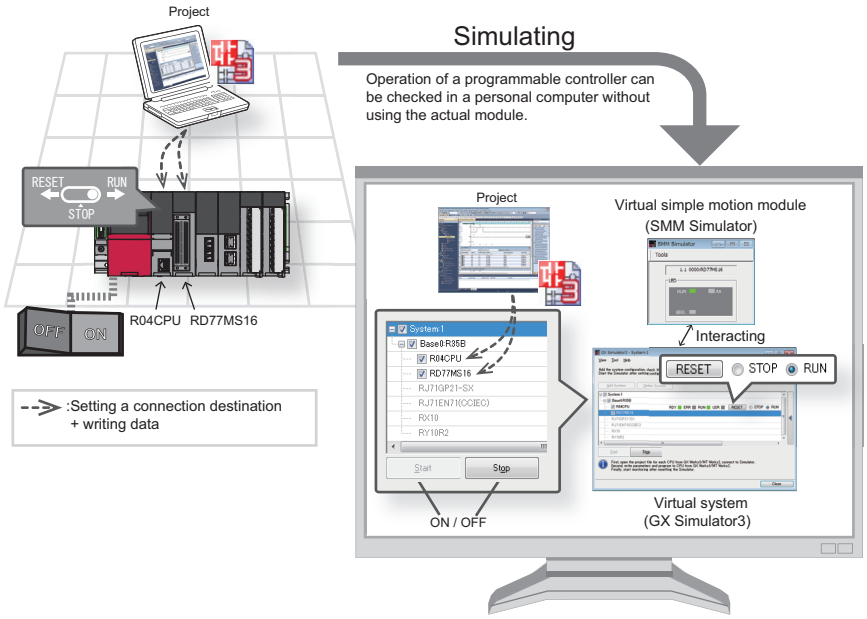
11 PROGRAM SIMULATION

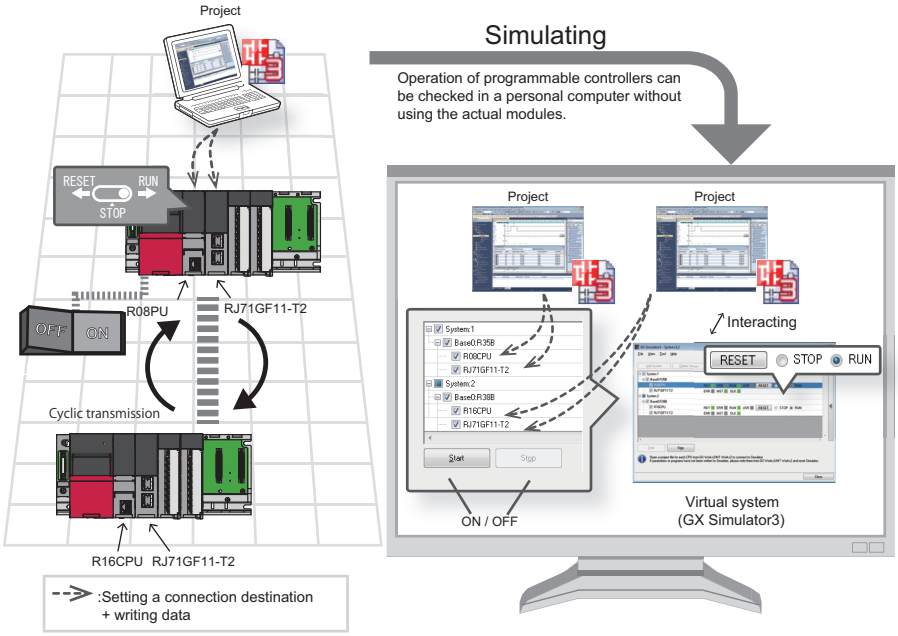
This chapter explains the method for debugging a program offline by using the simulation function.
For modules supporting the simulation function, refer to the following section.
☞ Page 553 Using Simulation Function

11.1 Simulation Function

The Simulation function debugs programs using a virtual programmable controller on a personal computer.
GX Simulator3 is used for the Simulation function.
This function is useful to check programs before operating them actually since it enables debugging without the connection with CPU module.
The following five simulations can be performed in GX Simulator3.

Purpose	Reference
Simulation of a CPU module (host CPU) 	Page 345 Simulation of a CPU module
Simulation of a multiple CPU system  FX5CPUs do not support it.	Page 348 Simulation of a multiple CPU system

Purpose	Reference
Simulation of a multiple CPU system including a programmable controller CPU and a motion CPU  FX5CPUs do not support it.	Page 351 Simulation of a programmable controller CPU and a motion CPU
Simulation of the system of a CPU module and simple motion module  	Page 354 Simulation of a CPU module and a simple motion module

Purpose	Reference
Simulation of multiple systems which perform cyclic transmission 	Page 356 Simulation for cyclic transmission

For the considerations for using the Simulation function, refer to the following section.

☞ Page 587 Considerations

Safety and handling consideration

⚠CAUTION

■The Simulation function simulates the actual module to debug a created sequence program. However, this function does not guarantee the operation of the debugged program.

■The Simulation function uses the memory for simulation to input and output data to/from an I/O module and intelligent function module. Some instructions/functions and device memory are not supported. Therefore, the operation results obtained with the virtual programmable controller may differ from those obtained using the actual module.

After debugging programs using the Simulation function, the normal program debugging, which is performed with the module connected before the actual operation, is required.

11.2 Simulation

This section explains the simulation methods.
During the simulation, GX Simulator3 is set as a connection destination and "Simulation ((system number).(CPU number))" is displayed in the status bar.

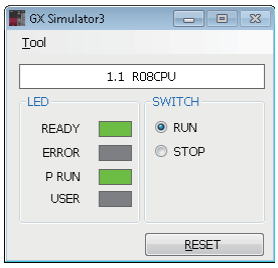
Simulation of a CPU module

This can be used when performing the simulation to a CPU module.

Starting a simulation

Window

[Debug] ⇨ [Simulation] ⇨ [Start Simulation] ( )



Operating procedure

Select the checkbox of the data to be written on the "Online Data Operation" screen, and click the [Execute] button.

■Simulation of an RnPCPU (redundant mode)

This function performs in the following condition:

- Operation mode: Separate mode
- Control system/standby system: Control system
- System A/B setting: System A
- Tracking transfer: No execution

■Simulation of an RnPSFCPU

This function performs in the following condition:

- Operation mode: Backup mode
- Control system/standby system: Control system
- System A/B setting: System A
- Tracking transfer: No execution

Precautions

The following shows the considerations when simulating an RnPCPU (redundant mode) or an RnPSFCPU.

- The following function cannot be performed during simulation.
  [Online] ⇨ [Redundant PLC Operation]
- Only one base unit is acceptable for simulation. When constructing a system without setting the base setting of the system parameter, the number of base units is automatically set to eight. Therefore a redundant system configuration abnormal error occurs.

Ending a simulation

Operating procedure

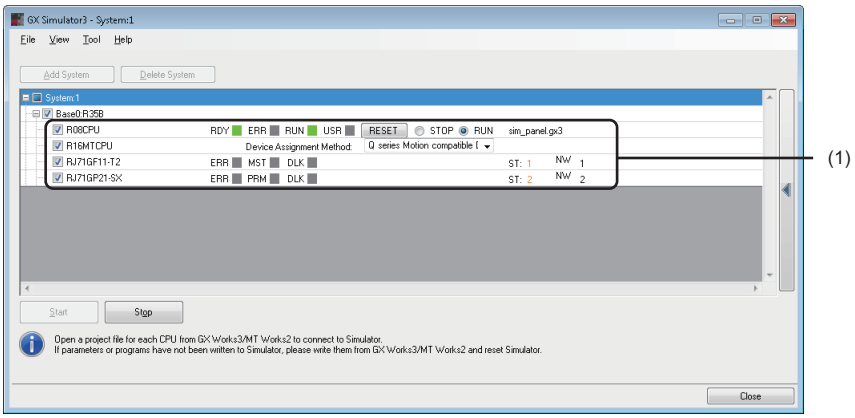
Select [Debug] ⇨ [Simulation] ⇨ [Stop Simulation] ( ).

11.3 System Simulation

The system simulation can be performed to simulate a program by interacting with other CPU modules and simple motion modules.

Window

[Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Start System Simulation] ( )



Item	Description
(1) Panel	The operating status of each module is displayed. Additionally, an operation for each module can be performed.

Operating procedure

For operating procedures for the system simulation, refer to the following sections.

Multiple CPU: ☞ Page 348 Simulation of a multiple CPU system

Programmable controller CPU and motion CPU: ☞ Page 351 Simulation of a programmable controller CPU and a motion CPU

CPU module and simple motion module: ☞ Page 354 Simulation of a CPU module and a simple motion module

Cyclic transmission: ☞ Page 356 Simulation for cyclic transmission

Display contents on a panel

Operating status can be checked and an operation can be changed in a panel for each module in GX Simulator3.

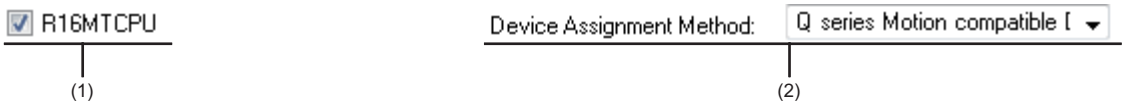
The following shows the display content on the panel of a CPU module and a network module.

Window

■Programmable controller CPU

Item	Description
(1) Module name	Indicates the model name of the CPU module.
(2) RDY	Indicates the 'READY' LED on the front of the CPU module.
(3) ERR	Indicates the 'ERROR' LED on the front of the CPU module.
(4) RUN	Indicates the 'PROGRAM RUN' LED on the front of the CPU module.
(5) USR	Indicates the 'USER' LED on the front of the CPU module.
(6) RESET	Behaves as RESET switch.
(7) STOP	Behaves as STOP switch.
(8) RUN	Behaves as RUN switch.

■Motion CPU

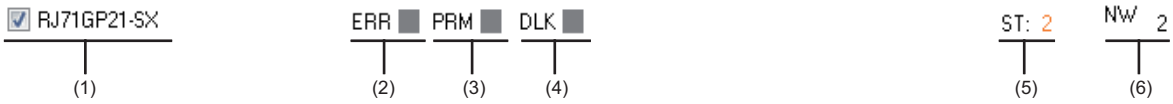


Item	Description
(1) Module name	Indicates the model name of the CPU module.
(2) Device Assignment Method	Select a device assignment method for a motion CPU. • Q series Motion compatible Device assignment • MELSEC iQ-R Motion Device assignment

■Field network

Item	Description
(1) Module name	Indicates the model name of the network module.
(2) ERR	Indicates the 'ERROR ' LED on the front of the module.
(3) MST	Indicates the 'MST' LED on the front of the module.
(4) DLK	Indicates the 'D LINK' LED on the front of the module.
(5) ST	Indicates the dot matrix LED of the module. Only a station number is displayed on the panel of GX Simulator3.
(6) NW	Indicates a network number set in the network parameter.

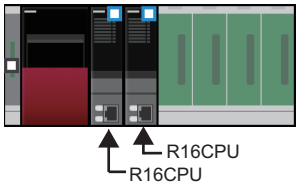
■Controller network



Item	Description
(1) Module name	Indicates the model name of the network module.
(2) ERR	Indicates the 'ERROR ' LED on the front of the module.
(3) PRM	Indicates the 'PRM' LED on the front of the module.
(4) DLK	Indicates the 'D LINK' LED on the front of the module.
(5) ST	Indicates the dot matrix LED of the module. Only a station number is displayed on the panel of GX Simulator3.
(6) NW	Indicates the network number set in a network parameter.

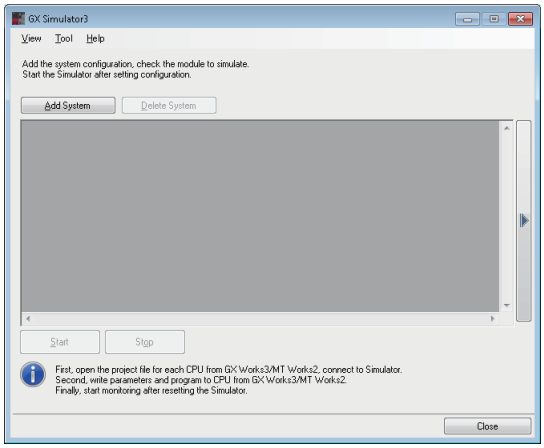
Simulation of a multiple CPU system

This section shows the operation to simulate a multiple CPU system by using the example of the following system configuration.



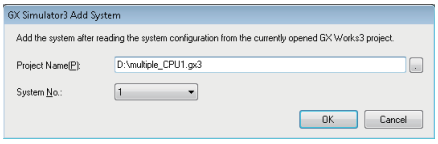
Operating procedure

- Starting GX Simulator3

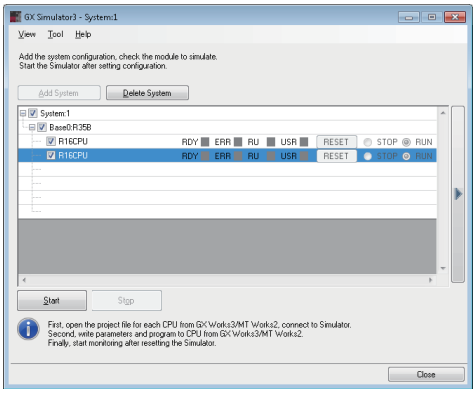


1. Start GX Simulator3. (☞ Page 346 System Simulation)

2. In the GX Simulator3 screen, click the [Add System] button.

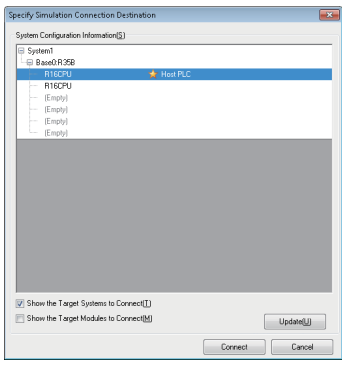


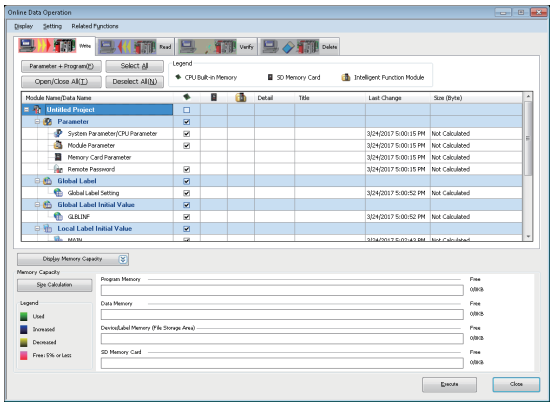
3. In the "GX Simulator3 Add System" screen, set a project name and a system number.



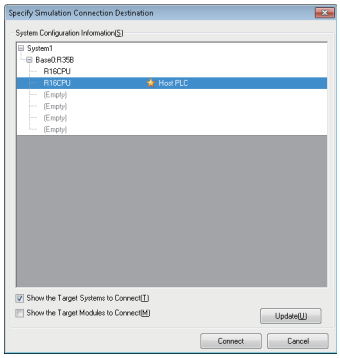
4. In the GX Simulator3 screen, select the checkboxes of the CPU modules to simulate, and click the [Start] button.

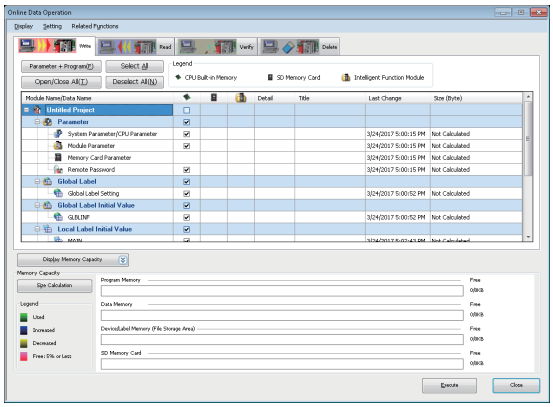
- Connecting to the CPU No.1 and writing data





- Connecting to the CPU No.2 and writing data





5. Select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

6. In the "Specify Simulation Connection Destination" screen, select the CPU module of the system which was set in step 3, and click the [Connect] button.

"Simulation ((system number).(CPU number)) will be displayed in the status bar.

7. Select [Online] ⇨ [Write to PLC]. Write the parameters and programs to GX Simulator3.

8. Start another GX Works3 and open the project of CPU No.2.

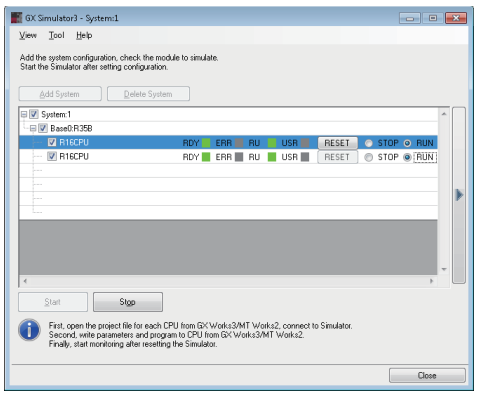
9. Select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

10. In the "Specify Simulation Connection Destination" screen, select the CPU module of the system which was set in step 3, and click the [Connect] button.

"Simulation ((system number).(CPU number))" will be displayed in the status bar of GX Works3.

11. Select [Online] ⇨ [Write to PLC]. Write the parameters and programs to GX Simulator3.

• Simulating



12. In the GX Simulator3 screen, click the [RESET] button in the row of the CPU No.1.

13. Select "RUN" in the row of each CPU.

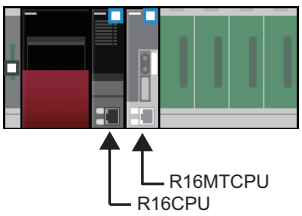
14. Select [Online] ⇨ [Monitor] ⇨ [Start Monitoring].

The system simulation starts.

Simulation of a programmable controller CPU and a motion CPU

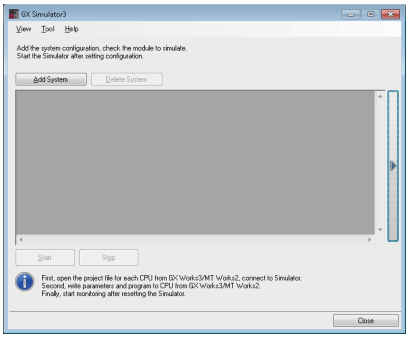
This section shows the operation to simulate a programmable controller CPU and a motion CPU by using the example of the following system configuration.

To use this function, MT Works2 Version 1.140W or later is required to be installed.



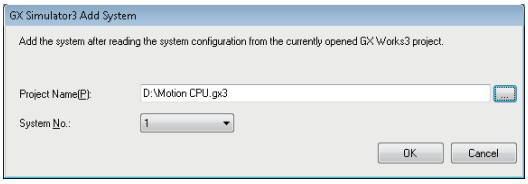
Operating procedure

- Starting GX Simulator3 and MT Simulator2

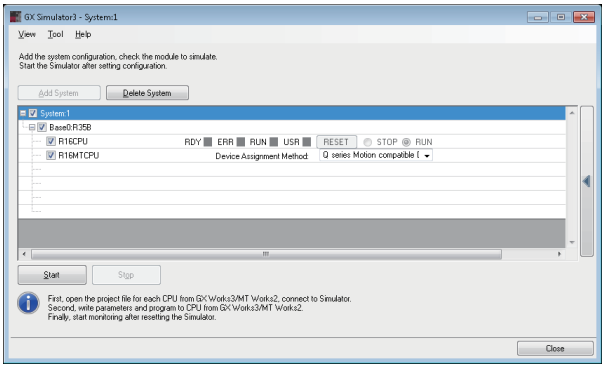


1. Start GX Simulator3. (☞ Page 346 System Simulation)

2. In the GX Simulator3 screen, click the [Add System] button.



3. In the "GX Simulator3 Add System" scree, set a project name and a system number.



4. In the GX Simulator3 screen, select the checkboxes of a programmable controller CPU and a motion CPU to simulate.

Up to two motion CPU modules can be selected.

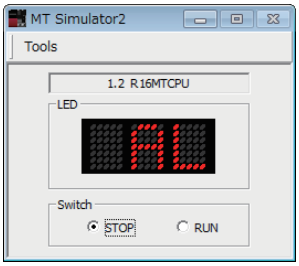
A simulation cannot start when a simple motion module and a motion CPU are selected at the same time.

5. Select "Q series Motion compatible Device assignment" or "MELSEC iQ-R Motion Device assignment " for "Device Assignment Method" of the motion CPU, and click the [Start] button.

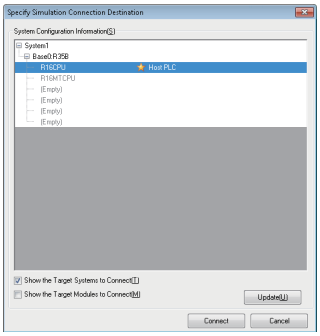
For details on the device assignment method, refer to the following manual.

MELSEC iQ-R Motion Controller Programming Manual (Common)

MT Simulator2 starts.



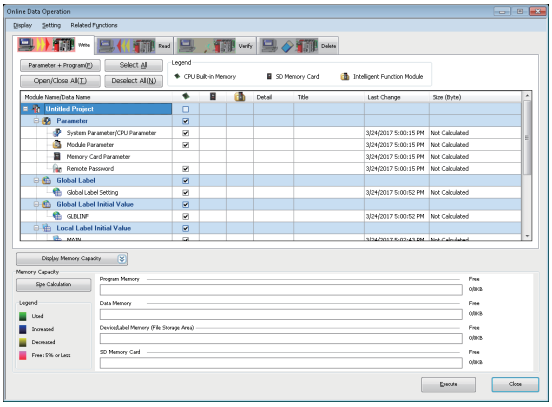
• Connecting to a programmable controller CPU and writing data



6. Select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

7. In the "Specify Simulation Connection Destination" screen, select the programmable controller CPU of the system which was set in step 3, and click the [Connect] button.

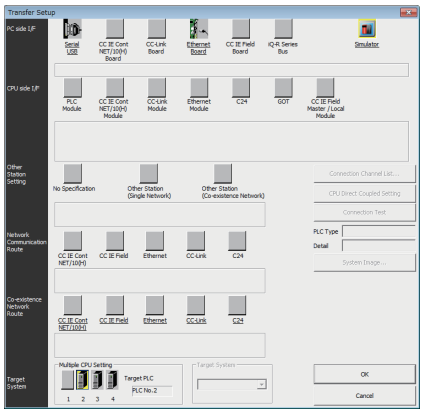
"Simulation ((system number).(CPU number))" will be displayed in the status bar of GX Works3.



8. Select [Online] ⇨ [Write to PLC].

Write the parameters and programs to GX Simulator3.

• Connecting to a motion CPU and writing data



9. Start MT Developer2, and open the project of a motion CPU to simulate.

10. Select [Online] ⇨ [Transfer Setup].

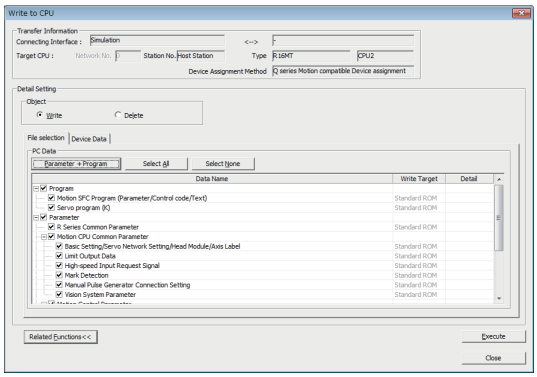
11. In the "Transfer Setup" screen, double-click "Simulator" for "PC side I/F".

12. In the "System No. Setting" screen, specify the system number, which was set in the step 3, for "System No.".

13. In the "Transfer Setup" screen, specify the motion CPU number for "Multiple CPU Setting".

14. In the "Transfer Setup" screen, click the [OK] button.

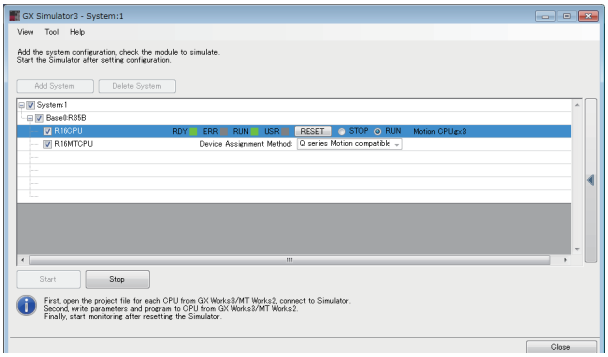
MT Simulator2 already started is connected.

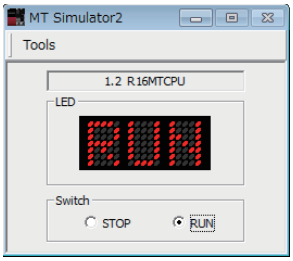


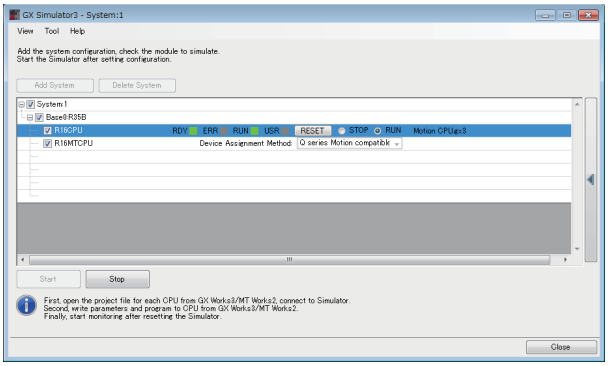
15. Select [Online] ⇨ [Write to Motion].

Write the parameters and programs to MT Simulator2.

• Simulating







16. In the GX Simulator3 screen, click the [RESET] button in the row of a programmable controller CPU.

17. In the GX Simulator3 screen, select "RUN" in the row of a programmable controller CPU.

18. In the "MT Simulator2" screen, select "RUN".

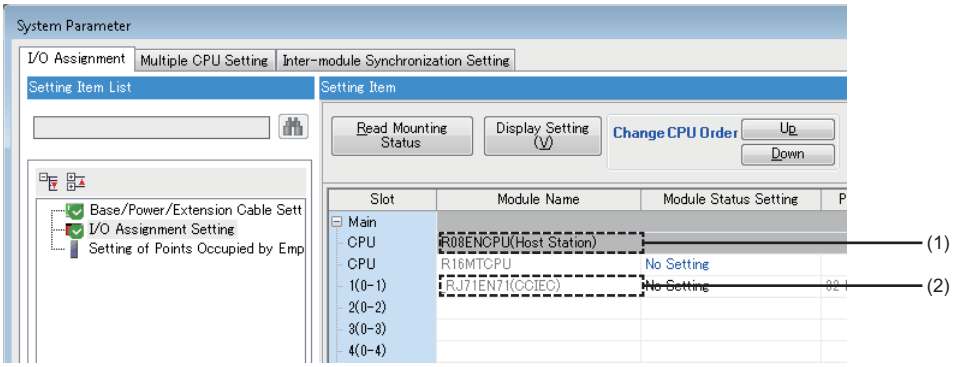
19. Select [Online] ⇨ [Monitor] ⇨ [Start Monitoring] on GX Works3.

The system simulation starts.

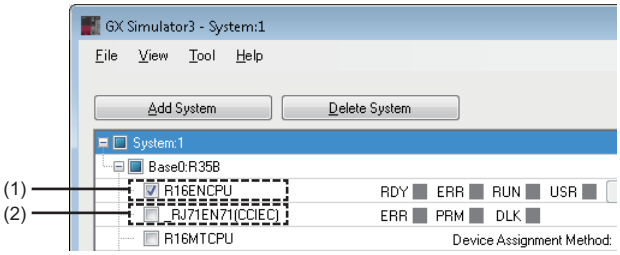
Precautions

In the simulation of a multiple CPU system where an RnENCPU is set as CPU No.1, the place of modules in the "System Parameter" screen and in the GX Simulator3 screen are differently displayed.

"System Parameter" screen



GX Simulator3 screen



(1): RnENCPU(CPU part)

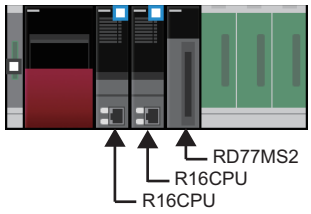
(2): RnENCPU (network part)

For details on the multiple CPU configuration using an RnENCPU, refer to the following manual.

MELSEC iQ-R Module Configuration Manual

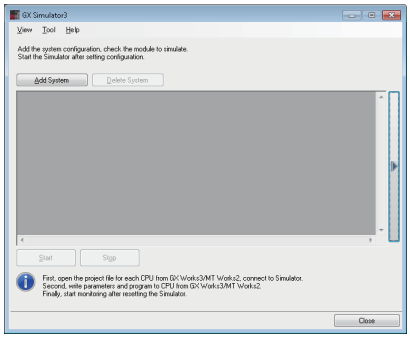
Simulation of a CPU module and a simple motion module

This section shows the operation to simulate a CPU module and a simple motion by using the example of the following system configuration.

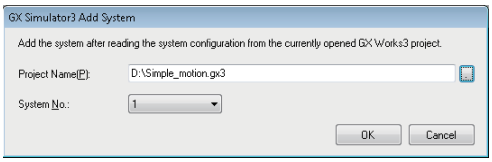


Operating procedure

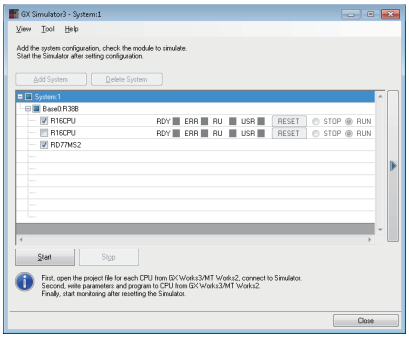
- Starting GX Simulator3



1. Start GX Simulator3. (☞ Page 346 System Simulation)
2. In the GX Simulator3 screen, click the [Add System] button.



3. In the "GX Simulator3 Add System" screen, set a project name and a system number.



4. In the GX Simulator3 screen, select the checkboxes of the CPU modules and simple motion modules to simulate, and click the [Start] button.

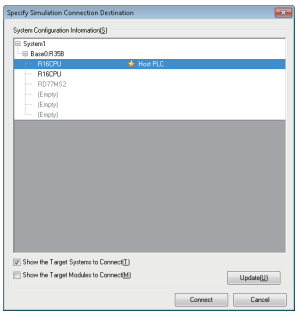
The number of selectable simple motion modules is limited.

- RD77MS, FX5-40SSC-S, FX5-80SSC-S: Up to 6
- RD77GF: Up to 2

A simulation cannot start when any of the following cases;

- RD77MS and RD77GF are selected at the same time
- A simple motion module and a motion CPU are selected at the same time

- Starting SMM Simulator, connecting to a CPU module, and writing data

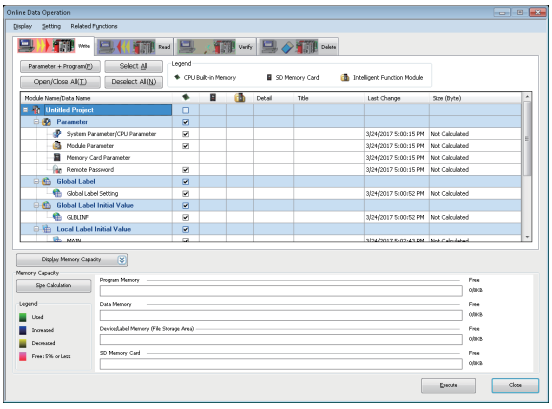


5. Select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

6. In the "Specify Simulation Connection Destination" screen, select the CPU module of the system which was set in step 3, and click the [Connect] button.

"Simulation ((system number).(CPU number))" will be displayed in the status bar of GX Works3.

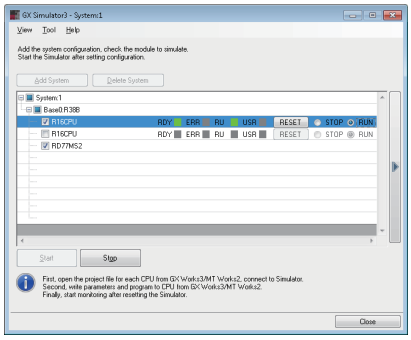
SMM Simulator (simulator of a simple motion module) starts.



7. Select [Online] ⇨ [Write to PLC].

Write the parameter, programs and module parameters of the simple motion module to GX Simulator3.

- Simulating



8. In the GX Simulator3 screen, click the [RESET] button in the row of a CPU module.

9. In the GX Simulator3 screen, select "RUN" in the row of a CPU module.

10. Select [Online] ⇨ [Monitor] ⇨ [Start Monitoring].

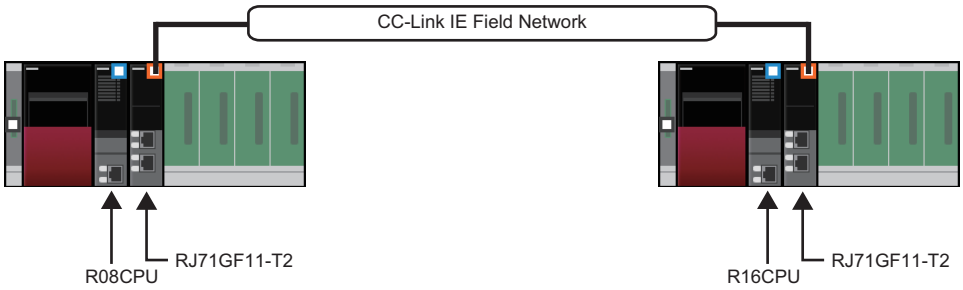
The system simulation starts.

Simulation for cyclic transmission

The section shows the operation to simulate cyclic transmission which sends data among multiple systems by using the example of the following system configuration.

Ex.

Module configuration diagram



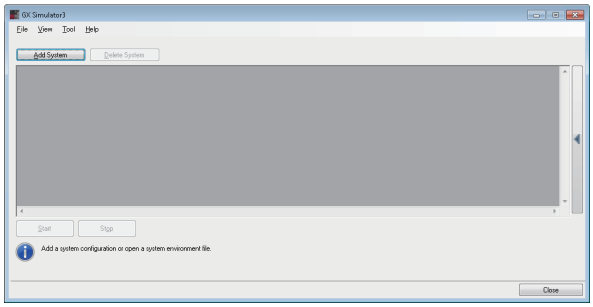
"I/O Assignment Setting" of "System Parameter"

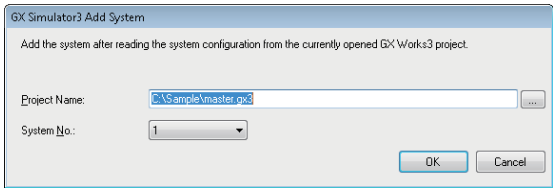
Slot	Project of master station	Project of local station
CPU	R08CPU (host CPU)	R16CPU (host CPU)
0	RJ71GF11-T2	RJ71GF11-T2
1	Empty	Empty
2	Empty	Empty
3	Empty	Empty
4	Empty	Empty

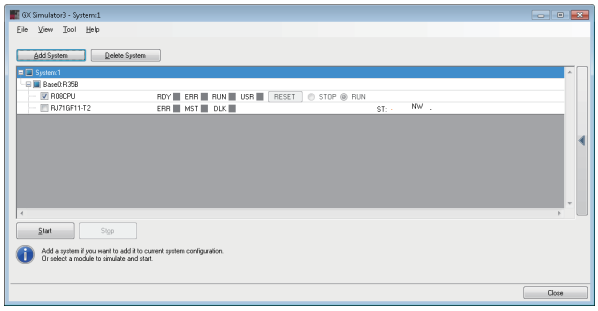
To simulate cyclic transmission, set the module parameters of network modules to link each other.

Operating procedure

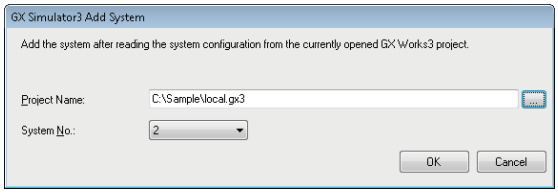
- Starting GX Simulator3



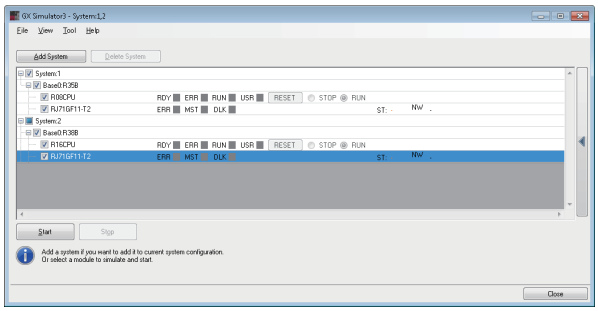




1. Open the project of a master station in GX Works3.
2. Start GX Simulator3. (☞ Page 346 System Simulation)
3. In the GX Simulator3 screen, click the [Add System] button.
4. In the "GX Simulator3 Add System" screen, set a project name and a system number.
5. Start another GX Works3, and open the project of a local station.
6. In the GX Simulator3 screen, click the [Add System] button.

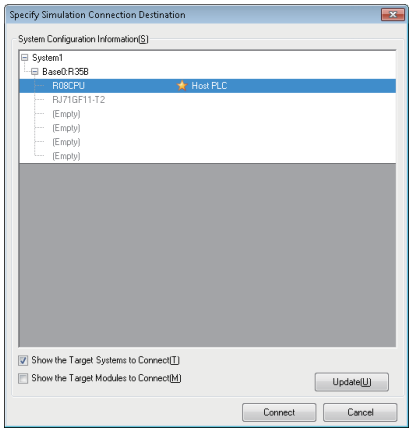


7. In the "GX Simulator3 Add System" screen, set a project name and a system number.



8. In the GX Simulator3 screen, select the checkboxes of the CPU modules and network modules to simulate, and click the [Start] button.

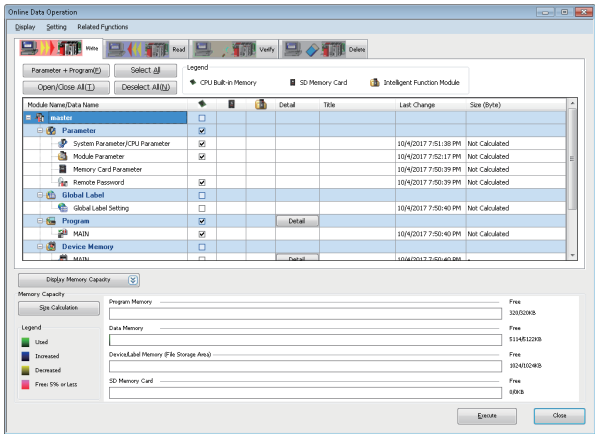
- Connecting to a programmable controller CPU and writing data



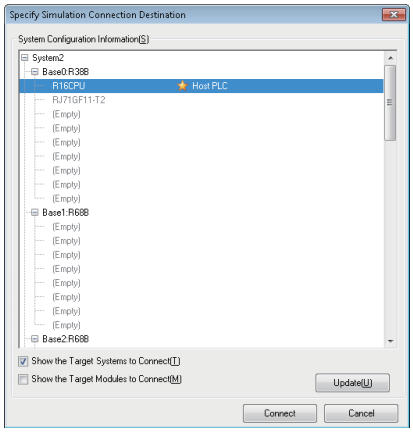
9. In GX Works3 used in step 1, select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

10. In the "Specify Simulation Connection Destination" screen, select the CPU module of the system which was set in step 4, and click the [Connect] button.

"Simulation ((system number).(CPU number))" will be displayed in the status bar of GX Works3.



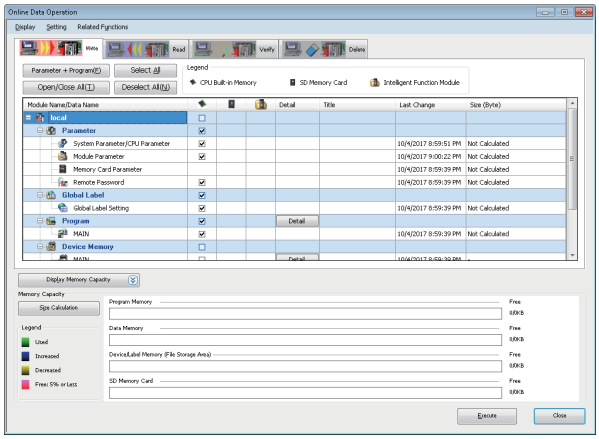
11. Select [Online] ⇨ [Write to PLC] to write parameters and programs in GX Simulator3.



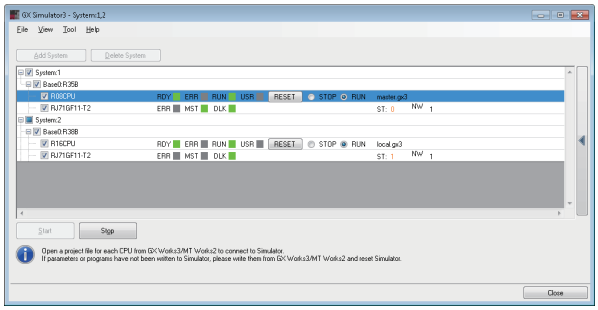
12. In GX Works3 used in step 5, select [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation].

13. In the "Specify Simulation Connection Destination" screen, select the CPU module of the system which was set in step 7, and click the [Connect] button.

"Simulation ((system number).(CPU number))" will be displayed in the status bar of GX Works3.



- Execution of simulation



14. Select [Online] ⇨ [Write to PLC] to write parameters and programs in GX Simulator3.

15. In the GX Simulator3 screen, click the [RESET] button in the row of the CPU module of a local station.

16. In the GX Simulator3 screen, select "RUN" in the row of the CPU module of a local station.

17. In the GX Simulator3 screen, click the [RESET] button in the row of the CPU module of the master station.

18. In the GX Simulator3 screen, select "RUN" in the row of the CPU module of the master station.

19. In both GX Works3 projects which control each of the master station and the local station, select [Online] ⇨ [Monitor] ⇨ [Start Monitoring].

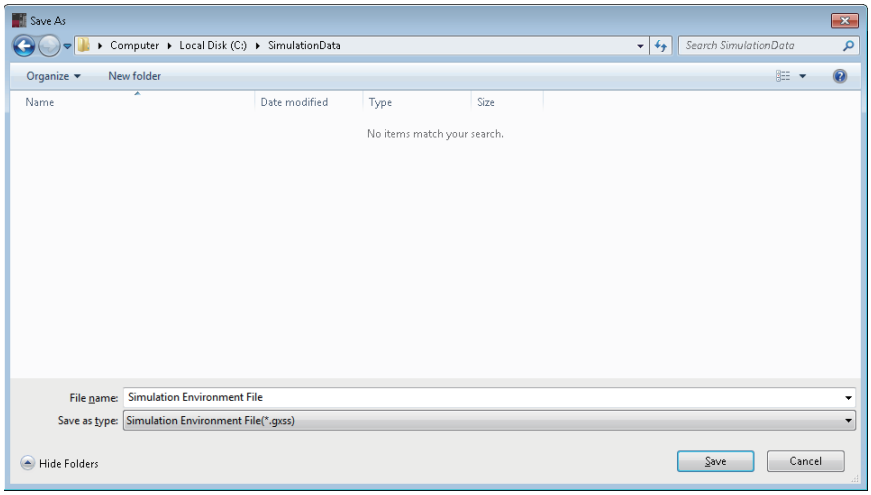
The system simulation starts.

Saving a simulation environment file

The system configuration added to the system simulation and data written in GX Simulator3 can be saved as a simulation environment file.
Before saving data, stop all simulations.

Window

Select [File] ⇨ [Save Simulation Environment] in the GX Simulator3 screen.



Operating procedure

Set each item and click the [Save] button.

Data list

The following data written to GX Simulator3 is saved as a simulation environment file.

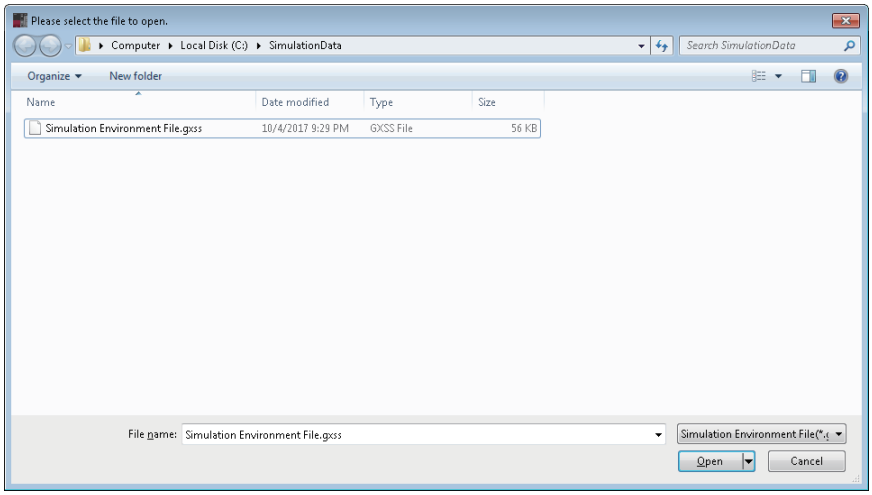
Module type	Data
PLC CPU	System parameter, CPU parameter, module parameter, module extended parameter, remote password, global label setting, global label assignment information, program file, FB file, FUN file, label initial value file, file register, initial device value, device comment, device/label within a latch range, event history, device data storage file
Motion CPU	Program, parameter, backup data, history of current value, event history, device within a latch range
Simple Motion	Positioning data, block start data, parameter, servo parameter (RD77MS only), mark detection, synchronous control parameter, cam data, backup data

Opening a simulation environment file

A simulation environment can be restored by opening a saved simulation environment file.

Window

Select [File] ⇨ [Open Simulation Environment] in the GX Simulator3 screen.



Operating procedure

Select a simulation environment file to open, and click the [Open] button.

Precautions

If the contents of the restored simulation environment and the project connected do not match, an error may occur in GX Simulator3.

After opening a simulation environment file, check if the data of GX Simulator3 and the project match by using the verification function.

When the verification result is a mismatch, data in GX Simulator3 and the project data can be matched using 'Read from PLC'.

Ending a system simulation

Operating procedure

Click the [Close] button in the GX Simulator3 screen.

Point

To disconnect with the virtual system without closing the GX Simulator3 screen, perform the following operation.

• [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Disconnect Simulation]

When restarting the system simulation, perform the following operation.

• [Debug] ⇨ [Simulation] ⇨ [System Simulation] ⇨ [Connect Simulation]

11.4 Simulation of External Device Operations

This section explains the method for debugging a program using the 'I/O System Setting' function.

I/O System Setting function

The I/O System Setting is a function to enable a debug by simulating operations of input/output devices (without changing a program.)

Precautions

- When the simulator is in STOP, the 'I/O System Setting' function does not run. At the timing of STOP to RUN, it starts performing from the beginning of the conditions described in the I/O system setting data.
- Since a label is acquired from a project being open at the first execution time of the I/O System Setting, the label that edited and written to the simulator after startup is not applied. Close the "I/O System Setting" screen and start it again.

Execution procedure of I/O System Setting function

1. Start GX Simulator3. (☞ Page 345 Simulation)
2. Set GX Simulator3 to "STOP".
3. Display the "I/O System Setting" screen. (☞ Page 362 Executing I/O System Setting function)
4. Output the template file of the setting data. (☞ Page 363 Outputting the template of setting data)
5. Edit the outputted file. (☞ Page 364 Creating setting data)
6. Register devices/labels to monitor in the "Watch" window. (☞ Page 434 Checking Current Values by Registering Devices/Labels)
7. Open the edited file. (☞ Page 368 Opening setting data)
8. The following shows the procedure to run an I/O system. (☞ Page 368 Executing the I/O system)
9. Set GX Simulator3 to "RUN".

Executing I/O System Setting function

Set the devices to be used in the I/O System Setting, then execute the simulation.

Window

■Simulation on a CPU module

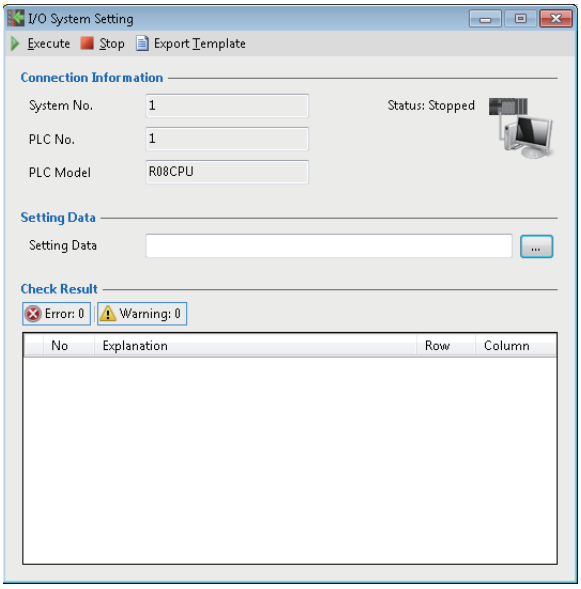
1. Select [Tool] ⇨ [I/O System Setting] in the GX Simulator3 screen.

■System simulation

1. Select [Tool] ⇨ [Start I/O System Setting] in the GX Simulator3 screen.

The "GX Simulator3 I/O System Setting" screen appears.

2. Set each items in the "GX Simulator3 I/O System Setting" screen, and click the [OK] button.



Outputting the template of setting data

The following shows the procedure to output a template for I/O system setting data.

Operating procedure

Select the [Export Template] on the "I/O System Setting" screen.

The template for I/O system setting data is output as a CSV format file (template file).

■Template file

Window

(1), (2), (3)

	A	B	C	D	E	F
1	//I/O System Setting Data					
2	//Control Record					
3	//Record Type	Comment	GX Works3 Project Path	PLC No.	Reserve	
4	1		C:¥Users¥PROJECT1.gx3			
5						
6	//Data Record					
7	//Record Type	Setting No.	Conditions	Timer (ms)	Output	Reserve
8	//2	1	Y0=TRUE AND (Y1=TRUE OR LDP(TRUE, Y2))	100	X0:=TRUE	
9	//2	1			D0:=100	
10	//2	2	Label1=TRUE AND Label2=TRUE	50	Label3:=TRUE	
11	//2	2			Label4:=200	
12	//2	3	LDF(TRUE, Y3)	0	X1:=TRUE	
13	//2	3			D10:=10	
14	//2	4	INIT	1000	X101:=TRUE	
15	//2	5	Y0=TRUE	100	X0.10:=TRUE	
16	//2	6	CONTINUE	1000	D100:D:=D100:D+65536	
17	//2	7	M0	0	D20:E:=INT_TO_REAL(wLabel5)	
18	//2	8	M0	*	D22:E:=LAG_DED(0,100,0,100,60,0,D20:E)	
19	//2	9	M0	0	eLabel6:=D22:E	
20						
21	//End Record					
22	//Record Type	Reserve				
23	3					

Displayed items

Item		Description	
		Output	Edit*1
(1) Control record	Record Type	'1' (the value indicates the control record) is displayed.	Enter '1'. (Required)
	Comment	A comment is displayed.	Enter a comment. (Up to 50 characters)
	GX Works3 Project Path	The project path of GX Works3 from which the simulator is activated is displayed.	Enter the project path of GX Works3 where the simulator is activated. (Setting required)
	PLC No.	A PLC No. (1 to 8) is displayed.	Enter a PLC No. (1 to 8).
	Reserve	—	
(2) Data record	Record Type	'2' (the value indicates the data record) is displayed.	Enter '2'.
	Setting No.	The number (1 to 1023) set for the condition is displayed in ascending order.	Enter a number (1 to 1023) set for the condition in ascending order. (Required) When setting multiple pieces of output for one condition, enter the same number to each of them.
	Conditions	Conditions are delimited with a space.	Enter a condition (up to 256 characters) delimited by a space. (Required only for the first line) Up to six conditions can be combined in logical operation.
	Timer (ms)	Delay time (-1 to 1000) until the instruction is executed since the conditions have been satisfied is displayed. • -1: Output one per line for every scan when it is specified with the reserved word "CONTINUE". • *: It is displayed when a process response operation is used.	Enter a delay time (-1 to 1000) until the instruction is executed since the conditions have been satisfied. (Required only for the first line) • -1: Output one per line for every scan when it is specified with the reserved word "CONTINUE". • *: Enter '*' when using a process response operation.
	Output	Output formulas are displayed (up to 100 characters).	Enter an output formula (up to 100 characters). (Required) When setting multiple pieces of output for one condition, enter the second or subsequent output formula to the next line.
	Reserve	—	
(3) End record	Record Type	'3' (the value indicates the end record) is displayed.	Enter '3'. (Required)
	Reserve	—	

*1 When creating setting data by editing the template file, edit the file by following the descriptions in this column.

Creating setting data

The following shows the procedure to create setting data by editing the template file.

Operating procedure

Open the template file output in Excel® or the like, and directly edit the items in the file. (☞ Page 363 Template file)

For devices/labels available in editing a template file, refer to the following section.

☞ Page 369 Available devices/labels

Ex.

Example for editing a template file

	A	B	C	D	E	F	
1	//I/O System Setting Data						
2	//Control Record						
3	//Record Type	Comment	GX Works3 Project Path	PLC No.	Reserve		
4	1		C:¥Users¥PROJECT1.gx3				
5							
6	//Data Record						
7	//Record Type	Setting No.	Conditions	Timer (ms)	Output	Reserve	
8	//2	1	Y0=TRUE AND (Y1=TRUE OR LDP(TRUE, Y2))	100	X0:=TRUE		(1)
9	//2	1			D0:=100		
10	//2	2	Label1=TRUE AND Label2=TRUE	50	Label3:=TRUE		(2)
11	//2	2			Label4:=200		
12	//2	3	LDF(TRUE, Y3)	0	X1:=TRUE		(3)
13	//2	3			D10:=10		
14	//2	4	INIT	1000	X101:=TRUE		(4)
15	//2	5	Y0=TRUE	100	X0..10:=TRUE		(5)
16	//2	6	CONTINUE	1000	D100:D:=D100:D+65536		(6)
17	//2	7	M0	0	D20:E:=INT_TO_REAL(wLabel5)		(7)
18	//2	8	M0	*	D22:E:=LAG_DED(0,100,0,100,60,0,D20:E)		(8)
19	//2	9	M0	0	eLabel6:=D22:E		(9)
20							
21	//End Record						
22	//Record Type	Reserve					
23	3						

Item	Example	Notation in a template file
(1) Basic device setting	When 'Y0' is turned ON and 'Y1' is also turned ON, or 'Y0' is turned ON and 'Y2' rises, after 100 milliseconds, 'X0' turns ON. '100' is assigned to 'D0'	2,1,"Y0=TRUE AND (Y1=TRUE OR LDP(TRUE, Y2))",100,X0:=TRUE, 2,1,,,D0:=100,
(2) Label specification	When 'Label1' is turned ON and 'Label2' is also turned ON, after 50 milliseconds, 'Label3' turns ON. '200' is assigned to 'Label4'.	2,2,Label1=TRUE AND Label2=TRUE,50,Label3:=TRUE, 2,2,,,Label4:=200,
(3) Instant specification	When 'Y3' falls, 'X1' turns ON immediately. '10' is assigned to 'D10'.	2,3,"LDF(TRUE, Y3)",0,X1:=TRUE, 2,3,,,D10:=10,
(4) After initialization specification	After 1 second from execution, 'X101' turns ON.	2,4,INIT,1000,X101:=TRUE,
(5) Successive bit device output	When 'Y0' is turned ON, after 100 milliseconds, 'X0' to 'X10' turn ON.	2,5,Y0=TRUE,100,X0..10:=TRUE,
(6) Timing chart 32-bit integer addition output	'65536' is added to 'D100' after 1 second from the above pattern.	2,6,CONTINUE,1000,D100:D:=D100:D+65536,
(7) Conversion from 16-bit integer to double precision	When 'M0' is ON, the data type of 'uLabel5' is converted from 16-bit integer to single precision. The converted value is assigned to 'D20'.	2,7,M0,0,D20:E:=INT_TO_REAL(wLabel5),
(8) Process response operation	LAG_DED operation is executed every one second. • D20: Input value • D22: Output value	2,8,M0,*,"D22:E:=LAG_DED(0,100,0,100,60,0,D20:E)",
(9) Substitution of a device value to a label value	The value of 'D22' is assigned to 'Label6'.	2,9,M0,0,eLabel6:=D22:E,

Set the conditions by using the following character strings and symbols.

○: Available, ×: Not available

Category	String/Symbol	Description	Availability				Usage example	
			Condition	Output	Device			
					Bit	Word		
Instruction	CONTINUE*1,*2	Keeps the previous condition	○	×	×	×	2,1,Y0=TRUE,1,X0:=TRUE 2,2,CONTINUE,1,X0:=FALSE 2,3,CONTINUE,1,LOOP	
	LOOP*1,*3	Repeats (It is used with "CONTINUE")	×	○	×	×		
	INIT*1,*4	Executes after initialization only one time	○	×	×	×	2,1,INIT,1,X0:=TRUE	
	LDP*5	LDP function	○	×	○	×	LDP(TRUE,Y0)	
	LDF*5	LDF function	○	×	○	×	LDF(TRUE,Y0)	
	DIRECT*6	Process response operation: direct connection	×	○	×	○	D22:E := DIRECT(0, 100, 0, 100, D20:E)	
	REVERSE*6	Process response operation: direct connection (output inversion)	×	○	×	○	D22:E := REVERSE(0, 100, 0, 100, D20:E)	
	LAG_DED*6	Process response operation: primary delay + dead time	×	○	×	○	D22:E := LAG_DED(0, 100, 0, 100, 60, 0, D20:E)	
	LAG_DED_REV*6	Process response operation: primary delay + dead time (output inversion)	×	○	×	○	D22:E := LAG_DED_REV(0, 100, 0, 100, 60, 0, D20:E)	
	INT_TO_REAL*6	Converts 16-bit integer to single precision	×	○	×	○	D0:E:=INT_TO_REAL(1) D0:E:=INT_TO_REAL(W0) D0:E:=INT_TO_REAL(wLabel1)	
	REAL_TO_INT*6,*7	Converts single precision to 16-bit integer	×	○	×	○	D0:=REAL_TO_INT(1.5) D0:=REAL_TO_INT(W0:E) D0:=REAL_TO_INT(eLabel1)	
	DINT_TO_REAL*6	Converts 32-bit integer to single precision	×	○	×	○	D0:E:=DINT_TO_REAL(1) D0:E:=DINT_TO_REAL(W0:D) D0:E:=DINT_TO_REAL(dLabel1)	
	REAL_TO_DINT*6,*7	Converts single precision to 32-bit integer	×	○	×	○	D0:D:=REAL_TO_DINT(1.5) D0:D:=REAL_TO_DINT(W0:E) D0:D:=REAL_TO_DINT(eLabel1)	
Operator	:=*8,*9	Assigns	×	○	○	○	Bit	X0:=TRUE
							Word	D0:=1
							Device	D0:=D10
							Label	D0:=wLabel1
	+*8	Adds	×	○	×	○	D0:=D0+1 D0:=D0+D1 D0:=D1+wLabel1 D0:U:=1+D1:U	
	-*8	Subtracts	×	○	×	○	D0:=D0-1 D0:=D0-D1 D0:=D1-wLabel1 D0:U:=1-D1:U	
	>*9,*10	Compares	○	×	×	○	D0>0	
	<*9,*10		○	×	×	○	D0<0	
	>=*9,*10		○	×	×	○	D0>=0	
	<=*9,*10		○	×	×	○	D0<=0	
	=*9,*10,*11		○	×	○	○	D0=0	
	<>*9,*10,*11		○	×	○	○	D0<>0	
	AND	Combines conditions using 'AND'	○	×	×	×	Y0=TRUE AND Y1=FALSE	
	OR	Combines conditions using 'OR'	○	×	×	×	Y0=TRUE OR Y1=FALSE	

Category	String/Symbol	Description	Availability				Usage example	
			Condition	Output	Device			
					Bit	Word		
Device type specifier*12	:U	Uses a device as a 16-bit non-negative integer	○	○	×	○	Condition	D0:U=0
							Output	D0:U:=0
	:D	Uses a device as a 32-bit integer	○	○	×	○	Condition	D0:D=0
							Output	D0:D:=0
	:UD	Uses a device as a 32-bit non-negative integer	○	○	×	○	Condition	D0:UD=0
							Output	D0:UD:=0
	:E	Uses a device as FLOAT [Single Precision]	○	○	×	○	Condition	D0:E=0
							Output	D0:E:=0
	:ED	Uses a device as FLOAT [Double Precision]	○	○	×	○	Condition	D0:ED=0
							Output	D0:ED:=0
Symbol	..*1,*13,*14	Specifies device range Example: X10..20	×	○	○	×	X10..20:=TRUE X10..20:=X0 X10..20:=Label1	
	(*15	Open bracket	○	×	○	○	Y0=TRUE AND (Y1=TRUE OR Y2=FALSE)	
	)*15	Close bracket	○	×	○	○		
Constant	TRUE*16	Turns ON a bit device	○	○	○	×	Condition	Y0=TRUE
							Output	X0:=TRUE
	FALSE	Turns OFF a bit device	○	○	○	×	Condition	Y0=FALSE
							Output	X0:=FALSE

*1 These are the original description methods in the I/O System Setting.

*2 An error occurs if the character is written at the top of a data record.

*3 When it is used without combining with "CONTINUE", an error does not occur but "LOOP" is ignored.
An error occurs if "LOOP" is written at the top of a data record.

*4 The timing that the execution transition of "INIT" is enabled are as follow:
· The I/O system setting was executed while the simulator is running
· The simulator was switched to RUN state while the I/O System Setting is executing

*5 Use both instructions according to the Structured Text notation.
MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

*6 If the data type of devices or labels used for arguments or output destination does not match with the ones specified by an instruction, an error will occur.

*7 For operations when a specific value is specified for an instruction argument, refer to the following section.
Page 367 When an invalid value is specified for an instruction argument

*8 If devices or labels with different data type are set to the terms of substitution expression, addition expression, or subtraction expression, an error will occur.

*9 A device whose data type is not specified can be calculated with the Word [Signed] type constant or Word [Unsigned] type constant. In that case, the data type of the device is determined according to the data type of the constant.

*10 To compare devices or labels each other, data types need to be consistent.

*11 To compare bit type devices using a sign of equality or inequality, device and constant must be a set.

*12 For devices to which a device type specifier can be added, refer to the following manual.
MELSEC iQ-R Structured Text (ST) Programming Guide Book

*13 A range for an assignment source cannot be specified.

*14 'A' to 'F' can be entered as device numbers for a device written in hexadecimal format. However, an error will occur if the order of the device numbers is changed in descending order. (Example: X10..2)

*15 There is no limit to the number of brackets if the combination of open brackets and close brackets matches.

*16 Only bit devises such as 'Y0' can be used for conditions. (When only 'Y0' is described, the 'Y0' will be 'TRUE'.)

■When an invalid value is specified for an instruction argument

If an invalid value is specified for an instruction argument, the value of the argument will be changed as follows.

Instruction	Argument	Incorrect value	Changed value
REAL_TO_INT	Device/label	-0	0
		Denormalized number	
		NaN	
		±∞	
	Constant	E32768 or more	32767
	Device/label	32768 or more	
	Constant	E-32769 or less	-32768
	Device/label	-32769 or less	
REAL_TO_DINT	Device/label	-0	0
		Denormalized number	
		NaN	
		±∞	
	Constant	E2147483648 or more	2147483647
	Device/label	2147483648 or more	
	Constant	E-2147483649 or less	-2147483648
	Device/label	-2147483649 or less	

Precautions

A row starting with '//' is regarded as a comment, and therefore it is skipped.

Opening setting data

The following shows the procedure to open created setting data.

Operating procedure

1. Click the [...] button in the setting data column on the "I/O System Setting" screen.
2. Select a file, then click the [Open] button.

Precautions

Language-specific characters are included in the setting data.
If the language font to display is not installed on the personal computer, some characters may be garbled.

Executing the I/O system

The following shows the procedure to run an I/O system after checking the setting data.

Operating procedure

Select [Execute] on the "I/O System Setting" screen.
If an error is included in the check result, correct the setting data and run the system again.

Precautions

If a function, device, or label which is not supported by the 'I/O System Setting' function in GX Works3 is included in the setting data, an error will occur.

Stopping the I/O system

The following shows the procedure to stop an I/O system.

Operating procedure

Select [Stop] on the "I/O System Setting" screen.

Available devices/labels

Device

Local devices are not available.

○: Available, ×: Not available

Category	Device name	Symbol		Digit specification	Bit-specified word device	Output formula	
						Destination	Source
User device	Input	X		○	×	○	○
	Output	Y		○	×	○	○
	Internal relay	M		○	×	○	○
	Latch relay	L		○	×	○	○
	Link relay	B		○	×	○	○
	Annunciator	F		○	×	○	○
	Link special relay	SB		○	×	○	○
	Timer	T	TS	×	×	○	○
			TN	×	×	○	○
			T	×	×	○	○
	Retentive timer	ST	STS	×	×	○	○
			STN	×	×	○	○
			ST	×	×	○	○
	Long timer	LT	LTS	×	×	○	○
			LTN	×	×	○	○
			LT	×	×	○	○
	Long Retentive Timer	LST	LSTS	×	×	○	○
			LSTN	×	×	○	○
			LST	×	×	○	○
	Counter	C	CS	×	×	○	○
			CN	×	×	○	○
			C	×	×	○	○
	Long counter	LC	LCS	×	×	○	○
			LCN	×	×	○	○
			LC	×	×	○	○
	Data register	D		×	○	○	○
	Link register	W		×	○	○	○
	Link special register	SW		×	○	○	○
System device	Special relay	SM		○	×	○	○
	Special register	SD		×	○	○	○
Link direct device (J□\□)	Link input	X		○	×	○	○
	Link output	Y		○	×	○	○
	Link relay	B		○	×	○	○
	Link special relay	SB		○	×	○	○
	Link register	W		×	○	○	○
	Link special register	SW		×	○	○	○
Module access device (U□\G□)	Module access device	G		×	○	○	○
CPU buffer memory access device (U3E□\G□/HG□)	CPU buffer memory access device	G/HG		×	○	○	○
File register	File register	R		×	○	○	○
		ZR		×	○	○	○
Refresh data register	Refresh data register	RD		×	○	○	○
Constant	Decimal constant	K		×	×	×	○
	Hexadecimal constant	H		×	×	×	○
	Real constant	E		×	×	×	○

Category	Device name	Symbol		Digit specification	Bit-specified word device	Output formula	
						Destination	Source
Safety device	Safety input	SA\X		○	×	○	○
	Safety output	SA\Y		○	×	○	○
	Safety internal relay	SA\M		○	×	○	○
	Safety link relay	SA\B		○	×	○	○
	Safety special relay	SA\SM		○	×	○	○
	Safety data register	SA\D		×	○	○	○
	Safety link register	SA\W		×	○	○	○
	Safety special register	SA\SD		×	○	○	○
	Safety timer	SA\T	TS	×	×	○	○
			TN	×	×	○	○
			T	×	×	○	○
	Safety retentive timer	SA\ST	STS	×	×	○	○
			STN	×	×	○	○
			ST	×	×	○	○
	Safety counter	SA\C	CS	×	×	○	○
			CN	×	×	○	○
			C	×	×	○	○

Label

The following labels are available.

- Global label
- Module label
- Labels of which class is "VAR_GLOBAL"/"VAR_GLOBAL_RETAIN"
- Labels except for string (32)/string [Unicode] (32)/pointer type

Precautions

- A label to which a device unavailable for outputs or conditions for data record is assigned cannot be used when creating setting data. (☞ Page 369 Device)
- For the labels of timer/retentive timer/counter type, a contact/coil/current value need to be specified as same as devices.
- A device and label cannot be used as an array index.

12 SETTING ROUTE TO CPU MODULE

This chapter explains the setting method of connection destination for accessing a CPU module from GX Works3.

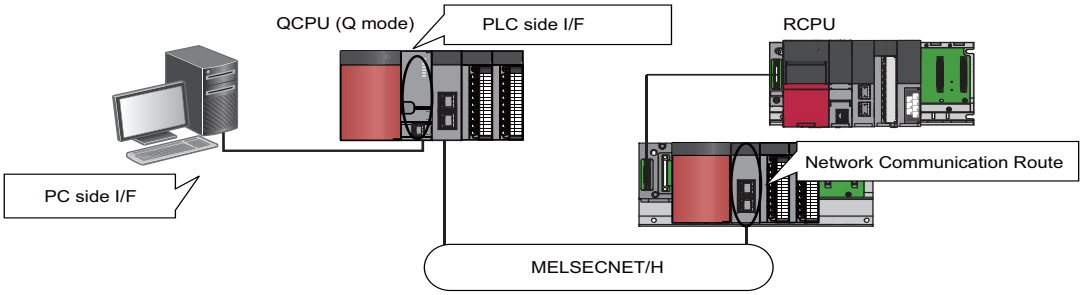
12.1 Specification of Connection Destination

This section explains the setting method of communication routes, including the interfaces both the personal computer and CPU module, and the routing networks, for accessing a CPU module on the "Specify Connection Destination" screen.
Up to 128 settings for connection destinations is created.
The same module type is required to be set for both a project and a CPU module to be accessed.

Precautions

Only connection destinations that can be set in the "Specify Connection Destination" screen are acceptable.
Additionally, a connection route via a MELSECNET/10 or a MELSECNET/H is not acceptable.

Ex.
Connection destination via a MELSECNET/H

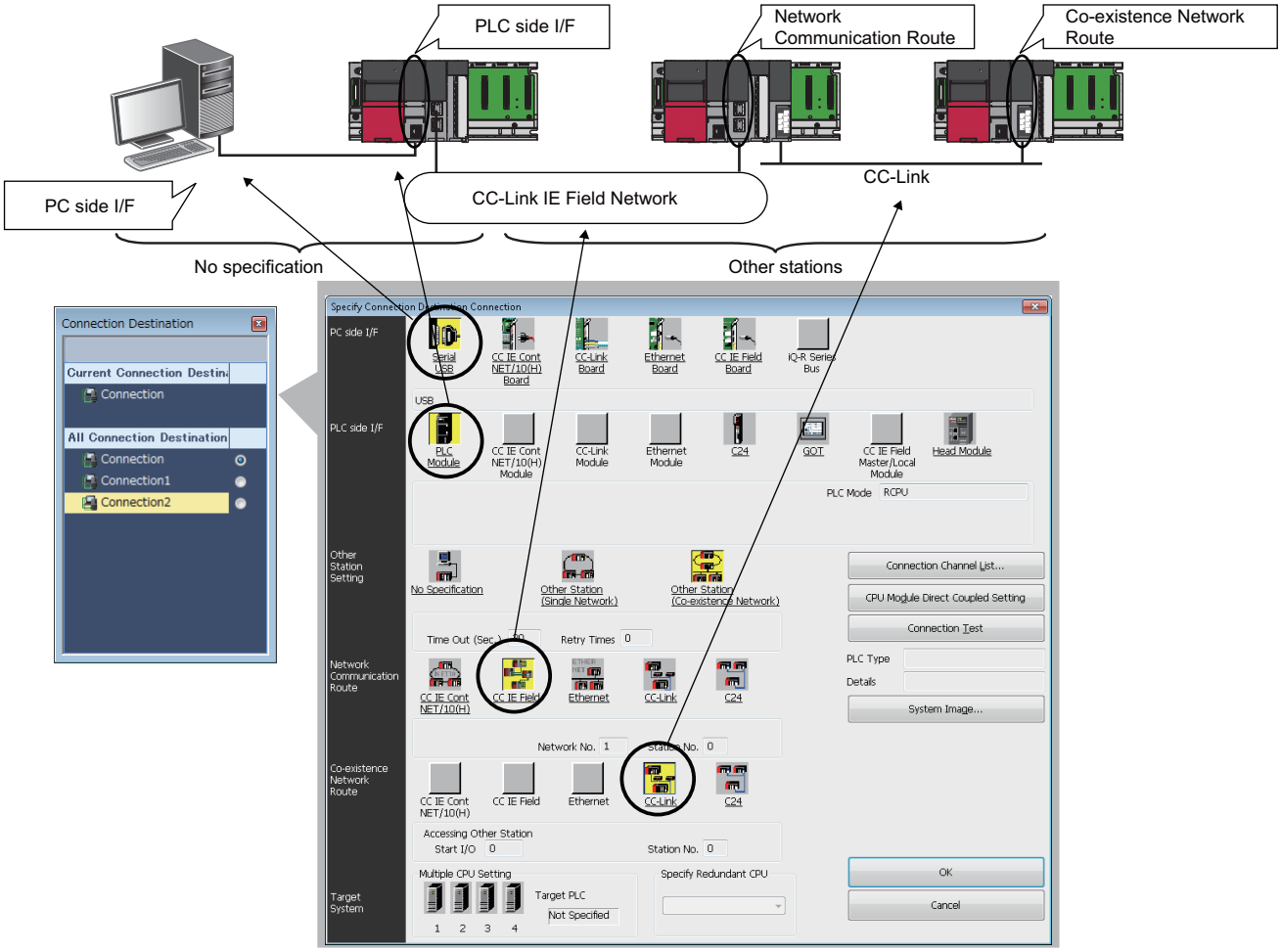


Changing connection destination settings

Window

Select data in the "Connection Destination" window and double-click it.

In another way, select [Online] ⇨ [Current Connection Destination] and change the current connection destination.



- Double-click the items underlined on the screen to set the details of each item.
- The icons colored yellow indicate that the settings have been applied.
- For FX5CPU, the icons of the unsettable connection destination route are not displayed.

Displayed items

Item		Description
Other Station Setting	No Specification	Specify this to access a CPU module directly connected to a personal computer.
	Other Station (Single Network) *1	Specify this to access a CPU module on another station via only one kind of network (including a multi-tier system). Ethernet, CC-Link IE Controller Network, and CC-Link IE Field Network are regarded as the same kind. When accessing a system in which those are mixed, specify "Single Network".
	Other Station (Co-existence Network) *1	Specify this to access the CPU module on another station via two kinds of network.
Network Communication Route		Select the network type, network number, station number, and start I/O number of the network to be routed through to access another station. The setting items differ depending on the selected network type.
Co-existence Network Route		Select the network type, network number, station number, and start I/O number of the network to be accessed. The setting items differ depending on the selected network type.
Target System		• Multiple CPU Setting: Specify an access destination in a multiple CPU system. • Specify Redundant CPU: Select a system of a CPU module to be connected.

*1 To specify the own station, select "No Specification".

Adding connection destination settings

Add a new setting of a connection destination.

Operating procedure

1. Right-click in the "Connection Destination" window and select [Create New Connection Destination] from the shortcut menu.
2. Set each item and click the [OK] button.

Switching connection destinations

Switch a connection destination used as the default.

Operating procedure

1. Select a connection destination under "All Connection Destination" in the Connection Destination window.
2. Right-click and select [Set as Default Connection] from the shortcut menu.

Display the illustration of the connection route

Click the [System Image] button to display the set connection route in an illustration to check the route.

Precautions

For the considerations when using a MELSECNET/H network module on an RQ extension base unit, refer to the following manual.

MELSEC iQ-R Module Configuration Manual

12.2 Direct Connection

This section explains the setting method for accessing the CPU module directly connected to a personal computer.

Point

Click the [CPU Module Direct Coupled Setting] button on the "Specify Connection Destination" screen to change the settings to direct connection.

For FX5CPUs, the Ethernet adapter on a personal computer, which is used when connecting directly to an Ethernet port, can be specified. For details, refer to the following section.

☞ Page 375 Specifying the Ethernet adapter on a personal computer used for FX5CPUs

USB connection

The following shows the setting example for accessing a CPU module on the own station with a USB from GX Works3.

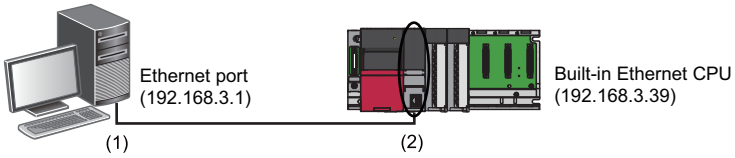
FX5CPUs do not support this connection.

No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	RCPU
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time

Ethernet connection

The following shows the setting example for accessing a built-in Ethernet CPU with Ethernet from GX Works3.

Remote head modules do not support it.



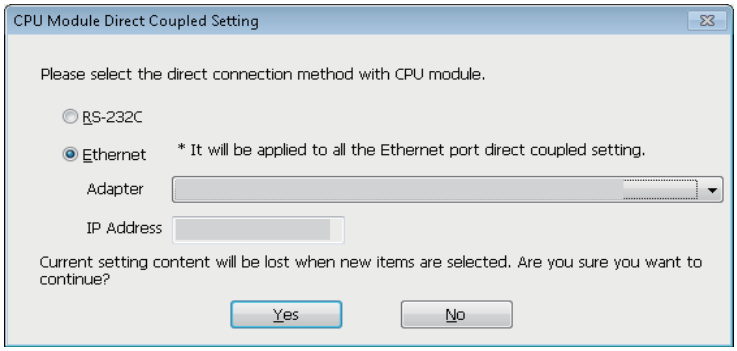
No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Ethernet Board	Network No.*1	—
			Station No.*1	—
			Protocol*1	TCP
(2)	PLC side I/F	PLC Module	Ethernet Port Direct Connection	—
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time

*1 No setting items for FX5CPUs

Specifying the Ethernet adapter on a personal computer used for FX5CPUs

Operating procedure

1. Click the [CPU Module Direct Coupled Setting] button on the "Specify Connection Destination" screen.
2. Select an adapter on the "CPU Module Direct Coupled Setting" screen, and click the [Yes] button.



Point

The adapter setting is applied to all connection destinations which are set the Ethernet port direct connection.
The adapter setting is saved for each logon user of the personal computer (not saved in a project).

Precautions

■Windows Vista® or later

A warning message may appear.

Click the [Unblock] button for Windows Vista, and click the [Allow access] button for Windows 7 or later to unblock the program (permit the access) and continue the operation.

■When the same IP addresses are displayed

When the [Find] button is clicked on the "PLC side I/F Detailed Setting of PLC Module" screen, the same IP addresses may be displayed in the list of the connection destination CPU.

Two or more IP addresses may have been set to the [IP Settings] tab in the "Advanced TCP/IP Settings" screen of Windows network settings. Set only one IP address.

■When communication with GX Works3 is not allowed by Windows Firewall

When Windows Firewall is enabled and communication with GX Works3 is not allowed, a timeout may occur.

To allow the communication, refer to the following procedures.

When using other software with a firewall function, refer to the manual of the software and allow the communication with GX Works3.

Ex.

For Windows Vista

1. Select [Control Panel] ⇨ [Security] ⇨ [Windows Firewall] ⇨ [Allow a program through Windows Firewall] from the Start menu of Windows.
2. Click the [Add Program] button in the [Exception] tab.
3. Select "GX Works3" on the "Add a Program" screen, and click the [OK] button.
4. Select "GX Works3"*1 in the list, and click the [OK] button.

*1 'gxw3' may be displayed when RCPU/Ethernet module is searched on the network and access through the Windows firewall is set to allow before Ethernet port direct connection.

Ex.

For Windows 7 or later

1. Select [Control Panel] ⇨ [System and Security] ⇨ [Windows Firewall] ⇨ [Allow a program*1 or feature through Windows Firewall] from Windows Start.
2. Click the [Change settings] button, and click the [Allow another program*1] button.
3. Select "GX Works3" on the "Add a Program*1" screen, and click the [Add] button.
4. Select "Domain", "Home/Work (Private)", and "Public" of GX Works3*2 added in the list, and click the [OK] button.

*1 For Windows 8 or later, "Apps" is displayed.

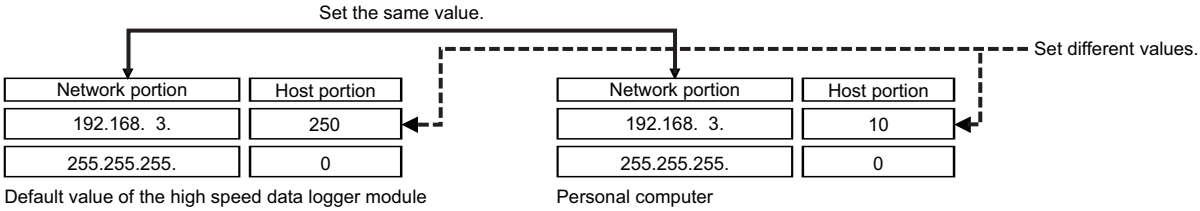
*2 'gxw3' may be displayed when RCPU/Ethernet module is searched on the network and access through the Windows firewall is set to allow before Ethernet port direct connection.

■Network setting when directly connecting GX Works3 to the Ethernet port of an FX5CPU

When directly connecting to the Ethernet port of an FX5CPU, communication may not be established by setting the communication destination on the screen that appears by clicking the [CPU Module Direct Coupled Setting] button.
Set the IP address of a personal computer according to the following procedure.

Operating procedure

1. Set the same value for the network portion of the IP addresses for a personal computer on which GX Works3 is installed and an FX5CPU.



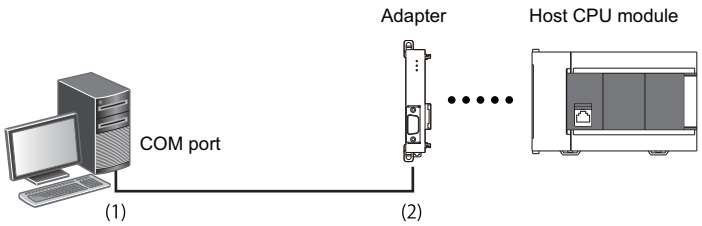
2. Set the network setting for the personal computer on the "Internet Protocol Version 4 (TCP/IPv4) Properties" screen.
(Example) Microsoft Windows 7 Ultimate

❶ Select [Control Panel] ⇨ [Network and Internet] ⇨ [Network and Sharing Center] ⇨ [Change adapter settings].
❷ Select [Local Area Connection] and click [Properties] on the right click menu.
❸ Select "Internet Protocol Version 4 (TCP/IPv4)" on the "Local Area Connection Properties" screen, and click the [Property] button.
❹ The "Internet Protocol Version 4 (TCP/IPv4) Properties" screen appears.

3. Restart the personal computer to enable the network setting.

Serial connection

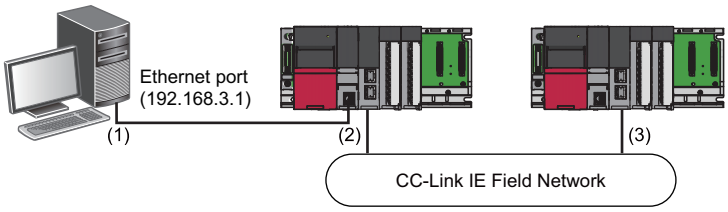
The following shows the setting example for accessing a CPU module on the own station via a serial port from GX Works3. RCPUs and remote head modules do not support this connection.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	RS-232C	—
			COM port	COM1
			Transmission Speed	115.2 Kbps
(2)	PLC side I/F	PLC Module	PLC Mode	FX5CPU
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time

12.3 Accessing via Network (Single Network)

This section shows the setting example for accessing a CPU module on another station via a single network after accessing an Ethernet built-in CPU from GX Works3.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Ethernet Board	Network No.*1	—
			Station No.*1	—
			Protocol*1	TCP
(2)	PLC side I/F	PLC Module	Ethernet Port Direct Connection	—
	Other Station Setting	Other Station (Single Network)	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Network Communication Route	CC IE Field	Network No.	1
			Station No.	0

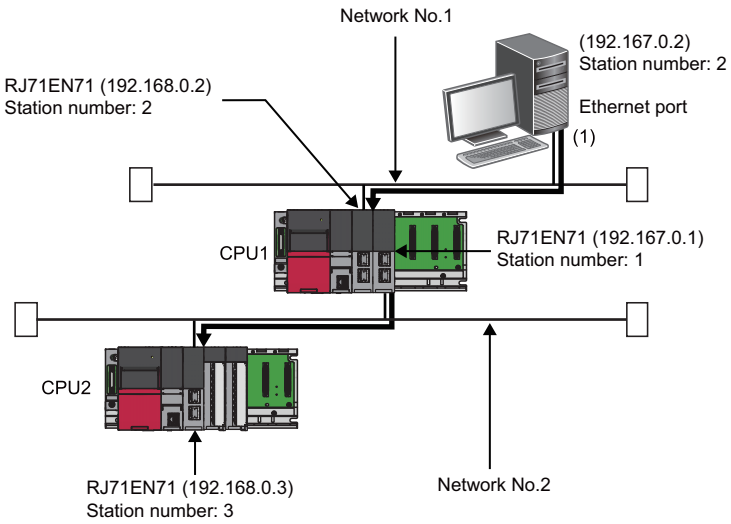
*1 No setting items for FX5CPUs

Access via Ethernet module

The following shows the setting example for accessing a CPU module via a CC-Link IE built-in Ethernet module from GX Works3.

It is same settings when accessing a CPU module via the network part of RnENCPU.

FX5CPUs do not support it.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Ethernet Board	Network No.	1
			Station No.	2
			Protocol	TCP

No.	Item	Item to be selected	Internal setting		Input value
(2)	PLC side I/F	Ethernet Module	PLC Type		RJ71EN71
			Network No.		—
			Station No.		1
			IP Address		192.167.0.1
			IP Input Format		DEC
			Station No. <-> IP Information		Automatic Response System
	Other Station Setting	Other Station (Single Network)	Check at Communication Time		30 seconds
			Retry Times		0 time
(3)	Network Communication Route	Ethernet	Other station in the same loop or access to multilevel system	Network No.	2
				Station No.	3

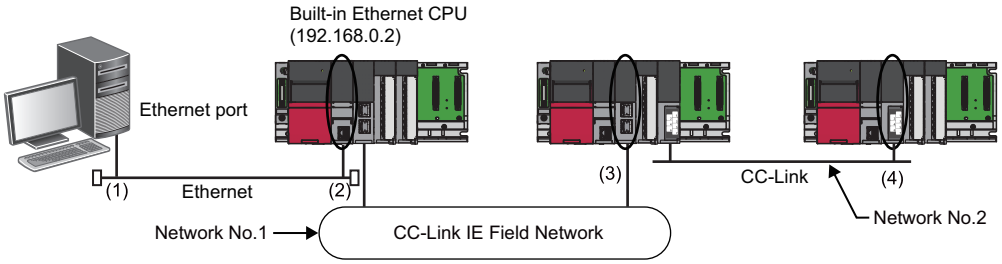
Precautions

- When communicating with multiple pieces of GX Works3, use TCP/IP or UDP/IP communication.
- For a multiple network system, setting the network dynamic routing is required.

MELSEC iQ-R Ethernet User's Manual (Application)

12.4 Accessing via Network (Co-existence Network)

The following shows the setting example for accessing a CPU module via a co-existence network from a personal computer. FX5CPUs do not support it.



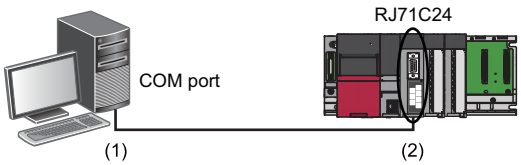
No.	Item	Item to be selected	Internal setting		Input value
(1)	PC side I/F	Ethernet Board	Network No.		1
			Station No.		1
			Protocol		TCP
(2)	PLC side I/F	PLC Module	Connection via HUB	IP Address	192.168.0.2
				Response Wait Time	2 seconds
	Other Station Setting	Other Station (Co-existence Network)	Check at Communication Time		30 seconds
			Retry Times		0 time
(3)	Network Communication Route	CC IE Field	Network No.		1
			Station No.		0
(4)	Co-existence Network Route	CC-Link	Start I/O		20
			Station No.		1

12.5 Accessing via Serial Communication Module

This section explains the setting method for accessing a CPU module on the own station or on another station via a serial communication module.
FX5CPUs do not support it.

Connection on a 1:1 basis

The following shows the setting example for accessing a CPU module by connecting a personal computer and a serial communication module.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	COM port	COM1
			Transmission Speed	115.2 Kbps
(2)	PLC side I/F	C24	PLC Type	RJ71C24
			Station No.*1	—
			Parity	—
			Sum Check	—
	Other Station Setting	No Specification	Check at Communication Time	—
			Retry Times	—

*1 Set the same station number as RJ71C24.
Set the station number on the Module Parameter screen.

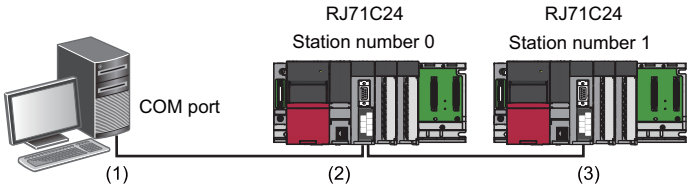
Connection on a 1:n basis

The following explains the method for accessing a CPU module on another station from GX Works3 in a system composed of multiple CPU modules.

Access via a serial communication module

The following shows the setting example for accessing a CPU module on another station via a serial communication module. When connecting via serial communication module, the module parameter for MELSOFT connection is required. For details, refer to the following manual.

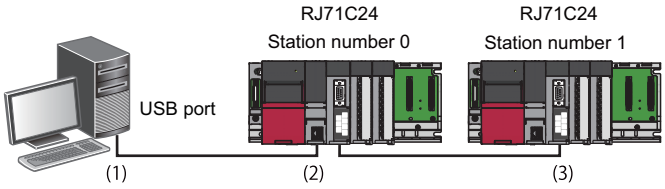
MELSEC iQ-R Serial Communication Module User's Manual(Application)



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	COM port	COM1
			Transmission Speed	115.2 Kbps
(2)	PLC side I/F	C24	PLC Type	RJ71C24
			Station No.	0
			Parity	Odd
			Sum Check	—
	Other Station Setting	Other Station (Single Network)	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Network Communication Route	C24	Start I/O	20
			Station No.	1

Direct connection of a CPU module

The following shows the setting example for accessing a CPU module on another station via a serial communication module by connecting a personal computer and a CPU module directly.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	RCPU
	Other Station Setting	Other Station (Single Network)	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Network Communication Route	C24	Start I/O	20
			Station No.	1

12.6 Accessing via GOT (GOT Transparent Function)

This section explains the setting method for accessing a CPU module from GX Works3 via a GOT by performing the GOT transparent function.

Precautions

■When performing online operations from GX Works3

During the online operation from GX Works3 to a CPU module using the GOT transparent function, do not perform online operations (such as downloading project data) on GOT from GT Designer2 or GT Designer3.

■When GOT does not monitor normally

The GOT transparent function cannot be used in the following cases.

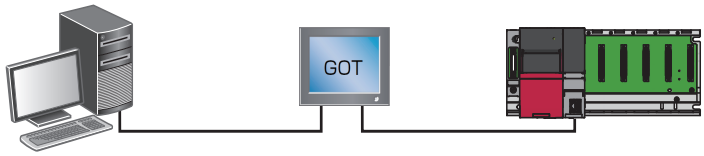
- When a GOT does not perform normal monitoring due to CPU module errors or communication errors between the CPU module and the GOT
- During the period of time between turning ON or resetting the CPU module or GOT and the start of GOT monitoring

Check the following items if monitoring on GOT is not normal.

Item	Reference
Does the CPU module operates normally?	☞ Page 483 Module Diagnostic
Is the CPU module connected to GOT normally?	🕮 Manual of GOT used

Access via a GOT

A personal computer (GX Works3) can access a CPU module via a GOT.



The connection availability and the specification method of connection destination differ depending on a GOT series and the connection condition between a personal computer and a GOT.

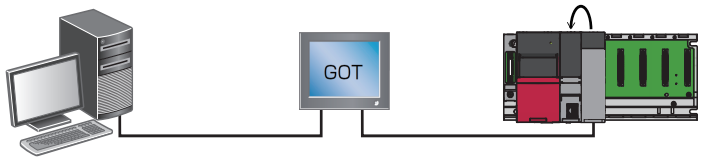
For details, refer to the following manuals.

🕮 GOT2000 Series Connection Manual (Mitsubishi Products) For GT Works3 Version1

🕮 GOT1000 Series Connection Manual (Mitsubishi Products) for GT Works3

Accessing via a module

A personal computer can access a CPU module via a GOT and another module (serial communication module, CC-Link IE Controller Network module, and CC-Link IE Field Network module).



The connection availability and the specification method of connection destination differ depending on a GOT series and the connection condition between a personal computer and a GOT.

For details, refer to the following manuals.

🕮 GOT2000 Series Connection Manual (Mitsubishi Products) For GT Works3 Version1

🕮 GOT1000 Series Connection Manual (Mitsubishi Products) for GT Works3

12.7 Accessing via QCPU (Q mode)

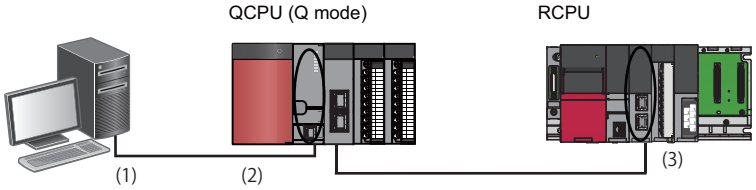
This section explains the setting method for accessing a CPU module from GX Works3 via a QCPU (Q mode).

An FX5CPU cannot be accessed via a QCPU (Q mode).

The QCPUs (Q mode) that can be used as a PLC side I/F are as follows.

Item	Available QCPU (Q mode)
PC side I/F: Serial communication (USB)	Built-in USB port QCPU (Q mode) Note that remote I/O modules (QJ72LP25 and QJ72BR15) are excluded.
PC side I/F: Ethernet board	Built-in Ethernet CPU

The following shows the setting example for accessing an RCPU via a QCPU (Q mode) from GX Works3.



No.	Item	Item to be selected	Internal setting	Setting content
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	QCPU (Q mode)
	Other Station Setting	Other Station (Single Network)	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Network Communication Route	CC IE Field	Network No.	1
			Station No.	0

Precautions

- An RCPU cannot be accessed via a MELSECNET/10 network module or a MELSECNET/H network.
- A remote password that has been set for the Ethernet port of a QCPU (Q mode) cannot be unlocked in GX Works3. Delete the remote password using GX Works2 in advance.

12.8 Connection to the Multiple CPU System

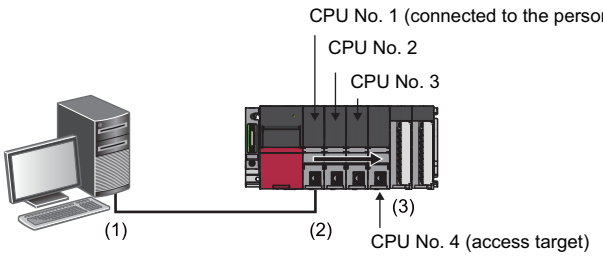
This section explains the setting method for accessing the CPU module (host CPU) directly connected to the personal computer or another CPU module (another CPU) in the multiple CPU system.
The setting method for accessing the multiple CPU system on another station via a network is also explained.
FX5CPUs and remote head modules do not support it.

Accessing host CPU

The setting for accessing the host CPU is the same as that for accessing the CPU module on the own station. (☞ Page 374 Direct Connection)

Accessing another CPU

To access a CPU module, which is not directly connected to a personal computer, in the multiple CPU system, the CPU number (CPU No.1 to 4) of the access target needs to be specified in "Multiple CPU Setting".
The following shows the setting example for accessing a CPU No.4 by connecting a personal computer to CPU No.1.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	RCPU
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Target System	Multiple CPU Setting	Target PLC	PLC No. 4

Accessing via network

The following explains the setting methods for accessing a CPU module in a multiple CPU system on another station via a network.

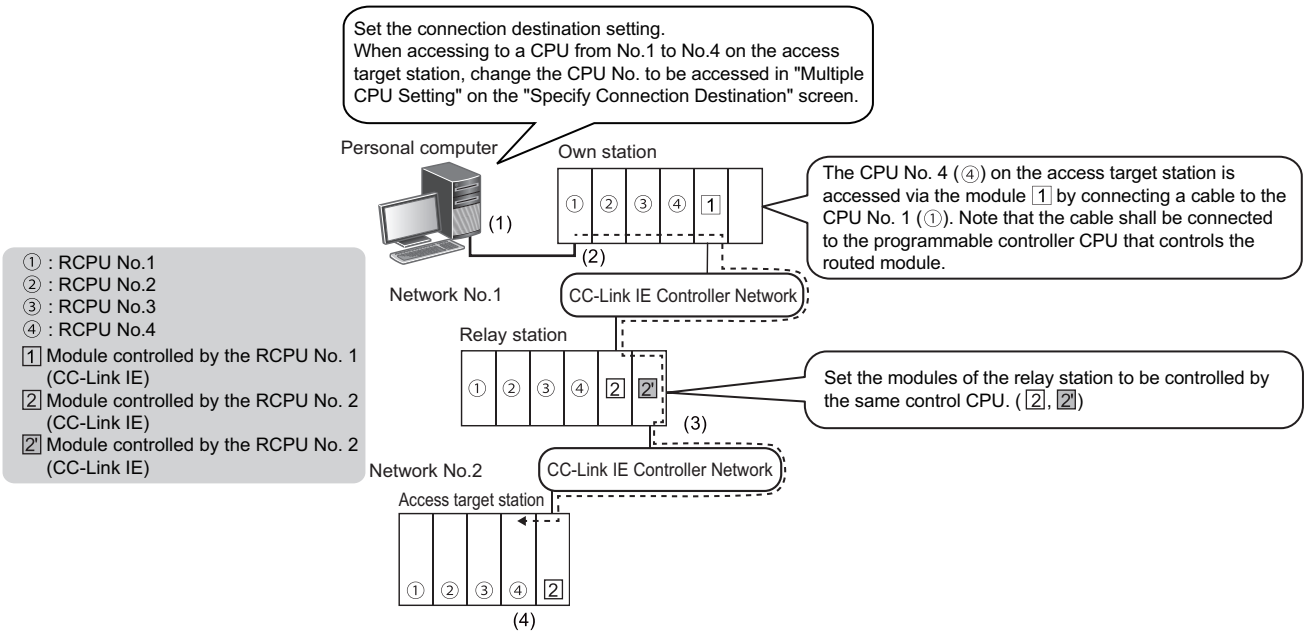
■Relay station

Set the parameters so that the module mounted on the relay station is controlled by the same CPU module. (In the figure below, the CPU No.2 is the control CPU.)

■Access target station

Set the CPU number in "Multiple CPU Setting" on the "Specify Connection Destination" screen when the access target station is the multiple CPU system.

The following shows the setting example for accessing a CPU No.4 in a multiple CPU system on the access target station via a network.



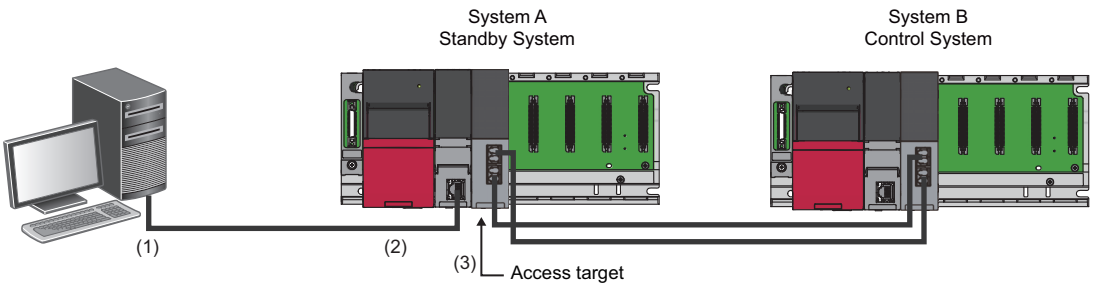
No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	RCPU
	Other Station Setting	Other Station (Single Network)	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Network Communication Route	CC IE Cont NET/10(H)	Network No.	2
			Station No.	0
(4)	Target System	Multiple CPU Setting	Target PLC	PLC No. 4

12.9 Connection to the Redundant System

This section explains the setting method for accessing a CPU module by specifying a system in the redundant system.
Only RnPCPUs (redundant mode), RnPSFCPUs, and remote head modules support it.

CPU module redundant system

To access a CPU module in a redundant system configuration, the system of access target (no specification/control system/standby system/system A/system B) needs to be specified in "Specify Redundant CPU".
The following shows the setting example for accessing a standby system via the system A of an RnPCPU (redundant mode) that is connected to a personal computer.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	PLC Module	PLC Mode	RCPU
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Target System	Specify Redundant CPU	Standby System	—

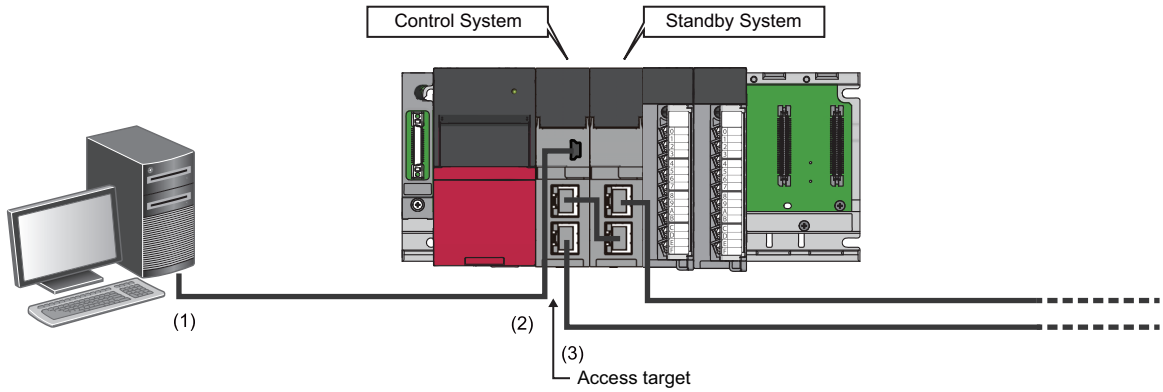
When "Not specified" is selected in "Specify Redundant CPU", the access target is set as follows:

- Direct connection: connective system
- Connection via a module mounted on a main base unit: CPU module on the station on which the network module, with the station number specified for the network communication route, is mounted

Remote head module redundant system

To access a remote head module in a redundant system configuration, the access target (CPU No.1/CPU No.2/no specification/control system/standby system) needs to be specified in "Multiple CPU Setting" or "Specify Redundant CPU". The setting for either "Multiple CPU Setting" or "Specify Redundant CPU" can be set.

The following shows the setting example for accessing a remote head module (single line) from GX Works3 using a USB connection.



No.	Item	Item to be selected	Internal setting	Input value
(1)	PC side I/F	Serial/USB	USB	—
(2)	PLC side I/F	Head module	RJ72GF15-T2	—
	Other Station Setting	No Specification	Check at Communication Time	30 seconds
			Retry Times	0 time
(3)	Target System	Specify Redundant CPU	Control System	—

When "Not specified" is selected in "Specify Redundant CPU", the access target is set as follows:

- Direct connection: remote head module that is directly connected to a personal computer
- Connection via a module mounted on a main base unit: remote head module No.1 (mounted on a CPU slot) on the station on which the network module, with the station number specified for the network communication route, is mounted
- Connection via a module mounted on an extension base unit: remote head module No.1 (mounted on a CPU slot)

12.10 Considerations of Communication with a CPU module

This section explains the considerations of communication with a CPU module.
Refer to the considerations described in each section as well as the descriptions in this section.

Communication via network system (single/multiple)

When accessing an RCPU via a network system, all the connected stations must be RCPUs or QCPUs (Q mode).
In that case, an RCPU must be used for a relay station.
Connected station: Station directly connected from GX Works3
Relay station: Stations to be routed on network system

Communication with the CPU module using a USB cable

■Connecting/disconnecting a USB cable, resetting a CPU module, and turning the power ON or OFF

A communication error may occur and it may not be recovered if connecting and disconnecting a USB cable, resetting the CPU module, or turning the power ON or OFF is performed frequently during communication with a CPU module.
Therefore, set GX Works3 to offline as much as possible during these operations. 'Offline' indicates the state other than below.

- Write to PLC/Read from PLC, Monitor, and PLC diagnostics

If the operation is not recovered from an error, remove the USB cable. Then, connect it again after five or more seconds.
(Even after this operation, an error may occur at initial communication. However, communication will be successful after that.)
Click the [OK] button on the warning message, and remove a USB cable from the personal computer.

■Combination of personal computer models and USB cables

A communication error may occur depending on the combination of personal computer models and USB cables.
If an error occurs, take appropriate actions in accordance with the message displayed on the screen.

Other considerations

■High-speed communication using an RS-232 cable

Communication may fail depending on the performance of the personal computer when high-speed communication is attempted by changing the transmission speed at the serial port of the personal computer (personal computer side interface).
Communication speed may also slow down due to communication retries.
Decrease the transmission speed if high-speed communication cannot be performed normally.

■Resume function, suspend setting, power saving function, and standby mode of the personal computer

A communication error may occur during communication with the CPU module when any of the settings shown above are enabled.
Disable these settings for communication with the CPU module.

13 WRITING/READING DATA TO CPU MODULE

This chapter explains the following operations: writing, reading, and deleting data to/from a CPU module or an SD memory card, and verifying projects.

For the methods for writing the clock setting to a CPU module, refer to the following section.

☞ Page 508 Clock Setting in a CPU Module

13.1 Writing/Reading Programmable Controller Data

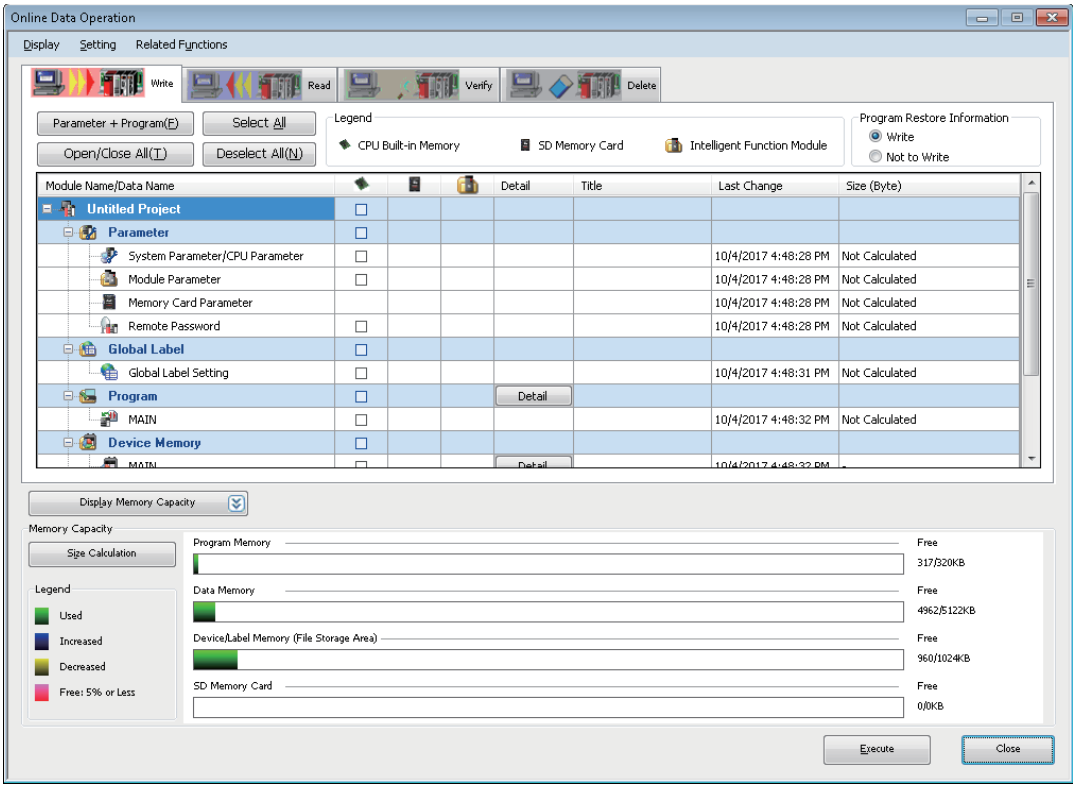
Read/write the created data to/from a CPU module or a memory card in the "Online Data Operation" screen.

Configuration of Online Data Operation screen

Window

[Online] ⇨ [Write to PLC] ( )/[Read from PLC] ( )/[Delete PLC Data]

The following screen is an example when writing data to an R01CPU.



- The data name in gray indicates that it is in the unconverted state.
- When a data is written to a programmable controller, the target memory capacity may be displayed smaller than the actual file size.
- Graphs for each memory capacity can be updated by clicking the [Size Calculation] button.

Precautions

■Memory capacity display for FX5CPU

- Program memory (The capacity of program memory is displayed in unit of step.)
- Data memory (The program, restored information, parameters, and device comments are displayed separately.)
- SD memory card (The capacity of the entire SD memory card is displayed.)
- SD memory card (The program, restored information, parameters, and device comments are displayed separately.)

■Safety project and safety operation mode of a CPU module

The safety data and device memory of a safety project can only be written when the safety operation mode of an RnPSFCPU or an RnSFCPU is in the test mode. If the module is in the safety mode, switch the mode to the test mode.

☞ Page 513 Safety operation mode switching

■Data to be written and write target

○: Writable, ×: Not writable

Data name		Write target		
		CPU built-in memory	SD memory card[*1]	Intelligent function module
System Parameter/CPU Parameter		○	○	×
Module Parameter		○	○	×
Module Extended Parameter		○	○	○
Memory Card Parameter[*1]		×	○	×
Remote Password		○	○	×
Global Label	Global Label Setting	○	○	×
	Global Label Assignment Information[*3]	○	○	×
Program File[*2]		○	○	×
FB File/FUN File[*2]		○	○	×
Label Initial Value File[*3]		○	○	×
Device Memory (File Register[*3])		○	×	×
Extended File Register[*4]		×	○	×
Device Initial Value[*2]		○	○	×
Device Comment[*5]		○	○	×

*1 R00CPU and remote head modules do not support it.
*2 Remote head modules do not support it.
*3 FX5CPUs do not support it.
*4 Only FX5CPUs support it.
*5 FX5CPUs and remote head modules only support common device comments and do not support device comments for each program.

For the details on the availability of writing safety data, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

■How to check the data size to be written

The size of write data can be displayed in the "Size (Byte)" column by enabling the file size display.

Select [Display] ⇨ [Display File Size] on the "Online Data Operation" screen to enable the file size display.

For program files, FB files, and FUN files, the size of program restoration information can be checked.

Display example: Size of an execution program/size of program restoration information (data memory)

■Graph display of memory capacity

The display content differs depending on the setting file size display.

Disabled: The current capacity of memory for writing on target is displayed.

Enabled: The capacity of memory to which the size of data to be written/deleted is displayed.

Writing data to a programmable controller

Write data to a CPU module.

For the considerations for writing, refer to the following section.

☞ Page 401 Considerations for Online data operation

Operating procedure

1. Select the [Write] tab on the "Online Data Operation" screen.
2. Select data to be written and a write destination.
3. Click the [Detail] button to set the details such as a range to be written.
4. Click the [Execute] button.

After writing a safety program or a parameter to an RnPSFCPU or an RnSFCPU, manuals are displayed to clarify the information that needs to be confirmed by users for using a safety project safely.

Point

When more than one program is written to the CPU module, the programs categorized as "No Execution Type" will never be executed on the CPU module. For saving the memory capacity of the CPU module, removing them from the target data at writing data is recommended.

■POU duplication check

When performing 'Write to PLC', the program is checked whether a POU name is duplicated in the program and in a program in the CPU module.

When using a CPU module in a redundant system configuration and writing a program to both systems, the program is checked whether a POU name is duplicated in the both systems.

Whether to check the duplication can be set by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Online" ⇨ "Write to PLC ⇨ "Operational Setting" ⇨ "Duplication Check for POU"

■Program restoration information

Whether to write the program restoration information with a program can be selected when performing 'Write to PLC'.

By setting the following option, whether or not to write the program restoration information can be selected in the "Online Data Operation" screen.

- [Tool] ⇨ [Options] ⇨ "Online" ⇨ "Program Restore Information" ⇨ "Operational Setting" ⇨ "Enable the setting to write/not to write program restore information"

When a safety program, safety FB, and safety FUN is written while "Not to Write" is selected in "Program Restore Information", the program restoration information is written to an RnSFCPU.

When a program is written without writing the program restoration information, the data cannot be read with 'Read from PLC', and the detailed verification result screen cannot be displayed with 'Verify with PLC'.

For CPU modules that do not support this function, whether to write the program restoration information cannot be selected even when the option is set.

■Skip overwriting data

When writing data to a CPU module, writing data that is not changed from the previous writing can be skipped, and that can shorten the time required for writing.

In the confirmation message appeared after the [Execute] button is clicked in the "Online Data Operation" screen, select the checkbox of "Skip writing for the files that has not been changed.".

The following files are overwritten even if the checkbox of "Skip writing for the files that has not been changed." is selected.

- Memory card parameter
- Global label assignment information
- Global label initial value
- Local label initial value
- Device memory
- File register

When writing program restoration information to a CPU module where no program restoration information is written, a program file, FB file, and/or FUN file is written even if no changes are applied.

When an SD memory card or intelligent function module is selected as a write target, the data is written even if the data is not modified.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.

An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system). If an error occurs in the control system while writing data, it is not written to the standby system. If an error occurs in the standby system while writing data, the data of control system cannot be restored to its former condition.

Point

Data allocations are changed by updating a firmware version from 30 or earlier to 31 or later for the R04CPU, R08CPU, R16CPU, R32CPU, or R120CPU.

For details on the operation, refer to the following manual.

(MELSEC iQ-R CPU Module User's Manual (Application))

This may cause a lack of free space in the program memory when data backed up is written to the CPU module. In this case, perform any of the following operations and write the data again.

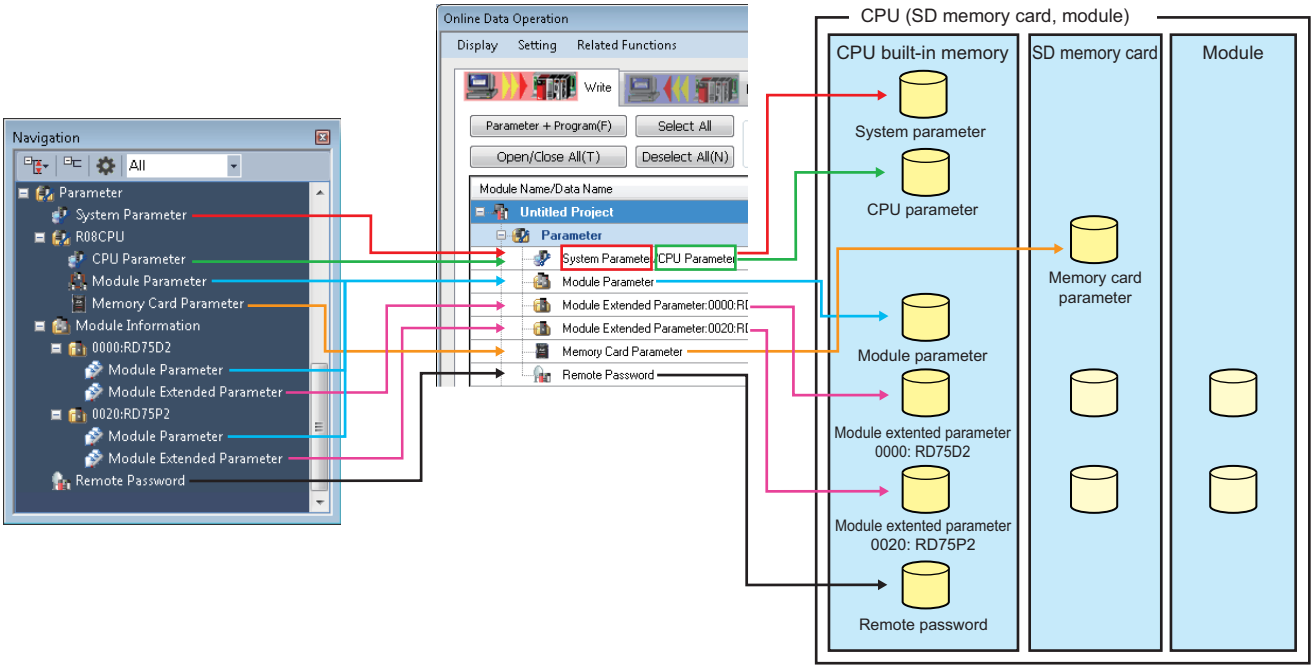
- Reduce the setting value of "Allocate Memory for Online Program Change". (Default: 500 steps)
- Reduce the number of program steps.

Parameter

Write "Parameter" in accordance with the operation or change of the system.

■Relation between module parameters in the "Navigation" window and module parameters in a CPU module

Module parameters are written with the parameters, displayed in the "Navigation" window, combined in one file.



When a module parameter exists in a CPU module, the parameter file is overwritten.

Ex.

When writing four module parameters to a CPU module in which module parameters of five modules exist; the settings of five modules are overwritten with the settings of four modules, and one setting that does not exist in the project will be deleted.

■Consistency of parameters

When writing a part of the parameters additionally or writing modified parameters, the consistency of the parameters are required. Consistency means matching the information such as the I/O assignment setting (start I/O number, slot number, etc.) between the system parameters and each parameter.

There are two methods to keep the consistency.

- Read a system parameter and each parameter and change them. After that, write them to a CPU module. The CPU module needs to be reset to change the system parameter.
- Read each parameter to be changed, and change them to be consistent with the system parameters in the project. After that, write the changed parameters only to the CPU module. Basically, the CPU module is does not need to be reset, however, some modules are required to reset the CPU module after changing parameters. For details, refer to the manual of the module used.

■Modules with start I/O number unset

The unset module parameters cannot be written to a programmable controller.

■Writing parameters of remote I/O module (slave station) on CC-Link IE Field Network

Parameters can be written to a slave station in the "CC IE Field Configuration" window. For details, refer to the manual of each remote I/O module.

Program

When creating a program (local label, program body), write "Program".

When the column of "Initial Value" is set on the local label editor, write "Label Initial Value by Program".

When the column of "Initial Value" is not set, an initial value file of labels is not displayed. In addition, the initial value file of labels with a same name in the programmable controller is deleted.

When a standard function or a standard function block is used in the program, write "SlibFbFile" of POU.

■Setting the secured steps for online program change

Set the range of program (program file) to be written and secured steps for online program change on the "Program Detail Setting" screen displayed by clicking the [Detail] button of "Program".

FX5CPUs do not support this setting.

Item	Description
Allocate Memory for Online Program Change	Writing programs while the CPU module is running affects scan time due to the change of number of steps. Enter the secured steps for online program change to handle the change of number of steps when performing the online program change function. When the number of program steps is changed, the capacity of program files is not changed if the changed number of steps are within the range of the number of the secured steps for online program change.

■Operations after writing SFC programs

For SFC programs, the operations performs differently between Ladder, ST, and FBD/LD when changing programs by writing them to a programmable controller. For the details, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

Global label

After setting global labels, write "Global Label Setting".

When the column of "Initial Value" is set on the global label editor, write "Global Label Initial Value".

When the column of "Initial Value" is not set, an initial value file of labels is not displayed. In addition, the initial value file of labels with a same name in the programmable controller is deleted.

When "Access from External Device" is selected on the global label editor, write "Global Label Assignment Information".

FX5CPUs do not support the setting for initial values of labels and access from external devices.

Precautions

The sample comments are included in the write target. If the data size to be written exceeds the memory capacity of the CPU module at writing data, prepare an SD memory card.

For FX5CPU, the writable capacity is the same as that of the CPU module even when data is written to an SD memory card.

Device memory

When writing values to the device memory area of the CPU module after setting device memory, write "Device Memory".
The device memory which has the same name as the program is written to a local device.
In contrast, the device memory which has the different name as the program is written to a global device.
Only one device memory for a global device can be selected.

Precautions

FX5CPUs do not support local devices.
The device memory is written to a global device regardless of the consistency or inconsistency with a program name.

■Setting write target devices and their ranges

Set the type and range of device memory to be written to the CPU module on the "Device Data Detail Setting" screen displayed by clicking the [Detail] button of "Device Memory".

• Writable devices to a CPU module

○: Writable, ×: Not writable, —: No corresponding device

Device	Global device	Local device*1
M, V*1, T, ST, C, D, R*2, SA\M, SA\T, SA\ST, SA\C, SA\D	○	○
L, B, F, SB, LT*1, LST*1, LC, W, SW, Z, LZ, RD*1, SA\B, SA\W	○	—
X, Y, S, SD, SM, SA\X, SA\Y, SA\SD, SA\SM	×	—

*1 FX5CPUs do not support it.
*2 RCPUs do not support it.

• Writable devices to a remote head module

○: Writable, ×: Not writable, —: No corresponding device

Device	Global device	Local device
SB, W, SW, RD	○	—
SD	×	—

For details on the devices to be written, refer to the following section.
☞ Page 541 Applicable Devices in GX Works3

File register

When writing the device memory which has been set as a file register, write "File Register".
FX5CPUs do not support this setting.

■Setting range to be written

Set the range of file registers to be written to a programmable controller in the "File Register Detail Setting" screen displayed by clicking the [Detail] button of "File Register".
If two or more file registers are selected, the value of each file register is written/read in the same range.

Precautions

When writing file registers, write CPU parameters first, and reset or cycle the power of the programmable controller.
Then, write file registers.

Extended file register

Values set in the device memory (extension file registers (ER)) of a project can be all written to extended file registers (ER) of an SD memory card in a batch.
It is not available in a project used for an RCPU.

■Range to be written

Values of the device memory (extension file registers (ER)) of a project are stored in extended file registers (ER) of an SD memory card by selecting "Extend File Register" of the SD memory card and performing writing.
All the points (32768 points) of the device memory of a project are written to extended file registers (ER) of an SD memory card regardless of the number of points of a user device set in file registers (R).

Device initial values

After setting a device initial value, the device needs to be written.
A device initial value which has the same name as a program is written as a file for a local device. A device, which cannot be used as a local device, is not written.
A device initial value which has a difference name from a program is written as a file for a global device.
FX5CPUs do not support local devices. The device memory is written to a global device regardless of the consistency or inconsistency of a program name.

Device comment

After setting device comments, write "Common Device Comment" or "Each Program Device Comment".
For FX5CPU, 'each program device comment' cannot be written to the CPU module.

■Setting range to be written

Set the range of "Common Device Comment"/"Each Program Device Comment" to be written to a CPU module on the "Device Comment Detail Setting" screen displayed by clicking the [Detail] button of "Common Device Comment" or "Each Program Device Comment".
Set this setting to limit the writing range of device comments in cases such as when the CPU module has small free capacity.
When the range of device comments is not set, all device comments are written.

Item	Description
Number of characters per 1 comment	Set the maximum number of comments to be written to a CPU module. When the character length of an input value is less than the number of characters of device comment set for the project, the device comment with less number of characters is written to a CPU module. Therefore, mismatched data may be detected when verifying project data.

Precautions

When the sample comments are read to device comments, all the sample comments are written to the CPU module. Therefore, the data size to be written may exceed the memory capacity of the CPU module. In this case, perform any of the following operations.

- Delete the device comments of unused devices.
- Set the write target of device comments to SD memory card.
  For FX5CPU, the writable capacity of SD memory card is the same as that of CPU module.
- Set the range to be written.

Tag FB setting

For a project used for an RnPCPU (process mode/redundant mode) and an RnPSFCPU, write CPU parameters (only when it is set at the first time or changed) and the global label setting when using a program with the process control extension enabled or for which the tag FB setting is set.
File register data in the range assigned to FB properties in a tag FB is written only one time after converting all programs (re-assigning labels).

Reading data from a programmable controller

Read data from a CPU module.

For the considerations for reading data, refer to the following section.

☞ Page 401 Considerations for Online data operation

Operating procedure

1. Select the [Read] tab on the "Online Data Operation" screen.
2. Select the files to be read and read target.
3. Click the [Detail] button to set the details such as a range to be read.
4. Click the [Execute] button.

■Writing a program without writing the program restoration information

When a CPU module contains the following data, 'Read from PLC' cannot be performed.

- Execution program that the program restoration information is not written
- Execution program that the program restoration information is not written at the same time

■Operations when using CPU modules in a redundant system configuration

Data is read from the CPU module in the connective system.

Point

Data can be read even when a project is not open.

☞ Page 86 Creating new projects by reading data from programmable controllers

Precautions

During the frequent access of an SD memory card with a data logging function or database function, the response to the reading operation from a programmable controller (until the "Online Data Operation" screen is displayed) could be slow.

Parameters

■Unsupported modules

The module parameters that are not supported by GX Works3 cannot be read.

Program

When reading a program (local label, program body), read "Program".

■Initial values of local labels

The operation differs between writing to and reading from the programmable controller.

- Writing: Local labels are written as "Label Initial Value by Program".
- Reading: the "Initial Value" of local labels are also read with global labels by reading programs.

FX5CPUs do not support it.

■Execution type which is overwritten at reading program

- When reading CPU parameters and program file at once: The program file is overwritten with the execution type in accordance with the program setting of the read CPU parameter.
- When reading a program file only: The program file is overwritten in accordance with the parameter settings in GX Works3.
- When the CPU parameter setting does not exist in both CPU module and GX Works3: The program file is overwritten with "No Execution Type".

■Setting read range

Set the range of a program (program file) to be read from a CPU module on the "Program Detail Setting" screen displayed by clicking the [Detail] button on the "Online Data Operation" screen.

In addition, the secured steps for online program change can be obtained from CPU module.

FX5CPUs do not support it.

■Status of a standard function block in "SlibFbFile"

Reading from a programmable controller is interrupted in any of the following cases:

- A standard function block to be read is inconsistent with the one in a project when reading a program from a programmable controller.
- A standard function block other than the one to be read is used in a project once or more times when reading a program from a programmable controller.

Global label

■Initial value, accessing from external device

The operation differs between writing to and reading from the programmable controller.

- Writing: Global labels are written as "Label Initial Value by Program" and "Global Label Assignment Information".
- Reading: the information on "Initial Value" and "Access from External Device" of global labels are also read with global labels by reading programs.

FX5CPUs do not support the setting for initial values of labels and access from external devices.

Restriction

When reading only a program in which global labels are used, the label definitions used in the program may not exist in the project. This may cause the disappearance of the labels on the ladder editor.
In this case, read the global label and program together.

Device memory

The device memory, which have the same name as the program, will be read as a file for a local device.
The device memory, which have the different name as the program, will be read as a file for a global device.
Only one device memory for a global device can be selected.
FX5CPUs do not support local devices. The device memory is read as a file for global labels regardless of the consistency or inconsistency with the program name.

■Setting read target devices and their read ranges

Set the type and range of device memory to be read from a CPU module on the "Device Data Detail Setting" screen displayed by clicking the [Detail] button.

Device memory can be read from link memory or buffer memory.

- Readable devices from a CPU module

○: Readable, —: No corresponding device

Device	Global device	Local device*1
M, V*1, T, ST, C, D, R*2, SA\M, SA\T, SA\ST, SA\C, SA\D	○	○
X, Y, L, B, F, SB, S, LT*1, LST*1, LC, W, SD, SW, SM, Z, LZ, RD*1, SA\X, SA\Y, SA\B, SA\W, SA\SD, SA\SM	○	—

*1 FX5CPUs do not support it.
*2 RCPUs do not support it.

- Readable devices from a remote head module

○: Readable, —: No corresponding device

Device	Global device	Local device
X, Y, SB, W, SD, SW, SM, RD	○	—

For details on the devices to be read, refer to the following section.
☞ Page 541 Applicable Devices in GX Works3

Device comment

■Setting read range

Set the range of Common device comments/Each program device comments to be read from a programmable controller on the "Device Comment Detail Setting" screen displayed by clicking the [Detail] button.

Device initial values

Even when the device initial value read from the CPU module is local device, it is not displayed as a local device (# is not added) on GX Works3.

Tag FB setting

For a project used for an RnPCPU (process mode/redundant mode) and an RnPSFCPU, read the global label setting when using a program with the process control extension enabled or for which the tag FB setting is set.

Note that FB properties are not read.

To read the current value of an FB property, update the initial value of the FB property.

☞ Page 452 Initial FB property value update/FB property management

Deleting data in CPU module

Delete the data such as programs and parameters in the CPU module.

For a safety project, safety data can be deleted when the safety operation mode of a CPU module is in the test mode.

Operating procedure

1. Select the [Delete] tab on the "Online Data Operation" screen.
2. Select a file to be deleted, and click the [Execute] button.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.

An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system). If an error occurs while deleting data from the control system, it is not deleted from the standby system. If an error occurs while deleting data from the standby system, the data of control system cannot be restored to its former condition.

Considerations for Online data operation

Unlocking a remote password

The confirmation message for unlocking the remote password is displayed when the remote password is set to the CPU module to be accessed. Unlock the password by following the message.

For details, refer to the following section.

☞ Page 477 Restricting Access from Other Than Specific Communication Route

Unusable functions while transferring programs

The following functions cannot be used while transferring a program.

- Writing data to a programmable controller
- Reading data from a programmable controller
- Verifying data with a programmable controller
- Deleting data in a programmable controller
- Reading/writing/deleting user data
- Closing a project
- Changing the module type and operation mode
- Ethernet diagnostics
- CC-Link IE Control diagnostics (optical cable)
- CC-Link IE Control diagnostics (twisted pair cable)
- CC-Link Field diagnostics
- MELSECNET diagnostics
- Changing a connection destination setting
- Circuit trace
- Simulation

Cases where the option setting is changed

The following option setting may be changed when reading data from a programmable controller.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Convert, Online Program Change Target Setting"

"Low-speed" is set in the option for the following cases:

- When reading data for which "High-speed" is selected to a project for which "Low-speed" is selected
- When reading data for which "Low-speed" is selected to a project for which "High-speed" is selected

Structures restored by reading data from a programmable controller

When reading data in which structure is used from a CPU module, the definition of the structure is restored to the state where it was written to the CPU module.

Note that if the definition of a structure is edited after writing it to a CPU module and data including the structure is read, it will return to the state before the editing.

Structure can be used in the following data.

- Standard program
- Safety program
- Standard FB
- Safety FB
- Standard FUN
- Safety FUN
- Standard global label
- Standard/safety global label
- Safety global label

13.2 Verifying Programmable Controller Data

This section explains the method to verify data between the open project and data in a CPU module.

The Verify with PLC function is used to compare the content of two projects or to locate the changes made in programs.

A project for which a security is set can be verified when both data of the verification source and verification destination are not read-protected.

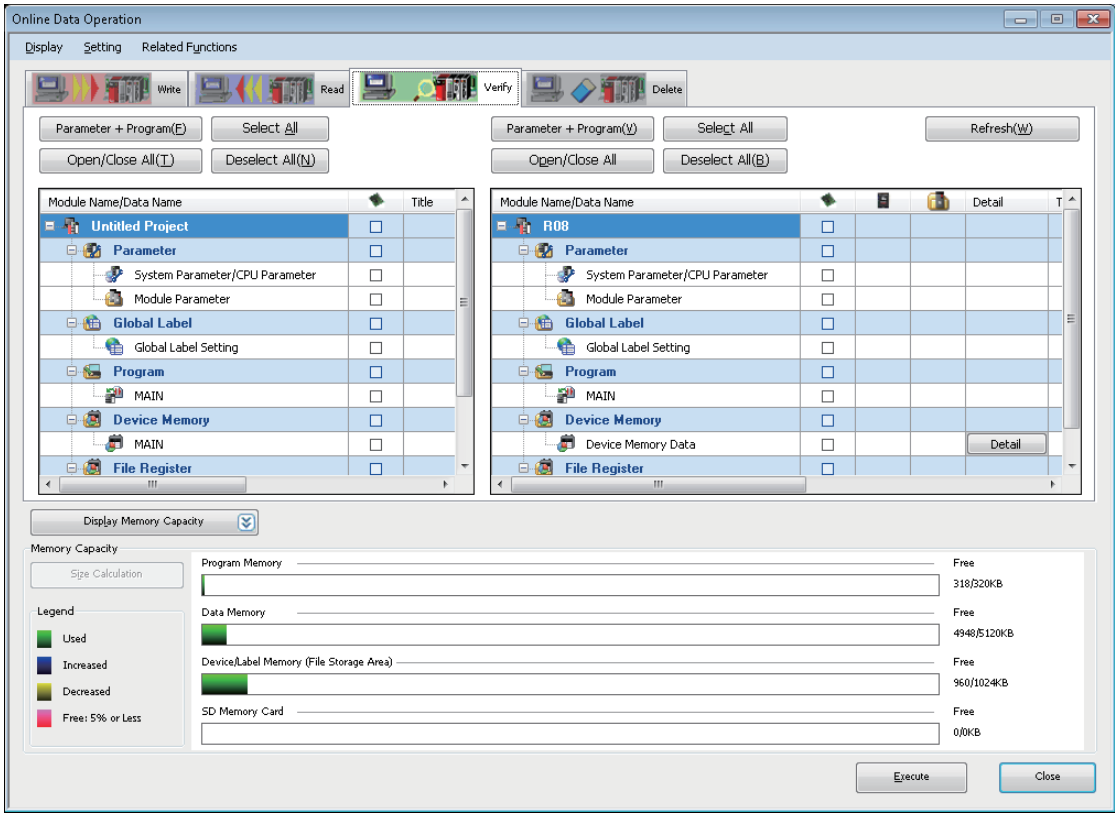
To verify data between two projects, use the Project Verify function.

For details, refer to the following section.

☞ Page 116 Verifying Projects

Window

[Online] ⇨ [Verify with PLC]



Operating procedure

Select the data to be verified, and click the [Execute] button.

The operation method for displaying the verification result is the same as that of project verification. For more details, refer to the following section.

☞ Page 118 Checking a verification result

■Writing a program without writing the program restoration information

When a CPU module contains the following data, the detailed verification result screen cannot be displayed.

- Execution program that the program restoration information is not written
- Execution program that the program restoration information is not written at the same time

■Verification of the control system and the standby system in a CPU module in a redundant system configuration

When verifying data in an RnPCPU (redundant mode) or an RnPSFCPU, the control system or standby system needs to be specified as the verification destination.

When verifying data in the control system and data in the standby system, compare the verification result of the CPU modules in the connective system and the standby system.

Parameter

■Verification of module parameters

Module extended parameters are excluded from a verification.

However, the module extended parameters of a simple motion module can be verified.

Device memory

In special relays and special registers of FX5CPUs, there are devices for which the values vary when a programmable controller is stopped.

Therefore, the verification result between a programmable controller and device memory may be mismatched.

Tag FB setting

In a project used for an RnPCPU (process mode/redundant mode) and an RnPSFCPU, the tag FB setting is excluded from a verification.

Function/function block

In GX Works3 Version 1.036N to Version 1.044W, unconverted functions/function blocks in FB files/FUN files are excluded from verification.

To verify unconverted functions/function blocks, install the latest GX Works3 or perform the 'Project Verify' function. (☞ Page 116 Verifying Projects)

13.3 Writing Programs While a CPU Module is in the RUN State

This section explains the operations for changing programs or data while a CPU module is running (online program change). Before performing, be sure to fully understand the considerations.

The specifications for the online program change function of CPU modules, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

There are two methods to write data while a CPU module is in the RUN state.

○: Writable, ×: Not writable

Type	Description	Supporting CPU module/remote head module			
		RnCPU/ RnENCPU /RnPCPU	RnPSFCPU/ RnSFCPU	FX5CPU	RJ72GF15-T2
Online program change*1,*2	To partially change and write programs or data while a CPU module is running.	○	○*3	○	×
File batch online change	To write data for each file while a CPU module is running.	○	○*3	×	○

*1 For SFC programs, the following data can be written using this function.
- Single SFC block (only for RnCPUs and RnENCPUs)
- Zoom

*2 This function can be used in the property screen in MELSAP-L (instruction format) display.

*3 Only standard data is writable.

Writing data while a CPU module is running affects scan time due to the change of number of steps. Set the secured steps for online program change on the "Program Detail Setting" screen displayed by clicking the [Detail] button of "Program".

Considerations

- The program execution is suspended while performing the online program change function. The length of down time depends on the number of the changed steps.
- When writing programs which includes the rise instructions, fall instructions, SCJ instructions, and STMR instructions while the CPU module is in RUN, the system may not operate properly.
- Do not perform the online program change function to the same program from multiple pieces of GX Works3 at the same time.
- If failed to write data while the CPU module is in RUN state, the project will be returned to the previous status before the conversion in order to make it possible to perform the online program change function again.
- Make sure that the parameters between in the CPU module and in the project match before performing the online program change function.
- Make sure that the writing target file has been written to the CPU module before performing the online program change function.
- When "Check at Communication Time" has been set less than 90 seconds, the timeout will be checked in 90 seconds. If an error occurred, extend the timeout time on the "Specify Connection Destination" screen.
- The online program change function will continue performing if a warning occurred at conversion.
- When the online program change function is performed after changing the label names which can be accessed from external devices, the data before the change is remained in the global label assignment information. To delete the remaining data, write the global label assignment information from the "Online Data Operation" screen.
- When global labels are changed, programs using the global labels will be a writing target for performing the online program change function.
- The online program change function cannot be performed when a structure definition is edited (added/deleted/changed). Write a program to a CPU module on the "Online Data Operation" screen. However, the function can be performed when a new member is added in the state that there is no member of a structure or when all members of the structure are edited.
- In a ladder with a large number of steps, the online program change function may not be performed due to insufficient memory in GX Works3.
  In this case, close all open editors and perform the function again.
  Or, convert a program and then perform the file batch online change function.

Design instructions

⚠WARNING

■When data change, program change, or status control is performed from a personal computer to a running programmable controller, create an interlock circuit outside the programmable controller to ensure that the whole system always operates safely.
Furthermore, for the online operations performed from a personal computer to a CPU module, the corrective actions against a communication error due to such as a cable connection fault should be predetermined as a system.

Startup/Maintenance Instructions

⚠CAUTION

■The online operations performed from a personal computer to a running CPU module (program change while a CPU module is in RUN state, operating status change such as RUN-STOP switching, and remote control operation) have to be executed after the manual has been carefully read and the safety has been ensured.
When changing a program while the CPU module is in RUN, it may cause a program corruption in some operating conditions. Fully understand the precautions described in this section.

Writing data after changing programs partially while a CPU module is running (Online program change)

This function partially overwrites data such as program files in the CPU module. Before changing the program, check if the programs between in the CPU module and in the project match using the "Verify with PLC" function. If there is no target file in the CPU module, the online program change function cannot be performed.
The list of operations for the data which can perform the online program change function and the target files are as shown below.
○: Applicable, —: Not applicable

Operation		Online program change target file				
		Program	POU	Local label initial value*1	Global label (settings, assignment information*1)	Global Label Initial Value*1
Global label	Adding/changing global labels	—	—	—	○*2	○*3
Program block	Adding/changing local labels	○	—	○*3	—	—
	Adding/changing/deleting programs	○	—	—	—	—
Function block	Adding/changing local labels	—	○	—	—	—
	Adding/changing/deleting programs	—	○	—	—	—
Function	Adding/changing local labels	—	○	—	—	—
	Adding/changing/deleting programs	—	○	—	—	—

*1 FX5CPUs do not support it.
*2 The operation for the assignment information can be performed only when the labels are set to be accessed from external devices.
*3 The operation for a initial value file of labels can be performed only when initial values are set to labels. When the initial values are not applied to labels, the initial value file of labels with a same name in a programmable controller will be deleted.

Operating procedure

1. Verify a program against a program on the programmable controller to ensure that they match.

If the program part to be written does not match with the program on the CPU module, the online program change function cannot be performed. Perform the function in file units. (☞ Page 411 Writing data for each file while a CPU module is running (file batch online change))

2. Modify a program.
3. Select [Convert] ⇨ [Online Program Change].
4. Select the target program, and click the [Yes] button.

Point

Check the processing procedure and precautions for the online program change function by clicking the [Precautions] button.

Online program change of SFC programs

The following data writing are supported for SFC programs.

- Online program change for an SFC block*1
- Online program change for a Zoom
- Performing the online program change function on the property screen in MELSAP-L (instruction format) display

The online program change function cannot be performed when multiple SFC diagrams are edited. In that case, write the data to the programmable controller on the "Online Data Operation" screen.

*1 RnCPUs and RnENCPUs support it.

■Deleting an SFC block

To perform the online program change function after deleting an SFC block, perform the following operations.

1. Select an SFC block to delete in the "Navigation" window, then right-click and select [Delete Data] from the shortcut menu.
2. Select [Convert] ⇨ [Online Program Change].

Online program change after editing device comments

When the online program change function is performed after editing device comments, the device comments are written after writing programs.

The operations below can be chosen for writing device comments by selecting [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Online Program Change".

Item	Value	Description
Check Device Comment Difference	No	The confirmation message does not appear, and all device comments are written.
	Yes	The confirmation message appears, and whether or not to write device comments can be selected.

Note that the online program change function cannot be performed even if only device comments were edited with the program or labels unchanged.

When writing only device comments while a CPU module is running, write data to the programmable controller from the "Online Data Operation" screen.

Online program change for the initial values of labels (version 1.000A only)

After adding/changing a label, the label initial value file needs to be written to a CPU module.

In addition, when clearing all initial values, the label initial value file needs to be deleted from a CPU module.

During the boot operation, an initial value file of labels needs to be written to an SD memory card in a CPU module. To clear all initial values, the file needs to be deleted from the Boot File Setting of the Memory Card Parameter. If the label initial value file is not written to a CPU module or deleted from a CPU module, an error occurs when powering OFF → ON, resetting, or changing the state STOP→RUN of the CPU module.

Online program change for the initial values of labels (version 1.032J or later)

When the initial values of labels are not set, the initial value file of labels with a same name in a programmable controller will be deleted.

During the boot operation, an initial value file of labels needs to be written to an SD memory card in a CPU module. By selecting "Reflect Changes to Boot Source" when the online program change function is performed, an initial value file of labels is written even if the initial values of labels are not set.

Writing range for online program change

The range to be written differs depending on the editing methods of programs.

■Ladder program

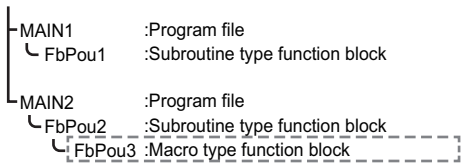
When a new ladder block is inserted, or a ladder block is deleted, the inserted program is written together with one instruction after the inserted ladder block to the CPU module.

Therefore, the online program change function may not be completed at a time depending on the number of program steps before and after addition or deletion. In this case, reduce the number of steps written at a time and perform the function in several times.

Execution of rising/falling instructions after performing online program change

When the raising/falling instructions in the subroutine function block program are modified or added, the instructions do not operate normally immediately after the online program change function is performed even if the execution condition is satisfied.

This is the same as the case of the macro type function block in the subroutine function block in the following example of program configuration.



For details, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

POU duplication check

When writing a program while the CPU module is in RUN state, the program can be checked whether a POU name is duplicated in the program and in a program in the module.

Whether to check the duplication can be set by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Online Program Change" ⇨ "Operational Setting" ⇨ "Duplication Check for POU"

Program transfer when a CPU module is in RUN state

A program can be transferred (i.e. the program restoration information are written and the program memory are transferred) in the background while a CPU module is in RUN state.

By doing so, the waiting time until the program becomes editable can be shorten.

The following conditions need to be satisfied to transfer a program in the background.

- "Write in Background" is selected in the following option.
  [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Online Program Change" ⇨ "Operational Setting" ⇨ "Write a Program Restore Information"
- The boot operation is not in process. Or, the boot operation is in process and "Reflect Changes to Boot Source" is not selected when the online program change function is performed.

This function is available only for a project created in an RnCPU project, RnENCPU project, or RnSFCPU project.

Precautions

■Interruption of writing the program restoration information

When the power-OFF or reset of a CPU module, or cable disconnection is detected while writing the program restoration information, the processing is canceled and a message appears.

For the interruption caused by the power-OFF or reset of a CPU module, write the program restoration information again.

For the interruption caused by the cable disconnection, connect the cable again, and click the [Retry] button on the message.

When the [Cancel] button is clicked, the following error occurs.

- The restoration information is not written. Therefore, an error occurs when reading the data from a programmable controller and it is not read.
- The execution program and the restoration information may be mismatched. Therefore, an error occurs after resetting the programmable controller and the program cannot be executed.

To clear the errors, set the CPU module in the STOP state and write the program again.

Program restoration information

Whether or not to write program restoration information with a program can be selected when performing the online program change function.

By setting the following option, whether or not to write the program restoration information can be selected in the "Online Program Change" screen.

- [Tool] ⇨ [Options] ⇨ "Online" ⇨ "Program Restore Information" ⇨ "Operational Setting" ⇨ "Enable the setting to write/not to write program restore information"

When a program is written without writing the program restoration information, the data cannot be read with 'Read from PLC', and the detailed verification result screen cannot be displayed with 'Verify with PLC'.

For CPU modules that do not support this function, whether to write the program restoration information cannot be selected even when the option is set.

Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.

An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to the CPU module in the connective system. A program is transferred to the other system after performed in the connective system.

Writing data for each file while a CPU module is running (file batch online change)

A program and/or data can be written for each file while a CPU module is running.
FX5CPUs do not support it.

Operating procedure

Select [Online] ⇨ [Write to PLC] while a CPU module is running.

Precautions

If there is not enough free capacity in the program memory of a CPU module to write the programs, the file batch online change cannot be performed.
If labels and module parameters are not changed when using a module label, writing the module parameter is omitted and the file batch online change of the program can be performed.

Execution condition

The following table shows the files to which the file batch online change can be performed and the conditions.
Before writing a file other than the one described in the following table, change the status of the CPU module to STOP/PAUSE.

■Project for RnCPUs, RnENCPUs, and RnPCPUs

Target	Condition
• Global label initial value • Local label initial value • Device memory • File register • Device initial value • Common device comment • Each program device comment	No condition
• Program file (A global label/FB/FUN is not used.)	• Registered in the program setting of the CPU parameter. • A standard program. • A program file described in Ladder Diagram, Structured Text, or Function Block Diagram.
• Program file*1 (A global label/FB/FUN is used.)	• Registered in the program setting of the CPU parameter. • A standard program. • A program file described in Ladder Diagram, Structured Text, or Function Block Diagram. • A standard/safety shared label is not used. • All programs have not been converted since the previous writing of the global label setting and FB/FUN to a CPU module.*2
• FB/FUN file*1	• Registered in the FB/FUN file setting of CPU parameters. • A standard FB/FUN. • All programs have not been converted since the previous writing of the FB/FUN file to a CPU module.*2
• Global label setting*1	• A standard global label. • A global label that can be accessed from an external device is not set. • All programs have not been converted since the previous writing of the global label setting to a CPU module.*2

*1 Before performing the file batch online change function, setting SM and/or SD devices of a CPU module is required in advance. For details, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

*2 When "No" is selected for the following option, the file batch online change function can be performed even when converting (retaining) any or all programs.
[Tool] ⇨ [Options] ⇨ "Online" ⇨ "Write to PLC" ⇨ "Operational Setting" ⇨ "Turn PLC to STOP in writing to PLC after executing Rebuild All and execute remote RUN"

■Project for RnSFCPUs and RnPSFCPUs

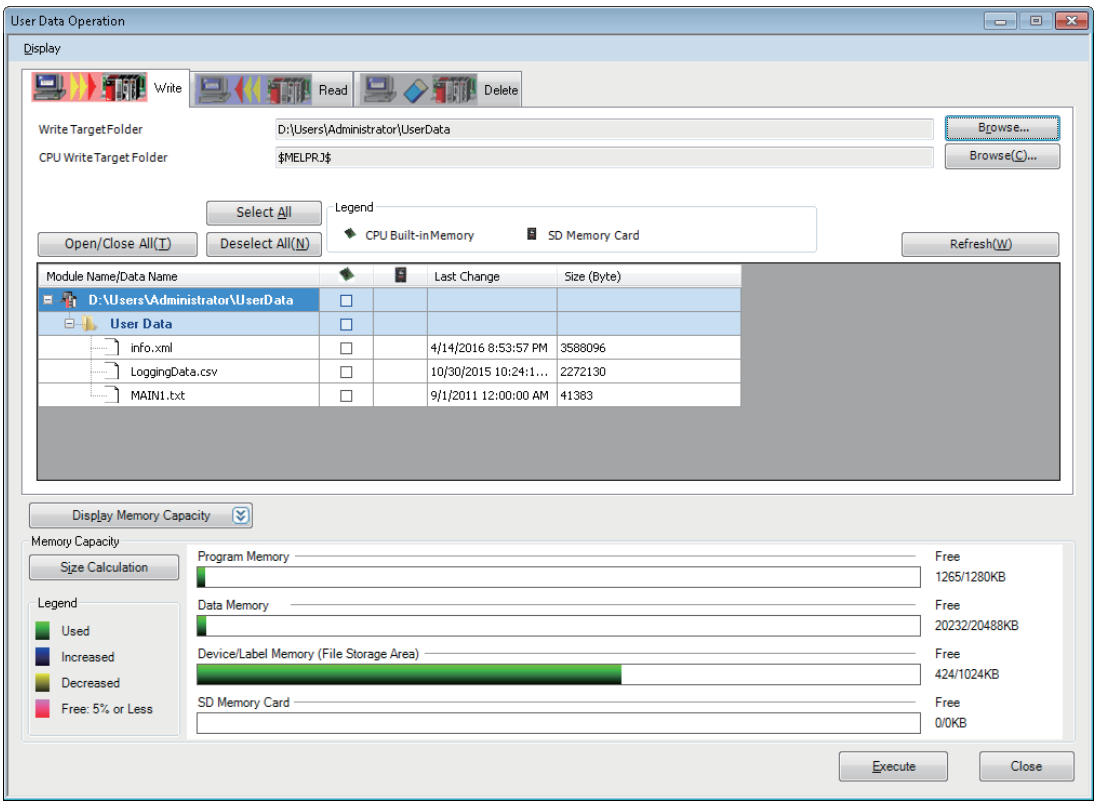
Target	Condition
• Global label initial value • Local label initial value • Device memory • File register • Device initial value • Common device comment • Device comment for each program	No condition
• Program file (A global label/FB/FUN is not used.)	• Registered in the program setting of the CPU parameter. • A standard program. • A program file described in Ladder Diagram, Structured Text, or Function Block Diagram.
• Program file (A global label/FB/FUN is used.)	• Registered in the program setting of the CPU parameter. • A standard program. • A program file described in Ladder Diagram, Structured Text, or Function Block Diagram. • A standard/safety shared label is not used. • A local label is not edited after the previous writing to a CPU module. • A global local label is not edited after the previous writing to a CPU module. • An FB/FUN used in a program is not edited after the previous writing to a CPU module. • A structure is not edited after the previous writing to a CPU module. • All programs are not converted after the previous writing of global label setting, FB, or FUN to a CPU module. • A file to be written with a program file is a global label setting file, FB file (including SlibFbFile), or FUN file. • Secured steps for online program change of FB files and FUN files are not changed. • A security setting for an FB file or FUN file is not changed.

13.4 Reading/Writing/Deleting User Data

Read/write/delete user data from/to the CPU built-in memory/SD memory card.
The user data written to the CPU built-in memory/SD memory card can be used in sequence programs.
The files which have a three-character extension (example: csv, txt, bin, xml) can be used as a user data.
However, some extensions and files are not supported. Unsupported files are not displayed on the screen.
FX5CPUs only support a firmware update prohibit file (FWUPDP.SYU).

Window

[Online] ⇨ [User Data] ⇨ [Write]/[Read]/[Delete]
The following screen is an example when writing data.



Operating procedure

1. Select [Write], [Read], or [Delete] tab on the "User Data Operation" screen.
2. Select the target files, and a write target or read source.
3. Click the [Execute] button.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.
An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system).

Creating/deleting folders, changing folder name

A folder can be created in the CPU built-in memory or SD memory card.
A created folder can be deleted and the folder name can be changed.
Create/delete a folder, or change a folder name on the "Browse Folders" screen displayed by clicking the [Browse] button on the "User Data Operation" screen.

■Creating folders

Select the place in which the folder is to be created on the "Browse Folders" screen, right-click it and select [Create Folder] from the shortcut menu.

■Deleting folders/changing folder name

Select the target folder on the "Browse Folders" screen, right-click it and select [Delete Folder]/[Change Folder Name] from the shortcut menu.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.
An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system).

13.5 Deleting All Files (Initialization)

Perform initialization to delete files in a CPU module or a memory card.
The process of "Initialization" is used when using a CPU module or memory card for the first time or clearing all data stored in a CPU module or memory card.
Once initialized, the following processing on memory is performed.

- Data memory: All folders/files in the program memory and data memory are deleted.
- Device/label memory: All files in the file storage area in the device/label memory are deleted.
- SD memory card: All folders/files in the SD memory card are deleted.

Operating procedure

To delete all files in the "CPU Memory Operation" screen, refer to the following section.
☞ Page 518 Initializing/Clearing Memory

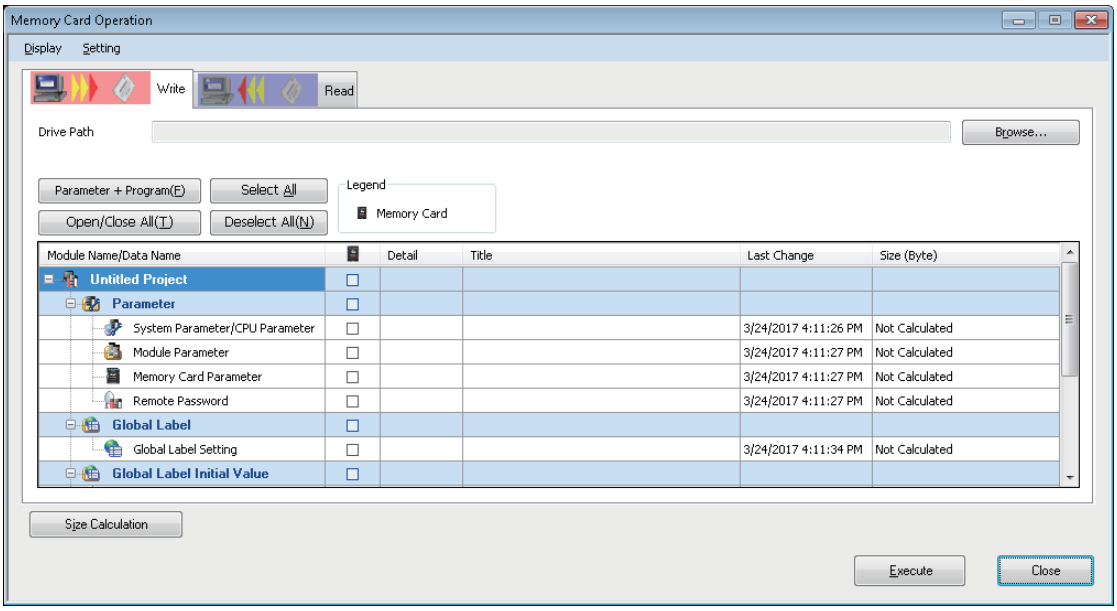
13.6 Writing/Reading Data to/from Memory Card

This section explains how to writing/reading data to/from a memory card attached to a personal computer.
This operation is used, for example, when data can not be written/read by attaching a memory card to a CPU module.
However, this writing/ reading function cannot be used in a safety project.
For details on the writing/reading data to a CPU module attached a memory card, refer to the following section.
☞ Page 390 Writing/Reading Programmable Controller Data
R00CPU and remote head modules do not support it.

Configuration of Memory Card Operation screen

Window

[Tool] ⇨ [Memory Card] ⇨ [Write to Memory Card]/[Read from Memory Card]
The following screen is an example when writing data.



The data name in gray indicates that it is in the unconverted state.

Writing to/Reading from a memory card

Write/Read data to/from a memory card.
The file, which is in the '$MELPRJ$' folder of the specified drive path, is the target for reading/writing.

Operating procedure

1. Select the [Write] tab/[Read] tab on the "Memory Card Operation" screen.
2. Set the drive path of the write target/read source, then click the [Execute] button.

Considerations when reading program files from a memory card

Perform the following operations to read program files from a memory card.

■Parameters have been written with program files when writing to a memory card

Read the parameters with the program files.

■Parameters have not been written with program files when writing to a memory card

Before reading the program files, open the project opened when writing to the memory card.
Read parameters used when writing to the memory card from the CPU module.

14 CHECKING OPERATION OF PROGRAMS

This chapter explains the method for checking the execution status of an intelligent function module and a CPU module connected to a personal computer.

The functions to check the execution status are as follows:

Purpose	Function name	Reference
To check the status of programs being executed on the program editor.	Monitor	Page 421 Checking Execution Programs on Program Editor
To check the current values of devices or buffer memory in a batch.	Device/buffer memory batch monitor	Page 431 Checking Device/Buffer Memory in Batch
To check the current values of devices and labels by registering them.	Watch	Page 434 Checking Current Values by Registering Devices/Labels
To check input and output devices, which are registered to a CPU module, to ON/OFF forcibly.	Register/cancel forced input/output	Page 438 Turning Input/Output Device ON/OFF Forcibly
To pause and restart the operation of a process control function block in a running program.	Pause FB/restart FB*1	Page 440 Pausing/Restarting the Operation of Function Blocks
To check the processing time of a program being executed.	Program list monitor*2	Page 443 Checking Processing Time of Program
To check the number of executions of an interrupt program used in a program.	Interrupt program list monitor*2	Page 444 Checking Execution Counts of Interrupt Programs
To check the I/O signals and the current value of buffer memory by registering the module information of an intelligent function module.	Intelligent function module monitor	Page 445 Checking Current Values in Intelligent Function Module
To check the current logging data sampled by a CPU module.	Realtime monitor	Page 447 Checking Current Logging Data
To check tag data.	Faceplate*1, PX Developer Monitor Tool interaction*1, initial FB property value update/FB property management*1	Page 448 Checking tag data

*1 This function can be used in a project for an RnPCPU (process mode/redundant mode) and RnPSFCPU with the process control extension enabled.

*2 FX5CPUs do not support it.

Changing current values

The operation of a module can be checked by changing the current value of devices, labels, and buffer memory using the change current value function.

This function turns bit devices forced ON/OFF on a CPU module. The current values of the word device and buffer memory can also be changed forcibly.

The current values can be changed on the following screens.

- Program editor
- "Device/Buffer Memory Batch Monitor" window
- Watch window
- Intelligent Function Module Monitor window

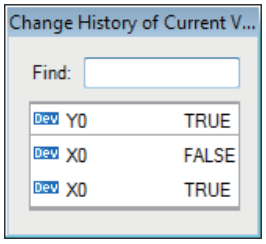
Safety devices/labels and standard/safety shared labels can be changed only when the safety operation mode of a CPU module is in the test mode.

■Change history of current value

When the current values of bit device are changed, the change history can be checked.

Window

[Debug] ⇨ [Change History of Current Value]



14.1 Monitor Status

Check the operating status of a CPU module or an intelligent function module using the monitoring function by connecting a personal computer.

Starting/stopping monitoring

Start/stop monitoring by selecting one of the following menus.

- [Online] ⇨ [Monitor] ⇨ [Start Monitoring]( )/[Stop Monitoring]( )
- [Online] ⇨ [Monitor] ⇨ [Start Monitoring (All Windows)]( )/[Stop Monitoring (All Windows)]( )
- [Online] ⇨ [Watch] ⇨ [Start Watching]/[Stop Watching]
- Select [Online] ⇨ [Monitor] ⇨ [Monitor Mode] on the active ladder editor

For a ladder editor, start monitoring by selecting a mode from the pull-down menu on the mode display area located at the upper left of the ladder editor.

■When monitoring multiple projects using a single personal computer

- If an communication error has occurred in one of the projects, the monitoring speed of the other projects may become slow. The operation speed will be back to normal after closing the error message displayed in the project in which the communication error occurred.
- The following functions may not be performed normally:
  Program List Monitor and Interrupt Program List Monitor

■Monitoring buffer memory or link devices

Monitor the ON/OFF state of the buffer memory or link devices (example: U0\G0.1) by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Monitor" ⇨ "Common Item"/"(Program editor)" ⇨ "Operational Setting"

■Changing display format of word devices

Select [Online] ⇨ [Monitor] ⇨ [Change Value Format (Decimal)] / [Change Value Format (Hexadecimal)] to change the display format of the monitored values.

■FB instance

To monitor the devices/labels in an FB instance, open the FB program and select the FB instance to be monitored from the monitor status bar.

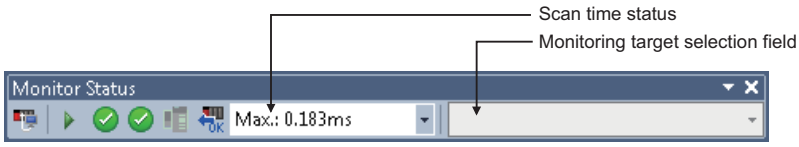
Status monitoring

Status is displayed during monitoring on the monitor status bar.

Window

At the start of monitoring

The following screen is an example for an RnCPU project.



Displayed items

Item	Description	Icon	Detail
Connection status	Displays the connection status between a CPU module and personal computer. The "Specify Connection Destination" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 371 SETTING ROUTE TO CPU MODULE		When connected to a CPU module
CPU operation status	Displays the CPU module status operated by the key switch on the CPU module or the remote operation from GX Works3. The "Remote Operation" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 509 Remote Operation		RUN
			STOP
			PAUSE
ERROR status	Displays the ERROR LED status of a CPU module. The "Module Diagnostics" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 483 Module Diagnostic		ERROR is OFF.
			ERROR is ON.
			ERROR is flashing.
USER status	Displays the USER LED status of a CPU module. The "Module Diagnostics" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 483 Module Diagnostic		USER is OFF.
			USER is ON.
			USER is flashing.
Register/cancel forced input/output status	Displays the register/cancel forced input/output status. The "Register/Cancel Forced Input/Output" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 438 Turning Input/Output Device ON/OFF Forcibly		Registered
			Canceled
Control/standby system status	Displays whether the status of a CPU module in a redundant system configuration or remote head module is a control system or a standby system.		Control System
			Standby System
			Not determined
System A/B status	Displays the system A/B status of a CPU module in a redundant system configuration.		System A
			System B
			Not determined
Redundant operation mode	Displays an operation mode of a CPU module in a redundant system configuration.		Backup mode
			Separate mode
Safety operation mode	Displays the safety operation mode of an RnPSFCPU and an RnSFCPU. The "Switch Safety Operation Mode" screen is displayed by clicking the icon. For details, refer to the following section. ☞ Page 513 Safety operation mode switching		Safety mode
			Test mode
Availability of Read from PLC	Displays whether data can be read from a programmable controller.		Available
			Unavailable
Scan time state	Displays the current value, maximum value, and minimum value of the scan time by switching them from the pull-down list.		
Monitor target selection	When monitoring multiple FB programs, select the target FB instance to be monitored.		

Monitor mode

Ladder editors are switched to monitor mode during monitoring.

☞ Page 182 Configuration of the ladder editor

Operations when the system is switched in the redundant configuration

When a tracking communication error occurs while monitoring via CC IE Control, CC IE Field, CC-Link, or Ethernet in a redundant configuration, monitoring is continued by switching a communication route (the system to be monitored).

This function performs when specifying any one of control system, standby system, system A, or system B as a connection destination.

Supported monitor function: circuit monitor, watch, device/buffer memory batch monitor, local device monitor

14.2 Checking Execution Programs on Program Editor

Use the monitoring function to check the following execution programs on each program editor.

- Ladder program
- ST program
- FBD/LD program
- SFC program

Open a program editor to be monitored in advance.

Point

The display format and detailed operation settings for each function can be set by setting the following option.
[Tool] ⇨ [Options] ⇨ "Monitor"

Applicable monitoring devices and labels

■Applicable devices

The following table shows the devices that can be monitored on a program editor.

Program editor type	Device
Ladder, ST, FBD/LD, SFC	X, Y, M, L, B, F, SB, V, S*1, T*2, T(TS), T(TC), T(TN), ST*2, ST(STS), ST(STC), ST(STN), LT*2, LT(LTS), LT(LTC), LT(LTN), LST*2, LST(LSTS), LST(LSTC), LST(LSTN), C*2, C(CS), C(CC), C(CN), LC*2, LC(LCS), LC(LCC), LC(LCN), D, W, SW, FX, FY, SM, SD, J□\X, J□\Y, J□\B, J□\SB, J□\W, J□\SW, U□\G, U3E□\G, U3E□\HG, DX*3, DY*3, Z, LZ, R, ZR, RD, BL, BL□\S

*1 'S' can be monitored in a Zoom or on an SFC diagram only. Monitor BL□\S when using program editors not a Zoom.
*2 The same value as 'N' (current value) is displayed.
*3 'DX' and 'DY' cannot be monitored on an SFC diagram.

■Inapplicable labels

- When a value other than a fixed value is used for an array index, the monitor value of the array is displayed as an indefinite value, or the monitor value is not displayed.
- An indefinite value is displayed as the monitor value of a local label in a function, or the monitor value is not displayed.

■When the type of defined function block is the macro type

Monitoring input/output labels depend on the monitor condition of the connected element. Therefore, when the connected element is not in the condition to be monitored, the input/output label cannot be monitored.

Considerations when monitoring file registers

When monitoring file registers while "Use File Register of Each Program" is selected in "File Setting" of "CPU Parameter", the monitor operation will differ depending on the device/label access service processing setting.
Therefore, add a program that transfers monitoring target file registers to devices, then monitor the transferred the program. Note that the number of steps and scan time will increase for the added programs.
If the file register for which "Use File Register of Each Program" is selected is used as data with no latch (such that the data is set to clear to '0' at the first time), replacing the file registers to local devices avoids increase of number of steps and scan time due to the addition of programs.

- When "Execute END Processing between Programs" is selected:
  When monitor is requested after the program which is set not to use the file register, FFFFH (-1) will be monitored since the monitor is performed between programs or at the END process.
- When other than "Execute END Processing between Programs" is selected:
  The value of the file register file that is enabled in the program executed at the right before the END processing is monitored.
  Example) When the execution order of the program is 'A→B→C→(END processing)→A→B', monitor the value of the file register at execution of program C.

Considerations when monitoring labels

Since the data type of an instruction arguments (labels) is represented as the genetic data type, the argument such as ANY16 or ANY32 may have both attribute of "Signed" and "Unsigned".

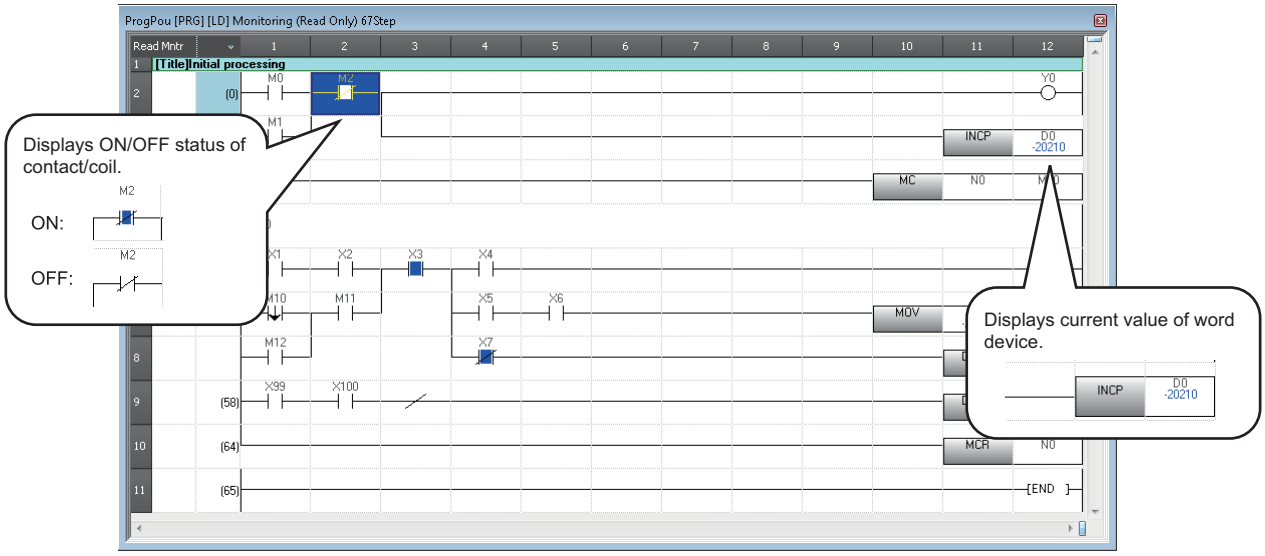
The monitor value of the genetic data type is displayed as the specified label data type. Specify the data type according to the instruction specifications (MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)).

Ladder

Circuit monitor

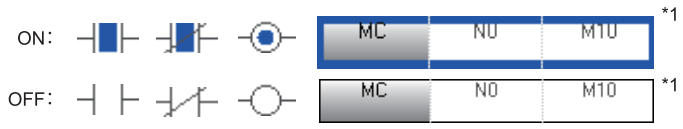
Operating procedure

Open the ladder editor, and select [Online] ⇨ [Monitor] ⇨ [Start Monitoring] ( )/[Stop Monitoring] ( ).



■ON/OFF state display

During monitoring, the ON/OFF state is displayed as shown in the following figure.



*1 Only the following comparison operation instructions that are equivalent to contacts and the instructions that are equivalent to coils are supported.
Comparison operation instructions equivalent to contacts: BIN16-bit data comparison, BIN32-bit data comparison, floating-point data comparison, 64-bit float data comparison
Instructions equivalent to coils: SET, RST, PLS, PLF, SFT, SFTP, MC, FF, DELTA, DELTAP, OUTHS, STL

■Monitoring FB programs

Double-click the FB instance to monitor the FB program.

Changing current values

Current values can be changed by the following methods during monitoring.

Target device/label	Operation procedure
Bit type	Select a cell of device/label, then press the Shift + Enter keys.
Word type	Register a device/label in the Watch window, and change the value. (☞ Page 434 Checking Current Values by Registering Devices/Labels)

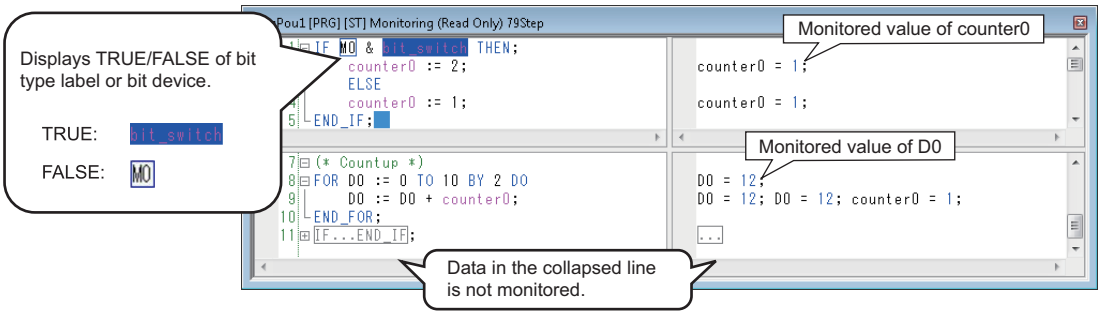
ST

The monitor value of bit type is displayed on a program, and the monitor value of a label other than bit type and a word device are displayed on the right side of the split window.
A monitor value is displayed on the tooltip by placing the cursor on a device/label name.

Monitor

Operating procedure

Open the ST editor, and select [Online] ⇨ [Monitor] ⇨ [Start Monitoring] ( )/[Stop Monitoring] ( ).



Changing current values

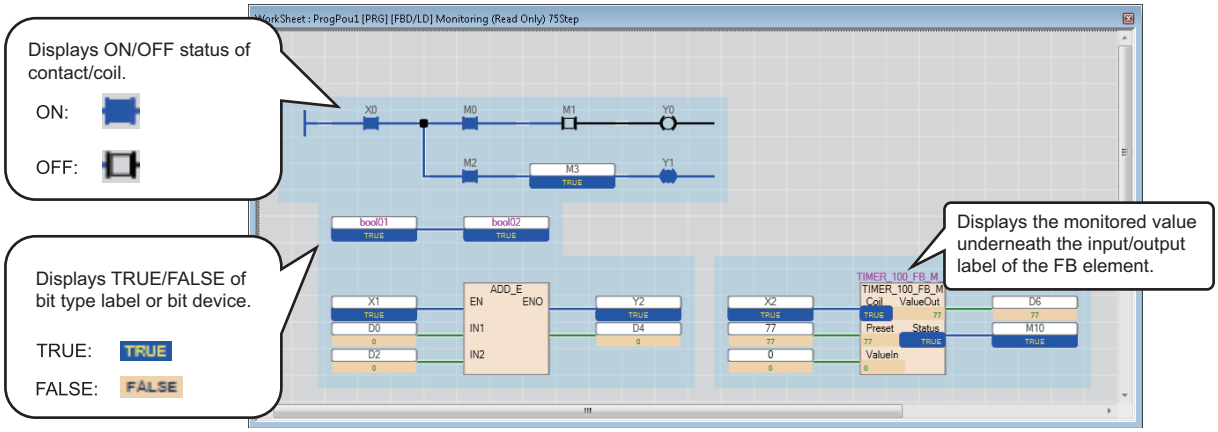
Current values can be changed by the following methods during monitoring.

Target device/label	Operation procedure
Bit type	Select a token of device/label, then press the Shift + Enter keys.
Word type	Register a device/label in the Watch window, and change the value. (☞ Page 434 Checking Current Values by Registering Devices/Labels)

Monitor

Operating procedure

Select [Online] ⇨ [Monitor] ⇨ [Start Monitoring] ( )/[Stop Monitoring] ( ).



When the current values cannot be monitored, "---" is displayed.

■Display format of a contact

The current continuity state can be checked by looking a contact.

By setting the following option, ON/OFF of a constant can be changed with the current value of a device/label.

- [Tool] ⇨ [Options] ⇨ "Monitor" ⇨ "FBD/LD editor" ⇨ "Display Setting" ⇨ "Use Same Display Format for Contact as Device/Label Current Value"

■Display format of word devices

A word device is displayed in Word [Signed].

For a word device with a device type specifier, the word device is displayed in the data type indicated by the device type specifier.

For details on a device type specifier, refer to the following manual.

MELSEC iQ-R Programming Manual (Program Design)

Changing current values

Current values can be changed by the following methods during monitoring.

Target device/label	Operation procedure
Bit type	Select an element of a device/label, then press the Shift + Enter keys.
Word type	Register a device/label in the Watch window, and change the value. (☞ Page 434 Checking Current Values by Registering Devices/Labels)

SFC

Monitor values of a device and a label of the SFC program that the execution type of the program is set for "Scan".

SFC program has the monitoring functions shown below.

Purpose	Target editor/function name	Reference
To check the active status of steps and current values of devices on an SFC diagram.	SFC diagram	Page 426 Monitoring an SFC diagram
	SFC auto-scroll	Page 428 Monitoring with the SFC auto-scroll
To check the current values of devices in a Zoom.	Zoom	Page 428 Monitoring a Zoom
To check block information in a list.	SFC block list	Page 429 Monitoring the SFC block list
To check active status of all blocks in a list.	SFC all blocks batch monitor	Page 430 Monitoring all SFC blocks in batch/active steps
To check active status of steps in a specified block in a list.	Active step monitor	

Monitoring an SFC diagram

Operating procedure

Select [Online] ⇨ [Monitor] ⇨ [Start Monitoring] ( )/[Stop Monitoring] ( ).

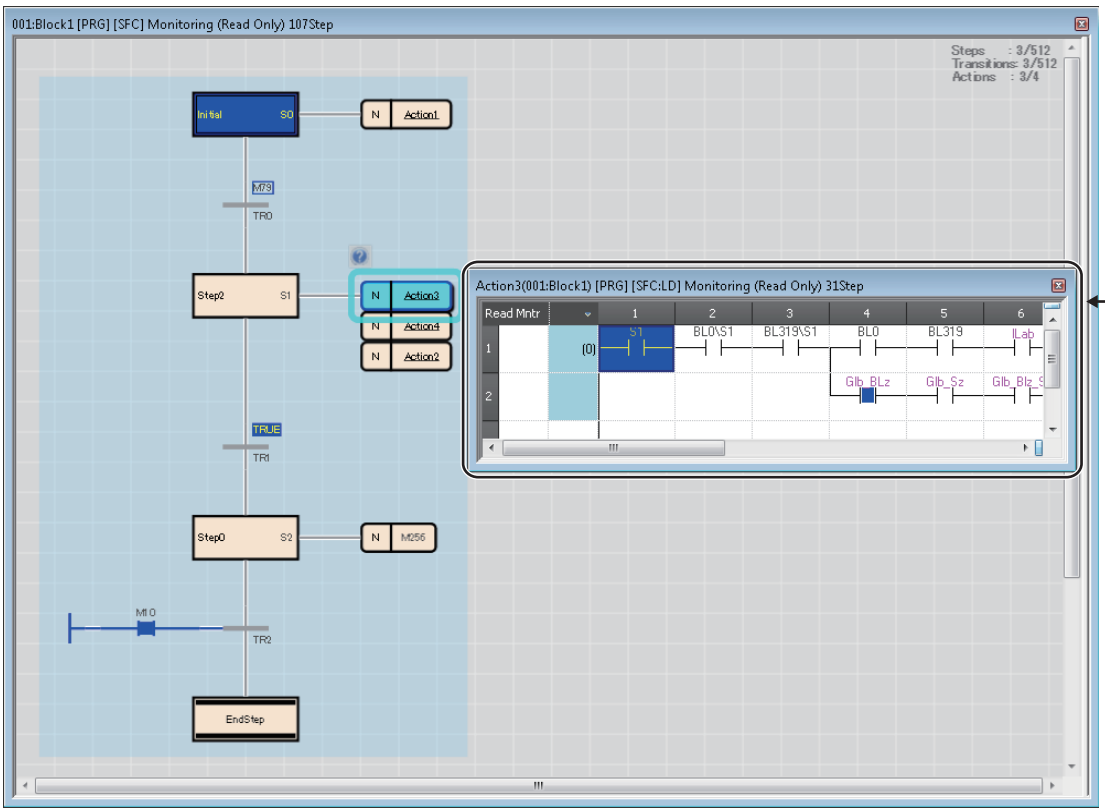
■Detailed expression

During monitoring, the SFC element status is displayed as shown in the following figure.

Monitor status of FBD/LD elements is the same as that of the FBD/LD editor.

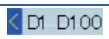
Ex.

The following screen is an example when selecting "Detailed Expression" in "Switch Ladder Display".



■MELSAP-L (instruction format)

For a monitor value of the bit type expressed in MELSAP-L (instruction format), the continuity state is highlighted on an SFC diagram as shown in the following table:

Instruction	Display example when monitoring
Coil output, set output	
Reset output	
At the time of output of a timer/high-speed timer At the time of output of a counter	
At the time when a timer/high-speed timer is up At the time when the value of a counter is counted up to the specified value	
Open contact/close contact	
Rising contact/falling contact	
Comparison operation instruction equivalent to a contact*1	
Bit device in an application instruction*2	

*1 A character string comparison instruction is not highlighted.

*2 A digit-specified bit device is not highlighted.

A monitor value of a label other than the bit type and a word device is displayed on the right side of the split window.

The following table shows the monitoring availability depending on the data type of a device and a label.

○: Monitored, ×: Not monitored, —: Not applicable

Data type*1	Variable		Constant	
	Device	Label*2	Device	Label
Bit	×	×	×	×
Word [Unsigned]/Bit String [16-bit]	○	○	×	○
Double Word [Unsigned]/Bit String [32-bit]	○	○	×	○
Word [Signed]	○	○	×	○
Double Word [Signed]	○	○	×	○
FLOAT [Single Precision]	○	○	×	○
FLOAT [Double Precision]	○	○	×	○
Time	—	×	×	×
String	—	○	×	○
Pointer	×	×	—	—
Timer*3	○	○	—	—
Retentive timer*3	○	○	—	—
Counter*3	○	○	—	—
Long timer*3	○	○	—	—
Long retentive timer*3	○	○	—	—
Long counter*3	○	○	—	—

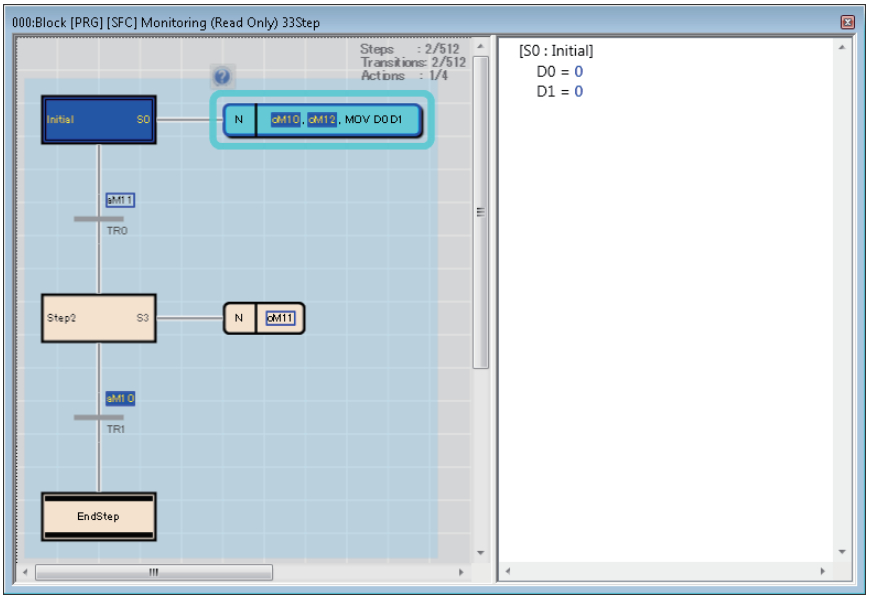
*1 An instruction other than a comparison operation instruction that is equivalent to a contact is monitored with a device type specifier added according to the data type of an argument.
Devices used for a comparison operation instruction are monitored with a device type specifier added according to each instruction.
A label used for a comparison operation instruction is monitored in the data type defined in a label editor.

*2 When a value other than a fixed value is used for an array index, the monitor value is not displayed in the editor, or displayed as an indefinite value.

*3 The current value (N) is displayed. When using it as a contact for a transition, the contact (S) is monitored, not the current value (N).

Ex.

The following screen is an example when selecting "MELSAP-L (Instruction Format)" in "Switch Ladder Display".



■Monitoring a Zoom

Select [View] ⇨ [Open Zoom/Start Destination Block], then open the Zoom to monitor.

The methods for operating/displaying a monitor of Zoom are the same as that of each program editor.

Devices, which can be monitored, are the same as that of each program editor except for S□. S□*1 can be monitored only in a Zoom.

*1 The devices may not be monitored properly when a target block is switched by the BRSET instruction.

Monitoring with the SFC auto-scroll

After starting monitoring of an SFC diagram, select [Online] ⇨ [Monitor] ⇨ [SFC Auto-scroll] ( ).

When a step, which is not displayed on the screen, is activated during monitoring, the screen automatically scrolls to show it.

When multiple steps are activated, the step closer to the row of the initial step will be displayed preferentially.

During monitoring with the SFC auto-scroll, the automatic synchronization of the cross reference function and the automatic registration to a Watch window cannot be performed.

■Displaying a start destination block during monitoring with the Auto-scroll

When an active step moves to a block start step during monitoring with the auto-scroll, the SFC diagram editor of the start destination block opens automatically and monitoring starts.

Whether to open a start destination block automatically can be set by setting the following option.

- [Tool] ⇨ [Options] ⇨ "Monitor" ⇨ "SFC Diagram Editor" ⇨ "Auto-scroll Monitor Setting" ⇨ "Monitor the Block Start in a New Window"

Precautions

When the update rate of the active status of a step is higher than the monitoring cycle, the status may not be acquired depending on the timing of monitoring.

In such a case, the step is not displayed by this function.

Changing the active status

The active status of blocks/steps can be changed by the following methods during monitoring.
It can be used to check the operation by starting/stopping particular blocks/steps only.

Target	Operation screen	Operation
Block	Each program editor (including a Zoom)	Change the current value (TRUE/FALSE) of BL□.*1
	"Device/Buffer Memory Batch Monitor" window	
	Watch window	
Step	SFC diagram editor	Select a step, then select [Debug] ⇨ [Control SFC Steps] ⇨ [Activate the Selected Steps]/[Deactivate the Selected Steps]/[Activate the Selected Steps Only].
	Zoom	Change the current value (TRUE/FALSE) of S□ or BL□\S□.*1
	Each program editor (excluding a Zoom)	Change the current value (TRUE/FALSE) of BL□\S□. *1
	"Device/Buffer Memory Batch Monitor" window	
	Watch window	

*1 Blocks/steps can be activated by changing the current values of labels which were assigned BL□\S□ or BL□.

Precautions

- Note that changing the active status of a block or step will affect the operation of a CPU module.
- If the current value of a block is changed during the online program change for an SFC block, the active status of the block cannot be changed.

Changing current values (device/label)

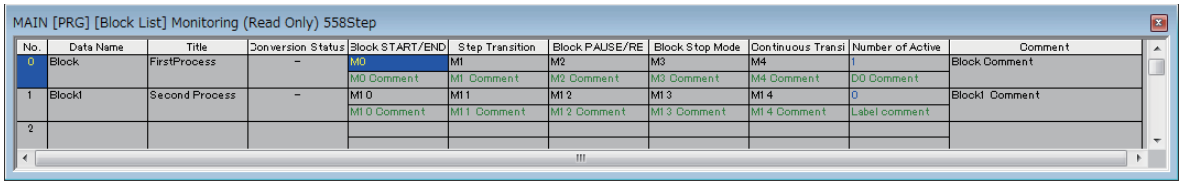
Current values of the following devices/labels can be changed on an SFC diagram during monitoring. Select a device/label and press the Shift + Enter keys.

- Bit devices/bit type labels of transitions/actions on the SFC diagram editor
- Bit devices/bit type labels of FBD/LD elements connected to transition

The methods for changing current values of devices/labels in a Zoom is the same as that of each program editor.
For S□, BL□\S□, BL□, refer to the following section.
☞ Page 429 Changing the active status

Monitoring the SFC block list

Display current block information on an SFC block list.
Select [View] ⇨ [Open SFC Block List], then open an SFC block list to monitor.



Point

The SFC diagram of specified block can be displayed by double-clicking the block column during monitoring.

Monitoring all SFC blocks in batch/active steps

Active status of all blocks/steps can be displayed.

Active status of /blocks/steps are not changed if the status of a CPU module is switched from RUN to STOP. Thereby, the active status when the CPU module was changed to STOP state is displayed on a monitor screen.

Precautions

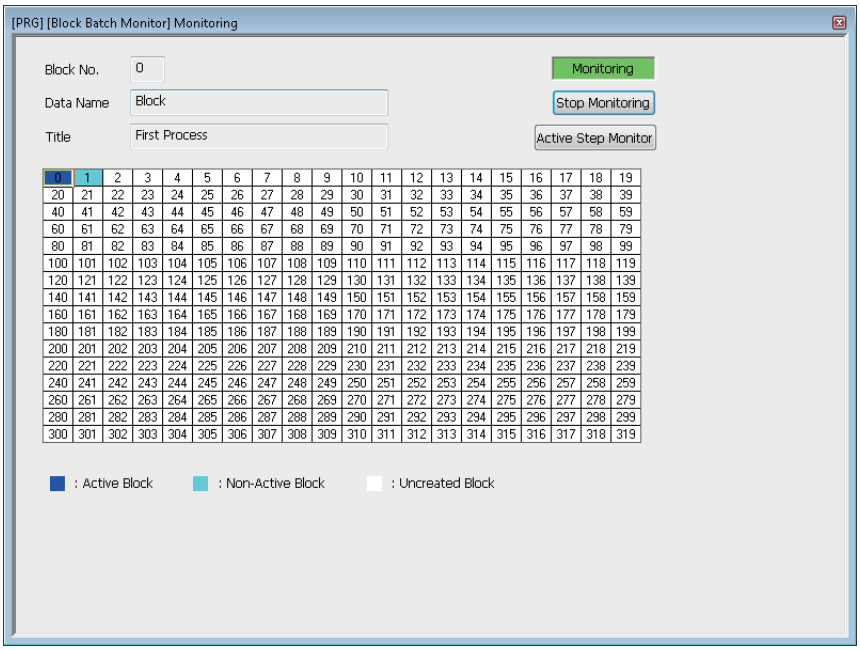
This monitoring function may not work properly when there is a difference between the program written in a CPU module and program in a project.

■Monitoring SFC blocks in batch

Display current active/inactive status of all blocks in a list.

Window

Select [Online] ⇨ [Monitor] ⇨ [SFC All Blocks Batch Monitoring] ( ).



■Monitoring active steps

Display current active/inactive status of all steps that exist in a specified block in a list.

Up to five monitor screens can be displayed at once.

Operating procedure

Move the cursor on a block to be monitored on the "Block Batch Monitor" screen, then click the [Active Step Monitor] button.

14.3 Checking Device/Buffer Memory in Batch

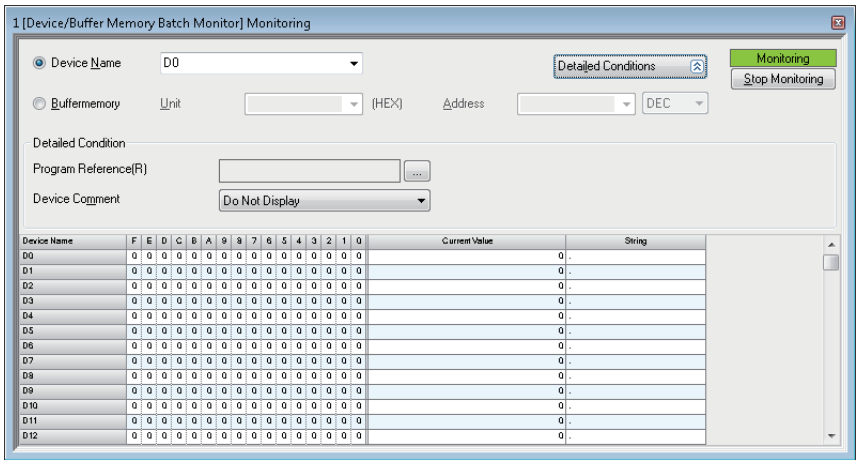
Check the devices and buffer memory in a batch using the device/buffer memory batch monitor function.
If multiple monitoring screens are open, lead time to start monitoring and monitoring intervals may become longer.
Multiple CPU shared memory (buffer memory) of multiple CPU system can be monitored only by the Device/Buffer Memory Batch Monitor function.

Window

[Online] ⇨ [Monitor] ⇨ [Device/Buffer Memory Batch Monitor] ( )

■Toolbar

■"Device/Buffer Memory Batch Monitor" window



Up to 64 monitoring screens can be displayed at once. The numbers are displayed at the start of the screen title.
The display format in the "Device/Buffer Memory Batch Monitor" window can be set with the same method as the one in the Device Memory editor. Refer to the following section.

☞ Page 290 Setting display format

Operating procedure

■Monitoring devices in a batch

Enter the device (start number) to be monitored in "Device Name".
For the devices that can be entered, refer to the following section.

☞ Page 541 Applicable Devices in GX Works3

- When the target device is local device: Specify "Program Reference".
- When checking the TC setting values: Enter a device of timer, retentive timer, long timer, long retentive timer, counter, or long counter (Example: T10, ST10, LT10, LST10, C10, LC10) and specify "Program Reference".

■Monitoring buffer memory in a batch

Enter the start I/O number and address of the intelligent function module.

Item	Description
Unit	Enter the start I/O number of the intelligent function module to be monitored in hexadecimal format. • For multiple CPU configuration Specify the CPU module to be monitored. CPU No.1: 3E00, CPU No.2: 3E10, CPU No.3: 3E20, CPU No.4: 3E30
Address	Enter the address of buffer memory to be monitored in decimal/hexadecimal format.

■Monitoring blocks/steps in an SFC program in batch

Enter BL□ in "Device Name" when monitoring blocks, and enter BL□\S□ there when monitoring steps.

Point

Fonts can be changed.

☞ Page 65 Checking and Changing Colors and Fonts

Applicable monitoring devices

The following table shows the devices that can be monitored in the "Device/Buffer Memory Batch Monitor" window.

Module type	Device
RCPU	X, Y, M, L, B, F, SB, V, T, T(TS), T(TC), T(TN), ST, ST(STS/SS), ST(STC/SC), ST(STN/SN), LT, LT(LTS), LT(LTC), LT(LTN), LST, LST(LSTS), LST(LSTC), LST(LSTN), C, C(CS), C(CC), C(CN), LC, LC(LCS), LC(LCC), LC(LCN), D, W, SW, FX, FY, SM, SD, FD, J□\X, J□\Y, J□\B, J□\SB, J□\W, J□\SW, U□\G, U□\HG, DX, DY, Z, LZ, K, R, ZR, RD, BL, BL□\S
Remote head module	X, Y, SB, W, SW, SM, SD, U□\G, DX, DY, RD

Changing current values

During monitoring, current values can be changed by one of the following operation.

- Double-click a cell of a device.
- Enter the Enter key.
- Right-click a cell of a device or the "Current Value" column, and select [Modify Value] in the shortcut menu

■For bit devices

The current value is changed.

■For word devices

A device is registered in a Watch window.

Change the current value in the Watch window. (☞ Page 434 Checking Current Values by Registering Devices/Labels)

Multiple word devices can be registered in a Watch window at once by selecting multiple cells of the current values.

Precautions

- For T, and C device, a contact and the current value can be changed in RCPU, and a contact only can be changed in FX5CPU.
- When "Bit and Word" is selected in "Display Unit Mode" of "Display Format Detailed Setting" (), the current value of the following devices can be changed by changing the bit status in the 0 to F column.
  DX, DY, FX, FY, J□\X□, J□\Y□, J□\B□, J□\SB□
- When "Bit and Word" is selected in "Display Unit Mode" of "Display Format Detailed Setting" (), the current value of a Z device cannot be changed even if the bit status in the 0 to F column is changed.
- For S□, BL□\S□, BL□, blocks/steps are activated/deactivated by changing the current values. (☞ Page 429 Changing the active status)

Considerations when monitoring file registers

The operation of file registers differ depending on the settings of the CPU parameters. Refer to the considerations in the following section.

☞ Page 421 Considerations when monitoring file registers

Specifying reference target of program

Specify the monitoring target program when monitoring the setting values of timer devices and counter devices, or local devices.

Operating procedure

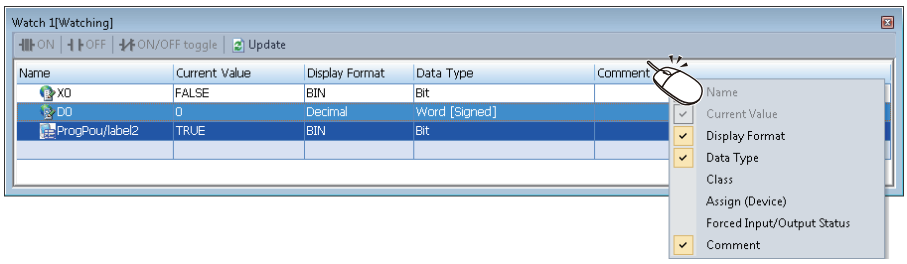
1. Click the [Detailed Conditions] button, then click the [...] button of "Program Reference" in the "Device/Buffer Memory Batch Monitor" window.
2. Set each item on the "Program Reference" screen, and click the [OK] button.

14.4 Checking Current Values by Registering Devices/Labels

To check the current values by registering devices or labels, use the watch function. Registering devices or labels to be checked in a Watch window is required.
By specifying a range, multiple devices or labels can be registered at once.
Once devices/labels are registered and the project is saved, the registered devices/labels are displayed in the registered state when the project is opened again.

Window

[View] ⇨ [Docking Window] ⇨ [Watch 1] to [Watch 4] ( )



The display format can be selected per row from the pull-down list displayed when selecting the display format.

Operating procedure

1. Register devices/labels to be monitored. (☞ Page 435 Register to Watch window)
2. Select [Online] ⇨ [Watch] ⇨ [Start Watching].

During monitoring, "[Watching]" is added in the title of the Watch window.

■Updating a Watch window

If data is changed by editing or converting[*1] program, the change will not be applied to a Watch window.
After changing data, update the display of a Watch window. [*2]

*1 Example: A comment is edited in a label editor.
*2 Label names, program names, and POU names are not updated. To update these items, register them in the Watch window again.

■Changing titles

To edit a title, open the "Change Title" screen by selecting a row in the Watch window, then right-clicking and selecting [Change Title] from the shortcut menu.

■ON/OFF of a bit device

The display format of the current value of a bit device can be changed from 'TRUE/FALSE' to 'ON/OFF' by right-clicking an arbitrary row in a Watch window and selecting [ON/OFF Display] from the Shortcut menu.

■Editing comments

To edit a comment, open the editor where the comment is defined by selecting a row in the Watch window, then right-clicking and selecting [Comment Edit] from the shortcut menu.

Register to Watch window

Register devices/labels to be monitored in the Watch window.

Operating procedure

■Enter to register

1. Open a Watch window.
2. Enter a device/label to be registered in the "Name" column, and press the Enter key.

The input format of devices/labels are as follows:

- Global device: Device name
- Local device: Program name/#Device name ('#' is not necessary for index register (Z))
- Global device: Label name
- Local device: Program block name/label name
- Step relay: BL□\S□

For structures, function blocks, and arrays, enter the items by referring to the following table.

Type	Target	Input format
Structure	Label (Structure)	Label name
	Structure member	Label name.member name
Function block	Label (Function block)	Label name
	Label in the function block	Label name.Label name in the function block
Array	Label (Array)	Label name excluding array notation
	Array index and the specific dimension part of array (more than two-dimensional array)	Label name[three-dimensional index] [two-dimensional index] [one-dimensional index]
Structure array	Label (Structure array)	Label name
	Specific member	Label name[three-dimensional index] [two-dimensional index] [one-dimensional index].member name
Nested function block	Label (Nested function block)	Label name
	Labels in the nested function block	Label name. label name in the function block. label name in the nested function block When nesting labels for one or more level deeper, the lower part of the label name which are delimited by a dot '.' is regarded as a label name. (Example: MAIN_PRG_LD/FB0_1.FB1_1.FB2_1.INOUT)
	When a function block includes array labels or structured labels	Follow the specification method of the array or structure.

Point

Options for labels are displayed when entering a label name.

They can also be displayed by any of the following operations.

- Press the Ctrl key + Space key
- Enter '/' after entering a program block name
- Enter '.' at the end of a label name of structure type or an instance name of a function block.

■Registering devices/labels from program editor/label editor

1. In a program editor or the label editor, select a device or label to register in the Watch window.

2. Select [Online] ⇨ [Watch] ⇨ [Register to Watch Window] ⇨ [Watch 1] to [Watch 4].

Devices/labels can be registered by dragging and dropping onto the Watch window.

- Ladder editor*1: Select a cell of device/label, and then drag the border of the selected cell and drop it onto a Watch window.
- ST editor*1: Select a token of a device/label, and then drag and drop it onto a Watch window.
- FBD/LD editor*1: Select an element of a device/label, and then drag and drop it onto a Watch window with pressing the Ctrl key.
- SFC diagram editor: Select a step, or a transition/action for which a device/label is set, and then drag and drop it onto a Watch window.
- Label editor: Select the header of a label, and then drag and drop it onto the Watch window

*1 For RCPU, step relays (S□) cannot be registered except in a Zoom.
Step relays (S□) are registered as step relays with a block specification (BL□\S□) automatically in a Zoom.

Point

Rectangular selection can be made by dragging the devices/labels while pressing the Alt key on the ST editor. The devices/labels only in the selected range can be registered.

■Registering devices/labels from the Cross Reference window

To register a device/label in a Watch window, select a row in the Cross Reference window, then right-click and select [Register to Watch 1] to [Register to Watch 4].

Precautions

■Inapplicable labels

- When a value other than fixed value is used for an array index, the monitor value is not displayed or displayed as an indefinite value in a Watch window.
- The monitor values of a local label used in a function are not displayed, or displayed as indefinite values in a Watch window.

Automatic registration to Watch windows

Devices and labels in a selected range in a program editor are automatically registered in a Watch window.
Devices and labels in a Watch window are updated every time when the specific range is changed.
The following table shows the range of automatic registration for each program language.

Program language	Range	Remarks
Ladder	Device/label on a ladder block containing the selected cell	A device/label in an FB and inline structured text is excluded.
Ladder (Inline structured text)	Device/label in a selected row within the selected inline structured text	It follows the option setting for the ladder editor.
ST	Device/label on which the cursor is placed	When multiple rows are selected, only a device/label in the row on which the cursor is placed is registered.
FBD/LD	Device/label in an FBD network block containing the element on which the cursor is placed	When multiple FBD network blocks are selected, only the device/label in the block containing the element on which the cursor is placed is registered.

Operating procedure

1. Set the following option.

Select one of [Watch 1] to [Watch 4] in [Tool] ⇨ [Options] ⇨ "Monitor" ⇨ "Ladder Editor"/"ST Editor"/"FBD/LD Editor" ⇨ "Setting for Automatic Registration to Watch Window" ⇨ "Set Automatic Registration Destination".

2. During monitoring, select a range of devices/labels to be registered to a Watch window in a program editor.

Applicable monitoring devices

The following table shows the devices that can be monitored in a Watch window.

Module type	Device
RCPU	X, Y, M, L, B, F, SB, V, T, T(TS), T(TC), T(TN), ST, ST(STS/SS), ST(STC/SC), ST(STN/SN), LT, LT(LTS), LT(LTC), LT(LTN), LST, LST(LSTS), LST(LSTC), LST(LSTN), C, C(CS), C(CC), C(CN), LC, LC(LCS), LC(LCC), LC(LCN), D, W, SW, FX, FY, SM, SD, FD, J□\X, J□\Y, J□\B, J□\SB, J□\W, J□\SW, U□\G, U□\HG, DX, DY, Z, LZ, K, R, ZR, RD, BL, BL□\S
Remote head module	X, Y, SB, W, SW, SM, SD, U□\G, DX, DY, RD

Changing current values

Directly enter a value for "Current Value" during monitoring.

For a bit device, select a row and double-click with pressing the Shift key or press the Shift+Enter keys to change the current value.

For S□, BL□\S□, BL□, blocks/steps are activated/deactivated by changing the current values. (☞ Page 429 Changing the active status)

Precautions

- When "Use File Register of Each Program" is selected in "File Setting" of "CPU Parameter", a file register file that is available at the END will be changed. Therefore, changing the current values by specifying a file register file for each program is not available.
- For bit type array global labels that are specified in digit specification, the current values can be changed when devices have been assigned to them.
  the current values of global labels to which devices are assigned and local labels cannot be changed.
- When the label name of a label registered in a Watch window is changed in a label editor, the label name before the change is displayed as a character string. To check the current value, register the changed label name.

Importing to/exporting from file

Information displayed in a Watch window can be exported to and imported from a file.

Operating procedure

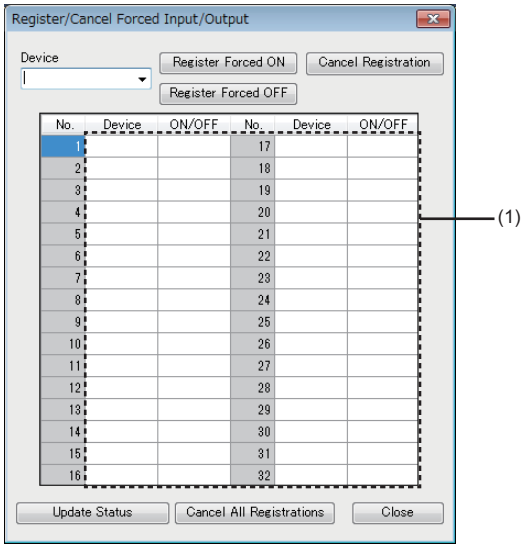
Select a row in a Watch window, and right-click and select [Import File] or [Export to File].

14.5 Turning Input/Output Device ON/OFF Forcibly

While GX Works3 and a CPU module are connected, input and output devices (X/Y devices) can be turned ON/OFF forcibly without receiving any affection from the input from an external device and program operation result.
RnCPUs, RnENCPUs, and RnPCPUs support it.

Window

[Debug] ⇨ [Register/Cancel Forced Input/Output](/)



(1) Registration status display area

Forced ON/OFF registration

Forced ON/OFF of a device can be registered in a CPU module.

Operating procedure

1. Enter an X/Y device name which can be used in the "Device" column.
2. Click the [Register Forced ON] button or the [Register Forced OFF] button.

The registered device turns ON/OFF until the registration is canceled.

Registration cancellation

The registration of devices for forcibly turning ON/OFF can be canceled.

Operating procedure

1. Enter a registered X/Y device name in the "Device" column.
2. Click the [Cancel Registration] button.

Registration status reading

The latest registration status can be read from a CPU module, and can be displayed in the 'Registration status display area'.

Operating procedure

Click the [Update Status] button.

Batch cancellation of registration

All the registered devices for forcibly turning ON/OFF can be canceled.

Operating procedure

Click the [Cancel All Registrations] button.

Considerations

- This function is not controlled exclusively on a CPU module side. The registered contents may be changed by a peripheral device connected via another station.
- Even when forcibly turning devices ON/OFF by using the 'Modify Value' function, a current value of the device for which forced ON/OFF is registered is not changed.

■RnPCPUs (redundant mode)

When GX Works3 is connected to an RnPCPU (redundant mode), a type of the system (control system or standby system) of the connected CPU module on the connected system is displayed in the title of the "Register/Cancel Forced Input/Output" screen.

The following table shows the availability of the buttons in the "Register/Cancel Forced Input/Output" screen for each system of the CPU module on a connected system.

○: Available, ×: Not available

System	Button				
	Register Forced ON	Register Forced OFF	Cancel Registration	Update Status	Cancel All Registrations
Control system (Other system: standby system)	○	○	○	○*1	○
Control system (Other system: other than standby system)	×	×	×	×	×
Standby system	×	×	×	○*1	×
Not specified	×	×	×	×	×

*1 Only the registration status of the CPU module on the connected system is read.

14.6 Pausing/Restarting the Operation of Function Blocks

While running a program, the operation of a process control function block in an FBD/LD editor can be paused or restarted.
The operation of a program can be checked by pausing the operation of the preceding process control function block and changing the current value of the output variable of the paused process control function block.
Moreover, paused process control function blocks can be checked in a list.

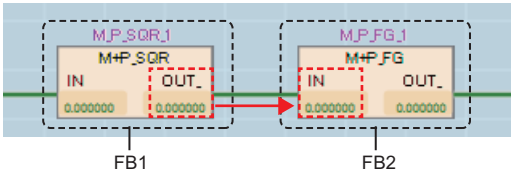
Function blocks that can be paused or restarted

The operation of the following process control function blocks can be paused or restarted.

- Standard process FBs (excluding standard process FBs for 'Analog Value Selection/Average')
- Tag access FB
- Tag FB

Application example of this function

The following explains the method for changing the current value of the input variable of the FB2 in the following figure to check the operation of the program.

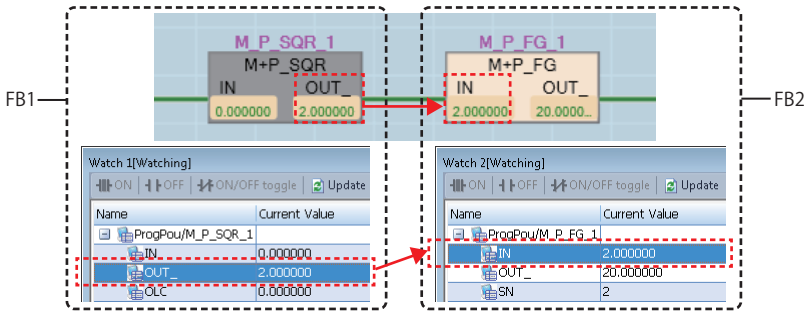


Even if the current value of the input variable (IN) of the FB2 is changed using the change current value function, the value will be overwritten with the current value of the output variable (OUT_) of the FB1 because the FB1 is in operation.
To change the current value of the input variable of the FB2, pause the operation of FB1 first, and then change the current value of the output variable of the FB1.

Operating procedure

1. Pause the operation of the FB1. (☞ Page 441 Pause)
2. Change the current value of the output variable (OUT_) of the FB1. (☞ Page 417 Changing current values)

The changed current value is stored to the input variable (IN) of the FB2.



Pause

The following shows the procedure to pause the operation of a process control function block.

Operating procedure

1. Monitor an FBD/LD program for process control. (☞ Page 425 Monitor)
2. Select a process control function block in the program editor.
3. Click the smart tag ( ).
   Alternatively, select [Debug] ⇨ [Process Control Extension] ⇨ [Pause FB].

The operation of the process control function block is paused.

Point

By setting 'Setting for Automatic Registration to Watch Window', when the operation of a process control function block is paused, devices and labels used for the paused process control function block are automatically registered to a Watch window and that makes it easy to change current values of input and output variables used for the process control function block.
For details on "Automatic registration to Watch windows", refer to the following section.
☞ Page 436 Automatic registration to Watch windows

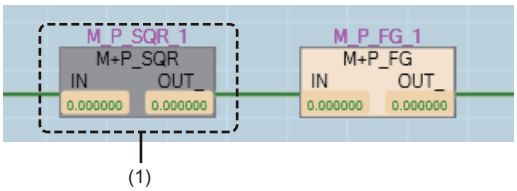
Precautions

- After checking the operation of a program, restart the operation of all the paused process control function blocks. (☞ Page 442 Restart, Page 442 List display)
- When one FB instance is used for multiple programs in a project, if the operation of any one of the FB instance is paused, all of the other operations of FB instances will be paused as well.

Display in pausing

The background color of a paused process control function block is displayed in gray.

Ex.



(1): Paused process control function block

Point

The background color of a paused process control function block can be changed in the "Color and Font" screen. (☞ Page 65 Checking and Changing Colors and Fonts)

Restart

The following shows the procedure to restart the operation of a paused process control function block.

Operating procedure

1. Select a paused process control function block in a program editor.
2. Click the smart tag ( ).
   Alternatively, select [Debug] ⇨ [Process Control Extension] ⇨ [Restart FB].

The operation of the process control function block is restarted.

List display

The following shows the procedure to display paused process control function blocks in a list.

Operating procedure

Select [Debug] ⇨ [Process Control Extension] ⇨ [Paused FB List].
Paused process control function blocks are displayed in the "Output" window.

Point

By selecting a row in the "Output" window and performing any one of the following operation, a cursor jumps to the position where an FB instance of the process control function block is used.
- Press the Enter key.
- Double-click a row.
- Right-click a row, and select [Jump] in the shortcut menu.

Precautions

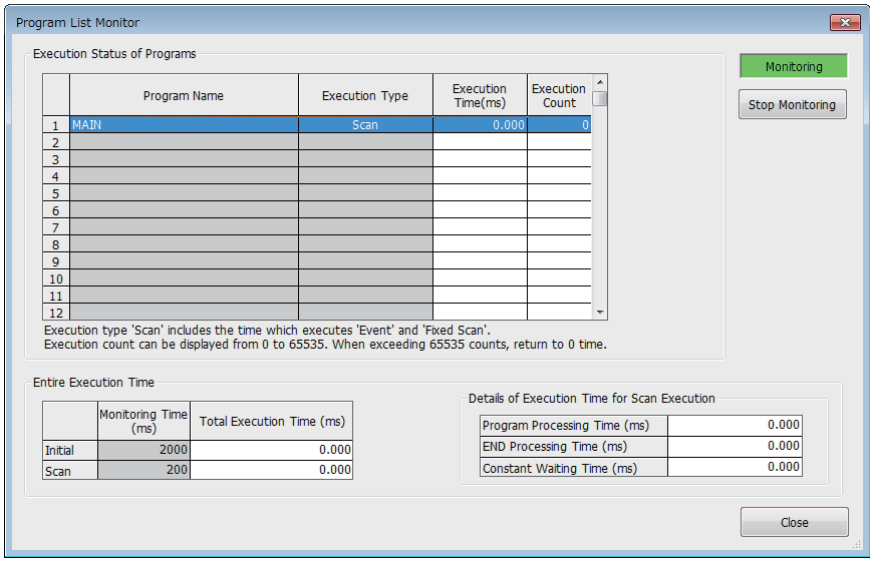
- After checking the operation of a program, check that all the process control function blocks are running.
- Function blocks in a program that is protected by a security key or block password are not displayed.

14.7 Checking Processing Time of Program

Check the processing time of the program being executed using the Program List Monitor function.
FX5CPUs and remote head modules do not support this function.

Window

[Online] ⇨ [Monitor] ⇨ [Program List Monitor]



Displayed items

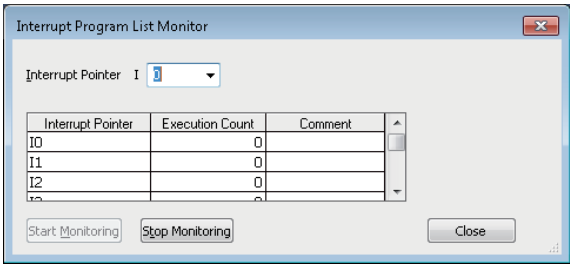
Item		Description
Execution Status of Programs	Execution Time (ms)	Displays the actual scan time (current value). The display contents are differ depending on the program execution type. At the program stop (standby) state: 0.000 ms
	Execution Count	Displays the number of executions, counted from '0' at the point of turning the CPU module to the RUN state. It is stored even after the program stops.
Entire Execution Time	Monitoring Time (ms)	Displays the program execution monitoring time set in "PLC RAS" of "CPU Parameter".
	Total Execution Time (ms)	Displays the total scan time of the programs executed in the CPU module.
Details of Execution Time for Scan Execution	Program Processing Time (ms)	Displays the total execution time of scan execution type program.
	END Processing Time (ms)	Displays the END processing time.
	Constant Waiting Time (ms)	Displays the waiting time of the constant scan when the constant scan is set.

14.8 Checking Execution Counts of Interrupt Programs

Check the execution count of interrupt programs used in a program using the Interrupt Program List Monitor function.
FX5CPUs and remote head modules do not support this function.

Window

[Online] ⇨ [Monitor] ⇨ [Interrupt Program List Monitor]



Operating procedure

Input the interrupt pointer number of which execution counts are to be displayed in "Interrupt Pointer".

Displayed items

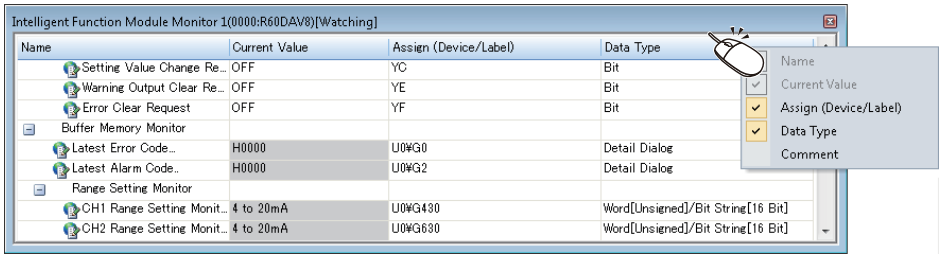
Item	Description
Execution Count	Starts counting when the CPU module turns to the RUN state and displays the execution counts. When reaching 65536, it returns to 0.

14.9 Checking Current Values in Intelligent Function Module

Check the current value of I/O signals and buffer memory of an intelligent function module using the Intelligent Function Module Monitor function.

Window

[View] ⇨ [Docking Window] ⇨ [Intelligent Function Module Monitor] ⇨ [Intelligent Function Module Monitor 1] to [Intelligent Function Module Monitor 10]



Operating procedure

1. Register an intelligent function module to be monitored. (☞ Page 446 Registering intelligent function modules)
2. Select [Online] ⇨ [Watch] ⇨ [Start Watching].

During monitoring, "[Watching]" is added in the title of the Intelligent Function Module Monitor window.

Point

Select and right-click the module information, and then select [Copy] from the shortcut menu to paste it to a text file.

Detailed display of monitor items

■Detailed display of log information

The details of log information can be displayed during monitoring.

Double-click a row in which "Detail Dialog" is displayed in "Data Type" column, or right-click and select [Detailed Dialog] from the shortcut menu.

When the menu is not selectable, it is not supported by the module.

■Detailed display of error codes/alarm codes

The details of an error code/alarm code can be displayed in an Intelligent Function Module Monitor window or the detailed dialog.

Double-click a row in which an error code/alarm code is displayed, or right-click and select [Detail Display] from the shortcut menu.

Precautions

The Intelligent Function Module Monitor updates current values only within the range displayed on the window for monitoring acceleration.

When performing operation such as copy and paste on Excel®, "--" or the previously monitored current value is displayed for the data outside the range displayed on the window.

Registering intelligent function modules

An intelligent function module to be monitored can be registered to an Intelligent Function Module Monitor window.

Operating procedure

■Registration method by using the shortcut menu in the "Navigation" window

1. In the "Navigation" window, select a module in an Intelligent Function Module Monitor window.
2. Right-click ⇨ select [Register to Intelligent Function Module Monitor] from the shortcut menu.

■Registration method by dragging and dropping in the "Navigation" window

1. Select a module to register in the "Navigation" window.
2. Drag and drop it onto an Intelligent Function Module Monitor window.

■Registration method by using the shortcut menu in an Intelligent Function Module Monitor window

1. On an Intelligent Function Module Monitor window, right-click and select [Register Module Information] from the shortcut menu.
2. Select the module to be registered in "Module List", and click the [OK] button.

When a positioning module is selected in "Module List", select the item displayed in "Monitor Item Category List".

Point

Module information can be copied and pasted to a file such as a text file by right-clicking arbitrary module information and selecting [Copy] from the shortcut menu in an Intelligent Function Module Monitor window.

14.10 Checking Current Logging Data

Logging data sampled by a CPU module can be checked with the trend graph function in GX LogViewer.
To check the current logging data, display the data on the realtime monitor graph.
For details, refer to the following manual.
GX LogViewer Version 1 Operating Manual

Procedure for using the realtime monitor

1. Select [Tool] ⇨ [Realtime Monitor Function] from the menu of GX Works3.
"Realtime Monitor Setting" screen of GX LogViewer appears.

2. Set the monitoring setting on the screen.

3. Click the [Monitor Start] button on the screen.
For the method for using GX LogViewer, refer to the following manual.
GX LogViewer Version 1 Operating Manual

Point

The following information is applied to GX LogViewer when the "Realtime Monitor Setting" screen of GX LogViewer is opened by selecting [Tool] ⇨ [Realtime Monitor Function] from the menu of GX Works3.

- Module type information of a project
- Current connection destination of a project
- Display language

14.11 Checking tag data

Checking tag data on the gauge window (faceplate)

'Faceplate' is a screen to display the image of a device such as a controller. The contents of tag data of a tag FB is displayed on it.

The status of the corresponding process can be monitored and a condition can be set by accessing the tag data.

A faceplate displays data and allows to manipulate the values of each tag data item as well.

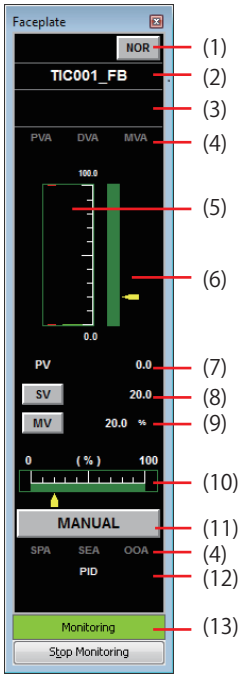
Up to two faceplates can be displayed simultaneously.

For details on tag FBs, refer to the following manual.

MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

Window

1. Start monitoring an FBD/LD program for process control.
2. Select a tag FB on the FBD/LD editor.
3. [Online] ⇨ [Monitor] ⇨ [Faceplate]



A faceplate can be displayed only while monitoring the call source program. Therefore, a faceplate will be closed if the monitoring is stopped due to an error such as a communication error.

Displayed items

Item	Description
(1) I/O mode display area	When the tag type is a loop tag or status tag, the current I/O mode is displayed. The "Change I/O Mode" screen appears by clicking this button. The I/O mode is classified into the following four types. • NORMAL(NOR) • SIMULATION(SIM) • OVERRIDE(OVR) • TAG STOP(TSTP) The I/O mode can be changed only when the control mode is MANUAL mode.
(2) Tag name display area	A tag name is displayed.
(3) Tag comment display area	A comment defined on the tag FB setting editor is displayed.
(4) Alarm display area	An tag alarm is displayed.

Item	Description
(5) PV value bar display area	The current PV value is displayed in a bar format. A graph in the range of the upper and lower limits of the PV engineering value is displayed. An alarm bar is displayed if any of the following is set; PV high high limit alarm value, PV high limit alarm value, PV low limit alarm value, and PV low low limit alarm value.
(6) SV value bar display area	The range of the SV high limit value and the SV low limit value is displayed with the green bar. The current SV value is displayed with the yellow pointer.
(7) PV value setting/display area	The current PV value is displayed in a numerical value. The button is displayed only when the I/O mode is OVERRIDE mode. Click the button to display the PV value setting dialog.
(8) SV value setting/display area	The current SV value is displayed in a numerical value. Click the button to display the SV value setting dialog.
(9) MV value setting/display area	The current MV value is displayed in a numerical value. (Unit: %) Click the button to display the MV value setting dialog.
(10) MV value bar display area	The range of the MV high limit value and the MV low limit value is displayed with the green bar. The current MV value is displayed with the yellow pointer.
(11) [Control mode change] button	When the tag type is a loop tag or status tag, the current control mode is displayed. Click the button to display the control mode change dialog. The control mode is classified into the following six types. • MANUAL(MAN) • AUTO(AUT) • CASCADE(CAS) • COMPUTER MV(CMV) • COMPUTER SV(CSV) • CASCADE DIRECT(CASDR) When OVERRIDE mode is set for the I/O mode, the control mode cannot be changed from MANUAL mode to another one.
(12) Tag type display area	The tag type is displayed.
(13) Monitor status display area	The current monitor status is displayed.

■Tag alarm

• PVA, DVA, MVA, SVA display area

Classification	Displayed character*1	Description	
Loop tag	PVA	PV-related	Positive/negative variation rate Input high high/high/low/low low limit
	DVA	DV-related	Large deviation
	MVA	MV-related	Output variation rate limit Output high/low limit
	SVA	SV-related	SV variation rate limit SV high/low limit
Status tag	AL1	Time-out-related	Time-out over
	AL2	Trip-related	Current and overload trip
Other tags	(Nothing displayed)		

*1 An alarm which is not including for the corresponding tag type is not displayed.

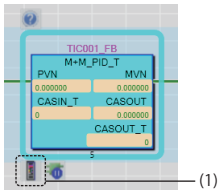
• SPA, SEA (or HBOA), OOA display area

Classification	Displayed character	Description
Loop tag	SPA	Stop alarm • When SPA turns ON, the 'SPA' part changes to a button. • Click the button to reset SPA.
	SEA or HBO*2	Sensor error (SEA) • SEA turns ON when a sensor error occurs. Heater failure (HBOA) • HBOA turns ON when a failure occurs in a heater.
	OOA	Output open alarm • OOA turns ON when output disconnection is detected in a user program.
Other tags	(Nothing displayed)	

*2 HBOA is displayed as 'HBO'.

Point

A smart tag(1) is displayed on the bottom left of a tag FB selected while monitoring a program.
By clicking a smart tag(1), a faceplate can be displayed.



Details on the parts displayed on a faceplate

On a faceplate, the image of a part such as a lamp and the push button are displayed according to the tag data content to display.

Parts displayed on a faceplate are same as for PX Developer. For details, refer to the following manual.

📖 PX Developer Version 1 Operating Manual (Monitor Tool)

The manual above can be read by the following methods.

- Start PX Developer Monitor Tool, then select [Display operating manual] ⇨ [Monitor Tool] on the help menu.

When a tag FB monitor value is incorrect

The corresponding display area on a faceplate is filled with black.

In that case, close the faceplate and tale the following corrective action. After that, display the faceplate again.

Case that a monitor value regarded as incorrect	Corrective action
The project is not written to the programmable controller.	Convert (reassign) all programs, and write the project to the programmable controller.
The file register setting is not set.	Set the following items in "File Register Setting " of "CPU Parameter", and write the project to a programmable controller. • Use Or Not Setting: Use Common File Register in All Programs • Capacity: Specify the required size. • File name: Specify a device memory name to use.
A file register is not set for the latch (2).	Set the file register 'ZR (R)' for the latch (2) in "Device/Label Memory Area Detailed Setting" of "CPU Parameter", and write the project to a programmable controller. (☞ Page 21 CPU parameter setting)
CPU parameters and the global label setting (file register)*1 are written simultaneously.	Write CPU parameters first, and turn the power of a CPU module OFF to ON or reset the CPU module. Then, write the global label setting (file register)*1 to the programmable controller.

*1 When writing the global label setting to a CPU module, data of file registers in the range set in the following option is automatically written.
[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "System Resource" ⇨ "File Register: ZR"

Precautions

When using a faceplate in GX Works3, the latest PX Developer is required to be installed.

Only alphanumeric characters can be used to enter a tag name and a tag comment in the tag FB setting for using a faceplate.

Interaction with PX Developer Monitor Tool

An FBD/LD program for process control created in GX Works3 can be managed, monitored, and controlled in PX Developer Monitor Tool.

Moreover, a GOT screen project can be created using the GOT screen generator of PX Developer Monitor Tool.

To use this function, follow the procedure in the table below.

No.	Procedure	Reference
1	Export an assignment information database file in GX Works3.	Page 451 Exporting an assignment information database file
2	Set the assignment information database file in PX Developer.	📖 PX Developer Version 1 Operating Manual (Monitor Tool)
3	Monitor FBD/LD programs for process control in PX Developer Monitor Tool.	
	Create a GOT screen project in PX Developer Monitor Tool.	📖PX Developer Version 1 Operating Manual (GOT Screen Generator)

Exporting an assignment information database file

The following shows the procedure to export the assignment information database file of a GX Works3 project.

Operating procedure

1. Open a GX Works3 project where an FBD/LD program for process control is used.
2. Click "Export Assignment Information Database File" ( ) in the toolbar.
3. Click the [Save] button in the "Export Assignment Information Database File" screen.

The assignment information database file (*.FADB) is exported.

Precautions

- When exporting an assignment information database file, only alphanumeric characters are available for a tag name and tag comment in the tag FB setting.
- When using the GOT screen generator of PX Developer Monitor Tool, export an assignment information database file in GX Works3 Version 1.045X or later.

Initial FB property value update/FB property management

The current value of an FB property read from a programmable controller can be saved as the initial value of an FB property by using the initial FB property value update/FB property management functions.

The following shows the target FB property of each function.

Initial FB property value update: FB property in an FB/tag FB selected in the FBD/LD editor.

FB property management: FB property in all FBs/tag FBs registered in a project

For details on an FB property, refer to the following manual.

☞ Page 233 Display/setting an FB property

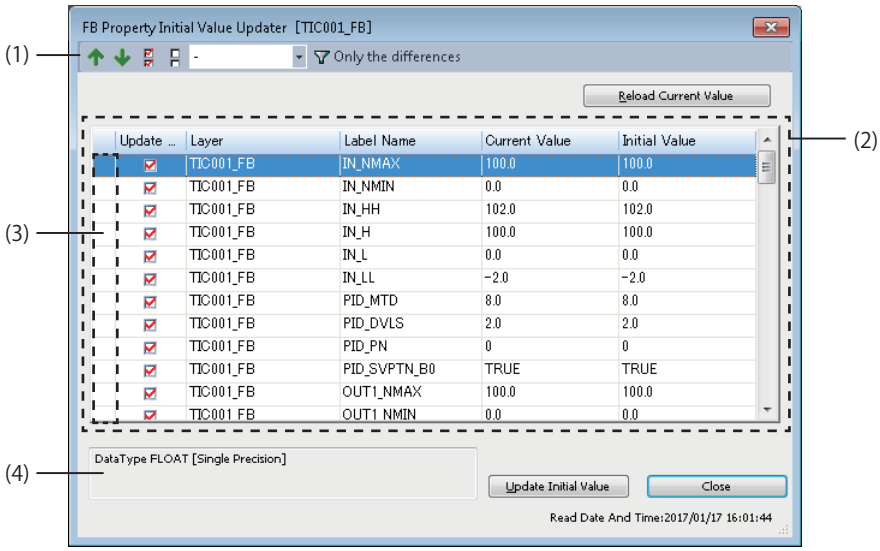
Updating the initial value of a selected FB property

The initial FB property value update function reads the current value of an FB property in an FB/tag FB selected in the FBD/LD editor.

In addition, the read current value can be set as the initial value of the FB property on a project.

Window

1. Select an FB or tag FB on the FBD/LD editor.
2. Select [Online] ⇨ [FB Property] ⇨ [Update the Initial Value of FB Property], or select [FB Property Initial Value Updater] from the shortcut menu.



Displayed items

Item	Description	
(1) Toolbar	Previous difference	To jump the cursor to the row with a difference in values (the row where the current value and initial value are different) before the current cursor position in the FB property list. (Always available)
	Next difference	To jump the cursor to the row with a difference in values after the current cursor position in the FB property list. (Always available)
	Select All	To select all selectable FB property items in the FB property list. (Always available)
	Deselect All	To unselect all selected FB property items in the FB property list. (Always available)
	- Number of digits after decimal point specification	To specify the number of digits after decimal point for the current value of which the data type is single precision or double precision. *1 • Without specification: — • With specification: 1 to 14 The number of digits can be specified only when a row with a difference in values is not specified. If filtering a row with a difference in values when the number of digits after the decimal point are specified, the row is filtered by keeping the setting. (Available only for the current value)
	Only the differences Filtering/clearing of a row with a difference	To display/ not display only a row with a difference by filtering. Filtering will be cleared when the current value is reloaded while filtering.
(2) FB property list	To display the FB property list of a specified FB when opening the "FB Property Initial Value Updater" screen.	
	Update Check	To select whether to set or not the current value as the initial value when the [Update Initial Value] button is clicked. • Selected: The current value is set as the initial value. • Not selected: The current value is not set as the initial value. The selection state is saved in a project for each FB instance.
	Layer	To display the layer of the target function block and tag data. The display contents of each FB are as follows. Function block (local label definition): POU name/FB label name in a program Function block (global label definition), tag FB: FB label name Tag data: label name of tag data
	Label Name	To display the FB property item name in a target FB.
	Current Value	To display the current value of an FB property acquired from a programmable controller. When the values between the current value and the initial value differ, the character string is displayed in red.*2
	Initial Value	To display the initial value of an FB property acquired from a project. When the values between the current value and the initial value differ, the character string is displayed in red.*2
(3) Header	To display an error icon ( ) when the current value cannot be set as the initial value.	
(4) Explanation column	To display the data type of a label selected in the FB property list and a label comment. A label comment can be displayed in the explanation column by setting the comment title of the comment as the display target on the "Multiple Comments Display Setting" screen*3. (☞ Page 66 Comment Display Setting)	

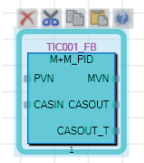
*1 When the digits after the decimal point are more than seven digits, the value is applied only for the item of the double precision. For the item the single precision, six digits are applied.

*2 The current value and the initial value in the FB property list are compared in binary. (Example: 1.0 and 1.00 is considered as the same value.)

*3 The "Multiple Comments Display Setting" screen can be displayed from the following menu.
[View] ⇨ [Multiple Comments Display Setting]

Precautions

The "FB Property Initial Value Updater" screen can be displayed only when the whole FB is selected as shown below.



Managing the initial values of all FB properties

The FB property management function reads the current value of an FB property in all FBs/tag FBs registered in a project in a batch.

In addition, the read current value can be set as the initial value of the FB property on a project in a batch.

Window

[Online] ⇨ [FB Property] ⇨ [FB Property Management]

Displayed items

The display contents are same as on the "FB Property Initial Value Updater" screen. (☞ Page 452 Updating the initial value of a selected FB property)

The following FBs and tag FBs are displayed in the FB property list.

- FB instance set for a global label
- FB instance set for a local label in a program

Point

Once the initial value is updated, a program related to a label of which the initial value was updated will be in the unconverted state.

PART 5 MAINTENANCE AND INSPECTION

This part explains the maintenance and inspection methods such as a function to protect data (prevent from falsification and data leakage) and display the system status of the CPU module.

15 PROTECTING DATA

16 MODULE DIAGNOSTIC

17 SAMPLING DEVICE DATA

18 CHECKING/CHANGING MODULE OPERATION

15 PROTECTING DATA

This chapter explains the method for protecting data in a project.

The following table shows the functions to protect data.

Purpose	Target	Function name	Reference
To prevent a program from being illegally accessed (for each POU) (Using a password)	Project	Block password	Page 457 Preventing Illegal Access to programs (Protected by a Password)
To prevent a program from being illegally accessed (for each program file) (Using a security key)	Project	Security key authentication	Page 459 Preventing Illegal Access to Programs (Protected by a Key)
To prevent a program from being illegally executed (Using a security key)	CPU module		Page 464 Preventing Illegal Program Execution
To prevent a project from being illegally accessed (Using a password)	Safety project	User authentication	Page 467 Preventing Illegal Access to Project
To prevent a CPU module from being illegally accessed (Using a password)	CPU module (RnPSFCPU and RnSFCPU)		Page 470 Preventing Illegal Access to CPU Module
To prevent a file from being illegally read/written (Using a password)	CPU module	File password	Page 474 Preventing Illegal Data Reading/Writing
To restrict access from a communication route other than specific one (Using a password)	CPU module	Remote password	Page 477 Restricting Access from Other Than Specific Communication Route
To block access from an illegal IP address by identifying the IP address of an external device via Ethernet (Setting in "Module Parameter")	CPU module	IP filter*1	MELSEC iQ-R Ethernet User's Manual (Application)

*1 Even when using the IP filter, illegal access may not be prevented completely. Take additional security measures system-wide, such as setting up a firewall for the network.

Operations when using CPU modules in a redundant system configuration

For RnPCPUs, the operations differ depending on the operation modes when executing the functions that the target is a CPU module.

RnPSFCPUs operate in the backup mode when executing the functions that the target is a CPU module.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system). If an error occurs in the control system while performing any functions above, that is not performed to the standby system. If an error occurs in the standby system while performing any functions above, the status of control system is not restored to that before changed.

15.1 Preventing Illegal Access to programs (Protected by a Password)

To prevent illegal access to a program (in a POU unit) by setting a password, use the Block password function.

Block password function

The password registered to a POU restricts the operations.

- Restricted operation: Accessing to a POU (The operations will be allowed while the program is authenticated even if a password has been registered.)
- Target data: Program blocks, function blocks, and functions (☞ Page 82 Data configuration)

Procedure for using the block password function

Procedure for making a security enable

1. Set a block password to a POU. (☞ Page 457 Setting block password)
2. Save a project. (☞ Page 105 Saving a project)

After closing a project in which the block password is set, the POU cannot be accessed when the file is opened next time.

Procedure for making locked POUs accessible

- Authenticate the block password set to the POU. (☞ Page 458 Authenticating a block password)

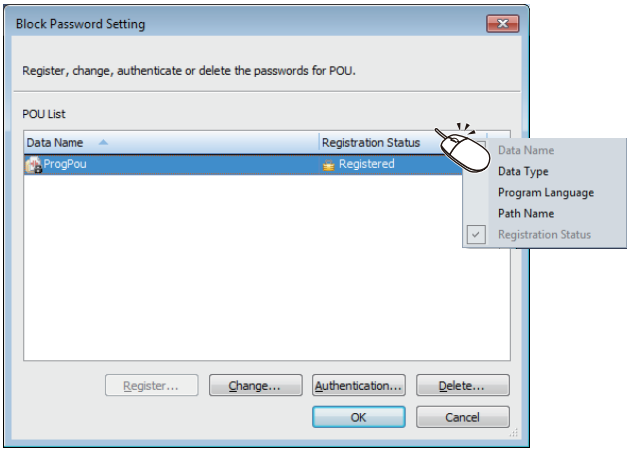
The POU can be accessed while the project is open.

Setting block password

Register a block password to POUs.

Window

- [Project] ⇨ [Security] ⇨ [Block Password Setting]
- Select a POU on the "Navigation" window, then right-click and select [Block Password Setting] from the shortcut menu.



Registering/changing a block password

Register/change a block password to POUs.

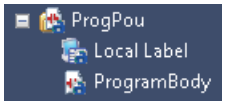
Operating procedure

1. Select a POU to set a block password and click the [Register]/[Change] button.
2. Enter each item on the "Register Password" screen/"Change Password" screen, and click the [OK] button.

When a block password is registered, the icons in the "Navigation" window will be displayed as shown below.

Registered

Authenticated



Point

By selecting multiple POUs in "Data Name", a block password can be registered to the selected POUs in batch.

Authenticating a block password

Unlock the POU temporarily by authenticating the password which has been set to it.
Once the password is authenticated, the data can be accessed until the project is closed.

Operating procedure

1. Select the POU to authenticate the block password, and click the [Authentication] button.
2. Enter the password on the "Password Authentication" screen, and click the [OK] button.

Deleting a block password

Delete the block password registered to a POU.

Operating procedure

1. Select the POU to delete the block password, and click the [Delete] button.
2. Enter the password on the "Delete Password" screen, and click the [OK] button.

15.2 Preventing Illegal Access to Programs (Protected by a Key)

To prevent illegal access to a program (in a program file unit) with a key, use the security key authentication function.

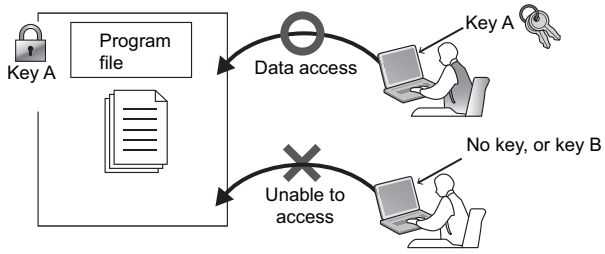
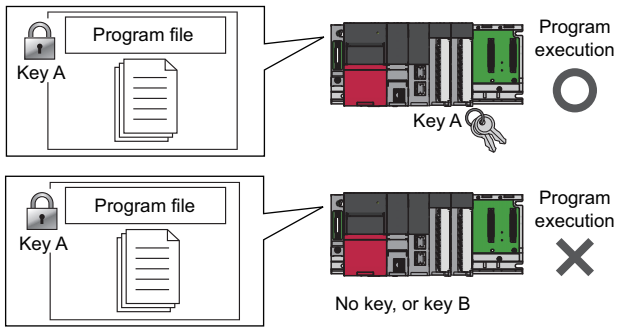
Security key authentication function

The operations can be restricted by using a security key.

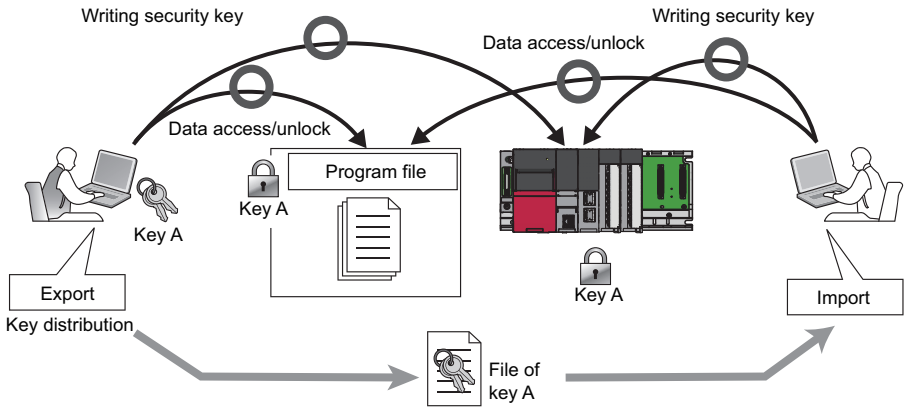
Security key setting target:

Target	Purpose
■Program files (Program file, FB file, FUN file) (☞ Page 82 Data configuration) A security key can be registered for each program file, however, all program files in a project will be set the same security key.	• To restrict the access for program files in a project. • To restrict the execution of programs by a CPU module.
■Personal computer Multiple security keys can be registered in one personal computer.	To make the access for program files protected by a security key enabled.
■CPU module Only one security key can be written to one CPU module.	To make the execution of a program restricted by a security key enabled.

The following operations can be restricted:

Access to programs (Program file, FB file, FUN file)	Execution of programs in CPU module (STOP/PAUSE → RUN)
Restrict the operations by detecting mismatches of the security key between the program file and personal computer. 	Restrict the operations by detecting mismatches of the security key between the program file written in a CPU module and CPU module.  The programs are not executed if any of the programs of which security key is unmatched in the CPU module exist. The security key written in the CPU module is retained after powering OFF.
☞ Page 460 Procedure for using the security key authentication function (access prevention)	☞ Page 464 Procedure for using the security key authentication function (execution prevention)

Copy of security key: The security key registered to a personal computer can be copied by exporting/importing it from/to other personal computer. In addition, the expiration date of the security key can be set.



Setting method: ☞ Page 462 Copying security key

Precautions

The security key registered to a personal computer is not deleted even if GX Works3 is uninstalled. Delete the security key on the "Security Key Management" screen.

Procedure for using the security key authentication function (access prevention)

Procedure for making a security enable

1. Create a security key. (☞ Page 461 Creating/deleting security key)
2. Register the security key in a program file. (☞ Page 463 Registering a security key in a program file)
3. Save a project. (☞ Page 105 Saving a project)

A personal computer which does not have the same security key as the one registered in the project cannot be accessed.

Procedure for making locked program files accessible

1. Copy the same security key as the saved program file. (☞ Page 462 Exporting a security key)
2. Register the security key in a personal computer from which a program file is to be accessed. (☞ Page 462 Import)
3. Open the program file. (☞ Page 87 Opening a project)

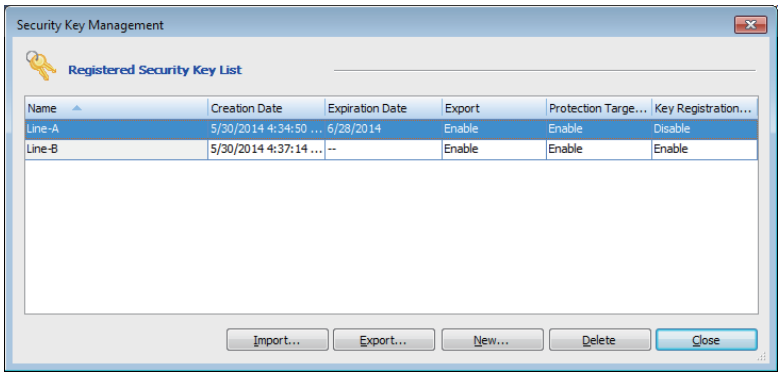
A program file can be accessed when the security key between the program file and a personal computer is consistent.
The operations shown above are not required for the personal computer with which a security key is registered in a program file. However, the above operations are required when the security key is deleted.

Creating/deleting security key

Create/delete security keys on the "Security Key Management" screen.

Window

[Project] ⇨ [Security] ⇨ [Security Key Management]



Displayed items

Item	Description
Creation Date	Displays the registered date of the security key.
Expiration Date	Displays the expiration date set when the security key was exported.
Export	Displays "Enable/Disable" that indicates whether re-exporting the security key is enabled/disabled set when the security key was exported.
Protection Target Selection	Displays "Enable/Disable" that indicates whether selecting data to be protected is enabled/disabled set when the security key was exported.
Key Registration to CPU	Displays "Enable/Disable" that indicates whether writing data to CPU module is enabled/disabled set when the security key was exported.

Creating a security key

Create a security key and register it to the personal computer.

Number of security key registration: The security keys can be created for each logon user. Up to 128 security keys combined with the created security keys and imported ones can be registered for each logon user.

Operating procedure

1. Click the [New] button.
2. Enter the security key name on the "New Security Key" screen and click the [OK] button.

Deleting a security key

Delete the security key registered to the personal computer.

If the security key used to lock the project is deleted, the locked data in the project cannot be accessed/edited.

After deleting the security key, even when the security key with the same name as the deleted one is recreated, it will not be the same security key as the deleted one. Take extra caution when deleting a security key.

Operating procedure

1. Select the security key to be deleted on the "Security Key Management" screen.
2. Click the [Delete] button.

Copying security key

Copy (import/export) security keys on the "Security Key Management" screen.

Exporting a security key

Export the security key registered to the personal computer to the file format (*.ity) which can be imported.
Expiration date and restrictions for operations can be added to the security key to be exported.

Operating procedure

1. Select the security key to be exported on the "Security Key Management" screen.
2. Click the [Export] button.
3. Set the following items on the "Export" screen.

Item	Description
Restriction	Set whether to add restrictions to the security file to be exported.
Expiration Date	Set the expiration date for the security key to be exported.
Export	Set whether to allow exporting the security key after importing the exported security key.
Protection Target Selection	Set whether to allow registering the security key for the program files using the exported security key.
Key Registration to CPU	Select whether to allow writing the security key to the CPU module using the exported security key.

4. Set the password to be required when importing the security key, and click the [Export] button.

Precautions

- The exported security key files should be tightly controlled.
- The security key files created with GX Works3 are not compatible with that of GX Works2.

Import

Import the exported security key file in a personal computer, and register the security key.

Operating procedure

1. Click the [Import] button on the "Security Key Management" screen.
2. Select a file (*.ity) on the "Import Security Key" screen, and click the [Open] button.
3. Enter the password set when the security key was exported on the "Password Authentication" screen, and click the [OK] button.

■Expiration date

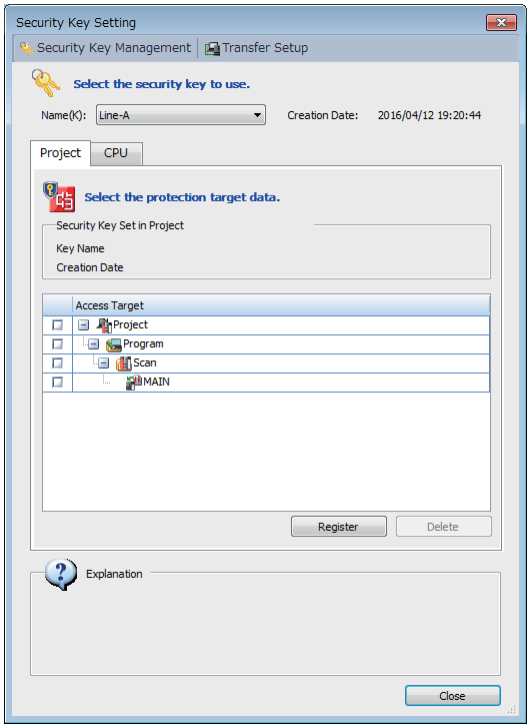
- If the expiration date of the security key registered in a personal computer is expired, accessing programs, re-exporting security keys, registering security keys in program files, and writing security keys to CPU module cannot be performed.
- To use the same security key after the expiration date, export the security key from the exported personal computer again, and import it to the personal computer.

Registering a security key in a program file

Create a security key on the "Security Key Management" screen in advance.
A security key can be registered for each program file, however, all program files in a project will be set the same security key.

Window

[Project] ⇨ [Security] ⇨ [Security Key Setting]



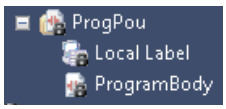
Registering a security key

Operating procedure

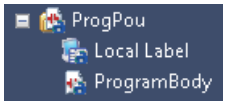
1. Select a security key to be registered to a program file from "Name".
2. Select a program file to lock from the [Project] tab, and click the [Register] button.

The security key registered to program files will be enabled after saving the project.
When a security key is registered, the icons in the "Navigation" window will be displayed as shown below.

When the security keys between in the personal computer and the project does not match



When the security keys between in the personal computer and the project matches



■Security key lock for FB files

If the program, in which the function block of FB file locked with a security key is used, is opened on the personal computer with no corresponding security key exists, the FB program cannot be opened.
However, the instances of the locked FB can be created in the program on the personal computer in which the security key is not registered.

Deleting a security key

Operating procedure

Click the [Delete] button in the [Project] tab.

15.3 Preventing Illegal Program Execution

To prevent an illegal execution for programs (STOP/PAUSE → RUN) written in a CPU module, use the security key authentication function.

For details on the security key authentication function, refer to the following section.

☞ Page 459 Security key authentication function

Procedure for using the security key authentication function (execution prevention)

Procedure for making a security enable

1. Create a security key. (☞ Page 461 Creating/deleting security key)
2. Register the security key in the program file to be written to the CPU module. (☞ Page 463 Registering a security key in a program file)
3. Write the program files to the CPU module. (☞ Page 392 Writing data to a programmable controller)

A CPU module which does not have the same security key as the one registered in the program file cannot execute the programs.

Procedure for making locked programs executable

1. Set the Specify Connection Destination to access to the CPU module. (☞ Page 371 Specification of Connection Destination)
2. Write the same security key as the protected program file to the CPU module. (☞ Page 465 Writing/deleting security key to/from CPU module)

The programs can be executed unless otherwise the security key set to the program file or CPU module is changed.

Writing/deleting security key to/from CPU module

By writing the same security key as a project to the CPU module, the execution of the programs can be permitted.

A security key can be written to any of the following.

- CPU module
- Cassette (extended SRAM cassette[*1] or battery-less option cassette[*2])

*1 An extended SRAM cassette cannot be attached to R00CPUs, R01CPUs, R02CPUs, FX5CPUs, and remote head modules.

*2 A battery-less option cassette cannot be attached to R00CPUs, R01CPUs, R02CPUs, RnPCPUs, RnPSFCPUs, RnSFCPUs, FX5CPUs, and remote head modules.

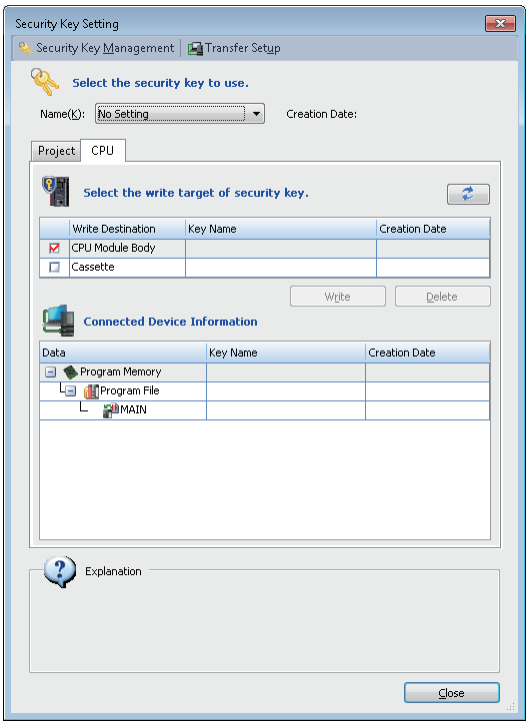
Additionally, one security key can be written to multiple CPU modules.

When writing a security key, create a key on the "Security Key Management" screen and connect a personal computer and a CPU module in advance. (Only when a CPU module is in STOP state, a security key can be written and deleted.)

For a safety project, the security key can be written/deleted when the safety operation mode of a CPU module is in the test mode.

Window

[Project] ⇨ [Security] ⇨ [Security Key Setting]



Writing security key

Operating procedure

1. Select the security key to be written from "Name".
2. Select the target to be written in the [CPU] tab, and click the [Write] button.

■When a security key is written to a cassette

A security key can be succeeded to the replaced CPU module only by replacing a cassette (extended SRAM cassette or battery-less option cassette). Writing the security key from the personal computer in which the security key is registered is unnecessary.

■Write target of a security key in a multiple CPU system

In a multiple CPU system, write a security key to each CPU module. Additionally, the security key set in CPU No.1 can be used in CPU No.2 to CPU No.4.

■Operations when using CPU modules in a redundant system configuration

When "Write to CPUs of both systems" is selected for an RnPCPU (redundant mode), the operations differ depending on the operation modes.

When "Write to CPUs of both systems" is selected for an RnPSFCPU, the module operates in the backup mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system). If an error occurs in the control system during writing, that is not performed to the standby system. If an error occurs in the standby system during writing, the status of control system is not restored to that before changed.

Deleting a security key

The security key written in the CPU module can be deleted on the personal computer in which the security key is not registered.

However, the program of which security key is registered in the CPU module exists, the security key cannot be deleted.

Operating procedure

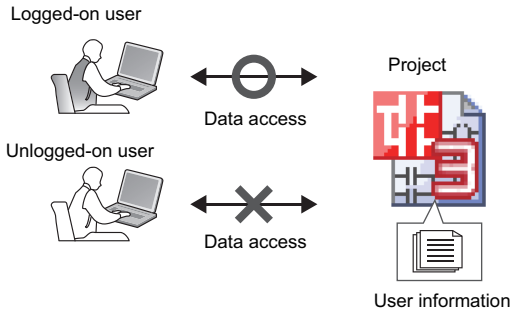
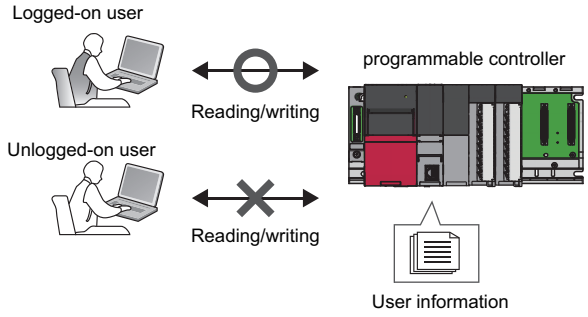
Select the security key to be deleted from the [CPU] tab, then click the [Delete] button.

15.4 Preventing Illegal Access to Project

To prevent an illegal access to a safety project from the users with no authority, use the User Authentication function.
Only RnPSFCPUs and RnSFCPUs support the function.

User Authentication function

The operations can be restricted by registering a user/password in a project and a CPU module.
The following operations can be restricted:

Access to project	Access to CPU module
To access to a project, logging on with the registered user information (user name/password) is required. 	To access to a CPU module, logging on with the registered user information (user name/password) is required. 
☞ Page 468 Procedure for using the user authentication function (access prevention)	☞ Page 471 Procedure for using the user authentication function (access prevention)

The user information registered in a CPU module needs to match with the user information of a project.

Access level

Access level is an operation privilege that is given to a user who logs on to a project and/or CPU module.
The operations allowed for each access level are as follows.

Access level		Operation authority
Higher	Administrators (Administrator level)	All operations including user management of projects and CPU modules
↕	Developers (Developer level)	Operations except for user management and security setting Writing of data on a standard program and safety program to a CPU module
↕	Assistant Developers (Developer level)	Operations except for user management, security setting, writing of safety programs and parameters Writing of data on a standard program to a CPU module
Lower	Users (Operator level)	Referencing of a project and monitoring of CPU modules

Functions that require user authentication

Depending on the access level, some functions are restricted in a project.

The functions restricted by each access level are as follows.

○: Available, ×: Not available

Function	Access level			
	Administrators	Developers	Assistant Developers	Users
Overwriting	○	○	○	×
User management	○	×	×	×
Deleting the user information of a project	○	×	×	×
Project revision history	○	○	○	×
Changing the module type and operation mode	○	×	×	×
Online program change	○	○	○	×
Writing data to a programmable controller	○	○	○*1	×

*1 Only data on a standard program can be written to a CPU module. (☞ Page 471 Operation)

Procedure for using the user authentication function (access prevention)

1. Create a safety project, and add a user of Administrators to the project. (☞ Page 85 Creating a project)
2. Add the users who are allowed to operate the project. (☞ Page 469 User management)
3. Save a project. (☞ Page 105 Saving a project)

Once the above procedure has done, logging on is necessary to access to the projects.

Logging on to project

For the project that the user information is registered, logging on is required to perform the operations such as opening a project.

Enter the user name and the password, that are registered in the project, to log on.

Changing password of logon user

Change the password of the user who is logging on to a project.

Operating procedure

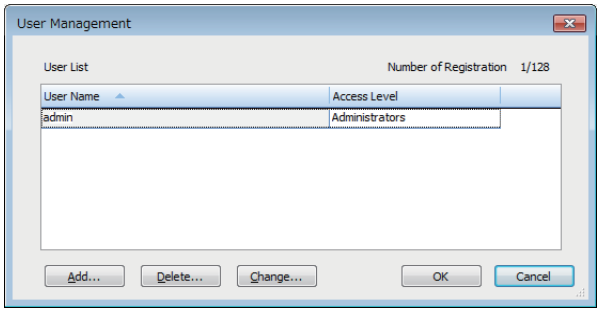
Select [Project] ⇨ [Security] ⇨ [Change User Password].

User management

Manage the user registration status of a project to which the security is set.
A User of the Administrators can change all user's passwords.

Window

[Project] ⇨ [Security] ⇨ [User Management]



Adding/changing users

Add/change a user information (user name/password) to/from a project.

Operating procedure

1. Click the [Add]/[Change] button.
2. Set each item on the "Add New User" screen/"Change User" screen, and click the [OK] button.

Deleting user information

Delete the user information registered in a project.

Operating procedure

Select the user name to be deleted, and click the [Delete] button.

15.5 Preventing Illegal Access to CPU Module

To prevent an illegal access to the project written to a CPU module, use the User Authentication function.
Only RnPSFCPUs and RnSFCPUs support the function.
For details on the User Authentication function, refer to the following section.
☞ Page 467 User Authentication function
For RnPSFCPUs, whether the user authentication function can be executed for both systems (the connective system and the other system) and the other system depends on each function.
○: Executable, —: Not executable

User authentication function	Both systems	Connective system
Logon to a programmable controller	○	○
Logoff from a programmable controller	○	○
Logoff of all users from a programmable controller	○	○
Password change of a programmable controller	—	○
User information reading from a programmable controller	—	○
User information writing to a programmable controller	—	○
User information copy to a programmable controller in the other system	—	○
Initializing all information of a programmable controller	—	○

Functions and operations that require user authentication

■Function

Depending on the access level, some functions are restricted in a CPU module.
The functions restricted by each access level are as follows.
○: Available, ×: Not available

Function		Access level			
		Administrators	Developers	Assistant Developers	Users
File operation	Write to PLC	○*1	○*1	○*1	×
	Read from PLC	○*1	○*1	○*1	○*1
	Verify with PLC	○*1	○*1	○*1	○*1
	Delete data in a programmable controller	○*1	○*1	○*1	×
Redundant programmable controller operation	Memory copy*2	○	×	×	×
CPU memory operation	Data memory initialization	○	○	×	×
	Device/label memory initialization	○	○	○	×
	Zero clear of file registers (all files)	○	○	○	×
	Zero clear of file registers (file specification)	○	○	○	×
Change program	Online program change	○	○	○	×
	File batch online change	○	○	○	×
Security	Write/delete a security key	○	×	×	×
	Register/change/delete file password	○	×	×	×
	Authenticate file password	○	○	○	○
	Add/delete/change new user	○	○	○	×
	Read/write user data	○	×	×	×
Diagnostic	All clear event history	○	○	×	×
Safety function	Safety operation mode switching	○	○	×	×
User authentication	Log off from PLC*2	○	○	×	○
	Log off all users from PLC*2	○	×	×	×
	Copy user information to other system PLC*2	○	×	×	×

*1 User authentication is not required to write/read a device memory (except for the file register).
*2 Only RnPSFCPUs support it.

■Operation

Depending on the access level, the operations (read, write, delete, verify) that can be performed for data in a CPU module differ.

The operations restricted by each access level are as follows.

○: Available, ×: Not available

Data	Administrator / Developers	Assistant Developers		Users	
	Read/Write/Delete/Verify	Read/Verify	Write/Delete	Read/Verify	Write/Delete
Sequence program	○	○	○	○	×
Safety sequence program	○	○	×	○	×
FB file	○	○	○	○	×
Safety FB file	○	○	×	○	×
CPU parameter	○	○	×	○	×
Safety CPU parameter	○	○	×	○	×
System parameter	○	○	×	○	×
Module parameter	○	○	×	○	×
Safety module parameter	○	○	×	○	×
Module extended parameter	○	○	×	○	×
Memory card parameter	○	○	×	○	×
Device comment	○	○	○	○	×
Device initial value	○	○	○	○	×
Global label setting file	○	○	○	○	×
Safety global label setting file	○	○	×	○	×
Standard/safety shared label setting file	○	○	×	○	×
Global label initial value	○	○	○	○	×
Local label initial value	○	○	○	○	×
Global label assignment information file for an access from an external device	○	○	○	○	×
File register	○	○	○	○	×
Remote password file	○	○	×	○	×
Device memory	○	○	○	○	×

Procedure for using the user authentication function (access prevention)

1. Register the user information in the project which is to be written to a CPU module. (☞ Page 469 User management)
2. Write the user information to a CPU module. (☞ Page 471 Writing/reading user information to/from CPU module)
3. For RnPSFCPUs, copy the user information to the other system. (☞ Page 473 Copying user information to the other system)
4. Write programmable controller data to a CPU module. (☞ Page 392 Writing data to a programmable controller)

Once this procedure has done, logging on is required to access to the CPU module in advance.

Writing/reading user information to/from CPU module

Write the user information registered in a project to a CPU module.

Read the user information registered in a CPU module, and overwrite the existing project.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Write User Information to PLC]/[Read User Information from PLC].

Precautions

When reading user information from a CPU module to GX Works3 Version 1.044W or earlier, the access label "Assistant Developers" is changed to "Users".

Logging on to CPU module

Logging on is required to access to the CPU module in which the user information is registered.
Enter the user name and the password, that are registered in the CPU module, to log on.
For RnPSFCPUs, users can log on to both systems or the connective system.
After logging on, the user is automatically logged off if the CPU module has no access within the logoff judgment time or user information are written.
The logoff judgment time differs depending on the firmware version of a CPU module.
For details, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Operating procedure

1. Select [Online] ⇨ [User Authentication] ⇨ [Log on to PLC]
2. Set each item on the "User Authentication" screen and click the [OK] button.

■When a user name and a password used in the User Authentication function are lost

Initialize the user information, the programmable controller data, and the security keys in the CPU module by performing the following operation.

- Select [Online] ⇨ [User Authentication] ⇨ [Initialize all PLC Data]

Rewrite the user information, the programmable controller data, and security keys (optional) to the CPU module after initialization.
If the power of the CPU is turned OFF → ON or the CPU module was reset, the allocation for the device/label memory is back to the initial status. (Each area has the default capacity.)

Changing password

Change the password for the CPU module to the same password set to a project.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Change the Password of PLC]

Authentication destination setting in the online function

When executing the online function, select either both systems or the connective system as the target of the user authentication.
Only RnPSFCPUs support it.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Authentication Destination] ⇨ [Both Systems]/[Connective System].

Logging off from a CPU module

Log off from a logged on CPU module.
Only RnPSFCPUs support it.
Users can log off from both systems or the connective system.

Logging off

Log off from a logged on CPU module.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Log off from PLC].

Logging off all users

Log off all users from a logged on CPU module.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Log off All Users from PLC].

Copying user information to the other system

Copy user information from the CPU module in the connective system to the CPU module in the other system.
Only RnPSFCPUs support it.

Operating procedure

Select [Online] ⇨ [User Authentication] ⇨ [Copy User Information to Other System PLC].

15.6 Preventing Illegal Data Reading/Writing

To prevent data from being illegally read from/written to CPU module, use the File password function.

File password function

By registering a password to the files in the CPU module, the password authentication is required when reading/writing files.
By selecting "Permanent PLC Lock" on FX5CPU, the operations to read/write a file are prohibited and the protection cannot be released. The password setting is not required when "Permanent PLC Lock" is selected.
There are two kinds of protections in password and "Permanent PLC Lock"; "Read Protection" and "Write Protection". Both of them can be set to one file.

■ Operations that require password authentication by setting a file password

○: Required, —: Not required

Online operation	Applicability	Password to be set
Read to a programmable controller	○	Read-protected password
Write to a programmable controller	○	Write-protected password
Online program change (Online Program Change, File batch online change)	○	Write-protected password
Verification with a programmable controller	○	Read-protected password
File password setting (register/change/authentication/deletion)	○	Read-protected password, write-protected password
Delete data in a programmable controller	○	Write-protected password
CPU memory operation (initialization)	—	—

■ Target file

○: Available, ×: Not available

File name	Availability
System parameter, CPU parameter, module parameter, module extended parameter, memory card parameter	○
Remote password	×
Global label setting	○
Global label assignment information	×
Global label initial value	×
Local label initial value	×
Program file	○
POU (FB file/FUN file)	○
File register	×
Device initial value	○
Common device comment	○
Each program device comment	○
Firmware update prohibited file	○
Faulty database check file	×
System file for backing up CPU module data	×
Backup data file for backing up CPU module data	×
Device/label data file for backing up CPU module data	×
System file for the iQ Sensor Solution data backup/restoration function	×
Backup data file for the iQ Sensor Solution data backup/restoration function	×
ODBC server setting file	×
Database path file	×

■When accessing a file saved in an RCPU from an external device by using a function other than one in GX Works3

A file password is validate when accessing a file using the FTP server function. For details, refer to the following manual.

MELSEC iQ-R Ethernet User's Manual (Application)

A file password is validate when accessing a file using MC protocols. For details, refer to the following manual.

MELSEC iQ-R Serial Communication Module User's Manual(Application)

Precautions

- Keep passwords in a secure place.
  If the registered password is lost, or "Permanent PLC Lock" set in FX5CPU is needed to be cancelled, initialize the CPU module using the CPU Memory Operation function (☞ Page 517 Checking Memory Usage) and write the project to the CPU module.
- To set "Permanent PLC Lock" to both of "Read Protection" and "Write Protection", configure the both settings at the time of the first registration. If only one of them was registered, the other cannot be registered later.

Procedure for using the file password function

Procedure for making a security enable

1. Set the Specify Connection Destination to access to the CPU module. (☞ Page 371 Specification of Connection Destination)
2. Set a file password to the file in the CPU module. (☞ Page 476 Setting file password)

If the project in which the file password is set is closed, the file cannot be read and write when GX Works3 is started up next time.

Procedure for making locked files readable/writable

1. Set the Specify Connection Destination to access to the CPU module. (☞ Page 371 Specification of Connection Destination)
2. Authenticate the file password which has been set to the file in the CPU module. (☞ Page 476 Setting file password)

The file can be write and read while the project is open.

The files can also be read/written when entering a correct password in the "File Password Setting" screen displayed when accessing a file.

Setting file password

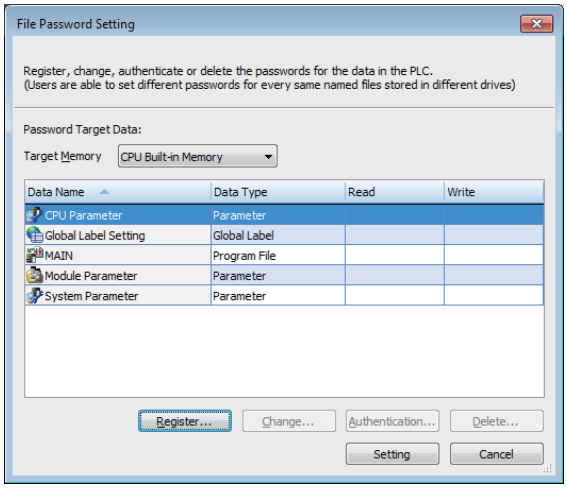
When registering a file password, connect a personal computer and CPU module in advance.
"Register", "Change", "Authentication", or "Delete" can be set in the "File Password Setting" screen.
For a safety project, a file password can be set when the safety operation mode of a CPU module is in the test mode. Only the authentication can be performed in the safety mode.

Setting	Operation
Register	Restrict online operations by setting password to data in the CPU module. A password set to data in the transfer source memory of boot operation remains set in the transfer destination memory.
Change	Change the password set to data in the CPU module.
Authentication	Unlock the data in the CPU module temporarily by authenticating the password. By authenticating a password, the corresponding data in the CPU module can be read/written until the project is closed.
Delete	Delete a password set to data in CPU module.

For R00CPU, a file password for an SD memory card cannot be set.

Window

[Project] ⇨ [Security] ⇨ [File Password Setting]



Operating procedure

1. Select the target data and click the [Register]/[Change]/[Authentication]/[Delete] button.
2. Set each item on the displayed screen and click the [Completed] button.
3. Click the [Setting] button on the "File Password Setting" screen.

15.7 Restricting Access from Other Than Specific Communication Route

To restrict the access from other than specific communication route, use the Remote password function.

Remote password function

By setting a password for the CPU module, accessing via the specified RJ71EN71, serial communication module, and built-in Ethernet CPU is limited.

For the modules that support remote password setting and details on the remote password setting, refer to the user's manual used.

Procedure for using the remote password function

Procedure for making a security enable

1. Set the remote password. (☞ Page 478 Setting remote password)
2. Specify "Remote Password" and write the data to the CPU module. (☞ Page 392 Writing data to a programmable controller)

The access to the CPU module will be restricted.

Procedure for accessing a locked CPU module

Entering the password is required in order to access the CPU module. The access is permitted when the entered password is correct.

1. Access to the CPU module (writing or reading operation). (☞ Page 392 Writing data to a programmable controller, Page 398 Reading data from a programmable controller)
2. Unlock the remote password by following the message. (☞ Page 478 Setting remote password)

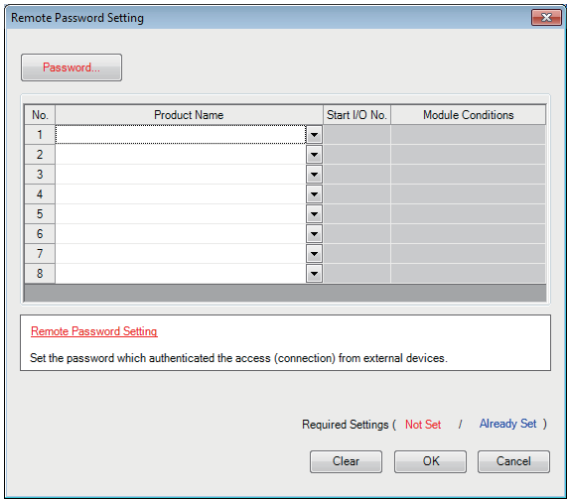
When the entered password is correct, the access to the CPU module will be permitted.

Setting remote password

The remote password can be set for up to 8 modules. (Up to 8 CPU modules for a multiple CPU configuration)

Window

"Parameter" ⇨ "Remote Password" in the "Navigation" window



Operating procedure

1. Click the [Password] button.
2. Set each item on the "Register Password" screen and click the [OK] button.

Item	Description
Product Name	Select the module of which remote connection is to be enabled. For CPU modules integrated network module (such as RnENCPU), select the following to use the CPU part and the network part as a separate module. • CPU part: CPU Module (Built-in Ethernet Function) • Network part: CC-Link IE Built-in Ethernet I/F Module
Start I/O No.*1	Enter the start I/O number*1. (The specification using module labels is applicable.)
Module conditions	Set the remote password to enable/disable for the user connection number or system connection.

*1 For FX5CPU, "Intelligent Module No." is displayed.

16 MODULE DIAGNOSTIC

This function displays the status of modules, networks, and entire system. At the time of error, it displays the error contents and the corrective action.

The diagnostic functions of GX Works3 are as follows:

Function	Reference
System monitor*1	Page 480 Module Status Check of a System
Sensor/device monitor	Page 482 Sensor/Device Status Check
Module diagnostic	Page 483 Module Diagnostic
Network diagnostic	Page 485 Ethernet diagnostic
	Page 486 CC-Link IE Controller Network diagnostic
	Page 488 CC-Link IE Field Network diagnostic
	Page 489 CC-Link IE Field Network Basic diagnostic
	Page 490 MELSECNET diagnostic
	Page 491 CC-Link diagnostic
	Page 492 Simple CPU communication diagnostic

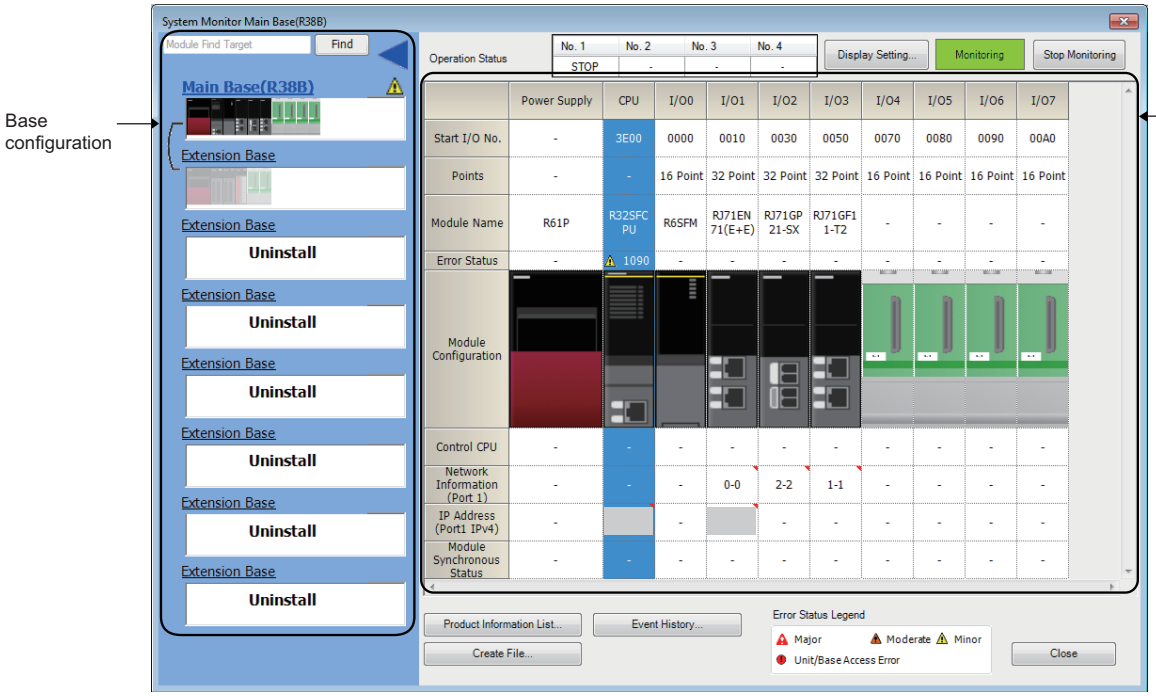
*1 FX5CPUs do not support it.

16.1 Module Status Check of a System

The System Monitor function displays the module configuration of the system in operation and detailed information of each module.
In addition, the error status can be checked and the module in which the error occurred can be diagnosed.
FX5CPUs do not support this function.

Window

[Diagnostics] ⇨ [System Monitor]



- For a Q series power supply module, the model name is displayed as "Power" instead of their model name. Additionally, for a Q series module, the network information and IP address are not displayed.
- To display the network information and IP address of port-2 of the modules having two ports, click the [Display Setting] button.
- When using a CPU module in a redundant system configuration, the statuses of a tracking cable and memory copy are displayed on the base unit configuration.

■When '?' appears on the image of a module

'?' appears on the image of a module when the connected module is in the following statuses.

- A connected module is broken.
- The mounting status differs from the I/O assignment setting of the system parameter.
- The control CPU is not mounted.
- A profile is not registered.

Precautions

- If the number of extension base units is set incorrectly, the base unit configuration will not be displayed in the order of the connection.
- For a CPU module in a redundant system configuration, the connected destination is switched at the time of selecting a base unit, which is used for the other system, regardless of the contents in the connection destination setting. Therefore, if the other system is selected in the system monitor, functions that are not supported by the other system cannot start.

Automatic diagnostic function

This function starts up the System Monitor function automatically when connecting CPU module and a personal computer by USB connection.

Set whether to start up automatically on the task tray.

Check of the module firmware version and product information

The firmware version and product information can be checked in the "Product Information List" screen which is displayed after [Product Information List] button is clicked.

File creation function

Information displayed on the system monitor can be output to a CSV file.

16.2 Sensor/Device Status Check

The status and the current value of a sensor/device connected to a network can be displayed.

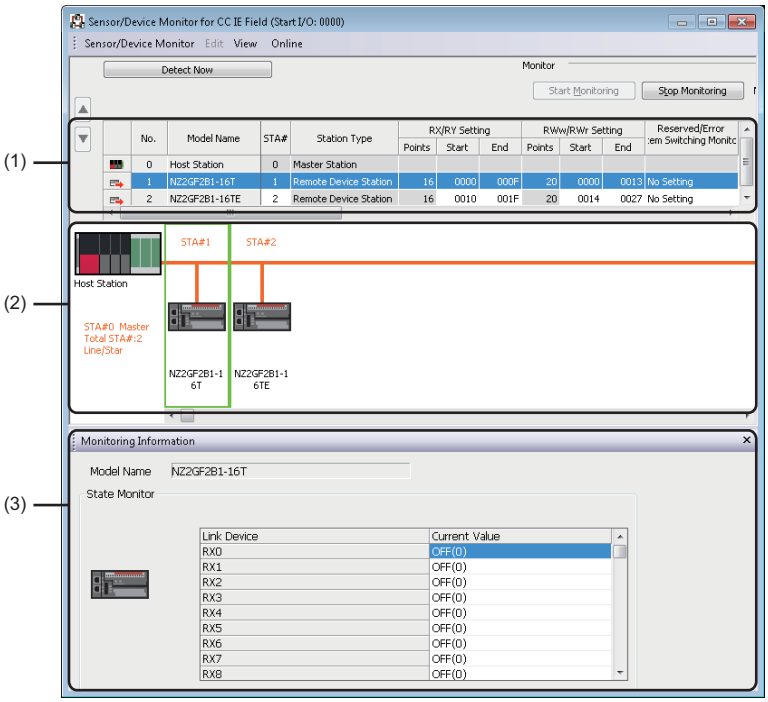
Supported network: Ethernet (CPU module), AnyWireASLINK*1, CC-Link IE Field Network, CC-Link

*1 Projects used for FX5CPUs are not supported.

Window

1. Select [Diagnostics] ⇨ [Sensor/Device Monitor].
2. Select a master module or master station in the "Module Selection (Sensor/Device Monitor)" screen, and click the [OK] button.

The following image is a screen example displayed when selecting a master station in CC-Link IE Field Network.



Operating procedure

Select a target device supporting iQSS to be monitored in the list of stations (1) or the device map area (2) on the sensor/device monitor screen.

The status of a selected device supporting iQSS is displayed in the "Monitoring Information" window (3).

Point

- Check the error status of a device supporting iQSS by using the network diagnostic function.
- The sensor/device monitor function reads a large volume of information from a CPU module at once. Therefore, the processing speed of the sensor/device monitor function may decrease depending on the set communication route.

16.3 Module Diagnostic

This section explains the method to display the status and error codes of a module.
FX5CPUs only support "Diagnosing CPU modules".

Window

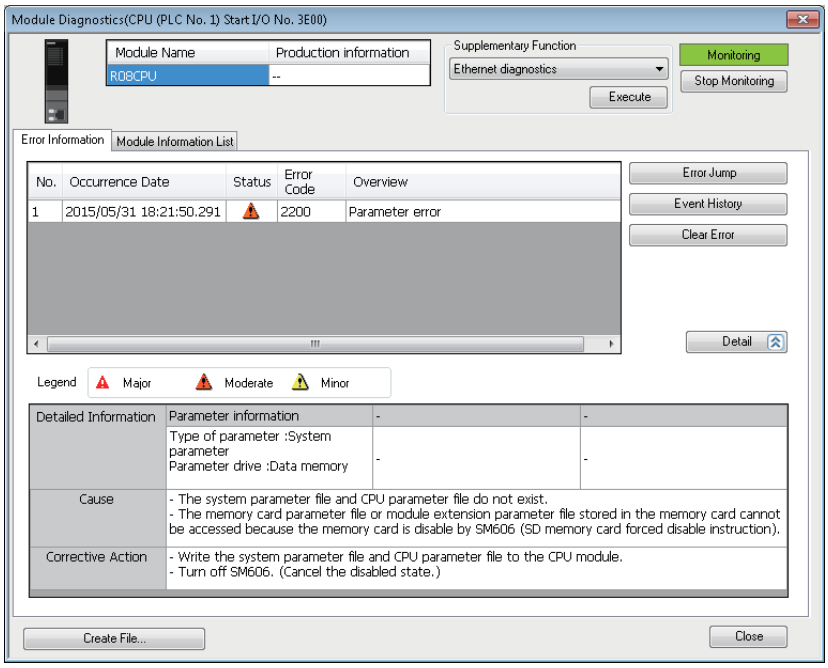
■CPU module and remote head module diagnostic

[Diagnostics] ⇨ [Module Diagnostics (CPU Diagnostics)]

In both a CPU module and a remote head module in a redundant system configuration, a module specified as the current connection destination is diagnosed. When diagnosing the other system, change the connection destination or specify the module to diagnose on the system monitor.

■I/O module and intelligent function module diagnostic

Select the module to be diagnosed from the module configuration of the "System Monitor" screen and double-click one of the cells on the same column to display the "Module Diagnostics" screen.



For Q series module, '-' is displayed in "Occurrence Date", "Status", and the detail field.

Precautions

The occurrence date depends on the time zone selected in "Clock Related Setting" of "Operation Related Setting" of "CPU parameter". Therefore, the time shown in the screen may be different from the one on the personal computer in use.
Monitoring stops if a program in the project is converted. When the conversion completed, the monitoring resumes.

Error information

Display the error history registered to the diagnostic target module in the [Error Information] tab.

■Display content

The displayed information will differ depending on the module.

- CPU module: Up to 16 current errors will be displayed in the order of occurrence. The 17th and succeeding errors are not displayed.
- Other than CPU module: Up to 16 current errors are displayed.

If a same error with error code has occurred which has already been displayed, then display content will not be updated.
For the errors of Q series module, occurrence date is not displayed.

■Error jump

Click the [Error Jump] button to jump to the selected error item.

Target items are a program, function block, and each parameter.

A jump to parameters is available for the items supported by the Error jump function. The supported items differ depending on the module.

For an inline structured text on ladder editor, the cursor will jump to the head line of the inline structured text regardless of the line that error occurs.

Precautions

In the following conditions, an error may not be found at the error jump destination.

- When the open project does not match with the data on the CPU module.
- When diagnosing programmable controller other than the one set as a connection destination in the project.

Ex.

When selecting a module from the "CC-Link IE Control Diagnostics" screen and activating the System Monitor function, and activating the "Module Diagnostics" screen from the activated "System Monitor" screen.

■Event history

☞ Page 493 Error History/Operation History Check

■Clearing errors

After the errors displayed on the module diagnostic screen are cleared, click the [Clear Error] button to clear the error status of the module. (The LED that indicates error status on the front of the module turns OFF.)

The error content are also deleted from the list of the error information.

Module information list

The current LED information and switch information of a target module are displayed in the [Module Information List] tab.

16.4 Network Diagnostic

This section explains the method to diagnose various networks.

Ethernet diagnostic

Check the status of each connection, status of each protocol, and connection status.

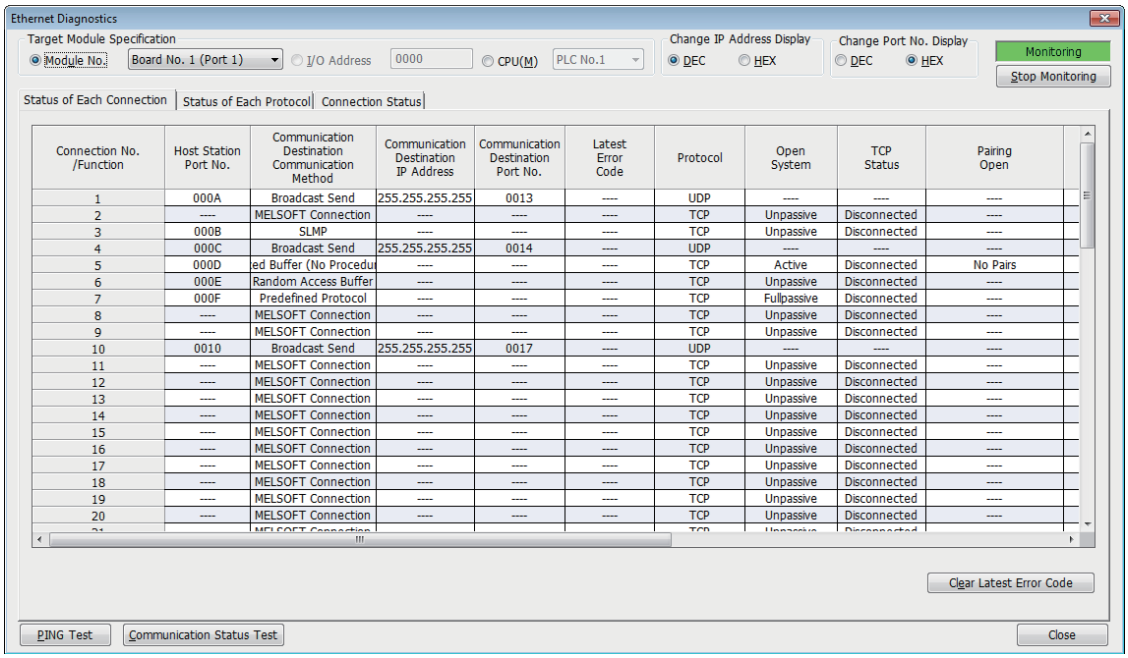
For details, refer to the following manuals.

📖MELSEC iQ-R Ethernet User's Manual (Application)

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

Window

[Diagnostics] ⇨ [Ethernet Diagnostics]



CC-Link IE Controller Network diagnostic

A network status can be monitored, diagnosed, and tested.

For details, refer to the following manual.

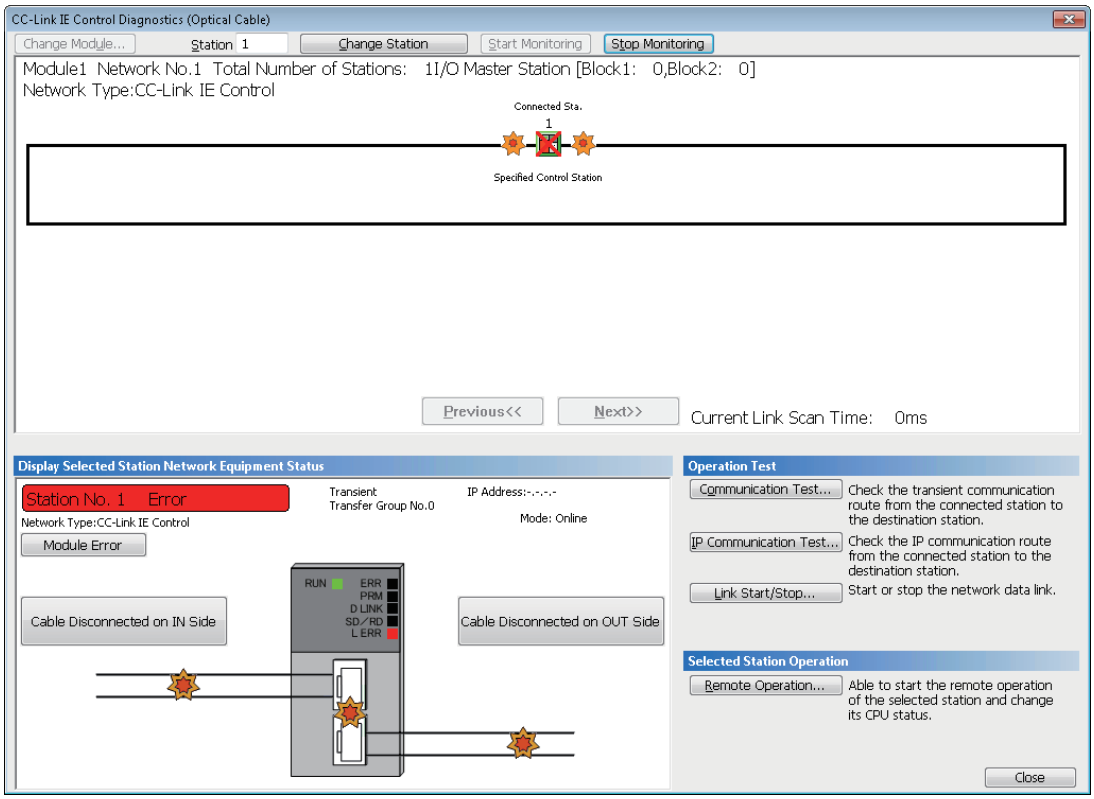
📖MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)

FX5CPUs and remote head modules do not support it.

Window

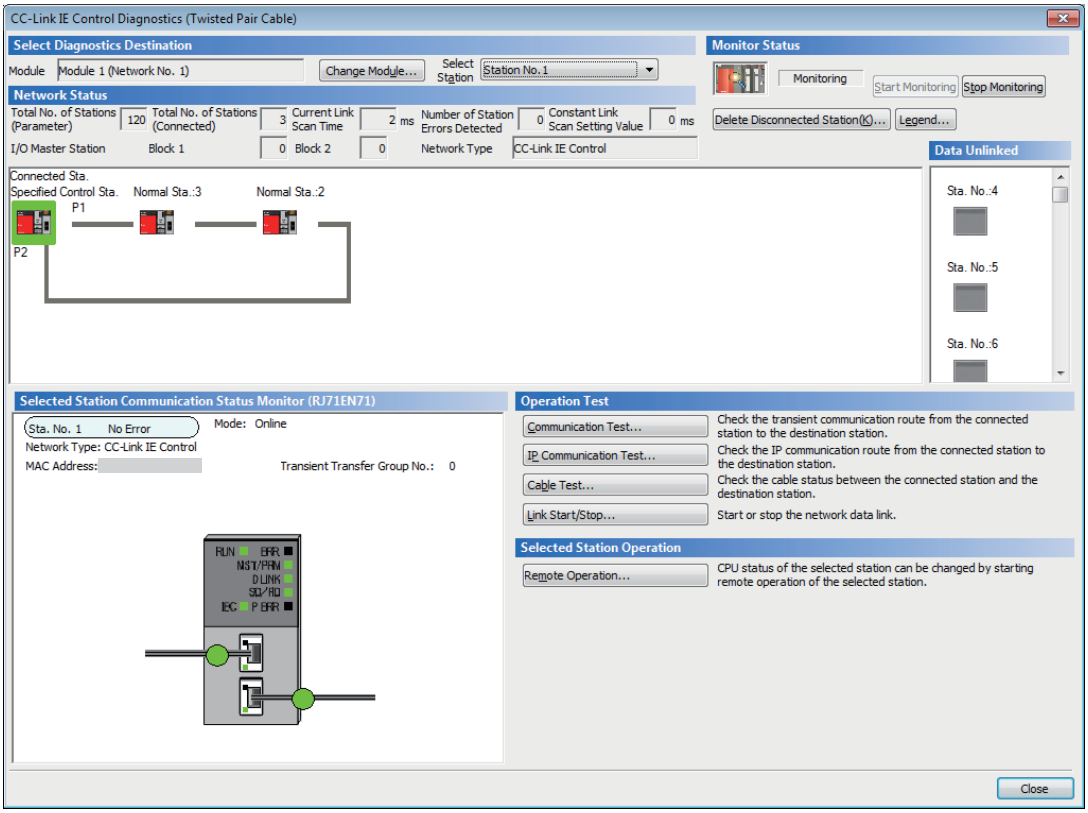
■Optical cable

[Diagnostics] ⇨ [CC-Link IE Control Diagnostics (Optical Cable)]



■Twisted pair cable

[Diagnostics] ⇨ [CC-Link IE Control Diagnostics (Twisted Pair Cable)]



CC-Link IE Field Network diagnostic

A network status can be monitored, diagnosed, and tested.

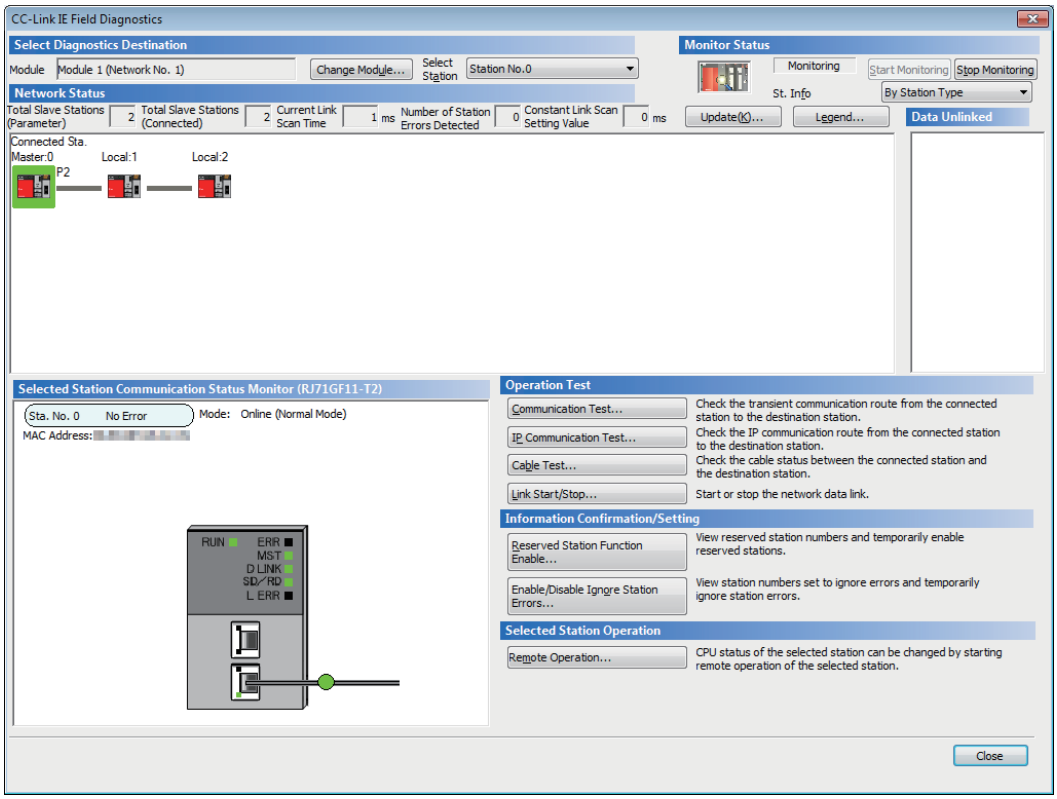
For details, refer to the following manual.

MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

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

Window

[Diagnostics] ⇨ [CC-Link IE Field Diagnostics]



■Displaying product information

The product information of a module can be checked by the following operation.

- Select and right-click a module, and select [Production Information] from the shortcut menu.

Note that this function cannot be used when a selected module does not support displaying the product information or an error occurs on a connected station.

For details, refer to the manual of each module.

■Displaying error history

An error history in a slave station can be checked by the following operation.

- Select and right-click a module, and select [Error History] from the shortcut menu.

This function is available only when a remote device station or intelligent device station which can read error history is selected.

CC-Link IE Field Network Basic diagnostic

Monitoring and diagnosing of network status can be performed.

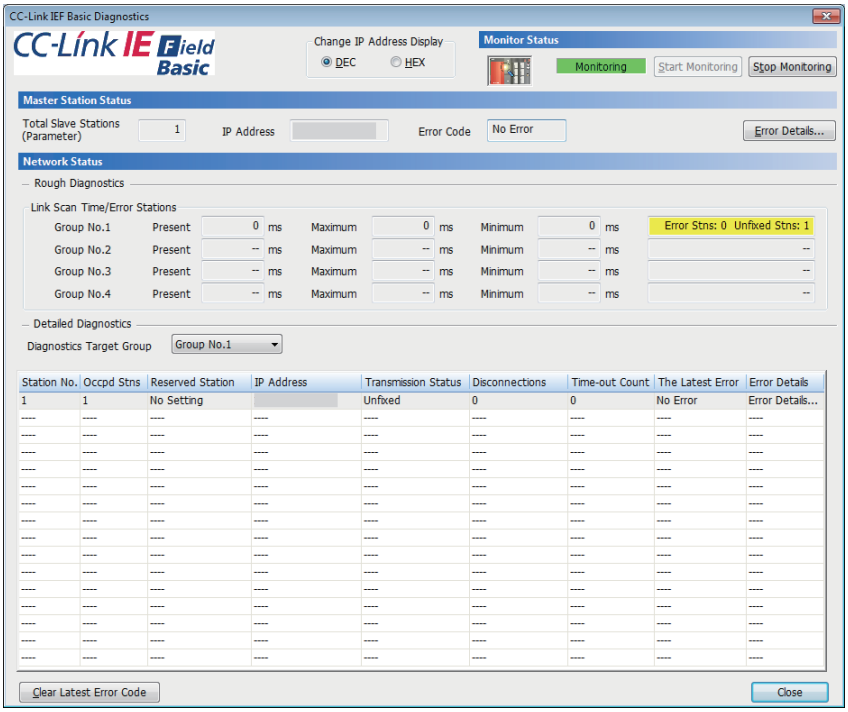
For details, refer to the following manual.

CC-Link IE Field Network Basic Reference Manual

RnCPUs, RnENCPUs, and FX5CPUs support it.

Window

[Diagnostics] ⇨ [CC-Link IEF Basic Diagnostics]



MELSECNET diagnostic

A network status of each station can be monitored, diagnosed, and tested.

Considerations for using MELSECNET/H network module when performing the MELSECNET Diagnostic , refer to the following manual.

📖MELSEC iQ-R Module Configuration Manual

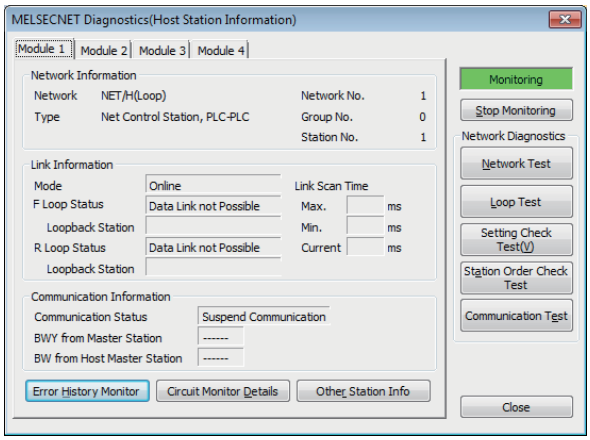
For the operation methods, refer to the following manual.

📖 GX Works2 Version 1 Operating Manual (Common)

RnPCPUs, RnPSFCPUs, FX5CPUs, and remote head modules do not support this function.

Window

[Diagnostics] ⇨ [MELSECNET Diagnostics]



CC-Link diagnostic

A network status of each station can be monitored, diagnosed, and tested.

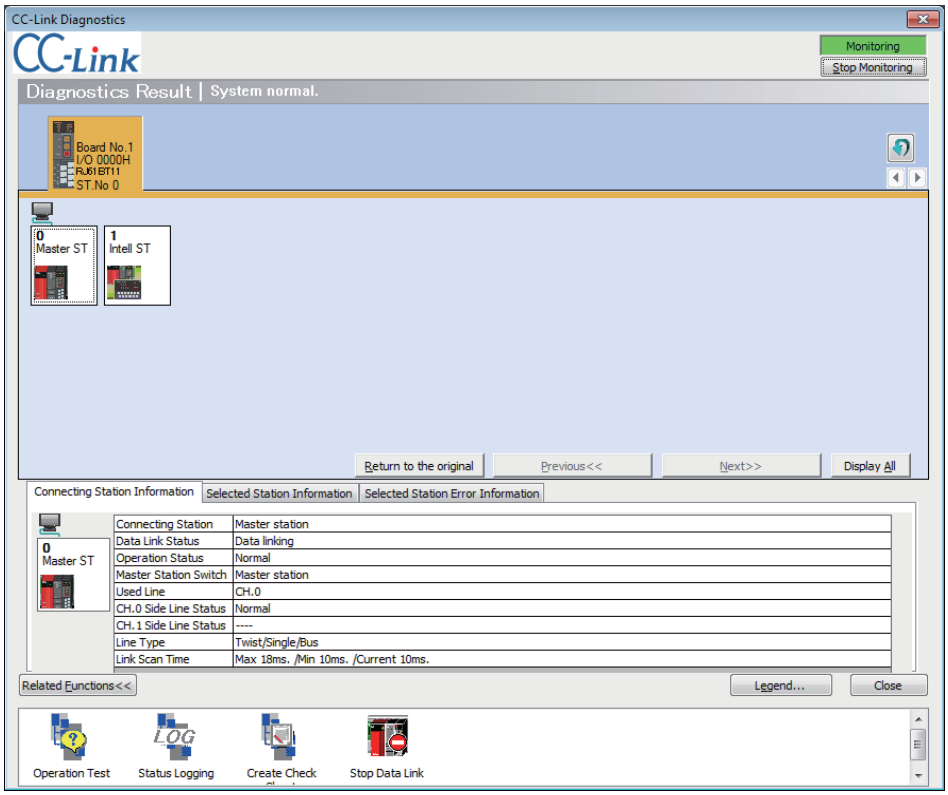
For details, refer to the following manual.

MELSEC iQ-R CC-Link System Master/Local Module User's Manual (Application)

MELSEC iQ-F FX5 User's Manual (CC-Link)

Window

[Diagnostics] ⇨ [CC-Link Diagnostics]



Simple CPU communication diagnostic

A network status can be diagnosed.

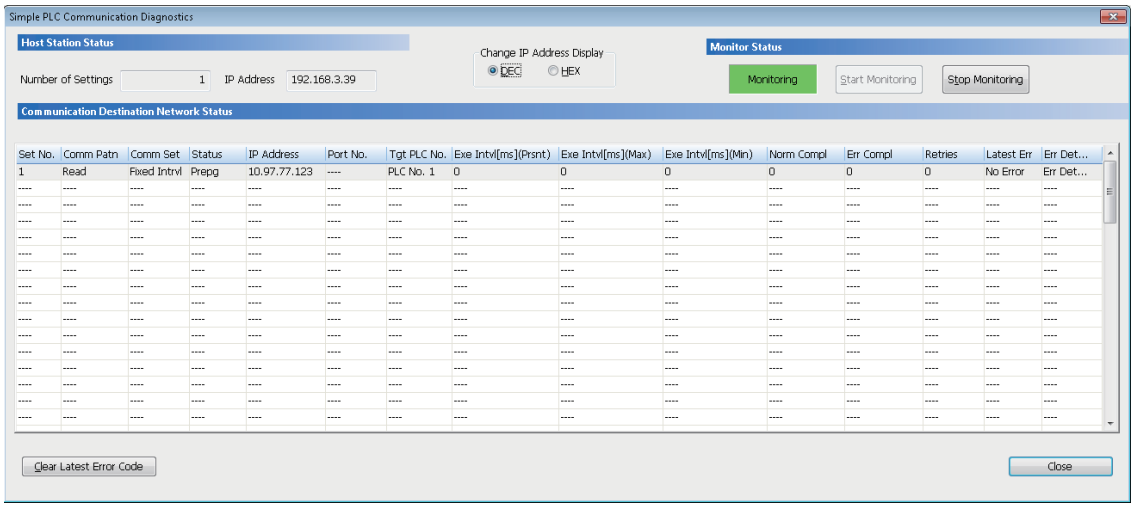
For details, refer to the following manual.

MELSEC iQ-R Ethernet User's Manual (Application)

RnCPUs and RnENCPUs support this function.

Window

[Diagnostics] ⇨ [Simple CPU Communication Diagnostics]

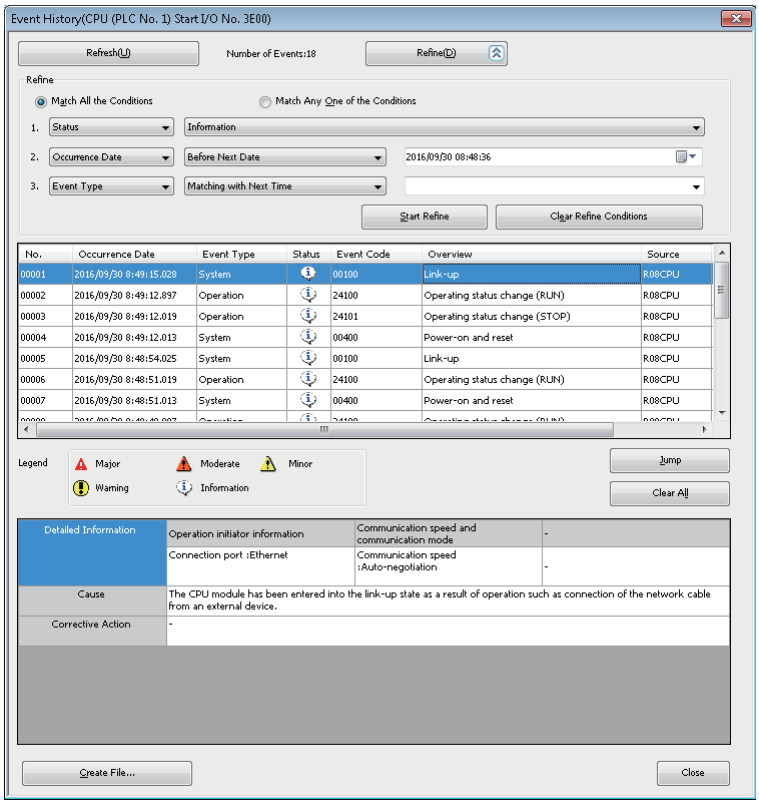


16.5 Error History/Operation History Check

The module's error information, history of operation, and system information can be displayed using the event history function. The detailed information of the error history can be displayed when a CPU module and an intelligent function module supports the module error history collection function.
For the versions of modules that support this function, refer to the user's manual of each module.

Window

[Diagnostics] ⇨ [Module Diagnostics (CPU Diagnostics)] or [System Monitor], and click the [Event History] button



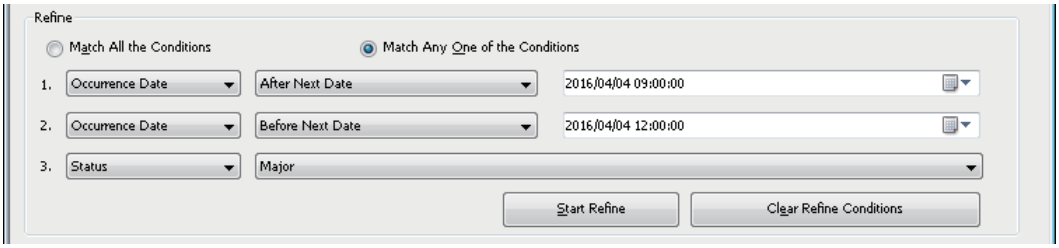
Operating procedure

■Event history refinement

1. Select either "Match All the Conditions" or "Match Any One of the Conditions".
2. Set the conditions.
3. Click the [Start Refine] button.

Ex.

Display an event of the major error that occurred between 9:00 am and 12:00 pm in April 4th



■Jump to a location in which an error occurred

Click the [Jump] button.

Target items are a program, function block, and each parameter.

■Event history clearing

Click the [Clear All] button.

All event histories are deleted.

Precautions

- The occurrence date on the event history depends the time zone selected in "Clock Related Setting" of "Operation Related Setting" of "CPU parameter". Therefore, the time shown in the screen may be different from the one on the personal computer in use.
- When writing/reading data to/from the CPU module for which a remote password has been set, the event, success to lock/unlock the remote password, is registered more than once.

17 SAMPLING DEVICE DATA

This chapter shows the methods for sampling and checking device data by using the memory dump function and the data logging function of a CPU module.

The functions to sample and check data are shown in the following table.

Purpose	Function name	Reference
To save device values of a CPU module to a personal computer at any timing and check the data.	Memory dump	Page 495 Memory Dump Function
To sample the data of a CPU module at the specified timing.	Data logging	Page 501 Data Logging Function
To check sampled data (memory dump result file, logging file) on the program editor.	Offline monitor	Page 503 Checking Sampled Data on Program Editor

17.1 Memory Dump Function

Device values of a CPU module can be checked at any timing with the memory dump function of a CPU module.

By setting the trigger conditions, the data at a time when the conditions have been satisfied are collected and saved to the SD memory card. The saved device values can be checked with GX Works3.

For details on the memory dump function of CPU modules, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

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

R00CPU and remote head modules do not support it.

Procedure for using the memory dump function

1. Set the internal buffer capacity of the CPU module to use the memory dump function. (☞ Page 496 Setting the internal buffer capacity for the memory dump function)
2. Write the memory dump setting file. (☞ Page 497 Writing memory dump settings)
   Once it is written, the memory dump result file is saved to an SD memory card when the set trigger conditions are satisfied.
3. Read the memory dump result file to the personal computer. (☞ Page 499 Reading memory dump results)
4. Check the read memory dump result file. (☞ Page 500 Displaying memory dump results)

Setting the internal buffer capacity for the memory dump function

RCPU

The internal buffer capacity for the memory dump function can be set in "Internal Buffer Capacity Setting" of "Memory/Device Setting" of "CPU Parameter". After the setting, write the CPU parameters to a CPU module.

However, when using the data logging function, the memory dump function, and the realtime monitor function of a CPU module at the same time, set the capacity within the range that meets the following conditions.

The total of data logging buffer capacities + memory dump buffer capacity + realtime monitor buffer capacity ≤ 3072 KB

Each buffer capacity can be checked with the following:

- Data logging buffer capacity, Memory dump buffer capacity: CPU parameter
- Realtime monitor buffer capacity: The realtime monitor setting of GX LogViewer

FX5CPU

Whether to use the memory dump function can be set in "Function to Use Internal Buffer" of "Memory/Device Setting" of "CPU Parameter".

When using the memory dump function, the internal buffer capacity cannot be changed.

After the setting, write the CPU parameters to a CPU module.

Precautions

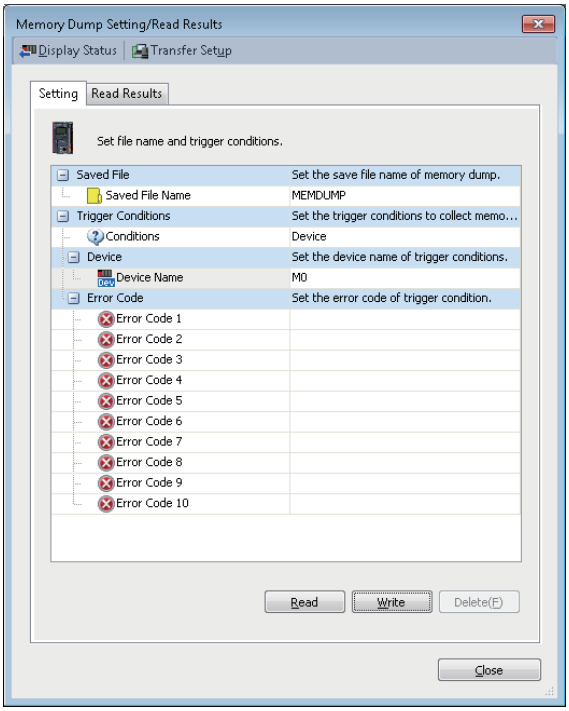
The data logging function and the memory dump function cannot be used at the same time.

Writing memory dump settings

Once the memory dump setting file is written, the Memory Dump function is started and waits for a trigger.
If the memory dump setting file has already been stored, the Memory Dump function is started by powering ON the CPU module.

Window

[Debug] ⇨ [Memory Dump] ⇨ [Setting]
The following screen is an example when opening a project used for an RCPU.



Operating procedure

Set each item and click the [Write] button.

Item	Description
Saved File	Set a name of a file to be output when the Memory Dump function is performed. A number, '00' to '99' is added to the end of the set name for the file name to be output actually.
Trigger Conditions	Specify the trigger conditions to collect memory dump. ■Trigger condition that can be set (RCPU) • Device: Specify this to set the timing when the bit data of a specified device turns OFF to ON as the trigger condition. • Error Code: Specify this to set an error code of CPU module as the trigger condition. • Device/Error Code: Specify this to set a device/error code as the trigger condition. The memory dump function is performed when any of the conditions are satisfied. ■Trigger condition that can be set (FX5CPU) • Device: Specify this to set the timing when the bit data of a specified device turns OFF to ON as the trigger condition. • On Error: Specify this to set the timing when an error occurs on a CPU module as the trigger condition. • Device/On Error: Specify this to set the timing either when the bit data of a specified device turns OFF to ON or when an error occurs on a CPU module as the trigger condition. The memory dump function is performed when any of the conditions are satisfied.
Device	Specify a device to be set as the trigger condition. Only global devices can be specified. ■Device representation that can be specified (RCPU) • Bit device: X, Y, M, L, F, SM, V, B, SB, T (enter 'TS'), ST (enter 'SS/STS'), C (enter 'CS'), LT (enter 'LTS'), LST (enter 'LSS/LSTS'), LC (enter 'LCS'), FX, and FY • Word device (bit specification): D, SD, W, SW, R, ZR, FD, RD ■Device representation that can be specified (FX5CPU) • Bit device: X, Y, M, L, F, SM, B, SB, T (enter 'TS'), ST (enter 'STS'), C (enter 'CS'), LC (enter 'LCS') • Word device (bit specification): Not applicable
Error Code*1	Specify a 4-digit error code to be set as the trigger condition in hexadecimal. The wild card, "*" can be specified for the 1st digit of an error code only.

*1 FX5CPUs do not support it.

Point

The number for annunciator cannot be specified as the error code to be set as the trigger condition. Use the device name in order to specify the number of annunciator.

Considerations for memory dump setting

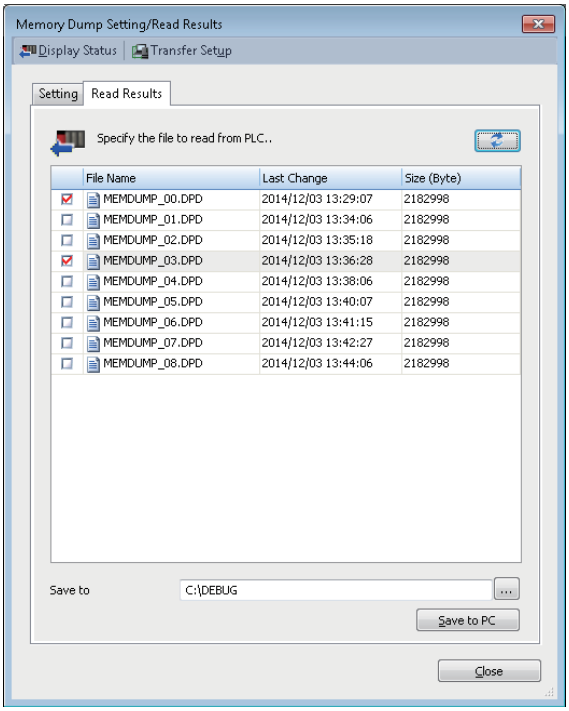
- Before writing the memory dump setting, check that the trigger condition has not already satisfied.
- When a file register is specified as the trigger condition, do not change the file register file name and the file register block No. once the memory dump setting has been written.

Reading memory dump results

To check the memory dump result file with GX Works3, read the memory dump file from SD memory card inserted in the CPU module and save it to the personal computer in advance.

Window

[Debug] ⇨ [Memory Dump] ⇨ [Read Results]



The current execution status of the Memory Dump function can be checked by selecting [Display Status].

Operating procedure

1. After clicking  , specify the memory dump result file to be read.
2. Specify "Save Destination", and click the [Save to PC] button.

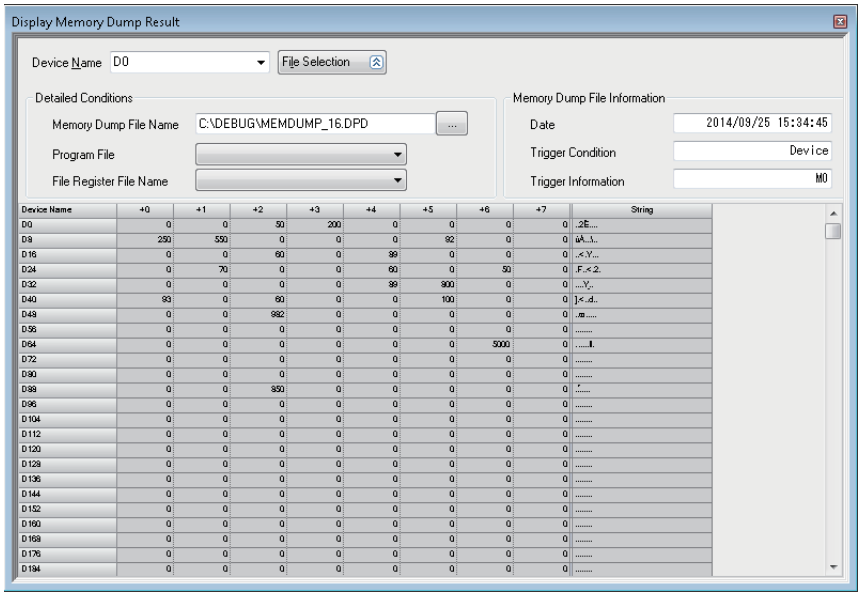
Displaying memory dump results

Display a memory dump result file save in the personal computer.

Window

[Debug] ⇨ [Memory Dump] ⇨ [Display Result]

The following screen is an example when opening a project used for an RCPU.



Operating procedure

Enter the path for the memory dump result file to be displayed in "Memory Dump File Name".

- To specify a local device for "Device Name", select the program file to be referred in "Program File".
- To specify 'R' or 'ZR' for "Device Name", select the file register to be referred in "File Register File Name". When 'R' is specified, the device for the first block is displayed.
- To specify 'Z' or 'LZ' for "Device Name", select the program file to be referred in "Program File".

Precautions

For FX5CPUs, both "Program File" and "File Register File Name" are not available.

17.2 Data Logging Function

Data can be sampled at the specified timing with the data logging function of a MELSEC-iQ-R series or MELSEC iQ-F series CPU module.

For details on the data logging, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

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

For R00CPU, the data logging function cannot be used.

Procedure for using the data logging function

1. Set the internal buffer capacity of the CPU module, which is used for the data logging function. (☞ Page 502 Setting internal buffer capacity for the data logging function)
2. Configure the data logging settings with CPU Module Logging Configuration Tool, and write the setting to the CPU module.
3. Start data logging with CPU Module Logging Configuration Tool.
4. Check the data logging results (logging data) in GX LogViewer.

For the method for using CPU Module Logging Configuration Tool, refer to the following manual.

MELSEC iQ-R CPU Module User's Manual (Application)

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

For the method for using GX LogViewer, refer to the following manual.

GX LogViewer Version 1 Operating Manual

Point

Following menus start each tool.

- [Tool] ⇨ [Logging Configuration Tool]
- [Tool] ⇨ [Realtime Monitor Function]
  (GX LogViewer starts and "Realtime Monitor Setting" screen appears.)

Setting internal buffer capacity for the data logging function

RCPU

The internal buffer capacity for the data logging function can be set in "Internal Buffer Capacity Setting" of "Memory/Device Setting" of "CPU parameter". After the setting, write the CPU parameters to a CPU module.

However, when using the data logging function, the memory dump function, and the realtime monitor function of a CPU module at the same time, set the capacity within the range that meets the following conditions.

The total of data logging buffer capacities + memory dump buffer capacity + realtime monitor buffer capacity ≤ 3072 KB

Each buffer capacity can be checked with the following:

- Data logging buffer capacity, memory dump buffer capacity: CPU parameter
- Realtime monitor buffer capacity: the realtime monitor setting of GX LogViewer

FX5CPU

Whether to use the data logging function can be set in "Function to Use Internal Buffer" of "Memory/Device Setting" of "CPU Parameter".

The internal buffer capacity for the data logging function can be set in "Internal Buffer Capacity Setting" of "Memory/Device Setting" in "CPU parameter".

After the setting, write the CPU parameters to a CPU module.

However, set the capacity in the range that satisfies the following condition.

The total of data logging buffer capacities ≤ 320 KB

Precautions

The data logging function and the memory dump function cannot be used at the same time.

17.3 Checking Sampled Data on Program Editor

Use the offline monitor function to check the sampled data (memory dump result file, logging file) from a CPU module on a program editor.

By using this function, it is possible to reproduce the sampled data on the program editor from a remote location and investigate the causes when error occurs.

Open a program editor to be monitored in advance.

For the methods for sampling data, refer to the following section.

☞ Page 495 Memory Dump Function

☞ Page 495 SAMPLING DEVICE DATA

R00CPU and remote head modules do not support it.

Checking memory dump results

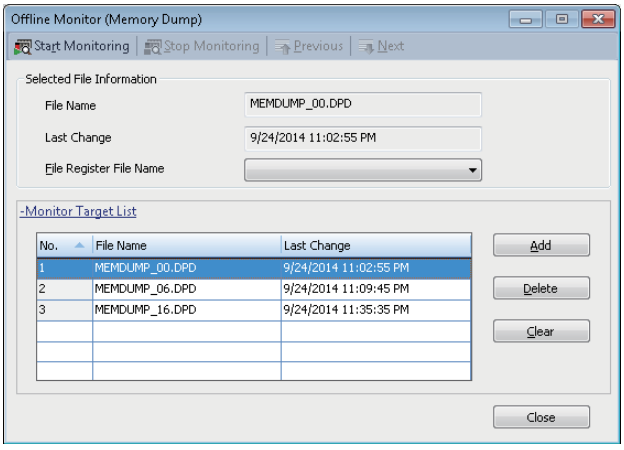
Snapshot data saved in a memory dump file can be displayed on the monitor screen of GX Works3.

When switching a memory dump result file to be monitored, a monitor value in GX Works3 is changed accordingly.

Selecting a target monitor

Window

[Debug] ⇨ [Offline Monitor] ⇨ [Offline Monitor (Memory Dump)]



Operating procedure

1. Click the [Add] button on the "Offline Monitor (Memory Dump)" screen.
2. Select the memory dump result file on the "Open File" screen, then click the [Open] button. (Multiple selections allowed.)

Performing the offline monitor function

Operating procedure

1. Select a file to monitor from the list on the "Offline Monitor (Memory Dump)" screen, then select [Start Monitoring].
2. Switch a file by selecting [Previous]/[Next] while the offline monitor function is being performed.

The device value of the selected file is displayed on the monitor of GX Works3.

■Online operation while the offline monitor function is being performed

While the offline monitor function is being performed, the following online functions are available.

- Monitor on a program editor
- Device/buffer memory batch monitor
- Watch

Stopping the offline monitor function

Operating procedure

Select [Stop Monitoring] on the "Offline Monitor (Memory Dump)" screen.

Offline monitoring is all stopped.

Considerations when monitoring files

■A monitor value cannot be displayed properly

When the following conditions are satisfied, a monitor value is not displayed properly.

Condition	Displayed value
A device value to be monitored does not exist in a selected file	• Bit device, bit-specified word device: FALSE (0) • Word device, double-word device, FLOAT [Double Precision]: -1
An indirectly specified device is monitored	
An index-modified device is monitored	A device value excluding the index modification part is displayed. (Example: "D0" is displayed for "D0Z0".)

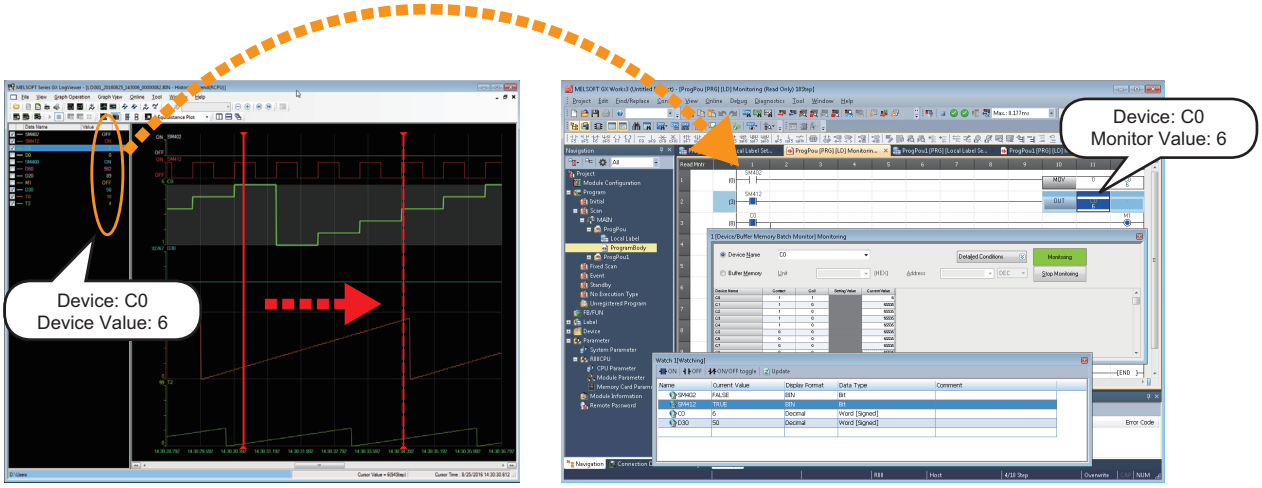
■Active status of blocks/steps in an SFC program

Active status is not displayed on the SFC diagram editor.

All blocks are displayed as "Uncreated Block" on all SFC blocks batch monitor.

Checking logging data

A value of logging data displayed in GX LogViewer can be displayed on the monitor screen of GX Works3.
When moving the red cursor of GX LogViewer, a monitor value in GX Works3 is also changed accordingly.
To use this function, the latest GX LogViewer is required to be installed.
This function is available only for binary format logging files that are output from an RCPU or an FX5CPU.

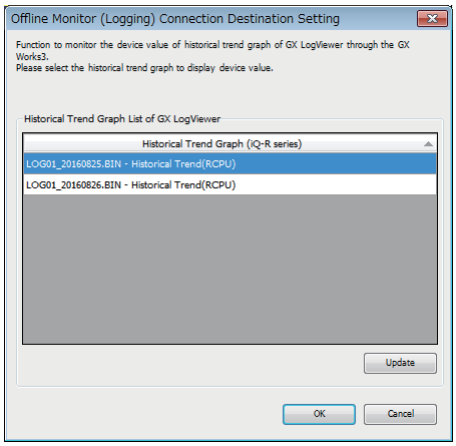


Selecting a target monitor

Start GX LogViewer, and open a logging file on which the offline monitor function is performed.

Window

[Debug] ⇨ [Offline Monitor] ⇨ [Offline Monitor (Logging)] ⇨ [Connection Destination Setting]



Select a logging file on the "Offline Monitor (Logging) Connection Destination Setting" screen, and click the [OK] button.
"Offline Monitor" is displayed on the status bar.

Precautions

- A logging file is not displayed in the list when opening the "Offline Monitor (Logging) Connection Destination Setting" screen in GX Works3 before opening the logging file in GX LogViewer. Open a logging file in GX LogViewer, and click the [Update] button on the "Offline Monitor (Logging) Connection Destination Setting" screen.
- A logging file is not displayed in the list when performing any of the following functions in GX LogViewer.
  [Graph View] ⇨ [Change the Data to Draw Graphs]
  [Graph Operation] ⇨ [Show Previous Graph] or [Show Next Graph]

Performing the offline monitor function

Operating procedure

1. Start monitoring in GX Works3. (☞ Page 418 Starting/stopping monitoring)
2. Move the red cursor in the "Historical Trend" window of GX LogViewer.

An updated device value in the graph legend area is displayed on the monitor of GX Works3.

■Online operation while the offline monitor function is being performed

While the offline monitor function is being performed, the following online functions are available.

- Monitor on a program editor
- Device/buffer memory batch monitor
- Watch

Stopping the offline monitor function

Operating procedure

Select [Debug] ⇨ [Offline Monitor] ⇨ [Offline Monitor (Logging)] ⇨ [Disconnect Offline Monitor].

Monitoring stops on all screens in GX Works3.

■Pausing and restarting the offline monitor function

When stopping monitoring in GX Works3, the offline monitor function pauses only for the stopped screen.

When restarting monitoring in GX Works3, the offline monitor function also restarts.

Considerations

■Active status of blocks/steps in an SFC program

Active status is not displayed on the SFC diagram editor.

All blocks are displayed as "Uncreated Block" on all SFC blocks batch monitor.

■Conditions that monitored values are not displayed properly

When any of the following conditions is satisfied, a monitor value is not displayed properly.

Condition	Value
A device value to be monitored does not exist in a file opened in the "Historical Trend" window	The following values are displayed. • Bit device, bit-specified word device: FALSE (0) • Word device, double-word device, FLOAT [Double Precision]: -1
A device that exists either in the lower bit or the upper bit is monitored by specifying in double-word format	
An indirectly specified device is monitored	
An index-modified device is monitored	A device value excluding the index modification part is displayed. (Example: "D0" is displayed for "D0Z0".)
A project which was written to a CPU module when a logging file was output and a project to monitor do not match.	If label assignment status is inconsistent between in a logging file and in a project to be monitored, values that are different from the ones displayed in the "Historical Trend" window of GX LogViewer may be displayed.

■Conditions that labels can be monitored

Labels can be monitored only when all of the following conditions are satisfied.

- GX Works3 Version 1.045X or later is used.
- GX LogViewer Version 1.82L or later is used.
- Monitoring is performed in the project which was written to a CPU module when a logging file was output
- Label assignment status is consistent between in a logging file and in a project to be monitored.

18 CHECKING/CHANGING MODULE OPERATION

The operation status of a CPU module and remote head module can be checked, and their operations can be changed in GX Works3.

CPU module

Purpose	Function name	Reference
To set the clock on a CPU module	Clock setting	Page 508 Clock Setting in a CPU Module
To switch the operation status of a CPU module connected to GX Works3 to RUN/STOP/PAUSE/RESET	Remote operation	Page 509 Remote Operation
To perform the functions of CPU modules in a redundant system configuration	System switching Operation mode change Memory copy Control system forced start while waiting for the other system started Redundant function module communication test System A/B setting	Page 511 Redundant Programmable Controller Operations
To perform the functions of RnPSFCPUs and RnSFCPUs	Safety operation mode switching Identification check for safety data	Page 513 Safety Programmable Controller Operations
To perform the functions of RnPSFCPUs	Safety module operation	Page 516 Safety module operation
To check the usage of data memory	CPU memory operation	Page 517 Checking Memory Usage
To clear values in data memory	Clear value	Page 518 Initializing/Clearing Memory

Remote head module

Purpose	Function name	Reference
To switch the operation status of a remote head module connected to GX Works3 to the RUN/STOP/PAUSE/RESET status	Remote operation	Page 509 Remote Operation
To perform the functions of remote head modules in a redundant system configuration	System switching	Page 511 Redundant Programmable Controller Operations
To check the usage of data memory	CPU memory operation	Page 517 Checking Memory Usage
To clear values in data memory	Clear value	Page 518 Initializing/Clearing Memory

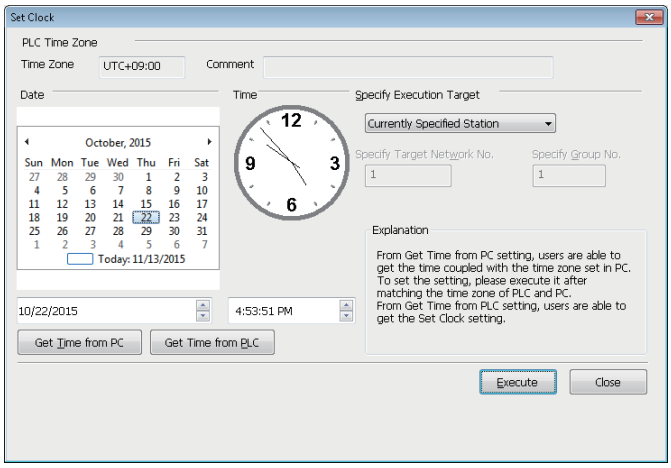
18.1 Clock Setting in a CPU Module

This section explains the setting method of the clock on a CPU module.

Remote head modules do not support it.

Window

[Online] ⇨ [Set Clock]



Operating procedure

Set the following items and click the [Execute] button.

Execution target	Description
Currently Specified Station	Select this to set the clock only upon the station specified in the connection destination setting.
All Stations Specified*1	Select this to perform the clock setting on the station specified in the connection destination setting and all the stations on the same network. Set a target network with "Specify Target Network No.".
Specify Group No.*1	Select this to perform the clock setting on the station specified in the connection destination setting and each station of the specific group on the specified network. Set a target network in "Specify Target Network No.", and set a group number in "Specify Group No.". The clock setting cannot be performed for CC-Link IE Field Network because it does not have group number.

*1 FX5CPUs do not support it.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.

An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Backup mode	Applied to both systems (order: control system → standby system).
Separate mode	Applied to the CPU module in the connective system.

Precautions

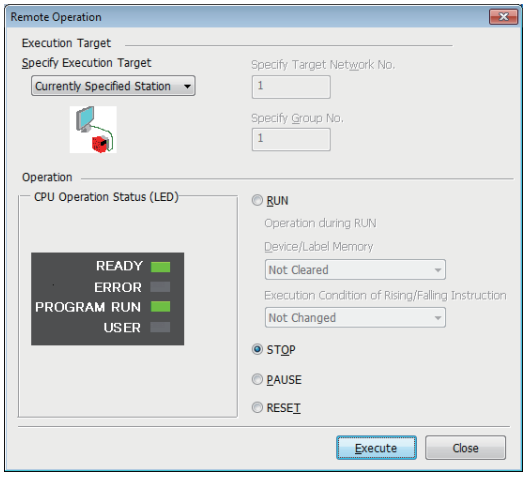
- The clock in a CPU module can be set regardless of the ON/OFF state of the clock setting device 'SM210'.
  Note that the ON/OFF state of 'SM210' does not change upon the clock setting.
- In the clock setting, a time-lag may occur due to the transfer time.
- The same time is set even if different time zones are specified between a connected station and another station.

18.2 Remote Operation

This section explains the method for switching the execution status of a CPU module and remote head module (such as RUN/STOP) in GX Works3.

Window

[Online] ⇨ [Remote Operation]



The screen above is an example when connecting with an RnCPU.

Operating procedure

Set the following items and click the [Execute] button.

Execution target	Description
Currently Specified Station*1	■CPU module Select this to perform the remote operation only on the station specified in the connection destination setting. ■Remote head module in a redundant system configuration • When starting from [Online] ⇨ [Remote Operation]: the remote operation is performed on the system of the remote head module specified as the connection destination. • When starting from the "CC IE Field Diagnostics" screen: the remote operation is performed on the system of the remote head module specified as the diagnostics target.
All Stations Specified*2	Select this to perform the remote operation on the station specified in the connection destination setting and all the stations on the same network. Set a target network in "Specify Target Network No.".
Specify Group No.*2	Select this to perform the remote operation on the station specified in the connection destination setting and each station of the specific group on the specified network. Set a target network in "Specify Target Network No.", and set a group number in "Specify Group No.". The remote operation cannot be performed for CC-Link IE Field Network because it does not have group number.
Specify Both Systems*2	Select this to perform the remote operation on the both systems (control/standby) on the route specified on the "Specify Connection Destination" screen. This setting is applied for a CPU module in a redundant system configuration.

*1 When resetting a CPU module in a redundant system configuration and a remote head module, "Currently Specified Station/Specify Both Systems" is displayed.

*2 FX5CPUs and remote head modules do not support it.

Remote operation and RUN/STOP switch

When the operation to the CPU module differs by the remote operation, RUN/STOP switch, or remote RUN/PAUSE contact, the CPU module operates according to the priority shown below:

Operation to CPU module	Priority
STOP	1
PAUSE	2
RUN	3

The operating status after RUN/STOP switching on the CPU module or remote RUN/STOP contact operation are as follows.

Remote operation	CPU module switch		Remote RUN/STOP contact is ON (The CPU module is in STOP.)
	RUN	STOP	
RUN	RUN	STOP	STOP
STOP	STOP	STOP	STOP
PAUSE*1	PAUSE	STOP	STOP
RESET*2	Inoperable *3	RESET	RESET

*1 Remote head modules do not support it.
*2 Remote reset is required to be enabled in "Operation Related Setting" of "CPU Parameter".
*3 Operable when the CPU module is switched to STOP by remote operation.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.

An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Backup mode	■STOP Applied to both systems (order: control system → standby system). ■RUN, PAUSE Applied to both systems (order: control system → standby system). ■RESET Control system (specified): applied to both systems (order: control system → standby system). Standby system (specified): applied to the standby system only.
Separate mode	Applied to the CPU module in the connective system.

18.3 Redundant Programmable Controller Operations

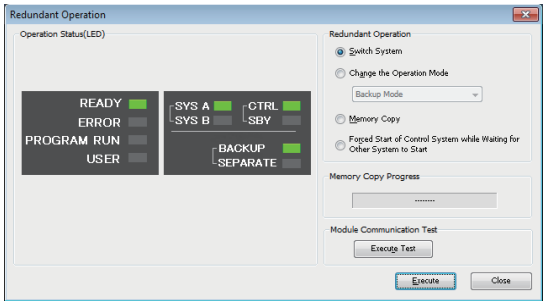
This section explains the method for operating redundant functions of both a CPU module and a remote head module in a redundant system configuration in GX Works3.

○: Supported, —: Not supported

Function name	RnPCPU (redundant mode)	RnPSFCPU	Remote head module
System switching	○	○	○
Operation mode change	○	—	—
Memory copy	○	○	—
Control system forced start while waiting for the other system started	○	○	—
Redundant function module communication test	○	○	—
System A/B setting	○	○	—

Window

[Online] ⇨ [Redundant PLC Operation] ⇨ [Redundant Operation]



System switching

The system of the current connection destination can be switched (control system → standby system).

This is allowed when the current connection destination is the control system, and the manual change permission flag (SM1646) is turned ON.

For details on the operation, refer to the following manuals.

📖MELSEC iQ-R CPU Module User's Manual (Application)

📖MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Operating procedure

Select "Switch System" on the "Redundant Operation" screen, and click the [Execute] button.

Operation mode change

The operation mode of the current connection destination can be changed (backup mode or separate mode.)

This is allowed when the current connection destination is the control system.

For details on the operation, refer to the following manual.

📖MELSEC iQ-R CPU Module User's Manual (Application)

Operating procedure

1. Select "Change the Operation Mode" on the "Redundant Operation" screen.
2. Select a new operation mode ("Backup Mode" or "Separate Mode"), and click the [Execute] button.

Memory copy from the control system to the standby system

To make the memory contents of the CPU modules in the control system and standby system consistent, the parameters and program etc. of the CPU module in the control system are transferred to the CPU module in the standby system.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Operating procedure

Select "Memory Copy" on the "Redundant Operation" screen, and click the [Execute] button.

Precautions

For the control system, the following operations and functions cannot be performed during memory copy; initialization of CPU memory operation, data writing to a programmable controller (including an operation while the CPU module is in RUN), memory copy, online program change, system switching, and operation mode change.

Control system forced start while waiting for the other system started

The CPU module, which is waiting the other system to start, can start as the control system.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Operating procedure

Select "Forced Start of Control System while Waiting for Other System to Start" on the "Redundant Operation" screen, and click the [Execute] button.

Redundant function module communication test

A communication test can be performed only for a redundant function module (R6RFM) on a standby system.
This function is available only when a CPU module on a standby system is directly connected to a personal computer.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Operating procedure

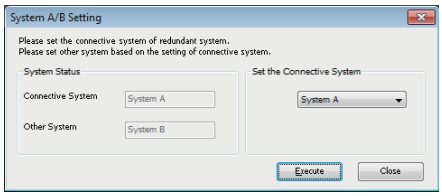
Click the [Execute Test] button on the "Redundant Operation" screen.

System A/B setting

Either the system A or system B can be set for the connected CPU module.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Window

[Online] ⇨ [Redundant PLC Operation] ⇨ [System A/B Setting]



Operating procedure

Select the system, which is set for the connective system, in "Set the Host System", then click the [Execute] button.

18.4 Safety Programmable Controller Operations

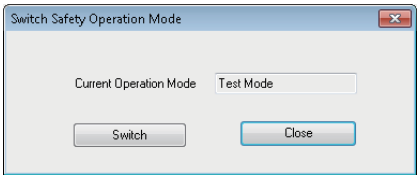
This section explains the method to perform the functions of an RnPSFCPU and an RnSFCPU with GX Works3.

Safety operation mode switching

The safety operation modes (safety mode or test mode) of a CPU module can be switched.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Window

[Online] ⇨ [Safety PLC Operation] ⇨ [Switch Safety Operation Mode]



Point

The safety operation mode of a running CPU module can be checked in the [Module Information List] tab on the "Module Diagnostics" screen.

Precautions

A project history is automatically registered when switching the safety operation mode.
For the method for checking registered histories, refer to the following section.
☞ Page 123 Displaying a history list

Considerations before switching the safety operation mode

⚠CAUTION

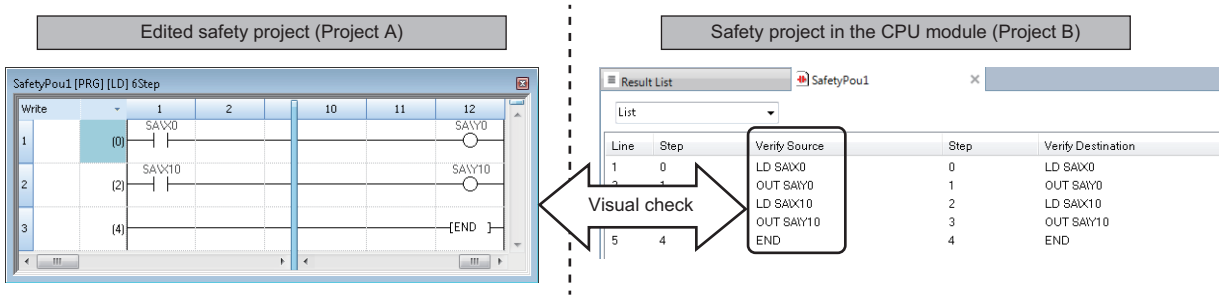
■Test the programs fully in the application environment before switching the mode to the safety mode.
■Before switching to the safety mode, ensure that the programs and parameters of the intended safety project have been written properly by the following operation.

Operating procedure

1. Save an edited safety project in the personal computer. (Hereinafter called 'Project A')
2. Start GX Works3, and write the programs and parameters of a safety project to CPU module. (☞ Page 392 Writing data to a programmable controller)
3. Test the programs fully in the application environment.
4. Start another GX Works3, and connect it to a CPU module to read the programs and the parameters. (☞ Page 398 Reading data from a programmable controller) (Hereinafter called 'Project B')
5. Visually check that there is no difference between Project A and Project B. (☞ Page 514 Checking programs, Page 514 Checking module parameters (Safety Communication Setting), Page 514 Checking parameters of safety remote I/O (slave station of CC-Link IE Field Network))

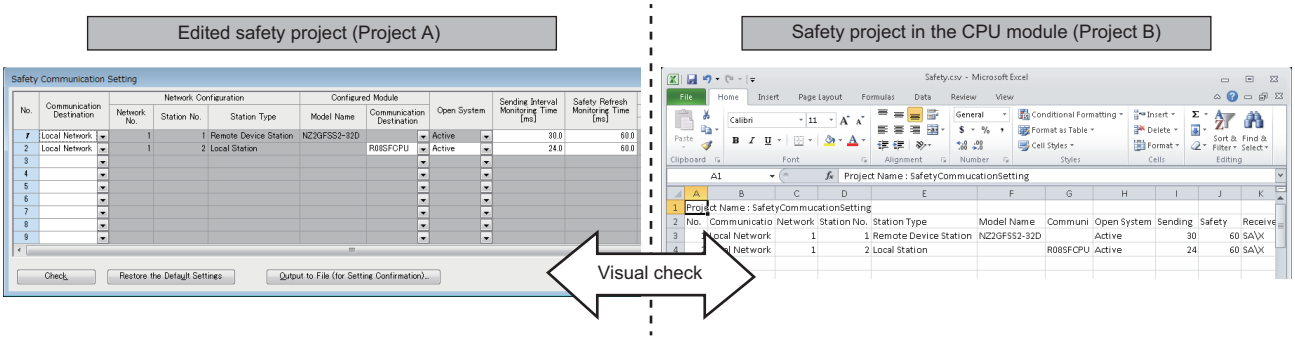
■Checking programs

To check whether intended programs were written properly, select "Project A" as the verification destination in Project B. Then, compare the verification source data the details of which are displayed in the "Verify Result" window with the project A data in a program editor.



■Checking module parameters (Safety Communication Setting)

To check whether intended parameters were written properly, output the module parameters in "Safety Communication Setting" of "Module Parameter" to a file. Then, compare the saved CSV file with the project A data in the "Safety Communication Setting" window.

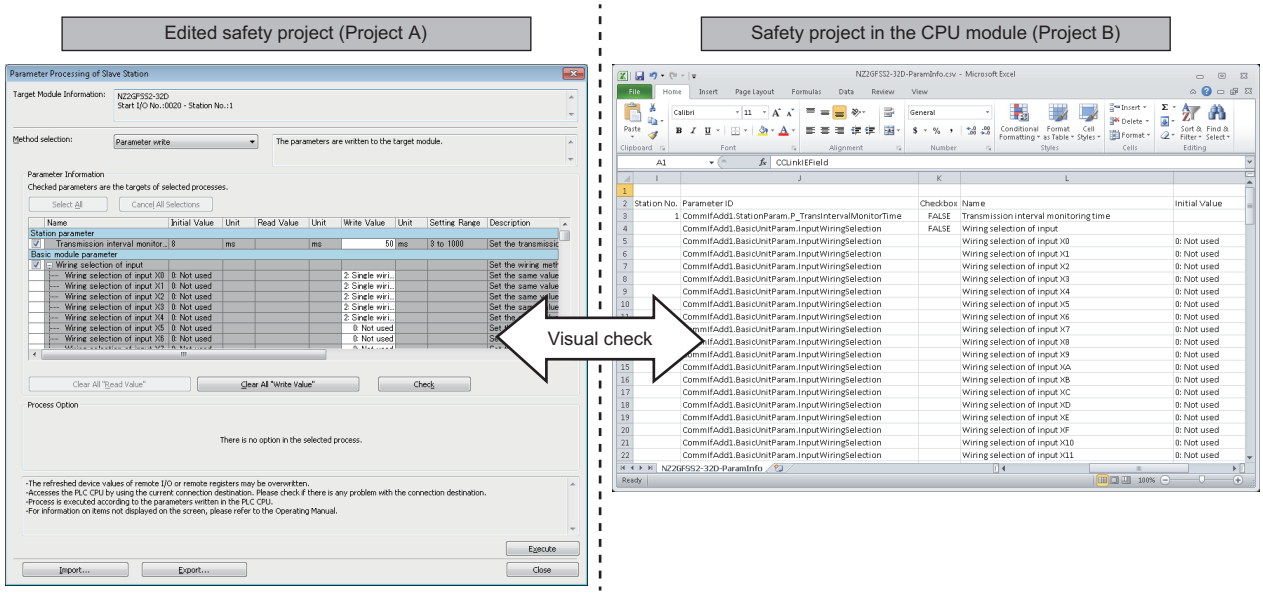


The figure above is a screen example in which Excel® is used. CSV files can also be checked by using other text editors.

■Checking parameters of safety remote I/O (slave station of CC-Link IE Field Network)

Check the following for all of the safety remote I/O modules in Project B.

Read the parameters from the slave station on CC-Link IE Field Network in Project B to a CSV file. Export the read parameters to a file. Compare the saved CSV file with the data on the "Parameter Processing of Slave Station" screen in Project A. Whether the intended parameters was written properly can be checked.



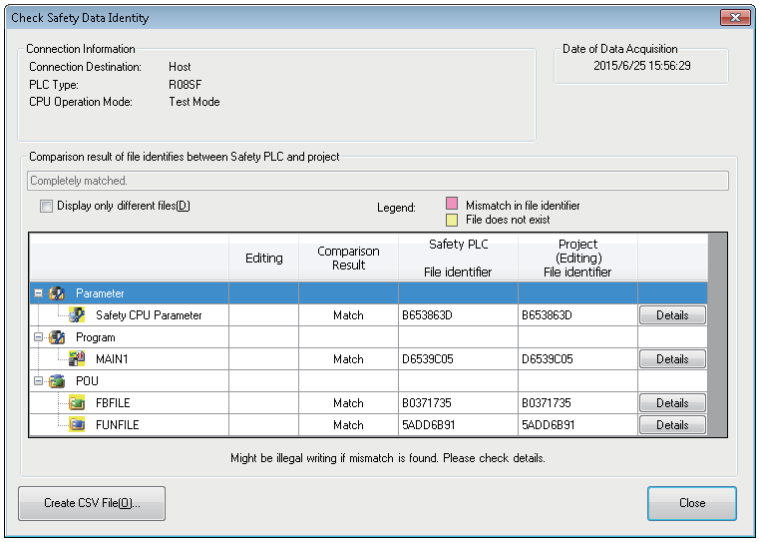
The figure above is a screen example in which Excel® is used. CSV files can also be checked by using other text editors.

Identification check for safety data

The consistency between a program to be used in the safety mode and the project written to a CPU module can be checked.
For details on the operation, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

Window

[Online] ⇨ [Safety PLC Operation] ⇨ [Check Safety Data Identity]



Checking whether the data in the project and in the CPU module are consistent

Check the result of compared data.

Checking whether the CPU module is running with the intended data

1. Save the information of Check Safety Data Identity in the CPU module as a CSV file using GX Works3 when the mode is changed to the safety mode after writing programs/parameters to the CPU module.
2. At a later date, perform the Check Safety Data Identity function with GX Works3, and check whether the "File identifier" in the saved CSV file and the one in the result are consistent.

If the data are not consistent, the data in the CPU module may not be the one written by the user. In this case, do not use the data in the actual operation.

Safety backup/restoration function

This function restores the backup data to a CPU module automatically.

Automatic restoration setting

Operating procedure

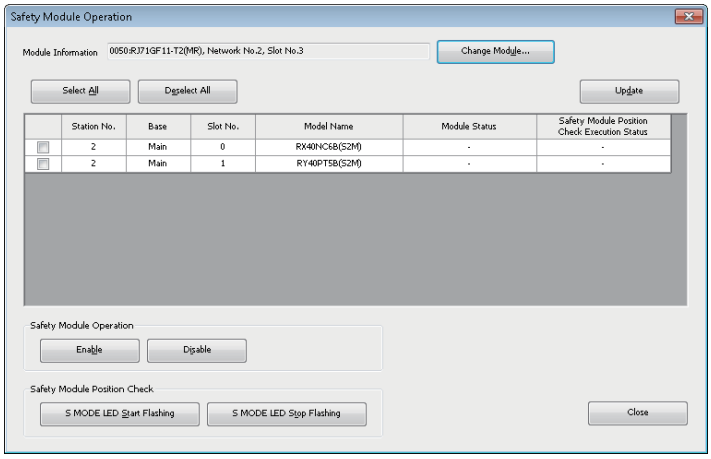
Select [Online] ⇨ [Safety PLC Operation] ⇨ [Automatic Restore Setting] ⇨ [Enable]/[Disable].

Safety module operation

The safety communication function can be enabled or disabled for a module used in a system using an RnPSFCPU.

Window

1. Select [Online] ⇨ [Safety PLC Operation] ⇨ [Safety Module Operation].
2. Select a module to operate on the "Safety Module Operation - Select Module" screen, and click the [OK] button.



Checking the position of a module

Check the mounting position of a module before enabling or disabling.

Operating procedure

1. Select a module to check the position.
2. Click the [S MODE LED Start Flashing] button.

After checking that the S MODE LED of the selected module is flashing, click the [S MODE LED Stop Flashing] button.

Enabling or disabling the safety communication function

The safety communication function can be switched to enable or disable for a module used in a system using an RnPSFCPU.

Operating procedure

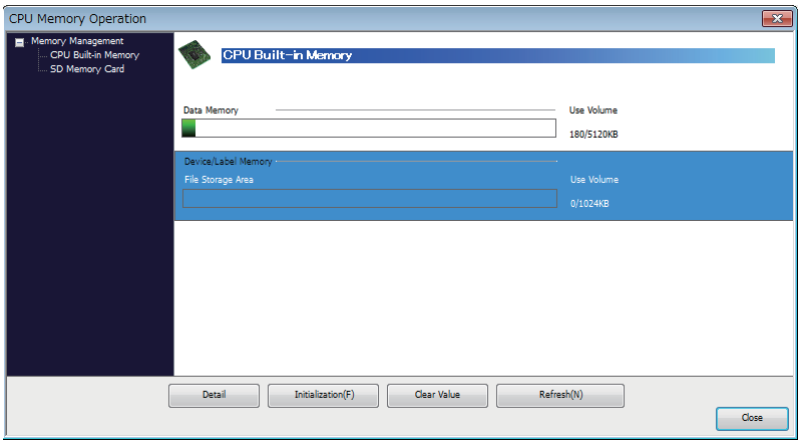
1. Select a module to enable or disable the safety communication function.
2. Click the [Enable] or [Disable] button.
3. Reset the remote head module, or turn the power OFF and ON.

18.5 Checking Memory Usage

This section explains the method for checking the usage of data memory and device memory/label memory built in a CPU module, and the SD memory card in the CPU module.

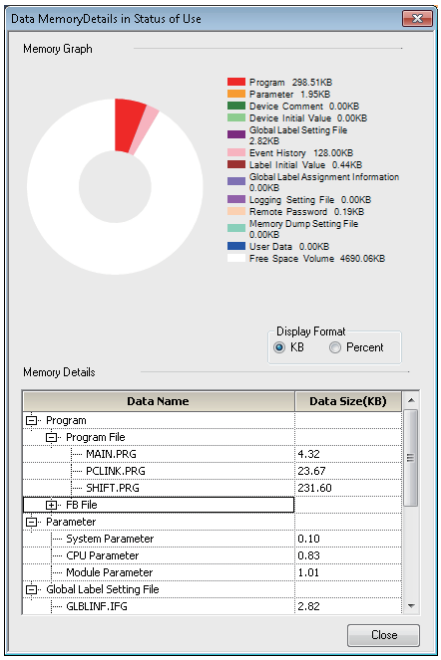
Window

[Online] ⇨ [CPU Memory Operation]



Details of memory usage

The details of current data memory, device/label memory, and data in an SD memory card can be checked by clicking the [Detail] button.



18.6 Initializing/Clearing Memory

This section explains how to operate memory (such as initialization and zero clear.)
For details on the memory operation, refer to the following manuals.
📖MELSEC iQ-R CPU Module User's Manual (Application)
📖MELSEC iQ-F FX5 User's Manual (Application)

Initializing data

Delete files in the data memory/device memory/label memory of the CPU module, or folders/files stored in the SD memory card.
Note that the information for the user authentication will not be deleted. To delete the information, initialize all information.
(☞ Page 472 When a user name and a password used in the User Authentication function are lost)
After initializing, rewrite the programmable controller data to the CPU module.
If the power of the CPU is turned OFF → ON or the CPU module was reset, the allocation for the device/label memory is back to the initial status. (Each area has the default capacity.)

Operating procedure

1. Select [Online] ⇨ [CPU Memory Operation]. (☞ Page 517 Checking Memory Usage)
2. Select "Data Memory" or "File Storage Area" on the "CPU Memory Operation" screen, and click the [Initialization] button.

When initializing an SD memory card, select "SD Memory Card" displayed on the left of the screen.

Precautions

Format a memory card to be used for CPU modules by using this function.
If a memory card is formatted using the function such as Windows® format function, it may not be used on a CPU module.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.
An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system).

Clearing values

Clear the values of devices, labels, and file registers to '0', and perform latch clear operation.

Operating procedure

1. Select [Online] ⇨ [CPU Memory Operation]. (☞ Page 517 Checking Memory Usage)
2. Select "Device/Label Memory" on the "CPU Memory Operation" screen, and click the [Clear Value] button.
3. Set each item on the "Clear Value" screen and click the [Execute] button.

Point

When the device initial value file/label initial value file is written in the CPU module, it can be initialized by resetting the CPU module.

■Operations when using CPU modules in a redundant system configuration

For an RnPCPU (redundant mode), the operations differ depending on the operation modes.
An RnPSFCPU operates only when selecting the backup mode for the operation mode.

Operation mode	Operation
Separate mode	Applied to the CPU module in the connective system.
Backup mode	Applied to both systems (order: control system → standby system).

APPENDIX

Appendix 1 Additions and Changes from Previous Version

This section shows the additions and changes with upgrade.

Functions, operability, and performance

Version 1.001B

Item	Description	Reference
Online program change	• Online program change on an instruction basis in ladder programs is supported. • Online program change for ST programs is supported. • Online program change after changing/deleting label initial values is supported.	Page 405 Writing Programs While a CPU Module is in the RUN State
Monitoring	• When using a constant label for an input argument of a function block, a constant value is displayed in monitoring.	Page 421 Checking Execution Programs on Program Editor
	• When display language in GX Works3 is changed, the language in an Intelligent Function Module Monitor window is also changed.	

Version 1.005F

Item	Description	Reference
Display language switching	• Display in Simplified Chinese is supported.	Page 39 Display Language Switching
Printing	• Printing the product information list is supported.	Page 74 Printing Data
Module tool list	The following settings are available. • "Offset/gain setting" under "Temperature Input" for "iQ-R Series" • "Q61LD Two-Point Calibration Setting" under "Analog Module" for "Q Series" • "Q61LD Default Setting" under "Analog Module" for "Q Series"	Page 148 Other Settings of Intelligent Function Modules
Interaction with iQ Works[*1]	• System labels are supported. • The parameter reflection function of MELSOFT Navigator and the parameter import function are supported.	Page 155 REGISTERING LABELS
Program check	• The program check function is supported.	Page 276 Checking a program
Diagnostic[*4]	• The CC-Link IE Controller Network diagnostic (Twisted pair cable) is supported.	Page 486 CC-Link IE Controller Network diagnostic
Memory dump[*3]	• The memory dump function is supported.	Page 495 Memory Dump Function

Version 1.007H

Item	Description	Reference
Creating a program	• Function Block Diagram/Ladder Diagram language is supported. [*3]	Page 223 Creating an FBD/LD Program
Module tool list	• "Analog input - Offset/gain setting" under "Analog Adapter" for "FX5 Series" is supported. • "Analog output - Offset/gain setting" under "Analog Adapter" for "FX5 Series" is supported.	Page 148 Other Settings of Intelligent Function Modules
Simple motion module setting	• The advanced synchronous control setting can be set on one screen, and the monitor function is supported.	Page 149 Simple Motion Module Setting function
Reading sample comments	• Sample comments is supported for a project in which an RD77MS is configured.	Page 275 Reading sample comments
Simulation	The following projects can be simulated. • Project used for an RnCPU • Project in which RD77MS is configured (It can interact with the simulation function of a project used for an RnCPU.)	Page 342 PROGRAM SIMULATION
Others	• Connected devices on the CC-Link IE Field Network can automatically be detected.	—

Item	Description	Reference
System label	• A system label change notification can be received automatically.	Page 175 Importing after checking the changes

Version 1.008J

Item	Description	Reference
Event history	• In the event history of an R12CCPU-V, script position information is added to the detailed information of the error code (3044h: program fault).	Page 493 Error History/Operation History Check

Version 1.010L

Item	Description	Reference
Verification	• Labels can be verified.	Page 116 Verifying Projects
Project revision history	• The project revision history function is supported.	Page 122 Project Revision History
Temporary ladder change	• An operation of a ladder block can temporarily changed in a ladder program.	Page 202 Changing ladder blocks temporarily
Search	• As one of the search functions, a function to search a global device and a local device individually is added.	Page 301 Searching/Replacing Devices/Labels
Library management	• A user library is supported.	Page 330 Enhancing Use of User Library
Simulation	• A project used for an RnPCPU can be simulated.	Page 342 PROGRAM SIMULATION
Diagnostic	• The MELSECNET diagnostic is supported for a project in which a Q series MELSECNET/H network module configured.	Page 490 MELSECNET diagnostic
Options	The following option is added. • "Convert" ⇨ "Online Program Change" ⇨ "Operational Setting" ⇨ "Write device comment"	Page 67 Option Setting for Each Function

Version 1.015R

Item	Description	Reference
Creating a program	• Sequential Function Chart language is supported for a project used for an RnCPU, RnENCPU, and RnSFCPU. *3	Page 240 Creating an SFC Program
Creating an SFC program	• Module labels of an RnCPU and sample comments are supported for an SFC program.	Page 168 Registering Module Labels Page 275 Reading sample comments
Element selection window	• Elements of RnCPUs and RnPCPUs are displayed in order by their capacity.	Page 45 Element selection window
Opening a GX Works2 format project	The following items can be imported. • The boot file setting, SFC setting, and multiple CPU setting of PLC parameters • A structured ladder program, FBD program, and device memory of an FXCPU (FX3U/FX3UC) • The settings of CC-Link IE Field and CC-Link IE Control of network parameters • The setting of a QD75 type positioning module in intelligent function modules. For considerations when reading a GX Works2 format SFC program in GX Works3, refer to the technical bulletin FA-D-0192.	Page 89 Opening a GX Works2 format project
Verification	• Differences of a ladder diagram can be checked in the detailed display of a ladder program (ladder diagram format).	Page 120 Detailed display (ladder diagram format)
Reading a module configuration	• Module configuration can be read from the actual module in a project used for an FX5CPU.	Page 129 Reading the module configuration from an actual system
Module tool list	• Temperature control modules (R60TCTRT2TT2, R60TCTRT2TT2BW, R60TCRT4, R60RCRT4BW) are supported.	Page 148 Other Settings of Intelligent Function Modules
Execution order setting	• The execution order setting of program blocks can be set.	Page 180 Program Execution Order and Execution Type Settings
Confirm memory size	• A memory size can be calculated offline.	Page 288 Calculating Memory Size
I/O system setting	• Operations of an input/output device can be simulated by using this function.	Page 361 Simulation of External Device Operations
Writing/reading data to/from a memory card	• Data can be written/read to/from a memory card inserted into a personal computer.	Page 415 Writing/Reading Data to/from Memory Card
Offline monitor	• Device data sampled by using the memory dump function can be monitored on the program editor.	Page 503 Checking Sampled Data on Program Editor
Diagnostic	The following can be detected in the CC-Link IE Field Network diagnostic. • Network connection status • Parameter setting status • Station type match status • Network number match status • Station number duplication occurrence status In addition, the error frame reception status can be detected in three stages according to the frequency.	Page 488 CC-Link IE Field Network diagnostic
	The following modules can be diagnosed. • CC-Link IE Field Network safety remote I/O modules (NZ2GFSS2-32D, NZ2EXSS2-8TE) • CC-Link IE Field Network remote I/O modules (NZ2GF2B1N1-16D/T/TE, NZ2GFCF1-32D/T/DT)	
Others	• The high-speed remote net mode of CC-Link IE Field is supported.	—
	• The receive buffer full detection signal is supported for a project in which an RJ71EN71 using Ethernet communication is configured.	
	• The safety communication function is supported for a project in which a CC-Link IE Field Network module is configured.	
Options	The following option is added. • "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Optimize the Number of Steps."	Page 67 Option Setting for Each Function

Version 1.020W

Item	Description	Reference
Creating a program	• Sequential Function Chart language is supported for an RnPCPU.	Page 240 Creating an SFC Program
Creating an SFC program	The following are improved in an SFC program. • Multiple initial steps can be edited on the SFC editor. • A jump can be edited on the SFC editor. • A Zoom can be copied on the SFC editor. • SFC Auto-scroll monitor can be used. • Block information can be searched and replaced.	Page 245 Inserting initial steps Page 250 Inserting/editing jumps (connection lines) Page 428 Monitoring with the SFC auto-scroll
Ladder editor	• When a contact is moved with a drag and drop operation while pressing the Shift key, lines are automatically drawn and the program of the original ladder block is completed. • After selecting a range by pressing the Shift + ↓ ← → ↑ keys, when the mouse cursor is moved back to the original position, the selected range is deselected.	Page 185 Entering ladders
FBD/LD editor	• When registering a label by entering a label name in an editor, a suitable data type for the label in the location where the element is to be added is displayed in the "Undefined Label Registration" screen. • A blank row between FBD network blocks and a blank column in the FBD network blocks can be deleted. • Multiple undefined FBs/FUNs can be updated in a batch. • Multiple rows can be inserted/deleted at the same time. • An element can be edited by pressing the Enter key or F2 key on the editor. • During monitoring, the background color of values of BOOL type labels and a continuity state of connectors can be set.	Page 228 Adding elements
Navigation window	• Scan programs can be sorted by execution order. • "Program Setting" in "CPU Parameter" in the parameter editor can be displayed by selecting a program execution type in the "Navigation" window and right-clicking [Program Setting] in the shortcut menu.	Page 43 Navigation window
Opening a project	• When opening a project, the process to open the work windows that were opened in the previous project can be cancelled by pressing the Ctrl + [Pause Break] key.	Page 87 Opening a project
Opening a GX Works2 format project	The following items can be imported. • Structured ladder program used for an FXCPU (FX3U/FX3UC) • Setting for the CC-Link and Ethernet of network parameters • Setting of an analog module and a high-speed counter module of intelligent function modules • The boot file setting, SFC setting, and multiple CPU setting of PLC parameters	Page 89 Opening a GX Works2 format project
Verification	• An FBD/LD program and an SFC program can be verified with ones in a CPU module. • The verification result of an SFC program and a Zoom can be checked in the detailed display.	Page 403 Verifying Programmable Controller Data Page 121 SFC programs
Temporary ladder change	• Only a ladder program changed temporarily can be displayed in the list of the line statements. • When changing the operation of a specific ladder block temporarily, an unused pointer device can be entered. • When a character string is entered, it can be registered as a pointer type label.	Page 203 Displaying ladder blocks changed temporarily in a list
Program check	• The program check function is supported for a project used for an FX5CPU.	Page 277 Program check
Library management	• A user library is supported for a project used for an FX5CPU.	Page 331 Creating a library file
Library	• A library POU to be exported can be selected individually. • Multiple library POUs can be selected in the library list. • A help file can be set and displayed from the library list.	Page 331 Creating a library Page 334 Enhanced use of libraries
Simulation	The following are supported by the simulation function. • Project used for multiple CPUs • Project used for an RnSFCPU • Project used for an RnENCPU In addition, the following are supported by the simulation function. • SFC program execution in a project used for an RnCPU • Simulation of a project in which multiple RD77MSs are configured (SMM Simulator2) • I/O system setting (process response operation)	Page 346 System Simulation
Diagnostic	The following modules can be diagnosed. • CC-Link IE Field Network remote I/O modules (NZ2GFCF1-32D, NZ2GFCF1-32T, Z2GFCF1-32DT)	Page 488 CC-Link IE Field Network diagnostic
Import/export of device comments	• Multiple device comments can be imported/exported in a batch.	Page 273 Importing to/exporting from device comments

Item	Description	Reference
Specifying a connection destination	• Multiple connection destination settings can be created.	Page 371 Specification of Connection Destination
Online data operation	• The selection status of data can be changed for each data in the [Write] tab of the "Online Data Operation" screen.	Page 390 Configuration of Online Data Operation screen
Monitor	• When an FB program is opened while monitoring a program, the FB instance starts monitoring.	Page 418 Starting/stopping monitoring
Installation of a USA driver	• A USB driver is installed simultaneously with the installation of GX Works3.	Page 591 USB Driver Installation Procedure
Options	The following option is added. • "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" ⇨ "Enable Rebuild All (Reassignment)"/"Enable Rebuild All (Retain)"/"Enable Conversion"	Page 67 Option Setting for Each Function
Others	• The amplifier-less operation function of a positioning module (RD75D2/D4/P2/P4) is supported.	—
	• Sample comments and the intelligent function module monitor function are supported for a project in which a MES interface module (RD81MES96) is configured.	
	Daylight saving time can be adjusted for the following modules. • RnCPU (R04CPU, R08CPU, R16CPU, R32CPU, R120CPU) • RnENCPU (R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU)	

Version 1.022Y

Item	Description	Reference
Creating an FBD/LD program	• A function to align an FBD network block on the FBD/LD editor to the left side is supported.	Page 231 Layout correction
Checking programs	• The syntax check function is supported in a project used for an RnCPU.	Page 276 Syntax check
Writing to a programmable controller Online program change	• In an RnCPU, RnENCPU, and RnSFCPU, whether to check the duplication of POU names can be selected.*3	Page 392 Writing data to a programmable controller Page 408 POU duplication check
Online program change	• The program restoration information can be written in the background process.*3	Page 409 Program transfer when a CPU module is in RUN state
Conversion	• In a project used for an RnCPU, the free space of the label memory area can be displayed in the "Output" window when the following processes are completed; converting any or all programs, or performing the online program change function.	—
Others	The following are supported for a project in which an RD77GF is configured. • Linear servo motor control mode/direct drive motor control mode/fully closed loop control mode • Synchronous encoder via a servo amplifier	—
Options	The following option is added. • "Program Editor" ⇨ "Ladder Editor" ⇨ "Verify" ⇨ "Verify Setting" ⇨ "Detailed Result Verification Selection"	Page 67 Option Setting for Each Function

Version 1.025B

Item	Description	Reference
OS	• Windows® 10 is supported.	—
Changing the module type/ operation mode	• The module type can be changed from an FX5CPU to an R04CPU.	Page 114 Changing the Module Type and Operation Mode of Projects
Creating a ladder program	The following are supported. • Switching showing or hiding grids, and setting the grid color • Displaying a comment in the continuous pasting function • Returning to an edited ladder program to the state before the edition. • Replacing a ladder program in the read mode • Adjusting the size of the editor to the width of a window	Page 182 Creating a Ladder Program
Creating an ST program Creating an FBD/LD program	The following are supported. • Registering devices/labels in the Watch window automatically • Displaying 'Warning' when type conversion is performed automatically • Changing the display color of devices, labels and comments • Creating multiple worksheets	Page 217 Creating an ST Program Page 223 Creating an FBD/LD Program Page 110 Adding worksheets
FBD/LD editor SFC editor	• An editor is zoomed in and out on the cursor position.	Page 223 Creating an FBD/LD Program Page 240 Creating an SFC Program
Specifying a connection destination	• The GOT transparent function performed via CC-Link IE Control Network is supported.	—
	In a project used for an RCPU and remote head module, connection via a following network interface board is supported. • CC-Link IE Controller Network interface board • CC-Link IE Field Network interface board • CC-Link Ver.2 board • MELSECNET/H board	Page 38 Connection through I/F boards
Printing	• This function is improved to print a selected page.	Page 74 Printing Data
Opening a GX Works2 format project	• A function to open a GX Works2 user library is supported in a project used for an FX5CPU.	Page 89 Opening a GX Works2 format project
Project management Exporting libraries	• An iQ AppPortal information file can be output.	Page 105 Saving a project
Verification	• Module parameters of a CPU module can be verified.	Page 117 Parameters
XY assignment display	• A function to display XY assignment information on a module configuration diagram and in the "Navigation" window is supported.	Page 136 XY assignment display
Execution order setting	• The execution order of multiple worksheets can be set.	Page 181 Worksheet execution order setting
Device comment	• Device comments can be exported to a file for each device type.	Page 274 Export
Program check	• The syntax check function is supported in a project used for an FX5CPU.	Page 276 Syntax check
Search/replacement	• In a ladder editor, a range for search or replacement can be specified.	Page 300 Range specification in editors
Device batch replacement	• When a character string is pasted onto the cell in the "Replace Device" row, the value set for "Points" will be remained.	Page 307 Batch Replacing of Devices and Labels
Device/buffer memory batch monitor	• Bit visibility is improved.	Page 431 Checking Device/Buffer Memory in Batch
Watch	• Visibility of bit devices and bit type labels are improved.	Page 434 Checking Current Values by Registering Devices/ Labels
Cross reference	• The current window can be specified as a search target.	Page 309 Displaying cross reference information
Cross reference Watch	• A comment can be edited using a shortcut menu.	Page 434 Checking Current Values by Registering Devices/ Labels Page 309 Displaying cross reference information
Unused label list	• A function to display unused labels in the list format is supported.	Page 312 Displaying a list of unused labels
Library management	• Libraries using a module label and/or structure can be exported. • A sample library is supported for a project used for an FX5CPU.	Page 335 Utilizing an element Page 331 Creating a library file

Item	Description	Reference
Simulation	• A project for an FX5CPU can be simulated.	Page 342 PROGRAM SIMULATION
Writing to a programmable controller Online program change	• In a project used for an RnPCPU (process mode/redundant mode), whether or not to check the duplication of POU names can be selected.*3	Page 392 Writing data to a programmable controller Page 408 POU duplication check
Diagnostic	The following modules can be diagnosed. • CC-Link IE Field Network remote I/O modules (NZ2GF2B1N1-16D, NZ2GF2B1N1-16T, NZ2GF2B1N1-16TE)	Page 488 CC-Link IE Field Network diagnostic
Project management	• Labels and FBs/FUNs can be hidden in the "Navigation" window.	—
Conversion	• In a project used for an FX5CPU, the free space of the label memory area can be displayed on the "Output" window when the following processes are completed; converting any or all programs, or performing the online program change function.	—
Parameter	The following functions for RnCPUs and RnENCPUs can be used. • File transfer function (FTP client) • CPU module data backup/restoration function • iQ Sensor Solution data backup/restoration function	—
Module label	• Module labels can easily be updated.	—
Module tool list	• A remote head module (RJ72GF15-T2) is supported (creation of wave output data).	Page 148 Other Settings of Intelligent Function Modules
Others	• An RnPCPU (redundant mode) is supported.	—
	• The high-speed logging mode of an analog module (Q64ADH) is supported.	
	• A redundant power supply system is supported for a project used for an RnCPU, RnENCPU, and RnPCPU (process mode/redundant mode.	
	A redundant power supply system is supported for a project in which the following modules are configured. • CC-Link system master/local module (RJ61BT11) • CC-Link IE Field Network master/local module (RJ71GF11-T2) • CC-Link IE Controller Network-equipped module (RJ71GP21-SX) • Ethernet interface module (RJ71EN71)	
	• The label initial value reflection setting function for RnPCPUs can be used.	

Version 1.030G

Item	Description	Reference
Network configuration	• The "AnyWireASLINK Configuration" window is supported for a project used for an RnCPU.	Page 142 Setting network configuration and target devices
Importing/exporting ladder programs	The following are supported. • Import/export of a CSV file • Export to a HTML file	Page 206 Importing/exporting ladder programs
Creating an FBD/LD program	The following are supported. • Displaying devices assigned to labels on the FBD/LD editor. • Using devices assigned to global labels for label input. • Wrapping a comment and a label name to display. • Displaying the "Undefined Label Registration" screen for labels with member notation '.' and array notation '[ ]'. • Searching or replacing a target by specifying a range	Page 223 Configuration of FBD/LD editor Page 228 Entering programs Page 223 Configuration of FBD/LD editor
Creating an SFC program	The following are supported. • MELSAP-L (instruction format) display • Displaying devices assigned to labels of an FBD/LD element • Opening a new window in a block start step during monitoring with the SFC auto-scroll	Page 244 Display format of action/transition Page 241 Configuration of SFC diagram editor Page 428 Monitoring with the SFC auto-scroll
Opening a GX Works2 format project	Parameters of the following modules can be imported in a project used for an RCPU. • Serial communication module • Temperature input module • Temperature control module • Simple motion module • Input module • Output module • I/O module • Interrupt module	Page 89 Opening a GX Works2 format project
Opening another format file	• Assignment of global labels are retained in a project used for an FX5CPU.	—
Opening another format file (GX IEC Developer format)	• An ASCII format file exported in GX IEC Developer can be opened.	Page 97 Opening a GX IEC Developer format project

Item	Description	Reference
Verification	• A device comment and device memory can be verified in project verification. • CPU module parameters can be verified in a project used for an FX5CPU.	Page 116 Verifying Projects
Cross reference	• In an FBD/LD program, the data type of an FB/FUN using devices/labels as arguments can be displayed. • MELSAP-L (instruction format) is supported.	Page 308 Displaying Device and Label Reference Information in a List
Unused label list	• A function to delete a label from the unused label list is supported.	Page 312 Displaying a list of unused labels
Simulation	The following are supported. • Simulation of a project used for an RnPCPU (redundant mode) • Simulation of a project in which an RnMTCPU is configured (MT Simulator2) • Simulation of a project in which an RD77GF is configured (SMM Simulator2) • The I/O system setting of a project used for an FX5CPU • Label initialization control function of RnPCPUs	Page 342 PROGRAM SIMULATION
Specifying a connection destination	• The GOT transparent function via CC-Link IE Field Network is supported for a project used for an RCPU. • The GOT transparent function via CC-Link IE Control Network is supported for a project used for an RnPCPU (redundant mode) and remote head module.	—
Writing/reading data to/from a memory card	• Data can be written to/read from a memory card in a project used for an FX5CPU.	Page 415 Writing to/Reading from a memory card
Registering/canceling forced input/output[*3]	• When GX Works3 is connected with an RnCPU or RnENCPU, X/Y devices can be turned ON/OFF forcibly.	Page 438 Turning Input/Output Device ON/OFF Forcibly
Offline monitor	• Values of logging data displayed in GX LogViewer can be monitored on the program editor by using the offline monitor function.	Page 505 Checking logging data
Intelligent function module monitor	• The intelligent function module monitor function is supported in a project used for an FX5CPU.	Page 445 Checking Current Values in Intelligent Function Module
Diagnostic	• The CC-Link IE Field Network Basic diagnostic is supported for a project used for an RnCPU, RnENCPU, and FX5CPU.	Page 489 CC-Link IE Field Network Basic diagnostic
	The following modules can be diagnosed. • CC-Link IE Field Network multiple input module (voltage/current/temperature) (NZ2GF2S-60MD4) • CC-Link IE Field Network analog-digital converter module (NZ2GFCE-60ADI8, NZ2GFCE-60ADV8) • CC-Link IE Field Network digital-analog converter module (NZ2GFCE-60DAI8, NZ2GFCE-60DAV8)	Page 488 CC-Link IE Field Network diagnostic
FX5CPU	The following functions are available. • Event history • Data logging • File transfer function (FTP server) • CC-Link IE Field Network Basic	Page 493 Error History/Operation History Check Page 501 Data Logging Function
	• A device connected with GX Works3 on Ethernet can automatically be detected. • The "Device/Label Memory Area Detailed Setting" screen is added in "Device/Label Memory Area Setting" of "CPU Parameters". Parameters can easily be set and displayed in this screen. • Parameters for FX5CPU built-in functions can be verified.	—
Options	The following options are added. • "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Enable the ladder editing by mouse operation" • "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Language Used by Instruction Conversion of String Operation"	Page 67 Option Setting for Each Function
Writing to a programmable controller	• A project with no labels can individually be written to a CPU module.	Page 392 Writing data to a programmable controller
Navigation window	Even if labels, functions, and function blocks are hidden, the following data is displayed. • A statement for which "Display in Navigation Window" is selected in the "Input Line Statement" window. • Multiple worksheets	Page 43 Navigation window
Monitor	• The visibility of a ladder editor with a low magnification is improved.	Page 416 CHECKING OPERATION OF PROGRAMS
Ladder editor	• A statement can be set for an END instruction.	Page 182 Creating a Ladder Program
System parameter	• When opening a system parameter, other screens, such as a parameter editor and module configuration diagram, are closed.	Page 139 Setting system parameters

Item	Description	Reference
Confirm memory size	• "Byte" or "Step" can be selected from "Display Unit" in the "Confirm Memory Size (Offline)" screen.	Page 288 Calculating Memory Size
Others	• When installing GX Works3, GX LogViewer and CPU Module Logging Configuration Tool can be installed at the same time.	GX Works3 Installation Instructions

Version 1.032J

Item	Description	Reference
Creating a ladder program	• The setting values of a timer and a counter used in a ladder can be changed in a batch.	Page 199 Changing TC setting values
Creating an FBD/LD program	• A link can be set between a comment element and an element. • FBD Network Blocks can be displayed in a list.	Page 236 Linking a comment Page 238 Displaying FBD network blocks in a list
Creating an SFC program	• A link can be set between a comment element and an element.	Page 262 Linking a comment
Process control function	• A process control system is supported for a project used for an RnPCPU (process mode/redundant mode).	Page 19 Process Control System
Element selection window	Data selected in the [Library] tab in the "Element Selection" window can be added to a project using the following menu. • Right-click data and select [Add to Project] in the shortcut menu	Page 45 Element selection window
Options	The following options are added. • "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" ⇨ "Enable Rebuild All (Reassignment)"/"Enable Rebuild All (Retain)"/"Enable Conversion" • "Monitor" ⇨ "FBD/LD editor" ⇨ "Display Setting" ⇨ "Use Same Display Format for Contact as Device/Label Current Value"	Page 67 Option Setting for Each Function
Opening a PX Developer format project	• A PX Developer format project created in PX Developer can be opened.	Page 92 Opening a PX Developer format project
Verification	• FB files and FUN files can be verified. • A device comment, device memory, and file register written in a CPU module can be verified. • After verifying program files, the details of the result can be checked. • Consistent ladder blocks are not displayed in a verification result of a ladder program.	Page 116 Verifying Projects Page 403 Verifying Programmable Controller Data Page 120 Ladder programs
System configuration	• An RnENCPU and a motion control CPU can be used together in a multiple CPU system.	Page 133 Multiple CPU configuration
Online data operation	Data to display in the "Online Data Operation" screen can be selected by setting the following menu. • [Setting] ⇨ [Set Favorites]	Page 390 Configuration of Online Data Operation screen
Writing to a programmable controller	• When a module label is not used in "Refresh Setting" of "Module Parameter", the checkbox of "Module Parameter" is not selected even when "Global Label" is selected in the "Online Data Operation" screen.	Page 392 Writing data to a programmable controller
Register/cancel forced input/output	• The "Register/Cancel Forced Input/Output" screen can be displayed using the icon in the monitor status bar.	Page 419 Status monitoring
Monitor	• When "MELSAP-L (Instruction Format)" is used as the display format of an SFC diagram editor, the monitor value where the cursor is placed is highlighted in monitoring.	Page 427 MELSAP-L (instruction format)
Diagnostic	• The sensor/device monitor function is supported.	Page 482 Sensor/Device Status Check
	The following modules can be diagnosed. • CC-Link IE Field Network remote I/O modules (NZ2GF2B1-32D, NZ2GF2B1-32DT, NZ2GF2B1-32DTE, NZ2GF2B1-32T, NZ2GF2B1-32TE)	Page 488 CC-Link IE Field Network diagnostic
Simulation	• The latch function can be used.	Page 557 Supported CPU module functions
Others	• When a constant or bit device (X, Y, M, L, SM, F, B, SB) is set for the second argument of the dedicated function 'G(P).OFFGAN', a conversion error occurs.	—

Version 1.035M

Item	Description	Reference
Creating a ladder program	• Pasting to the input/output circuit parts of a function block and function is supported. • The device comment editor can be opened in a program editor with the menu or shortcut key. • The width of all the selected columns can be changed. • Lines remain after deleting an instruction in "Insert mode". • When an element is pasted to the position where a line cannot be pasted, only the element is pasted. • After pressing the F2 key to edit a device name, the edit can be cancelled by pressing the Esc key.	Page 270 Displaying the device comment editor in a program editor
	The display magnification of all ladder editors can be set in a batch by setting the following menu. • [View] ⇨ [Zoom] ⇨ [Set Zoom Factor]	
Importing/exporting ladder programs	• Ladder programs can be exported to a text file.	Page 214 Exporting to a text file
Creating an ST Program	• Usable instructions in an ST program are added. • The device comment editor can be opened in a program editor with the menu or shortcut key.	Page 270 Displaying the device comment editor in a program editor
Creating an FBD/LD program	• Connecting elements automatically can be disabled. • The device comment editor can be opened in a program editor with the menu or shortcut key. • The display order of comment elements can be changed.	Page 229 Common operations of elements Page 270 Displaying the device comment editor in a program editor
Creating an SFC program	• The device comment editor can be opened in a program editor with the menu or shortcut key. • The display order of comment elements can be changed.	Page 270 Displaying the device comment editor in a program editor
Print	An FBD/LD program can be printed according to the setting in the following option. • "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Element (Ladder Symbol)" ⇨ "Display Format" ⇨ "Numbers of Wrapping Rows for Device/Label Name"	Page 74 Printing Data
Creating a function block and function	• "Use MC/MCR to Control EN" can be set for a subroutine type function block in a project used for an RnCPU and an RnENCPU.*3	Page 318 Creating new data
Options	The following options are added. • "Project" ⇨"Auto-save" ⇨ "Operational Setting" ⇨ "Save project after conversion"/"Save project after Write to PLC"/"Save project after Online Program Change"/"Save project after changing TC Setting Value and writing to PLC" • "Find/Replace" ⇨ "Common Item" ⇨ "Operational Setting" ⇨ "Distinguish DX/DY device from X/Y device when X/Y device is specified"	Page 67 Option Setting for Each Function
	The following option can be used in a project for FX5CPU. • "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Optimize the Number of Steps."	
Opening a GX Works2 format project	• The parameters of a triac output module (QY22) are imported.	Page 89 Opening a GX Works2 format project
Opening another format file (GX IEC Developer format)	• An IL/MELSEC IL program created in GX IEC Developer can be opened.	Page 97 Opening a GX IEC Developer format project
Help file	• A help file can be linked to a function or function block.	Page 111 Associating data with help files
Verification	• Module extended parameters of a simple motion module can be verified. • The module information of an intelligent function module can be verified.	Page 116 Verifying Projects Page 403 Verifying Programmable Controller Data
Module tool list	• Multiple input modules (FX5-8AD) are supported. • Temperature control modules (FX5-4LC) are supported. • Positioning modules (FX5-20PG-P) are supported.	Page 148 Other Settings of Intelligent Function Modules
Online program change	The following data can be written to a CPU module using this function. • A single SFC block*3 • SFC inactive block	Page 407 Online program change of SFC programs
	• After writing a project to a running RnPCPU (process mode), program restoration information can be written in the background process.*3	
	• When only one program file that is set as "No Execution Type" exists in a project, the data can be written to a CPU module by using the "Online Program Change" function.	Page 405 Writing Programs While a CPU Module is in the RUN State

Item	Description	Reference
Diagnostic	In the following diagnostics, the diagnostic screen can be displayed when another station was specified as the connected destination. • CC-Link IE Controller Network diagnostic • CC-Link IE Field Network diagnostic	Page 486 CC-Link IE Controller Network diagnostic Page 488 CC-Link IE Field Network diagnostic Page 489 CC-Link IE Field Network Basic diagnostic
	The following setting are available for CC-Link IE Field Network Basic diagnostic. • Group setting of a slave station (No.1 to 4) • Setting of the number of connected stations (up to 64 stations)	
	The following modules can be diagnosed. • CC-Link IE Field Network remote I/O modules (NZ2GF2B2-16A, NZ2GF2B2-16R, NZ2GF2B2-16S, NZ2GF2S2-16A, NZ2GF2S2-16R, NZ2GF2S2-16S) • CC-Link IE Field Network Basic remote I/O module (NZ2MFB1-32D, NZ2MFB1-32T, NZ2MFB1-32TE1, NZ2MFB1-32DT, NZ2MFB1-32DTE1, NZ2MFB2-16A, NZ2MFB2-16R)	
Tool interaction	The following tools can be started in GX Works3. • CPU Module Logging Configuration Tool • GX LogViewer	Page 501 Data Logging Function
Simulation	The following are supported by the simulation function. • Simulation of a project in which an RD77GF32 is configured (SMM Simulator) • I/O control function of RCPUs • Simulation of a project in which a MELSEC FX5 series simple motion module is configured (SMM Simulator2)	Page 553 Using Simulation Function
	• The capacity of signal flow memory (for EB), which is used for simulating a project for RnPCPUs (R08PCPU, R16PCPU, R32PCPU, R120PCPU), is expanded.	
Search/replacement	When "Move" is selected in the following option in the "Find and Replace" window, an undisplayed device comment is also moved when replacing the device. • "Find/Replace Options" ⇨ "Replace" ⇨ "Device Comment"	—
	• When registering devices/labels within a selected range to a Watch window or the "Device Batch Replace" screen, overlapped devices/labels are not registered.	
e-Manual Viewer interaction	• Sample programs (ladder) on the manuals that can be browsed in e-Manual Viewer can be copied on ladder programs in GX Works3.	Page 614 Using Sample Programs
FX5CPU	The following functions can be used in a project for an FX5CPU. • Memory dump • Change of TC setting value • Offline monitor • Parallel link • IP filter • File transfer function (FTP server) • Verification of extension adapters • Simulation on simple motion module • Interaction with the FX5CPU simulation function	—
	• A CPU module can be accessed via a CC-Link IE Field Network module using the GOT transparent function.	
	• Devices used by the function of a CPU module are displayed in the "Device List" window.	
Others	• The safety communication setting can be configured before writing parameters of a safety remote I/O module to a CPU module. • The automatic restoration setting is supported in a project used for an RnSFCPU. • The CPU module built-in database can be accessed from an external device. • The parameters of a slave station can be saved in a project.	— Page 515 Automatic restoration setting

Version 1.036N

Item	Description	Reference
Online program change	When writing data to a CPU module with either of the following functions, the behavior of each falling instruction right after the writing process is the same. • File batch online change • Online program change	Page 405 Writing Programs While a CPU Module is in the RUN State

Version 1.038Q

Item	Description	Reference
Creating a ladder program Creating an ST Program Creating an FBD/LD program	Reserved area capacities of the following items can be set in the "Properties" screen of a function block. • Label reserved area • Latch label reserved area • Signal flow reserved area	Page 319 Setting reserved area capacities

Version 1.040S

Item	Description	Reference
Process control function	• A process control system is supported for a project used for an RnPSFCPU.	Page 19 Process Control System
Ladder editor	• A device assigned to a label can be entered as a label.	Page 185 Displaying a global label entered by using an assigned device
	When the number of displayed contacts are changed with the following option and input and output circuits of an FB/FUN is not displayed, the circuit is displayed highlighted. • [Tool] ⇨ [Options] ⇨ "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Display Connection of Ladder Diagram"	
	• When a program including a specific instruction (INV, MEP, MEF, EGP, EGF) does not comply with the instruction specifications, a conversion error occurs. • When a project is opened, a ladder program that was previously displayed is displayed. • When the position of a mouse cursor is in a nested master control instruction at the start of monitoring ladder program, the ON/OFF status of the master control instruction and the nesting number is displayed in the window title of the ladder editor. • A line statement name can be edited in the "Navigation" window. • The comment of a structure member is displayed in the "Input Device Comment" screen.	Page 87 Opening a project Page 43 Navigation window
Creating an FBD/LD program	• A page break can be displayed in the FBD/LD editor.	Page 223 Configuration of FBD/LD editor
	• The font color and the background color of comment elements can be changed in the "Color and Font" screen. • The font color and the background color of comment elements can be changed individually.	Page 65 Checking and Changing Colors and Fonts Page 223 Configuration of FBD/LD editor
	• When a jump label element of an FBD/LD is selected and the F2 key is pressed, a pointer type label is displayed in an edit box as an option.	Page 228 Adding elements
Creating an SFC program	• The font color and the background color of comment elements can be changed in the "Color and Font" screen. • The font color and the background color of comment elements can be changed individually.	Page 65 Checking and Changing Colors and Fonts Page 241 Configuration of SFC diagram editor
Navigation window	• The background color and font color can be changed. • The tree can be filtered. • A message will appear when moving data. • Module parameters and module POUs (shortcut) can be hidden. • A module tool can be opened.	Page 43 Navigation window
	• The default display of modules that only one "Module Parameter" was displayed is changed so as not to display "Module Parameter". • The default display is changed so as not to display "Module POU (Shortcut)".	
Options	The following option is added. • "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Operational Setting" ⇨ "Include Device Comment in Copying"	Page 67 Option Setting for Each Function

Item	Description	Reference
Printing	• Ladder programs can be printed by specifying the range (number of lines). • Ladder programs can be printed by setting a page break for each ladder block. • The page setting can be set for FBD/LD programs. • Project data can be printed by changing the color and the font to the default setting. • The contents of parameter items which are unset cannot be printed.	Page 74 Printing Data
Q/L/FX series compatibility mode	GX Works3 in the Q/L/FX series compatibility mode can be started in GX Works3. In GX Works3 in the Q/L/FX series compatibility mode, a project for a QCPU (Q mode), an LCPU, and an FXCPU can be used. The following operations can mainly be performed. • Creating a new project • Creating a new project with data read from a CPU module • Opening a project • Performing the system monitor function automatically • Saving a project as a GX Works3 project or GX Works2 project	Page 85 Creating a project Page 86 Creating new projects by reading data from programmable controllers Page 87 Opening a project Page 105 Saving projects under the specified name
Opening a GX Works2 format project	• The names of instructions used in ST programs are replaced automatically.	Page 593 Instructions of which names need to be replaced
	The following items can be imported in a project used for an FX5CPU. • Project used for an FXCPU (FX3G/FX3GC) • CC-Link settings of network parameters	Page 89 Opening a GX Works2 format project
Opening a PX Developer format project	The following project parameters that are set in a PX Developer project can be imported. • Program execution setting • I/O control • Event notification	Page 92 Opening a PX Developer format project Page 604 Replacement of a PX Developer format project
	• The initial values of FB properties that are set in a PX Developer project can be imported.	
Opening another format file (GX IEC Developer format)	• Data in an ASCII format file or SUL format file exported in GX IEC Developer can be imported into an open GX Works3 project. • Even when a GX Works3 project is not open, the module type of a GX IEC Developer format project can be changed. • An SUL format file (user library) exported in GX IEC Developer can be opened.	Page 97 Opening a GX IEC Developer format project Page 333 Creating a library in GX Works3 format from a library in GX IEC Developer format
Module tool list	• Analog input modules (FX5-4AD) are supported. • Analog output modules (FX5-4DA) are supported.	Page 148 Displaying the module tool list
Parameter	For a module in which the system parameter is set as follows, "Do not Synchronize" is automatically set to the "Setting" column in the "Select the Synchronous Target Module" screen. • "I/O Assignment Setting" ⇨ "Module Status Setting" column: Empty • "Inter-module Synchronization Setting" ⇨ "Use Inter-module Synchronization Function in System": Use	Page 139 Setting system parameters
Module configuration diagram	• Module parameters of a module with multiple ports can be opened in the "Input the Configuration Detailed Information" window.	Page 131 Setting parameters on a module configuration diagram
Importing/exporting ladder programs	A program including the elements below can be exported to a CSV file. Moreover, a program including the elements below can be imported from a CSV file. • Label • Inline structured text • Function block and function	Page 206 Importing/exporting ladder programs
	• When exporting a text file, whether or not to output step numbers can be set.	
	• A Zoom created in Ladder Diagram language can be exported in a CSV, HTML, or text file. • Listed instructions in a CSV file can be imported into a Zoom created in Ladder Diagram language.	
	• Ladder programs in functions or function blocks can be exported in a CSV, HTML, or text file. • Listed instructions in a CSV file can be imported into ladder programs in functions or function blocks.	
Library management	• Elements of a library created in an ST program or an FBD/LD program can be updated at once.	Page 337 Updating library POUs
Safety programmable controller operation	• The safety module operation function is supported for a project used for an RnPSFCPU.	Page 513 Safety Programmable Controller Operations
Search/replacement	• Data is searched or replaced in the display order in the "Navigation" window.	—
Search/replacement Cross reference	• In the ST editor, FBD/LD editor, and SFC diagram editor, searching and/or replacing by selecting "Multiple words" of "Find/Replace Options" are supported.	—
Cross reference	• A device assigned to an arias source is displayed as a 'device' of the arias.	Page 309 Displaying cross reference information

Item	Description	Reference
Device list	• When using an instruction which uses multiple devices (example: BMOV (P)) in an ST editor, FBD/LD editor, or SFC editor, all the devices used for the instruction are displayed in the Device List. • The number of times all devices for program indirection in programs have been used is displayed in the Device List.	—
Device comment editor	• A screen can be split vertically. • When an unused device comment is deleted, the comments of bit-specified word devices are also deleted.	Page 270 Configuration of device comment editor
Conversion	• When changing the type of a function block, all the programs are converted (reassigned) in the next conversion.	—
Writing to a programmable controller Online program change	• Program files, FB files, and FUN files can be written without the program restoration information.*3	Page 392 Program restoration information Page 410 Program restoration information
	• It is improved so that the status of edited function block or POU using a function will not be changed to unconverted when editing the program body of the subroutine type function block or function.	Page 320 Converting function blocks Page 329 Converting functions
Online program change	• The file batch online change function can be performed when editing a global label, function block, or function in a project used for an RnCPU, RnENCPU, and RnPCPU.*3	Page 411 Writing data for each file while a CPU module is running (file batch online change)
	• When "Online Program Change" is performed after converting a program, whether or not to write the program can be selected in the "Online Data Operation" screen.	Page 405 Writing Programs While a CPU Module is in the RUN State
Device/buffer memory batch monitor	• Multiple word devices can be registered in a Watch window at once.	Page 432 Changing current values
Watch	• When data is changed by editing or converting a program, the change is not applied to a Watch window automatically. It will be updated when clicking the [Update] button.	Page 434 Updating a Watch window
	• In a Watch window, the display of the current values of bit devices can be changed from 'TRUE/FALSE' to 'ON/OFF'.	Page 434 ON/OFF of a bit device
	• The current values of bit devices can be changed by clicking the [ON]/[OFF]/[Switch ON/OFF] buttons on a Watch window.	—
User authentication function	The following functions are supported for a project used for an RnPSFCPU. • Authentication destination setting in the online function • Logging off from a CPU module • Logging off all users from a CPU module • Copying user information to the other system	Page 470 Preventing Illegal Access to CPU Module
Diagnostic	The following can be displayed in CC-Link IE Field Network Basic diagnostic. • Detailed error information of a slave station	—
	In a project using AnyWireASLINK or CC-Link IE Field Network, the following functions can be used. • iQ Sensor Solution data backup/restoration function • Sensor/device monitor	Page 482 Sensor/Device Status Check
	The following modules can be diagnosed. • CC-Link IE Field Network remote I/O module (NZ2GFCE3N-32D, NZ2GFCE3N-32T, NZ2GFCE3N-32DT)	Page 488 CC-Link IE Field Network diagnostic
Confirm memory size	• In a project used for an RnCPU, RnENCPU, and RnPCPU, a memory size can be calculated depending on the version of the CPU module.*3	Page 288 Calculating Memory Size
Simulation	• A cyclic communication can be simulated. • A simulation environment file can be saved. • A simulation environment file can be opened. • The label communication function from an external device can be set.	Page 342 PROGRAM SIMULATION
Interaction with iQ Works*2	The following can be operated in MELSOFT Navigator. • Label information in an electrical CAD file that was imported into MELSOFT Navigator can be applied to global labels in GX Works3. • Global labels in GX Works3 can be set for label information in MELSOFT Navigator, and the label information can be exported as an electrical CAD file.	—
Monitoring	• SQL statements that are buffered by the DB buffering function of a MES Interface module (RD81MES96) and stored procedure call information can be displayed in an Intelligent Function Module Monitor window.	Page 445 Checking Current Values in Intelligent Function Module
Specifying a connection destination	• In a project used for an RCPU, except for RnPSFCPU, the GOT transparent function is supported in the networks connecting a personal computer and a GOT or connecting a GOT and a connection station via Ethernet.	—

Item	Description	Reference
FX5CPU	The following functions are available in a project for FX5CPUs. • Extended file registers (ER) • Realtime monitor • Web server • MODBUS/TCP settings • Time setting (SNTP client)	—
	• Logging data displayed in GX LogViewer can be monitored on the program editor by using the 'Offline monitor' function.	Page 505 Checking logging data
Windows 10	• When a screen display is collapsed, GX Works3 screens can be displayed by the high DPI scaling option on Windows 10.	Page 615 Troubleshooting
	• GX Developer can be installed with GX Works3.	—

Version 1.042U

Item	Description	Reference
Ladder program	• A label comment of a structure member can be edited in the "Input Device Comment" screen.	Page 194 Entering/editing comments
FBD/LD editor SFC editor	• A tool hint is displayed while options for labels are displayed.	Page 223 Configuration of FBD/LD editor Page 241 Configuration of SFC diagram editor
Label editor	• The selection status of "Access from External Device" can be pasted to other rows.	Page 158 Editing a row
Verification	When "Hide System Generated Items" is selected from the pull-down list in a Verify Result screen (detailed display), the following instruction codes are not displayed. • NOP • LD TMP • OUT TMP	Page 119 Detailed display (list format)

Version 1.044W

Item	Description	Reference
Opening another format file	In a ladder program, a program in which any of the following instructions are used and the argument is omitted can be read. • D(P).DDRD, D(P).DDWR, JP.READ, JP.SREAD, JP.WRITE, JP.SWRITE, GP.READ, GP.SREAD, GP.WRITE, GP.SWRITE, J.ZNRD, J.ZNWR, JP.ZNWR, JP.ZNRD	Page 89 Opening a GX Works2 format project Page 92 Opening a PX Developer format project

Version 1.045X

Item	Description	Reference
Ladder editor	• In a simple search, the options for instructions and labels can be displayed by pressing the Ctrl + Space button. • In a simple search, a device used in a standard program and safety program can be searched.	—
FBD/LD editor	• A function to correct the layout in an FBD network block is added. (The 'Delete the Blank Column In FBD Network Block' function is integrated with this function.)	Page 231 Layout correction
Navigation window	• Unused data in a program is displayed in light blue.	Page 43 Navigation window
Search	After a cursor is moved from a search result to a program editor, a label editor, or an SFC block list, the cursor can be moved back to the previous position by using the following menu. • [Find/Replace] ⇨ [Previous]/[Next]	Page 48 Basic menus
	Options for labels can be displayed when entering a label name in the following functions. • Device/label search • Device/label replacement • Open/close contact change • Device batch replacement	Page 301 Searching/Replacing Devices/Labels Page 306 Changing Contacts between Open Contact and Close Contact Page 307 Batch Replacing of Devices and Labels
Device list	• Display format can be set in a batch.	Page 313 Displaying Device Usage List

Item	Description	Reference
Options	The following options are added. • "Project" ⇨ "Navigation" ⇨ "Display Setting" ⇨ "Imported Library POU" ⇨ "Display Read-only POU" • "Project" ⇨ "Navigation" ⇨ "Display Setting" ⇨ "Imported Library POU" ⇨ "Display Read-protected POU" ⇨ "Display Password Authentication Disabled POU" • "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Check the ladders in which certain instructions are used at inappropriate positions" • "Other Editor" ⇨ "Label Editor Common" ⇨ "Fix the Number of Display Windows" • "Program Editor" ⇨ "ST Editor" ⇨ "Editor Display Items" ⇨ "Highlight Matching Brackets"	Page 67 Option Setting for Each Function
Print	• In the "Print" screen, only the background color of a print result can be set to white.	Page 74 Printing Data
Opening a GX Works2 format project	• The device/label automatic-assign setting can be utilized to the CPU parameter of GX Works3.	Page 89 Opening a GX Works2 format project Page 592 Correcting parameters
Verify	• Unconverted functions and function blocks are displayed in the "Verify Result" window. • The "Caution" column is added in the [Result List] tab of the "Verify Result" window.	Page 116 Verifying Projects Page 403 Verifying Programmable Controller Data
Module configuration diagram	• The parameter information of a cut or copied module object are utilized to the parameter information of the paste destination.	Page 131 Application of parameter information
Change Module	A model name, module type, and station type of the following modules can be changed from the shortcut menu. • Another CPU module • CC-Link IE built-in Ethernet module • CPU extension module	Page 152 Change Module
Confirm memory size	• In an RnSFCPU project, memory size can be calculated according to the version of the CPU module used. *3	Page 288 Calculating Memory Size
Library	• A library which is associated with a simple motion module can be used.	Page 326 Using a library associated with a module
	• Password authentication for a read-protected POU can be disabled.	Page 331 Creating a library file Page 335 Utilizing an element
	• An option to automatically check whether or not all the user libraries are updated is added.	Page 337 Checking for library updates automatically
Simulation	Simulations in the following projects are supported. • Project for R00CPUs, R01CPUs, and R02CPUs • Project for RnPSFCPUs	Page 342 PROGRAM SIMULATION
Connection destination setting	• A connection to a CPU module via a QCPU (Q mode) is available.	Page 384 Accessing via QCPU (Q mode)
Writing to a programmable controller	• For an RnCPU, an RnENCPU, and an RnSFCPU, a file with no changes from the previous writing is not written to a CPU module.	Page 393 Skip overwriting data
Writing to a programmable controller Online program change	• For an RnSFCPU project, a standard program, standard FB, and standard FUN excluding the program restoration information can be written to a CPU module. *3	Page 392 Program restoration information Page 410 Program restoration information
Online program change	• For an RnPCPU (redundant mode) project, program files, FB files, and FUN files excluding the program restoration information can be written while a CPU module is in RUN.*3	Page 409 Program transfer when a CPU module is in RUN state
	• For an RnPCPU (redundant mode) project, program restoration information can be written in the background process.*3	Page 410 Program restoration information
	• For an RnCPU and RnENCPU, an SFC active block can be written while a CPU module is running.	Page 407 Online program change of SFC programs
Watch	• Label options can be displayed when entering a label name.	Page 435 Register to Watch window
Register/cancel forced input/output*3	In a project for the following CPUs, X/Y devices can be forcibly ON/OFF. • R00CPU, R01CPU, R02CPU • RnPCPU (process mode/redundant mode)	Page 438 Turning Input/Output Device ON/OFF Forcibly
Pause FB/restart FB	• During a program execution, the execution of a process control function block can be paused or restarted. • Process control function blocks whose operations are temporarily paused can be displayed and checked in a list.	Page 440 Pausing/Restarting the Operation of Function Blocks
User authentication function	• "Assistant Developers" is added to the access level of user.	Page 467 Preventing Illegal Access to Project
Offline monitor	• Label values displayed in GX LogViewer can be monitored on a program editor.	Page 505 Checking logging data

Item	Description	Reference
Diagnostics	• The 'Simple CPU Communication Diagnostics' function can be used.	Page 492 Simple CPU communication diagnostic
	The following functions can be used in a project using Ethernet (CPU module) and CC-Link. • iQ Sensor Solution data backup/restoration • Sensor/device monitor	Page 482 Sensor/Device Status Check
	The following information can be displayed in CC-Link IE Field Network diagnostic. • Error history in a slave station	Page 488 CC-Link IE Field Network diagnostic
	The following modules can be diagnosed. • CC-Link IE Field Network Basic remote I/O module (NZ2MF2S1-32D, NZ2MF2S1-32T, NZ2MF2S1-32TE1, NZ2MF2S1-32DT, NZ2MF2S1-32DTE1) • CC-Link IE Field Network remote I/O module (NZ2GF12A-60IOLH8, NZ2GFSS2-16DTE, NZ2GFSS2-8D, NZ2GFSS2-8TE, FCU8-EX564, FR-A8NCE) • MELIPC (MI5122-VW)	Page 489 CC-Link IE Field Network Basic diagnostic Page 488 CC-Link IE Field Network diagnostic
FX5CPU	• The GOT transparent function, which connects a personal computer and a GOT, and the GOT and a CPU on Ethernet, can be used.	Page 383 Accessing via GOT (GOT Transparent Function)
	• A simulation environment file can be saved. • A simulation environment file can be opened.	Page 359 Saving a simulation environment file Page 360 Opening a simulation environment file
	• A power supply capacity and I/O points can be checked.	Page 136 Checking a power supply capacity and I/O points
Parameter	The following items are added to the parameters for RnCPU and RnENCPU. • Web Server Settings • Battery-less Option Cassette Setting • Simple CPU Communication Setting	—
Others	• The devices on a CC-Link network can be detected.	—

*1 To use this function, it is required that MELSOFT Navigator supports the function. For information on the versions of supporting MELSOFT Navigator, refer to MELSOFT Navigator Help.

*2 To use this function, it is required that MELSOFT Navigator supports the function. For information on the versions of supporting MELSOFT Navigator, refer to following manual.
Let's start iQ Works Version 2

*3 To use this function, it is required that CPU module supports the function. For information on the firmware version of the supported CPU modules, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)
MELSEC iQ-F FX5 User's Manual (Application)

*4 To use this function, it is required that the module supports the function. For information on the firmware version of the supported module, refer to the manual for respective modules.

Modules

Supported version	Module name	Model name
Version 1.005F	Ethernet interface module	RJ71EN71(E+CCIEC), RJ71EN71(CCIEC)
Version 1.007H	RCPU	R08PCPU, R16PCPU, R32PCPU, R120PCPU
	FX5CPU	FX5UCPU, FX5UCCPU
	Power supply module	R62P, R64P
	C Controller	R12CCPU-V
	Channel isolated RTD input module	R60RD8-G
	Channel isolated thermocouple input module	R60TD8-G
	Channel isolated analog input module	R60AD8-G, R60AD16-G
	Channel isolated digital-analog convertor module	R60DA8-G, R60DA16-G
Version 1.010L	MELSECNET/H network module	QJ71LP21(-25 S-25 G GE), QJ71BR11, QJ71NT11B
Version 1.015R	RCPU	R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, R120ENCPU
		R08SFCPU, R16SFCPU, R32SFCPU, R120SFCPU
	Safety function module	R6SFM
	CC-Link IE Field Network module	RJ71GF11-T2
	MES interface module	RD81MES96
	Temperature control module	R60TCTRT2TT2, R60TCTRT2TT2BW, R60TCRT4, R60RCRT4BW
Version 1.019V	FX5CPU	FX5UC-64MT/D, FX5UC-64MT/DSS, FX5UC-96MT/D, FX5UC-96MT/DSS
	FX5 series input module	FX5-C16EX/D, FX5-C16EX/DS
	FX5 series output module	FX5-C16EYT/D, FX5-C16EYT/DSS
	FX5 series extension power supply module	FX5-C1PS-5V
Version 1.020W	Main base unit	R310B-HT
	Extension base unit	R610B-HT
	High speed data logger module	RD81DL96
	Transistor high-speed output module	RY41NT2H, RY41PT2H
	High-Speed analog input module	R60ADH4
	Simple motion module	RD77GF
	Motion CPU	R64MTCPU
	C intelligent function module	RD55UP06-V
Version 1.025B	FX5CPU	FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS
	FX5 series CC-Link IE Field Network module	FX5-CCLIEF
	FX5 series I/O module	FX5-32ER/DS, FX5-32ET/DS, FX5-32ET/DSS
	FX5 series high speed pulse I/O module	FX5-16ET/ES-H, FX5-16ET/ESS-H
	Redundant function module	R6RFM
	Main base unit	R310RB, R38RB-HT
	Extension base unit	R610RB, R68RB-HT
	Power supply module	R64RP
	CC-Link IE Field Network remote head module	RJ72GF15-T2
	DC high-speed input module	RX41C6HS, RX61C6HS
	Input module with diagnostic functions	RX40NC6B
	Output module with diagnostic functions	RY40PT5B
	AnyWireASLINK master module	RJ51AW12AL
	NCCPU	R16NCCPU
	Dual signal module	R173SXY

Supported version	Module name	Model name
Version 1.030G	Power supply module	R63RP
	Triac output module	RY20S6
	Flexible high-speed I/O control module	RD40PD01
	Simple motion module	RD77GF32
	FX5CPU	FX5U-64MR/DS, FX5U-64MT/DS, FX5U-64MT/DSS, FX5U-80MR/DS, FX5U-80MT/DS, FX5U-80MT/DSS
	FX5 series I/O module	FX5-16ER/ES, FX5-16ET/ES, FX5-16ET/ESS
	FX5 series RTD input adapter	FX5-4AD-PT-ADP
	FX5 series thermocouple input adapter	FX5-4AD-TC-ADP
	FX5 series simple motion module	FX5-80SSC-S
Version 1.032J	AC input module	RX28
	Contact output module	RY18R2A
	High-speed analog output module (voltage/current)	R60DAH4
	Extension cable	RC100B
Version 1.035M	Robot CPU	R16RTCPU
	OPC UA server module	RD81OPC96
	BACnet module	RJ71BAC96
	FX5CPU	FX5UC-32MT/DS-TS, FX5UC-32MT/DSS-TS
	FX5 series input module	FX5-C32EX/DS-TS
	FX5 series output module	FX5-C32EYT/D-TS, FX5-C32EYT/DSS-TS
	FX5 series I/O module	FX5-C32ET/DS-TS, FX5-C32ET/DSS-TS
	FX5 series multiple input module	FX5-8AD
	FX5 series temperature control module	FX5-4LC
	FX5 series positioning module	FX5-20PG-P
	FX5 series CC-Link system master/intelligent device module	FX5-CCL-MS
	FX5 series AnyWireASLINK master module	FX5-ASL-M
Version 1.038Q	CANopen module	RJ71CN91
Version 1.040S	RCPU	R00CPU, R01CPU, R02CPU, R08PSFCPU, R16PSFCPU, R32PSFCPU, R120PSFCPU
	SIL2 function module	R6PSFM
	Input module with diagnostic functions	RX40NC6B(S2M), RX40NC6B(S2S)
	Output module with diagnostic functions	RY40PT5B(S2M), RY40PT5B(S2S)
	MES interface module	QJ71MES96N
	FX5 series analog input module	FX5-4AD
	FX5 series analog output module	FX5-4DA
Version 1.045X	PROFIBUS interface module	RJ71PB91V(S)
	Input module	RX70C4, RX71C4, RX72C4, RX10-TS, RX40C7-TS, RX41C4-TS
	Output module	RY40PT5B-AS, RY10R2-TS, RY40NT5P-TS, RY40PT5P-TS, RY41NT2P-TS, RY41PT1P-TS
	CC-Link IE Controller Network module	RJ71GP21S-SX
	DeviceNet master/slave module	QJ71DN91, RJ71DN91
	Channel isolated analog input module	R60AD8-G(S2M), R60AD8-G(S2S)
	Channel isolated digital-analog convertor module	R60DA8-G(S2M)

Appendix 2 Unusable Character String (Reserved Word)

Character strings used for application function names, common instruction names, special instruction names, instructions and so on are referred to as the reserved words.

Reserved words may not be used for names.

When the character strings defined as reserved words is used for names, an error occurs at the registration or conversion.

Precautions

Characters are not case-sensitive.

Unusable character strings for the name of a project/work space/library

Category		Character string
Invalid character	Symbol	Space, ", %, ', *, /, ., :, <, >, ?, \, |, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0 to U+00BF, U+FFFE, U+FFFF
Windows® reserved word		COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL, CLOCK$, END_MARK

Unusable character string for data name

Category		Character string
Invalid character	Symbol*1	Space, !, ", #, $, %, &, ', (,), *, +, /, ,, -, ., :, ;, <, =, >, ?, @, [, \,], ^, `, {, |, }, ~, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0 to U+00BF, U+FFFE, U+FFFF
	Others*1	COMMENT, GLBLINF
Windows® reserved word		COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL, CLOCK$, END_MARK
Data type reserved words	Class*1	VAR, VAR_RETAIN, VAR_ACCESS, VAR_CONSTANT, VAR_INPUT, VAR_INPUT_RETAIN, VAR_OUTPUT, VAR_OUTPUT_RETAIN, VAR_IN_OUT, VAR_IN_EXT, VAR_EXTERNAL, VAR_EXTERNAL_CONSTANT, VAR_EXTERNAL_RETAIN, VAR_GLOBAL, VAR_GLOBAL_CONSTANT, VAR_GLOBAL_RETAIN, VAR_PUBLIC, VAR_PUBLIC_RETAIN
	Data type	BOOL, BYTE, INT, SINT, DINT, LINT, UINT, USINT, UDINT, ULINT, WORD, DWORD, LWORD, ARRAY, REAL, LREAL, TIME, STRING, WSTRING, TIMER, LTIMER, RETENTIVETIMER, LRETENTIVETIMER, COUNTER, LCOUNTER, POINTER ANY, ANY_NUM, ANY_BIT, ANY_REAL, ANY_INT, ANY_DATE, ANY_SIMPLE, ANY16, ANY32, DATE, DATE_AND_TIME, DT, TIME, TIME_OF_DAY, TOD, BODY_CCE, BODY_FBD, BODY_IL, BODY_LD, BODY_SFC, BODY_ST, END_BODY, END_PARAMETER_SECTION, PARAM_FILE_PATH, PARAMETER_SECTION, POW, LONGCOUNTER, LONGRETENTIVETIMER, LONGTIMER, UNKNOWN, ANY_BITADDR, ANY_WORDADDR, ANY_STRING, ANYSTRING_SINGLE, ANYSTRING_DOUBLE, ANY_ELEMENTARY, ANY_ELEMENTARY_IEC, ANY_MAGNITUDE, ANY_BOOL, ANY_SIGNED, ANY_UNSIGNED, ANYREAL_64, ANYREAL_32, ANY_DERIVED, ANY16_S, ANY16_U, ANY32_S, ANY32_U, ANY64, ANY64_S, ANY64_U, ANY_STRUCT, ANYWORD_ARRAY, ANY16_ARRAY, ANY16_S_ARRAY, ANY16_U_ARRAY, ANY32_ARRAY, ANY32_S_ARRAY, ANY32_U_ARRAY, ANY64_ARRAY, ANY64_S_ARRAY, ANY64_U_ARRAY, ANY_REAL_ARRAY, ANY_REAL_32_ARRAY, ANY_REAL_64_ARRAY, ANY_STRING_ARRAY, ANYSTRING_SINGLE_ARRAY, ANYSTRING_DOUBLE_ARRAY, ANYBIT_ARRAY, UINT_WORD, UDINT_DWORD, ULINT_LWORD, TIME2, KBIT64, KBIT32, KBIT16, WDEVICE, BDEVICE, DUMMYDEVICE, FB, FUN, STRUCT_MEMBER, BIT_ARRAY, STRUCT_ARRAY, STRING_ARRAY, WSTRING_ARRAY, LINT_ARRAY, ULINT_LWORD_ARRAY, DINT_ARRAY, UDINT_DWORD_ARRAY, INT_ARRAY, UINT_WORD_ARRAY, REAL_ARRAY, LREAL_ARRAY, TIME_ARRAY, NONE, ANY16_OR_STRING_SINGLE, ANY_DT, ANY_TM, ANY_BOOL_OR_POINTER

Category		Character string
IEC reserved word[*1]		ABS, ACOS, ACTION, ADD, AND, ANDN, ANY, ANY_BIT, ANY_INT, ANY_NUM, ANY_REAL, ARRAY, ASIN, AT, ATAN, BOOL, BY, BYTE, CAL, CALC, CASE, CONCAT, CONFIGURATION, CONSTANT, CONTINUE, COS, CTD, CTU, CTUD, D, DATE, DATE_AND_TIME, DELETE, DINT, DIV, DO, DT, DWORD, ELSE, ELSIF, END_ACTION, END_CASE, END_CONFIGURATION, END_FOR, END_FUNCTION, END_FUNCTION_BLOCK , END_IF, END_PROGRAM, END_REPEAT, END_RESOURCE, END_STEP, END_STRUCT, END_TRANSITION, END_TYPE, END_VAR, END_WHILE, EN, ENO, EQ, EXIT, EXP, EXPT, FALSE, F_EDGE, F_TRIG, FIND, FOR, FROM, FUNCTION, FUNCTION_BLOCK, GE, GT, IF, INITIAL_STEP, INSERT, INT, INTERVAL, JMP, JMPC, JMPCN, L, LD, LDN, LE, LEFT, LEN, LIMIT, LINT, LN, LOG, LREAL, LT, LWORD, MAX, MID, MIN, MOD, MOVE, MUL, MUX, N, NE, NEG, NOT, OF, ON, OR, ORN, P, PROGRAM, R, R1, R_TRIG, READ_ONLY, READ_WRITE, REAL, REPEAT, REPLACE, RESOURCE, RET, RETAIN, RETC, RETURN, RIGHT, ROL, ROR, RS, R_EDGE, S, S1, SD, SEL, SHL, SHR, SIN, SINGLE, SINT, SQRT, SR, ST, STEP, STN, STRING, STRUCT, SUB, TAN, TASK, THEN, TIME, TIME_OF_DAY, TO, TOD, TOF, TON, TP, TRANSITION, TRUE, TYPE, UDINT, UINT, ULINT, UNTIL, USINT, VAR, VAR_ACCESS, VAR_EXTERNAL, VAR_GLOBAL, VAR_INPUT, VAR_IN_OUT, VAR_OUTPUT, WHILE, WITH, WORD, XOR, XORN
Code conversion[*1]	Device	A, B, BL, C, CC, CN, CS, D, DX, DY, E, F, FD, FX, FY, G[*2], GLP, H, HG[*2], I, J, K, L, LC, LCC, LCN, LCS, LLP, LSC, LSN, LSS, LST, LSTC, LSTN, LSTS, LT, LTC, LTN, LTS, LZ, M, N, P, PH, R, RD, S, SB, SC, SD, SM, SN, SS, ST, STC, STN, STS, SW, SZ, T, TC, TN, TR, TS, U, V, VD, W, X, Y, Z, ZR, ZZ, RX[*2], RY[*2], RWr[*2], RWw[*2]
	Others	A manufacturer-provided functions/function blocks, MELSEC instructions

*1 These can be used for some names.

*2 When the character string is used with a number, it will be regarded as a reserved word.

Unusable character string for label name

Category		Character string
Invalid character	Symbol	Space, !, ", #, $, %, &, ', (,), *, +, /, ,, -, ., :, ;, <, =, >, ?, @, [, \,], ^, `, {, |, }, ~, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0 to U+00BF, U+FFFE, U+FFFF
Windows® reserved word		CLOCK$
Data type reserved words	Class	VAR, VAR_RETAIN, VAR_ACCESS, VAR_CONSTANT, VAR_INPUT, VAR_INPUT_RETAIN, VAR_OUTPUT, VAR_OUTPUT_RETAIN, VAR_IN_OUT, VAR_IN_EXT, VAR_EXTERNAL, VAR_EXTERNAL_CONSTANT, VAR_EXTERNAL_RETAIN, VAR_GLOBAL, VAR_GLOBAL_CONSTANT, VAR_GLOBAL_RETAIN, VAR_PUBLIC, VAR_PUBLIC_RETAIN
	Data type	BOOL, BYTE, INT, SINT, DINT, LINT, UINT, USINT, UDINT, ULINT, WORD, DWORD, LWORD, ARRAY, REAL, LREAL, TIME, STRING, WSTRING, TIMER, LTIMER, RETENTIVETIMER, LRETENTIVETIMER, COUNTER, LCOUNTER, POINTER ANY, ANY_NUM, ANY_BIT, ANY_REAL, ANY_INT, ANY_DATE, ANY_SIMPLE, ANY16, ANY32, DATE, DATE_AND_TIME, DT, TIME, TIME_OF_DAY, TOD, BODY_CCE, BODY_FBD, BODY_IL, BODY_LD, BODY_SFC, BODY_ST, END_BODY, END_PARAMETER_SECTION, PARAM_FILE_PATH, PARAMETER_SECTION, POW, LONGCOUNTER, LONGRETENTIVETIMER, LONGTIMER, UNKNOWN, ANY_BITADDR, ANY_WORDADDR, ANY_STRING, ANYSTRING_SINGLE, ANYSTRING_DOUBLE, ANY_ELEMENTARY, ANY_ELEMENTARY_IEC, ANY_MAGNITUDE, ANY_BOOL, ANY_SIGNED, ANY_UNSIGNED, ANYREAL_64, ANYREAL_32, ANY_DERIVED, ANY16_S, ANY16_U, ANY32_S, ANY32_U, ANY64, ANY64_S, ANY64_U, ANY_STRUCT, ANYWORD_ARRAY, ANY16_ARRAY, ANY16_S_ARRAY, ANY16_U_ARRAY, ANY32_ARRAY, ANY32_S_ARRAY, ANY32_U_ARRAY, ANY64_ARRAY, ANY64_S_ARRAY, ANY64_U_ARRAY, ANY_REAL_ARRAY, ANY_REAL_32_ARRAY, ANY_REAL_64_ARRAY, ANY_STRING_ARRAY, ANYSTRING_SINGLE_ARRAY, ANYSTRING_DOUBLE_ARRAY, ANYBIT_ARRAY, UINT_WORD, UDINT_DWORD, ULINT_LWORD, TIME2, KBIT64, KBIT32, KBIT16, WDEVICE, BDEVICE, DUMMYDEVICE, FB, FUN, STRUCT_MEMBER, BIT_ARRAY, STRUCT_ARRAY, STRING_ARRAY, WSTRING_ARRAY, LINT_ARRAY, ULINT_LWORD_ARRAY, DINT_ARRAY, UDINT_DWORD_ARRAY, INT_ARRAY, UINT_WORD_ARRAY, REAL_ARRAY, LREAL_ARRAY, TIME_ARRAY, NONE, ANY16_OR_STRING_SINGLE, ANY_DT, ANY_TM, ANY_BOOL_OR_POINTER
IEC reserved word		ABS, ACOS, ACTION, ADD, AND, ANDN, ANY, ANY_BIT, ANY_INT, ANY_NUM, ANY_REAL, ARRAY, ASIN, AT, ATAN, BOOL, BY, BYTE, CAL, CALC, CASE, CONCAT, CONFIGURATION, CONSTANT, CONTINUE, COS, CTD, CTU, CTUD, D, DATE, DATE_AND_TIME, DELETE, DINT, DIV, DO, DT, DWORD, ELSE, ELSIF, END_ACTION, END_CASE, END_CONFIGURATION, END_FOR, END_FUNCTION, END_FUNCTION_BLOCK , END_IF, END_PROGRAM, END_REPEAT, END_RESOURCE, END_STEP, END_STRUCT, END_TRANSITION, END_TYPE, END_VAR, END_WHILE, EN, ENO, EQ, EXIT, EXP, EXPT, FALSE, F_EDGE, F_TRIG, FIND, FOR, FROM, FUNCTION, FUNCTION_BLOCK, GE, GT, IF, INITIAL_STEP, INSERT, INT, INTERVAL, JMP, JMPC, JMPCN, L, LD, LDN, LE, LEFT, LEN, LIMIT, LINT, LN, LOG, LREAL, LT, LWORD, MAX, MID, MIN, MOD, MOVE, MUL, MUX, N, NE, NEG, NOT, OF, ON, OR, ORN, P, PROGRAM, R, R1, R_TRIG, READ_ONLY, READ_WRITE, REAL, REPEAT, REPLACE, RESOURCE, RET, RETAIN, RETC, RETURN, RIGHT, ROL, ROR, RS, R_EDGE, S, S1, SD, SEL, SHL, SHR, SIN, SINGLE, SINT, SQRT, SR, ST, STEP, STN, STRING, STRUCT, SUB, TAN, TASK, THEN, TIME, TIME_OF_DAY, TO, TOD, TOF, TON, TP, TRANSITION, TRUE, TYPE, UDINT, UINT, ULINT, UNTIL, USINT, VAR, VAR_ACCESS, VAR_EXTERNAL, VAR_GLOBAL, VAR_INPUT, VAR_IN_OUT, VAR_OUTPUT, WHILE, WITH, WORD, XOR, XORN

Category		Character string
Code conversion	Device	A, B, BL, C, CC, CN, CS, D, DX, DY, E, F, FD, FX, FY, G*1, GLP*1, H, HG*1, I, J, K, L, LC, LCC, LCN, LCS, LLP*1, LSC*1, LSN*1, LSS*1, LST, LSTC, LSTN, LSTS, LT, LTC, LTN, LTS, LZ, M, N, P, PH, R, RD, S, SB, SC*1, SD, SM, SN*1, SS*1, ST, STC*1, STN*1, STS*1, SW, SZ*1, T, TC, TN, TR, TS, U, V, VD, W, X, Y, Z, ZR, ZZ, RX*1, RY*1, RWr*1, RWw*1
	Others	A manufacturer-provided functions/function blocks, MELSEC instructions

*1 When the character string is used with a number, it will be regarded as a reserved word.

Unusable character strings for path name

Category		Character string
Invalid character	Symbol	", *, /, ,, ;, <, >, ?, |, ¡, ¢, £, ¤, \, ¦, §, ¨, ©, ª, «, ¬, -, ®, ¯, °, ±, ², ³, ´, µ, ¶, ·, ¸, ¹, º, », ¼, ½, ¾, ¿
	Surrogate pair	0xD800 to 0xDBFF, 0xDC00 to 0xDFFF
	Control code	U+0000 to U+001F, U+0080 to U+009F, U+00A0 to U+00BF, U+FFFE, U+FFFF
Windows® reserved word		COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9, AUX, CON, PRN, NUL, CLOCK$, END_MARK

Appendix 3 Applicable Devices in GX Works3

RCPUs

○: Applicable, △: Display only, ×: Not applicable —: Not available

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
User device	Input	X	○	—	○	△	×
	Output	Y	○	—	○	△	×
	Internal relay	M *1	○	—	○	○	×
	Latch relay	L	○	—	○	○	×
	Link relay	B	○	—	○	○	×
	Annunciator	F	○	—	○	○	×
	Link special relay	SB	○	—	○	△	×
	Edge relay	V*1	○	—	○	○	×
	Step relay	S*2	○	—	×	△	×
	Timer	T *1	—	×	○	○	○
	Retentive timer	ST *1	—	×	○	○	○
	Long timer	LT*1	—	×	○	○	○
	Long retentive timer	LST*1	—	×	○	○	○
	Counter	C *1	—	×	○	○	○
	Long counter	LC *1	—	×	○	○	○
	Data register	D *1	—	○	○	○	○
	Link register	W	—	○	○	○	○
	Link special register	SW	—	○	○	○	○
	Direct access input	X (DX)	○	—	×	×	×
	Direct access output	Y (DY)	○	—	×	×	×
System device	Function input	FX	×	—	×	×	×
	Function output	FY	×	—	×	×	×
	Function register	FD	—	○	×	×	×
	Special relay	SM	○	—	○	△	×
	Special register	SD	—	○	○	○	○
Link direct device	Link input	J□\X	○	—	○	△	×
	Link output	J□\Y	○	—	○	△	×
	Link relay	J□\B	○	—	○	△	×
	Link special relay	J□\SB	○	—	○	△	×
	Link register	J□\W	—	○	○	○	○
	Link special register	J□\SW	—	○	○	○	○
Module access device	Module access device	U□\G	—	○	○	○	○
CPU buffer memory access device	CPU buffer memory access device	U3E□\G U3E□\HG	—	○	○	○	○
Index register	Index register	Z *1	—	×	×	○	×
	Long index register	LZ *1	—	×	×	○	×
File register	File register	R	—	○	○	×	×
		ZR	—	○	○	○	○
Refresh data register	Refresh data register	RD	—	○	○	○	○
Nesting	Nesting	N	—	—	×	×	×
Pointer	Pointer	P *1	—	—	○	×	×
	Interrupt pointer	I	—	—	○	×	×

A

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
Other devices	SFC block device	BL	—	—	○	×	×
	SFC transition device	TR	—	—	×	×	×
	Step relay (with a block specification)	BL\S	—	—	○	×	×
	SFC transition device (with a block specification)	BL\TR	—	—	○	×	×
	Network number specified device	J	—	—	○	×	×
	I/O number specified device	U	—	—	○	×	×
Constant	Decimal constant	K	—	—	×	×	×
	Hexadecimal constant	H	—	—	×	×	×
	Real constant	E	—	—	×	×	×
	String constant	—	—	—	×	×	×

*1 Writing to local devices is available.
*2 When editing it in other places except in a Zoom, specify a step relay with a block specification (BL□\S□).

How to input local devices

Prefix '#' to the device name (Example: #D10)

Creating comments for module access devices

Device comments within the following range can be created in the buffer memory (3E00H to 3E30H) of CPU module in a multiple CPU system.

Supported range	Unsupported range
U0 (\G0) to U1FF (\G268435455)	U200 (\G0) to U3DF (\G268435455)
U3E0 (\G0) to U3E3 (\G268435455)	

Applicable devices in safety project

○: Applicable, △: Display only, ×: Not applicable —: Not available

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
User device	Safety input	SA\X	○	—	○	△	×
	Safety output	SA\Y	○	—	○	△	×
	Safety internal relay	SA\M*1	○	—	○	○	×
	Safety link relay	SA\B	○	—	○	○	×
	Safety timer	SA\T*1	—	×	○	○	×
	Safety retentive timer	SA\ST*1	—	×	○	○	×
	Safety counter	SA\C*1	—	×	○	○	×
	Safety data register	SA\D*1	—	○	○	○	×
	Safety link register	SA\W	—	○	○	○	×
System device	Safety special relay	SA\SM	○	—	○	△	×
	Safety special register	SA\SD	—	○	○	○	×

*1 Writing to local devices is available.

■How to input device

Global device: Prefix 'SA\' to the device name. (Example: SA\D10)
Local device: Prefix 'SA\#' to the device name. (Example: SA\#D10)

FX5CPUs

○: Applicable, △: Display only, ×: Not applicable —: Not available

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
User device	Input	X	○	—	○	△	×
	Output	Y	○	—	○	△	×
	Internal relay	M	○	—	○	○	×
	Latch relay	L	○	—	○	○	×
	Link relay	B	○	—	○	○	×
	Annunciator	F	○	—	○	○	×
	Link special relay	SB	○	—	○	△	×
	Timer	T	—	×	○	○	○
	Retentive timer	ST	—	×	○	○	○
	Counter	C	—	×	○	○	○
	Long counter	LC	—	×	○	○	○
	Data register	D	—	○	○	○	○
	Link register	W	—	○	○	○	○
	Link special register	SW	—	○	○	○	○
System device	Special relay	SM	○	—	○	△	×
	Special register	SD	—	○	○	○	○
Module access device (U□\G□)	Module access device	G	—	○	○	○	○
Index register	Index register	Z	—	×	×	○	×
	Long index register	LZ	—	×	×	○	×
File register	File register	R	—	○	○	○	○
	Extended file register	ER	—	○	×	○	×
Nesting	Nesting	N	—	—	×	×	×
Pointer	Pointer	P	—	—	○	×	×
	Interrupt pointer	I	—	—	○	×	×
Others	I/O number specified device	U	—	—	○	×	×
Constant	Decimal constant	K	—	—	×	×	×
	Hexadecimal constant	H	—	—	×	×	×
	Real constant	E	—	—	×	×	×
	String constant	—	—	—	×	×	×

Creating comments for module access devices

Device comments can be created within the range of U01 (\G0) to U10 (\G262143).

Remote head modules

○: Applicable, △: Display only, ×: Not applicable —: Not available

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
User device	Input	X	○	—	○	△	×
	Output	Y	○	—	○	△	×
	Internal relay	M	○	—	×	×	×
	Latch relay	L	○	—	×	×	×
	Link relay	B	○	—	×	×	×
	Annunciator	F	○	—	×	×	×
	Link special relay	SB	○	—	○	△	×
	Edge relay	V	○	—	×	×	×
	Step relay	S	○	—	×	×	×
	Timer	T	—	×	×	×	×
	Retentive timer	ST	—	×	×	×	×
	Long timer	LT	—	×	×	×	×
	Long retentive timer	LST	—	×	×	×	×
	Counter	C	—	×	×	×	×
	Long counter	LC	—	×	×	×	×
	Data register	D	—	○	×	×	×
	Link register	W	—	○	○	○	○
	Link special register	SW	—	○	○	○	○
	Direct access input	X (DX)	○	—	×	×	×
	Direct access output	Y (DY)	○	—	×	×	×
System device	Function input	FX	×	—	×	×	×
	Function output	FY	×	—	×	×	×
	Function register	FD	—	○	×	×	×
	Special relay	SM	○	—	○	△	×
	Special register	SD	—	○	○	○	○
Link direct device	Link input	J□\X	○	—	×	×	×
	Link output	J□\Y	○	—	×	×	×
	Link relay	J□\B	○	—	×	×	×
	Link special relay	J□\SB	○	—	×	×	×
	Link register	J□\W	—	○	×	×	×
	Link special register	J□\SW	—	○	×	×	×
Module access device	Module access device	U□\G	—	○	○	○	○
CPU buffer memory access device	CPU buffer memory access device	U3E□\G U3E□\HG	—	○	×	×	×
Index register	Index register	Z	—	×	×	×	×
	Long index register	LZ	—	×	×	×	×
File register	File register	R	—	○	×	×	×
		ZR	—	○	×	×	×
Refresh data register	Refresh data register	RD	—	○	○	○	○
Nesting	Nesting	N	—	—	×	×	×
Pointer	Pointer	P	—	—	×	×	×
	Interrupt pointer	I	—	—	×	×	×

Category	Device name	Symbol	Digit specification	Bit-specified word device	Device comment	Device memory	Device initial value
Other devices	SFC block device	BL	—	—	×	×	×
	SFC transition device	TR	—	—	×	×	×
	Step relay (with a block specification)	BL\S	—	—	×	×	×
	SFC transition device (with a block specification)	BL\TR	—	—	×	×	×
	Network number specified device	J	—	—	×	×	×
	I/O number specified device	U	—	—	×	×	×
Constant	Decimal constant	K	—	—	×	×	×
	Hexadecimal constant	H	—	—	×	×	×
	Real constant	E	—	—	×	×	×
	String constant	—	—	—	×	×	×

Appendix 4 Using a Project in a Different Version

This section explains the considerations for using a project in a different version of GX Works3 than the created one.
Note the following contents to use a project.

Considerations common to all versions

■Module type of a CPU module

Function	Considerations
Opening a project Writing data to a programmable controller/reading data from a programmable controller Project verification/verification with a programmable controller	These functions cannot be performed in GX Works3 which does not support the module type currently used.

■Profile

Function	Considerations	Reference
Opening a project Writing data to a programmable controller/ reading data from a programmable controller	When a profile which is not supported by GX Works3 is used in a project, these functions cannot be used.	Page 536 Modules
Project verification/verification with a programmable controller	When the profile of a module that is not supported by GX Works3 is used in the verification target project, these functions cannot be used.	

Using a project in a later version

■Using a project, which was created in version 1.010L, in version 1.015R or later

Function	Considerations
Library operation	Even if libraries that contain global labels created in version 1.010L are registered in the library list in version 1.015R or later, the global labels are not displayed in the [Library] tab in the "Element Selection" window.
	A global label called by a utilized element will be changed to an undefined label without being utilized.

■Using a project, which was created in version 1.011M or earlier, in version 1.015R or later

Function	Considerations
Option setting	The following option will be set to "No" when a project, which was created in version 1.011M or earlier, is opened/read in version 1.015R or later. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Optimize the Number of Steps." Therefore, the verification result is inconsistent due to the difference of the option setting.
Verification with a programmable controller	A verification result may mismatch when verifying a project, which was created in version 1.011M or earlier, against the global label setting in a CPU module. In this case, re-read/re-write the data from/to the CPU module, and then verify them again.

■Using a project, which was created in version 1.033K or earlier, in version 1.035M or later

Function	Considerations
Option setting	The following option will be set to "No" when a project, which was created in version 1.033K or earlier, is opened/read in version 1.035M or later. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Use MC/MCR to Control EN"

■Using a project, which was created in version 1.036N or earlier, in version 1.038Q or later

Function	Considerations
Option setting	The following option will be set to "No" when a project, which was created in version 1.036N or earlier, is opened/read in version 1.038Q or later. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Set Reserved Area"

Using a project in an earlier version

■Using a project, which was created in version 1.005F or later, in version 1.002C or earlier

Function	Considerations
Reading data from a programmable controller	A project, which was created in version 1.005F or later, cannot be read in version 1.002C or earlier.

■Using a project, which was created in version 1.007H or later, in version 1.006G or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	A project that contains an FBD/LD program cannot be opened/read in version 1.006G or earlier.

■Using a project, which was created in version 1.010L or later, in version 1.008J or earlier

Function	Considerations
Library operation	An edit-protected FBD/LD element is editable by opening it in version 1.008J. (Worksheet only)
	An element is not editable when an edit-protected ST program is opened and copied in version 1.008J or earlier. To make the element editable, open the project that contains the copied data in version 1.010L or later, and copy it again.
	When an edit-protected element is opened and copied in version 1.008J or earlier, then it is reopened in version 1.010L or later, the icon of the copied data (element) may indicate that the element is still edit-protected.

■Using a project, which was created in version 1.015R or later, in version 1.010L or earlier

Function	Considerations
Library operation	A read-protected element, which was utilized from a library, is identified as an element with a block password when it is opened in version 1.010L or earlier. Therefore, the element cannot be detected and the name cannot be changed.

■Using a project, which was created in version 1.015R or later, in version 1.011M or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	A project that contains an SFC program cannot be opened/read in version 1.011M or earlier.
Option setting	A project that "Yes" has been selected for the following option cannot be opened/read in version 1.011M or earlier. In addition, a project that "Yes" has been selected for the following option cannot be verified with one created in version 1.011M or earlier. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Optimize the Number of Steps."
Program file setting	When a project that the execution order has been set is opened and converted in version 1.011M or earlier, the order is changed to the program block name order.
Library operation	Even if libraries that contain global labels are registered in the library list in version 1.010L, the global labels are not displayed in the [Library] tab in the "Element Selection" window. In addition, global labels called by utilized elements will be changed to undefined labels without being utilized.
	Libraries that contain a read-protected element can be registered in the library list in version 1.011M or earlier, but they cannot be used.

■Using a project, which was created in version 1.020W or later, in version 1.019V or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	When a project, for which multiple connection destinations have been set, is opened in version 1.019V or earlier, the destinations except for one which was set first are deleted.
	Parameters of a project used for an RnCPU or RnENCPU return to the defaults when the project is opened in version 1.019V or earlier.
	Parameters of a project, for which the daylight saving time setting has been enabled, return to the defaults when the project is read in version 1.019V or earlier.
	A project, in which an extended temperature range base unit (R310B-HT, R610B-HT) has been placed, cannot be opened/read in version 1.019V or earlier.
	A project that contains an SFC program including multiple steps cannot be opened/read in version 1.019V or earlier.
	A project that contains an SFC program including a jump may not be opened/read in version 1.019V or earlier.
Project verification Verification with a programmable controller	CPU parameters of a project used for an RnCPU or RnENCPU cannot be verified against data in another project in version 1.019V or earlier.
	CPU parameters of a project, for which the daylight saving time setting is enabled, cannot be verified in version 1.019V or earlier against data in a programmable controller.
	A project, in which an extended temperature range base unit (R310B-HT, R610B-HT) has been placed, cannot be verified in version 1.019V or earlier.
	A project that contains an SFC program including multiple steps cannot be verified in version 1.019V or earlier.
	A project that contains an SFC program including a jump may not be verified in version 1.019V or earlier.

Function	Considerations
Library operation	A project that contains an SFC program including multiple steps cannot be read in version 1.019V or earlier.
	A project that contains an SFC program including a jump may not be read in version 1.019V or earlier.
	Libraries that contain an element, for which the edit password has individually been set, can be registered in the library list in version 1.019V or earlier, but they cannot be used.
	A help file, for which "Import" has been selected at exporting, retains as the unused data in a project or a library when it is opened by version 1.019V or earlier. When it is reopened in version 1.020W or later after being saved in version 1.019V or earlier, the help file of the unused data is deleted.
Reading from a memory card	A project that contains an SFC program including multiple steps cannot be read in version 1.019V or earlier.
	A project that contains an SFC program including a jump may not be read in version 1.019V or earlier.
Editing an SFC program	An SFC program, which was created in GX Works3 version 1.020W or later, may run unstably if it is used in version 1.019V or earlier. When editing an SFC program, use version 1.020W or later.

■Using a project, which was created in version 1.025B or later, in version 1.022Y or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	Parameters of a project used for an RnCPU, RnENCPU, and RnPCPU (process mode/redundant mode) return to the defaults when the project is opened in version 1.022Y or earlier. A project used for an RnPCPU (redundant mode) is changed to one used for an RnPCPU (process mode).
	Parameters of a project used for an RnCPU and RnENCPU, for which the FTP client is set, return to the defaults when the project is opened in version 1.022Y or earlier.
	A project used for a remote head module cannot be opened/read in version 1.022Y or earlier.
	Parameters of a project, in which a redundant power supply base unit (R310RB, R38RB-HT, R610RB, R68RB-HT) has been placed and for which a power supply 2 has been set, return to the defaults when the project is opened/read in version 1.022Y or earlier.
	A project, in which some worksheets are created in a POU, cannot be opened in version 1.025B or earlier.
	A project, in which an AnyWireASLINK master module (RJ51AW12AL) has been placed, cannot be opened/read in version 1.022Y or earlier.
Project verification Verification with a programmable controller	A project used for an RnPCPU (redundant mode) cannot be verified in version 1.022Y or earlier.
	A project used for a remote head module cannot be verified in version 1.022Y or earlier.
	Parameters of a project, in which a redundant power supply base unit (R310RB, R38RB-HT, R610RB, R68RB-HT) has been placed and for which a power supply 2 has been set, cannot be verified in version 1.022Y or earlier.
	A project, in which an AnyWireASLINK master module (RJ51AW12AL) has been placed, cannot be verified in version 1.022Y or earlier.
Connection destination specification	If any of the following options are set, the setting for connection destination on the "Specify Connection Destination" screen returns to the default when the screen is opened. • "GOT" is selected for "PLC side I/F" and "CC IE Cont" is set in the "PLC side I/F Detailed Setting of GOT" screen. • "CC IE Control NET/10(H) Board" is set for "PC side I/F". • "CC-Link Board" is set for "PC side I/F". • "CC IE Field board" is set for "PC side I/F".
Library operation	Libraries that contain a module label/ structure cannot be used in version 1.022Y or earlier.

■Using a project, which was created in version 1.030G or later, in version 1.027D or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	Parameters of a project used for an RnCPU and an RnENCPU return to the defaults when the project is opened in version 1.027D or earlier.
	A project, in which a flexible high-speed I/O control module (RD40PD01) or triac output module (RY20S6) has been placed, cannot be opened/read in version 1.027D or earlier to which profiles have not been registered.
	A project, for which an AnyWireASLINK configuration has been set, cannot be opened/read in version 1.027D or earlier.
	A project written to a programmable controller after selecting "No" for the following option cannot be read in version 1.027D or earlier. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Check the data type of instruction argument"
	When a data type other than Word [Unsigned]/Bit String [16-bit]/Word [Signed] is used for an argument of BMOV(P) instruction, an error occurs at the conversion in version 1.027D or earlier.
	An SFC program in MELSAP-L (instruction format) is displayed in the detailed expression of a ladder when it is opened in version 1.027D or earlier.
	A project, in which a redundant power supply module (R63RP) has been placed, cannot be opened in version 1.026C or earlier.
	When a project, in which a redundant power supply module (R63RP) has been placed, is opened in version 1.026C or earlier, the name of the power supply module is blank.
	When writing a project, in which safety global labels or safety/standard shared global labels are created in version 1.030G or later, to a programmable controller, the project cannot be read in version 1.027D or earlier.
Project verification Verification with a programmable controller	A project, in which a flexible high-speed I/O control module (RD40PD01) or triac output module (RY20S6) has been placed, cannot be verified in version 1.027D or earlier in which a profile to which profiles have not been registered.
	A project, for which an AnyWireASLINK configuration has been set, cannot be verified in version 1.027D or earlier.
	A project, in which a redundant power supply module (R63RP) has been placed, cannot be verified in version 1.027D or earlier.
	A project that parameters for CC-Link IE Field Network Basic have been set cannot be verified in version 1.027D or earlier.
Connection destination specification	If any of the following options are set, the setting for connection destination is changed to the defaults. • "GOT" is selected for "PLC side I/F" and "CC IE Field" is set in the "PLC side I/F Detailed Setting of GOT" screen. • For a project which is used for an RnPCPU (redundant mode) and a remote head module, "GOT" is selected for "PLC side I/F" and "CC IE Cont" is set in the "PLC side I/F Detailed Setting of GOT" screen.
Register/cancel forced input/output	The current value of devices in a CPU module, in which forced input/output has been registered in version 1.030G or later, cannot be changed in version 1.027D or earlier.

■Using a project, which was created in version 1.032J or later, in version 1.019V or earlier

Function	Considerations
Reading data from a programmable controller Verification with a programmable controller	A project, in which a following module has been placed, cannot be read/verified in version 1.019V or earlier. • Analog output module (R60DA4, R60DA4(Q), R60DAI8, R60DAI8(Q), R60DAV8, R60DAV8(Q)) • Channel isolated digital-analog convertor module (R60DA8-G, R60DA8-G(Q), R60DA16-G) • High-Speed analog input module (Q64ADH)

■Using a project, which was created in version 1.032J or later, in version 1.031H or earlier

Function	Considerations
Open project Read from PLC	Parameters of a project used for an RnCPU and an RnENCPU return to the defaults when the project is opened in version 1.031H or earlier.
	A project containing any one of the following data cannot be used in version 1.031H or earlier. • A program file, in which "Yes" is selected for "Use the process control extension" • A function block, in which "Yes" is selected for "Use as Tag FB" • A process control function block • Data registered in a tag FB setting
	A project, in which an extension cable (RC100B) has been placed, cannot be opened/read in version 1.031H or earlier.
	A project, in which an analog output module (R60DAH4), an input module (RX28), and an output module (RY18R2A) have been placed, cannot be opened/read in version 1.031H or earlier to which profiles have not been registered.
Project verification Verification with a programmable controller	A project, in which an extension cable (RC100B) has been placed, cannot be verified in version 1.031H or earlier.
	A project, in which an analog output module (R60DAH4), an input module (RX28), and an output module (RY18R2A) has been placed, cannot be verified in version 1.031H or earlier to which profiles have not been registered.

■Using a project, which was created in version 1.035M or later, in version 1.019V or earlier

Function	Considerations
Reading data from a programmable controller	Module parameters of a project, in which a flexible high-speed I/O control module (RD40PD01) has been placed, cannot be read in version 1.019V or earlier.

Function	Considerations
Project verification Verification with a programmable controller	Module parameters of a project, in which a flexible high-speed I/O control module (RD40PD01) has been placed, cannot be verified in version 1.019V or earlier.

■Using a project, which was created in version 1.035M or later, in version 1.033K or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	Parameters of a project used for an RnCPU and an RnENCPU return to the defaults when the project is opened in version 1.033K or earlier.
	A project, in which an OPC UA server module (RD81OPC96), BACnet module (RJ71BAC96), and a robot controller CPU (R16RTCPU) have been placed, cannot be opened/read in version 1.033K or earlier to which profiles have not been registered.
	When a project that saves the parameters of a slave station is opened in version 1.033K or earlier, the parameters seem to be deleted even though the parameters are not deleted. By reopening the project in version 1.035M or later, the parameters of the slave station can be used.
	A project that "Yes" has been selected for any of the following options cannot be opened/read in version 1.033K or earlier. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Use MC/MCR to Control EN" • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Collectively Allocate Temporary Area to Optimize the Number of Steps"
Project verification Verification with a programmable controller	A project, in which an OPC UA server module (RD81OPC96), BACnet module (RJ71BAC96), and a robot controller CPU (R16RTCPU) have been placed, cannot be verified in version 1.033K or earlier to which profiles have not been registered.
Configuration setting	When a project that saves the parameters of a slave station is opened in version 1.033K or earlier and the following operations are performed in the screen of CC-Link IE Field configuration setting, the saved parameter information will not be updated/deleted. • Editing the CC IE Field configuration • Parameter processing of a slave station • Deleting the parameter information of a slave station When the screen of the CC IE Field configuration setting is opened in version 1.035M or later after changing the station number of a slave station in version 1.033K or earlier, the parameter information of the slave station to which the station number was changed will be skipped and not read. By clicking the [Close with Reflecting the Setting] button in the state where the parameter information was skipped and not read, the information will be deleted.
Verification	An error occurs at the conversion in version 1.033K or earlier when a different data type has been specified for the argument of an instruction by selecting "No" in the following option. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Check the data type of instruction argument"
	An error occurs when an ST program that contains an instruction supported in 1.035M or later is converted in version 1.033K or earlier.

■Using a project, which was created in version 1.038Q or later, in version 1.036N or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	A project that "Yes" has been selected for the following option cannot be opened/read in version 1.036N or earlier. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Set Reserved Area"
	A project including an element with the security key registered cannot be opened in version 1.036N or earlier. By deleting the security key registered to the element, the project can be opened in version 1.036N or earlier.
	A project, in which a CANopen module (RJ71CN91) has been placed, cannot be opened/read in version 1.036N or earlier to which profiles have not been registered.
Project verification Verification with a programmable controller	A project, in which a CANopen module (RJ71CN91) has been placed, cannot be verified in version 1.036N or earlier to which profiles have not been registered.
Library operation	Libraries of a project that "Yes" has been selected for the following option can be registered in the library list in version 1.036N or earlier, but they cannot be used. • [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Function Block" ⇨ "Enable to Set Reserved Area"

■Using a project, which was created in version 1.040S or later, in version 1.019V or earlier

Function	Considerations
Reading data from a programmable controller	Module parameters of a project, in which a high-speed analog input module (R60ADH4) has been placed, cannot be read in version 1.019V or earlier.
Project verification Verification with a programmable controller	Module parameters of a project, in which a high-speed analog input module (R60ADH4) has been placed, cannot be verified in version 1.019V or earlier.

■Using a project, which was created in version 1.040S or later, in version 1.038Q or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	Parameters of a project used for an RnPCPU return to the defaults when the project is opened in version 1.038Q or earlier.
	Parameters of a project used for an RnPCPU, for which the FTP client is set, return to the defaults when the project is opened in version 1.038Q or earlier.
	The setting of extended file registers (ER) in a project used for an FX5CPU will be cleared when the project is opened in version 1.038Q or earlier. A message appears when opening the Device Memory editor. The Device Memory editor will not open by clicking the [OK] button on the message. Therefore, retry opening the Device Memory editor.
	A project that contains an instruction supported in 1.040S or later cannot be read in version 1.038Q or earlier.
	A project, in which a SIL2 function module (R6PSFM) has been placed, cannot be opened/read in version 1.038Q or earlier.
	A project, in which an MES interface module (QJ71MES96N), an input module with diagnostic functions (RX40NC6B(S2M), RX40NC6B(S2S)), and an output module with diagnostic functions (RY40PT5B(S2M), RY40PT5B(S2S)) has been placed, cannot be opened/read in version 1.038Q or earlier to which profiles have not been registered.
	When printing FBD/LD programs, the paper size and the paper feed direction depend on the page setting.
	When a project for which the following items have been changed in the FBD/LD or SFC editor in opened in version 1.038Q or earlier, the changes will not be applied. • Background color of an editor • Background color of a comment element • Font color of a comment element Note that the font colors set for each comment element will remain in version 1.038Q or earlier.
Project verification Verification with a programmable controller	A project used for an RnPCPU cannot be verified with another project in version 1.038Q or earlier.
	Module parameters of an RnPCPU to which a project that the FTP client has been set is written cannot be verified in version 1.038Q or earlier.
	A project that contains an instruction supported in 1.040S or later cannot be verified in version 1.038Q or earlier.
	A project, in which a SIL2 function module (R6PSFM) has been placed, cannot be verified in version 1.038Q or earlier.
	A project, in which an MES interface module (QJ71MES96N), an input module with diagnostic functions (RX40NC6B(S2M), RX40NC6B(S2S)), and an output module with diagnostic functions (RY40PT5B(S2M), RY40PT5B(S2S)) has been placed, cannot be verified in version 1.038Q or earlier to which profiles have not been registered.
Connection destination specification	If the following option is set, the setting for connection destination on the "Specify Connection Destination" screen returns to the default when the screen is opened. • "Ethernet board" is set for "PC side I/F", and "via GOT(Ethernet) transparent mode" is set in the "PLC side I/F Detailed Setting of GOT" screen.
Verification	An error occurs when a program that contains an instruction supported in version 1.040S or later is converted in version 1.038Q or earlier.

■Using a project, which was created in version 1.045X or later, in version 1.044W or earlier

Function	Considerations
Opening a project Reading data from a programmable controller	The following projects that are created in version 1.045X or later cannot be opened and read from a CPU module in version 1.044W or earlier. • A project using a read-protected POU whose password authentication is disabled. • A project to which a user having the access level of "Assistant Developers" is registered.
	When opening an RnCPU or RnENCPU project created in version 1.045X or later in version 1.044W or earlier, the parameters return to the default.
	When an RnCPU or RnENCPU project, which was created in version 1.045X or later and in which any one of the following parameter has been set, is read to version 1.044W or earlier, the parameter is returned to the default. • Web server setting • Battery-less option cassette setting • Simple CPU communication setting
Project verification Verification with a programmable controller	The following projects that are created in version 1.045X or later cannot be verified with another project in version 1.044W or earlier. • A project using a read-protected POU whose password authentication is disabled. • A project to which a user with the access level of "Assistant Developers" is registered.
	When an RnCPU or RnENCPU project, which was created in version 1.045X or later and in which any one of the following parameter has been set, is verified with another project in version 1.044W or earlier, the parameter of a CPU module cannot be verified. • Web server setting • Battery-less option cassette setting • Simple CPU communication setting
Opening a simulation environment	A simulation environment file saved in version 1.045X or later cannot be opened in version 1.044W or earlier.
Connection destination specification	When a project for which a connection destination via a QCPU (Q mode) was specified is opened in version 1.044W or earlier, only this connection destination setting returns to the default.

Function	Considerations
Library operation	When a password authentication for a read-protected POU is disabled in version 1.045X or later, a library including the POU cannot be used in version 1.044W or earlier.
User authentication	When reading user information whose access level is set as "Assistant Developers" in version 1.045X or later from a CPU module using version 1.044W or earlier, the access level is changed to "Users" . (☞ Page 471 Writing/reading user information to/from CPU module)

Appendix 5 Using Simulation Function

The following shows the modules supporting the simulation function.

GX Simulator3

■CPU modules supporting the function

Series		Module name
iQ-R Series	RnCPU	R00CPU
		R01CPU
		R02CPU
		R04CPU
		R08CPU
		R16CPU
		R32CPU
		R120CPU
	RnENCPU	R04ENCPU
		R08ENCPU
		R16ENCPU
		R32ENCPU
		R120ENCPU
	RnPCPU	R08PCPU
		R16PCPU
		R32PCPU
		R120PCPU
	RnSFCPU	R08SFCPU
		R16SFCPU
		R32SFCPU
		R120SFCPU
	RnPSFCPU	R08PSFCPU
		R16PSFCPU
		R32PSFCPU
		R120PSFCPU
iQ-F Series	FX5CPU	FX5UCPU

• Firmware versions of the CPU modules supporting the function

GX Simulator3 runs based on the following firmware versions. When the firmware version of a CPU module is not matched with the following one, operation of the actual module and GX Simulator3 may differ.

Module type	Supported version of GX Works3	Firmware version
RnCPU (R00CPU, R01CPU, R02CPU)	Version 1.045X or later	01
RnCPU (R04CPU, R08CPU, R16CPU, R32CPU, R120CPU)	Version 1.007H or later	03
	Version 1.020W or later	13
	Version 1.025B or later	17
	Version 1.030G or later	22
	Version 1.035M or later	26
	Version 1.040S or later	28
	Version 1.045X or later	31
RnENCPU	Version 1.020W or later	13
	Version 1.025B or later	17
	Version 1.030G or later	22
	Version 1.035M or later	26
	Version 1.040S or later	28
	Version 1.045X or later	31

Module type	Supported version of GX Works3	Firmware version
RnPCPU	Version 1.010L or later	01
	Version 1.020W or later	02
	Version 1.025B or later	03
	Version 1.030G or later	05
	Version 1.035M or later	08
	Version 1.040S or later	10
	Version 1.045X or later	13
RnSFCPU	Version 1.020W or later	03
	Version 1.030G or later	06
	Version 1.035M or later	07
	Version 1.040S or later	08
	Version 1.045X or later	10
RnPSFCPU	Version 1.045X or later	01
FX5UCPU	Version 1.025B or later	1.015
	Version 1.030G or later	1.031
	Version 1.035M or later	1.040
	Version 1.040S or later	1.050
	Version 1.045X or later	1.060

■Supported modules

Even if any of following modules exist in the system configuration of a project, the simulation function can be performed without an error.

Series	Module type	
iQ-R Series	PLC CPU	
	Motion CPU	
	SIL2 function module	
	Redundant function module	
	Safety CPU	
	Input	
	Output	
	I/O	
	NC Dedicated Module	
	Analog Input	
	Analog Output	
	Temperature Input	
	Temperature Control Module	
	Simple Motion	
	Pulse I/O/Positioning	
	Information Module	Serial communication
		Ethernet
		High speed data logger module
		MES Interface
		OPC UA Server module
		C intelligent function module
	Network Module	CC-Link
		CC IE Field
		CC IE Controller
		AnyWireASLINK Master Module
		BACnet
		CANopen module
	Blank Cover	

Series	Module type	
iQ-F Series	PLC CPU	
	Input	
	Output	
	I/O	
	Analog Input	
	Analog Output	
	Temperature Control Module	
	Simple Motion	
	Pulse I/O/Positioning	
	Network Module	CC-Link
		CC IE Field
Q Series	Input	
	Output	
	I/O	
	Interrupt Input	
	Analog Input	
	Analog Output	
	Analog I/O	
	Temperature Input	
	Temperature Control Module	
	Loop Control	
	Pulse I/O/Positioning	
	Energy Measuring Module	
	Information Module	Intelligent Communications
		MES Interface
		Web Server
	Network Module	AnyWireASLINK Master Module
		CC-Link/LT
		AS-i
		MELSECNET/H
		FL-net
		MODBUS(R)
	Blank Cover	
	Partner Products	

• Firmware version of supported network modules

GX Simulator3 operates based on the firmware with the following version.

Network module	Supported version of GX Works3	Firmware version
RnENCPU (network part)	Version 1.040S or later	18
RJ71EN71	Version 1.040S or later	18
RJ71GP21-SX	Version 1.040S or later	18
RJ71GF11-T2	Version 1.040S or later	18
FX5-CCLIEF	Version 1.040S or later	1.004

SMM Simulator

Series	Module type	Module name
iQ-R Series	Simple Motion	RD77MS2
		RD77MS4
		RD77MS8
		RD77MS16
		RD77GF4
		RD77GF8
		RD77GF16
		RD77GF32
iQ-F Series	Simple Motion	FX5-40SSC-S
		FX5-80SSC-S

MT Simulator2

Series	Module type	Module name
iQ-R Series	Motion CPU	R16MTCPU
		R32MTCPU
		R64MTCPU

Supported CPU module functions

The simulation function of GX Works3 does not support some functions of a CPU module.
The following shows the functions which are supported by the simulation function.
For details on each function, refer to the following manuals.
📖MELSEC iQ-R Programming Manual (Program Design)
📖MELSEC iQ-F FX5 User's Manual (Application)

CPU module (RnCPUs, RnENCPUs, and RnPCPUs)

Function name					Remarks
Basic function	Program related function	Program execution (ladder, ST, and FBD/LD)			Page 587 Program execution time
		Program execution (SFC)*1			
		Scan time monitoring time (WDT) setting			Page 588 Watchdog timer Page 587 Program execution time
	Clock function	Clock function	Clock function		The clock data is written to the internal time of a simulator. It differs from the time of a personal computer.
			Time zone setting		The clock of a personal computer is copied to the internal time and used.
			Daylight saving time function*2		—
		System clock function			
	LED display function	LED display function			—
	Writing to PLC/reading from PLC	Writing data to a programmable controller (including data writing while a CPU module is in RUN) *3			—
		Reading from a programmable controller			
	Diagnostic function	Self-diagnostic function	Error detection function		—
			Module diagnostic function		Only a host CPU supports this function.
	Monitor and test function	Basic monitor function	Monitoring a program (circuit monitor)		—
		Test function	Testing device and label data (changing values)	Testing device and label data (changing values)	
				Testing local device and local label data	
	Debug function	Online program change	Changing program while CPU module is in RUN (changing ladder block)*3		—

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Function name				Remarks
Operation function	Program related function	Program execution setting function	Program execution type setting function	—
			Device/file usage setting	
		Interrupt function	Fixed cycle interval setting	
			File register block number saving/ recovering setting	
			Interrupt permission setting during instruction execution	
		PID control function		
		Process control function*4		
		Constant scan		
	Operation function	Remote operation function	Operation change function	—
			RUN-PAUSE contact setting function	
	Device/data related function	Device/label memory area setting function (Device variable setting function)	Device/label memory area setting function (Device variable setting function)	—
			Local device setting function	
		Refresh memory setting function		
		Internal buffer capacity setting function*5		
		Index register setting function		
		Device/label initial value setting function		
		Label initial value reflection setting function*4		
		Label initialization function after converting all programs and writing to a programmable controller*4		
		Device comment function		
		File register setting function		
		Timer device limit setting function		
		STOP→RUN operation setting function of output (Y)		
	Latch function	Latch function		It is not supported while simulation is stopped.
	Communication setting function	Device/label access service processing setting		—
RAS function	Diagnostic function	Error clear function		—
	History function	Event history function (Error history/module error history collecting function)		Only a host CPU supports this function.
Maintenance function	Monitor function	(Interrupt) program list monitor		Page 587 Program execution time
		Scan time monitor		
		SFC program (diagram) monitor*1		—
		(Local) device/label batch/registration monitor		
		Buffer memory monitor function		
	Test function	Forced ON/OFF of an external I/O*2		—
		Clearing device, label and file register		
		Clearing a latch device and label		

Function name				Remarks
Multiple CPU system function	Operation setting	Other PLC control module setting function	Control CPU setting function	—
			Importing I/O from outside group function	Only a CPU, which operates interactively with another module in the system simulation, supports these functions.
		Operation mode setting function	Clock data synchronization function	
			Operation setting function at stop error	
			Multiple CPU synchronous startup setting function	
	CPU data communication function	Communication function	The cycle of the fixed cycle communication function	Only a CPU, which operates interactively with another module in the system simulation, supports these functions.
			Fixed scan communication sending data function	
			CPU number-based data assurance function	
			Communication function by refresh	
			Communication function by direct access	
	Interrupt function	Multiple CPU synchronization interrupt function (I45)		Only a CPU, which operates interactively with another module in the system simulation, supports these functions.
Redundant function*6	☞ Page 345 Simulation of an RnPCPU (redundant mode)			

*1 RnPCPUs (redundant mode) do not support them.
*2 RnCPUs and RnENCPUs support it.
*3 In the simulation for an RnPCPU (redundant mode), program restoration information cannot be written to GX Simulator3.
*4 Only RnPCPUs support them.
*5 R00CPUs do not support it.
*6 Only RnPCPUs (redundant mode) support it.

CPU module (RnSFCPU, RnPSFCPU)

Function name					Remarks
Basic function	Program related function	Program execution (ladder, ST, and FBD/LD)		Standard program	Page 587 Program execution time
				Safety program	
		Scan time monitoring time (WDT) setting		Standard program	Page 588 Watchdog timer Page 587 Program execution time
				Safety program	
	Clock function	Clock function	Clock function		The clock data is written to the internal time of a simulator. It differs from the time of a personal computer.
			Time zone setting		The clock of a personal computer is copied to the internal time and used.
		System clock function	System clock function		—
			Safety special relay/safety special register		
	Writing to PLC/reading from PLC	Writing to a programmable controller (including data writing while a CPU module is in RUN)		Standard program	—
				Safety program	
		Reading from a programmable controller (including data reading while a CPU module is in RUN)		Standard program	
				Safety program	
	Diagnostic function	Self-diagnostic function	Error detection function		—
			Module diagnostic function		Only a host CPU supports this function.
	Monitor and test function	Monitoring a program (circuit monitor)		Standard program	—
				Safety program	
		Testing device and label data (changing values)	Testing device and label data (changing values)	Standard label	
				Safety device/ safety label	
				Standard/safety shared label	
			Testing local device and local label data	Safety device/ safety label	
				Standard/safety shared label	
	Debug function	Online program change	Changing program while CPU module is in RUN (changing ladder block)	Standard program	—

Function name					Remarks
Operation function	Program related function	Program execution setting function	Program execution type setting function	Standard program	—
				Safety program	
			Device/file usage setting	Standard program	
				Safety program	
		Interrupt function	Fixed cycle interval setting	Standard program	—
			File register block number saving/ recovering setting	Standard program	
			Interrupt permission setting during instruction execution	Standard program	
		PID control function		Standard program	
		Process control function*1		Standard program	
		Constant scan			
	Operation function	Remote operation function	Operation change function		—
			RUN-PAUSE contact setting function		
	Device/data related function	Device/label memory area setting function (Device variable setting function)	Device/label memory area setting function (Device variable setting function)	Standard device/ standard label	—
				Safety device/ safety label	
				Standard/safety shared label	
			Local device setting function	Standard program (Standard device/ standard label)	
				Safety program (Safety device/ safety label)	
		Refresh memory setting function			
		Internal buffer capacity setting function			
		Index register setting function		Standard program	
		Device/label initial value setting function		Standard device/ standard label	
		Label initial value reflection setting function*1		Standard label	
		Label initialization function after converting all programs and writing to a programmable controller*1		Standard label	
		Device comment function		Standard device	
				Safety device	
		File register setting function		Standard program	
		Timer device limit setting function		Standard program	
				Safety program	
		STOP→RUN operation setting function of output (Y)			
	Communication setting function	Device/label access service processing setting			
Diagnosis/History function	Diagnostic function	Error clear function			—
	History function	Event history function (Error history/module error history collecting function)			Only a host CPU supports this function.

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Function name				Remarks
Maintenance function	Monitor function	(Interrupt) program list monitor		Page 587 Fixed scan execution type program and timer device
		Scan time monitor		
		(Local) device batch/registration monitor		—
		Buffer memory monitor function		
	Test function	Clearing device, label and file register	Standard device/ standard label	—
			Safety device/ safety label	
			Standard/safety shared label	
		Clearing a latch device and label		
Safety function (RnSFCPU+R6SFM)	Safety condition control function	Safety/test mode		Can be used in the test mode.
Redundant function*1	☞ Page 345 Simulation of an RnPSFCPU			

*1 Only RnPSFCPUs support these functions.

MELSEC iQ-R series common function

Function name				Remarks
System configuration function	System configuration setting function	Input/output number and point variable setting function		—
		MELSEC iQ-R series 2-slots module		—
Module programming common function	Data communication function	Direct access function (U□\G□, J□\□)		Access with module FB (dedicated instruction) and module label is available. Cannot be used in a safety program.
	Program creation support function	Module label and module FB (device comment) auto-creation function		—
		Sample program display function (Template display function)		
		Parameter auto-creation function (Initial setting and refresh setting)		
Label communication function	Access from an external device	Label communication from GOT*1		—
Inter-module synchronization function	Inter-module synchronization function	Fixed cycle synchronous control		—
	Interrupt function	Inter-module synchronous interrupt function (I44)		—
RAS function	History function	Event history function	Event history function	—
			(Error history/system error history function)	
	Diagnostic function	Module diagnostics		Only a host CPU supports this function.

*1 R00CPUs, R01CPUs, and R02CPUs do not support this function.

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CPU module (FX5CPU)

Function name				Remarks
Basic function	Program related function	Program execution (ladder, ST, and FBD/LD)		—
		Scan time monitoring time (WDT) setting		Page 588 Watchdog timer Page 587 Program execution time
	Clock function	Clock function		The clock data is written to the internal time of a simulator. It differs from the time of a personal computer.
		Time zone setting		The clock of a personal computer is copied to the internal time and used.
	LED display function	LED display function		—
	Writing to PLC/reading from PLC	Writing to a programmable controller (including data writing while a CPU module is in RUN)		
		Reading from a programmable controller		
	Diagnostic function	Self-diagnostic function	Error detection function	
			Module diagnostic function	
	Monitor and test function	Basic monitor function	Monitoring a program (circuit monitor)	
		Test function	Testing a device	
	Debug function	Online program change	Changing program while CPU module is in RUN (changing ladder block)	
Operation function	Program related function	Program execution setting function	Program execution type setting function	—
			Device/file usage setting	
		Interrupt function	Interrupt level control	
			Interrupt execution method	
		PID control function		
		Constant scan		
	Operation function	Remote operation function	Operation change function	
			RUN-PAUSE contact setting function	
	Device/data related function	Device/label memory area setting function		
		Device/label initial value setting function		
		Device comment function		
	Communication setting function	Device/label access service processing setting		
RAS function	Event history	Error code		—
		Warning code		
Maintenance function	Monitor function	Scan time monitor		Page 587 Program execution time
		(Local) device/label batch/registration monitor		—
		Buffer memory monitor function		
	Test function	Clearing a device and label		
		Clearing a latch device and label		

Supported devices

The devices supported by the Simulation function are the same as that of CPU module.
Note that the devices used in an SFC program are not supported.
For details on the devices, refer to the following manual.
📖MELSEC iQ-R CPU Module User's Manual (Application)
📖MELSEC iQ-F FX5 User's Manual (Application)

List of special relay

○: Supported, ×: Not supported

No.	Name	Description	RCPU	FX5CPU
SM0	Latest self diagnostics error (including annunciator ON)	OFF: No error ON: Error state	○	○
SM1	Latest self diagnostics error (not including annunciator ON)	OFF: No error ON: Error state	○	○
SM50	Error reset	OFF→ON: Error reset request ON→OFF: Error reset complete	○	○
SM56	Instruction execution fault	OFF: Normal ON: Instruction execution fault state	○	○
SM62	Annunciator	OFF: Not detected ON: Detected	○	○
SM80	Detailed information 1: Flag in use	OFF: Not used ON: In use	○	○
SM112	Detailed information 2: Flag in use			
SM203	STOP contact	OFF: Other than STOP state ON: STOP state	○	○
SM204	PAUSE contact	OFF: Other than PAUSE state ON: PAUSE state	○	○
SM210	Clock data set request	OFF→ON: setting request is detected ON→OFF: setting is completed	○	○
SM211	Clock data set error	OFF: No error ON: Error state	○	○
SM213	Clock data read request	OFF: Non-processing ON: Reading request	○	○
SM220	No.1 CPU preparation completed	OFF: CPU No.n preparation not completed ON: CPU No.n preparation completed	○	×
SM230	No.1 CPU error flag	OFF: CPU No.n normal ON: CPU No.n stop error state	○	×
SM320	Presence/absence of SFC program	OFF: No SFC program ON: SFC program	○*1	×
SM321	Start/stop SFC program	OFF: Does not execute an SFC program (stop) ON: Executes an SFC program (start)	○*1	×
SM322	SFC program start status	OFF: Initial start ON: Continue start	○*1	×
SM323	Presence/absence of continuous transition for entire block	OFF: No continuous transition ON: Continuous transition	○*1	×
SM324	Continuous transition prevention flag	OFF: When transition executed ON: When there is no transition	○*1	×
SM325	Output mode at block stop	OFF: OFF ON: Hold	○*1	×
SM326	SFC device/label clear mode	OFF: Device/label clear ON: Device/label retain	○*1	×
SM327	Output mode at execution of the END step	OFF: Hold step output OFF ON: Hold step output retained	○*1	×
SM328	Clear processing mode when the sequence reaches the END step	OFF: Clear processing performed ON: Clear processing not performed	○*1	×
SM400	Always ON	ON —————— OFF	○	○

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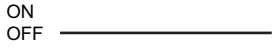
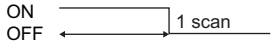
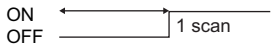
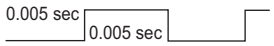
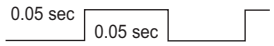
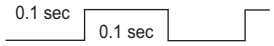
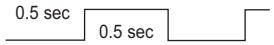
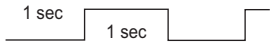
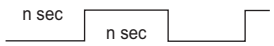
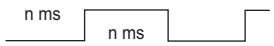
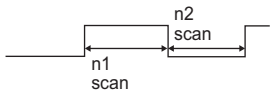
No.	Name	Description	RCPU	FX5CPU
SM401	Always OFF		○	○
SM402	After RUN, ON for 1 scan only		○	○
SM403	After RUN, OFF for 1 scan only		○	○
SM409	0.01 second clock		○	○
SM410	0.1 second clock		○	○
SM411	0.2 second clock		○	○
SM412	1 second clock		○	○
SM413	2 second clock		○	○
SM414	2n second clock		○	○
SM415	2n (ms) clock		○	○
SM420	User timing clock No.0		○	○
SM421	User timing clock No.1			
SM422	User timing clock No.2			
SM423	User timing clock No.3			
SM424	User timing clock No.4			
SM600	Memory card usable flags	OFF: Disabled ON: Enabled	○	×
SM603	Memory card (drive 2) flag	OFF: No SD memory card inserted ON: SD memory card inserted	○	×
SM604	Memory card in-use flag	OFF: Not used ON: In use	○	×
SM626	Extended SRAM cassette insertion flag	OFF: Extended SRAM cassette is not attached ON: Extended SRAM cassette is attached	○	×
SM628	Program memory write error	OFF: Write error ON: No write operation/normal	○	×
SM629	Program memory write flag	OFF: Writing is in progress ON: No write operation	○	×
SM632	Data memory write error	OFF: Write error ON: No write operation/normal	○	×
SM633	Data memory write flag	OFF: Writing is in progress ON: No write operation	○	×
SM699	Dedicated instruction skip flag	OFF: Instruction is executing or completed ON: Instruction has not been executed	○	○
SM700	Carry flag	OFF: Carry OFF ON: Carry ON	○	○
SM701	Number of output characters selection	OFF: Outputs until reaching NULL code ON: Outputs 16 characters	○	○
SM702	Search method	OFF: Sequential search ON: Dichotomizing search	○	×
SM703	Sort order	OFF: Ascending ON: Descending	○	○
SM704	Block comparison	OFF: Mismatch is detected ON: Completely match	○	○
SM709	DT/TM instruction improper data detection flag	OFF: No improper data ON: Improper data is detected	○	○
SM752	Dedicated instruction End bit control flag	OFF: End bit automatically controlled ON: End bit not automatically controlled	○	×

No.	Name	Description	RCPU	FX5CPU
SM753	File being accessed	OFF: File access is not in progress ON: File access is in progress	○	×
SM754	BIN/DBIN instruction error control flag	OFF: Executes error detection ON: No execute error detection	○	×
SM755	Scaling data check settings	OFF: Performs data check ON: Not perform data check	○	×
SM756	Module access completion wait control flag	OFF: Not wait the completion ON: Waits the completion	○	×
SM776	Local device setting at CALL	OFF: Disables local devices ON: Enables local devices	○	×
SM777	Local device setting in interrupt programs	OFF: Disables local devices ON: Enables local devices	○	×
SM816	Hold mode	OFF: Value not held ON: Value held	○*2	×
SM817	Hold mode	OFF: Value not held ON: Value held	○*2	×
SM1524	Initial processing successful completion state	OFF: The initial processing was completed successfully. ON: The initial processing was not completed successfully.	○	×
SM1525	Initial processing error completion state	OFF: The initial processing was completed with an error. ON: The initial processing was not completed with an error.	○	×
SM1888	Safety cycle processing time execution cycle error flag	OFF: No safety cycle processing time execution cycle error occurred (normal) ON: A safety cycle processing time execution cycle error occurred	○*3	×

*1 RnCPUs and RnENCPUs support it.
*2 Only RnPCPUs support it.
*3 Only RnSFCPUs support it.

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List of special register

○: Supported, ×: Not supported

No.	Name	Description	RCPU	FX5CPU
SD0	Latest self diagnostics error code	Latest self diagnostics error code	○	○
SD1	Clock time for self diagnosis error occurrence	Clock time for self diagnosis error occurrence	○	○
SD2				
SD3				
SD4				
SD5				
SD6				
SD7				
SD10	Self-diagnostic error number	Self-diagnostic error number 1	○	○
SD11		Self-diagnostic error number 2	○	○
SD12		Self-diagnostic error number 3	○	○
SD13		Self-diagnostic error number 4	○	○
SD14		Self-diagnostic error number 5	○	○
SD15		Self-diagnostic error number 6	○	○
SD16		Self-diagnostic error number 7	○	○
SD17		Self-diagnostic error number 8	○	○
SD18		Self-diagnostic error number 9	○	○
SD19		Self-diagnostic error number 10	○	○
SD20		Self-diagnostic error number 11	○	○
SD21		Self-diagnostic error number 12	○	○
SD22		Self-diagnostic error number 13	○	○
SD23		Self-diagnostic error number 14	○	○
SD24		Self-diagnostic error number 15	○	○
SD25		Self-diagnostic error number 16	○	○
SD62	Annunciator number	Annunciator number	○	○
SD63	Number of annunciators	Number of annunciators	○	○
SD64 to SD79	Table of detected annunciator numbers	Detected annunciator number	○	○
SD80	Detailed information 1 information category	Detailed information 1 information category code	○	○
SD81 to SD111	Detailed information 1	Detailed information 1	○	○
SD112	Detailed information 2 information category	Detailed information 2 information category code	○	○
SD113 to SD143	Detailed information 2	Detailed information 2	○	○*4
SD200	Status of switch	CPU switch status	○	○
SD201	LED status	CPU-LED state	○	○
SD203	Operating status of CPU	Operating status of CPU	○	○
SD205	Safety operation mode	Safety operation mode	○*3	×
SD206	Pair version	Pair version of a safety CPU	○*3	×
SD210	Clock data	Clock data (year)	○	○
SD211		Clock data (month)	○	○
SD212		Clock data (day)	○	○
SD213		Clock data (hour)	○	○
SD214		Clock data (minute)	○	○
SD215		Clock data (second)	○	○
SD216		Clock data (day of the week)	○	○
SD218	Time zone setting value	Time zone (in minutes)	○	○
SD241	Extension stage number	0: base unit only 1 to 7: extension stage number	○	×
SD242	Identification for whether or not Q series module can be mounted	Identification of the base type 0: Q series module cannot be mounted (There is no base unit that can mount the Q series unit) 1: Q series module can be mounted (There is a base unit that can mount the Q series unit)	○	×

No.	Name	Description	RCPU	FX5CPU
SD243	Number of base slots	Number of base slots	○	×
SD244				
SD250	Loaded maximum I/O	RCPU: The last I/O number for a mounted module is stored. FX5CPU: The first two digits of the last I/O number of a mounted module +1 in 8-bit binary is stored.	○	○
SD260	Number of points assigned to bit devices	X number of points assigned (L)	○	○
SD261		X number of points assigned (H)	○	○
SD262		Y number of points assigned (L)	○	○
SD263		Y number of points assigned (H)	○	○
SD264		M number of points assigned (L)	○	○
SD265		M number of points assigned (H)	○	○
SD266		B number of points assigned (L)	○	○
SD267		B number of points assigned (H)	○	○
SD268		SB number of points assigned (L)	○	○
SD269		SB number of points assigned (H)	○	○
SD270		F number of points assigned (L)	○	○
SD271		F number of points assigned (H)	○	○
SD272		V number of points assigned (L)	○	×
SD273		V number of points assigned (H)	○	×
SD274		L number of points assigned (L)	○	○
SD275		L number of points assigned (H)	○	○
SD276		S number of points assigned (L)	○*1	×
SD277		S number of points assigned (H)	○*1	×
SD280	Number of points assigned to word devices	D number of points assigned (L)	○	○
SD281		D number of points assigned (H)	○	○
SD282		W number of points assigned (L)	○	○
SD283		W number of points assigned (H)	○	○
SD284		SW number of points assigned (L)	○	○
SD285		SW number of points assigned (H)	○	○
SD288	Number of points assigned to timer-type devices	T number of points assigned (L)	○	○
SD289		T number of points assigned (H)	○	○
SD290		ST number of points assigned (L)	○	○
SD291		ST number of points assigned (H)	○	○
SD292		C number of points assigned (L)	○	○
SD293		C number of points assigned (H)	○	○
SD294		LT number of points assigned (L)	○	×
SD295		LT number of points assigned (H)	○	×
SD296		LST number of points assigned (L)	○	×
SD297		LST number of points assigned (H)	○	×
SD298		LC number of points assigned (L)	○	○
SD299		LC number of points assigned (H)	○	○
SD300	Number of points assigned to index registers	Z number of points assigned	○	○
SD302	Number of points assigned to long index registers	LZ number of points assigned	○	○
SD304	R Device Size [Lower]	R number of points assigned (L)	×	○
SD305		R number of points assigned (H)	×	○
SD306	Number of points assigned to file registers	ZR number of points assigned (L)	○	×
SD307		ZR number of points assigned (H)	○	×
SD308	Number of points assigned to refresh devices	RD number of points assigned (L)	○	×
SD309		RD number of points assigned (H)	○	×
SD312	File register block number	File register block number	○	×
SD412	One second counter	Number of counts in 1-second units	○	○
SD414	2n second clock setting	Unit setting for 2n second clock	○	○
SD415	2n ms clock setting	Unit setting for 2n ms clock	○	○

No.	Name	Description	RCPU	FX5CPU
SD420	Scan counter	Number of counts in each scan	○	○
SD500	Execution program number	Execution type of the program being executed	○	×
SD518	Initial scan time	Initial scan time (unit: ms)	○	○
SD519		Initial scan time (unit: μs)	○	○
SD520	Current scan time	Current scan time (unit: ms)	○	○
SD521		Current scan time (unit: μs)	○	○
SD522	Minimum scan time	Minimum scan time (unit: ms)	○	○
SD523		Minimum scan time (unit: μs)	○	○
SD524	Maximum scan time	Maximum scan time (unit: ms)	○	○
SD525		Maximum scan time (unit: μs)	○	○
SD526	END processing time	END processing time (unit: ms)	○	○
SD527		END processing time (unit: μs)	○	○
SD528	Constant scan wait time	Constant scan wait time (unit: ms)	○	○
SD529		Constant scan wait time (unit: μs)	○	○
SD530	Scan program execution time	Scan program execution time (unit: ms)	○	○
SD531		Scan program execution time (unit: μs)	○	○
SD600	Memory card mounting status	SD memory card type	○	×
SD604	SD memory card (drive 2) usage status	SD memory card (drive 2) usage status	○	×
SD606	SD memory card (drive 2) capacity	SD memory card (drive 2) capacity: the lower digit (unit: KB)	○	×
SD607		SD memory card (drive 2) capacity: the higher digits (unit: KB)	○	×
SD610	SD memory card (drive 2) free space	SD memory card (drive 2) free space: the lower digit (unit: KB)	○	×
SD611		SD memory card (drive 2) free space: the higher digits (unit: KB)	○	×
SD614	Device/label memory (drive 3) usage status	Device/label memory (drive 3) usage status	○	×
SD616	Device/label memory (drive 3) capacity	Device/label memory (drive 3) capacity: the lower digits (unit: KB)	○	×
SD617		Device/label memory (drive 3) capacity: the higher digits (unit: KB)	○	×
SD618	Device/label memory (file storage area) capacity	Device/label memory (file storage area) (drive 3) capacity: the lower digits (unit: KB)	○	×
SD619		Device/label memory (file storage area) (drive 3) capacity: the higher digits (unit: KB)	○	×
SD620	Data memory (drive 4) usage status	Data memory (drive 4) usage status	○	×
SD622	Data memory (drive 4) capacity	Data memory (drive 4) capacity: the lower digits (unit: KB)	○	×
SD623		Data memory (drive 4) capacity: the higher digits (unit: KB)	○	×
SD626	Extended SRAM cassette capacity identification information	Capacity identification information of the Extended SRAM cassette	○	×
SD629	Program memory write (transfer) status	Write (transfer) status display (percent)	○	×
SD633	Data memory write (transfer) status	Write (transfer) status display (percent)	○	×
SD642	Internal buffer capacity	Internal buffer capacity: the lower digits (unit: KB)	○*1	×
SD643		Internal buffer capacity: the higher digits (unit: KB)	○*1	×
SD644	Internal buffer free area capacity	Internal buffer free area capacity: the lower digits (unit: KB)	○*1	×
SD645		Internal buffer free area capacity: the higher digits (unit: KB)	○*1	×
SD757	Current interrupt priority	Current interrupt priority	○	○
SD758	Interrupt disabling for each priority setting value	Interrupt disabling for each priority setting value	○	○
SD771	Specification of the number of write instruction executions to data memory	Specification of the number of write instruction executions to data memory	○	×
SD816	Basic period	Basic period	○*2	×
SD817				
SD818	Bumpless function availability setting for the S.PIDP instruction	0: Enable 1: Disable	○*2	×
SD819	Dummy device	Dummy device	○*2	×
SD820				

No.	Name	Description	RCPU	FX5CPU
SD1400 to SD1463	Interrupt pointer mask pattern	Mask pattern	○	○*5
SD1504	Open completion signal	Open completion	○	×
SD1505	Open request signal	Open request	○	×
SD1844	Number of points assigned to safety bit devices	SA\X number of points assigned (L)	○*3	×
SD1845		SA\X number of points assigned (H)	○*3	×
SD1846		SA\Y number of points assigned (L)	○*3	×
SD1847		SA\Y number of points assigned (H)	○*3	×
SD1848		SA\M number of points assigned (L)	○*3	×
SD1849		SA\M number of points assigned (H)	○*3	×
SD1850		SA\B number of points assigned (L)	○*3	×
SD1851		SA\B number of points assigned (H)	○*3	×
SD1864	Number of points assigned to safety word devices	SA\D number of points assigned (L)	○*3	×
SD1865		SA\D number of points assigned (H)	○*3	×
SD1866		SA\W number of points assigned (L)	○*3	×
SD1867		SA\W number of points assigned (H)	○*3	×
SD1872	Number of points assigned to safety timer/ counter devices	SA\T number of points assigned (L)	○*3	×
SD1873		SA\T number of points assigned (H)	○*3	×
SD1874		SA\ST number of points assigned (L)	○*3	×
SD1875		SA\ST number of points assigned (H)	○*3	×
SD1876		SA\C number of points assigned (L)	○*3	×
SD1877		SA\C number of points assigned (H)	○*3	×
SD1888	Safety cycle processing time execution cycle error count	0: No safety cycle processing time execution cycle error occurred (normal) 1 to 65535: Cumulative number of execution cycle errors during safety cycle processing time	○*3	×
SD1890	Current safety cycle processing time	Current safety cycle processing time (unit: ms)	○*3	×
SD1891		Current safety cycle processing time (unit: μs)	○*3	×
SD1892	Minimum safety cycle processing time	Minimum safety cycle processing time (unit: ms)	○*3	×
SD1893		Minimum safety cycle processing time (unit: μs)	○*3	×
SD1894	Maximum safety cycle processing time	Maximum safety cycle processing time (unit: ms)	○*3	×
SD1895		Maximum safety cycle processing time (unit: μs)	○*3	×
SD1903	Total standard/safety shared label usage capacity	Total standard/safety shared label usage capacity (unit: words)	○*3	×

*1 RnCPUs and RnENCPUs support it.
*2 Only RnPCPUs support it.
*3 Only RnSFCPUs support it.
*4 SD116 to SD129 cannot be used.
*5 Only SD1400 and SD1401 can be used.

Safety special relays list

No.	Name	Description
SA\SM400	Always ON	ON OFF
SA\SM401	Always OFF	ON OFF
SA\SM444	On at the first safety program execution	ON OFF First time only

Safety special register list

No.	Name	Description
SA\SD205	Safety operation mode	Safety operation mode

List of special relays for FX3 compatible area in FX5CPUs

No.	Name	Description
SM8000	RUN monitor NO contact	OFF: STOP ON: RUN
SM8001	RUN monitor NC contact	OFF: RUN ON: STOP
SM8002	Initial pulse NO contact	OFF: SM8002 turns off except during 1 scan at the time of RUN ON: SM8002 turns on during 1 scan at the time of RUN
SM8003	Initial pulse NC contact	OFF: SM8003 turns on during 1 scan at the time of RUN ON: SM8003 turns off except during 1 scan at the time of RUN
SM8004	Error occurrence	OFF: No error ON: Error state
SM8011	10 msec clock pulse	ON and OFF in 10 ms cycles OFF: 5 ms ON: 5 ms
SM8012	100 msec clock pulse	ON and OFF in 100 ms cycles OFF: 50 ms ON: 50 ms
SM8013	1 sec clock pulse	ON and OFF in 1 sec cycles OFF: 500 ms ON: 500 ms
SM8014	1 min clock pulse	ON and OFF in 1 min cycles OFF: 30 s ON: 30 s
SM8020	Zero	OFF: Zero flag OFF ON: Zero flag ON
SM8021	Borrow	OFF: Borrow flag OFF ON: Borrow flag ON
SM8022	Carry	OFF: Carry flag OFF ON: Carry flag ON
SM8029	Instruction execution complete	OFF: Instruction execution not complete ON: Instruction execution complete
SM8031	Non-latch memory all clear	OFF: No clear ON: Non-latch memory all clear
SM8032	Latch memory all clear	OFF: No clear ON: Latch memory all clear
SM8033	Memory hold stop	OFF: Clear ON: Hold
SM8039	Constant scan mode	OFF: Normal operation ON: Constant scan mode
SM8040	STL transfer disable	OFF: Normal operation ON: Transfer disable
SM8041	Transfer start	Transfer from initial state is enabled in automatic operation mode.
SM8042	Start pulse	Pulse output is given in response to a start input.
SM8043	Zero return complete	Set this in the last state of zero return mode.
SM8044	Zero point condition	Set this when machine zero return is detected.
SM8045	All output reset disable	Disables the 'all output reset' function when the operation mode is changed.
SM8046	STL state ON	ON when SM8047 is ON and any state (S) is active.
SM8047	Enable STL monitoring (SD8040 to SD8047)	SD8040 to SD8047 are enabled when SM8047 is ON.
SM8048	Annunciator ON	ON when SM8049 is ON and any state (S900 to S999) is ON.
SM8049	Enable annunciator monitoring	SD8049 is enabled when SM8049 is ON.
SM8067	Operation error	OFF: No error ON: Error

No.	Name	Description
SM8068	Operation error latch	OFF: No error ON: Error (latch)
SM8090	Block comparison signal	Block comparison signal ON when all comparison results are ON.
SM8161	8 bit operation mode	OFF: 16 bit operation mode ON: 8 bit operation mode
SM8168	SMOV data mode	BIN → BCD conversion will not be performed, if a SMOV instruction is executed after turning ON SM8168.
SM8304	Zero	OFF: Zero flag OFF ON: Zero flag ON
SM8306	Carry	OFF: Carry flag OFF ON: Carry flag ON
SM8330	Timing clock output 1	DUTY instruction: Timing clock output 1
SM8331	Timing clock output 2	DUTY instruction: Timing clock output 2
SM8332	Timing clock output 3	DUTY instruction: Timing clock output 3
SM8333	Timing clock output 4	DUTY instruction: Timing clock output 4
SM8334	Timing clock output 5	DUTY instruction: Timing clock output 5

List of special registers for FX3 compatible area in FX5CPUs

No.	Name	Description
SD8000	Watchdog timer	The watchdog timer is stored.
SD8001	PLC type and system version	The PLC type and system version are stored.
SD8010	Current scan time	The current scan time is stored.
SD8011	Minimum scan time	The minimum scan time is stored.
SD8012	Maximum scan time	The maximum scan time is stored.
SD8013	RTC: Second	The second data is stored.
SD8014	RTC: Minute	The minute data is stored.
SD8015	RTC: Hour	The hour data is stored.
SD8016	RTC: Day	The day data is stored.
SD8017	RTC: Month	The month data is stored.
SD8018	RTC: Year	The year data is stored.
SD8019	RTC: Day of week	The day of week data is stored.
SD8039	Constant scan time	The constant scan time is stored.
SD8040 to SD8047	STL: ON state number	The ON state number is stored.
SD8049	Lowest active annunciator	The lowest active annunciator is stored.
SD8067	Operation error	The error code number of an operation error is stored.
SD8310 to SD8311	RND Random number generation	The RND random number generation data is stored.
SD8330 to SD8334	Timing clock output Counted number of scans	The scan count for timing clock output is stored.

Supported instructions

The instructions supported by the Simulation function are shown below:

Note that no processing is performed for unsupported instructions (NOP processing).

For details on each instruction, refer to the following manuals.

📖MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

📖MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

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

RCPU

■Sequence instruction

Classification	Symbol
Contact instruction	AND, ANDF, ANDFI, ANDP, ANDPI, ANI, LD, LDF, LDFI, LDI, LDP, LDPI, OR, ORF, ORFI, ORI, ORP, ORPI
Association instruction	ANB, EGF, EGP, INV, MEF, MEP, MPP, MPS, MRD, ORB
Output instruction	FF, OUT, OUT C, OUT F, OUT LC, OUT LT/LST, OUT T/ST, OUTH T/ST, PLF, PLS, RST, RST F, SET, SET F
Shift instruction	SFT(P)
Master control instruction	MC, MCR
Termination instruction	END, FEND
Stop instruction	STOP
No operation instruction	NOP, NOPLF

■Basic instruction

Classification	Symbol*1
Comparison operation instruction	AND□(_U), ANDD□(_U), BKCMP□(P)(_U), CMP(P)(_U)*2, DBKCMP□(P)(_U), DCMP(P)(_U)*2, DZCP(P)(_U)*2, LD□(_U), LDD□(_U), OR□(_U), ORD□(_U), ZCP(P)(_U)*2
Arithmetic operation instruction	*(P)(_U), +(P)(_U), -(P)(_U), /(P)(_U), B*(P), B+(P), B-(P), B/(P), BK+(P)(_U), BK-(P)(_U), D*(P)(_U), D+(P)(_U), D-(P)(_U), D/(P)(_U), DB*(P), DB+(P), DB-(P), DB/(P), DBK+(P)(_U), DBK-(P)(_U), DDEC(P)(_U), DEC(P)(_U), DINC(P)(_U), INC(P)(_U)
Data transfer instruction	BLKMOVB(P), BMOV(P), BMOVL(P), BXCH(P), CML(P), CMLB(P), DCML(P), DFMOV(P), DFMOVL(P), DMOV(P), DSWAP(P)*2, DXCH(P), FMOV(P), FMOVL(P), MOV(P), MOVB(P), SMOV(P)*2, SWAP(P), XCH(P)
Logical operation instruction	BKAND(P), BKOR(P), BKXNR(P), BKXOR(P), DAND(P), DOR(P), DXNR(P), DXOR(P), WAND(P), WOR(P), WXNR(P), WXOR(P)
Data shift instruction	BSFL(P), BSFR(P), EDSFTL(P)*2, EDSFTR(P)*2, ESFTL(P)*2, ESFTR(P)*2, DDSFR(P)*2, DDSFL*2, DSFL(P), DSFR(P), DWSFTL(P)*2, DWSFTR(P)*2, ESFR(P)*2, ESFL(P)*2, EDSFR(P)*2, EDSFL(P)*2, SFL(P), SFR(P), SFTER(P)*2, SFTDWL(P)*2, SFTBL(P), SFTBR(P), SFTEDL(P)*2, SFTEDR(P)*2, SFTEL(P)*2, SFTDWR(P)*2, SFTL(P)*2, SFTR(P)*2, SFTWL(P), SFTWR(P), WSFL(P)*2, WSFR(P)*2
Bit processing instruction	BKRST(P), BRST(P), BSET(P), DTEST(P), TEST(P)
Data conversion instruction	ASC2INT(P), BCD(P), BIN(P), BKBCD(P), BKBIN(P), BTOW(P), DABCD(P), DABIN(P)(_U), DBCD(P), DBIN(P), DBL2DINT(P), DBL2INT(P), DBL2UDINT(P), DBL2UINT(P), DDABCD(P), DDABIN(P)(_U), DECO(P), DGBIN(P)(_U), DGRY(P)(_U), DHABIN(P), DINT2INT(P), DINT2UDINT(P), DINT2UINT(P), DIS(P), DNEG(P), DVAL(P)(_U), EMOD(P), ENCO(P), FLT2DINT(P), FLT2INT(P), FLT2UDINT(P), FLT2UINT(P), GBIN(P)(_U), GRY(P)(_U), HABIN(P), INT2DINT(P), INT2UDINT(P), INT2UINT(P), NDIS(P), NEG(P), NUNI(P), SEG(P), UDINT2DINT(P), UDINT2INT(P), UDINT2UINT(P), UINT2DINT(P), UINT2INT(P), UINT2UDINT(P), UNI(P), VAL(P)(_U), WTOB(P)

*1 □ indicates an operator.

*2 RnCPUs and RnENCPUs support it.

■Application instruction

Classification	Symbol*1
Program branch instruction	CJ, GOEND, JMP, SCJ
Program execution control instruction	DI, EI, IMASK, IRET, SIMASK, WDT(P)
Rotation instruction	DRCL(P), DRCR(P), DROL(P), DROR(P), RCL(P), RCR(P), ROL(P), ROR(P)
Data processing instruction	BON(P)*2, CRC(P)*2, DBON(P)*2, DMAX(P)(_U), DMEAN(P)(_U), DMIN(P)(_U), DSERDATA(P), DSERMM(P)*2, DSORTD(_U), DSQRT(P)*2, DSUM(P), DWSUM(P)(_U), MAX(P)(_U), MEAN(P)(_U), MIN(P)(_U), SERDATA(P), SERMM(P)*2, SORTD(_U), SQRT(P)*2, SUM(P), WSUM(P)(_U)
Structure creation instruction	BREAK(P), CALL(P), ECALL(P), EFCALL(P), FCALL(P), FOR, NEXT, RET, XCALL
Data table operation instruction	FDEL(P), FIFR(P), FIFW(P), FINS(P), FPOP(P)

Classification	Symbol[*1]
Debugging and failure diagnostic instruction	LEDR, PALERT(P)[*3], PABORT[*3]
String processing instruction	$+(P), $MOV(P), $MOV(P)_WS, AND$□, BCDDA(P), BINDA(P)(_U), BINHA(P), DBCDDA(P), DBINDA(P)(_U), DBINHA(P), DSTR(P)(_U), ESTR(P), INSTR(P), INT2ASC(P), LD$□, LEFT(P), LEN(P), MIDR(P), MIDW(P), OR$□, RIGHT(P), SJIS2WS(P), SJIS2WSB(P), STR(P)(_U), STRDEL(P), STRINS(P), WS2SJIS(P)
Data control instruction	BAND(P)(_U), DBAND(P)(_U), DLIMIT(P)(_U), DSCL(P)(_U), DSCL2(P)(_U), DZONE(P)(_U), LIMIT(P)(_U), SCL(P)(_U), SCL2(P)(_U), ZONE(P)(_U)
Indirect address read instruction	ADRSET(P)
Read/write instruction for each 1 byte of a file register.	ZRRDB(P), ZRWRB(P)
File register operation instruction	QDRSET(P), RSET(P)
Clock instruction	ANDDT□, ANDTM□, DATE+(P), DATE-(P), DATERD(P), DATEWR(P), DATE2SEC(P)(_U)[*2], LDDT□, LDTM□, ORDT□, ORTM□, SEC2DATE(P)(_U)[*2], S(P).DATE+, S(P).DATE-, S(P).DATERD, SEC2TIME(P), TCMP(P)[*2], TIME2SEC(P), TZCP(P)[*2]
Program control instruction	POFF(P), PSCAN(P), PSTOP(P)
PID operation	PID[*2]
PID control instruction	PIDCONT(P), PIDINIT(P), PIDPRMW(P), PIDRUN(P), PIDSTOP(P), S(P).PIDCONT, S(P).PIDINIT, S(P).PIDPRMW, S(P).PIDRUN, S(P).PIDSTOP
SFC control instruction[*4]	AND, ANI, BMOV(P), BRSET, DMOV(P), LD, LDI, MOV(P), OR, ORI, PAUSE, RST, RSTART, SET
SFC dedicated instruction[*4]	TRAN
Reading/writing data instruction	S(P).DEVLD, SP.DEVST
Real number instruction	ACOS(P), ACOSD(P), ANDE□, ANDED□, ASIN(P), ASIND(P), ATAN(P), ATAND(P), BACOS(P), BASIN(P), BATAN(P), BCOS(P), BDSQRT(P), BSIN(P), BSQRT(P), BTAN(P), COS(P), COSD(P), DBL2FLT(P), DEG(P), DEGD(P), DINT2DBL(P), DINT2FLT(P), E*(P), E+(P), E-(P), E/(P), ECMP(P)[*2], ED*(P), ED+(P), ED-(P), ED/(P), EDCMP(P)[*2], EDMAX(P), EDMIN(P), EDMOV(P), EDNEG(P), EDSQRT(P), EDZCP(P)[*2], EMAX(P), EMIN(P), EMOV(P), ENEG(P), EREXP(P), ESQRT(P), EVAL(P), EXP(P), EXPD(P), EZCP(P)[*2], FLT2DBL(P), INT2DBL(P), INT2FLT(P), LDE□, LDED□, LOG(P), LOG10(P), LOG10D(P), LOGD(P), ORE□, ORED□, POW(P), POWD(P), RAD(P), RADD(P), SIN(P), SIND(P), TAN(P), TAND(P), UDINT2DBL(P), UDINT2FLT(P), UINT2DBL(P), UINT2FLT(P)
Random number instruction	RND(P), SRND(P)
Index register instruction	ZPOP(P), ZPUSH(P)
Special counter instruction	UDCNT1, UDCNT2
Special timer instruction	STMR, TTMR
Shortcut control instruction	ROTC
Ramp signal instruction	RAMPQ
Pulse related instruction	PLSY, PWM, SPD
Matrix input instruction	MTR
Check code	CCD(P)
Timing check instruction	DHOURM[*2], DUTY, HOURM[*2], TIMCHK
Module access instruction	DFROM(P), DFROMD(P), DTO(P), DTOD(P), FROM(P), FROMD(P), TO(P), TOD(P)
Process control instruction (RnPCPU only)	S.2PID, S.□, S.ABS, S.ADD, S.AMR, S.AT1, S.AVE, S.BC, S.BPI, S.BUMP, S.D, S.DBND, S.DED, S.DIV, S.DUTY[*3], S.ENG, S.FG, S.FLT, S.HS, S.I, S.IENG, S.IFG, S.IN, S.IPD, S.LIMIT, S.LLAG, S.LS, S.MID, S.MOUT, S.MUL, S.ONF2, S.ONF3, S.OUT1[*3], S.OUT2, S.PGS, S.PHPL[*3], S.PID, S.PIDP, S.PSUM, S.R, S.SEL, S.SPI, S.SQR, S.SUB, S.SUM, S.TPC, S.VLMT1, S.VLMT2
Multiple CPU dedicated instruction[*5]	D(P).DDRD, D(P).DDWR, M(P).DDRD, M(P).DDWR

*1 □ indicates an operator.
*2 Only RnCPUs and RnENCPUs support them.
*3 Only RnPCPU support them.
*4 RnPCPUs (redundant mode) do not support them.
*5 Executes during interaction with the system simulation.

FX5CPU

■Sequence instruction

Classification	Symbol
Contact instruction	AND, ANDF, ANDFI, ANDP, ANDPI, ANI, LD, LDF, LDFI, LDI, LDP, LDPI, OR, ORF, ORFI, ORI, ORP, ORPI
Association instruction	ANB, INV, MEF, MEP, MPP, MPS, MRD, ORB
Output instruction	FF, ALT, ALTP, ANR, ANRP, ANS, OUT, OUT C, OUT F, OUT LC, OUT T/ST, OUTH T/ST, OUTHS T/ST, PLF, PLS, RST, RST F, SET, SET F
Shift instruction	SFT(P)
Master control instruction	MC, MCR
Termination instruction	END, FEND
Stop instruction	STOP

■Basic instruction

Classification	Symbol*1
Comparison operation instruction	AND□(_U), ANDD□(_U), BKCMP□(P)(_U), CMP(P)(_U), DBKCMP□(P)(_U), DCMP(P)(_U), DZCP(P)(_U), LD□(_U), LDD□(_U), OR□(_U), ORD□(_U), ZCP(P)(_U)
Arithmetic operation instruction	*(P)(_U), +(P)(_U), -(P)(_U), /(P)(_U), ADD(P)(_U), B*(P), B+(P), B-(P), B/(P), BK+(P)(_U), BK-(P)(_U), D*(P)(_U), D+(P)(_U), D-(P)(_U), D/(P)(_U), DADD(P)(_U), DB*(P), DB+(P), DB-(P), DB/(P), DBK+(P)(_U), DBK-(P)(_U), DDEC(P)(_U), DDIV(P)(_U), DEC(P)(_U), DINC(P)(_U), DIV(P)(_U), DMUL(P)(_U), DSUB(P)(_U), INC(P)(_U), MUL(P)(_U), SUB(P)(_U)
Data transfer instruction	BLKMOVB(P), BMOV(P), CML(P), CMLB(P), DCML(P), DFMOV(P), DMOV(P), DPRUN(P), DSWAP(P), DXCH(P), FMOV(P), MOV(P), MOVB(P), PRUN(P), SMOV(P), SWAP(P), XCH(P)
Logical operation instruction	BKAND(P), BKOR(P), BKXNR(P), BKXOR(P), DAND(P), DOR(P), DXNR(P), DXOR(P), WAND(P), WOR(P), WXNR(P), WXOR(P)
Data shift instruction	BSFL(P), BSFR(P), DSFL(P), DSFR(P), SFL(P), SFR(P), SFTL(P), SFTR(P), WSFL(P), WSFR(P)
Bit processing instruction	BKRST(P), BRST(P), BSET(P), DTEST(P), TEST(P)
Data conversion instruction	BCD(P), BIN(P), BTOW(P), DABIN(P)(_U), DBCD(P), DBIN(P), DDABIN(P)(_U), DECO(P), DGBIN(P)(_U), DGRY(P)(_U), DINT2INT(P), DINT2UDINT(P), DINT2UINT(P), DIS(P), DNEG(P), DVAL(P)(_U), ENCO(P), FLT2DINT(P), FLT2INT(P), FLT2UDINT(P), FLT2UINT(P), GBIN(P)(_U), GRY(P)(_U), HEXA(P), INT2DINT(P), INT2UDINT(P), INT2UINT(P), NDIS(P), NEG(P), NUNI(P), UDINT2DINT(P), UDINT2INT(P), UDINT2UINT(P), UINT2DINT(P), UINT2INT(P), UINT2UDINT(P), UNI(P), VAL(P)(_U), WTOB(P)

*1 □ indicates an operator.

■Application instruction

Classification	Symbol*1
Program branch instruction	CJ, GOEND
Program execution control instruction	DI, EI, IMASK, IRET, SIMASK, WDT(P)
Rotation instruction	DRCL(P), DRCR(P), DROL(P), DROR(P), RCL(P), RCR(P), ROL(P), ROR(P)
Data processing instruction	BON(P), CRC(P), DBON(P), DMAX(P)(_U), DMEAN(P)(_U), DMIN(P)(_U), DSERDATA(P), DSERMM(P), DSORTTBL2(_U), DSQRT(P), DSUM(P), DWSUM(P)(_U), MAX(P)(_U), MEAN(P)(_U), MIN(P)(_U), SERMM(P), SORTTBL(_U), SORTTBL2(_U), SQRT(P), SUM(P), WSUM(P)(_U)
Structure creation instruction	BREAK(P), CALL(P), FOR, NEXT, RET, SRET, XCALL
Data table operation instruction	FDEL(P), FINS(P), POP(P), SFRD(P), SFWR(P)
String processing instruction	$+(P), $MOV(P), AND$□, ASCI(P), BINDA(P)(_U), DBINDA(P)(_U), DESTR(P), DSTR(P)(_U), ESTR(P), INSTR(P), LD$□, LEFT(P), LEN(P), MIDR(P), MIDW(P), OR$□, RIGHT(P), STR(P)(_U), STRDEL(P), STRINS(P)
Data control instruction	BAND(P)(_U), DBAND(P)(_U), DLIMIT(P)(_U), DSCL(P)(_U), DSCL2(P)(_U), DZONE(P)(_U), LIMIT(P)(_U), SCL(P)(_U), SCL2(P)(_U), ZONE(P)(_U)
Indirect address read instruction	ADRSET(P)
Clock instruction	ANDDT□, ANDTM□, DHTOS(P), DSTOH(P), HTOS(P), LDDT□, LDTM□, ORDT□, ORTM□, STOH(P), TADD(P), TCMP(P), TRD(P), TSUB(P), TWR(P), TZCP(P)
PID operation	PID
Reading/writing data instruction	S(P).DEVLD, SP.DEVST

Classification	Symbol*1
Real number instruction	ACOS(P), ANDE□, ASIN(P), ATAN(P), COS(P), DACOS(P), DASIN(P), DATAN(P), DCOS(P), DDEG(P), DEADD(P), DEBCD(P), DEBIN(P), DEDIV(P), DEG(P), DEMOV(P), DEMUL(P), DENEG(P), DESQR(P), DESUB(P), DEVAL(P), DEXP(P), DEZCP(P), DINT2FLT(P), DLOGE(P), DLOG10(P), DRAD(P), DSIN(P), DTAN(P), E*(P), E+(P), E-(P), E/(P), ECMP(P), EMAX(P), EMIN(P), EMOV(P), ENEG(P), ESQRT(P), EVAL(P), EXP(P), INT2FLT(P), LDE□, LOG(P), LOG10(P), ORE□, POW(P), RAD(P), SIN(P), TAN(P), UDINT2FLT(P), UINT2FLT(P)
Random number instruction	RND(P)
Index register instruction	ZPOP(P), ZPUSH(P)
Special timer instruction	STMR, TTMR
Shortcut control instruction	ROTC
Ramp signal instruction	RAMPF
Handy instruction	ABSD, DABSD, INCD, IST
Matrix input instruction	MTR
External device I/O instruction	DSW, SEGD, SEGDP, SEGL
Step ladder instruction	STL, RETSTL
Check code	CCD(P)
Indirect address read	ADRSET(P)
Timing check instruction	DHOURM, DUTY, HOURM
Module access instruction	DFROM(P), DFROMD(P), DTO(P), DTOD(P), FROM(P), FROMD(P), TO(P), TOD(P)

*1 □ indicates an operator.

Enabled/disabled parameter items

The simulation function does not support some parameter setting items.

The following shows the parameter setting items which are supported by the simulation function.

RCPU

■System parameter

Setting item		
I/O Assignment Setting	Base/Power/Extension Cable Setting	Slots
	I/O Assignment Setting	Module Name
		Module Status Setting
		Module/Points/Start XY
		Control PLC Setting
	Setting of Points Occupied by Empty Slot	
Multiple CPU Setting	Setting for number of CPU modules	
	Communication Setting between CPU	Refresh setting
		CPU Buffer Memory Setting
		PLC Unit Data
		Fixed Scan Communication Function
		Fixed Scan Communication Area Setting
	Fixed Scan Communication Setting	Fixed Scan Interval Setting of Fixed Scan Communication
		Fixed Scan Communication Function and Inter-module Synchronization Function
	Operation Mode Setting	Stop Setting
		Synchronous Startup Setting
	Other PLC Control Module Setting	I/O Setting Outside Group
Inter-module Synchronization Setting	Use Inter-module Synchronization Function in System*1	
	Select Inter-module Synchronization Target Module	
	Fixed Scan Interval Setting of Inter-module Synchronization	
	Inter-module Synchronization Master Setting	

*1 RnCPUs, RnENCPUs, and RnPCPUs support it.

■CPU parameter

Setting item	
Operation Related Setting	Timer Limit Setting
	RUN-PAUSE Contact Setting
	Remote Reset Setting*1
	Output Mode Setting at STOP to RUN
	Clock Related Setting
Interrupt Settings	Fixed Scan Interval Setting
	Fixed Scan Execution Mode Setting
	Interrupt Enable Setting during Instruction Execution
	Block No. Save/Recovery Setting
Service Processing Setting	Device/Label Access Service Processing Setting
File Setting	File Register Setting
	Initial Value Setting
	Label Initial Value Reflection Setting*4
	File Setting for Device Data Storage

Setting item			
Memory/Device Setting	Device/Label Memory Area Setting	Extended SRAM Cassette Setting*1	
		Device/Label Memory Area Capacity Setting	
		Device/Label Memory Area Detailed Setting	Points
			Safety device points*2
			Local Device
			Safety local device*2
		Latch Range Setting	
		Latch Type Setting of Latch Type Label	
	Index Register Setting		
	Refresh Memory Setting		
	Device Latch Interval Setting		
	Pointer Setting		
	Internal Buffer Capacity Setting		
RAS Setting	Scan Time Monitoring Time (WDT) Setting		
	Constant Scan Setting		
	Error Detections Setting	Battery Error	
		Module Verification Error	
		Fuse Blown	
		Redundant Power Supply System Error (same operation as for "Not Detected")	
	CPU Module Operation Setting at Error Detected		
	LED Display Setting		
	Event History Setting		
	Online module change setting*4		
Program Setting	Program Setting	Program Setting	Program Name
			Execution Type
			Detailed Setting Information (Fixed Scan)
			Detailed Setting Information (Event)
			Device/File Use or not
	FB/FUN File Setting		
Refresh Setting between Multiple CPUs	Refresh Setting (At the END)		
	Refresh Setting (At I45 Exe.)		
SFC Setting*1	SFC Program Start Mode Setting		
	Start Conditions Setting		
	Output Mode Setting at Block Stop		
Safety Function Setting*2	Safety Function Setting	Safety Cycle Time	
Redundant System Settings*3	Redundant Behavior Setting	Watching Standby System Setting (same operation as for "Disable")	

*1 RnCPUs, RnENCPUs, and RnPCPUs support it.
*2 Only RnSFCPUs support it.
*3 Only RnPCPUs (redundant mode) support it.
*4 Only RnPCPUs support it.

■Module parameter

Setting item	
Required Settings*1	Station Type
Basic Settings*1	Refresh Settings
Refresh Setting*2	

*1 Only network modules support it.
*2 Modules except for network modules support it.

FX5CPU

■System parameter

Setting item	
I/O Assignment Setting	CPU module name

■CPU parameter

Setting item		
Name Setting	Title Setting	
	Comment Setting	
Operation Related Setting	RUN Contact Setting	
	Remote Reset Setting	
	Clock Related Setting	Time Zone
Interrupt Settings	Fixed Scan Interval Setting	
	Fixed Scan Execution Mode Setting	
	Priority Setting for Interrupt from Module	
Service Processing Setting	Device/Label Access Service Processing Setting	
File Setting	Initial Value Setting	
Memory/Device Setting	Device/Label Memory Area Setting	Option Battery Setting
		Device/Label Memory Area Capacity Setting
		Device/Label Memory Area Detailed Setting
	Index Register Setting	
	Pointer Setting	
RAS Setting	Scan Time Monitoring Time (WDT) Setting	
	Constant Scan Setting	
	Error Detections Setting	
	CPU Module Operation Setting at Error Detected	
	LED Display Setting	
	Event History Setting	
Program Setting	Program Setting	
	FB/FUN File Setting	

■Module parameter

Setting item	
Required Settings*1	Station Type
Basic Settings*1	Refresh Settings
Refresh Setting*2	

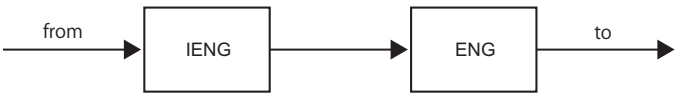
*1 Only network modules support it.
*2 Modules except for network modules support it.

Process response operation

The following shows the specifications when using a process response operation in the 'I/O System Setting' function.
For details on the conversion processing, refer to the following manual.
MELSEC iQ-R Programming Manual (Process Control Function Blocks/Instructions)

DIRECT

Convert from an input value to an output value by using a specified upper and lower limit.



- IENG: Engineering value inverse conversion
- ENG: Engineering value conversion

■Instruction format

to := DIRECT(to_min, to_max, from_min, from_max, from)

■Argument

Argument name	Data type	Description	Range
to_min	REAL (Constant)	Lower limit of an output value	-999999.0<=to_min<to_max
to_max	REAL (Constant)	Upper limit of an output value	to_min<to_max<=999999.0
from_min	REAL (Constant)	Lower limit of an input value	-999999.0<=from_min<from_max
from_max	REAL (Constant)	Upper limit of an input value	from_min<from_max<=999999.0
from	REAL	Input value	—

■Return value

Output value: REAL

REVERSE

Convert from an input value to an output value by using a specified upper and lower limit.

- IENG: Engineering value inverse conversion
- REV: Inversion
- ENG: Engineering value conversion

■Instruction format

to := REVERSE(to_min, to_max, from_min, from_max, from)

■Argument

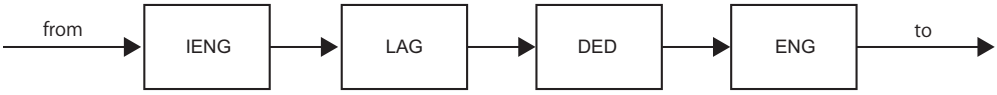
Argument name	Data type	Description	Range
to_min	REAL (Constant)	Lower limit of an output value	-999999.0<=to_min<to_max
to_max	REAL (Constant)	Upper limit of an output value	to_min<to_max<=999999.0
from_min	REAL (Constant)	Lower limit of an input value	-999999.0<=from_min<from_max
from_max	REAL (Constant)	Upper limit of an input value	from_min<from_max<=999999.0
from	REAL	Input value	—

■Return value

Output value: REAL

LAG_DED

Convert from an input value to an output value by using a specified upper and lower limit.



- IENG: Engineering value inverse conversion
- LAG: Primary delay
- DED: Dead time
- ENG: Engineering value conversion

■Instruction format

to := LAG_DED(to_min, to_max, from_min, from_max, lag, ded, from)

■Argument

Argument name	Data type	Description	Range
to_min	REAL (Constant)	Lower limit of an output value	-999999.0<=to_min<to_max
to_max	REAL (Constant)	Upper limit of an output value	to_min<to_max<=999999.0
from_min	REAL (Constant)	Lower limit of an input value	-999999.0<=from_min<from_max
from_max	REAL (Constant)	Upper limit of an input value	from_min<from_max<=999999.0
lag	REAL (Constant)	Lag time constant (second)	0.0<=lag<=999999.0
ded	INT (Constant)	Dead time (second)	0<=ded<=999
from	REAL	Input value	—

■Return value

Output value: REAL

LAG_DED_REV

Convert from an input value to an output value by using a specified upper and lower limit.

- IENG: Engineering value inverse conversion
- LAG: Primary delay
- DED: Dead time
- REV: Inversion
- ENG: Engineering value conversion

■Instruction format

to := LAG_DED_REV(to_min, to_max, from_min, from_max, lag, ded, from)

■Argument

Argument name	Data type	Description	Range
to_min	REAL (Constant)	Lower limit of an output value	-999999.0<=to_min<to_max
to_max	REAL (Constant)	Upper limit of an output value	to_min<to_max<=999999.0
from_min	REAL (Constant)	Lower limit of an input value	-999999.0<=from_min<from_max
from_max	REAL (Constant)	Upper limit of an input value	from_min<from_max<=999999.0
lag	REAL (Constant)	Lag time constant (second)	0.0<=lag<=999999.0
ded	INT (Constant)	Dead time (second)	0<=ded<=999
from	REAL	Input value	—

■Return value

Output value: REAL

Module buffer memory

The following shows the number of points of buffer memory (U□\G□) for a module supported by the simulation function.

Series	Module type		Points
iQ-R Series	PLC CPU		524288
	Motion CPU		2097152
	Redundant module		2097152
	Safety CPU		2048
	SIL2 function module		2048
	Input		512
	Output		512
	I/O		512
	NC Dedicated Module		512
	Analog Input		131072
	Analog Output		131072
	Temperature Input		131072
	Temperature Control Module		131072
	Simple motion	RD77MS	131072
		RD77GF	4194304
	Pulse I/O/Positioning		131072
	Information Module	Serial communication	65536
		Ethernet	4194304
		High speed data logger module	131072
		MES Interface	131072
		OPC UA Server module	131072
		C intelligent function module	4210688
	Network Module	CC-Link	32768
		CC IE Field	65536
		CC IE Controller	2097152
		AnyWireASLINK Master Module	131072
		BACnet	131072
		CANopen module	131072
MELSEC iQ-F series	Simple motion		98304
Q Series	Analog Input		131072
	Analog Output		
	Analog I/O		
	Temperature Input		
	Temperature Control Module		
	Loop Control		
	Pulse I/O/Positioning		
	Energy Measuring Module		
	Information Module	Intelligent Communications	
		MES Interface	
		Web Server	
	Network Module	AnyWireASLINK Master Module	
		CC-Link/LT	
		AS-i	
		MELSECNET/H	
		FL-net	
		MODBUS(R)	
	Partner Products		

A

Link devices of network module

The following shows the link devices and the number of points for network module supported by the simulation function.

Series	Module type		Device type	Points
MELSEC iQ-R series	Network module	Ethernet (When using CC-Link IE Controller Network)	J□\SB	512
			J□\SW	512
			J□\X	8192
			J□\Y	8192
			J□\B	32768
			J□\W	131072
		Ethernet (When using CC-Link IE Field Network)	J□\SB	512
			J□\SW	512
			J□\X	16384
			J□\Y	16384
			J□\W	16384
		CC-Link IE Controller Network	J□\SB	512
			J□\SW	512
			J□\X	8192
			J□\Y	8192
			J□\B	32768
			J□\W	131072
		CC-Link IE Field Network	J□\SB	512
			J□\SW	512
			J□\X	16384
			J□\Y	16384
			J□\W	16384
	Simple motion module	RD77GF	J□\SB	512
			J□\SW	512
			J□\X	16384
			J□\Y	16384
			J□\W	16384
Q series	Network module	MELSECNET/H network	J□\SB	512
			J□\SW	512
			J□\X	8192
			J□\Y	8192
			J□\B	16384
			J□\W	16384

Network

The following shows the network types, network modules, network functions, and network parameters which are supported by the simulation function (simulation for cyclic transmission).

Network types

Series	Network type
MELSEC iQ-R series	CC-Link IE Controller Network
	CC-Link IE Field Network
MELSEC iQ-F series	CC-Link IE Field Network

Network modules

Series	Network module
MELSEC iQ-R series	RnENCPU (network part)
	RJ71EN71
	RJ71GP21-SX
	RJ71GF11-T2
MELSEC iQ-F series	FX5-CCLIEF

Network functions

■CC-Link IE Controller Network

Function		Remarks
Cyclic transmission	Communication with another station	—
	Link refresh	—
	Direct access for link devices	—
	Assurance of cyclic data consistency	Data is sent for each station regardless of the parameter setting contents.
	Group cyclic transmission	—

■CC-Link IE Field Network

Function		Remarks
Cyclic transmission	Communication with another station	Since transient transmission is not supported, the setting of communication mode is ignored.
	Link refresh	—
	Direct access for link devices	—
	Assurance of cyclic data consistency	Data is sent for each station regardless of the parameter setting contents.
RAS	Self-diagnostic function	An overlap of station types and station numbers can be detected. An overlap error is detected in the station where the setting is configured later.
Others	Reserved station specification	—
	Error invalid station setting	—

Network parameters

■CC-Link IE Controller Network

Parameter				Remarks
Required Settings		Station Type	Station Type	—
		Network No.	Network No.	—
		Station No.	Setting Method	Only "Parameter Editor" is supported.
			Station No.	—
		Network Range Assignment	Total No. of Stations	—
			LB/LW Setting (1)	—
			LB/LW Setting (2)	—
			LX/LY Setting (1)	—
			LX/LY Setting (2)	—
			I/O Master Station	—
			Reserved Station	—
			Pairing	Since system switching is not supported by simulator, cyclic transmission is performed only from a control system.
			Shared Group Setting	—
Basic Settings	Refresh Settings	Refresh Settings		—

■CC-Link IE Field Network

Parameter				Remarks
Required Settings		Station Type	Station Type	A submaster station always operates as a local station.
		Network No.	Network No.	—
		Station No.	Station No.	—
			Setting Method	Only "Parameter Editor" is supported.
		Parameter Setting Method	Setting Method of Basic/ Application Settings	Only "Parameter Editor" is supported.
Basic Setting	Network Configuration Settings	Total Slave Stations		—
		Station No.		—
		Model Name		—
		Station Type		—
		RX/RY		—
		RWr/RWw		—
		Reserved/Error Invalid Station/System Switching Monitoring Target Station		Only "Reserved Station" and "Error Invalid Station" are supported.
		Pairing		Since system switching is not supported by simulator, cyclic transmission is performed only from a control system.
		Arias		—
		Comment		—
	Refresh Setting	Refresh Setting (SB/SW)		—

Considerations

The following describes the considerations on debugging programs using the simulation function.

Program execution time

Since the instruction processing speed differs between the simulation function and CPU module, the simulator operates as follows.

- A simulation time is calculated by adding a value of instruction processing time every execution of an instruction in a CPU module.
  The simulator operates behind the actual time when the simulation time takes longer than the actual time due to the performance of a personal computer.
  The simulation time gains in accordance with the actual time when the actual time takes longer than the simulation time.

For instruction processing time, refer to the following manual.

MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

Fixed scan execution type program and timer device

A program is executed in accordance with the simulation time.

Handling of floating point

A rounding error may occur in the operation result of an instruction using floating point. The result will not the same as that of a CPU module.

RnSFCPU

■Safety operation mode

The simulation function can be used in the test mode only.

■Safety support functions

The following menus cannot be perform during a simulation.

- [Online] ⇨ [Safety PLC Operation] ⇨ [Check Safety Data Identity]
- [Online] ⇨ [Safety PLC Operation] ⇨ [Switch Safety Operation Mode]
- [Online] ⇨ [User Authentication]

■Identification check for safety data

When the target for writing is a simulator, the writing is not treated as one to a programmable controller.
Therefore, the file ID and the writing date and time are not updated.

Multiple CPU system function

The multiple CPU system function can be used only for a CPU module that operates interactively with another CPU module in a system simulation.
Simulation to a single CPU module or a CPU module, which does not operates interactively with other CPU modules, are not supported.
An error is not detected in a CPU module that does not operate interactively and a module controlled by the CPU.

Module

■I/O module

Simulation of the operation does not support I/O module.

■Intelligent function module

The buffer memory for an intelligent function module is reserved by the information set in "I/O Assignment Setting" of "System Parameter".

The buffer memory (U□\G□) cannot be accessed when the I/O assignment setting is not configured.

By setting an intelligent function module as the module type in the I/O assignment setting, the buffer memory corresponding to the set module is created.

If the module type is not specified, it becomes an empty slot.

If the module type is specified without specifying the number of points, the number of points for the set module will be one specified in "Setting of Points Occupied by Empty Slot" of "System Parameter".

General module

When a general module is set in the I/O assignment setting of the system parameter, the input/output of the general module and buffer memory can be accessed.

The following table shows the range of accessible input/output and buffer memory.

Series	Module name	Type	Access to X/Y	Access to the buffer memory
MELSEC iQ-R series	General CPU module	—	—	Equivalent to a CPU module of a simulator
	General I/O module	Input	Follows the number of occupied points of a slot set in the I/O assignment setting of the system parameter.	Equivalent to an input module.
		Output		Equivalent to an output module.
		High-speed input		Equivalent to an input module.
		Interrupt		Equivalent to an analog input module.
		I/O mixed (Mixed)		Equivalent to an I/O module.
		I/O mixed (Both sides)		Equivalent to an I/O module.
	General intelligent module	—		Equivalent to an analog input module.
MELSEC iQ-F series	General I/O module	—	Follows the I/O points of the system parameter.	—
	General intelligent module	—	—	Equivalent to an intelligent module.
Q series	General I/O module	Input	Follows the number of occupied points of a slot set in the I/O assignment setting of the system parameter.	Equivalent to an input module.
		Output		Equivalent to an output module.
		High-speed input		Equivalent to an input module.
		Interrupt		Equivalent to an analog input module.
		I/O mixed (Mixed)		Equivalent to an I/O module.
		I/O mixed (Both sides)		Equivalent to an I/O module.
	General intelligent module	—		Equivalent to an analog input module.

Watchdog timer

The time required for one instruction is one nanosecond.

Attachment of extended SRAM cassette

The simulator operates as if an extended SRAM cassette (8 MB or 16 MB[*1]) was attached.

An parameter error will occur when specifying the capacity more than 8 MB or 16 MB in "Extended SRAM Cassette Setting" of "CPU Parameter".

*1 The capacity of a extended SRAM cassette differs depending on the types.
RnCPU, RnENCPU: 16 MB
RnPCPU, RnSFCPU: 8 MB

SD memory card

A function to read and write data from and to an SD memory card is not available.

Ex.

"Memory Card" is selected in "Save Destination" under "Event History Setting" of "CPU Parameter".

Drive usage

The data in the ROM drive of a CPU module (program memory/data memory) is stored in a temporary folder in the hard disk of a personal computer.

The ROM drive usage per data depends on the hard disk of a personal computer.

Enabling the remote RESET

In the simulation function, the simulator operates on the assumption that "Enable" is selected in "Remote Reset Setting" of "Operation Related Setting" of "CPU Parameter".

In the multiple CPU system, the CPU, in which the RESET button in the system simulation is enabled, operates as if "Enable" is being set. The CPU, in which the RESET button is disabled, operates as if "Disable" is being set.

Writing parameters to an intelligent function module

When writing parameters on the "Online Data Operation" screen, the availability differs according to the interaction with an intelligent function module.

○: Writable, ×: Not writable, —: Not supported

Parameter	With interaction	Without interaction
Simple motion module setting	○	×
Others	—	×

Clock function

A program is executed in accordance with the simulation time.

The clock on a personal computer is applied to the time of the clock function every time simulation is started or reset.

Operation when the base setting is not set

When the number of slots is not set, the system on the simulation operates as if the eight base units in MELSEC iQ-R series, which have eight slots for each, were being set.

When the model name of a base unit is not set, the base unit on the simulation operates as if a base unit in the MELSEC iQ-R series was being used.

When the model name of a power supply module is not set, the power supply module operates as if R61P was being used on a base unit in the MELSEC iQ-R series, or Q61P was being used on a base unit of the Q series.

Self-diagnostic function error

For RCPUs, the self-diagnostic function error '1900H' (constant scan time exceeded) is not detected.

Error information on module diagnostics

Within errors detected by the simulator, error information which is different from the one that will occur in an actual CPU module may displayed in the module diagnostics screen.

Remote operation screen

Under the following conditions, the operating status (such of a stand-by station) related to a redundant system is not displayed even if the "Remote Operation" screen is opened after the simulation for RnPSFCPU is started.

- Parameters are not written to GX Simulator3.
- GX Simulator3 is not reset.

Simulation for cyclic transmission

■Connection among network modules using cables

The network modules on the network with the same network number operates as all network modules are connected.

■Online operations for another station

Online operations for GX Simulator3 (system simulation) can be performed for the own station only.

■Overlapped station number

While button pass is stopped, an overlap error occurs in both stations where a station number is overlapped.

During the execution of baton pass, an overlap error is detected in the station where the setting is configured later.

■Troubleshooting on network modules

For details on troubleshooting, refer to the following manuals.

📖MELSEC iQ-R CC-Link IE Controller Network User's Manual (Application)

📖MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

📖MELSEC iQ-F FX5 User's Manual (CC-Link IE)

In the simulation for cyclic transmission, some troubleshooting methods which are effective for the actual network modules are not supported.

The procedure for troubleshooting and availability of each procedure of simulation for cyclic transmission are as follows.

○: Supported, ×: Unsupported

Procedure for troubleshooting	Support status
1. Check the LED status.	○
2. Check the network status by performing the CC-Link IE Field Network diagnostics or CC-Link IE Controller Network diagnostics.	×
3. Check error information by performing the module diagnostics for the network module.	×
4. Check event history by performing the module diagnostics for a CPU module.	○
5. Check the system monitor or detailed module information.	×
6. Monitor link special relays (SB) and/or link special registers (SW).	○

Appendix 6 USB Driver Installation Procedure

To communicate with a CPU module via USB, installing a USB driver is required.
If multiple MELSOFT products are already installed, refer to the installation location of the first product.

Windows® XP

Operating procedure

1. Connect a personal computer and a CPU module with a USB cable, and turn the power of the programmable controller ON.
2. Select "Install from a list or specific location (Advanced)" on the "Found New Hardware Wizard" screen.
3. Select "Search for the best driver in these locations" in the next screen. Select "Include this location in the search" and specify 'Easysocket\USBDrivers' in the folder where GX Works3 has been installed.

Precautions

If the driver cannot be installed, check the following settings on Windows®.
The USB driver may not be installed when "Block—Never install unsigned driver software" is selected in [Control Panel] ⇨ [System] ⇨ [Hardware] ⇨ [Driver Signing].
Select "Ignore — Install the software anyway and don't ask for my approval", or "Warn — Prompt me each time to choose an action" in [Driver Signing], and execute the USB driver installation.

Windows Vista®

Operating procedure

1. Connect a personal computer and a CPU module with a USB cable, and turn the power of the programmable controller ON.
2. Select "Locate and install driver software (recommended)" on the "Found New Hardware Wizard" screen.
3. Select "Browse my computer for driver software (advanced)" on the "Found New Hardware" screen.
4. Select "Search for the best driver in these locations" in the next screen. Select "Include subfolders" and specify 'Easysocket\USBDrivers' in the folder where GX Works3 has been installed.

Precautions

When "Windows can't verify the publisher of this driver software" screen appears during the installation, select "Install this driver software anyway".

Windows® 7 or later

Operating procedure

1. Connect a personal computer and a CPU module with a USB cable, and turn the power of the programmable controller ON.
2. Select [Control Panel] ⇨ [System and Security] ⇨ [Administrative Tools] ⇨ [Computer Management] ⇨ [Device Manager] from Windows® Start*1. Right-click "Unknown device" and click "Update Driver Software".
3. Select "Browse my computer for driver software" on the "Update Driver Software" screen, and specify 'Easysocket\USBDrivers' in the folder where GX Works3 is installed on the next screen.

*1 On the Start screen or from the Start menu.

Appendix 7 Replacement of other format projects

When using another format project as one for GX Works3, some instructions, devices, and programs need to be replaced with ones for GX Works3. Check the contents of this section, and correct the project.

Replacement of GX Works2 format projects

To use GX Works2 format projects created for FXCPUs (FX3U/FX3UC and FX3G/FX3GC) as ones created for FX5CPUs in GX Works3, refer to the following handbook.

Transition from MELSEC FX3U, FX3UC Series to MELSEC iQ-F Series Handbook

Correcting parameters

The settings in the device/label automatic-assign setting set in a GX Works2 format project are applied for "Label Area Capacity", "Latch Label Area Capacity", and "Latch Type Setting of Latch Type Label" in the CPU parameter of a GX Works3 project.

However, depending on a GX Works2 format project, the settings may not be applied.

In that case, check the changes in the "Output" window, and set "CPU Parameter" depending on the label capacity of the project.

The setting items for a GX Works3 project corresponding to that for a GX Works2 format project are as follows.

GX Works2		GX Works3	
Project	**Device/label automatic-assign setting**	**CPU parameter**	**Setting content**
• Simple project with labels • Structured project	Total points (VAR)	Label area capacity	The settings are utilized.
	Total points (VAR_RETAIN)	Latch label area capacity	
	Latch selection column (latch type)	Latch type setting of latch type label	• When all the latch types of each data type*1 are the same, the settings are applied. • When a latch type is different between these data types*1, "Latch(1)" is set.
• Simple project with no labels • A project in which the value of "Use Volume" exceeds that of "Total Capacity" in the "Device/Label Memory Configuration" screen in GX Works3.*2,*3 • A project created in GX Works2 Version 1.570U or earlier	Total points (VAR)	Label area capacity	"0 K word" is set.
	Total points (VAR_RETAIN)	Latch label area capacity	
	Latch selection column (latch type)	Latch type setting of latch type label	"Latch(1)" is set.

*1 Word device, bit device, timer, retentive timer, and counter

*2 For details on the device/label memory, refer to the following manual.
MELSEC iQ-R Programming Manual (Program Design)

*3 The "Device/Label Memory Configuration" screen appears when "Device/Label Memory Configuration Confirmation" is clicked in "CPU Parameter".

Correcting instructions and arguments

The data types of some instructions, function, and function blocks in GX Works2 are different from ones of instructions, functions, function blocks and arguments in GX Works3. Therefore, the data type mismatch error may occur when utilizing a program of GX Works2. In that case, replace the instruction names and arguments to the appropriate ones.
The following table, that indicates the replacement method, is not applied to a ladder program.

■Instructions of which names need to be replaced

Names that need to be replaced → names after replacement			
BAND → BAND_U	BANDP → BANDP_U	BINDA → BINDA_U	BINDAP → BINDAP_U
DABIN → DABIN_U	DABINP → DABINP_U	DBAND → DBAND_U	DBANDP → DBANDP_U
DBINDA → DBINDA_U	DBINDAP → DBINDAP_U	DDABIN → DDABIN_U	DDABINP → DDABINP_U
DDEC → DDEC_U	DDECP → DDECP_U	DEC → DEC_U	DECP → DECP_U
DGBIN → DGBIN_U	DGBINP → DGBINP_U	DGRY → DGRY_U	DGRYP → DGRYP_U
DINC → DINC_U	DINCP → DINCP_U	DLIMITP → DLIMITP_U	DMAXP → DMAXP_U
DMEAN → DMEAN_U	DMEANP → DMEANP_U	DMINP → DMINP_U	DSCL → DSCL_U
DSCL2 → DSCL2_U	DSCL2P → DSCL2P_U	DSCLP → DSCLP_U	DSTR → DSTR_U
DSTRP → DSTRP_U	DVAL → DVAL_U	DVALP → DVALP_U	DWSUM → DWSUM_U
DWSUMP → DWSUMP_U	DZONE → DZONE_U	DZONEP → DZONEP_U	GBIN → GBIN_U
GBINP → GBINP_U	GRY → GRY_U	GRYP → GRYP_U	INC → INC_U
INCP → INCP_U	LIMITP → LIMITP_U	MAXP → MAXP_U	MEAN → MEAN_U
MEANP → MEANP_U	MINP → MINP_U	SCL → SCL_U	SCL2 → SCL2_U
SCL2P → SCL2P_U	SCLP → SCLP_U	STR → STR_U	STRP → STRP_U
VAL → VAL_U	VALP → VALP_U	WSUM → WSUM_U	WSUMP → WSUMP_U
ZONE → ZONE_U	ZONEP → ZONEP_U	-	-

■Standard functions/function blocks of which names and arguments need to be replaced

Names that need to be replaced → names after replacement		
BCD_TO_STR → BCD_TO_STRING	BCD_TO_STR_E → BCD_TO_STRING_E*1	BOOL_TO_STR → BOOL_TO_STRING
BOOL_TO_STR_E → BOOL_TO_STRING_E*1	DINT_TO_STR → DINT_TO_STRING	DINT_TO_STR_E → DINT_TO_STRING_E*1
DWORD_TO_STR → DWORD_TO_STRING	DWORD_TO_STR_E → DWORD_TO_STRING_E*1	INT_TO_STR → INT_TO_STRING
INT_TO_STR_E → INT_TO_STRING_E*1	LIMITATION → LIMIT	LIMITATION_E → LIMIT_E*3
MAXIMUM → MAX	MAXIMUM_E → MAX_E*2	MINIMUM → MIN
MINIMUM_E → MIN_E*2	REAL_TO_STR → REAL_TO_STRING	REAL_TO_STR_E → REAL_TO_STRING_E*1
STR_TO_BCD → STRING_TO_BCD	STR_TO_BCD_E → STRING_TO_BCD_E*1	STR_TO_BOOL → STRING_TO_BOOL
STR_TO_BOOL_E → STRING_TO_BOOL_E*1	STR_TO_DINT → STRING_TO_DINT	STR_TO_DINT_E → STRING_TO_DINT_E*1
STR_TO_DWORD → STRING_TO_DWORD	STR_TO_DWORD_E → STRING_TO_DWORD_E*1	STR_TO_INT → STRING_TO_INT
STR_TO_INT_E → STRING_TO_INT_E*1	STR_TO_REAL → STRING_TO_REAL	STR_TO_REAL_E → STRING_TO_REAL_E*1
STR_TO_TIME → STRING_TO_TIME	STR_TO_TIME_E → STRING_TO_TIME_E*1	STR_TO_WORD → STRING_TO_WORD
STR_TO_WORD_E → STRING_TO_WORD_E*1	TIME_TO_STR → TIME_TO_STRING	TIME_TO_STR_E → TIME_TO_STRING_E*1
WORD_TO_STR → WORD_TO_STRING	WORD_TO_STR_E → WORD_TO_STRING_E*1	-

*1 The following replacement is required.
The second argument → the third argument, the third argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := BCD_TO_STR_E(SM400, l_word, l_string); → l_string := BCD_TO_STRING_E(SM400, M0, l_word);

*2 The following replacement is required.
The second argument → the third argument, the third argument → the fourth argument, the fourth argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := MAXIMUM_E(SM400, D1, D2, D3); → D3 := MAX_E(SM400, M0, D1, D2);

*3 The following replacement is required.
The second argument → the third argument, the third argument → the fourth argument, the fourth argument → the fifth argument, the fifth argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := LIMITATION_E(SM400, D1, D2, D3, D4); → D4 := LIMIT_E(SM400, M0, D1, D2, D3);

■Instructions of which names and arguments need to be replaced

Names that need to be replaced → names after replacement		
ACOSD_E_MD → ACOSD	ACOSD_MD → ACOSD*1	AND_DT_EQ_M → ANDDT_EQ*7
AND_DT_GE_M → ANDDT_GE*7	AND_DT_GT_M → ANDDT_GT*7	AND_DT_LE_M → ANDDT_LE*7
AND_DT_LT_M → ANDDT_LT*7	AND_DT_NE_M → ANDDT_NE*7	AND_EDEQ_M → ANDED_EQ
AND_EDGE_M → ANDED_GE	AND_EDGT_M → ANDED_GT	AND_EDLE_M → ANDED_LE
AND_EDLT_M → ANDED_LT	AND_EDNE_M → ANDED_NE	AND_EEQ_M → ANDE_EQ
AND_EGE_M → ANDE_GE	AND_EGT_M → ANDE_GT	AND_ELE_M → ANDE_LE
AND_ELT_M → ANDE_LT	AND_ENE_M → ANDE_NE	AND_EQ_M → AND_EQ
AND_GE_M → AND_GE	AND_GT_M → AND_GT	AND_LE_M → AND_LE
AND_LT_M → AND_LT	AND_NE_M → AND_NE	AND_STRING_EQ_M → ANDSTRING_EQ
AND_STRING_GE_M → ANDSTRING_GE	AND_STRING_GT_M → ANDSTRING_GT	AND_STRING_LE_M → ANDSTRING_LE
AND_STRING_LT_M → ANDSTRING_LT	AND_STRING_NE_M → ANDSTRING_NE	AND_TM_EQ_M → ANDTM_EQ*8
AND_TM_GE_M → ANDTM_GE*8	AND_TM_GT_M → ANDTM_GT*8	AND_TM_LE_M → ANDTM_LE*8
AND_TM_LT_M → ANDTM_LT*8	AND_TM_NE_M → ANDTM_NE*8	ANDD_EQ_M → ANDD_EQ
ANDD_GE_M → ANDD_GE	ANDD_GT_M → ANDD_GT	ANDD_LE_M → ANDD_LE
ANDD_LT_M → ANDD_LT	ANDD_NE_M → ANDD_NE	ASIND_E_MD → ASIND
ASIND_MD → ASIND*1	ATAND_E_MD → ATAND	ATAND_MD → ATAND*1
BKCMP_EQ_M → BKCMP_EQ*9	BKCMP_EQP_M → BKCMP_EQP*9	BKCMP_GE_M → BKCMP_GE*9
BKCMP_GEP_M → BKCMP_GEP*9	BKCMP_GT_M → BKCMP_GT*9	BKCMP_GTP_M → BKCMP_GTP*9
BKCMP_LE_M → BKCMP_LE*9	BKCMP_LEP_M → BKCMP_LEP*9	BKCMP_LT_M → BKCMP_LT*9
BKCMP_LTP_M → BKCMP_LTP*9	BKCMP_NE_M → BKCMP_NE*9	BKCMP_NEP_M → BKCMP_NEP*9
BKMINUS_M → BKMINUS	BKMINUSP_M → BKMINUSP	BKPLUS_M → BKPLUS
BKPLUSP_M → BKPLUSP	BMINUS_3_M → BMINUS	BMINUSP_3_M → BMINUSP
BPLUS_3_M → BPLUS	BPLUSP_3_M → BPLUSP	BREAK_MD → BREAK*6
BREAK_P_MD → BREAKP*6	CALL_M → CALL_1*6	CALLP_M → CALLP_1*6
CHGT_D_M → D_CHGT*3	CHGT_DP_M → DP_CHGT*3	CJ_M → CJ*6
CMP_M → CMP*9	CMPP_M → CMPP*9	COSD_E_MD → COSD
COSD_MD → COSD*1	DATEMINUS_M → DATEMINUS	DATEMINUS_S_M → S_DATEMINUS
DATEMINUS_SP_M → SP_DATEMINUS	DATEMINUSP_M → DATEMINUSP	DATEPLUS_M → DATEPLUS
DATEPLUS_S_M → S_DATEPLUS	DATEPLUS_SP_M → SP_DATEPLUS	DATEPLUSP_M → DATEPLUSP
DBKCMP_EQ_M → DBKCMP_EQ*11	DBKCMP_EQP_M → DBKCMP_EQP*11	DBKCMP_GE_M → DBKCMP_GE*11
DBKCMP_GEP_M → DBKCMP_GEP*11	DBKCMP_GT_M → DBKCMP_GT*11	DBKCMP_GTP_M → DBKCMP_GTP*11
DBKCMP_LE_M → DBKCMP_LE*11	DBKCMP_LEP_M → DBKCMP_LEP*11	DBKCMP_LT_M → DBKCMP_LT*11
DBKCMP_LTP_M → DBKCMP_LTP*11	DBKCMP_NE_M → DBKCMP_NE*11	DBKCMP_NEP_M → DBKCMP_NEP*11
DBKMINUS_M → DBKMINUS*12	DBKMINUSP_M → DBKMINUSP*12	DBKPLUS_M → DBKPLUS*12
DBKPLUSP_M → DBKPLUSP*12	DBMINUS_3_M → DBMINUS	DBMINUSP_3_M → DBMINUSP
DBPLUS_3_M → DBPLUS	DBPLUSP_3_M → DBPLUSP	DCMP_M → DCMP*11
DCMPP_M → DCMPP*11	DDIVID_3_M → DDIVISION	DDIVIDP_3_M → DDIVISIONP
DIV_MD → EDIVISION*5	DIV_P_MD → EDIVISIONP*5	DIVID_3_M → DIVISION
DIVIDP_3_M → DIVISIONP	DLIMIT_MD → DLIMIT	DMAX_M → DMAX*10
DMIN_M → DMIN*10	DMINUS_3_M → DMINUS	DMINUSP_3_M → DMINUSP
DMULTI_3_M → DMULTI	DMULTIP_3_M → DMULTIP	DPLUS_3_M → DPLUS
DPLUSP_3_M → DPLUSP	DROL_2_M → DROL	DROL_M → DROL
DROR_2_M → DROR	DROR_M → DROR	DZCP_M → DZCP*13
DZCPP_M → DZCPP*13	EDDIV_M → EDDIVISION	EDDIVP_M → EDDIVISIONP
EDIV_M → EDIVISION	EDIVP_M → EDIVISIONP	EDMINUS_3_M → EDMINUS_3
EDMINUSP_3_M → EDMINUSP_3	EDPLUS_3_M → EDPLUS_3	EDPLUSP_3_M → EDPLUSP_3
EMINUS_3_M → EMINUS_3	EMINUSP_3_M → EMINUSP_3	EPLUS_3_M → EPLUS_3
EPLUSP_3_M → EPLUSP_3	EXPD_MD → EXPD*1	IRET_M → IRET
JMP_M → JMP*6	LD_DT_EQ_M → LDDT_EQ*7	LD_DT_GE_M → LDDT_GE*7
LD_DT_GT_M → LDDT_GT*7	LD_DT_LE_M → LDDT_LE*7	LD_DT_LT_M → LDDT_LT*7
LD_DT_NE_M → LDDT_NE*7	LD_EDEQ_M → LDED_EQ	LD_EDGE_M → LDED_GE

Names that need to be replaced → names after replacement		
LD_EDGT_M → LDED_GT	LD_EDLE_M → LDED_LE	LD_EDLT_M → LDED_LT
LD_EDNE_M → LDED_NE	LD_EEQ_M → LDE_EQ	LD_EGE_M → LDE_GE
LD_EGT_M → LDE_GT	LD_ELE_M → LDE_LE	LD_ELT_M → LDE_LT
LD_ENE_M → LDE_NE	LD_EQ_M → LD_EQ	LD_GE_M → LD_GE
LD_GT_M → LD_GT	LD_LE_M → LD_LE	LD_LT_M → LD_LT
LD_NE_M → LD_NE	LD_STRING_EQ_M → LDSTRING_EQ	LD_STRING_GE_M → LDSTRING_GE
LD_STRING_GT_M → LDSTRING_GT	LD_STRING_LE_M → LDSTRING_LE	LD_STRING_LT_M → LDSTRING_LT
LD_STRING_NE_M → LDSTRING_NE	LD_TM_EQ_M → LDTM_EQ*8	LD_TM_GE_M → LDTM_GE*8
LD_TM_LE_M → LDTM_GT*8	LD_TM_LE_M → LDTM_LE*8	LD_TM_LT_M → LDTM_LT*8
LD_TM_NE_M → LDTM_NE*8	LDD_EQ_M → LDD_EQ	LDD_GE_M → LDD_GE
LDD_GT_M → LDD_GT	LDD_LE_M → LDD_LE	LDD_LT_M → LDD_LT
LDD_NE_M → LDD_NE	LOGD_MD → LOGD*1	MINUS_3_M → MINUS
MINUSP_3_M → MINUSP	MULTI_3_M → MULTI	MULTIP_3_M → MULTIP
NEXT_M → NEXT	OR_DT_EQ_M → ORDT_EQ*7	OR_DT_GE_M → ORDT_GE*7
OR_DT_GT_M → ORDT_GT*7	OR_DT_LE_M → ORDT_LE*7	OR_DT_LT_M → ORDT_LT*7
OR_DT_NE_M → ORDT_NE*7	OR_EDEQ_M → ORED_EQ	OR_EDGE_M → ORED_GE
OR_EDGT_M → ORED_GT	OR_EDLE_M → ORED_LE	OR_EDLT_M → ORED_LT
OR_EDNE_M → ORED_NE	OR_EEQ_M → ORE_EQ	OR_EGE_M → ORE_GE
OR_EGT_M → ORE_GT	OR_ELE_M → ORE_LE	OR_ELT_M → ORE_LT
OR_ENE_M → ORE_NE	OR_EQ_M → OR_EQ	OR_GE_M → OR_GE
OR_GT_M → OR_GT	OR_LE_M → OR_LE	OR_LT_M → OR_LT
OR_NE_M → OR_NE	OR_STRING_EQ_M → ORSTRING_EQ	OR_STRING_GE_M → ORSTRING_GE
OR_STRING_GT_M → ORSTRING_GT	OR_STRING_LE_M → ORSTRING_LE	OR_STRING_LT_M → ORSTRING_LT
OR_STRING_NE_M → ORSTRING_NE	OR_TM_EQ_M → ORTM_EQ*8	OR_TM_GE_M → ORTM_GE*8
OR_TM_GT_M → ORTM_GT*8	OR_TM_LE_M → ORTM_LE*8	OR_TM_LT_M → ORTM_LT*8
OR_TM_NE_M → ORTM_NE*8	ORD_EQ_M → ORD_EQ	ORD_GE_M → ORD_GE
ORD_GT_M → ORD_GT	ORD_LE_M → ORD_LE	ORD_LT_M → ORD_LT
ORD_NE_M → ORD_NE	PLUS_3_M → PLUS	PLUSP_3_M → PLUSP
SCJ_M → SCJ*6	SIND_E_MD → SIND	SIND_MD → SIND*1
SMOV_M → SMOV*4	SMOV_MD → MOV	SMOV_P_MD → MOVP
SMOV_P_S_MD → STRINGMOVP	SMOV_S_MD → STRINGMOV	STRING_MOV_M → STRINGMOV
STRING_MOVP_M → STRINGMOVP	STRING_PLUS_3_M → STRINGPLUS	STRING_PLUSP_3_M → STRINGPLUSP
TAND_E_MD → TAND	TAND_MD → TAND*1	ZCP_M → ZCP*2
ZCPP_M → ZCPP*2	-	-

*1 The following replacement is required.
The types of second and third arguments → FLOAT (Double Precision) (ANYREAL_64) type
Example: I_eno := EXPD_MD(I_en, I_word_array_1, I_word_array_2); → I_eno := EXPD(I_en, I_lreal_1, I_lreal_2);

*2 The following replacement is required.
The types of second, third, and fourth arguments → the unsigned BIN 16 bit (ANY16_U) type
Example: I_eno := ZCP_M(I_en, I_any16_1, I_any16_2, I_any16_3, I_bit_array); → I_eno := ZCP(I_en, I_word_1, I_word_2, I_word_3, I_bit_array);

*3 The following replacement is required.
Add the signed BIN 16 bit (ANY16_S) type to the fifth argument. Then, the fifth argument → the sixth argument, the sixth argument → the seventh argument
Example: I_eno := CHGT_D_M(I_en, I_int_1, I_string, I_int_2, I_bit_array, I_int); → I_eno := D_CHGT(I_en, I_int_1, I_string, I_int_2, I_int_3, I_bit_array, I_int);

*4 The following replacement is required.
The types of third, fourth, and fifth arguments → the unsigned BIN 16 bit (ANY16_U) type
Example: I_eno := SMOV_M(I_en, I_int_1, I_any16_1, I_any16_2, I_any16_3, I_int_2); → I_eno := SMOV(I_en, I_int_1, I_word_1, I_word_2, I_word_3, I_int_2);

*5 The following replacement is required.
The types of second, third, and fourth arguments → FLOAT (Single Precision) (ANYREAL_32) type
Example: I_eno := DIV_MD(I_en, I_any32_1, I_any32_2, I_any32_3); → I_eno := EDIVISION(I_en, I_real_1, I_real_2, I_real_3);

*6 The following replacement is required.
The type of second argument → the device name (POINTER) type
Example: I_eno := BREAK_MD(I_en, I_int_1, I_int_2); → I_eno := BREAK(I_en, I_pointer, I_int_2);

*7 The following replacement is required.

The types of second and third arguments → the signed BIN 16 bit (ANY_DT) type
Example: l_eno := LD_DT_EQ_M(l_en, l_any16_array_1, l_any16_array_2, l_int_3); → l_eno := LDDT_EQ(l_en, l_int_1, l_int_2, l_int_3);

*8 The following replacement is required.
The types of second and third arguments → the signed BIN 16 bit (ANY_TM) type
Example: l_eno := LD_TM_EQ_M(l_en, l_any16_array_1, l_any16_array_2, l_int_3); → l_eno := LDTM_EQ(l_en, l_int_1, l_int_2, l_int_3);

*9 The following replacement is required.
The types of second and third arguments → the signed BIN 16 bit (ANY16_S) type
Example: l_eno := CMP_M(l_en, l_word_1, l_word_2, l_bit_array); → l_eno := CMP(l_en, l_int_1, l_int_2, l_bit_array);

*10 The following replacement is required.
The type of second argument → the signed BIN 32 bit (ANY32_S) type, the type of fourth argument → the signed BIN 32 bit (ANY32_S_ARRAY, number of elements: 4) type
Example: l_eno := DMAX_M(l_en, l_any32_1, l_word, l_any32_2); → l_eno := DMAX(l_en, l_dint, l_word, l_dint_array);

*11 The following replacement is required.
The types of second and third arguments → the signed BIN 32 bit (ANY32_S) type
Example: l_eno := DBKCMP_EQ_M(l_en, l_any32_1, l_any32_2, l_word, l_bool); → l_eno := DBKCMP_EQ(l_en, l_dint_1, l_dint_2, l_word, l_bool);

*12 The following replacement is required.
The types of second, third, and fifth arguments → the signed BIN 32 bit (ANY32_S) type, the type of fourth argument → the unsigned BIN 16 bit (ANY16) type
Example: l_eno := DBKMINUS_M(l_en, l_any32_1, l_any32_2, l_any32_3, l_any32_4); → l_eno := DBKMINUS(l_en, l_dint_1, l_dint_2, l_word, l_dint_3);

*13 The following replacement is required.
The types of second, third, and fourth arguments → the signed BIN 32 bit (ANY32_S) type
Example: l_eno := DZCP_M(l_en, l_any32_1, l_any32_2, l_any32_3, l_bit_array); → l_eno := DZCP(l_en, l_dint_1, l_dint_2, l_dint_3, l_bit_array);

■Standard functions of which arguments need to be replaced

Name					
ABS_E*1	ACOS*3	ACOS_E*1	ADD_E*2	ADD_TIME_E*2	AND_E*2
ASIN*3	ASIN_E*1	ATAN*3	ATAN_E*1	BCD_TO_DINT_E*1	BCD_TO_INT_E*1
BITARR_TO_DINT_E*2	BITARR_TO_INT_E*1	BOOL_TO_DINT_E*1	BOOL_TO_DWORD_E*1	BOOL_TO_INT_E*1	BOOL_TO_TIME_E*1
BOOL_TO_WORD_E*1	CONCAT_E*2	COS*3	COS_E*1	CPY_BIT_OF_INT_E*2	CPY_BITARR_E*2
DELETE_E*2	DINT_TO_BCD_E*1	DINT_TO_BITARR_E*2	DINT_TO_BOOL_E*1	DINT_TO_DWORD_E*1	DINT_TO_INT_E*1
DINT_TO_LREAL*1	DINT_TO_LREAL_E*1	DINT_TO_REAL_E*1	DINT_TO_TIME_E*1	DINT_TO_WORD_E*1	DIV_E*2
DIV_TIME_E*2	DWORD_TO_BOOL_E*1	DWORD_TO_DINT_E*1	DWORD_TO_INT_E*1	DWORD_TO_TIME_E*1	DWORD_TO_WORD_E*1
EQ_E*2	EXP*3	EXP_E*1	EXPT_E*2	FIND_E*2	GE_E*2
GET_BIT_OF_INT_E*2	GT_E*2	INSERT_E*4	INT_TO_BCD_E*1	INT_TO_BITARR_E*2	INT_TO_BOOL_E*1
INT_TO_DINT_E*1	INT_TO_DWORD_E*1	INT_TO_LREAL_E*1	INT_TO_REAL_E*1	INT_TO_TIME_E*1	INT_TO_WORD_E*1
LE_E*2	LEFT*6	LEFT_E*2	LEN*3	LEN_E*1	LN_E*1
LREAL_TO_DINT_E*1	LREAL_TO_INT_E*1	LREAL_TO_REAL_E*1	LT_E*2	MID_E*4	MOD_E*2
MOVE_E*1	MUL_E*1	MUL_TIME_E*1	MUX_E*1	NE_E*1	NOT_E*1
OR_E*1	REAL_TO_DINT_E*1	REAL_TO_INT_E*1	REAL_TO_LREAL_E*1	REPLACE_E*7	RIGHT*6
RIGHT_E*2	ROL*5	ROL_E*2	ROR*5	ROR_E*2	SEL_E*1
SET_BIT_OF_INT_E*2	SHL_E*1	SHR_E*1	SIN*3	SIN_E*1	SQRT_E*1
SUB_E*1	SUB_TIME_E*2	TAN*3	TAN_E*1	TIME_TO_BOOL_E*1	TIME_TO_DINT_E*1
TIME_TO_DWORD_E*1	TIME_TO_INT_E*1	TIME_TO_WORD_E*1	WORD_TO_BOOL_E*1	WORD_TO_DINT_E*1	WORD_TO_DWORD_E*1
WORD_TO_INT_E*1	WORD_TO_TIME_E*1	XOR_E*2	-	-	-

*1 The following replacement is required.
The second argument → the third argument, the third argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := ABS_E(SM400, l_num_in, l_num_d); → l_num_d := ABS_E(SM400, M0, l_num_in);

*2 The following replacement is required.
The second argument → the third argument, the third argument → the fourth argument, the fourth argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := ADD_E(SM400, l_num1, l_num2, l_num_d); → l_num_d := ADD_E(SM400, M0, l_num1, l_num2);

*3 The following replacement is required.

The third argument → the left side of the assignment statement. Delete the first argument.
Example: ACOS(SM400, l_real_s, l_real_d); → l_real_d := ACOS(l_real_s);

*4 The following replacement is required.
The second argument → the third argument, the third argument → the fourth argument, the fourth argument → the fifth argument, the fifth argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := INSERT_E(SM400, l_string1, l_string2, l_num_in, l_string_d); → l_string_d := INSERT_E(SM400, M0, l_string1, l_string2, l_num_in);

*5 The following replacement is required.
Delete the first argument. The third argument → the left side of the assignment statement. Add the input value (WORD type) to the second argument.
Example: ROL(SM400, l_any16_in, l_any16_d); → l_any16_d := ROL(l_any16_in, l_any16_n);

*6 The following replacement is required.
The fourth argument → the left side of the assignment statement. Delete the first argument.
Example: LEFT(SM400, l_string1, l_num_in, l_string_d); → l_string_d := LEFT(l_string1, l_num_in);

*7 The following replacement is required.
The second argument → the third argument, the third argument → the fourth argument, the fourth argument → the fifth argument, the fifth argument → the sixth argument, the sixth argument → the left side of the assignment statement, the left side of the assignment statement → the second argument
Example: M0 := REPLACE_E(SM400, l_string1, l_string2, l_num1, l_num2, l_string_d); → l_string_d := REPLACE_E(SM400, M0, l_string1, l_string2, l_num1, l_num2);

■Standard function blocks of which arguments need to be replaced

Name					
CTD*1	CTD_E*1	CTU*2	CTU_E*2	CTUD*1,*2	CTUD_E*1,*2
F_TRIG*3	F_TRIG_E*3,*4	R_TRIG*3	R_TRIG_E*3,*4	RS*7	RS_E*7,*4
SR*2	SR_E*7,*5	TOF_E*5	TON_E*6	TP_E*6	-

*1 The following replacement is required.
LOAD → LD
Example: CTD_1(CD := l_bool, LOAD := l_bool, PV := l_int, Q := l_bool_d, CV := l_int_d); → CTD_1(CD := l_bool, LD := l_bool, PV := l_int, Q := l_bool_d, CV := l_int_d);

*2 The following replacement is required.
RESET → R
Example: CTU_1(CU := l_bool, RESET := l_bool, PV := l_int, Q := l_bool_d, CV := l_int_d); → CTU_1(CU := l_bool, R := l_bool, PV := l_int, Q := l_bool_d, CV := l_int_d);

*3 The following replacement is required.
_CLK → CLK
Example: R_TRIG_1(_CLK := l_bool, Q := l_bool_d); → R_TRIG_1(CLK := l_bool, Q := l_bool_d);

*4 The following replacement is required.
The fourth argument → the second argument, the second argument → the third argument, the third argument → the fourth argument
Example: R_TRIG_E_1(EN := SM400, _CLK := l_bool, Q := l_bool_d, ENO := M0); → R_TRIG_E_1(EN := SM400, ENO := M0, CLK := l_bool, Q := l_bool_d);

*5 The following replacement is required.
The fifth argument → the second argument, the second argument → the third argument, the third argument → the fourth argument, the fourth argument → the fifth argument
Example: inst_TOF_E(EN := l_bool1, IN := l_bool2, PT := l_time, Q := l_bool3, ET := l_time2, ENO := l_bool4); → inst_TOF_E(EN := l_bool1, ENO := l_bool4, IN :=l_bool2, PT := l_time1, Q := l_bool3, ET := l_time2);

*6 The following replacement is required.
The sixth argument → the second argument, the second argument → the third argument, the third argument → the fourth argument, the fourth argument → the fifth argument, the fifth argument → the sixth argument
Example: inst_TON_E(EN := l_bool1, IN := l_bool2, PT := l_time1, Q := l_bool3, ET := l_time2, ENO := l_bool4); → inst_TOF_E(EN := l_bool1, ENO := l_bool4, IN := l_bool2, PT := l_time1, Q := l_bool3, ET := l_time2);

*7 The following replacement is required.
_S → S, _R → R
Example: RS_1(_S := l_bool, _R1 := l_bool, Q1 := l_bool_d); → RS_1(S := l_bool, R1 := l_bool, Q1 := l_bool_d);

■LIMIT instruction

Names that need to be replaced → names after replacement	
LIMIT[*1]	DLIMIT → LIMIT[*2]

*1 The following replacement is required.
Delete the first argument. The second argument → the first argument, the third argument → the second argument, the fourth argument → the third argument, the fifth argument → the left side of the assignment statement
Example: LIMIT(SM400, D1, D2, D3, D4); → D4 := LIMIT(D1, D2, D3);

*2 The following replacement is required.
Delete the first argument. The second argument → the first argument:D, the third argument → the second argument:D, the fourth argument → the third argument:D, the fifth argument → the left side of the assignment statement:D (':D' indicates a suffix.)
Example: DLIMIT(SM400, D0, D2, D4, D6); → D6:D := LIMIT(D0:D, D2:D, D4:D);

■Instructions that are not supported by MELSEC iQ-R series modules

If an instruction which is not supported by MELSEC iQ-R series modules is included in a program created with GX Works2, the instruction will be changed to one in which SM4095/SD4095 is used.

In addition, FBs/FUNs that are not supported by an ST program and an FBD/LD program will be undefined.

Correct the program so that it includes an instruction equivalent to one supported by MELSEC iQ-R series.

MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

Instructions in which the data type of the arguments need to be replaced

The following table shows the instructions in which the data type of the arguments differ between GX Works2 and GX Works3.
The data type of arguments can be used without being replaced by selecting "No" in the following option.

• [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Check the data type of instruction argument"

Name					
BDSQR	BDSQRP	BMOV	BMOVP	BMOV_E	BSQR
BSQRP	D_DDRD	DP_DDRD	D_DDWR	DP_DDWR	DB*
DB*P	DHOURM	DSORT	DVAL	DVALP	DWSUM
DWSUMP	FMOV	FMOVP	G_BIDIN	GP_BIDIN	G_BIDOUT
GP_BIDOUT	G_CCPASET	GP_CCPASET	G_CCREQ	GP_CCREQ	G_CPRTCL
GP_CPRTCL	G_GETE	GP_GETE	G_INPUT	G_OGLOAD	GP_OGLOAD
G_OGSTOR	GP_OGSTOR	G_ONDEMAND	GP_ONDEMAND	G_OUTPUT	GP_OUTPUT
G_PRR	GP_PRR	G_PUTE	GP_PUTE	G_RDMSG	GP_RDMSG
G_READ	GP_READ	G_REQ	GP_REQ	G_RIRCV	GP_RIRCV
G_RIRD	GP_RIRD	G_RISEND	GP_RISEND	G_RIWT	GP_RIWT
G_RLPASET	GP_RLPASET	G_SPBUSY	GP_SPBUSY	G_WRITE	GP_WRITE
GP_ECPRTCL	J_CCREQ	JP_CCREQ	J_REQ	JP_REQ	J_RIRD
JP_RIRD	J_RIWT	JP_RIWT	J_ZNRD	JP_ZNRD	J_ZNWR
JP_ZNWR	S_2PID	S_ABS	S_ADD	S_AMR	S_AT1
S_AVE	S_BC	S_BPI	S_BUMP	S_D	S_DBND
S_DED	S_DIV	S_DUTY	S_ENG	S_EQ	S_FG
S_FLT	S_GE	S_GT	S_HS	S_I	S_IENG
S_IFG	S_IN	S_IPD	S_LE	S_LIMT	S_LLAG
S_LS	S_LT	S_MID	S_MOUT	S_MUL	S_ONF2
S_ONF3	S_OUT1	S_OUT2	S_PGS	S_PHPL	S_PID
S_PIDP	S_PSUM	S_R	S_SEL	S_SPI	S_SQR
S_SUB	S_SUM	S_TPC	S_VLMT1	S_VLMT2	SECOND
SECONDP	SORT	SP_ECPRTCL	STR	STRP	VAL
VALP	Z_ABRST1	Z_ABRST2	Z_ABRST3	Z_ABRST4	Z_MBREQ
ZP_MBREQ	Z_MBRW	ZP_MBRW	Z_RECVS	Z_UINI	ZP_UINI
ZP_BUFRCV	ZP_BUFSND	ZP_CLOSE	ZP_CSET	ZP_ERRRD	ZP_OPEN
ZP_PFWRT	ZP_PINIT	ZP_PSTRT1	ZP_PSTRT2	ZP_PSTRT3	ZP_PSTRT4
ZP_TEACH1	ZP_TEACH2	ZP_TEACH3	ZP_TEACH4	-	-

Correcting devices

■Devices that are not supported by MELSEC iQ-R series module

- When a device, which is not supported by MELSEC iQ-R series module, is used in a program created with GX Works2, it is changed to SM4095/SD4095. In addition, when a GX Works2 project consists of a ladder program, the device, which is changed to a character string by an instruction, is changed to "SM4095"/"SD4095". To search a character string, refer to the search function. (☞ Page 304 Searching/Replacing Character Strings)
- The following devices will be deleted when they are set to the device memory data or the device initial value data created with GX Works2.
  S device, R device

■Number of device points and start/end device

The setting range for the number of device points may differ between the CPU type of a project created with GX Works2 and a MELSEC iQ-R series module. When the value, which has been set to the parameter, cannot be set for a MELSEC iQ-R series module, it is corrected to the value configurable in the MELSEC iQ-R series module after changing the module type.

■Increase of the number of device points due to the differences in local device setting units

Although the bit devices and word devices of local devices are set in one point units for Q series, the bit devices, word devices (excluding T/ST/C), and T/ST/C for MELSEC iQ-R series are set in 64-point units, 4-point units, and 32-point units, respectively. Since the setting units are different between Q series and MELSEC iQ-R series, the CPU parameters are automatically changed after changing the module type, resulting in the increase of the number of device points.

■Device name and label name display

- For a device that has been set as the local device with GX Works2, '#' is added in front of the device name.
- When a label used in GX Works2 has a name starting with "M+" or "P+", the "+" of the label name is replaced with "_".

■Step relay/SFC block device

A step relay/SFC block device may not be used on the ST editor and the FBD/LD editor.
Correct the program to provide the equivalent operation to the ST program and Structured Ladder/FBD program of GX Works2.
For details, refer to the following manual.
📖MELSEC iQ-R Programming Manual (Program Design)

■Correcting devices in address representation

GX Works3 does not support address representation of devices (such as '%MW0.0').
When address representation is used in a project created in GX Works2, it is read as is.
Correct each device in address representation by replacing the character string.

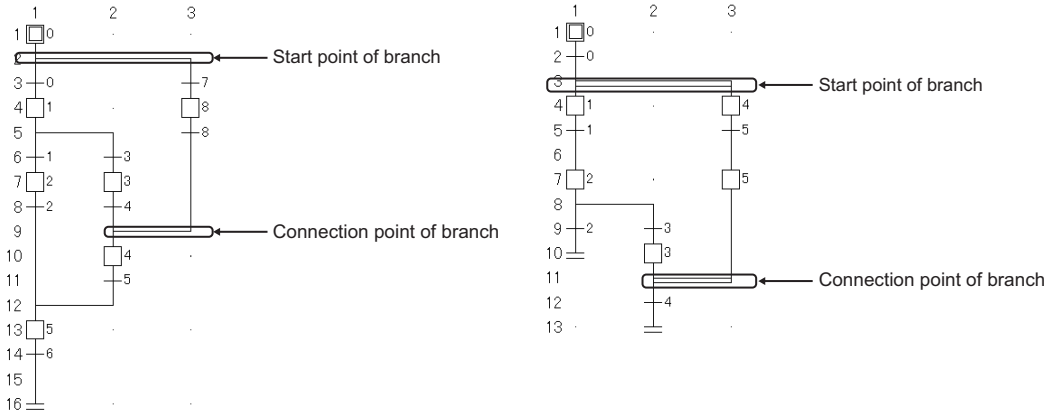
Correcting a program

■Structured Ladder/FBD program

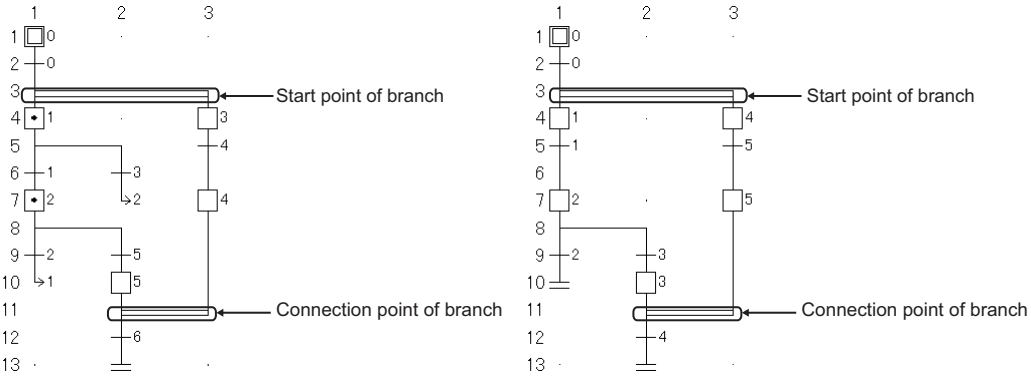
- The execution order is handled differently between Structured Ladder/Function Block Diagram language in GX Works2 and Function Block Diagram/Ladder Diagram language in GX Works3. Display the execution order and check it.
- A way of counting FBD network blocks differ between a program written in Structured Ladder/Function Block Diagram language in GX Works2 and a program written in Function Block Diagram/Ladder Diagram language in GX Works3. For a program written in Structured Ladder/Function Block Diagram language in GX Works2, a single function block is counted as a single FBD network block. For a program written in Function Block Diagram/Ladder Diagram language in GX Works3, all connected elements are counted as a single FBD network block. Therefore, a GX Works2 program may exceed the maximum number of creatable FBD network blocks (4096) when it is opened in GX Works3. In this case, divide the program and reduce the number of FBD network blocks.
- A performance of an return element differ between a program written in Structured Ladder/Function Block Diagram language in GX Works2 and a program written in Function Block Diagram/Ladder Diagram language in GX Works3. For details on return elements in GX Works3, refer to the following section.
  (☞ Page 227 Common element)
- There may be differences in the number and order of I/O arguments of a function element/function block element between Structured Ladder/Function Block Diagram language in GX Works2 and Function Block Diagram/Ladder Diagram language in GX Works3. In this case, the element is displayed as an undefined FB/FUN. Select [Edit] ⇨ [Update FB/FUN] to update the definition information, and correct the program.
- When a program in which members of standard FB are referenced is created in Structured Ladder/Function Block Diagram of GX Works2, a conversion error may occur after opening the program with GX Works3. In this case, check the member name and class of the standard FB, and correct the program.
- Inverting the contact is available for I/O arguments of function elements/function block elements in Function Block Diagram/Ladder Diagram language of GX Works3. (☞ Page 228 Switching methods for contacts/instructions)
  Connectors of those elements are deleted when the elements other than above are inverted in a Structured Ladder/FBD program of GX Works2. Correct the program to provide equivalent operations to the Structured Ladder/FBD program in GX Works2.
- Function Block Diagram/Ladder Diagram language in GX Works3 does not support wired OR of FBD elements. Correct the program to provide the equivalent operation to the Structured Ladder/FBD program of GX Works2 since a conversion error is caused.
- When a pointer branch instruction (CJ, SCJ, JMP), a jump, or a subroutine program is used, a conversion error may occur. For more details, refer to the following manual.
  (📖MELSEC iQ-R Programming Manual (Program Design))
- The program layout may be changed due to the differences between a Structured Ladder/FBD editor of GX Works2 and an FBD/LD editor of GX Works3. In that case, correct the layout properly.
  Additionally, the layout can be corrected by the layout correction function. For details on the layout correction function, refer to the following section.
  (☞ Page 231 Layout correction)
- Ladder block label used in the Structured Ladder/FBD of GX Works2 is defined as the pointer type in a local label.

■SFC programs

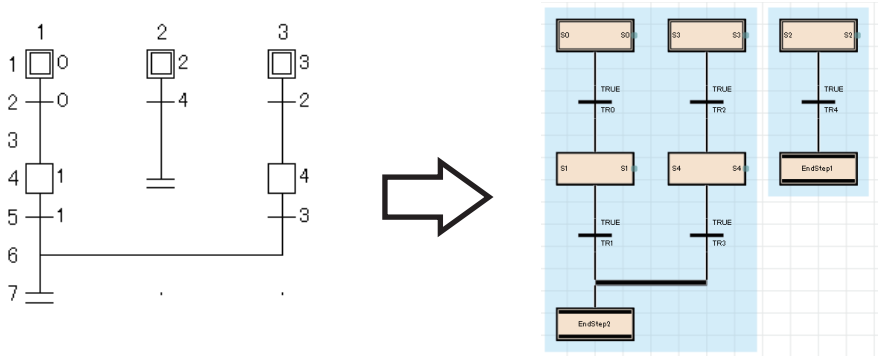
- Program restoration information included in an SFC program in GX Works3 is replaced with the source information in GX Works2. Note the data size of the program because it increases after replacement. The size can be checked in the "Size (Byte)" column on the [Write] tab on the "Online Data Operation" screen.
- A POU which is not included in the program setting of a structured project in GX Works2 cannot be read. Move the POU to the program setting before reading.
- When a label name such as "Step0" is included on an SFC diagram in GX Works2, the label name may duplicate with a step name and a label name in an SFC block after reading the SFC program. Change the step name/label name to avoid duplication.
- When an SFC program in the MELSAP-L (start condition format) format is read, it is converted into a program equivalent to one in MELSAP3 format.
- The settings to show an output only and not show a contact in a Zoom, cannot be set in GX Works3. Therefore, 'LD SM400' is added to a ladder block in which there is no contact when the ladder block is displayed in MELSAP3 format.
- A program is read in the detailed expression when some display formats (MELSAP3 and MELSAP-L) are used to display an SFC program in GX Works2.
- An SFC program such as shown below cannot be read with version 1.019V or earlier. It is because the connection point is not connected to the same line on which the starting point is connected on the branch. Adjust the positions for the starting point and the connection point of the branch so that they are connected to the same line before reading the program.



- An SFC program, such as shown below, cannot be read. It is because the connection point is not connected to the same line on which the starting point is connected on the branch. Switch the position of the jump or end step, and adjust the positions for the starting point and the connection point of the branch so that they are connected to the same line before reading the program.



- When an independent SFC diagram exists between the SFC diagrams in which multiple initial steps are connected each other as shown below, the program is read by moving the independent program to the rightmost.



- FX5CPUs do not support SFC programs. A project is read excluding an SFC program.

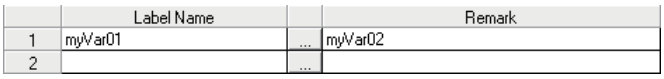
A

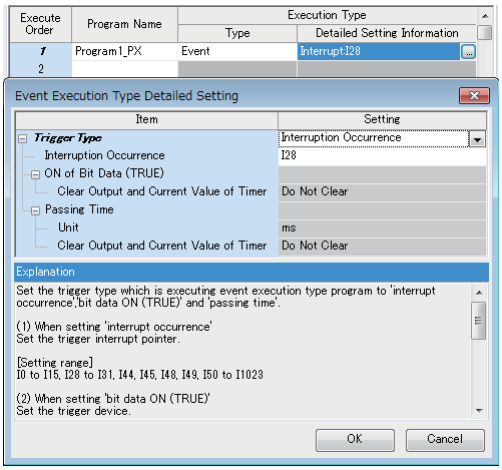
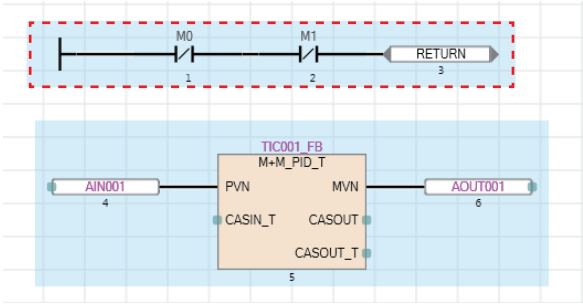
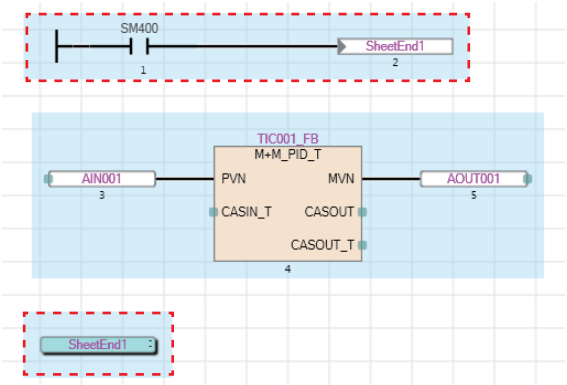
Replacement from a PX Developer format project

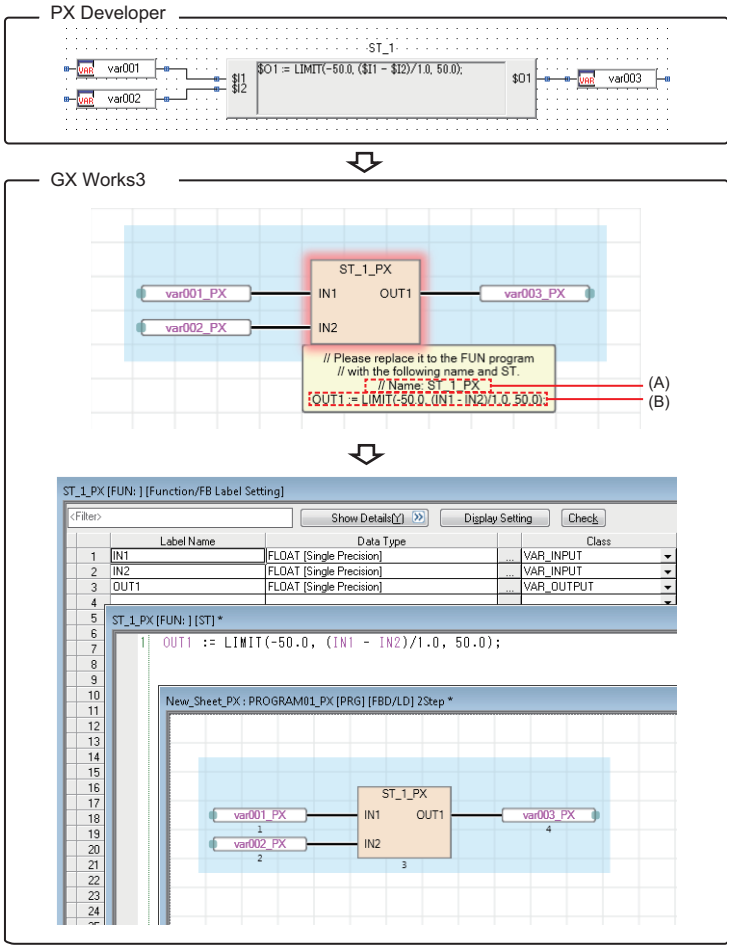
Some units of PX Developer project data are not supported by GX Works3.
A project needs to be corrected according to a GX Works3 project after changing the module type.
Check the contents in this section, then correct a PX Developer project and a GX Works2 project.
For details on the conversion processing for each unit of data, refer to the following manual.
☞ Page 92 Opening a PX Developer format project

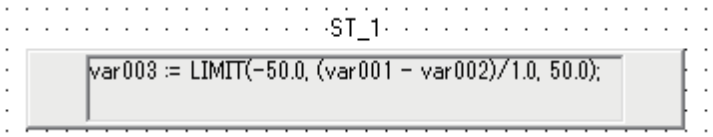
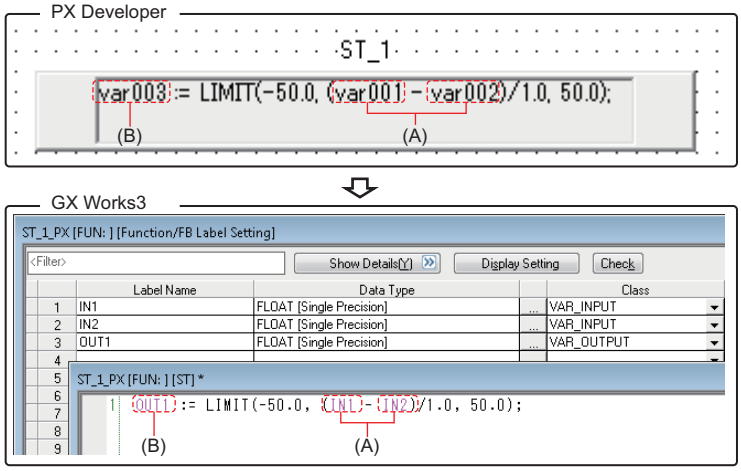
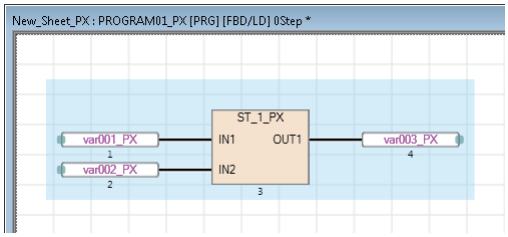
Replacement of a PX Developer format project

■Correcting setting items

Setting content in PX Developer		Operation in module type change	Correction method
Module FB declaration		Deleting the data	Create a program equivalent to a module FB in a PX Developer project by using an X device, a Y device, or a module access device (Un\Gn) on the FBD/LD editor of GX Works3. Delete a module FB (that is used in a PX Developer project) read to an FBD/LD program in GX Works3.
Initial value of an FB property	Tag FB declaration	Returning to the default if the initial values of FB properties were not read.	Set the initial value of an FB property of a tag FB which has been set for a PX Developer project as that of the initial value of an FB property of a tag FB in a GX Works3 project. (☞ Page 233 Display/setting an FB property)
	FB		Set the initial value of an FB property of an FB which has been set for a PX Developer project as that of the initial value of an FB property of an FB in a GX Works3 project. (☞ Page 233 Display/setting an FB property)
GX Works2 label assignment		Converting the data[*1]	In a GX Works3 project after changing the module type, correct the global label "GXW2LabelAssignment_PX" as mentioned below to use a label name used in a PX Developer project. After the correction, delete the global label.  ❶ In a GX Works3 project after changing the module type, search a character string (label name used in a GX Works2 project) in the "Label Name" column of "GXW2LabelAssignment_PX". (☞ Page 299 SEARCHING DATA) ❷ After checking that replacement is available, then replace the character string in the "Label Name" column with a character string (label name used in a PX Developer project) in the "Remark" column[*2]. ❸ Delete the replaced label setting from "GXW2LabelAssignment_PX". When same names are shown in the "Label Name" column and the "Remark" column, delete the label setting from GXW2LabelAssignment_PX". (The procedure ❶ and ❷ is not required.) **Point** A label name can easily be changed using the 'Automatic synchronization' function. (☞ Page 161 Automatic synchronization) ❶ Select "Yes" in the following option. • [Tool] ⇨ [Options] ⇨ "Other Editor" ⇨ "Label Editor Common" ⇨ "Track label name automatically in program editor" ❷ Convert all the programs. (☞ Page 279 Converting any or all programs) A conversion error may occur; however, go on to step ❸. ❸ Open the global label "GXW2LabelAssignment_PX" in the label editor. ❹ Copy a cell of the "Remarks" column [*2], and paste it to the "Label Name" column. The label name in the program is replaced. ❺ Check that the label name is replaced, delete the global label "GXW2LabelAssignment_PX".

Setting content in PX Developer	Operation in module type change	Correction method
Interrupt pointer execution	Changing to "No Execution Type"	Set the following for the target program. ❶ Select "CPU Parameter" ⇨ "Program Setting", then set a program name of a program to execute the interrupt pointer in the "Program Name" column. Select "Event" in the "Type" column of "Execution Type". ❷ Click the [...] button in the "Detailed Setting Information" column, and select "Interruption Occurrence" for "Trigger Type" on the "Event Execution Type Detailed Setting" screen. Set a interrupt pointer for "Interruption Occurrence". 
Execution condition setting of a program and an FBD sheet	Converting as a comment element	Create a program to control the execution by combining a contact with jump/return on the FBD/LD editor in GX Works3 according to the execution condition settings of a program and an FBD sheet which have been set for a PX Developer project. The following shows the examples of processing to control the execution of a program. Example 1) Execute a program when 'M0' or 'M1' is true. (It is not executed when 'M0' and 'M1' are false.)  Example 2) Not execute a program of a worksheet always 

Setting content in PX Developer	Operation in module type change	Correction method
Inline ST part	Converting as an FB element and a comment element	Create a function in an ST program of a GX Works3 project based on an inline ST part created for a PX Developer project. (☞ Page 328 Creating a Function) ❶ Create a function in an ST program and name it with the name (A) of the inline ST part that was converted as a comment element. ❷ Register an input/output argument that was converted to an FB element into the local label of the function created in procedure ❶. ❸ Create an ST program that was converted as a comment element (B) to the program body of the function created in procedure ❶. ❹ Select the converted FB element, then click [Edit] ⇨ [Update FB/FUN]. 

Setting content in PX Developer	Operation in module type change	Correction method
Inline ST part	Converting as an FB element and a comment element	When a label is used in an inline structured text of a PX Developer project, change the label to an input/output argument in addition to the above procedure. The following figure shows a correction example. (Example) Inline structured text of a PX Developer project  ❶ Change a label used in an inline structured text to an input/output argument of a function. Change each label as follows: (A) Label used for reading: input argument (B) Label used for writing: output argument  ❷ Connect the label with an input connection point/output connection point of the function. 
I/O simulation setting	Deleting the data	Register the contents of the I/O simulation setting which is set for a PX Developer project to the I/O system setting of the simulation function in GX Works3. For details on the I/O system setting, refer to the following section. ☞ Page 361 Simulation of External Device Operations

*1 It is converted as a global label "GXW2LabelAssignment_PX" of GX Works3.
Each unit of data is converted as follows: (☞ Page 157 Configuration of label editor)
Global label of GX Works2: "Label Name" column
Global variable name in PX Developer: "Remark" column
Comment: "Comment" column

*2 The "Remarks" column is displayed by clicking the [Detail Display] button in a label editor.

■Others

The program layout may be changed due to the differences between an FBD editor of PX Developer and an FBD/LD editor of GX Works3. In that case, correct the layout properly.

Additionally, the layout can be corrected by the layout correction function. For details on the layout correction function, refer to the following section.

☞ Page 231 Layout correction

Replacement of a GX Works2 project

Some settings for a GX Works2 project that are used in a PX Developer format project are not applied for a GX Works3 project.

The following shows the settings that are not utilized in a GX Works3 project.

■Execution order of programs

The execution order of programs is changed as follow.

• Programs in a GX Works2 project → Programs in a PX Developer project

Correct the execution order in "Program Setting" of "CPU Parameter" in a GX Works3 project as necessary.

■Others

For details on the replacement of other data, refer to the following section.

☞ Page 592 Replacement of GX Works2 format projects

Considerations in module type change

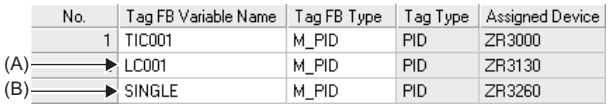
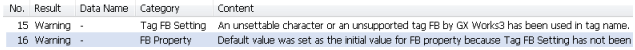
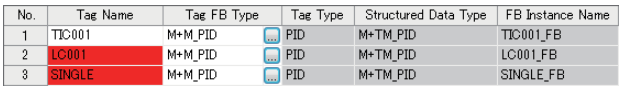
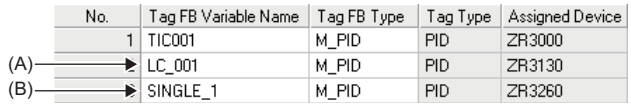
■Tag names that cannot be set in GX Works3

Some tag names set in a PX Developer format project may include characters that cannot be used for label names in GX Works3. (☞ Page 539 Unusable character string for label name)

In that case, the tag FB settings are not applied to GX Works3, and the initial FB property values are changed to their default.

To apply the initial FB property values, change the tag names in a PX Developer project in advance.

Examples of tag names that cannot be set in GX Works3 and their correction method are as follows.

Unavailable tag name	Correction method
■Tag names before changing the module type are displayed. • "Tag FB declaration" window in a PX Developer project  (A) LC001: A reserved word (device) for GX Works3 and number are used together. (B) SINGLE: A reserved word (IEC reserved word) for GX Works3 is used. ■After the module type is changed, the status will be changed as follows because tag names that cannot be used in GX Works3 have been used. The following two warning messages appear in the "Output" window.  • Category: Tag FB Setting Content: An unsettable character or an unsupported tag FB by GX Works3 has been used in tag name. Please check it through Tag FB Setting. • Category: FB Property Content: Default value was set as the initial value for FB property because Tag FB Setting has not been applied or the setting that does not reflect the initial value of FB property has been selected. When [Apply] button is clicked in the tag FB setting editor, an error occurs.  The initial values of FB properties are changed to their default.	■Correct the tag names as follows. Correct the tag names that cannot be set in GX Works3 in the "Tag FB declaration" windows of a PX Developer project. In a program where the tag FB is used, correct the variable names of the tag FB. *1 A correction example of tag names is as follows. • "Tag FB declaration" window in a PX Developer project  (A) LC_001: Add any text between the reserved word (device) for GX Works3 and the number. (B) SINGLE_01: Add any text to the reserved word (IEC reserved word) for GX Works3. ■When the module type is changed, the tag FB settings are applied and the initial FB property values are utilized.

*1 The variable name of a tag FB used in a program can be changed by editing the assignment information on a local variable sheet. For details, refer to the following manual.

PX Developer Version 1 Operating Manual (Programming Tool)

■Data name overlapping

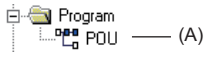
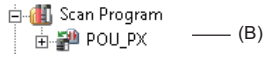
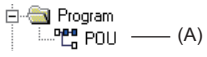
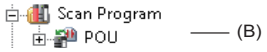
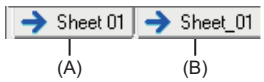
When changing the module type, the data name of a PX Developer project is changed as follows:

- '_PX' is added to the end of a data name.
- An invalid character used for a data name is changed to the underscore '_'.

Therefore, the data name may be duplicated and the module type change may be canceled.

Correct the data name of PX Developer format project, and change the module type again.

The following shows the example of duplication and the correction method.

Duplication after changing the module type	Example	Correction method
Data names of a PX Developer project and a GX Works2 project	■Data names before changing the module type are as follows: (A) PX Developer project data Data name: POU  (B) GX Works2 project data Data name: POU_PX  ■Since the data name (A) and (B) are duplicated as shown below when changing the module type, the change is canceled. Data name (A): POU_PX ('_PX' is added to the end.) Data name (B): POU_PX (No change)	■Correct the data names as follows: (A) PX Developer project data Do not change the data name. Data name: POU  (B) GX Works2 project data Delete '_PX'. Data name: POU  ■Since the data name (A) and (B) are not duplicated as shown below when changing the module type, the change is not canceled. Data name (A): POU_PX ('_PX' is added to the end.) Data name (B): POU (No change)
Data names of a PX Developer project	■Data names in a PX Developer project before changing the module type are as follows: (A) Data that an invalid character (space) is used for the data name Data name: Sheet 01 (B) Data that an invalid character is not used for the data name Data name: Sheet_01  ■Since the data name (A) and (B) are duplicated as shown below when changing the module type, the change is canceled. Data name (A): Sheet_01_PX (The invalid character is changed to '_', and '_PX' is added to the end.) Data name (B): Sheet_01_PX ('_PX' is added to the end.)	■Correct the data names as follows: (A) Data that an invalid character (space) is used for the data name Delete the invalid character (space) of the data name. Data name: Sheet01 (B) Data that an invalid character is not used for the data name Do not change the data name. Data name: Sheet_01  ■Since the data name (A) and (B) are not duplicated as shown below when changing the module type, the change is not canceled. Data name (A): Sheet01_PX ('_PX' is added to the end.) Data name (B): Sheet_01_PX ('_PX' is added to the end.)

■Label area capacity

When a PX Developer format project is opened in GX Works3, if the value of "Use Volume" exceeds that of "Total Capacity" in the "Device/Label Memory Configuration" screen, "0 K Word" may be set for "Label Area Capacity" and "Latch Label Area Capacity". (☞ Page 96 Label area capacity)

In that case, check the changes in the "Output" window, and correct "CPU Parameter" in the GX Works3 project according to the label capacity on the project.

A

Appendix 8 Considerations for Changing from FX5CPUs to RCPUs

This section explains the considerations when changing the module type from an FX5CPU to an RCPU.

Considerations before changing the module type

■Checking the security set to a project

When an element to which a block password and security key are set is included, the module type cannot be changed to an RCPU.

Delete the setting of a block password and a security key before changing the module type.

■Checking the representation recognized as X/Y devices after changing the module type.

An element such as 'X08' or 'Y0F', which is not recognized as a device in an FX5CPU, is not converted when changing the module type.

These elements are recognized as devices in an RCPU after the change. Correct them before changing the module type.

Procedure to change the module type

1. Check the project data before changing the module type. (☞ Page 610 Considerations before changing the module type)
2. Change the project used for an FX5CPU to the one used for an RCPU by changing the module type and operation mode.
3. Set the module configuration for the project after changing the module type and operation mode.
4. Set the parameter.
5. Correct the program. (☞ Page 612 Correction after changing the module type)

Replace the X/Y devices, module specification number, and instruction.

Review the program according to the system configuration after changing the module type and operation mode.

6. Check the operation on the programmable controller.

Data to be changed when changing the module type

Project data used for FX5CPU		Description
Program Function Function block	Ladder[*1]	X/Y devices are converted to hexadecimal from octal. An R device is replaced with a ZR device.
	ST	
	FBD/LD	
Program file management	Program file	Succeeded.
	FBFILE	
	FUNFILE	
Module Configuration Diagram		Returns to the default.
System Parameter	I/O Assignment Setting	Returns to the default.
CPU Parameter	Name Setting	Succeeded. When it cannot be succeeded, change the setting depending on the module type after the change to succeed.
	Operation Related Setting	
	Interrupt Settings	
	Service Processing Setting	
	File Setting	
	Memory/Device Setting	
	RAS Setting	
	Program Setting	

Project data used for FX5CPU		Description
Module Parameter	Ethernet Port	Succeeded. When it cannot be succeeded, change the setting depending on the module type after the change to succeed. Change the following settings to the defaults. • CC-Link IEF Basic setting
	485 Serial Port	Deleted.
	High Speed I/O	
	Input Response Time	
	Analog Input	
	Analog Output	
	Expansion Board	
Memory Card Parameter	Boot Setting	Succeeded. When it cannot be succeeded, change the setting depending on the module type after the change to succeed.
	Setting of File/Data Use or Not in Memory Card	
Module Information		Deleted.
Remote Password		Returns to the default.
Structured Data Types		The definition of the module label is deleted.
Label	Global Label	X/Y devices are converted to hexadecimal from octal. An R device is replaced with a ZR device. M+Global and all the data in M+Global are deleted.
	Local Label	Succeeded.
Device Memory		An S device is deleted. X/Y devices are converted to hexadecimal from octal. An R device is replaced with a ZR device. An ER device is deleted. The data of SM4096 or later are deleted. The data of SD4096 or later are deleted.
Device Comment		
Device Initial Value		A device which cannot be used for a module after changing the module type is deleted. An R device is replaced with a ZR device. The data of SD4096 or later are deleted.
Connection Destination Setting		Returns to the default.
Options		The setting value of R is changed to that of ZR in [Tool] ⇨ [Options] ⇨ "Project" ⇨ "Device Comment Reference/Reflection Target".
Print Setting		Returns to the default.

*1 An instruction of which the argument specification is different exists in the module types before and after the change. When correcting a program, note that a device used for such an instruction is not converted at the module type change.

Correction after changing the module type

■Replacing devices

I/O devices are used sequentially from the start in FX5CPUs.

In RCPUs, I/O devices are used in order from the number set to the start XY, and the number never duplicates in an X device and a Y device.

Therefore, devices need to be replaced so that the device number of X/Y devices will not duplicate.

Ex.

When the system configuration before and after changing the module type is the following:

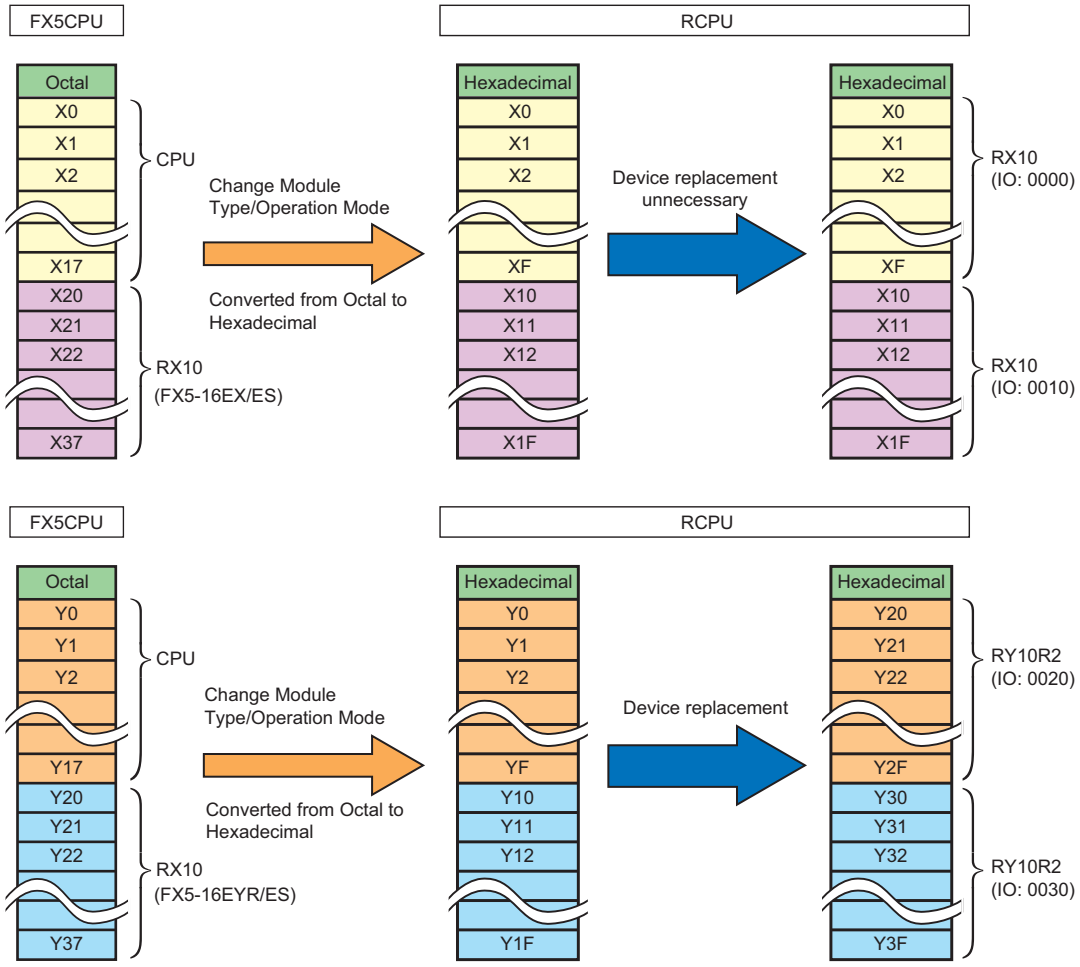
• System configuration for FX5CPUs

Model	Module type	Input	Output
FX5U-32MR/ES	CPU	16 points	16 points
FX5-16EX/ES	Input	16 points	—
FX5-16EYR/ES	Output	—	16 points
FX5-40SSC-S	Simple motion	—	—

• System configuration for RCPUs

Model	Module type	Input	Output	Start XY
R04	CPU	—	—	3E00
RX10	Input	16 points	—	0000
RX10	Input	16 points	—	0010
RY10R2	Output	—	16 points	0020
RY10R2	Output	—	16 points	0030
RD77MS4	Simple motion	32 points	32 points	0040

Correct a device number as shown below:



■Replacing module specification numbers

A module specification number can be replaced by using the Replace Device/Label function.
(Example: "U1"→"U4")

■Replacing instructions

An instruction which cannot be used for RCPUs is replaced with the one that can be used.
An instruction which cannot be used can be checked by an error occurring at conversion.

■Correcting FBD/LD programs

The number and order of I/O arguments of a function element are different in Function Block Diagram/Ladder Diagram language between FX5CPUs and RCPUs.
In this case, the element is displayed as undefined FUN. Select [Edit] ⇨ [Update FB/FUN] to update the definition information, and correct the program.

Appendix 9 Using Sample Programs

This section shows the method for using sample programs, described in manuals that can be browsed on e-Manual Viewer, in GX Works3.

To use this function, GX Works3 Version 1.035M or later and e-Manual Viewer Version 1.13P or later are required to be installed.

For the operation method of e-Manual Viewer, refer to e-Manual Viewer Help.

Procedure to use

■Label

1. Create a module label in the project, following the manual on e-Manual Viewer, and set parameters.
2. Click "Copy a label (for GX Works3)" on the manual to copy the global labels/local labels.
3. Set the item order (label name, data type, class, assignment (device/label) of the labels copied in step 2 to be the same order as ones on the label editor in GX Works3.
4. Paste the labels on the global label editor/local label editor in GX Works3.

■Ladder program

1. Click "Copy Ladder Program (for GX Works3)" on the manual to copy the ladder program.
2. Paste the program on the ladder editor in GX Works3.

Precautions

■When a label name is duplicated

An error occurs at the program conversion when a label name in a sample program and one in a project where the program is pasted are duplicated.

Copy and paste the sample program again according to the following procedure.

1. Delete the ladder program pasted from the sample program.
2. Change the label name to be duplicated on the label editor.
3. Paste the ladder program of the sample program on the ladder editor in GX Works3.
4. Change the label name used in the ladder program to the one set in the step 2.

■When an undefined label exists

In the following cases, the module labels in sample programs are pasted as undefined labels.

Check that the latest GX Works3 is installed.

- The versions of module labels differ between the sample program and GX Works3.
- GX Works3 does not support the module labels of the sample program.

Appendix 10 Troubleshooting

This section shows the errors which may occur when using GX Works3 and their corrective actions.

Symptom	Check point	Corrective action
Contents in the screen may not be displayed properly. (For example, overlapping of icons, text overflowing from the flame of a button, etc.)	Is the size of the text and/or other items in the screen changed to a value other than the default value (such as 96 DPI, 100%, and 9 pt) in Windows settings?	• Return the settings to the defaults. • For Windows 10 (version 1703 or later)*1, GX Works3 can be displayed in high DPI scaling by using a Windows 10 function*2. ❶ Select 'GXW3.exe'*3, and select [Properties] on the right-click menu. ❷ Select "Override high DPI scaling behavior. Scaling performed by:" in the [Compatibility] tab, and select "System" from the pull-down list. ❸ Click the [OK] button.
Timeout occurs while GX Works3 is accessing to a built-in Ethernet CPU in Ethernet.	Is communication with GX Works3 allowed when Windows Firewall is enabled?	For details, refer to the following section. ☞ Page 376 When communication with GX Works3 is not allowed by Windows Firewall

*1 The Windows version can be checked by the following procedure.
❶ Press Windows key + R, or select [Windows System] ⇨ [Run] from the Start menu of Windows.
❷ Enter 'winver' in the "Run" screen.
❸ Check the version in the displayed screen.

*2 The display of GX Works3 will be blurred by enlarging.
The following lists the setting values for "Change the size of text, apps, and other items" and the recommended display resolution for each setting value in Windows 10.
Setting value: 100%, display resolution: 1024 × 768 dots or more
Setting value: 125%, display resolution: 1900 × 1200 dots or more
Setting value: 150%, display resolution: 1900 × 1200 dots or more
Setting value: 175%, display resolution: 2880 × 1620 dots or more
Setting value: 200%, display resolution: 2880 × 1620 dots or more
Setting value: 225%, display resolution: 3840 × 2160 dots or more
Setting value: 250%, display resolution: 3840 × 2160 dots or more

*3 'GXW3.exe' is stored in the folder where GX Works3 has been installed.
The following is an example of a storage location.
64-bit version operating system: C:\Program Files (x86)\MELSOFT\GPPW3\GXW3.exe
32-bit version operating system: C:\Program Files\MELSOFT\GPPW3\GXW3.exe

Appendix 11 Differences with Conventional Applications

This section shows the differences from GX Works2 version 1.570U.

For details on the functions and option settings of GX Works2, refer to the following manuals.

📖GX Works2 Version 1 Operating Manual (Common)

📖GX Works2 Version 1 Operating Manual (Simple Project)

📖GX Works2 Version 1 Operating Manual (Structured Project)

For the difference with PX Developer, refer to the technical bulletin No. FA-A-0236.

For details on the functions and option settings of PX Developer, refer to the following manuals.

📖 PX Developer Version 1 Operating Manual (Programming Tool)

📖 PX Developer Version 1 Operating Manual (Monitor Tool)

Differences of functions

This section explains the differences of functions from ones of GX Works2.

List of GX Works2 functions

Function	Reference
Common function	Page 617 Common function
Label	Page 624 Label
Device comment	Page 625 Device comment
Device memory	Page 625 Device memory
Verification result	Page 627 Verification result
Sampling trace	Page 627 Sampling trace
Ladder editor	Page 628 Ladder editor
SFC diagram	Page 631 SFC diagram
SFC block list	Page 632 SFC block list
ST editor	Page 633 ST editor
Structured Ladder/FBD editor	Page 634 Structured Ladder/FBD editor
CC IE Field Configuration window	Page 636 CC IE Field Configuration window
CC-Link Configuration window	Page 637 CC-Link Configuration window
AnyWireASLINK Configuration window	Page 638 AnyWireASLINK Configuration window
Ethernet Configuration window	Page 639 Ethernet Configuration window
CC-Link IEF Basic Configuration window	Page 640 CC-Link IEF Basic Configuration window
Sensor/Device Monitor screen	Page 641 Sensor/Device Monitor screen
GX Simulator2 screen	Page 642 GX Simulator2 screen
Predefined protocol support	Page 643 Predefined protocol support

Common function

These functions can always be used regardless of the editing or setting target.

■Project

○: Similar function supported, ×: Similar function not supported

GX Works2			GX Works3	
			Supported or not	Reference/similar function
New			○	Page 85 Creating a project
Open			○	Page 87 Opening a project
Close			○	• [Project] ⇨ [Close]
Save			○	Page 106 Overwriting projects
Save As			○	Page 105 Saving projects under the specified name
Compress/Unpack	Compress		×	
	Unpack		×	
Delete			○	Page 106 Deleting a project
Verify			○	Page 116 Verifying Projects
Project Revision	Revision Entry		○	Page 122 Registering histories
	Revision List		○	Page 123 Displaying a history list
Change PLC Type			○	Page 114 Changing the Module Type and Operation Mode of Projects
Change Project Type			×	
Object	New		○	Page 108 Creating data
	Rename		○	Page 109 Changing a data name
	Delete		○	Page 110 Deleting data
	Copy		○	Page 109 Copying/pasting data
	Paste		○	
	Set as Default Connection		×	
	Property		○	Page 112 Properties
Intelligent Function Module	New Module		○	Page 141 Setting parameters for an I/O module and intelligent function module
	Delete Module		○	Page 110 Deleting data
	Property		○	Page 112 Properties
	Save the Positioning Module Data		×	
	Read from the Positioning Module Data		×	
	Save GX Configurator-QP Data		×	
	Import GX Configurator-QP Data		×	
	Intelligent Function Module Parameter List		○	Page 145 Checking/changing the number of intelligent function module parameters
	Save/Read FX Special Module Data	Read new FX Special Module Data	×	
		Save FX Special Module Data	×	
		Read from FX Special Module Data	×	
Open Other Data	Open Other Project		○	Page 89 Opening a GX Works2 format project Page 92 Opening a PX Developer format project
Export to GX Developer Format File			×	

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GX Works2		GX Works3	
		Supported or not	Reference/similar function
Library	Create	○	Page 331 Creating a library file
	Install	○	Page 335 Registering user libraries in the library list
	Export FB to Library (Project)	×*1	
	Deinstall	○	Page 335 Deleting libraries/updating display information
	Reload	○	
	Rename	×*2	
	Open	○	Page 331 Creating a library file
	Close	○	
	Change Password	○	
	Save As	○	
	Save	○	
	Help	○	Page 335 Displaying Help
Security	Change Password	○	Page 468 Changing password of logon user It is available only for a project used for RnSFCPUs and RnPSFCPUs.
	User Management	○	Page 469 User management It is available only for a project used for RnSFCPUs and RnPSFCPUs.
	Data Security Setting	×	
	Soft Security Key Management	○	Page 461 Creating/deleting security key
Print		○	Page 74 Printing Data
Print Preview		○	Page 74 Printing Data
Print Window		×	
Print Window Preview		×	
Printer Setup		○	Page 74 Printing Data
(Recently used files 1 to 4)		○	• [Project] ⇨ [Recent Projects] ⇨ [(project path used recently 1 to 10)]
Start GX Developer		○	• [Project] ⇨ [Start GX Works2]
Exit		○	Page 39 End

*1 In GX Works3, function blocks cannot be exported directly to a project.
When importing FB elements, which were exported to a library file, in a project, refer to the following section.
☞ Page 334 Enhanced use of libraries

*2 An arbitrary name can be set to a library file to be exported.
However, the file name of a imported library file cannot be changed.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Similar function
Undo	○	• [Edit] ⇨ [Undo]
Redo	○	• [Edit] ⇨ [Redo]
Cut	○	• [Edit] ⇨ [Cut]
Copy	○	• [Edit] ⇨ [Copy]
Paste	○	• [Edit] ⇨ [Paste]

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Cross Reference	○	Page 309 Displaying cross reference information
Device List	○	Page 313 Displaying Device Usage List
Find Device	○	Page 301 Searching/Replacing Devices/Labels

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Find Instruction	○	Page 303 Searching/Replacing Instructions
Find Contact or Coil	○	
Find String	○	Page 304 Searching/Replacing Character Strings
Replace Device	○	Page 301 Searching/Replacing Devices/Labels
Replace Instruction	○	Page 303 Searching/Replacing Instructions
Replace String	○	Page 304 Searching/Replacing Character Strings
Change Open/Close Contact	○	Page 306 Changing Contacts between Open Contact and Close Contact
Device Batch Replace	○	Page 307 Batch Replacing of Devices and Labels
Register to Device Batch Replace	○	• [Find/Replace] ⇨ [Register to Device Batch Replace]

■Convert/Compile

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Build	○	Page 279 Converting any or all programs
Online Program Change	○	Page 406 Writing data after changing programs partially while a CPU module is running (Online program change)
Rebuild All	○	Page 279 Converting any or all programs

■View

○: Similar function supported, ×: Similar function not supported

GX Works2			GX Works3	
			Supported or not	Reference/similar function
Toolbar	Toolbar name		○	Page 40 Main frame
	Display All		×	
Statusbar			○	Page 40 Main frame
Color and Font			○	Page 65 Checking and Changing Colors and Fonts
Docking Window	Navigation		○	Page 43 Navigation window
	Element Selection		○	Page 45 Element selection window
	Output		○	• [View] ⇨ [Docking Window] ⇨ [Output]
	Cross Reference		○	Page 309 Displaying cross reference information
	Device List		○	Page 313 Displaying Device Usage List
	Device Reference (CC-Link)		○	Page 144 Checking refresh devices assigned to modules
	Device Reference (AnyWireASLINK)		×	
	Watch 1 to 4		○	Page 434 Checking Current Values by Registering Devices/Labels
	Intelligent Function Module Monitor	Module 1 to 10	○	Page 445 Checking Current Values in Intelligent Function Module
	Intelligent Function Module Guidance		×	
	Find/Replace		○	• [View] ⇨ [Docking Window] ⇨ [Find/Replace]
	Debug	Break Point	×	
		Break Device	×	
		Skip Range	×	
	Reset the Window Position to its Default		○	Page 40 Displaying docked windows

A

■Online

○: Similar function supported, ×: Similar function not supported

GX Works2			GX Works3	
			Supported or not	Reference/similar function
Read from PLC			○	Page 390 Writing/Reading Programmable Controller Data
Write to PLC			○	
Verify with PLC			○	Page 403 Verifying Programmable Controller Data
Remote Operation			○	Page 509 Remote Operation
Redundant Operation			○	Page 511 Redundant Programmable Controller Operations
Password/Keyword	New		○	Page 476 Setting file password
	Delete		○	
	Disable		○	
Soft Security Key Management			○	Page 463 Registering a security key in a program file
PLC Memory Operation	Format PLC Memory		○	Page 517 Checking Memory Usage
	Clear PLC Memory		○	
	Arrange PLC Memory		×	
Delete PLC Data			○	Page 390 Writing/Reading Programmable Controller Data
PLC User Data	Read		○	Page 413 Reading/Writing/Deleting User Data
	Write		○	
	Delete		○	
Export to ROM Format			×	
Program Memory Batch Download			×	
Latch Data Backup	Backup		×*1	
	Delete Backup Data		×*1	
PLC Module Change	Create Backup Data		×*2	
	Restore		×*2	
Set Clock			○	Page 508 Clock Setting in a CPU Module
Register/Cancel Display Module Menu			×	
Monitor	Monitor Mode		○	Page 184 Read mode/Write mode/Monitor read mode/Monitor write mode
	Monitor (Write Mode)		○	
	Start Monitoring (All Windows)		○	Page 418 Starting/stopping monitoring
	Stop Monitoring (All Windows)		○	
	Start Monitoring		○	
	Stop Monitoring		○	
	Change Value Format (Decimal)		○	Page 418 Changing display format of word devices
	Change Value Format (Hexadecimal)		○	
	Device/Buffer Memory Batch		○	Page 431 Checking Device/Buffer Memory in Batch
	Program List		○	Page 443 Checking Processing Time of Program
	Interrupt Program List		○	Page 444 Checking Execution Counts of Interrupt Programs
	Change Instance (Function Block)		×	
	SFC All Block Batch Monitoring		○	Page 430 Monitoring all SFC blocks in batch/active steps
	SFC Auto Scroll		○	Page 428 Monitoring with the SFC auto-scroll
Watch	Start Watching		○	Page 434 Checking Current Values by Registering Devices/Labels
	Stop Watching		○	
	Insert Next Object		×	
	Display Format of Bit Device	Number Display	×	
		ON/OFF Display	×	
		Symbol Display	×	
	Register to Watch		○	Page 434 Checking Current Values by Registering Devices/Labels

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Local Device Batch Read + Save CSV	×	

*1 It is a function of RnCPUs.
For details, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

*2 It is a function of RnPCPUs.
For details, refer to the following manual.
MELSEC iQ-R CPU Module User's Manual (Application)

■Debug

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Start/Stop Simulation		○	Page 345 Simulation
Instructions Unsupported by Simulation		×	
Modify Value		○	Page 417 Changing current values
Forced Input Output Registration/Cancellation		○	Page 438 Turning Input/Output Device ON/OFF Forcibly
Device Test with Execution Condition	Register	×	
	Registration Check/Disable	×	
	Batch Disable	×	
Sampling trace	Open Sampling Trace	×*1	
Scan Time Measurement		×	
Step Execution	Stop	×	
	Cancel	×	
	Break Execution	×	
	Step Execution	×	
	Execution Option	×	
Break Setting	Set/Cancel Break Point	×	
	Enable/Disable Break Point	×	
	Cancel All Break Points	×	
	Break Point Window	×	
	Cancel All Break Devices	×	
	Break Device Window	×	
Skip Setting	Set/Cancel Skip Range	×	
	Enable/Disable Skip Range	×	
	Cancel All Skip Ranges	×	
	Skip Range Window	×	

*1 GX Works3 does not have a similar function. Use the following functions instead.
Data logging function (CPU Module Logging Configuration Tool)
Realtime monitor function (GX LogViewer)

■Diagnostics

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
PLC Diagnostics	○	Page 483 Module Diagnostic
Ethernet Diagnostics	○	Page 485 Ethernet diagnostic
CC IE Control Diagnostics	○	Page 486 CC-Link IE Controller Network diagnostic
CC IE Field Diagnostics	○	Page 488 CC-Link IE Field Network diagnostic
CC-Link IEF Basic Diagnostics	○	Page 489 CC-Link IE Field Network Basic diagnostic
MELSECNET Diagnostics	○	Page 490 MELSECNET diagnostic
CC-Link Diagnostics	○	Page 491 CC-Link diagnostic
Sensor/Device Monitor	○	Page 482 Sensor/Device Status Check
System Monitor	○	Page 480 Module Status Check of a System
Online Module Change	×	

■Tool

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
IC Memory Card	Read IC Memory Card	○	Page 415 Writing to/Reading from a memory card
	Write IC Memory Card	○	
	Read from IC Memory Card (Edit and Data Copy)	×	
	Write to IC Memory Card (Edit and Data Copy)	×	
	Read from IC Memory Card (Edit and Data Copy)	×	
	Write to IC Memory Card (Edit and Data Copy)	×	
Check Program		○	Page 277 Program check
Check Parameter		○	Page 138 Checking parameters
Clear All Parameters		×	
Check Device Duplication of Global Label		×	
Device/Label Automatic-Assign Setting		×	
Block Password		○	Page 457 Setting block password
Confirm Memory Size		○	Page 288 Calculating Memory Size
Delete Unused Device Comment		○	Page 272 Deleting unused device comments
Merge Data		×	
Set TEL Data/Connect via Modem	Line Connection	×	
	Line Disconnection	×	
	AT Command Registration	×	
	Phone Book	×	
	Options	×	
Logging Configuration Tool		○	Page 501 Data Logging Function
Real-time Monitor Function		○	Page 447 Checking Current Logging Data
Ethernet Adapter Module Configuration Tool		×	
Built-in I/O Module Tool	Positioning Monitor	×	
	High-Speed Counter Monitor	×	
	I/O Monitor	×	
Check Intelligent Function Module Parameter	Check Auto Refresh Duplication	○	Page 138 Checking parameters
Intelligent Function Module Tool		○	Page 148 Displaying the module tool list
Predefined Protocol Support Function		○	Page 150 Predefined Protocol Support Function
Language Selection		×*1	
Profile Management	Register	○	Page 125 Managing Profiles
	Delete	○	
Key Customize		○	Page 64 Checking and Changing Shortcut Keys
Options		○	Page 67 Option Setting for Each Function

*1 GX Works3 supports multiple languages, and therefore the display language such as one on the menu can be switched on a personal computer.
For details, refer to the section.
☞ Page 39 Display Language Switching

■Window

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Cascade	○	• [Window] ⇨ [Cascade]
Tile Vertically	○	• [Window] ⇨ [Tile Vertically]
Tile Horizontally	○	• [Window] ⇨ [Tile Horizontally]
Arrange Icons	○	• [Window] ⇨ [Arrange Icons]
Close All	○	• [Window] ⇨ [Close All Windows]
(Switch to other window)	○	• [Window] ⇨ [(Window information being displayed)]
Other Window	○	Page 41 Arranging work windows

■Help

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
GX Works2 Help	○	Page 36 Displaying Help
Connection to MITSUBISHI ELECTRIC FA Global Website	○	Page 36 Connecting to MITSUBISHI ELECTRIC FA Global Website
About	○	Page 36 Checking the version of GX Works3

Label

The following table shows the functions available for setting and editing labels.

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Delete		○	—
Select All		○	
New Declaration (Before)		○	Page 158 Editing a row
New Declaration (After)		○	
Delete Row		○	
Read from CSV File		○	Page 167 Importing/exporting files
Write to CSV File		○	
System Label	Reservation to Register System Label	○	Page 174 Registering labels in system label database
	Reservation to Release System Label	○	Page 174 Releasing system labels
	Import System Label	○	Page 174 Importing system labels in system label database to GX Works3
	Reflect to System Label Database	○	Page 174 Registering labels in system label database
	Confirm Update of System Label Database	○	Page 175 Importing the changes of system label database
	Execute Verification Synchronous with System Label	○	Page 175 Verifying system label information
Sort		○	Page 158 Sorting labels
Unused label list		○	Page 312 Displaying a list of unused labels

Device comment

The following table shows the functions available for editing device comments.

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Delete	○	—
Select All	○	
Import from Sample Comment	○	Page 275 Reading sample comments
Clear All (All Devices)	○	Page 272 Clearing all device comments
Clear All (All Displayed Devices)	○	
Read from CSV File	○	Page 206 Importing/exporting ladder programs
Write to CSV File	○	
Hide Bit Specification Information	○	• [Edit] ⇨ [Hide All Bit Specification Information]
Show Bit Specification Information	○	• [Edit] ⇨ [Show All Bit Specification Information]
Cut The Range including Hidden Bit Specification Information	○	Page 271 Creating device comments
Copy The Range including Hidden Bit Specification Information	○	
Paste The Range including Hidden Bit Specification Information	○	

Device memory

The following table shows the functions available for setting the device memory.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Delete	○	—
Insert Row	×	
Input Device	×	
Paste Text	○	Page 293 Setting character strings
FILL	○	Page 292 Setting values in batch

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3
	Supported or not
Find Device Cell	×

■View

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Similar function
Display Mode	○	• [View] ⇨ [Display Format Detailed Setting]
Register	○	• [View] ⇨ [Display Format Detailed Setting]
Setup	×	

■Tool

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3
	Supported or not
Read Device Memory from PLC	×
Write Device Memory to PLC	×
Read from Excel File	×
Write to Excel File	×

Verification result

The following table shows the functions available while a verification result is displayed.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Write to CSV File	○	Page 121 Exporting data to file

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Next Unmatch	○	Page 118 Checking a verification result
Previous Unmatch	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Return to Result List	○	• [View] ⇨ [Return to Result List]
Close Detail Result	○	• [View] ⇨ [Close Detailed Result]
Close All Detail Result	○	• [View] ⇨ [Close All Detailed Result]

Sampling trace

GX Works3 does not have a similar function. Use the following functions instead.

Function	Reference
Data logging	MELSEC iQ-R CPU Module User's Manual (Application)
Realtime monitor	GX LogViewer Version 1 Operating Manual

Ladder editor

The following table shows the functions available for editing data in the ladder editor.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2			GX Works3	
			Supported or not	Reference/similar function
Continuous Paste			○	Page 201 Pasting device number/label name consecutively
Delete			○	—
Restore After Ladder Conversion			○	Page 201 Returning ladder diagrams to the condition before editing
Insert Row			○	• [Edit] ⇨ [Insert Row]/[Delete Row]/[Insert Column]/[Delete Column]
Delete Row			○	
Insert Column			○	
Delete Column			○	
NOP Batch Insert			○	Page 199 Inserting/deleting NOP instruction
NOP Batch Delete			○	
Edit Line			×*1	
Delete Line			×*1	
Change TC Setting			○	Page 199 Changing TC setting values
Ladder Edit Mode	Read Mode		○	Page 184 Read mode/Write mode/Monitor read mode/Monitor write mode
	Write Mode		○	
Ladder Symbol	Open Contact		○	Page 185 Entering ladders
	Close Contact		○	
	Open Branch		○	
	Close Branch		○	
	Coil		○	
	Application Instruction		○	
	Vertical Line		○	
	Horizontal Line		○	
	Delete Vertical Line		○	
	Delete Horizontal Line		○	
	Pulse Contact Symbol	Rising Pulse	○	
		Falling Pulse	○	
		Rising Pulse Branch	○	
		Falling Pulse Branch	○	
		Rising Pulse Close	○	
		Falling Pulse Close	○	
		Rising Pulse Close Branch	○	
		Falling Pulse Close Branch	○	
	Invert Operation Results		○	• [Edit] ⇨ [Ladder Symbol] ⇨ [Invert Operation Results]/[Operation Result Rising Pulse]/[Operation Result Falling Pulse]
	Operation Result Rising Pulse		○	
	Operation Result Falling Pulse		○	
Inline Structured Text	Insert Inline Structured Text Box		○	Page 192 Inserting inline structured text
	Display Template		○	Page 221 Displaying syntax templates
	Mark Template (Left)		○	
	Mark Template (Right)		○	
Edit FB Instance			○	Page 188 Editing FB instance names

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Documentation	Device Comment	○	Page 194 Entering/editing comments
	Statement	○	Page 195 Entering/editing statements
	Note	○	Page 198 Entering/editing notes
	Statement/Note Batch Edit	○	Page 195 Entering/editing statements Page 198 Entering/editing notes
Easy Edit	Connect Line to Right-Side Symbol	○	• [Edit] ⇨ [Easy Edit] ⇨ [Connect Horizontal Line to Right-Side Ladder Symbol]
	Connect Line to Left-Side Symbol	○	• [Edit] ⇨ [Easy Edit] ⇨ [Connect Horizontal Line to Left-Side Ladder Symbol]
	Enter/Delete HLine Rightward	○	• [Edit] ⇨ [Easy Edit] ⇨ [Enter/Delete Horizontal Line to Rightward]
	Enter/Delete HLine Leftward	○	• [Edit] ⇨ [Easy Edit] ⇨ [Enter/Delete Horizontal Line to Leftward]
	Enter/Delete VLine Downward	○	• [Edit] ⇨ [Easy Edit] ⇨ [Enter/Delete Vertical Line to Downward]
	Enter/Delete VLine Upward	○	• [Edit] ⇨ [Easy Edit] ⇨ [Enter/Delete Vertical Line to Upward]
	Switch Open/Close Contact	○	Page 186 Switching methods for contacts/instructions
	Switch Statement/Note Type	○	• [Edit] ⇨ [Easy Edit] ⇨ [Switch Statement/Note Type]
	Instruction Partial Edit	○	• [Edit] ⇨ [Easy Edit] ⇨ [Instruction Partial Edit]
	Edit List for Ladder Block	×	
Read from CSV File		○	Page 207 Importing CSV files
Write to CSV File		○	Page 209 Exporting to a CSV file

*1 In GX Works3, a line can be drawn with the shortcut keys (Ctrl+←/→/↑/↓) (☞ Page 186 Drawing a line)

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Change Module I/O No.	×	
Switch Statement/Note Type	×	
Line Statement List	○	Page 196 Displaying a list
Jump	○	Page 205 Jump
Jump to Next Ladder Block Start	○	• [Find/Replace] ⇨ [Jump to Next Ladder Block Start]
Jump to Previous Ladder Block Start	○	• [Find/Replace] ⇨ [Jump to Previous Ladder Block Start]
Next Device	×	
Next Contact	×	
Next Coil	×	
Back	○	• [Find/Replace] ⇨ [Previous]/[Next]

■Online

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3
		Supported or not
Monitor	Monitor Condition Setting	×
	Monitor Stop Condition Setting	×
	Entry Ladder Monitor	×
	Delete All Entry Ladder	×

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Comment		○	Page 194 Entering/editing comments
Statement		○	Page 195 Entering/editing statements
Note		○	Page 198 Entering/editing notes
Display Lines of Monitored Current Value		○	• [View] ⇨ [Display Lines of Monitored Current Value]
Display Format for Device Comment		○	• [View] ⇨ [Display Format for Device Comment]
Display Ladder Block	Hide Ladder Block	×*1	
	Display Ladder Block	×*1	
	Hide All Ladder Block	×*1	
	Display All Ladder Block	×*1	
Device Display	Device Display	×	
	Batch Device Display	○	Page 182 Configuration of the ladder editor
	Cancel All Device Display	○	
Display Compile Result		×	
Zoom		○	• [View] ⇨ [Zoom] ⇨ [Set Zoom Factor]/[Zoom In]/[Zoom Out]/[Fit the editor width to the window width]
Text Size	Bigger	○	Page 65 Checking and Changing Colors and Fonts The text size can be changed in the following menu of each editor. • [View] ⇨ [Text Size] ⇨ [Bigger]/[Smaller]
	Smaller	○	
Open Other Window	Open Reference Window	×	
	Update Reference Window	×	
	Open Reference Source Window	×	
	Tile FB Horizontally	○	• [View] ⇨ [Open Program Body of Selected Element] ⇨ [Tile Horizontally]
	Open Label Setting	○	• [View] ⇨ [Open Label Setting] ⇨ [Open in Front]
	Open Zoom SFC Block	○	Page 263 Creating/displaying Zooms (action/transition)
Move SFC Cursor	Up	×	
	Down	×	
	Left	×	
	Right	×	
Open Instruction Help		○	Page 205 Displaying instruction help

*1 The display status of ladder blocks in the ladder editor can be changed in the following menu.
[View] ⇨ [Outline] ⇨ [Expand/Collapse of Outlines]/[Expand/Collapse of All Outlines]/[Show/Hide of Outlines]

SFC diagram

The following table shows the functions available for editing SFC diagrams.

By comparing with GX Works2, the functions are enhanced and their operability have been improved.

For the editing method, refer to the following section.

☞ Page 240 Creating an SFC Program

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Delete		○	—
Arrange SFC		×	
Change TC Setting		○	Page 199 Changing TC setting values
Ladder Edit Mode	Read Mode	×	
	Write Mode	×	
SFC Step Attribute	No Attribute	○	Page 246 Changing a step name/step No./step attribute/step attribute target
	Stored Coil	○	
	Stored Operation (without Transition Check)	○	
	Stored Operation (with Transition Check)	○	
	Reset	○	
Sort SFC Step No.		×	
Documentation	SFC Step/Transition Comment	×	

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3
	Supported or not
Jump	×
Find Jump Step	×
Change SFC Step No.	×

■Convert/Compile

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Convert Block	○	Page 262 Converting a block

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Program Display		×	
SFC Step/Transition Comment		○	Page 241 Configuration of SFC diagram editor
Zoom		○	• [View] ⇨ [Zoom] ⇨ [Set Zoom Factor]/[Zoom In]/[Zoom Out]
Text Size	Bigger	×	
	Smaller	×	
SFC Column Setting		×	
Open SFC Blocklist		○	Page 265 Displaying an SFC block list
MELSAP3 Display		○	Page 244 Display format of action/transition
MELSAP-L (Instruction Format) Display		○	
MELSAP-L (Start Conditions Format) Display		×	
Open Zoom/Start Destination Block		○	Page 241 Configuration of SFC diagram editor
Back to Start SFC Block		○	Page 246 Creating a step that makes another block activated
Open Header		○	Page 266 Displaying local label editor
Reset the Window Position to its Default		×	

■Online

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3
		Supported or not
Monitor	Monitor Condition Setting	×
	Monitor Stop Condition Setting	×

SFC block list

The following table shows the functions available for editing the SFC block list.

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Jump	○	Page 266 Jump
Find Block Number	×	
Block Information Find Device	○	Page 266 Searching for block information

■View

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
SFC Block List Comment	○	Page 265 Displaying an SFC block list
Device Display	○	
Open SFC Body	○	Page 266 Displaying SFC diagrams
Open Header	○	Page 266 Displaying local label editor

ST editor

The following table shows the functions available for editing data in the ST editor.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Delete	○	—
List Operands	×	
Display Template	○	Page 221 Displaying syntax templates
Mark Template (Left)	○	
Mark Template (Right)	○	

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Jump		○	Page 222 Jump
Bookmark	Toggle Bookmark	×	
	Bookmark List	×	
	Next Bookmark	×	
	Previous Bookmark	×	
	Delete All Bookmarks	×	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Display Compile Result		×	
Zoom	Set Zoom Factor	○	• [View] ⇨ [Zoom] ⇨ [Set Zoom Factor]
	Increase Zoom	○	• [View] ⇨ [Zoom] ⇨ [Zoom In]
	Decrease Zoom	○	• [View] ⇨ [Zoom] ⇨ [Zoom Out]
Zoom Header/Body	Header	○	• [View] ⇨ [Open Label Setting of Selected Element] ⇨ [Open in Front]
	Body	○	• [View] ⇨ [Open Program of Selected Element] ⇨ [Open in Front]
Open Header		○	• [View] ⇨ [Open Label Setting] ⇨ [Open in Front]

■Online

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Monitor	Start Monitoring	○	Page 424 Monitor
	Start Monitor (bit type only)	×	

Structured Ladder/FBD editor

The following table shows the functions available for editing data in the Structured Ladder/FBD editor.

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Delete		○	—
Select Mode		○	Contacts/coils can always be placed when the editor is in the 'Write' mode.
Interconnect Mode		○	Lines can always be drawn when the editor is in the 'Write' mode.
Guided Mode	Guided Editing	×	
	Overwrite Mode	×	
	Insert Mode	×	
	Line Mode	×	
	Auto Comment	×	
Auto Connect		○	• [Edit] ⇨ [Edit Mode] ⇨ [Element Auto-connect]
Recalculate Line		○	Lines are always be arranged automatically when the editor is in the 'Write' mode. Page 231 Correcting layout in an FBD network block Page 231 Correcting layout in an FBD network block in a batch
Insert Row		○	Page 231 Layout correction
Insert Column		○	
New Ladder Block List	Top	×	
	Before	×	
	After	×	
	Bottom	×	
Input Instruction		○	In GX Works2, enter an instruction in "Input Instruction" screen. In GX Works3, instructions can be entered directly in the editor.
Ladder Symbol	Open Contact	○	Page 228 Inserting from the menu or on the toolbar
	Close Contact	○	
	Coil	○	
	Jump	○	
	Return	○	
	Open Branch	○	
	Close Branch	○	
	Input Label	○	
	Output Label	○	
	Horizontal Line Segment	×	
	Vertical Line Segment	×	
	Rising Pulse	○	Page 228 Inserting from the menu or on the toolbar
	Falling Pulse	○	
	Rising Pulse Close	○	
	Falling Pulse Close	○	
	Comment	○	
	Ladder Block Label	○	
	Left Power Rail	○	
List Operands		○	• [Edit] ⇨ [Change Name]
Number of Pins	Increment	○	Page 230 Adding/deleting arguments
	Delete	○	

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Ladder Block List		○	Page 238 Displaying FBD network blocks in a list
Signal Configuration	Configure	○	Page 228 Switching methods for contacts/instructions
	Toggle	○	

■Find/Replace

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Jump	○	Page 238 Displaying FBD network blocks in a list

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
View Mode	Label	○	Labels used in programs are always displayed with their label names.
	Device	×	
	Address	×	
	Comment	×	
	Change Label-Device-Address Mode	×	
	Change Label-Comment Mode	×	
	Change I/O Label-Comment Mode	×	
Add Label Display Items	Device	○	Page 223 Configuration of FBD/LD editor
	Address	×	
	Label Comment	○	Page 223 Configuration of FBD/LD editor
	Device Comment	○	
All Device Display		×	
Cancel All Device Display		×	
Grid		○	Page 223 Configuration of FBD/LD editor
Print Wrap Position		○	• [View] ⇨ [Display Page Break]
Display Compile Result		×	
Zoom	Set Zoom Factor	○	• [View] ⇨ [Zoom] ⇨ [Set Zoom Factor]
	Increase Zoom	○	• [View] ⇨ [Zoom] ⇨ [Zoom In]
	Decrease Zoom	○	• [View] ⇨ [Zoom] ⇨ [Zoom Out]
Zoom Header/Body	Header	○	• [View] ⇨ [Open Label Setting of Selected Element]
	Body	○	• [View] ⇨ [Open Program Body of Selected Element]
Open Header		○	• [View] ⇨ [Open Label Setting]

CC IE Field Configuration window

The following table shows the functions available while the "CC IE Field Configuration" window is displayed.

■CC IE Field configuration

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Change Module	Replace General CC IE Field Module	○	Page 142 Setting network configuration and target devices
	Change to General CC IE Field Module	○	
Change Transmission Path Method	Line/Star	○	
	Ring	○	
Supplementary Setting		○	"Navigation" window • "Module Parameter" ⇨ "Basic Settings" ⇨ "Network Topology" • "Module Parameter" ⇨ "Basic Settings" ⇨ "Operation of Master Station after Reconnection" • "Module Parameter" ⇨ "Application Settings" ⇨ "Supplementary Cyclic Settings"
Equal Assignment		○	—
Identical Point Assignment		○	
Open System Configuration	Open AnyWireASLINK Configuration	×	
Check	System Configuration	○	—
Online	Detect Now	○	
	Parameter Processing of Slave Station	○	
	Command Execution of Slave Station	○	
Close with Discarding the Setting		○	
Close with Reflecting the Setting		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Copy	○	—
Paste	○	
Select All	○	
Delete	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Module List	○	—
	Output	○	
	Supplementary Information	×	

CC-Link Configuration window

The following table shows the functions available while the "CC-Link Configuration" window is displayed.

■CC-Link Configuration

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Change Module	Replace General CC-Link Module	○	Page 142 Setting network configuration and target devices
	Change to General CC-Link Module	○	
Open System Configuration	Open AnyWireASLINK Configuration	○	
Check	System Configuration	○	—
Online	Detect Now	○	
	Verification of the Configuration with the Connected Module	×	
	Parameter Processing of Slave Station	○	—
	Command Execution of Slave Station	○	
	Backup Slave Station	○	
	Restore Slave Station	○	
Close with Discarding the Setting		○	
Close with Reflecting the Setting		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Copy	○	—
Paste	○	
Select All	○	
Delete	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Module List	○	—
	Output	○	
	Verify Result	×	

A

AnyWireASLINK Configuration window

The following table shows the functions available while the "AnyWireASLINK Configuration" window is displayed.

■AnyWireASLINK Configuration

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Change Module	Replace General AnyWireASLINK Module	○	Page 142 Setting network configuration and target devices
	Change to General AnyWireASLINK Module	○	
Address Auto-Input		○	
Check	System Configuration	○	
Online	Detect Now	○	
	Verification of the Configuration with the Connected Module	×	
	Parameter Processing of Slave Module	○	—
	Backup Slave Module	○	
	Restore Slave Module	○	
Close with Discarding the Setting		○	
Close with Saving the Setting		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Copy	○	—
Paste	○	
Select All	○	
Delete	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Module List	○	—
	Output	○	
	Verify Result	×	

Ethernet Configuration window

The following table shows the functions available while the "Ethernet Configuration" window is displayed.

The settings of a network configuration and a target device in GX Works3 is set in the configuration setting screen. (☞ Page 142 Setting network configuration and target devices)

For details on the settings, refer to each user's manual.

■Ethernet Configuration

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Change Module	Replace General SLMP Module	○	Page 142 Setting network configuration and target devices
	Change to General SLMP Module	○	
Check	System Configuration	○	
Online	Detect Now	○	
	Communication Setting Reflection of Ethernet Device	○	
	Parameter Processing of Ethernet Device	○	
	Backup Ethernet Device	○	—
	Restore Ethernet Device	○	
Close with Discarding the Setting		○	
Close with Reflecting the Setting		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Copy	○	—
Paste	○	
Select All	○	
Delete	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Module List	○	—
	Output	○	

CC-Link IEF Basic Configuration window

The following table shows the functions available while the "CC-Link IEF Basic Configuration" window is displayed.

■CC-Link IEF Basic Configuration

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Change Module	Replace CC-Link IEF Basic Connected Module	○	Page 142 Setting network configuration and target devices
	Change to CC-Link IEF Basic Connected Module	○	
Link Scan Setting		○	
Check	System Configuration	○	
Online	Detect Now	○	
	Communication Setting Reflection of Slave Station	○	
	Parameter Processing of Slave Station	○	
Close with Discarding the Setting		○	
Close with Reflecting the Setting		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Copy	○	—
Paste	○	
Select All	○	
Delete	○	

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Module List	○	—
	Output	○	

Sensor/Device Monitor screen

The following table shows the functions available while the "Sensor/Device Monitor" screen is displayed.

■Sensor/Device Monitor

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3
		Supported or not
Open System Configuration	Open AnyWireASLINK Configuration	×

■View

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
Docking Window	Monitor Information	○	Page 482 Sensor/Device Status Check

■Online (CC-Link IE Field Network)

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Parameter Processing of Slave Station	○	—
Command Execution of Slave Station	○	
Start Monitoring	○	
Stop Monitoring	○	

■Online (CC-Link)

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/Similar function
Parameter Processing of Slave Station	○	Page 482 Sensor/Device Status Check
Command Execution of Slave Station	○	
Backup Slave Station	○	
Restore Slave Station	○	
Start Monitoring	○	
Stop Monitoring	○	

■Online (AnyWireASLINK)

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Parameter Processing of Slave Module	○	Page 482 Sensor/Device Status Check
Backup Slave Module	○	
Restore Slave Module	○	
Start Monitoring	○	
Stop Monitoring	○	

■Online (Ethernet)

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/Similar function
Parameter Processing of Ethernet Device	○	Page 482 Sensor/Device Status Check
Backup Ethernet Device	○	
Restore Ethernet Device	○	
Start Monitoring	○	
Stop Monitoring	○	

GX Simulator2 screen

The following table shows the functions available while "GX Simulator2" screen is displayed.

■Tool

○: Similar function supported, ×: Similar function not supported

GX Simulator2		GX Simulator3	
		Supported or not	Reference/similar function
Backup Device Memory in Simulation	Save	○	The device memory of GX Simulator3 can be read and written in the following menu. • [Online] ⇨ [Read from PLC] • [Online] ⇨ [Write to PLC]
	Read	○	
I/O System Setting		○	Page 361 Simulation of External Device Operations

■Options

○: Similar function supported, ×: Similar function not supported

GX Simulator2	GX Simulator3
	Supported or not
Start in minimized status	×
Save device memory at stop	×

Predefined protocol support

The following tables show the functions available while the predefined protocol support function is used.

■File

○: Similar function supported, ×: Similar function not supported

GX Works2		GX Works3	
		Supported or not	Reference/similar function
New		○	Page 150 Predefined Protocol Support Function
Open		○	
Close		○	
Save		○	
Save As		○	
Open Other Data	Serial Communication Module Format	×	
	Ethernet Module Format	×	
	Built-in/Adapter Serial Format	×	
	Built-in Ethernet Format	×	
Print		○	—
Exit		○	

■Edit

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Add Protocol	○	Page 150 Predefined Protocol Support Function
Change to Editable Protocol	○	
Protocol Detailed Setting	○	
Add Receive Packet	○	
Delete	○	
Copy	○	
Paste	○	
Delete Multiple Protocols	○	
Copy Multiple Protocols	○	
Paste Multiple Protocols	○	
Device Batch Setting	○	
Save User Protocol Library	○	

■Module Read/Write

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Read from Module	○	—
Write to Module	○	
Module Verification	○	

A

■Tool

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Setting Device List	○	—
Register Predefined Protocol Library	○	

■Debug

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Module Selection	○	—
Protocol Execution Log	○	
State Monitor	×	

■Window

○: Similar function supported, ×: Similar function not supported

GX Works2	GX Works3	
	Supported or not	Reference/similar function
Cascade	○	—
Tile Horizontally	○	
(Switch to other window)	○	

Differences of option settings

This section explains the differences of option settings from ones of GX Works2.

Note that the option settings of GX Works3 can be set in the "Options" screen ([Tool]] ⇨ [Options]).

For details, refer to the following section.

☞ Page 67 Option Setting for Each Function

List of GX Works2 option settings

Item		Reference
Project	Common Setting	Page 646 Common Setting
	Automatic Save	Page 646 Automatic Save
	Change history	Page 646 Change history
Program Editor	All Editors	Page 647 All Editors
	Structured Ladder/FBD/ST	Page 647 Structured Ladder/FBD/ST
	Structured Ladder/FBD	Page 648 Structured Ladder/FBD
	ST	Page 648 ST
	Ladder/SFC	Page 649 Ladder/SFC
	Ladder	Page 650 Ladder
	SFC	Page 651 SFC
Device Comment Editor		Page 652 Device Comment Editor
Device Memory Editor		Page 652 Device Memory Editor
Label Setting Editor		Page 652 Label Setting Editor
Parameter		Page 652 Parameter
Monitor	Common	Page 653 Common
	Structured Ladder/FBD/ST	Page 653 Structured Ladder/FBD/ST
	Ladder/SFC	Page 653 Ladder/SFC
	Ladder	Page 653 Ladder
	SFC	Page 654 SFC
PLC Read/Write		Page 654 PLC Read/Write
Online Change		Page 654 Online Change
Symbolic Information		Page 654 Symbolic Information
Save Destination of Device Comment		Page 655 Save Destination of Device Comment
Compile	Basic Setting	Page 656 Basic Setting
	Output Result	Page 656 Output Result
	Ladder/SFC	Page 656 Ladder/SFC
	Structured Ladder/FBD/ST	Page 656 Structured Ladder/FBD/ST
Intelligent Function Module	QD75/LD75 type positioning	Page 657 QD75/LD75 Type Positioning
	Guidance	Page 657 Guidance
iQ Works Interaction		Page 657 iQ Works Interaction
System Label Setting		Page 657 System Label Setting
Sampling Trace		Page 657 Sampling trace

Project

■Common Setting

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Automatically change language according to system	○	• "Edit" ⇨ "Language" ⇨ "Automatically change language according to system"
Use Dedicated Instruction for GX Developer, GX IEC Developer	×	
Connect directly to PLC on creating a new project	×	

■Automatic Save

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Save project after compiling	○	• "Project" ⇨ "Auto-save" ⇨ "Save project after conversion"
Save project after writing to PLC	○	• "Project" ⇨ "Auto-save" ⇨ "Save project after Write to PLC"
Save project after online change	○	• "Project" ⇨ "Auto-save" ⇨ "Save project after Online Program Change"
Save project after changes in TC setting values are written to PLC	○	• "Project" ⇨ "Auto-save" ⇨ "Save project after changing TC Setting Value and writing to PLC"

■Change history

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Revision is not Registered when Save Project	×
Revision is Registered when Save Project	×
Display confirmation message showing whether to register history	×
Automatically set revision titles	×

Program Editor

■All Editors

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Device Comment	Program/Program File Name	○	• "Project" ⇨ "Device Comment Reference/Reflection Target" ⇨ "(program/program file name)"
	Specify the Reference/Reflection Target	○	• "Project" ⇨ "Device Comment Reference/Reflection Target"
	Reference/Reflect the other, when device comment is not set	○	• "Project" ⇨ "Device Comment Reference/Reflection Target" ⇨ "Reference/Reflection Target for Device Comment" ⇨ "Reference/Reflect the Other Device Comment When Setting Device Comment"
	[Apply to all programs] button	×	
	[Global] button	○	• "Project" ⇨ "Device Comment Reference/Reflection Target" ⇨ "(program/program file name)" Select 'Common' for the application and reference destinations of device comments for each device.
	[Local] button	○	• "Project" ⇨ "Device Comment Reference/Reflection Target" ⇨ "(program/program file name)" Select 'Each Program' or the application and reference destinations of device comments for each device.
	[PLC Parameter Setting] button	×	

■Structured Ladder/FBD/ST

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Tool Hint	Monitored Value	×	• "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Tool Hint" ⇨"Display Item in Tool Hint"
	Class	○	
	Device	○	
	Address	×	
	Device Comment	○	
	Data Type	○	
	Constant Value	○	
	Label Comment	○	
	Remark	×	
	Tool Hint Display Format	×	

A

■Structured Ladder/FBD

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Label	Display label name/comment of contact or coil in multiline	○	• Comment: "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Comment" ⇨ "Display Format" ⇨ "Number of Rows" • Label name: "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Element (Ladder Symbol)" ⇨ "Display Format" ⇨ "Numbers of Wrapping Rows for Device/Label Name"
	Device	○	• "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Element (Ladder Symbol)" ⇨ "Display Format" ⇨ "Display Labels and Devices"
	Address	×	
	Label Comment	○	• "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Comment" ⇨ "Display Item" ⇨ "Display Label/Device Comment"
	Device Comment	○	
	Declare new label name	○	• "Program Editor" ⇨ "FBD/LD Editor" ⇨ "Enter Element" ⇨ "Operational Setting" ⇨ "Open undefined label registration window at element entry"
FB/FUN	Wrap instance name for function block	×	
	Specify the number of enable characters for label name/comment	×	
	Automatic input/output labels	×	
	Automatic ENO labels	×	
	Automatically Add Output Variable to VAR_IN_OUT	×	
	Pin overwrites	×	
	Double clicking opens header	○	• "Program Editor" ⇨ "FBD/LD Editor" ⇨ "FB/FUN" ⇨ "Operational Setting" ⇨ "Parameter of Double Clicking"
	Double clicking opens body	○	
Guided	Ladder Wrapping	×	
	Return Contacts	×	
	Open Structured Ladder/FBD Editor in guided mode	×	
	Allow hotkey repeater	×	
	Enter label names after contacts and coils	×	
	Auto Comment Block Width	×	

■ST

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Auto Indention	○	• "Program Editor" ⇨ "ST Editor" ⇨ "Edit Operation" ⇨ "Automatic Indention"
Instruction/label name prediction	○	• "Edit" ⇨ "Instruction/Device/Label Candidacy Display" ⇨ "Operational Setting" ⇨ "Instruction/Device/Label name Prediction" The setting is applied to all program editors.
Tabulator Length	○	• "Program Editor" ⇨ "ST Editor" ⇨ "Edit Operation" ⇨ "Tabulator Length"

■Ladder/SFC

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Enter ladder	Check duplicated coil	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter ladder" ⇨ "Operational Setting" ⇨ "Check Duplicated Coil"
	Enter label comment and device comment	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter ladder" ⇨ "Operational Setting" ⇨ "Enter label comment and device comment"
	Do not leave the Device/Label Comment field editing status	×	
	Do not display note in ladder input window when edit coil instructions	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter ladder" ⇨ "Operational Setting" ⇨ "Display Note in Ladder Input Window When Editing Coil Instructions"
	Check special relay/special register compatible with A-PLC	×	
	Display available instruction tool hints in entering instruction	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter ladder" ⇨ "Display Setting" ⇨ "Display tool hint of instruction when entering instruction"
	Display available instructions in entering instruction	○	• "Edit" ⇨ "Instruction/Device/Label Candidacy Display" ⇨ "Operational Setting" ⇨ "Instruction/Device/Label name Prediction"
	Display available labels in entering instruction	○	• "Edit" ⇨ "Instruction/Device/Label Candidacy Display" ⇨ "Operational Setting" ⇨ "Instruction/Device/Label name Prediction" • "Edit" ⇨ "Instruction/Device/Label Candidacy Display" ⇨ "Candidate Display Setting" ⇨ "Display Local Labels" • "Edit" ⇨ "Instruction/Device/Label Candidacy Display" ⇨ "Candidate Display Setting" ⇨ "Display Global Labels"
Tool Hint	Monitored Value	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Tool Hint" ⇨ "Display Item in Tool Hint"
	Class	○	
	Device	○	
	Device Comment	○	
	Data Type	○	
	Constant Value	○	
	Label Comment	○	
	Remark	×	
	Tool Hint Display Format	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Tool Hint" ⇨ "Display in Multiline"

■Ladder

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Comment	Device Comment	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Comment" ⇨ "Comment Display Items"
	Note	○	
	Statement	○	
	Device Comment Display Format	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Comment" ⇨ "Device Comment Display Format"
	Copy device comment in copying ladder	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Comment" ⇨ "Operational Setting" ⇨ "Copy Device Comment in Copying Ladder"
Ladder Diagram	Display Connection of Ladder Diagram	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Display Connection of Ladder Diagram"
	Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Use the Switching Ladder Edit Mode (Read, Write, Monitor, Monitor (Write))"
	Display labels and devices	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Display labels and devices"
	Display &STL instruction in contact format. * Only applies to the FXCPU	×	
	Display Instruction Help at symbol error occurrence	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter Ladder" ⇨ "Operational Setting" ⇨ "Display Help ladder input window when symbol errors occur"
	Open Undefined Label Registration dialog at ladder entry	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Enter Ladder" ⇨ "Operational Setting" ⇨ "Open Undefined Label Registration Window at Ladder Entry"
	Set initial value to '1' for Enter HLine/Delete HLine dialog	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Set initial value to '1' for Enter HLine/Delete HLine dialog"
	Stop at the connection points (Instruction/Vertical Line) when enter or delete horizontal line	○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Edit Operation" ⇨ "Stop at the connection points (Instruction/Vertical Line) when enter or delete horizontal line"

■SFC

○: Similar setting supported, ×: Similar setting not supported

GX Works2			GX Works3	
			Supported or not	Similar setting
Comment	Block List		○	• "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Blocklist" ⇨ "Comment Display Items" ⇨ "Display Label/Device Comment"
	Step/Transition		○	• "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Comment" ⇨ "Display Item" ⇨ "Display Label/Device Comment"
SFC 1	SFC Edit Area		×	
	Tile SFC and Zoom vertically	Arrange	×	
		SFC Display Window Ratio	×	
	MELSAP-L Label/Device Display Format		×	
	Jump to start destination block		×	
SFC 2	Leave comment or step No. selected		×	
Zoom	Open Zoom with New Window		○	• "Program Editor" ⇨ "SFC Diagram Editor" ⇨ "Action/Transition" ⇨ "Display Format" ⇨ "Window Display Method"
	Number of Action/Transition Contacts		○	• "Program Editor" ⇨ "Ladder Editor" ⇨ "Ladder Diagram" ⇨ "Display Format" ⇨ "Display Connection of Ladder Diagram"

A

Device Comment Editor

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Number of Device Comment Edit/Display Characters	○	• "Other Editor" ⇨ "Device Comment Editor" ⇨ "Number of Editing/Displaying Characters" ⇨ "Number of Device Comment Editing/Displaying Characters"
Extended setting	×	
Execute the operation including the hidden bit specification information	×	

Device Memory Editor

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Always Confirm	×
Auto	×
Specify the number of column	×

Label Setting Editor

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Automatic copy and increment when inserting a row	○	• "Other Editor" ⇨ "Label Editor Common" ⇨ "Editor Setting" ⇨ "Automatic Copy and Increment in Inserting a Row"
Copy data type/comment items	○	• "Other Editor" ⇨ "Label Editor Common" ⇨ "Editor Setting" ⇨ "Copy Data Type/Comment Items"
Default Length of String Data Type	○	• "Other Editor" ⇨ "Label Editor Common" ⇨ "Data Type Setting" ⇨ "Data Length of Character String Data Types"
Display last blank row	○	• "Other Editor" ⇨ "Label Editor Common" ⇨ "Display Setting" ⇨ "Display Last Blank Row"

Parameter

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Use user defined parameter	×
Display number of columns for CC-Link list setting	×
Display number of rows for CC-Link station information	×

Monitor

■Common

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Disable Current Value Changing by Pressing the Shift + Enter keys	×
Start monitoring if converted or compiled program is opened during monitoring	×

■Structured Ladder/FBD/ST

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Display Format of Monitoring Value	○	• "Monitor" ⇨ "FBD/LD Editor" ⇨ "Display Setting" ⇨ "Display Format of Monitoring Value" • "Monitor" ⇨ "ST Editor" ⇨ "Display Setting" ⇨ "Display Format of Monitoring Value"
Monitor buffer memory and link direct device	○	• "Monitor" ⇨ "FBD/LD Editor" ⇨ "Operational Setting" ⇨ "Monitor Buffer Memory and Link Memory" • "Monitor" ⇨ "ST Editor" ⇨ "Operational Setting" ⇨ "Monitor Buffer Memory and Link Memory"
Significant Characters	○	• "Monitor" ⇨ "ST Editor" ⇨ "Character String Monitoring Setting" ⇨ "Numbers of Characters to Display" • "Monitor" ⇨ "FBD/LD Editor" ⇨ "Character String Monitoring Setting" ⇨ "Numbers of Characters to Display" • "Monitor" ⇨ "SFC Diagram Editor" ⇨ "Character String Monitoring Setting" ⇨ "Numbers of Characters to Display"
Verify with PLC setting before starting monitoring	×	

■Ladder/SFC

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Set automatic registration destination	○	• "Monitor" ⇨ "Ladder Editor" ⇨ "Setting for Automatic Registration to Watch Window" ⇨ "Set Automatic Registration Destination" • "Monitor" ⇨ "SFC Diagram Editor" ⇨ "Setting for Automatic Registration to Watch Window" ⇨ "Set Automatic Registration Destination"

■Ladder

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Display Format of Monitoring Value	○	• "Monitor" ⇨ "Ladder Editor" ⇨ "Display Setting" ⇨ "Display Format of Monitoring Value"
Monitor buffer memory and link direct device	○	• "Monitor" ⇨ "Ladder Editor" ⇨ "Operational Setting" ⇨ "Monitor Buffer Memory and Link Memory"
FXGP format Ladder monitor	×	
Display monitored value by device/label name of contact/coil instruction	○	• "Monitor" ⇨ "Ladder Editor" ⇨ "Operational Setting" ⇨ "Display Monitored Value by Device/Label Name of Contact/Coil Instruction"
Display Lines for Monitoring Current Value	○	• "Monitor" ⇨ "Ladder Editor" ⇨ "Display Setting" ⇨ "Display Lines for Monitoring Current Value"

■SFC

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Watch Step Not Transferring within Watching Time		×	
Program/Program File Name		×	
Target All Blocks		×	
Specify the Block	Detail Setting	×	
Stop Transition Watch Monitor when Detected		×	
Monitor block start with new window		○	• "Monitor" ⇨ "SFC Diagram Editor" ⇨ "Auto-scroll Monitor Setting" ⇨ "Monitor the Block Start in a New Window"

PLC Read/Write

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Keep last file selection for PLC read/write dialog	○	• "Online" ⇨ "Write to PLC" ⇨ "Operational Setting" ⇨ "Store file selection status in writing to PLC."
Turn PLC to STOP at time of PLC write after executing Rebuild All and do not execute remote RUN	×	
Clear the device ranges set in the Device/Label Automatic-Assign setting to 0 at time of PLC write after a Rebuild All operation	×	
Check the password in reading/writing/verifying/deleting PLC	×	
Check program cache memory when writing to PLC	×	
Merge device comment with the project data at time of PLC read	×	
Show a completion message if the PLC read/write window is automatically closed	×	

Online Change

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Execute fall instruction	×	
Transfer program cache memory to program memory	×	
Execute online change based on relative step No.	×	
Execute online change by Compile	○	• "Convert" ⇨ "Online Program Change" ⇨ "Operational Setting" ⇨ "Execute Online Program Change in Converting"
Under booting, reflect changes to boot source during online program change	×	• When performing the online program change function during the boot operation, select "Reflect Changes to Boot Source".

Symbolic Information

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Setting for Writing Symbolic Information to PLC	×	
Write symbolic information when Online Program Change is executed	×	

GX Works2	GX Works3	
	Supported or not	Similar setting
In the Write to PLC window, keep the symbolic information selected status as a write target	○	• "Online" ⇨ "Program Restore Information" ⇨ "Operational Setting" ⇨ "Enable the setting to write/not to write program restore information"
Setting for Save Destination of Symbolic Information to PLC	×	

Save Destination of Device Comment

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Set save destination of device comment to the target memory of PLC data	×
Save Destination of Device Comment	×

Compile

■Basic Setting

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Enable calling function block and using inline ST	×	
Do not execute duplicated coil check, ladder check and consistency (pair) check after Build or Online Program Change	○	• "Convert" ⇨ "Basic Setting" ⇨ "Program Check" ⇨ "Execute Program Check after Build or Online Program Change"
Do not target the SET instruction for duplicated coil check	○	• "Convert" ⇨ "Basic Setting" ⇨ "Program Check" ⇨ "Target the SET instruction for duplicated coil check"
Use the same label name in global label and local label	○	• "Convert" ⇨ "Basic Setting" ⇨ "Operational Setting" ⇨ "Use the Same Label Name in Global Label and Local Label"
Create cross reference information after completion compile.	×	

■Output Result

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3	
		Supported or not	Similar setting
Stop Build by		○	• "Convert" ⇨ "Output Result" ⇨ "Cancel Conversion" ⇨ "Number of Conversions to Cancel"
Disable Warning and Notification Message	Display the Use Status Notification of Automatic-Assign Device in Output Result	×	

■Ladder/SFC

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3
		Supported or not
Compile Condition	Make sure that the instruction is not used beyond the device range assigned by the label	×

■Structured Ladder/FBD/ST

○: Similar setting supported, ×: Similar setting not supported

GX Works2		GX Works3
		Supported or not
Compile Condition 1	Use lower-case device names as labels	×
	Function Output Setting	×
	Allow VAR_OUTPUT at FB call (ST)	×
	Add temporary variables as arguments to use macrocode	×
Compile Condition 2	(D)INT_TO_BOOL_E,(D)WORD_TO_BOOL_E, TIME_TO_BOOL_E(I)	×
	NOT_E	×
	LIMITATION_E,MAXIMUM_E,MINIMUM_E	×
	EQ_E,NE_E,GT_E,GE_E,LT_E,LE_E	×
	AND_E,OR_E, XOR_E	×
	User Defined Function with EN/ENO	×
	User Defined &Function Block with EN/ENO	×
Compile Condition 3	Automatically assign each system device to output of functions that use EN/ENO	×

Intelligent Function Module

■QD75/LD75 Type Positioning

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Display Specification of Positioning Data	×
Confirm PLC operation status when writing a Data	×
Display a confirmation message when writing to flash ROM	×

■Guidance

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Display intelligent function module guidance	×

iQ Works Interaction

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Enable an editing of parameters set in MELSOFT Navigator	×

System Label Setting

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3	
	Supported or not	Similar setting
Use MELSOFT Navigator Option Information	○	• "iQ Works Interaction" ⇨ "System Label Setting" ⇨ "System Label Setting" ⇨ "Use MELSOFT Navigator Option Information"
System Label Name Setting	○	• "iQ Works Interaction" ⇨ "System Label Setting" ⇨ "System Label Setting" ⇨ "Use MELSOFT Navigator Option Information" ⇨ "System Label Name Setting"

Sampling trace

○: Similar setting supported, ×: Similar setting not supported

GX Works2	GX Works3
	Supported or not
Display a message to confirm operation contents at the start of trace	×
Display a message to confirm discard of the trace result at the start of trace	×
Display a caution message in saving data as GX LogViewer format CSV file	×

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MEMO

REVISIONS

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

Revision date	*Manual number	Description
June 2014	SH(NA)-081215ENG-A	First edition
July 2014	SH(NA)-081215ENG-B	Partial correction
October 2014	SH(NA)-081215ENG-C	■Added or modified parts Section 1.2, Section 2.4, Section 2.8, Section 2.9, Section 3.1, Section 3.2, Section 4.2, Section 4.3, Section 4.4, Section 5.1, Section 5.2, Section 5.4, Section 6.1, Section 6.5, Section 12.3, Chapter 13, Section 13.2, Section 13.4, Section 13.8, Section 15.2, Section 15.3, Section 15.4, Section 16.1, Section 17.3, Appendix 1
January 2015	SH(NA)-081215ENG-D	■Added or modified parts TERMS, Chapter 1, Section 1.1, Section 1.2, Section 1.3, Section 1.4, Section 2.3, Section 2.4, Section 2.9, Section 3.1, Section 3.2, Section 3.3, Section 3.4, Section 3.5, Chapter 4, Section 4.1, Section 4.2, Section 4.3, Section 4.4, Section 5.1, Section 5.2, Section 5.3, Section 5.4, Section 6.1, Section 6.2, Section 6.3, Section 6.4, Section 6.5, Section 6.6, Section 7.1, Section 8.1, Chapter 9, Section 9.1, Section 9.2, Section 9.3, Section 9.4, Section 9.5, Section 9.6, Section 9.7, Chapter 10, Section 10.1, Section 10.2, Chapter 11, Section 11.1, Section 11.2, Section 12.1, Section 12.2, Section 12.3, Section 12.4, Section 12.5, Section 12.6, Section 12.7, Section 13.1, Section 13.3, Section 13.4, Chapter 14, Section 14.1, Section 14.2, Section 14.5, Section 14.6, Section 14.7, Section 14.8, Section 15.3, Section 15.4, Section 15.5, Chapter 16, Section 16.1, Section 16.2, Section 16.3, Section 16.4, Section 18.1, Section 18.2, Section 18.4, Appendix 1, Appendix 3, Appendix 4
April 2015	SH(NA)-081215ENG-E	■Added or modified parts TERMS, Section 2.3, Section 2.4, Section 2.9, Section 3.2, Section 3.3, Section 3.4, Section 3.5, Section 3.6, Section 4.2, Section 4.3, Section 4.4, Section 6.1, Section 6.2, Section 6.3, Section 6.7, Chapter 10, Section 10.1, Section 10.3, Section 10.4, Section 13.2, Section 15.4, Chapter 16, Section 16.2, Section 16.3, Appendix 1, Appendix 4
July 2015	SH(NA)-081215ENG-F	■Added or modified parts TERMS, Section 1.2, Section 1.3, Section 1.4, Section 2.1, Section 2.3, Section 2.4, Section 2.7, Section 2.9, Section 3.1, Section 3.2, Section 3.3, Section 3.4, Section 3.5, Section 3.6, Section 3.7, Section 4.1, Section 4.2, Section 4.3, Section 5.1, Section 5.2, Section 5.4, Section 6.1, Section 6.2, Section 6.3, Section 6.5, Section 6.6, Section 6.8, Section 6.9, Section 6.10, Chapter 9, Section 9.1, Section 9.2, Section 9.3, Section 9.4, Section 9.5, Section 9.6, Section 9.7, Chapter 10, Section 10.1, Section 10.3, Section 10.4, Chapter 11, Section 11.3, Section 12.3, Section 13.1, Section 13.3, Section 13.6, Chapter 14, Section 14.1, Section 14.2, Section 14.3, Section 14.4, Section 14.9, Chapter 15, Section 15.3, Section 15.4, Section 15.5, Section 15.6, Section 15.7, Section 16.2, Section 16.4, Chapter 18, Section 18.3, Section 18.5, Appendix 1, Appendix 2, Appendix 3, Appendix 4, Appendix 5
January 2016	SH(NA)-081215ENG-G	■Added or modified parts TERMS, Section 2.2, Section 2.3, Section 2.4, Section 2.9, Section 3.2, Section 3.3, Section 3.5, Section 4.1, Section 4.2, Section 4.3, Section 4.5, Section 5.2, Section 6.1, Section 6.3, Section 6.4, Section 6.5, Section 6.6, Section 6.7, Section 6.8, Section 6.9, Section 6.10, Chapter 9, Section 9.5, Section 10.1, Section 10.2, Section 10.3, Section 10.4, Section 11.1, Section 11.2, Section 11.3, Section 11.4, Section 12.1, Section 12.2, Section 13.1, Section 13.3, Section 13.6, Section 14.2, Section 14.3, Section 14.9, Section 18.1, Appendix 1, Appendix 2, Appendix 4, Appendix 5, Appendix 6, Appendix 7
February 2016	SH(NA)-081215ENG-H	■Added or modified parts Section 2.3, Section 2.4, Section 3.2, Section 3.5, Section 6.5, Section 6.8, Section 6.9, Section 13.1, Section 13.3, Section 15.5, Appendix 1, Appendix 7
May 2016	SH(NA)-081215ENG-I	■Added or modified parts TERMS, Section 1.2, Section 1.3, Section 1.4, Section 1.5, Section 1.6, Section 1.8, Section 2.1, Section 2.2, Section 2.3, Section 2.4, Section 2.6, Section 3.1, Section 3.2, Section 3.3, Section 3.4, Section 3.5, Section 3.6, Section 4.1, Section 4.2, Section 4.4, Section 5.1, Section 5.2, Section 5.3, Chapter 6, Section 6.2, Section 6.3, Section 6.7, Section 6.8, Section 6.9, Section 6.10, Section 7.3, Section 8.1, Chapter 9, Section 9.1, Section 9.5, Section 9.6, Section 9.7, Chapter 10, Section 10.1, Section 10.3, Section 10.4, Section 11.3, Section 11.4, Section 12.1, Section 12.2, Section 12.3, Section 12.6, Section 12.7, Section 12.8, Section 13.1, Section 13.2, Section 13.3, Section 13.4, Section 13.6, Section 14.1, Section 14.2, Section 14.3, Section 14.4, Section 14.5, Section 14.6, Section 14.8, Section 14.9, Chapter 15, Section 15.3, Section 15.5, Section 16.1, Section 16.2, Section 16.3, Chapter 18, Section 18.1, Section 18.2, Section 18.3, Section 18.4, Section 18.6, Appendix 1, Appendix 3, Appendix 4, Appendix 5, Appendix 7, Appendix 8

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October 2016	SH(NA)-081215ENG-J	■Added or modified parts TERMS, Section 2.4, Section 2.5, Section 2.8, Section 2.9, Section 3.1, Section 3.2, Section 3.5, Section 4.1, Section 4.2, Section 5.2, Section 6.3, Section 6.5, Section 6.6, Section 6.7, Section 6.9, Section 6.10, Section 7.2, Section 7.3, Chapter 9, Section 9.1, Section 9.3, Section 9.6, Section 11.1, Section 11.2, Section 11.3, Section 11.4, Section 12.1, Section 12.2, Section 12.6, Section 13.1, Section 13.2, Section 13.3, Section 13.6, Section 14.1, Section 14.2, Section 14.4, Section 14.5, Section 14.8, Section 14.10, Section 15.6, Section 16.1, Section 16.3, Section 16.4, Chapter 17, Section 17.1, Appendix 1, Appendix 2, Appendix 4, Appendix 5, Appendix 7, Appendix 8
January 2017	SH(NA)-081215ENG-K	■Added or modified parts TERMS, Section 1.2, Section 1.7, Section 1.8, Section 2.4, Section 2.8, Section 2.9, Section 3.1, Section 3.2, Section 3.4, Section 3.5, Section 5.4, Section 6.1, Section 6.2, Section 6.3, Section 6.5, Section 6.6, Section 6.7, Section 6.8, Section 6.9, Section 7.1, Chapter 10, Section 10.1, Section 13.1, Section 13.3, Chapter 14, Section 14.1, Section 14.2, Section 14.11, Section 16.2, Section 16.4, Section 18.4, Appendix 1, Appendix 4, Appendix 5, Appendix 7
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