FA-A-0236-B

Differences of PX Developer and GX Works3 process control functions

■Date of Issue
June 2017 (Ver. B: May 2018)
■Relevant Models
PX Developer, GX Works3

Thank you for your continued support of MELSOFT series.

This bulletin provides differences between PX Developer that is a process control engineering tool for MELSEC-Q series and GX Works3 process control function that are process control engineering tools for MELSEC iQ-R series.

Note that the specifications for functions and references described in this bulletin provide information as of April 2018.

1   SUPPORTED CPU MODULES

PX Developer programming tool is not supported in CPU modules for MELSEC iQ-R series.

When using CPU modules for MELSEC iQ-R series , use GX Works3.

PX Developer monitor tool is supported in CPU modules for MELSEC iQ-R series.

Series	CPU module		Available engineering tool	
			Programming	**Monitor**
MELSEC iQ-R	Process CPU	R08PCPU, R16PCPU, R32PCPU, R120PCPU	GX Works3 process control functions	PX Developer monitor tool
	SIL2 process CPU	R08PSFCPU, R16PSFCPU, R32PSFCPU, R120PSFCPU		
MELSEC-Q	Process CPU	Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU	PX Developer programming tool + GX Works2 PX Developer programming tool + GX Developer	
	Redundant CPU	Q12PRHCPU, Q25PRHCPU		

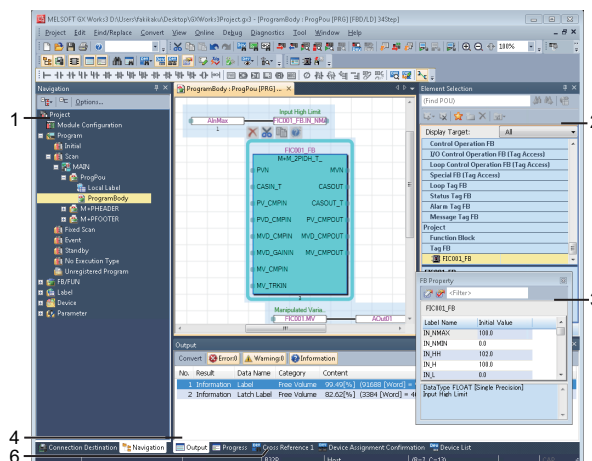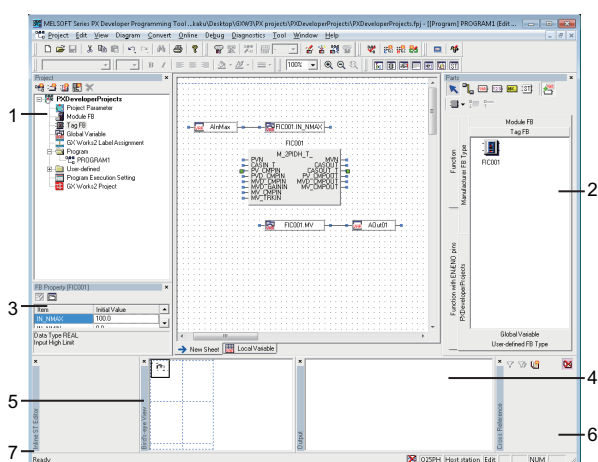## MITSUBISHI ELECTRIC CORPORATION

2 PX Developer PROGRAMMING TOOL AND GX Works3 PROCESS CONTROL FUNCTIONS

This chapter explains GX Works3 functions corresponding to PX Developer programming tool functions, and their differences.

Screen configuration

PX Developer programming tool

GX Works3

PX Developer helper windows correspond to the following docking windows in GX Works3.

No.	PX Developer programming tool	GX Works3
1	Project window	Navigation window
2	Parts window	Element Selection window
3	FB property window	FB property window
4	Output window	Output window/Progress window
5	Bird's-eye view window	There is no Docking Window that corresponds to the bird's-eye view window. Select [View] ⇨ [Zoom] to change the display magnification of FBD/LD program.
6	Cross reference window	Two screens can be displayed at once by selecting [View] ⇨ [Docking Window] ⇨ [Cross Reference 1]/[Cross Reference 2].
7	Inline ST editor window	An inline ST part is unsupported. Create FB/FUN in Structured Text.

Outline of the procedures

This section explains the outline of the procedures for using PX Developer and GX Works2/GX Developer and for using GX Works3.

No.	Procedure	MELSEC-Q	MELSEC iQ-R
		PX Developer programming tool + GX Works2/GX Developer	**GX Works3**
1	Start the tool and set system configuration.	Start PX Developer programming tool.	Start GX Works3.
		Create a new project.	Create a new project.
		Start GX Works2/GX Developer with PX Developer programming tool. Set a PLC parameter and network parameter with GX Works2/GX Developer.	Set a system parameter, CPU parameter, and module parameters of network modules.
2	Set items related to process control functions.	Set the project parameter.	Set the option menu and a CPU parameter.
3	Create programs.	Create FBD programs.	Create FBD/LD programs for process control.
		Create ladder programs, etc., with GX Works2/GX Developer.	Create ladder programs, etc.

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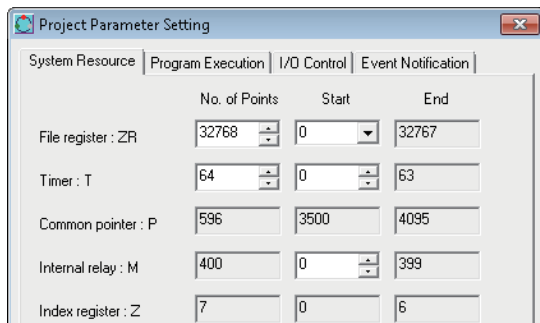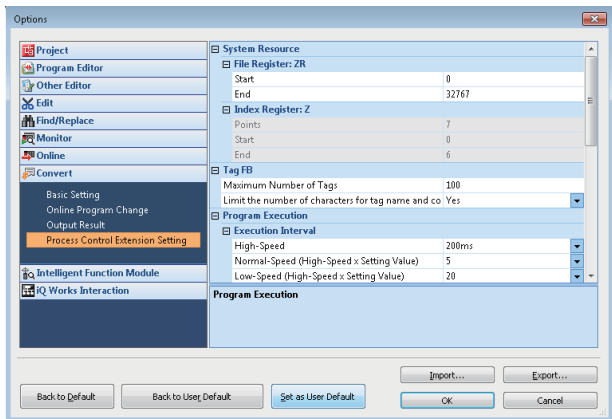| No.	Procedure	MELSEC-Q	MELSEC iQ-R
		PX Developer programming tool + GX Works2/GX Developer	**GX Works3**
4	Set the conditions to execute the programs.	Select "Program Execution Setting" in the project window, and set the execution state, the execution type, etc..	Set the execution type in "Program Setting" of "CPU parameter" or in "Program" in the navigation window.
5	Convert the programs.	The following conversions are available. • Cold-start compile • Hot-start compile • Online change compile	The following conversions are available. • Online Program Change • Rebuild all (reassignment)
6	Write the data to a CPU module.	Set a connection destination, and write the following data. • Symbolic Data of the project • Executable Data of the project	Set a connection destination, and write the following data. • Parameter • Program • POU • Global Label
7	Check the operation.	Specify a connection destination.	Specify a connection destination.
		The current value of variable and errors can be checked by using the following monitoring and diagnostic functions, etc. • Monitoring programs • Changing a current value • Monitoring a tag FB on a faceplate • Reading the current value of an FB property • Monitoring with entry variable monitor window • FBD program diagnostics • Simulation (GX Simulator, GX Simulator2) • I/O simulation setting • Pause/Restart of FB	The current value of variable and errors can be checked by using the following monitoring and diagnostic functions, etc. • Monitoring programs • Changing current values • Monitoring a tag FB on a faceplate • Updating the initial value of an FB property • Monitoring on the watch window • Module diagnostics (CPU diagnostics) • Simulation (GX Simulator3) • I/O system setting • Pause/Restart of FB

2.1 Starting the Tool and Setting System Configuration

To start a tool or create a project, perform the following operations.

No.	Operation	PX Developer programming tool	GX Works3
1	Start	Windows Start ⇨ [MELSOFT Application] ⇨ [PX Developer] ⇨ [Programming Tool]	Windows Start ⇨ [MELSOFT] ⇨ [GX Works3] ⇨ [GX Works3]
2	Creating a new project	[Project] ⇨ [New Project]	[Project] ⇨ [New] There are two operation modes in the MELSEC iQ-R series process CPU; process mode and redundant mode. Select one when creating a new project.
3	Setting parameters	"Parameter" ⇨ "GX Works2 Project", "GX Developer Project" in the project window of PX Developer "Parameter" ⇨ "PLC Parameter", "Network Parameter" in the project window of GX Works2/GX Developer	[Parameter] ⇨ [Module Information] in the navigation window and right-click⇨[Add New Module] [Parameter] ⇨ Target module ⇨ [Module Parameter] in the navigation window After setting parameters, click the [Apply] button.
4	Exit	Exit [Project] ⇨ [Exit PX Developer]	[Project] ⇨ [Exit]

2.2 Setting Items Related to Process Control Functions

To use GX Works3 process control functions, variable-related settings and CPU parameter settings are required in addition to the settings that correspond to PX Developer project parameters.

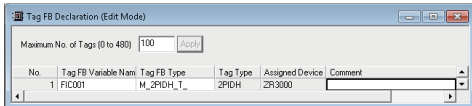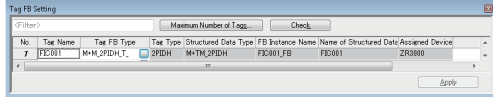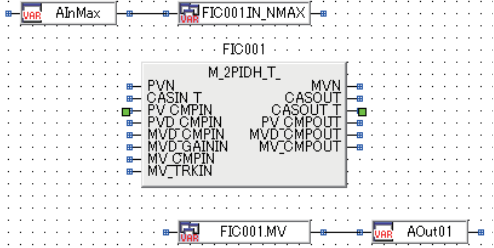| No.	PX Developer programming tool	GX Works3
1	"Project Parameter" in the project window • System Resource (ZR, T, P, M, Z) • Program Execution (Execution Interval) • I/O Control (Percentage Conversion, Input Limiter, Hold Processing, Disconnection Detection) • Event Notification 	[Tool] ⇨ [Options] ⇨"Convert" ⇨"Process Control Extension Setting" • System Resource (ZR, Z) No settings are required for T, P, and M devices. • Program Execution (Execution Interval) • I/O Control (Input Limiter, Holding Processing, Disconnection Detection) • Event Notification
2	—	[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation" • Enable Rebuild All (Retain): No • Enable Conversion: No
3	—	[Parameter] ⇨ Target module ⇨ [CPU Parameter] in the navigation window. • "File Setting" ⇨ "File Register Setting" ⇨ "Use Or Not Setting": "Use Common File Register in All Programs", "Capacity": Specify a size larger than the size required for the file register (ZR) set for the system resource, "File Name": Arbitrary (example: FBDQ). • "File Setting" ⇨ "Label Initial Value Reflection Setting" ⇨ "Label Initial Value Reflection Setting at STOP to RUN": Disable • "Memory/Device Setting" ⇨ "Device/Label Memory Area Setting" ⇨ "Device/Label Memory Area Detailed Setting" ⇨ "Device Setting" ⇨ Set 'ZR(R)' on the [Latch (2)] tab on the "Latch Range Setting" screen. • "Memory/Device Setting" ⇨ "Index Register Setting" ⇨ "Points Setting" ⇨ "Total Points" ⇨ "Index Register (Z)": Specify seven points or higher.
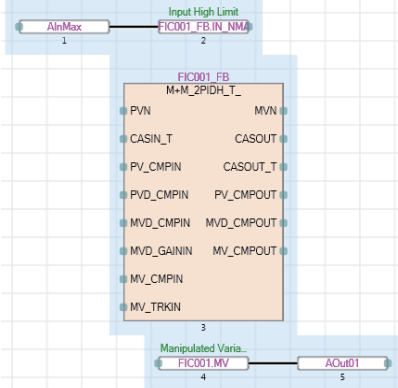
For details on settings for GX Works3 process control functions, refer to the following manual.

📖GX Works3 Operating Manual

2.3   Creating Programs

Creating a FBD program

This section explains the differences of functions that create a FBD program for process control.

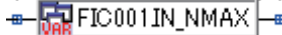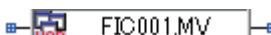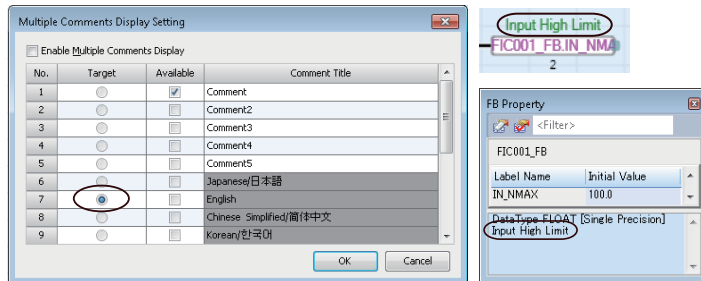| No.	Operation	PX Developer programming tool	GX Works3
1	Create a tag FB.	"Tag FB" in the project window Set the following in the "Tag FB Declaration" screen. • Maximum No. of Tags • Tag FB Variable Name, Tag FB Type, Tag Type, etc. The set tag FB is displayed in the parts window.	Process control extension toolbar ⇨ [Tag FB Setting]( ) Set the following in the "Tag FB Setting" screen. • Maximum Number of Tags • Tag Name, Tag FB Type, Tag Type, etc. After setting the "Tag FB Setting" screen, click the [Apply] button. An FB instance and tag data are registered for a global label. The FB instance is displayed as the name with "Tag name" + "_FB" on the Element Selection window.
2	Add a program.	[Project] ⇨ [Edit Data] ⇨ [Add New] ⇨ [New Program]	[Project] ⇨ [Data Operation] ⇨ [New Data] • Program file: Select "Yes" for "Use the process control extension". • Program block: Select "FBD/LD" for "Program Language".
3	Add a screen (sheet) to edit a program.	[Diagram] ⇨ [FBD sheet] ⇨ [Add]	Select a program block in the navigation window. [Project] ⇨ [Data Operation] ⇨ [Add New Worksheet]
4	Arrange a tag FB on a sheet.	Drag and drop a tag FB from the parts window onto an FBD sheet. 	Drag and drop an FB instance from the Element Selection window onto a worksheet.
5	Set the FB property.	[View] ⇨ [Window] ⇨ [FB Property] Select FB on the FBD sheet, and set the initial values of public variables in the FB property window.	[View] ⇨ [Docking Window] ⇨ [FB Property] Select FB on the FBD/LD editor, and set the initial values of public variables in the FB property window.
6	Specify the tag data of a tag FB and public variable.	When using a tag FB, specify it as follows. • Public variable: Tag FB variable name.Public variable name(Example: FIC001.IN_NMAX) • Tag data: Tag FB variable name.Tag data name(Example: FIC001.MV) 	When using a tag FB, specify it as follows. • Public variable: FB instance name.Public variable name(Example: FIC001_FB.IN_NMAX) • Tag data: Tag name.Tag data name(Example: FIC001.MV)
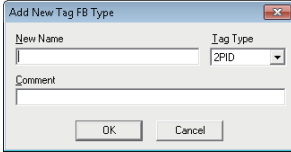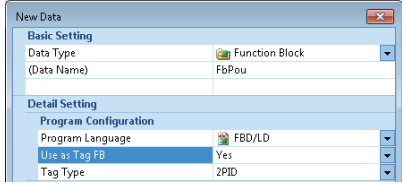
Point

With GX Works3, by selecting English for "Target" on [View] ⇨ [Multiple Comments Display Setting], the descriptions of the labels set in a tag FB and in the structure members of tag data are displayed on the FBD/LD editor and on the explanation column in the FB property window.

GX Works3 functions that correspond to the setting screens of PX Developer Project Data are explained below.

No.	PX Developer programming tool	GX Works3
1	"Module FB" in the project window • Module FB declaration	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.
2	"Tag FB" in the project window	Process control extension toolbar ⇨ [Tag FB Setting]( )
3	"Global Variable" in the project window • Global variable name, Data type, etc.	"Label" ⇨ "Global Label" in the navigation window. • Label name, Data type, etc.
4	"GX Works2 Label Assignment" in the project window • GX label assignment	As the functions are integrated, GX label assignment setting is not necessary for GX Works3.
5	"User-defined" in the project window • FB type • Tag FB type	"FB/FUN" in the navigation window. When creating a new user-defined tag FB, select the following on the "New Data" screen. • Program Language: FBD/LD • Use as Tag FB: Yes
6	"User-defined" in the project window • Structure type	"Label" ⇨ "Structured Data Types" in the navigation window. With GX Works3, structure members can be set for a structure type.

Point

With GX Works3, a user-defined tag FB and a tag FB are subroutine, so program memory can be saved.

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Creating a ladder program etc., for sequence control

How to create a ladder program and other programs for sequence control are the same as general projects.

The outline of the procedures for using GX Works2 (structured project) and GX Works3 is explained below.

No.	Operation	GX Works2(Structured Project)	GX Works3
1	Add a program.	Add a new program block to a POU. Edit a program of the program block. Create a new program file and a task in the program setting. Register the program block to the task.	Create a program file and a program block. Edit a program body of the program block.
2	Set labels.	Set a global label. Set a local label of a program block.	Set a global label. Set a local label of a program block.

For details on the programming functions of engineering tools, refer to the following manuals.

📖 GX Works3 Operating Manual

📖 GX Works2 Version 1 Operating Manual (Structured Project)

📖 GX Developer Version 8 Operating Manual

For program configuration, refer to the following manuals.

📖 MELSEC iQ-R Programming Manual (Program Design)

📖 MELSEC-Q/L/F Structured Programming Manual (Fundamentals)

Point

A PX Developer project can be opened in GX Works3 by the following operation.

• GX Works3: [Project] ⇨ [Open Other Format File] ⇨ [PX Developer Format]

There is a notation of constants that causes an error in GX Works3, because the specifications are different between PX Developer and GX Works3.

When adding 'E' between the mantissa part and an exponent in the exponent notation of real numbers, add a decimal point to the mantissa part.

Example) '1E7', '1E+007', and '1.0E7'

• When '1E7' or '1.0E7' is entered in PX Developer, it is automatically converted to '1E+007'.

• When opening a PX Developer project in the [Open Other Format File] menu, the notation format of real numbers is not converted. '1E+007' is displayed in GX Works3 as in PX Developer.

• An error will occur for '1E+007' and '1E7' in GX Works3 when converting. Change to '1.0E+007' or '1.0E7'.

For the notation of constants in MELSEC iQ-R series, refer to the following manual.

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

2.4 Setting Conditions to Execute the Programs

The setting conditions of "Program Execution Setting" of PX Developer can be set as execution types in "Program" in the navigation window or "Program Setting" of "CPU Parameter" with GX Works3.

PX Developer programming tool

"Program Execution Setting" in the project window

or [Diagram] ⇨ [FBD sheet] ⇨ [Set Execution Condition]

GX Works3

"Program" in the navigation window

[Project] ⇨ [Data Operation] ⇨ [New Data]

PX Developer programming tool			GX Works3	
Execution state	**Execution type**	**Other settings**	**Execution type**	**Other settings**
Execute, Execute conditionally	Timer execution (Scan)	—	Scan	—
	Timer execution (High speed/Normal speed/ Low speed)	Phase and priority can be set at a normal speed and a low speed.	Scan	Select "Yes" for "Use the process control extension" on the "Properties" screen of a program file. When creating a new program, select "FBD/LD" for a program language. Then, "Execution Interval" and "Phase" can be set on the "Properties" screen of a program of a program block.
		Set the execution cycle in the millisecond as follows. Project Parameter" ⇨ [Project Parameter] tab in the project window • High speed: 200ms • Normal speed: 200ms × Setting value 2, 3, 4, 5 • Low speed: 200ms × Setting value 5, 10, 20, 25, 50		Set the execution interval in the millisecond as follows. [Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Process Control Extension Setting" ⇨ "Program Execution" ⇨ "Execution Interval" • High-Speed: 50ms, 100ms, 200ms • Normal-Speed: High-Speed × Setting value 2, 3, 4, 5 • Low-Speed: High-Speed × Setting value 5, 10, 20, 25, 50 The user default is the same as in PX Developer.
	Fixed scan execution	Set the interruption interval.	Fixed scan	Select "Yes" for "Use the process control extension" on the "Properties" screen of a program file.
	Interrupt pointer execution	Set the number of the interrupt pointer (I).	Event	[Parameter] ⇨ CPU module model name ⇨ [CPU Parameter] in the navigation window ⇨ [Program Setting] ⇨ <Detailed Setting> ⇨ Click the [...] button in the "Detailed Setting Information" column. ⇨ Select "Interruption Occurrence" for "Trigger Type" on the "Event Execution Type Detailed Setting" screen. Set an interrupt pointer for "Interruption Occurrence".
Do not execute	—	—	Unregistered program	—

Point

For the execution condition settings of an FBD sheet of PX Developer, create a program to control the execution by combining a contact with jump/return on the FBD/LD editor in GX Works3.
For details, refer to the following manual.
📖GX Works3 Operating Manual

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2.5 Converting Programs

When using process control functions, set the following so as not to convert (retain) any or all program with GX Works3 projects.

[Tool] ⇨ [Options] ⇨ "Convert" ⇨ "Basic Setting" ⇨ "Conversion Operation"

• Enable Rebuild All (Retain): No

• Enable Conversion: No

GX Works3 conversion functions corresponding to PX Developer conversion functions are explained below.

Hot-start compile is not supported, so substitute online program change for it.

No.	PX Developer programming tool	GX Works3
1	[Convert] ⇨ [Cold-start Compile]	[Convert] ⇨ [Rebuild All] (reassignment)
2	[Convert] ⇨ [Hot-start Compile]	[Convert] ⇨ [Compile (Online Change)]
3	[Convert] ⇨ [Online Program Change]	☞ Page 10 Whether to perform the online program change with change for tag FBs

Whether to perform the online program change with change for tag FBs

Changes that the online program change can perform are different in PX Developer and GX Works3.

○: Performed, ×: Not performed

No.	Change for tag FBs	PX Developer programming tool	GX Works3
1	Registration of tag FBs (adding a tag FB)	○	○
2	Changing the tag FB type		
3	Changing a comment		
4	Deleting the tag FB setting		
5	Changing the tag FB type	○	× After change, all programs are required to be converted.
6	Changing a tag type	×Cold-start compile is required.[1]	× After change, all programs are required to be converted.
7	Changing a declaration position		
8	Changing a user-defined tag FB or a user-defined FB	○	○[2]

*1 Undo the change, so the cold-start compile can be avoided.

*2 When adding a local label that exceeds the reserved area capacity in an FB, the reserved area capacity can be changed in the "Properties" screen of an FB file. If it exceeds the secured steps for online program change, the secured steps can be set again if there is enough free space in the program memory.

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2.6 Writing Data to a CPU Module

This section explains differences in communication route settings and in the functions related to reading/writing programs to CPU modules.

No.	PX Developer programming tool	GX Works3
1	[Online] ⇨ [Transfer Setup]	[Online] ⇨ [Current Connection Destination]
2	[Online] ⇨ [Download] • Executable Data of the project • Symbolic Data of the project GX Developer/GX Works2 [Online] ⇨ [Write to PLC] • User ladder executable program	[Online] ⇨ [Write to PLC] • System Parameter/CPU Parameter • Global Label Setting • Global Label Initial Value • Program • POU (Tag FB) When writing a program which uses a tag FB, CPU parameters, global labels, and POU of a tag FB must be written as well. Write CPU parameters first, and turn the power of a CPU module OFF and ON or reset the CPU module. Then, write the global label setting. When writing the global label setting, data of file registers in the range set for the system resource in the option is automatically written.
3	[Online] ⇨ [Upload] • Symbolic Data of the project GX Developer/GX Works2 [Online] ⇨ [Read from PLC] • User ladder executable program • Symbolic information	[Online] ⇨ [Read from PLC] • System Parameter/CPU Parameter • Global Label • Program • POU (Tag FB) When reading a program which uses a tag FB, CPU parameters, global labels, and the POU of a tag FB must be read as well.
4	[Online] ⇨ [Delete PLC Data]	[Online] ⇨ [Delete PLC Data]
5	[Online] ⇨ [Check Project Consistency]	[Online] ⇨ [Verify with PLC]
6	[Online] ⇨ [FB Property Management]	[Online] ⇨ [FB Property ⇨ FB Property Management]

2.7 Checking Operation

This section explains differences of the functions in Monitor, PLC diagnostics, etc.

No.	PX Developer programming tool	GX Works3
1	[Online] ⇨ [Monitor] ⇨ [Read Out FB Property]	[Online] ⇨ [FB Property] ⇨ [Update the Initial Value of FB Property]
2	[Online] ⇨ [Pause FB]/[Restart FB]/[Paused FB List]	[Debug] ⇨ [Process Control Extension] ⇨ [Pause FB]/[Restart FB]/[Paused FB List]
3	[Online] ⇨ [Monitor] ⇨ [Entry Variable Monitor]	[View] ⇨ [Docking Window] ⇨ [Watch 1] to [Watch 4]
4	[Debug] ⇨ [Start Simulation]/[Stop Simulation]	[Debug] ⇨ [Simulation] ⇨ [Start Simulation]/[Stop Simulation]
5	[Debug] ⇨ [I/O Simulation Setting]	[Tool] ⇨ [I/O System Setting] on the "GX Simulator3" screen.
6	[Diagnostics] ⇨ [FBD Program Diagnostics]	[Diagnostics] ⇨ [Module Diagnostics (CPU Diagnostics)] The program/FB hierarchy list function (jump to the error position) is not supported.

3   MONITOR TOOL

PX Developer monitor tool can be used for MELSEC iQ-R series as well as for MELSEC-Q series for connection destination.
Differences in functions are explained below.

Trend graph

The global label declared in GX Works3 cannot be used as a monitor variable.

Communication route

This section explains differences of communication route depending on a connection destination of PX Developer monitor tool.

For details on communication route, refer to the following manual.

🕮 PX Developer Version 1 Operating Manual (Monitor Tool)

Type	Communication route	MELSEC-Q	MELSEC iQ-R
USB	USB cable — CPU module(USB Port Direct Connection)	○	○
Serial	RS-232C — CPU module	○	—
	RS-232C — Serial communication module	○	—
	RS-232C — MELSECNET/H Remote I/Omodule	○	—
	RS-422 — G4 module	○	—
Ethernet	Ethernet Port Direct Connection — Built-in Ethernet CPU(Ethernet Port Direct Connection)	—	○
	Commercially available Ethernet board— Built-in Ethernet CPU(connect to the PLC Module via HUB)	○	○
	Commercially available Ethernet board — Ethernet module(connect to the Ethernet Module via HUB)	○	○
CC-Link IE Controller Network	Network board — Network module	○	○
MELSECNET/H, MELSECNET/10		○	—
CC-Link		○	—
GOT transparent	RS-232C/USB — GOT — CPU module	○	—

4   LIBRARY

This chapter explains the functions and function blocks of PX Developer applicable for GX Works3.

4.1   Process Control FB

For the following functions and function blocks of PX Developer, there are applicable process control function blocks in a library in GX Works3.

Process function, general process FB

No.	Category	Function name	Part name	
			PX Developer	**GX Works3**
1	Analog value selection and Average value function	High Selector	P_HS	M+P_HS[*1]
2			P_HS_E	M+P_HS_E[*1]
3		Low Selector	P_LS	M+P_LS[*1]
4			P_LS_E	M+P_LS_E[*1]
5		Middle Value Selection	P_MID	M+P_MID[*1]
6			P_MID_E	M+P_MID_E[*1]
7		Average Value	P_AVE	M+P_AVE[*1]
8			P_AVE_E	M+P_AVE_E[*1]
9		Absolute Value	P_ABS	M+P_ABS
10			P_ABS_E	M+P_ABS_E
11	Correction Operation	Function Generator	P_FG	M+P_FG
12		Inverse Function Generator	P_IFG	M+P_IFG
13		Standard Filter (Moving Average)	P_FLT	M+P_FLT
14		Engineering Value Conversion	P_ENG	M+P_ENG
15		Inverse Engineering Value Conversion	P_IENG	M+P_IENG
16		Temperature/Pressure Correction	P_TPC	M+P_TPC
17		Summation	P_SUM	M+P_SUM
18		Summation (Internal Integer Integration)	P_SUM2_	M+P_SUM2_
19		Range Conversion	P_RANGE_	M+P_RANGE_
20	Arithmetic Operation	Addition (With Coefficient)	P_ADD	M+P_ADD
21		Subtraction (With Coefficient)	P_SUB	M+P_SUB
22		Multiplication (With Coefficient)	P_MUL	M+P_MUL
23		Division (With Coefficient)	P_DIV	M+P_DIV
24		Square Root (With Coefficient)	P_SQR	M+P_SQR
25	Comparison Operation	Compare Greater Than (With Setting Value)	P_>	M+P_GT
26		Less Than (With Setting Value)	P_<	M+P_LT
27		Compare Equal Than (With Setting Value)	P_=	M+P_EQ
28		Compare Greater Or Equal (With Setting Value)	P_>=	M+P_GE
29		Compare Less Or Equal (With Setting Value)	P_<=	M+P_LE
30	Control Operation	Lead-Lag	P_LLAG	M+P_LLAG
31		Integral	P_I	M+P_I
32		Derivative	P_D	M+P_D
33		Dead Time	P_DED	M+P_DED
34		High/Low Limiter	P_LIMT	M+P_LIMT
35		Variation Rate Limiter1	P_VLMT1	M+P_VLMT1
36		Variation Rate Limiter2	P_VLMT2	M+P_VLMT2
37		Dead Band	P_DBND	M+P_DBND
38		Bumpless Transfer	P_BUMP	M+P_BUMP
39		Analog Memory	P_AMR	M+P_AMR
40		8 Points Time Proportional Output	P_DUTY_8PT_	M+P_DUTY_8PT_

*1 The specifications of input variables are different. A pin number can be changed within the range from 2 to 16 in PX Developer; however, specify an array with 16 elements in GX Works3.

Tag access FB

No.	Category	Function name	Part name	
			PX Developer	**GX Works3**
1	I/O Control Operation	Analog Input Processing	P_IN	M+P_IN
2		Output Processing-1 with Mode Switching (With Input Addition)	P_OUT1	M+P_OUT1
3		Output Processing-2 with Mode Switching (Without Input Addition)	P_OUT2	M+P_OUT2
4		Output Processing-3 with Mode Switching (With Input Addition and Compensation)	P_OUT3_	M+P_OUT3_
5		Manual Output	P_MOUT	M+P_MOUT
6		Time Proportioning Output	P_DUTY	M+P_DUTY
7		Pulse Integration	P_PSUM	M+P_PSUM
8		Batch Counter	P_BC	M+P_BC
9		Manual Setter	P_MSET_	M+P_MSET_
10	Loop Control Operation	Ratio Control (With Tracking to primary loop)	P_R_T	M+P_R_T
11		Ratio Control (Without Tracking to primary loop)	P_R	M+P_R
12		Velocity Type PID Control (With Tracking to primary loop)	P_PID_T	M+P_PID_T
13		Velocity Type PID Control (Without Tracking to primary loop)	P_PID	M+P_PID
14		2-Degree-of-Freedom PID Control (With Tracking to primary loop)	P_2PID_T	M+P_2PID_T
15		2-Degree-of-Freedom PID Control (Without Tracking to primary loop)	P_2PID	M+P_2PID
16		2-Degree-of-Freedom Advanced PID Control (With Tracking to primary loop)	P_2PIDH_T_	M+P_2PIDH_T_
17		2-Degree-of-Freedom Advanced PID Control (Without Tracking to primary loop)	P_2PIDH_	M+P_2PIDH_
18		Position Type PID Control (With Tracking to primary loop, Without Tracking from secondary loop)	P_PIDP_T	M+P_PIDP_T
19		Position Type PID Control (Without Tracking to primary loop, Without Tracking from secondary loop)	P_PIDP	M+P_PIDP
20		Position Type PID Control (With Tracking to primary loop, With Tracking from secondary loop)	P_PIDP_EX_T_	M+P_PIDP_EX_T_
21		Position Type PID Control (Without Tracking to primary loop, With Tracking from secondary loop)	P_PIDP_EX_	M+P_PIDP_EX_
22		Sample PI Control (With Tracking to primary loop)	P_SPI_T	M+P_SPI_T
23		Sample PI Control (Without Tracking to primary loop)	P_SPI	M+P_SPI
24		I-PD Control (With Tracking to primary loop)	P_IPD_T	M+P_IPD_T
25		I-PD Control (Without Tracking to primary loop)	P_IPD	M+P_IPD
26		Blend PI Control (With Tracking to primary loop)	P_BPI_T	M+P_BPI_T
27		Blend PI Control (Without Tracking to primary loop)	P_BPI	M+P_BPI
28		High/Low Limit Alarm Check	P_PHPL	M+P_PHPL
29		2 Position ON/OFF (With Tracking to primary loop)	P_ONF2_T	M+P_ONF2_T
30		2 Position ON/OFF (Without Tracking to primary loop)	P_ONF2	M+P_ONF2
31		3 Position ON/OFF (With Tracking to primary loop)	P_ONF3_T	M+P_ONF3_T
32		3 Position ON/OFF (Without Tracking to primary loop)	P_ONF3	M+P_ONF3
33		Program Setter	P_PGS	M+P_PGS
34		Multi-Point Program Setter	P_PGS2_	M+P_PGS2_
35		Loop Selector (Without Tracking to primary loop)	P_SEL	M+P_SEL
36		Loop Selector (With Tracking to primary loop)	P_SEL_T1	M+P_SEL_T1
37		Loop Selector (With Tracking to primary loop)	P_SEL_T2	M+P_SEL_T2
38		Loop Selector (With Tracking from secondary loop to primary loop)	P_SEL_T3_	M+P_SEL_T3_
39		Predictive Functional Control (Simple First Order Lag)	P_PFC_SF_	Not supported
40		Predictive Functional Control (Simple Second Order Lag)	P_PFC_SS_	Not supported
41		Predictive Functional Control (Integral Process)	P_PFC_INT_	Not supported
42	Tag Special	Control Mode Change/Change Control Mode	P_MCHG	M+P_MCHG

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Tag FB

No.	Category	Function name	Part name	
			PX Developer	**GX Works3**
1	Loop Tag	Velocity Type PID Control (With Tracking to primary loop)	M_PID_T	M+M_PID_T
2		Velocity Type PID Control (Without Tracking to primary loop)	M_PID	M+M_PID
3		Velocity Type PID Control and Duty Output (With Tracking to primary loop)	M_PID_DUTY_T	M+M_PID_DUTY_T
4		Velocity Type PID Control and Duty Output (Without Tracking to primary loop)	M_PID_DUTY	M+M_PID_DUTY
5		2-Degree-of-Freedom PID Control (With Tracking to primary loop)	M_2PID_T	M+M_2PID_T
6		2-Degree-of-Freedom PID Control (Without Tracking to primary loop)	M_2PID	M+M_2PID
7		2-Degree-of-Freedom PID Control and Duty Output (With Tracking to primary loop)	M_2PID_DUTY_T	M+M_2PID_DUTY_T
8		2-Degree-of-Freedom PID Control and Duty Output (Without Tracking to primary loop)	M_2PID_DUTY	M+M_2PID_DUTY
9		2-Degree-of-Freedom Advanced PID Control (With Tracking to primary loop)	M_2PIDH_T_	M+M_2PIDH_T_
10		2-Degree-of-Freedom Advanced PID Control (Without Tracking to primary loop)	M_2PIDH_	M+M_2PIDH_
11		Position Type PID Control (With Tracking to primary loop, Without Tracking from secondary loop)	M_PIDP_T	M+M_PIDP_T
12		Position Type PID Control (Without Tracking to primary loop, Without Tracking from secondary loop)	M_PIDP	M+M_PIDP
13		Position Type PID Control (With Tracking to primary loop, With Tracking from secondary loop)	M_PIDP_EX_T_	M+M_PIDP_EX_T_
14		Position Type PID Control (Without Tracking to primary loop, With Tracking from secondary loop)	M_PIDP_EX_	M+M_PIDP_EX_
15		Sample PI Control (With Tracking to primary loop)	M_SPI_T	M+M_SPI_T
16		Sample PI Control (Without Tracking to primary loop)	M_SPI	M+M_SPI
17		I-PD Control (With Tracking to primary loop)	M_IPD_T	M+M_IPD_T
18		I-PD Control (Without Tracking to primary loop)	M_IPD	M+M_IPD
19		Blend PI Control (With Tracking to primary loop)	M_BPI_T	M+M_BPI_T
20		Blend PI Control (Without Tracking to primary loop)	M_BPI	M+M_BPI
21		Ratio Control (With Tracking to primary loop)	M_R_T	M+M_R_T
22		Ratio Control (Without Tracking to primary loop)	M_R	M+M_R
23		2 Position ON/OFF (With Tracking to primary loop)	M_ONF2_T	M+M_ONF2_T
24		2 Position ON/OFF (Without Tracking to primary loop)	M_ONF2	M+M_ONF2
25		3 Position ON/OFF (With Tracking to primary loop)	M_ONF3_T	M+M_ONF3_T
26		3 Position ON/OFF (Without Tracking to primary loop)	M_ONF3	M+M_ONF3
27		Monitor	M_MONI	M+M_MONI
28		Manual Output With Monitor	M_MWM	M+M_MWM
29		Batch Preparation	M_BC	M+M_BC
30		Pulse Integrator	M_PSUM	M+M_PSUM
31		Loop Selector (Without Tracking to primary loop)	M_SEL	M+M_SEL
32		Loop Selector (With Tracking to primary loop)	M_SEL_T1	M+M_SEL_T1
33		Loop Selector (With Tracking to primary loop)	M_SEL_T2	M+M_SEL_T2
34		Loop Selector (With Tracking from secondary loop to primary loop)	M_SEL_T3_	M+M_SEL_T3_
35		Manual Output	M_MOUT	M+M_MOUT
36		Program Setter	M_PGS	M+M_PGS
37		Multi-Point Program Setter	M_PGS2_	M+M_PGS2_
38		Manual Setter With Monitor	M_SWM_	M+M_SWM_
39		Predictive Functional Control (Simple First Order Lag)	M_PFC_SF_	Not supported
40		Predictive Functional Control (Simple Second Order Lag)	M_PFC_SS_	Not supported
41		Predictive Functional Control (Integral Process)	M_PFC_INT_	Not supported
42		Position Proportional Output	M_PVAL_T_	M+M_PVAL_T_
43		Heating and Cooling Output	M_HTCL_T_	M+M_HTCL_T_

No.	Category	Function name	Part name	
			PX Developer	**GX Works3**
44	Status Tag	Motor Irreversible (2 Input, 2 Output)	M_NREV	M+M_NREV
45		Motor Reversible (2 Input, 3 Output)	M_REV	M+M_REV
46		ON/OFF Operation (2 Input, 2 Output)	M_MVAL1	M+M_MVAL1
47		ON/OFF Operation (2 Input, 3 Output)	M_MVAL2	M+M_MVAL2
48		Timer 1 (Timer Stops When COMPLETE Flag is ON)	M_TIMER1	M+M_TIMER1
49		Timer 2 (Timer Continues When COMPLETE Flag is ON)	M_TIMER2	M+M_TIMER2
50		Counter 1 (Counter Stops When COMPLETE Flag is ON)	M_COUNTER1	M+M_COUNTER1
51		Counter 2 (Counter Continues When COMPLETE Flag is ON)	M_COUNTER2	M+M_COUNTER2
52		Push Button Operation (5 Input, 5 Output)	M_PB_	M+M_PB_
53	Alarm Tag	Alarm	M_ALARM	M+M_ALARM
54		64-points alarm	M_ALARM_64PT_	M+M_ALARM_64PT_
55	Message Tag	Message	M_MESSAGE	M+M_MESSAGE
56		64-points message	M_MESSAGE_64PT_	M+M_MESSAGE_64PT_

4.2 General function, general FB

For the following general functions and general FB of PX Developer, there is no applicable part for GX Works3. Use an alternative method.

No.	Category	Function name	Part name of PX Developer	Alternative method for GX Works3
1	Type Conversion Function	REAL Type → STRING Type (Decimal Point Format) Conversion	REAL_TO_STRING_EX	Convert the REAL type data to STRING type (exponential format) data for REAL_TO_STRING(_E). Create a function that converts into a decimal point format.
2			REAL_TO_STRING_EX_E	
3	Numerical Operation Function	Sign Reversal	NEG	Use the following instructions: • NEG(P): Two's complement of 16-bit binary data (sign inversion) • DNEG(P): Two's complement of 32-bit binary data (sign inversion) • ENEG(P): Inverting the sign of single-precision real number • EDNEG(P): Inverting the sign of double-precision real number
4			NEG_E	
5	Arithmetic Operation Function	Exponentiation	POW	Use the following instructions: • POW(P): Calculating the exponentiation of single-precision real number • POWD(P): Calculating the exponentiation of double-precision real number For the INT or DINT type, change the data type.
6			POW_E	
7	Ladder Program Control Function	Sub-routine Program Call (DINT/REAL Type Argument)	CALL_DINT	Use the following instruction: • CALL(P): Calling a subroutine program Or, change a target program to a function.
8			CALL_DINT_E	
9			CALL_REAL	
10			CALL_REAL_E	
11		Program Scan Execution Registration	PSCAN	Use the following instruction: • PSCAN(P): Changing the program execution type to scan execution type
12			PSCAN_E	
13		Program Standby Instruction	PSTOP	Use the following instruction: • PSTOP(P): Changing the program execution type to standby type
14			PSTOP_E	
15		Program Output Standby Instruction	POFF	Use the following instruction: • POFF(P): Changing the program execution type to standby type (output off)
16			POFF_E	
17		Program Low-speed Execution Registration	PLOW	This instruction is not supported by MELSEC iQ-R CPU modules as with redundant CPUs.
18			PLOW_E	

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No.	Category	Function name	Part name of PX Developer	Alternative method for GX Works3
19	Helper Function	WORD→16BOOL Unbinding	UNBIND	Create a function that expands a word input to bits.
20			UNBIND_E	
21		16BOOL→WORD/ DWORD	BIND	Create a function that connects bits input to a word/doubleword.
22			BIND_E	
23		2WORD→DWORD	MAKE_DWORD	Create a function that connects words input to a doubleword.
24			MAKE_DWORD_E	
25		High-order/Low-order Output of DWORD Type Data	HI_WORD	Create a function that copies high-order word of a doubleword input.
26			HI_WORD_E	
27			LO_WORD	Create a function that copies high-order word of a doubleword input.
28			LO_WORD_E	
29		Input Pins Connection Status Acquisition	IS_CONNECTED_	Add labels of VAR_INPUT or VAR_PUBLIC to the function block that needed to check the connection status of VAR_INPUT labels, and assign the connection status from the original program. The connection status can be checked by referring the values of labels of VAR_INPUT or VAR_PUBLIC added on the program of a function block.
30			IS_CONNECTED_E_	
31	Bistable FB	Latch FB (BOOL Type)	LATCH_BOOL	Create a function block that latches an input value.
32		Latch FB (REAL Type)	LATCH_REAL	
33		Latch FB (WORD Type)	LATCH_WORD	
34		Latch FB (DWORD Type)	LATCH_DWORD	
35	Edge Detection FB	Edge Detection Input	EDGE_CHECK	Use rising edge detection (R_TRIG) and falling edge detection (F_TRIG) of a standard function block.
36	Timer FB	Pulse Timer (High-speed Timer)	TP_HIGH	Use the following instruction: • TP(_E): Pulse timer The specifications of variables are different. Set a time type value.
37		Pulse Timer (Low-speed Timer)	TP_LOW	
38		ON Delay Timer (High-speed Timer)	TON_HIGH	Use the following instruction: • TON(_E): On delay timer The specifications of variables are different. Set a time type value.
39		ON Delay Timer (Low-speed Timer)	TON_LOW	
40		OFF Delay Timer (High-speed Timer)	TOF_HIGH	Use the following instruction: • TOF(_E): Off delay timer The specifications of variables are different. Set a time type value.
41		OFF Delay Timer (Low-speed Timer)	TOF_LOW	
42	Communication Control FB	Sending Data to PLC CPUs of Other Stations	SEND	Use the following instruction: • JP.SEND: Sending data to the programmable controller on another station
43		Receiving Data from PLC CPUs of Other Stations	RECV	Use the following instruction: • JP.RECV: Receiving data from the programmable controller on another station

The specifications of the following general function of PX Developer are different from those of elements supported by GX Works3.

No.	Category	Function name	Part name of PX Developer	Difference in GX Works3
1	Selection Function	Multiplexer	MUX	The specifications of input variables are different. A pin number can be changed within the range from 2 to 8 in PX Developer, while it can be changed within the range from 2 to 28 in GX Works3.
2			MUX_E	

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REVISIONS

Version	Date of Issue	Revision
-	June 2017	First edition
A	August 2017	The description in 'Whether to perform the online program change with change for tag FBs' is modified.
B	May 2018	Available for e-Manual Viewer Differences in specifications for the exponent notation of real numbers are added. Functions supported or changed in GX Works3 Ver.1.045X are modified. Functions and FBs with different specifications are added.

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