

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 90 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 (Retain)' 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"		
[Tool] ⇒ [Options] ⇒ "Convert" ⇒ "Basic Setting" ⇒ "Operational Setting" ⇒ "Reassign Labels in Executing Rebuild All"	Select "Yes."	

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

■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.
"Redundant System Settings" ⇒ "Tracking Setting" ⇒ "Tracking Device/Label Setting" ^{*3}	Select "Detailed setting." ^{*4}	To transfer (track) file registers used for tag FBs and system data (system header and system footer)
"Redundant System Settings" ⇒ "Tracking Setting" ⇒ "Tracking Device/Label Setting" ⇒ "Device/Label Detailed Setting" ^{*3}	For the "Global Device Setting" column except for tracking block No.64, specify devices or file registers that are not used in an FBD/LD program for process control. ^{*5}	If "Detailed setting" is specified for "Tracking Device/Label Setting," devices or labels to be transferred (tracked) need to be set manually.

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

*2 Can also be set by clicking the [Yes] button in the screen that appears when setting "Use Common File Register in All Programs" for the following parameter item:

"File Setting" ⇒ "File Register Setting" ⇒ "Use Or Not Setting"

*3 Required only when a CPU module operation mode is "Redundant."

*4 "Detailed setting" is automatically set for this item if a program with the process control extension enabled is converted.

*5 Ranges of devices and devices set for the following parameter item can be applied to the global device settings in a batch by clicking the [Device Setting Reflection] button in the "Global Device Setting" screen.

"Memory/Device Setting" ⇒ "Device/Label Memory Area Setting" ⇒ "Device/Label Memory Area Detailed Setting" ⇒ "Device Setting"

■Execution interval setting

Set the execution interval for a program with the process control extension enabled to fit the processing.

Execution type	Setting content
Scan	Set the execution interval and phase in the "Program File Setting" screen or the "Properties" screen of a program block. (Page 267 Execution interval and phase)
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 Appears 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	
FB property	Explanation column in the "FB Property" window	
FB property management	Explanation column in the "FB Property Management (Offline)" screen	
	Explanation column in the "FB Property Management (Online)" 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_Q_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 intervals. 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 interval.
	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. ① Write CPU parameters to a programmable controller. ② Reset or cycle the power of the programmable controller. ③ 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 Z0 to Z6 in programs with the process control extension enabled and within its programs of the functions/functions.
	Periodic execution type program Interrupt program	Due to the following cause, a periodic execution type program*4 and interrupt program*4 may not be executed at the specified timing.*5 • Cause: During the execution of a process control function block, executing a periodic execution type program and interrupt program is prohibited by the DI instruction. (It is released by the EI instrument after the execution of the process control function block is completed.) This may affect high-speed pulse measurement with a CPU module and the result may be inaccurate. In that case, use a counter function of a high-speed counter module or a pulse input module. When using these modules, refer to the manual of the module and create a program.
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 • Function block 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"

*4 For details on a periodic execution type program and interrupt program, refer to the following:

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

*5 The execution time and the number of execution times of a running program can be checked in the "Program List Monitor" screen.
(Page 667 Checking the Processing Time of a Program)