Servo System Controller

MELSEC iQ-R Series Motion Module Basics (RD78G(H) Positioning Control)

This training course is intended for those who will construct a motion control system using the MELSEC iQ-R Series Motion module for the first time.

Click the Forward button at the upper right corner to proceed to the next page.

This course aims to develop knowledge and understanding about positioning control of the Motion control system using the MELSEC iQ-R Series Motion module.



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Introduction Course Structure

The contents of this course are as follows. We recommend that you start from Chapter 1.

Chapter 1 - Contents of the Course

This chapter describes the contents of the course.

Chapter 2 - Public Label

This chapter describes the public label, which is used to exchange the device information between the PLC CPU and Motion module.

Chapter 3 - Buffer Mode

This chapter describes the synchronous control using the buffer mode of the Motion control FB.

Chapter 4 - Operation with PLC CPU

This chapter describes how to create a program using the Motion control FB on the PLC CPU.

Chapter 5 - Logging

This chapter describes how to perform data logging using GX LogViewer.

Final Test

4 sections in total (7 questions)

Introduction How to Use This e-Learning Tool

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Back to the previous page	<	Back to the previous page.
Move to the desired page	тос	"Table of Contents" will be displayed, enabling you to navigate to the desired page.
Exit the learning	x	Exit the learning. Window such as "Contents" screen and the learning will be closed.

■Safety precautions

When using actual products for learning purposes, please carefully read the "Safety Precautions" described in the manual of the product to be used, and pay close attention to safety and proper use.

■Precautions in this course

The screen images shown in the course may differ from your actual software depending on the version. The following software versions are used in the course.

For the latest version of each software, check the Mitsubishi Electric FA Website.

MELSOFT GX Works3	Ver.1.066U	Motion Control Setting function	Ver.1.012N
GX LogViewer	Ver.1.106K		
MELSOFT MR Configurator2	Ver.1.110Q or later		

The firmware version of the PLC CPU must be 44 or later (46 or later for RD78GH).

The firmware version of the motion module must be 10 or later.

For how to update the firmware version, refer to MITSUBISHI ELECTRIC FA Website or the module configuration manual.

The \Box icon indicates the reference manual.

The contents of the manuals described in this course are those of the following versions.

If the versions differ, the location of description and contents may be slightly different.

Manual name	Manual No.	Version
MELSEC iQ-R Motion Module User's Manual (Startup)	IB-0300406	E
MELSEC iQ-R Motion Module User's Manual (Application)	IB-0300411	E
MELSEC iQ-R Motion Module User's Manual (Network)	IB-0300426	E
MELSEC iQ-R Programming Manual (Motion Module Instructions, Standard Functions/Function Blocks)	IB-0300431	E
MELSEC iQ-R Programming Manual (Motion Control Function Blocks)	IB-0300533	С
MELSEC iQ-R Structured Text (ST) Programming Guide Book	SH-081483	F
MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)	SH-081266	Z
MELSEC iQ-R CPU Module User's Manual (Application)	SH-081264	AK



The following shows the course overview.



This chapter describes the contents of the course.

Chapter 2 Public Label

This chapter describes the public label, which is used to exchange the device information between the PLC CPU and Motion module.

Chapter 3 Buffer Mode

This chapter describes the synchronous control using the buffer mode of the Motion control FB.

Chapter 4 Operation with PLC CPU

This chapter describes how to create a program using the Motion control FB on the PLC CPU.

Chapter 5 Logging

This chapter describes how to perform data logging using GX LogViewer to check the operation of the Motion module.

This course uses the same single-shaft ball screw mechanism as used in the Startup course.



The configuration of the target system is as follows.

Remove the remote input module from the system used in the Startup course, and add the input module RX40C7-TS to slot 1 of the base unit of the programmable controller.

The station No. of the servo amplifier MR-J5-10G has been changed to 1, and the IP address has been changed to 192.168.3.1.



Wiring of External Circuit

Wiring of the power supply for the programmable controller and servo amplifier, and the connection method of the servo motor are the same as described in the Startup course. The following shows the external circuit wiring of the input module.



(Note) Since the I/O No. of RX40C7-TS is 0020H, X20 to X25 and X2F are used in the program.

1.4

Chapter 2 Public Label

When the Motion module is controlled by the input module of the programmable controller, as in the system used in this course described in chapter 1, the PLC CPU and Motion module must exchange the device information.

There are following two methods.

- 1. Use public labels.
- 2. Use buffer memory of the Motion module.

This chapter describes how to exchange data by using public labels.

Download the sample program to be used in this chapter and chapter 3 by clicking the link below.

RD78GBasic2_sample1.zip (1.34MB)

[Point] When using the buffer memory, copy the data to be ex	changed to the user area (U $_{\Box}$ \G11478000 to G11997999).
(Program example) <plc cpu=""></plc>	<motion module=""></motion>
Positioning start	MC_MoveAboslute_1(Execute:= G11478000.0 , : ;

What is Public Label?

A public label is a shared label that can be used in both the Motion module and PLC CPU. The following shows the applicable areas of the local label, global label, and public label.



2.1

(1) How to register public labels

Register the public labels from the global labels of the Motion module.

Make sure that the "Public Label" column is visible in the global label editor of the Motion Module Setting Function screen. Set the labels to be registered as the public label to "Enabled".

This activates the "Motion Control Attribute" column.

Select whether each label is to be read or written from/to the PLC CPU.

_	Label Name	Data Type	Class	Initial	Constant	Japanese	English(Display Target)	Chinese	Remark	Public Label	Motion Control Attribute
1	G_5SVONCMD	Bit	VAR_GLOBAL				Servo ON			Enabled	WRITE (=> Motion)
2	G_leJogVelocity	FLOAT [Double Precision]	VAR_GLOBAL				JOG Velocity			Enabled	WRITE (=> Motion)
3	G_bJogFwd	Bit	VAR_GLOBAL				JOG Forward			Enabled	WRITE (=> Motion)
4	G_bJogBwd	Bit	VAR_GLOBAL				JOG Backward			Enabled	WRITE (=> Motion)
5	G_bJogBusy	Bit	VAR_GLOBAL				JOG Busy			Enabled	READ (Motion =>)
6	G_lePosition0	FLOAT [Double Precision]	VAR_GLOBAL				Position() Address			Disabled	-
7	G_bHomingCMD	Bit	VAR_GLOBAL				Homing Command			Enabled	WRITE (=> Motion)
8	G_bHomingDone	Bit	VAR_GLOBAL				Homing Done			Enabled	READ (Motion =>)
9	G_bHomingReq	Bit	VAR_GLOBAL				Homing Request			Enabled	READ (Motion =>)
10	G_bPosCMD	Bit	VAR_GLOBAL				Positioning Command			Enabled	WRITE (=> Motion)
11	G_bPosDone	Bit	VAR_GLOBAL				Positioning Done			Enabled	READ (Motion =>)
12	G_bPosReq	Bit	VAR_GLOBAL				Positioning Start Request			Enabled	READ (Motion =>)
13	G_bErrorReset	Bit	VAR_GLOBAL				Error Reset			Enabled	WRITE (=> Motion)
14	G_bContPosCMD	Bit	VAR_GLOBAL				Continuous Positioning Command			Enabled	WRITE (=> Motion)
15	G_bContPosReq	Bit	VAR_GLOBAL				Continuous Positioning Start Request			Enabled	WRITE (=> Motion)
16	G_bContPosDone	Bit	VAR_GLOBAL				Continuous Positioning Done			Enabled	READ (Motion =>)
17											

[Point]

If the column of the public label is not visible, scroll the table to the right.

(2) Data types that can be registered as the public label

The following table shows the data types that can be registered as the public label.

Variable type	Туре	Array selection	Public label setting	Remarks
	Cimple type	No	0	Settings are not possible for the
	Simple type	Yes	riangle(Note 1,2)	following labels and class. ■Label
	Structured data type	No	riangle(Note 3)	String type label
Global label	Structured data type	Yes	∆(Note 1,2,4,5)	• Timer type label
	FB (Including Motion control FBs)	No	×	Counter type label
		(Including Motion control FBs)	Yes	×
Program	_	-	×	Retentive timer label
Program block local label	-	_	×	Long retentive time type labelLong timer type label
Structured data type	-	-	riangle(Note 3,5)	
Motion control FB structured data	-	-	△(Note 6,7)	VAR_GLOBAL_CONSTANT class

(Note)

1. The public label setting cannot be configured for each element of an array.

- 2. When a bit type array is used, the public label cannot be set to "Enabled". (In a structured data, only the corresponding member cannot be set to "Enabled".)
- 3. When the string type is used as a member of the structured data type, the member cannot be set to "Enabled".
- 4. Structured data with a maximum of four layers can be made public.
- 5. When an array of the structured data is used as a member of the structured data, the member cannot be set to "Enabled".
- 6. It may be used in the program of the PLCopen Motion control FB by the CPU module.
- 7. When the string type is used in a Motion control FB structured data, the Motion control FB structured data type itself cannot be set.

2.2

(3) How to register structured data as the public label

To set the members of a structured data type prepared in the system such as axis monitor data to the public label, register the public labels by layer of the structured data as shown below.

This course describes how to register Set Position (SetPosition) and Set Velocity (SetVelocity), monitor data (Md) of the actual drive axis (Axis_Real), as public labels.

[How to set AxisName.Md.SetPosition (Command current position) and AxisName.Md.SetVelocity (Command current velocity) to the public label]



(4) Reflecting the public labels

Select [Convert] \rightarrow [Rebuild All] in the menu.

The free capacity of the public label is displayed as Information in the output window.

0	Dutpu	t				ųх
	Rebui	ild All 🔯 Err	ror:0 🔒 Wan	ning:0 🔯 Info	rmation	
ſ	No.	Result	Data Name	Category	Content	Error Code
	1	Information	Public Label	Free Volume	99.88[%] (32728 [Word] = 32768 [Word] - (Global: 40 [Word]))	-

When the rebuild all process is successfully completed, select [Convert] \rightarrow [Reflect Public Labels] in the menu. Click [Yes] in the following pop up window.

When a message indicating that the public labels are successfully reflected appears, click the [OK] button.



(Note) The memory capacity that can be used to register public labels is 32K words by default.

The capacity can be increased up to 64K words.

To change the capacity, set the memory size from [Convert] \rightarrow [Public Label Capacity Setting] in the menu.

Public Label Area Capacity Setting	×
Set the label area capacity used by public labels. When the capacity is changed, the global label data of the CPU module will become unconverted and conversion of sequence programs will be required.	
Public Label Area Capacity 32 K Word	
[Setting Range] 2 to 64 [K word] (in unit of 1 K word)	
OK Cancel	

(5) Checking the labels from the PLC CPU side

The reflected public labels are registered to the module label at the PLC CPU side.

Select the module label from the Element Selection window of GX Works3, and check that the public labels have been registered under [0000:RD78G4] in [Module Label].

After changing the public label setting, always execute "Reflect Public Labels" again.

When using the public labels in the PLC CPU, rebuild all the programs.



(1) Sample program operation

The input signals of the sample program used in this chapter are assigned as follows.

Input	Operation			
X20	Servo off (Note)			
X21	Forward rotation JOG operation			
X22	Reverse rotation JOG operation			
X23	Home position return			
X24	Positioning control			
X25	Continuous positioning control (Chapter 3)			

The following shows the operation pattern of X24: positioning control.



(Note) This sample program executes servo ON automatically when the PLC CPU is set to RUN. When the power is turned on with the start signals ON, the servo motor may be activated.

(2) Program of the PLC CPU

1) MAIN (ladder, scan program)



Y0 is turned on first.

When X0 is turned on, servo ON is executed.

Turn on X20 to execute servo OFF.

Set the initial value of the JOG velocity. This program used the inline ST. Since the motion control attribute of the global label "G_JogVelocity" that stores the JOG velocity is set to "WRITE (→Motion)", the numerical value must be set in the PLC CPU.

Turns on the start signal of the JOG operation.

It prevents the forward rotation and reverse rotation from being started at the same time.

An interlock is set to prevent JOG operation from being started while another program is being executed.

The startup of the home position return (X23) is retained in the public label G_bHomingCMD, and sent to the Motion module as the start condition of the home position return.

An interlock is set to prevent home position return from being started while another program is running.

Upon receiving that the Motion module turned on the home position return completion signal, G_bHomingCMD is reset at the rising edge of that signal.

(2) Program of the PLC CPU

1) Continued part of MAIN (ladder, scan program)

12 P X24 -Ith-Й N 1 13 (62 SET sitioning JOG Busy Homing Continuou s Positioning -Iñ 14 (73 RST sitionin 15 •0 tioning X25 -Ith Й И Ň 16 (78) SET ontinuou JOG Busy Positioni Start Request sitioning -Iti 17 RST ntinuou sitioning 18 *Er or F X2F .GJ -19 (94) Error Reset -(END)-20 (9

(Continued from previous page)

The rising edge of the positioning control start (X24) is retained in G_bPosCMD, and sent to the Motion module as the start condition of the positioning control.

An interlock is set to prevent positioning control from being started while another program is running. Upon receiving that the Motion module turned on the home position return completion signal, G_bPosCMD is reset at the rising edge of that signal.

The start program for continuous positioning described in chapter 3. For details, refer to 3.4.

Errors are reset when X2F is turned on.

(2) Program of the PLC CPU

2) MONITOR (ST, scan program)

SetPosition (Set Position) and SetVelocity (Set Velocity) of the axis monitor set as the public label are stored in the word devices D0 and D2.

Since SetPosition and SetVelocity are the double precision real number type, they are converted to the signed double word type so that they can be easily handled by the PLC CPU. (Note)

Although these word devices are not used in this course, they are used to display data on other sequence programs and GOT, and for other purposes.

1 2 3	DO:D D2:D	<pre>:= LREAL_TO_DINT(RD78_0000.Axis0001.Md.SetPosition); := LREAL_TO_DINT(RD78_0000.Axis0001.Md.SetVelocity);</pre>
3	Specify	the signed double word type with "D0:D".

(Note) When the double precision real number type is converted to signed double word type, if the value to be converted is outside the range from -2147483648 to 2147483647, a calculation error occurs.

(3) Program of the Motion module

2.3

1) ServoON_JOG (normal execution type)



(Note) In this sample program, I/O signals of FBs that are not used or that have not been changed from the initial values are omitted.

- (3) Program of the Motion module
 - 2) Homing (normal execution type)

1 //Homing Operation 2 //Initial Value Setting, Operation Start Request 3 □ IF G_bHomingCMD THEN ← 4 GilePosition0 := 0.0; 5 GibHomingReg := TRUE •	Receives the home position return command signal (G_bHomingCMD) from the PLC CPU. Stores the home position address to the label and turns on the home position return request (G_bHomingReq).
6 ELSE 7 G_bHomingReq := FALSE ; 8 -END_IF; 9	Turns off G_bHomingReq when G_bHomingCMD is turned off.
<pre>10 //Homing 11 MC_Home_1(12 Axis := Axis0001.AxisRef, 13 Execute := G_bHomingReq, 14 Position := G_lePositionU, 15 Done => bHomingDone, 16 Busy => G_bHomingBusy, 17 CommandAborted => bHomingAborted, 18 Error => bHomingError 19); 20</pre>	
<pre>21 //Done Signal => PLC CPU 22 G_bHomingDone := bHomingDone OR bHomingAborted OR 23</pre>	bHomingError;
20:	Returns the execution completion signal to the PLC CPU after the home position return is successfully completed (Done output ON), execution is interrupted (CommandAborted output ON), or an error occurred (Error output ON).

(3) Program of the Motion module

3) Positioning (normal execution type)



(3) Program of the Motion module

2.3

4) ErrorReset (normal execution type)



2.4 Writing Program

Write the program and parameters to the PLC CPU and Motion module.

- 1) After all the programs in the PLC CPU are rebuilt, select [Online] → [Write to PLC] in the tool bar of GX Works3 to write all data to the PLC CPU.
- 2) When the parameters are written to the PLC CPU, communication with the Motion module is enabled. Select [Online] → [Write to Module] in the tool bar of the Motion Control Setting Function to write all data to the Motion module.
- 3) Reset the PLC CPU to finish the writing operation.

Click the play button at the lower left of the window.





Set the RUN/STOP/RESET switch of the PLC CPU to RUN. The READY lamp and PROGRAM RUN lamp of the PLC CPU turn on. The RUN lamp of the Motion module turns on.



2.5

Wait until the PROGRAM RUN lamp of the Motion module turns on. "r.01" is displayed on the servo amplifier. (The dots are lit.) The servo motor enters the servo ON state.

Operation Check	
Servo OFF	MITSUBISH MELSERI/0-J5 RUN MS SFTY ▼ PULL CC-LinkIETSN

Turn on X20 to execute servo OFF. "r.01" is displayed on the servo amplifier. (The dots blink.) Turn off X20 to execute the servo ON again.



Turn on forward rotation JOG (X21) to move the axis in the address increase direction, and turn off to stop. Turn on reverse rotation JOG (X22) to move the axis to the address decrease direction, and turn off to stop.



When X21 is turned on, "RD78_0000.G_bJogFwd" turns on and "G_bJogFwd" on the Motion module side turns on. When the JogForward input of MCv_Jog_1 turns on, the forward rotation JOG starts.


When X22 is turned on, "RD78_0000.G_bJogBwd" turns on and "G_bJogBwd" on the Motion module side turns on. When the JogBackward input of MCv_Jog_1 turns on, the reverse rotation JOG starts.



Turn on home position return (X23) to start the home position return. Execute the home position return with the proximity dog method (33 is subtracted from Pr.PT45) The axis stops a little further beyond the dog, and sets that point as the home position.



When X23 is turned on, "RD78_0000.G_bHomingCMD" is set. "G_bHomingCMD" on the Motion module side turns on, and "G_bHomingReq", which is the execution command of MC_Home_1, turns on.



When the home position return is completed, the Done output and "G_bHomingDone" turn on.

"G_bHomingCMD" on the PLC CPU side is reset to the initial state.



Turning on positioning start (X24) starts reciprocating motion. The axis moves forward 150 mm and stops for 0.5 seconds, and moves back 150 mm and stops for 0.5 seconds.



Check the program monitor. When X24 is turned on, "RD78_0000.G_bPosCMD" is set. "G_bPosCMD" on the Motion module side turns on, and "G_bPosReq", which is the execution command of MC_MoveAbsolute_1, turns on.



After reciprocating motion is finished and dwell time is elapsed, "G_bPosDone" turns on.

"G_bPosCMD" on the PLC CPU side is reset to the initial state.



This completes the operation check. Go to the next page. In this chapter, you have learned:

- What is Public Label?
- Public Label Setting
- Program Example
- Writing Program
- Operation Check

Point

2.6

What is Public Label?	• A public label is a shared label that can be used in both the Motion module and PLC CPU.
Public Label Setting	 Register the public labels from the global labels of the Motion module. Select whether each label is to be read or written from/to the PLC CPU. To set the members of a structured data type prepared in the system to the public label, register the public labels by layer of the structured data type. After setting the public labels in the Motion module, rebuild all the programs and reflect the public labels. The public labels are registered to the module label on the PLC CPU side.
Program Example	• This chapter described the following program example: a ladder program of the PLC CPU that uses public labels to exchange the positioning start signal and positioning completion signal.
Writing Program	Write data to the PLC CPU first, and then the Motion module.
Operation Check	• You have checked the operation of the sample program in the video.

Chapter 3 Buffer Mode

The buffer mode executes operations continuously by starting multiple operation FBs of Motion control FBs. It can be set with the BufferMode input of the Motion control FB.

Up to two FBs can be started simultaneously for each axis and axis group.

(Example) MC_MoveAbsolute

MC_	MoveAbsolute_1(
	Axis	:= Axis0001.AxisRef ,		
	Execute	:= G_bPositioningReq ,		
	ContinuousUpdat	e:= FALSE ,		
	Position	:= lePosition1 ,		
	Velocity	:= lePosVelocity ,		
	Acceleration	:= lePosAcceleration ,		
	Deceleration	:= lePosDeceleration .		
	Jerk	:= lePosJerk .		
	Direction	:= MC DIRECTION mcShortest	t₩ay .	
	BufferMode	:= MC BUFFER MODEmcAborti	ing .	
	Options	:= 0 ,//mcAccDec		
	Done	<pre>=> bMoveAbs1Done .</pre>		
	CommandAborted	<pre>> bMoveAbs1Aborted .</pre>		
	Error	=> bMoveAbs1Error		
):				
,,	0 or MC_	BUFFER_MODEmcAborting	···The FB being executed is interrupted and the next FB is immedia	tely executed.
	1 or MC_	BUFFER_MODEmcBuffered	···After the operation of the FB being executed is completed, the r	ext FB is executed.
	2 or MC_	BUFFER_MODEmcBlendingLow	•••The lower one of target velocities for the FB being executed and	
			FB to be buffered is set as the switching velocity.	
	3 or MC_	BUFFER_MODEmcBlendingPrevious	••• The target velocity of the FB being executed is set as the switching	ng velocity.
	4 or MC_	BUFFER_MODEmcBlendingNext	 The target velocity of the FB to be buffered is set as the switchin 	g velocity.
	5 or MC_	BUFFER_MODEmcBlendingHigh	••• The higher one of the target velocities for the FB being executed FB to be be found in order of the multiplication of the FB being executed	and
	L L		FB to be buffered is set as the switching velocity.	

[Point]

For Direction and BufferMode input, specify numbers or ENUM enumerators starting with MC_BUFFER_MODE and MC_DIRECTION.

For details of the ENUM enumerators, refer to the following manual.

MELSEC iQ-R Programming Manual (Motion Control Function Blocks)

2 VARIABLES AND MOTION CONTROL FB

2.2 List of Enumerators

The following diagram shows the operation when BufferMode is set to 0: mcAborting. The FB being executed is interrupted and the next FB is immediately executed.



The following diagram shows the operation when BufferMode is set to 1:mcBuffered. When the operation of the FB being executed is completed, the next FB is executed.



3.3 Blending

When BufferMode is set to mcBlending***, the next FB is continuously executed after the target position of the FB being executed is reached.

In the following description, the FB to be executed first is FB1, and FB to be buffered is FB2.

(1) BlendingPrevious

The following diagram shows the operation when BufferMode is set to 3: mcBlendingPrevious. The operation is performed at the target velocity of FB1 until the target position of FB1. When the operation is switched to FB2, the velocity is changed to the target velocity of FB2, and move to the target position of FB2.



(2) BlendingNext

The following diagram shows the operation when BufferMode is set to 4: mcBlendingNext. The velocity changes to the target velocity of FB2 when the operation reaches the target position of FB1.



3.3 Blending

(3) BlendingLow, BlendingHigh

The operation when BufferMode is set to 2: mcBlendingLow or 5: mcBlendingHigh varies depending on which target velocities of FB1 and FB2 is larger.

Setting value	Target velocity of FB1 > Target velocity of FB2	Target velocity of FB1 < Target velocity of MFB2				
2 : mcBlendingLow	Same operation as BlendingPrevious	Same operation as BlendingNext				
5 : mcBlendingHigh	Same operation as BlendingNext	Same operation as BlendingPrevious				

[Point]

The following diagram shows the velocity waveform for BlendingPrevious, BlendingNext, BlendingHigh, and BlendingLow when the target velocity of FB1 and FB2 is the same.



(1) Sample program operation

This chapter uses the sample program used in Chapter 2. Check the difference in buffer mode operation in a program that starts with X25.

Item	FB1 (MC_MoveAbsolute)	FB2 (MC_MoveAbsolute)
Positioning address	75000.0[μm]	150000.0[μm]
Velocity	50000.0[µm/s]	25000.0[μm/s]
Acceleration, deceleration	100000.0[μm/s ²]	50000.0[μm/s ²]
Jerk	200000.0[μm/s ³]	100000.0[μm/s ³]

(2) Program of the PLC CPU MAIN (ladder, scan program)

15	*Con	tinuou	Positioning									
16		(78)	×25	RD78_0000 .G_bJogBu	RD78_0000 .G.bHomin eReg	RD78_0000 .G_bPosRe			SET	RD78.000 G.BContF osCMD Continuou		
			RD78,0000 .G_bContP osDane	JUG Busy	Request	Positioning Start Request						Positioning Command
17		(89)	Continuou S Positioning Done								RST	Continuou s Positionin Command

The rising edge of the continuous positioning control start (X25) is retained with

G_bContPosCMD, and sent to the Motion module as the start condition of the continuous positioning control.

An interlock is set to prevent positioning control from being started while another program is running.

Upon receiving that the Motion module turned on the continuous home position return completion signal, G_bContPosCMD is reset at the rising edge of that signal. (3) Motion module program

3.4

ContinuousPositioning (normal execution type)



Click the play button at the lower left of the window.













58 G_bContPosDone := bDwell_out OK bError OK bAborted



3.5



11 🖬 🚳 : > 🗊 🖓 🖓 🐄 😓 -	
4 × st ContinuousPositioning [PRG] [×	
Execute of FB1 OFF	
Active of FB1 OFF	
CommandAborted of FB1 OFF OFF	
Active of FB2 OFF	
50 SET(bMoveAbs2Done,bDwell_In);	
Check the I/O signals of FB1 and FB2 at the time of start. The CommandAborted output of FB1 is turned on, indicating that FB1 is interrupted.	
TO //D D	

3.5







3.5



58 G_bContPosDone := bDwell_out OK bError OK bAborted



3.5






3.5



In the example of this course, because the command velocity of FB2 is slower, the velocity waveform is the same as BlendingNext.

3.5



58] G_bContPosDone := bDwell_out OK bError OK bAborted





3.5



In this chapter, you have learned:

- Aborting
- Buffered
- Blending
- Program Example
- Operation Check

Point

Aborting	• When the operation-type FB is running and the next operation-type FB is executed, Aborting interrupts the FB being executed and executes the next FB.
Buffered	• When the operation-type FB is running and the next operation-type FB is executed, Buffered waits until the FB being executed is completed and executes the next FB.
Blending	 When the operation-type FB is running and the next operation-type FB is executed, Blending executes the next FB without stopping the operation of the FB being executed. In Blending, there are four velocity switching methods: BlendingLow, BlendingHigh, BlendingPrevious, and BlendingNext.
Program Example	• Select the buffer mode with the BufferMode input of the operation FB.
Operation Check	• You have checked the difference in operation of each buffer mode in the video.

Chapter 4 Operation with PLC CPU

Download the sample program to be used in this chapter from the link below. The program content is the same as the sample program described in chapter 2 and chapter 3. Only the programming method is different.

RD78GBasic2_sample2.zip (1.39 MB)

4.1 Registering the Motion Module FB Library

(1) Download the FB library

The Motion control FB can be used in the program of the PLC CPU by registering the FB library for the Motion module to GX Works3. Download the FB library from the link below, and unzip the ZIP file to the desired destination.

MotionControl_RD78G_3d.zip(4.29 MB)

(Note) The latest version of FB library can be downloaded from the MITSUBISHI ELECTRIC FA Global Website.

Registering the Motion Module FB Library

(2) Registering the FB library

- 1) Open any project in GX Works3, and open the Library tab in the Element Selection window.
- 2) Click the [Register to Library List] button at the upper part, and select [Register Library].
- 3) When a message "Library is registered to the list" is displayed, click [OK].
- 4) Select the FB library file "MotionControl_RD78_****.mslm", and click [Open]. (**** indicates the version.)
- 5) The Motion control FB is registered to the library in the Element Selection window.

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The procedure for creating a project is the same as described in the previous section.

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					~	(Find POU)	201	N.
1 Project						》四日 4 日 3	ZAXIS	[]*
Module Configuration		100				Display Target:	Al	~
E C Program	JOG Forward	JOG Backward				Module Label		
Initial	G_bJogFW	G_bJogBW	MOV_Joej			3E00:RD4CPU		
	X92	X91	MDv, Jog	-		🗉 🍌 0000:RD78G4		
E 🙆 ProcPers	JOG Beckmard	JOG Forward	JogForward	Do	Den	□ ▲ RD78_0000		_
The Decel Light			JogBeckward	Bury G,bk	pellesy	RD78_0000		
ProgramBody	3 .	JOG Velocity		Y	11	Avic0001		
Fixed Scan		3, is Jost Velocity	Velocity	Active		Axis000	1	
Event	•	le Jog Acc	Acceleration Comma	dAb orted ()		- AxisRef	_	
Standby	e e e e e e e e e e e e e e e e e e e	DG Defeleration	Deceleration	Error		👘 Axit	Ref	
Lipregistered Program		JOGUerk				Axia	No	
B FB/FUN		le JogJerk					ך	_
E 🖪 Label		0	Connect f	he AxisRef-typ	e structured d	lata registered		
🔳 🚮 Global Label		9	as the pu	olic label to the	e Axis input.			
Global 👘			Drag and	drop "AvisRef	" (avis inform:	ation) to the		
(M+RD78_0000			program	ditor	(axis internit	ition) to the		
Structured Data Type:			program	eartor.				
E Cevice						AxisRef		
					· · · · ·	POU Favori History	Madula III	bran
Connection De			L Por	Heat	1/R-6 C-1	History	woodle	urary
			HUA	Host	(R=0, C=1			- m

(1) ServoON_Jog

4.4

This program executes PLC ready ON, servo ON, and JOG operation.



(2) Homing

This program performs the home position return.



(3) Positioning

This program performs the single axis positioning operation.



4.4

(4) ContinuousPositioning

This program performs continuous positioning by using the buffer mode.



4.4

(5) ErrorReset

This program performs the error reset.



When the error reset signal (G_bErrorReset: X2F) is turned on, the axis error reset (MC_Reset) and system error reset (MCv_MotionErrorReset) are executed.

(6) Monitor

This program stores SetPosition (Set Position) and SetVelocity (Set Velocity) of the axis monitor global label assigned to D0 and D2 of the PLC CPU.

Since SetPosition and SetVelocity are the double precision real number type, they are converted to the signed double word type so that they can be easily handled by the PLC CPU. (Note)

These word devices are not used in the subject.

They are used to display on other sequence programs and GOT, and for other purposes. This program is described with ST.

1 G_dSetPosition := LREAL_TO_DINT(RD78_0000.Axis0001.Md.SetPosition); G_dSetVelocity := LREAL_TO_DINT(RD78_0000.Axis0001.Md.SetVelocity); 2 3 $G_dSetPosition → D0$ $G_dSetVelocity → D2$

(Note) When the double precision real number type is converted to signed double word type, if the value to be converted is outside the range from -2147483648 to 2147483647, a calculation error occurs.

4.4

4.5 Writing Program

Write the program and parameters to the PLC CPU and Motion module.

The program is only written to the CPU module. The axis parameter and public label settings are required to be written to the Motion module side.

- 1) After all the programs in the PLC CPU are rebuilt, select [Online] → [Write to PLC] in the tool bar of GX Works3 to write all data to the PLC CPU.
- 2) When the parameters are written to the PLC CPU, communication with the Motion module is enabled. Select [Online]→[Write to Module] in the tool bar of the Motion Control Setting Function to write all data to the Motion module.
- 3) Reset the PLC CPU to finish the writing operation.

Click the play button at the lower left of the window.



Check the sample program operation. Before starting operation, make sure that the programs and parameters are written to the PLC CPU and Motion module.



Set the RUN/STOP/RESET switch of the PLC CPU to RUN. READY lamp and PROGRAM RUN lamp of the programmable controller turn on. The RUN lamp of the Motion module turns on.





Wait until the PROGRAM RUN lamp of the Motion module turns on. "r.01" is displayed on the servo amplifier. (The dots are lit.) The servo motor enters the servo ON state.



Turn on X20 to execute servo OFF. "r.01" is displayed on the servo amplifier. (The dots blink.) Turn off X20 to execute the servo ON again.



Turn on forward rotation JOG (X21) to move to the address increase direction, and turn off to stop. Turn on axis reverse rotation JOG (X22) to move to the address decrease direction, and turn off to stop.



Check the program monitor.

When X21 is turned on, the JogForward input of MCv_Jog_1 turns on. The normal rotation JOG operation is performed.

Busy output and "G_bJogBusy" turn on during the operation.



When X22 is turned on, the JogBackward input of MCv_Jog_1 turns on. The reverse rotation JOG operation is performed. Busy output and "G_bJogBusy" turn on during the operation.



Turn on home position return (X23) to start the home position return. Execute the home position return with the proximity dog method (33 is subtracted from Pr.PT45) The axis stops a little further beyond the dog, and sets that point as the home position.



Check the program monitor.

When X23 is turned on, the home position address is stored to the label. "G_bHomingReq", which is the execution command of MC_Home_1, is turned on and retained.



The home position return operation starts. When the home position return is completed, the Done output and "bHomingDone" turn on, and the retention of "G_bHomingReq" is cancelled.



Turning on positioning start (X24) starts reciprocating motion. The axis moves forward 150 mm and stops for 0.5 seconds, and moves back 150 mm and stops for 0.5 seconds.



When X24 is turned on, the data for positioning is stored to each label, and "bValueSet" turns on.

"G_bPosReq", which is the execution command of MC_MoveAbsolute_1, is turned on and retained at the rising edge of "bValueSet".



When "G_bPosReq" is turned on, MC_MoveAbsolute_1 starts and the servo motor starts running.



When the positioning by MC_MoveAbsolute_1 is completed, TON_1, which is the dwell, operates.

When 500 ms is elapsed, MC_MoveAbsolute_2 is executed and the servo motor starts running.



When the positioning by MC_MoveAbsolute_2 is completed, TON_2, which is the dwell, operates.

When 500 ms is elapsed, the retention of "G_bPosReq" is cleared, and reset to the initial state.



Turn on continuous positioning start (X25) to start the operation of the buffer mode (mc_Buffered).



Check the program monitor.

When X25 is turned on, the data for positioning is stored to each label, and "bValueSet" turns on.

"G_bContPosReq", which is the execution command of MC_MoAbsolute_1, is turned on and retained at the rising edge of "bValueSet".



When "G_bContPosReq" is turned on, MC_MoveAbsolute_1 starts and the servo motor starts running.

At this time, since the Active output is the execution command of MC_MoveAbosolute_2, MC_MoveAbsolute_2 is buffered.



When the operation of MC_MoveAbosolute_1 is completed, the buffered C_MoveAbsolute_2 is executed.When the operation of MC_MoveAbosolute_2 is completed, TON_1, which is the dwell, is executed.



is cleared, and reset to the initial state.



Go to the next page.

4.7 Summary of This Chapter

In this chapter, you have learned:

- Registering the Motion Module FB Library
- Creating Projects
- How to Use the Motion Control FB
- Sample Program Description
- Sample Program Operation Check

Point

Registering the Motion Module FB Library	• The FB library must be registered to GX Works3 to use the Motion control FB in the PLC CPU.
Creating Projects	Configure axis parameters and other settings as when programming to the Motion module.
How to Use the Motion Control FB	 The Motion control FB can be placed to the program editor by dragging and dropping it from the Library tab of Element Selection window of GX Works3. Connect the contact and label to the input/output of the FB.
Sample Program Description	• You have created a program similar to the sample programs in chapter 2 and chapter 3 by using only the PLC CPU.
Sample Program Operation Check	You have checked the operation of the sample program in the video.

Chapter 5 Logging

This chapter describes how to log data of the Motion module and display it in the graph. In this course, the positioning start program of the sample program in chapter 2 and chapter 3 will be logged as an example.

(Note) The program in chapter 4 cannot be logged with the procedure described in this chapter. "CPU Module Logging Configuration Tool" must be used.

5.1 Starting the Logging Configuration Tool

Select [Tool] \rightarrow [Logging Function] \rightarrow [Logging Setting] from the tool bar of the Motion Control Setting Function screen. The motion system logging setting tool starts.



[Point]

The motion system logging setting tool can be started from [Tool] → [MotionSystem Logging] in GX LogViewer.

File	View	Online	Tool	Window	Help							
6	20 1-	ŭ 4		Start Loggin	g Configur	ation Too	ol					
1	ñ 🍒	► ■		Start MELSEC	iQ-R Serie	es High S	Speed Data	Logger	Module (Configurat	tion Tool	
				Start MELSEC	iQ-R Serie	es High S	Speed Data	Commu	unication	Module C	onfigurati	on Tool
				Start MELSEC	-Q Series	High Spe	ed Data Lo	ogger M	odule Co	nfiguratio	n Tool	
				Start MELSEC	-Q Series	High Spe	ed Data C	ommuni	ication M	odule Con	figuration	Tool
				Start BOX Da	ta Logger	Configur	ration Tool					
				Realtime Mo	nitor Settir	ng						
				MotionSyste	m Logging]						
			R	Convert Log	ging Files							
				Option								

(1) In the edit logging setting field of the motion system logging setting tool, set the save destination of the logging data. Then, click the [Edit] button.

The Data Logging Setting screen is displayed.



(2) Select [Logging type] from continuous logging, trigger logging, and event detection. In this course, the details of the trigger logging is described. Select trigger logging, and click the [Next] button.

	and codding acturily to					
dit						
yger						
ogging type >	Data to be collected >	Sampling interval >	Trigger >	Number of records	> Count >	Save >
Select a loggin	ig type.					
- Logging type						
O Co	ntinuous logging					
	Data logging contin	rues at a specified samp	aling interval unt	il a logging stop oper	ation is performe	d.
	The ergypt contain	in carrier be set for a ci	a la lacas loggi	9		
(i) Tri	oper logging					_
	ggor rogging	adam basis dariba d	to be from the	the second second the		
	Monitor data and p	entorm logging for the da	sta before/after	the satisfaction of the	e condition (ingg	ered).
0.5	ant detection					
0.64	Erection	detection settion of the	hinner condition			
	Execute the event	is will be created by eve	nt detection.	L		
	No logging data file					
	No logging data file					
	No logging data file					
	No logging data file					
	No logging data file					
	No logging data file					
	No logging data tie					
	No logging data tile					
< Beck	No logging data tile					Next>

Setting the Data to be Logged

(3) The label of the data to be logged is registered in [Data to be collected].

1) Clobal Jabal		Motion System Data Log	ging Setting[No.1]				×
I) Global label		Edit					
Enter the global label name to the data		Trigger					
name field.		Logging type > Data to	be collected > Sampling	interval > Trigger >	Number of reco	rds > Count > S	ave > • •
In the data type field, select the data ty of the label.	ре	Set the data to collect d	uting logging.				
2) -		Data points to be o	ollected: 7 /1024	Points Items to be di	splayed:	7 /32	
2) Local label		Label Input Assistant					
Enter the data name in "program name,	/local					Size	^
label name" format.		No. Display Type	Data Name	Da	ta Type	[Word] Axis Name	
In the data type field, select the data type	pe of	0001 VAR	 G_bPcsReq Postoring/bMove/bs1Dor 	e Bi	×	l	
the label.		0003 VAR	Positioning/bDwell1_out	BR	· ·	i	
		0004 VAR	 Positioning/bMoveAbs2Don G bPosDone 	e Bit	v		
2) Characterized data trues		0006 VAR	Axis0001.Md.SetPostion	Float (doub	e precision)	4 Axis0001	V
3) Structured data type		0007 🔽 VAR	Axis0001.Md.SetVelocity	Float (doub	le precision)	4 Axis0001	
Click the [Label Input Assistant] button	and	0008 VAR	× ×				
select the member of the structured da	ta type	0010 VAR					
from the list.		0011 U VAR	- 1			>	~
Select it from the list and click the [Reg	ister]	ļ				_	
button to reflect to the data to be colle	cted	<back< td=""><td></td><td></td><td></td><td>P</td><td>lext></td></back<>				P	lext>
button to reflect to the data to be colle	cieu.					OK	Cancel
In this course, the following data is logge	d as example.	Label Input Assistant			>	<	
Data ware		Set the data to collect du	ring logging.				
Data name		Type:	Real Drive Axis		~		
G_bPosReq		Axis Name:	Axis0001 Menter Data		~		
Positioning/bMoveAbs1Done		Data List	Montor Data		Ť		
Positioning/bDwell1 out		Name		Data Name (Label)	^		
rositioning/bb/weiri_out		Md Object Data_V	elActualValue	".Md.lo_VelActualValue			
Positioning/bMoveAbs2Done		Md Jerk Limit Value Md Control Cycle	•	*.Md.JerkLimit *.Md.OperationCycle			
G bPosDone		Md Operation Setti	ng at Overrun	*.Md.OverrunOperation			
		Md Current Position	Restoration Status	".Md.PosRestoration_S	tatus		
Axis0001.Md.SetPosition		Md Execution Profi	le ID No.	*.Md.ProfileID	_		
		Md Set Postion	n	* Md SetPostion			
Axis0001.Md.SetVelocity		Md Set Velocity		*.Md.SetVelocity			
·		Md Slave Emulatin	9	*.Md.SlaveEmulate_En	able		
Click the [Next] button when the registrat	ion is completed	Md Start Permissio	n at Homing Uncompleted	*.Md.StartableAtUnhom	ed		
click the [Next] button when the registrat	ion is completed.	Md Deceleration a	Stop	.Md.StopMode_Decel	eration		
		Md Stop Signal.Sig	nal Detection Method	".Md. Stop Signal Detect	ion v	J	
				Register	Close	.al	

Setting the Data to be Logged (Continue)

(4) Set the sampling interval in [Sampling Interval].In this course, use the operation cycle No. 1 for sampling.

5.2

After selecting the sampling interval, click the [Next] button.



Setting the Data to be Logged (Continue)

(5) The condition to start the logging is set in [Trigger].

In this course, the startup the bit that is the positioning start signal is used as the trigger.

- 1) Select [With trigger].
- 2) Select "OR combination" for the trigger type.
- 3) Select No. 1 of the condition list, and click the edit button. The sub window appears.
- 4) Select "Data Condition", and select "0001:G_bPosReq" for the data name. Select "UP" for the condition. When the selection is completed, click the [OK] button.
- 5) After you return to the original screen, click the [Next] button.

gger			and the second second		20	
ogging type >	Data to be collected >	Sampling interval >	Trigger > Num	ber of records >	Count	> Save > [+]
Set the trigger	type and the trigger condition	6. I	O Without trigger	Wth	trigger	
Trigger T	ipe:	Description		-	_	
OR	combination 🗸 🗸					
		Triggered when	any of the set condition	ns is satisfied.		
Condition	List					
				-	-	_
Mon	toring Data Points:	1 /32 Points	Edit	Delete	Delete A	NI.
				-		
No.	Туре		intert			^
No.	Type Data Condition (OFF-ON)	G_bPosReq	entert			î.
No. 1 2	Type Data Condition (OFF-ON)	G_bPesReq	Intert	_		
No. 1 2 3	Type Deta Condition (OFF-ON)	G_bPosReq	intent			
No. 1 2 3 4	Type Data Condition (OFF-ON)	G_bPosReq	entert			
No. 1 2 3 4 5	Type Data Condition (QFF-ON)	G_bPosReq	Gritert			
No. 1 2 3 4 5 6	Type Deta Condition (OFF-ON)	G_bPosReq	entent			 ▼
No. 1 2 3 4 5 6 7	Type Data Cendicon (OFF-ON)	G_bPosReq	ortert			▲ ▼
No. 1 2 3 4 5 6 7 8	Type Bitla Cendison (OFF-ON)	G_tPosReq	ortert			* *
No. 1 2 3 4 5 6 7 7 8	Type Deta Condison (OFF-ON)	G_tPosReq	rtert			* *
No. 1 2 3 4 5 6 7 8 8	Type Diria Condition (OFF-ON)	G_bPosReq				Nest>

0001:G_bPosReq ~	UP ~	Data/Constant	t Data Name/Con	atant Valu
O Rived Scan		1 0	[mi] (1 to 66400000)	5
Triggered every specified	cycle.			
O At System Start				
Triggered at system start.				
C & Toner Instruction Even	for (W)			
Triggered when LoggingF	lef Cd Trigger i	s set to TRUE		
0.5				
 Event History Triggered when the event 	of the corresp	onding event hists	ary occurs.	
. Set the event code of th	e Hoper Larbeit			
- Multiple event codes car	t be set by usin	g a (hyphen) or	ra"," (comma).	

Setting the Data to be Logged (Continue)

(6) The number of sampling points is set in [Number of records].

5.2

In this course, No. of records (before trigger) is set to "500", and No. of records (after trigger) to "19500". When the setting is completed, click the [Next] button.

otion System Data Logging Setting[No	5.1]					
dit						
oper ogging type > Data to be collected >	Sampling interval >	Trigger >	Number of	records > C	ount >	Save > 🔳
Set the No. of records output to file wh	en triggered during trigge	r logging.				
No. of records (before trigger):	500 @ [Rec	ord] (0 to 295	3999)			
No. of records (after trigger):	19500 🜩 (Rec	ord] (1 to 300	(000			
Total No. of records:	20000 [Rec	ord] (1 to 300	(0000			
					_	
<back< td=""><td></td><td></td><td></td><td></td><td></td><td>Next></td></back<>						Next>
				OK	-	Cancel

(7) The logging count is set in [Count]. In this course, the count is set to 1. When the setting is completed, click the [Next] button.

Motion System Data Logging Setting[No.1]		×
Edit		
Trigger		
Logging type > Data to be collected > Sampling interval > Trigger > Number of reco	ords > Count	> Save > • •
Specify the trigger counts. Count Specified Count Specified Count Count Coun	ed.	
Specified Number of Saved Files Execute the trigger logging repeatedly according to the maximum number setting of s	aved files.	
<back< td=""><td></td><td>Next></td></back<>		Next>
	ОК	Cancel
Setting the Data to be Logged (Continue)

(8) The file format and number of saved files of the logging data is set in [Save]. In this course, the default value (format: JSON, number of saved files: 1) is set. When the setting is completed, click the [Next] button.

Edit		
gger		
ampling interval > Trigger > Number of re	ecords > Count > Save > Start condition > Finish	
Save setting for logging data file		
Set the destination folder of the logging data f	file and the file format.	
File format: JSON	✓ Save in the same folder as the setting file	
Destination drive:		
Folder:		
Maximum number of saved files		
Maximum number of saved files Set the maximum number of saved files of the	e destination drive.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled.	e destination drive. stration becomes full when 'Do not specify the maximum value' has been	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled.	s destination drive. shation becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled.	e destination drive. stration becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled. 1 (1 to 65535) 0 on the sectify the maximum value	e destination drive. tination becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded © Overwrite Files with lower numbers are deleted	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des inabled. 1 1 1 1 1 1 1	e destination drive, stration becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded Overwrite Files with lower numbers are deleted O Stop Logging stops.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des nabled. 1 1 0 (1 to 65535) Do not specify the maximum value	e destination drive, stration becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded Overwrite Files with lower numbers are deleted O Stop Logging stops.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled. 1 (1 to 65535) Do not specify the maximum value	e destination drive. struction becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded © Overwrite Files with lower numbers are deleted O Stop Logging stops.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled. 1 (1 to 65535) Do not specify the maximum value	e destination drive. stration becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded © Overwrite Files with lower numbers are deleted O stop Logging stops.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des enabled. 1 (1 to 65535) Do not specify the maximum value	e destination drive. Enation becomes this when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded © Overwrite Files with lower numbers are deleted O Stop Logging stops.	
Maximum number of saved files Set the maximum number of saved files of the Files are created until the capacity of the des inabled. 1	e destination drive. tination becomes full when 'Do not specify the maximum value' has been Operation when the maximum number is exceeded Overwrite Files with lower numbers are deleted O Stop Logging stops.	Next>

(9) The condition to start the logging is set in [Start condition]. In this course, "Start by User Operation" is set.
When the estimation is completed, click the [Next] button.

When the setting is completed, click the [Next] button.



5.2 Setting the Data to be Logged (Continue)

(10) The data logging name is set in [Finish].In this course, the default value (LOG01) is set.When the setting is completed, click the [Next] button.

tion System Data	a Logging Set	tting[No.1]					
dit							
yger							
ampling interval >	Trigger >	Number of records >	Count >	Save >	Start condition >	Finish	
All required infor	mation for data	logging has been provid	led.				
To finish the sett	ing, click the [OK]button.					
Set the data k	ogging name.						
Data logging	name : LOG	01					
<back< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></back<>							
					_	_	TYEAL2

(11) Return to the motion system logging setting tool.The settings that have been configured can be saved.Click the save icon and save to the destination of your choice.



Writing the Logging Setting

The setting information of the logging is written.

Click the write logging setting icon, select the target memory, and click the [Write] button.

A confirmation window appears.

Click the [Yes] button and continue. When the writing is completed, click the [OK] button and close the screen.

Motion Suttem Looping Settion (2000)2028G(k) log and p	
roject Edit Online Mate	Write Logging Setting-0000:RD78G(H) (Host)
) 🈂 🖻 👗 🛍 🛄 📅 🖉 🖉 🗍	Online operation
Current user defined label	Bead logging setting
Andrews and the second s	Write logging setting
Edit logging setting	O <u>D</u> elete logging setting
To edit an existing data logging setting, select the corresponding row, click [Edit] or double-click.	
Data being edited Destination Drive of Logging Setting File: User drive	Target memory User drive V
Delete Delete All	
No. Tarpet Data Name Logging Type File Format Sampling Interval Data Points	Target logging setting data
01 J LOG01 Trigger JSON Operation cycle 7Point	Data being edited If the servo system recorder add-on is enabled at system start, No.9 and No.10 will use logging settings of the SD
	memory card with priority. Refer to manuals for details.
	Data Lancing Setting
	No.01[LOG01](Trigger)
8	
10	3
Edt No 9 and No 10 are dedicated areas for serve system recorder. Make logging settings using No.1 to No.8.	Y
0	
	Write Close
	Wrtg Close
	Writg
•	Write Close
otion System Logging Configuration Tool X	Motion System Logging Configuration Tool
otion System Logging Configuration Tool X	Motion System Logging Configuration Tool
otion System Logging Configuration Tool ×	Motion System Logging Configuration Tool
otion System Logging Configuration Tool ×	Motion System Logging Configuration Tool
otion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8</connection>	Motion System Logging Configuration Tool
otion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the</connection>	Motion System Logging Configuration Tool
otion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the selected logging settings, already exists in the target memory of the write destination.</connection>	Motion System Logging Configuration Tool Completed writing the logging setting data. Caution> Logging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To fine the lignments flaters Display and Operation' window.
Notion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the selected logging settings, already exists in the target memory of the write destination.</connection>	Wrtg Core Motion System Logging Configuration Tool > Image: Completed writing the logging setting data. < Caution > Logging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To display the 'Logging Status Display and Operation' window, select [Online] -> [Logoing Status Display and Operation].
Notion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the selected logging settings, already exists in the target memory of the write destination. - No.01</connection>	Wreg Cose Motion System Logging Configuration Tool > Image: Completed writing the logging setting data. < Caution> Logging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To display the 'Logging Status Display and Operation' window, select [Online] -> [Logging Status Display and Operation].
Iotion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the selected logging settings, already exists in the target memory of the write destination No.01 Writing settings will overwrite the logging setting in the target memory.</connection>	Wrtg Cose Motion System Logging Configuration Tool > Image: Completed writing the logging setting data. > < Caution > Cogging is not started just by writing logging settings. Cogging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To display the 'Logging Status Display and Operation' window. Start [Online] -> [Logging Status Display and Operation].
Iotion System Logging Configuration Tool × Write the logging settings to the motion system. <connection destination=""> RD78G8 The following setting No., which has been included in the selected logging settings, already exists in the target memory of the write destination No.01 Writing settings will overwrite the logging setting in the target memory. Do you want to continue?</connection>	Wrtg Cose Motion System Logging Configuration Tool > Image: Completed writing the logging setting data. < Caution > Coging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To display the 'Logging Status Display and Operation' window, select [Online] -> [Logging Status Display and Operation].
Instant Instant	Wreg Cose Motion System Logging Configuration Tool Image: Completed writing the logging setting data. < Caution > Logging is not started just by writing logging settings. Start logging in the 'Logging Status Display and Operation' window. To display the 'Logging Status Display and Operation' window, select [Online] -> [Logging Status Display and Operation].

When "Start by User Operation" is set in 5.2 (9), click the [Logging Status and Operation] icon to display the [Logging Status and Operation] screen and to start the logging.

When the logging data setting name to be executed is selected the [Start] button is clicked, the LoggingStatus switches to "Waiting for trigger".

When the program is executed in this state and the trigger condition (when X24 is turned ON in this example of this course) is satisfied, the status switches to "Triggered".

When the logging is completed, the status switches to "CollectionCompleted" from "Saving".



GX LogViewer is used to read the logging data.

Select [Tool] \rightarrow [Logging Function] \rightarrow [Start GX LogViewer] from the tool bar of the Motion Control Setting Function screen. When GX LogViewer is started, select [Online] \rightarrow [Open Logging File].

Select "0000:RD78G(H) (Host)" in the Connection Destination screen. (Note)



(Note) If GX LogViewer is already started, and the communication with the Motion module is already set, this screen is not displayed.

Select the logging file to be read.

5.5

In the example of this chapter, the user drive in "LOGGING" \rightarrow "LOG1" \rightarrow "(Logged date and time).json" is selected. Select the file name and click the [Open File] button.

Logging File - 0000:RD78G(H) (Host) X	Logging File - 0000:RD78G(H) (Host)	Logging File - 0000:RD78G(H) (Host)
Target Memory User drive V	Target Memory User drive ~	Target Memory User drive ~
Directory / Move	Directory /LOGGING Move	Directory /LOGGING/LOG01 Move
Up one level Befresh	Lip one level Befresh	Up one level Befresh
Name Size Date Modified	Name Size Date Modified	Name Size Date Modified
SMOTPRJS 7/14/2022 10:41 AM 105GING 7/6/2022 11:10 AM	7/14/2022 10:44 AM CallOG10 7/14/2022 10:44 AM	160875 7/14/2022 10:44 AM
Entre json 59 7/14/2022 10:41 AM		
		<u> </u>
Qpen File Oose	Qpen File Cose	Qoen File Oose

The waveform data logged in GX LogViewer is displayed.

When the plot format is changed from "Equidistance Plot" to "Time Interval Plot", the entire logged waveform can be displayed.



The logged waveform data can be saved as a csv file or json file. (When it is logged in CSV format, it can be saved as CSV file.)

1) When saving as csv file

Select [File] \rightarrow [Save As] \rightarrow [Save CSV File] from the tool bar of GX LogViewer.

🐕 MELSOFT Series GX LogViewer - [20200720_105018.json - Historical Trend(RD78G(H))]



2) When saving as json file

Select [Online] \rightarrow [Save Logging File to PC] from the tool bar of GX LogViewer.

Onl	ine	Tool	Window	Help		
	Ор	en Logg	ing File	Ctrl+L		
	Rea	altime M	onitor		Ctrl+R	
	Rec	ent Fold	lers		•	
5	Sav	e Loggii				
⊩	Beg	jin Mon	itor	F3		
	End	Monito	or	Alt+F3		
-	Pau	ise Mon	itor	F9		
$\frac{1}{\mathbb{D}}$	Res	tart Mo	nitor		Ctrl+F9	
$S_{\rm e}^{\rm e}$	Clea	ar Graph				

In this chapter, you have learned:

- Starting the Logging Configuration Tool
- Setting the Data to be Logged
- Writing the Logging Setting
- Starting the Logging
- Reading the Logging Data
- Saving the Logging Data

Point

5.7

Starting the Logging Configuration Tool	• Start the motion system logging setting tool from the motion control setting function.
Setting the Data to be Logged	• Set the data to be logged, trigger conditions, and others by following the procedure displayed in the motion system logging setting tool.
Writing the Logging Setting	Write the logging setting data to the Motion module before logging.
Starting the Logging	• When the logging start condition is set to "Start by User Operation", click the start button in the "Logging Status and Operation" screen to start logging.
Reading the Logging Data	GX LogViewer is used to read the logging data.
Saving the Logging Data	• The logged waveform data can be saved as a csv file or json file.

Test Final Test	
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Now that you have completed all of the lessons of the **MELSEC iQ-R Series Motion Module Basics (RD78G(H) Positioning Control)** Course, you are ready to take the final test. If you are unclear on any of the topics covered, please take this opportunity to review those topics.

There are a total of 4 questions (7 items) in this Final Test.

You can take the final test as many times as you like.

Score results

The number of correct answers, the number of questions, the percentage of correct answers, and the pass/fail result will appear on the score page.

		1	2	3	4	5	6	7	8	9	10	
Retry	Final Test 1	 Image: A second s	 Image: A second s	 Image: A second s	X							Total questions: 28
	Final Test 2	 Image: A second s	√	1	1							Correct appears: 23
	Final Test 3	√										
	Final Test 4	√	√									Percentage: 82 %
	Final Test 5	 Image: A second s	 Image: A set of the set of the									
Retry	Final Test 6	√	X	X	X							
	Final Test 7	 Image: A second s	√	√	√			-				
	Final Test 8	×	×	√	1	1		10	pas	s the	e tes	t, 60% of correct
	Final Test 9	×						an	swe	rs is	requ	uired.
Retry	Final Test 10	X						<u> </u>				

	Test Final Test 1
	Select the correct description(s) of the public label. (You may select multiple answers.)
•	
	A public label is a shared label that can be used in both the Motion module and PLC CPU.
	Public label is registered from the global label of the PLC CPU.
	When the global label is set to the public label, select whether the label is read or written from/to the PLC CPU.
	 A public label is a shared label that can be used in both the Motion module and PLC CPU. Public label is registered from the global label of the PLC CPU. When the global label is set to the public label, select whether the label is read or written from/to the PLC CPU.



- Q1: 1 : mcAborting
 - 2 : mcBuffered
 - 3 : mcBlendingNext
 - 4 : mcBlendingPrevious
- Q2: 1 : mcBlendingNext and mcBlendingHigh
 - 2 : mcBlendingPrevious and mcBlendingHigh
 - 3 : mcBlendingNext and mcBlendingLow
 - 4 : mcBlendingPrevious and mcBlendingLow

)
ers.)
•
module



Q1: •1 : CPU module logging configuration tool

- 2 : Motion system logging setting tool
- Q2: •1 : CPU module
 - 2 : Motion module
 - 3 : Servo amplifier

Q3: • 1 : MR Configurator2

• 2 : GX LogViewer

Test	Final Test 1	
_		
Select the	e correct description(s) of the public label. (You may select multiple answers.)	
		•
	A public label is a shared label that can be used in both the Motion module and PLC CPU.	
	Public label is registered from the global label of the PLC CPU.	
	When the global label is set to the public label, select whether the label is read or written	
	from/to the PLC CPU.	



- Q1: 1 : mcAborting
 - 2 : mcBuffered
 - 3 : mcBlendingNext
 - 4 : mcBlendingPrevious
- Q2: •1: mcBlendingNext and mcBlendingHigh
 - 2 : mcBlendingPrevious and mcBlendingHigh
 - 3 : mcBlendingNext and mcBlendingLow
 - 4 : mcBlendingPrevious and mcBlendingLow

Test	Final Test 3	
Select the	correct sentence(s) from the following for programming with the PLC CPU. (You may select multiple answers.)	•
		•
	The FB library must be registered to GX Works3 to use the Motion control FB for Motion module in the PLC CPU.	
	Place the motion control FB in the program editor from the project tree of GX Works3.	
	There are no parameters to be set for the Motion module.	

Test	Final Test 4	\supset	
Select the a	nnronriate answers to fill in the blanks		
 Start (Q1) to set the data to be logged. 			
• Write the logging data to (Q2) to perform logging.			
(Q3) is used to read the logging data and check the waveform.			
Q1	2 : Motion system logging setting tool		
Q2	2 : Motion module		
Q3	2 : GX LogViewer		

- Q1: 1 : CPU module logging configuration tool 2 : Motion system logging setting tool
- Q2: •1 : CPU module
 - 2 : Motion module
 - 3 : Servo amplifier

Q3: •1 : MR Configurator2

• 2 : GX LogViewer

You have completed the Final Test. You results area as follows. To end the Final Test, proceed to the next page. Total questions: 7 Final Test 1 Final Test 2 Correct answers: 7 Final Test 3 Percentage: 100 % Final Test 4 Clear

You have completed the "MELSEC iQ-R Series Motion Module Application (RD78G(H) Positioning Control)" Course.

Thank you for taking this course.

We hope you enjoyed the lessons and the information you acquired in this course is useful for configuring systems in the future.

You can review the course as many times as you want.

Review

Close