

Programmable Controller

MELSEC iQ-R
series

**MELSEC iQ-R Motion Module
(Simple Motion Mode) Function Block Reference**

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1 List of FB

This FB list is for using the MELSEC iQ-R series Motion module in Simple Motion mode.

Name	Description
M+RD78GS_SetPositioningData	Sets positioning data (Da.1 to Da.10, Da.20 to Da.22, Da.27 to Da.29).
M+RD78GS_StartPositioning	Starts the positioning operation.
M+RD78GS_JOG	Performs the JOG operation or inching operation.
M+RD78GS_MPG	Performs the manual pulse generator operation.
M+RD78GS_ChangeSpeed	Changes the speed.
M+RD78GS_ChangeAccDecTime	Changes the acceleration/deceleration time at a speed change.
M+RD78GS_ChangePosition	Changes the target position.
M+RD78GS_Restart	Restarts the axis being stopped.
M+RD78GS_OperateError	Monitors errors and warnings, and resets errors.
M+RD78GS_InitializeParameter	Initializes the parameter.
M+RD78GS_WriteFlash	Writes the parameter, positioning data, and block start data in the buffer memory to the flash ROM.
M+RD78GS_ChangeTorqueControlMode	Sets torque limit values in the forward direction and reverse direction individually.
M+RD78GS_ChangeSpeedControlMode	Activates the speed control mode.
M+RD78GS_ChangePositionControlMode	Activates the position control mode.
M+RD78GS_ChangeContinuousTorqueMode	Activates the continuous operation to torque control mode.
M+RD78GS_Sync	Starts and ends the synchronous control.
M+RD78GS_ChangeSyncEncoderPosition	Changes the synchronous encoder axis current value and synchronous encoder axis current value per cycle.
M+RD78GS_DisableSyncEncoder	Disables inputs from the synchronous encoder axis.
M+RD78GS_EnableSyncEncoder	Enables inputs from the synchronous encoder axis.
M+RD78GS_ResetSyncEncoderError	Reads error information from the synchronous encoder axis, and resets the error.
M+RD78GS_ConnectSyncEncoder	Connects a synchronous encoder via CPU.
M+RD78GS_MoveCamReferencePosition	Adds the movement amount set in the synchronous control change value to the cam reference position to move the cam reference position.
M+RD78GS_ChangeCamPositionPerCycle	Changes the cam axis current value per cycle to a synchronous control change value.
M+RD78GS_ChangeMainShaftGearPositionPerCycle	Changes the current value per cycle after main shaft gear to a synchronous control change value.
M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle	Changes the current value per cycle after auxiliary shaft gear to a synchronous control change value.
M+RD78GS_MoveCamPositionPerCycle	Adds the movement amount set in the synchronous control change value to a cam axis current value per cycle to move the cam axis current value per cycle.
M+RD78GS_MakeRotaryCutterCam	Automatically generates the cam for a rotary cutter.
M+RD78GS_CalcCamCommandPosition	Calculates a cam axis feed current value, and outputs the calculation result.
M+RD78GS_CalcCamPositionPerCycle	Calculates a cam axis current value per cycle, and outputs the calculation result.
M+RD78GS_ReadWriteParameter	Reads and writes the slave device object.

Restriction

When using this FB, set the Motion modules which have a module model name that ends with (S)^{*1}(RD78G4(S)/RD78G8(S)/RD78G16(S)) in the module configuration of GX Works3.

The Motion modules with names that do not end with (S) (RD78G4/RD78G8/RD78G16) do not support Simple Motion mode and thus cannot use these FBs.

*1: (S) refers to Simple Motion mode.

2 Motion Module FB

2.1 M+RD78GS_SetPositioningData

Name

M+RD78GS_SetPositioningData

Overview

Item	Description															
Function overview	Sets positioning data (Da.1 to Da.10, Da.20 to Da.22, Da.27 to Da.29).															
Symbol	<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">M+RD78GS_SetPositioningData</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) — B : i_bEN</td> <td style="width: 60%;"></td> <td style="width: 20%;">o_bENO : B — (5)</td> </tr> <tr> <td>(2) — DUT : i_stModule</td> <td></td> <td>o_bOK : B — (6)</td> </tr> <tr> <td>(3) — UW : i_uAxis</td> <td></td> <td>o_bErr : B — (7)</td> </tr> <tr> <td>(4) — UW : i_uDataNo</td> <td></td> <td>o_uErrId : UW — (8)</td> </tr> <tr> <td colspan="3" style="text-align: center; padding: 5px;"> pb_uOpePattern (9) pb_uCtrlSys (10) pb_uAccTimeNo (11) pb_uDecTimeNo (12) pb_uMcode (13) pb_uDwellTime (14) pb_uMcodeOnTiming (15) pb_uABS (16) pb_uInterpolateSpd (17) pb_udCmdSpd (18) pb_dPositAdr (19) pb_dArcAdr (20) pb_uInterpolationAxisNo1 (21) pb_uInterpolationAxisNo2 (22) pb_uInterpolationAxisNo3 (23) </td> </tr> </table> </div>	(1) — B : i_bEN		o_bENO : B — (5)	(2) — DUT : i_stModule		o_bOK : B — (6)	(3) — UW : i_uAxis		o_bErr : B — (7)	(4) — UW : i_uDataNo		o_uErrId : UW — (8)	pb_uOpePattern (9) pb_uCtrlSys (10) pb_uAccTimeNo (11) pb_uDecTimeNo (12) pb_uMcode (13) pb_uDwellTime (14) pb_uMcodeOnTiming (15) pb_uABS (16) pb_uInterpolateSpd (17) pb_udCmdSpd (18) pb_dPositAdr (19) pb_dArcAdr (20) pb_uInterpolationAxisNo1 (21) pb_uInterpolationAxisNo2 (22) pb_uInterpolationAxisNo3 (23)		
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Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_uDataNo	Positioning data No.	Word [unsigned]	1 to 600	Specify the positioning data No.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that setting the positioning data has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Disclosed labels

No.	Variable name	Name	Data type	Setting range	Description
(9)	pb_uOpePattern	Da.1: Operation pattern	Word [unsigned]	0, 1, 3	<p>Specify whether the positioning is completed with the data being executed, or continues with the following data.</p> <ul style="list-style-type: none"> • 0: Positioning complete • 1: Continuous positioning control • 3: Continuous path control <p>*: When 4 or higher, which is out of the setting range, is specified, bit 0 and 1 are enabled. For example, when 4 is set, 0 is applied.</p>
(10)	pb_uCtrlSys	Da.2: Control system	Word [unsigned]	01H to 1EH, 80H to 84H	<p>Sets the control system for positioning control.</p> <ul style="list-style-type: none"> • 01H: ABS1 1-axis linear control (ABS) • 02H: INC1 1-axis linear control (INC) • 03H: FEED1 1-axis fixed-feed control • 04H: VF1 1-axis speed control (Forward) • 05H: VR1 1-axis speed control (Reverse) • 06H: VPF Speed-position switching control (Forward) • 07H: VPR Speed-position switching control (Reverse) • 08H: PVF Position-speed switching control (Forward) • 09H: PVR Position-speed switching control (Reverse) • 0AH: ABS2 2-axis linear interpolation control (ABS) • 0BH: INC2 2-axis linear interpolation control (INC) • 0CH: FEED2 Fixed-feed control by 2-axis linear interpolation • 0DH: ABS$\hat{\curvearrowright}$ Circular interpolation control with sub point designation (ABS) • 0EH: INC$\hat{\curvearrowright}$ Circular interpolation control with sub point designation (INC) • 0FH: ABS. Circular interpolation control with center point designation (ABS, CW) • 10H: ABS. Circular interpolation control with center point designation (ABS, CCW) • 11H: INC. Circular interpolation control with center point designation (INC, CW) • 12H: INC. Circular interpolation control with center point designation (INC, CCW) • 13H: VF2 2-axis speed control (Forward) • 14H: VR2 2-axis speed control (Reverse) • 15H: ABS3 3-axis linear interpolation control (ABS) • 16H: INC3 3-axis linear interpolation control (INC) • 17H: FEED3 Fixed-feed control by 3-axis linear interpolation • 18H: VF3 3-axis speed control (Forward) • 19H: VR3 3-axis speed control (Reverse) • 1AH: ABS4 4-axis linear interpolation control (ABS) • 1BH: INC4 4-axis linear interpolation control (INC) • 1CH: FEED4 Fixed-feed control by 4-axis linear interpolation • 1DH: VF4 4-axis speed control (Forward) • 1EH: VR4 4-axis speed control (Reverse) • 20H: ABSH$\hat{\curvearrowright}$ Helical interpolation control with sub point designation (ABS) • 21H: INCH$\hat{\curvearrowright}$ Helical interpolation control with sub point designation (INC) • 22H: ABSH. Helical interpolation control with center point designation (ABS, CW) • 23H: ABSH. Helical interpolation control with center point designation (ABS, CCW) • 24H: INCH. Helical interpolation control with center point designation (INC, CW) • 25H: INCH. Helical interpolation control with center point designation (INC, CCW) • 80H: NOP NOP instruction • 81H: POS Current value changing • 82H: JUMP JUMP instruction • 83H: LOOP Top of LOOP-LEND loop • 84H: LEND End of LOOP-LEND loop

No.	Variable name	Name	Data type	Setting range	Description
(11)	pb_uAccTimeNo	Da.3: Acceleration time No.	Word [unsigned]	0 to 3	Set any of the acceleration time 0 to 3 as the acceleration time for positioning. <ul style="list-style-type: none"> • 0: Acceleration time 0 • 1: Acceleration time 1 • 2: Acceleration time 2 • 3: Acceleration time 3 *: When 4 or higher, which is out of the setting range, is specified, bit 0 and 1 are enabled. For example, when 4 is set, 0 is applied.
(12)	pb_uDecTimeNo	Da.4: Deceleration time No.	Word [unsigned]	0 to 3	Set any of the deceleration time 0 to 3 as the deceleration time for positioning. <ul style="list-style-type: none"> • 0: Deceleration time 0 • 1: Deceleration time 1 • 2: Deceleration time 2 • 3: Deceleration time 3 *: When 4 or higher, which is out of the setting range, is specified, bit 0 and 1 are enabled. For example, when 4 is set, 0 is applied.
(13)	pb_uMcode	Da.10: M code	Word [unsigned]	Setting range will differ based on "Da.2: Control system" settings.	Set the "condition data No.", "number of repetitions, or "M code" for the control system. ■When "Da.2: Control system" is "82H: JUMP" Set the "condition data No." <ul style="list-style-type: none"> • 0 to 10 ■When "Da.2: Control system" is "83H: LOOP" Set the "number of repetitions". <ul style="list-style-type: none"> • 1 to 65535 ■When "Da.2: Control system" is anything other than the above Set "M code". <ul style="list-style-type: none"> • 0 to 65535 *: 0 to 32767: Set by decimal number. 32768 to 65535: Convert the number to a hexadecimal number and set.
(14)	pb_uDwellTime	Da.9: Dwell time	Word [unsigned]	Setting range will differ based on "Da.2: Control system" settings.	Set the "positioning data No." or "dwell time" for the control system. ■When "Da.2: Control system" is "82H: JUMP" Set the "positioning data No." <ul style="list-style-type: none"> • 1 to 600 ■When "Da.2: Control system" is anything other than "82H: JUMP" Set the "dwell time". <ul style="list-style-type: none"> • 0 to 65535 *: 0 to 32767: Set by decimal number. 32768 to 65535: Convert the number to a hexadecimal number and set.
(15)	pb_uMcodeOnTiming	Da.27: M code ON signal output timing	Word [unsigned]	0 to 2	Set the timing to output the M code ON signal. <ul style="list-style-type: none"> • 0: Setting value of "Pr.18: M code ON signal output timing" • 1: WITH mode • 2: AFTER mode *: When 4 or higher is specified, bit 0 and 1 are enabled. For example, when 4 is set, 0 is applied.
(16)	pb_uABS	Da.28: ABS direction in degrees	Word [unsigned]	0 to 3	Set the movement direction of ABS when the unit is degree under position control. <ul style="list-style-type: none"> • 0: Setting value of "Cd.40: ABS direction in degrees" • 1: ABS circular right • 2: ABS circular left • 3: Takes a shortcut (Specified direction ignored.) *: When 4 or higher, which is out of the setting range, is specified, bit 0 and 1 are enabled. For example, when 4 is set, 0 is applied.

No.	Variable name	Name	Data type	Setting range	Description
(17)	pb_ulInterpolateSpd	Da.29: Interpolation speed designation method	Word [unsigned]	0 to 2	Set whether to specify the composite speed or reference axis speed when performing linear interpolation or circular interpolation. <ul style="list-style-type: none"> • 0: Setting value of "Pr.20: Interpolation speed designation method". • 1: Composite speed • 2: Reference axis speed *: When 8 or higher is specified, bit 0 to 2 are enabled. For example, when 8 is set, 0 is applied.
(18)	pb_udCmdSpd	Da.8: Command speed	Double word [unsigned]	Setting range will differ based on "Pr.1: Unit setting" settings.	Set the command speed for positioning. ■When "Pr. 1: Unit setting" is "0: mm, 1: inch, 2: degree" <ul style="list-style-type: none"> • 1 to 2000000000 ■When "Pr.1: Unit setting" is "3: pulse" <ul style="list-style-type: none"> • 1 to 1000000000
				FFFFFFFFH	The speed set for the previous positioning data No. is used for positioning control. <ul style="list-style-type: none"> • FFFFFFFFH: Current speed
(19)	pb_dPositAdr	Da.6: Positioning address	Double word [signed]	Setting range will differ based on "Pr.1: Unit setting" and "Da.2: Control system" settings.	Specify the target position or movement amount for positioning control. The setting value differs depending on the control system. ■When "Pr.1: Unit setting" is "0: mm, 1: inch, 3: pulse" <ul style="list-style-type: none"> • "Da.2: Control system" is "06H to 09H": 0 to 2147483647 • "Da.2: Control system" is other than "06H to 09H": -2147483648 to 2147483647 ■When "Pr.1: Unit setting" is "2: degree" <ul style="list-style-type: none"> • "Da.2: Control system" is "01H, 0AH, 15H, 1AH, 81H, 20H, 22H, 23H": 0 to 35999999 • "Da.2: Control system" is "02H, 0BH, 16H, 1BH, 03H, 0CH, 17H, 1CH, 20H, 22H, 23H": -2147483648 to 2147483647 • "Da.2: Control system" is "06H, 07H": 0 to 2147483647 (INC mode) 0 to 35999999 (ABS mode) • "Da.2: Control system" is "08H, 09H": 0 to 2147483647
(20)	pb_dArcAdr	Da.7: Arc address	Double word [signed]	Setting range will differ based on "Pr.1: Unit setting" settings.	Use this label only when performing circular interpolation control. For the control with sub point designation, set the sub point address. For the control with center point designation, set the center point address of the arc. ■When "Pr.1: Unit setting" is "0: mm, 1: inch, 3: pulse" <ul style="list-style-type: none"> • -2147483648 to 2147483647 ■When "Pr.1: Unit setting" is "2: degree" <ul style="list-style-type: none"> • Unused (Set "0".)
(21)	pb_ulInterpolation AxisNo1	Da.20: Axis to be interpolated No. 1	Word [unsigned]	0H to FH	Set the interpolation-target axis 1 when performing interpolation operation. Values out of the setting range or the own axis cannot be set as the interpolation-target axis. Set "0" to disable the interpolation. <ul style="list-style-type: none"> • 0H: Axis 1 • 1H: Axis 2 • 2H: Axis 3 • 3H: Axis 4 • 4H: Axis 5 • 5H: Axis 6 • 6H: Axis 7 • 7H: Axis 8 • 8H: Axis 9 • 9H: Axis 10 • AH: Axis 11 • BH: Axis 12 • CH: Axis 13 • DH: Axis 14 • EH: Axis 15 • FH: Axis 16 *: When 100H or higher is set, lower 8 bits (bit 0 to 7) are enabled. For example, when 101H is set, 1H is applied.

No.	Variable name	Name	Data type	Setting range	Description
(22)	pb_ulInterpolation AxisNo2	Da.21: Axis to be interpolated No. 2	Word [unsigned]	0H to FH	<p>Set the interpolation-target axis 2 when performing interpolation operation. Values out of the setting range or the own axis cannot be set as the interpolation-target axis.</p> <p>Set "0" to disable the interpolation or for 2-axis interpolation control.</p> <ul style="list-style-type: none"> • 0H: Axis 1 • 1H: Axis 2 • 2H: Axis 3 • 3H: Axis 4 • 4H: Axis 5 • 5H: Axis 6 • 6H: Axis 7 • 7H: Axis 8 • 8H: Axis 9 • 9H: Axis 10 • AH: Axis 11 • BH: Axis 12 • CH: Axis 13 • DH: Axis 14 • EH: Axis 15 • FH: Axis 16 <p>*: When 100H or higher is set, lower 8 bits (bit 0 to 7) are enabled. For example, when 101H is set, 1H is applied.</p>
(23)	pb_ulInterpolation AxisNo3	Da.22: Axis to be interpolated No. 3	Word [unsigned]	0H to FH	<p>Set the interpolation-target axis 3 when performing interpolation operation. Values out of the setting range or the own axis cannot be set as the interpolation-target axis.</p> <p>Set "0" to disable the interpolation, for 2-axis interpolation control, or for 3-axis interpolation control.</p> <ul style="list-style-type: none"> • 0H: Axis 1 • 1H: Axis 2 • 2H: Axis 3 • 3H: Axis 4 • 4H: Axis 5 • 5H: Axis 6 • 6H: Axis 7 • 7H: Axis 8 • 8H: Axis 9 • 9H: Axis 10 • AH: Axis 11 • BH: Axis 12 • CH: Axis 13 • DH: Axis 14 • EH: Axis 15 • FH: Axis 16 <p>*: When 100H or higher is set, lower 8 bits (bit 0 to 7) are enabled. For example, when 101H is set, 1H is applied.</p>

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	209 steps
Function description	<ul style="list-style-type: none"> • By turning ON i_bEN (Execution command), the set positioning data is written to the buffer memory. • When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). • When the setting value of the positioning data No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (101H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (single scan execution type)

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>

Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation.
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Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
101H	The setting value of i_uDataNo (Positioning data No.) is out of the range. The positioning data No. is not within the range of 1 to 600.	Please try again after confirming the setting.

Version upgrade history

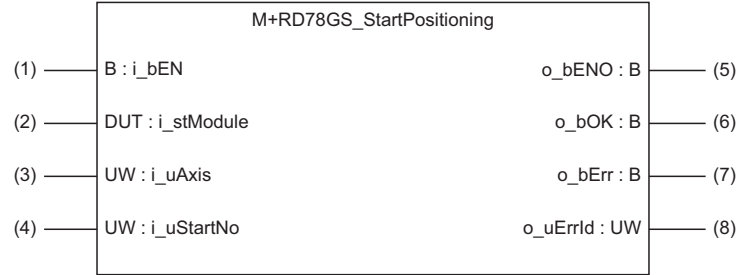
Version	Date	Description
00A	2021/04/30	First edition

2.2 M+RD78GS_StartPositioning

Name

M+RD78GS_StartPositioning

Overview

Item	Description
Function overview	Starts the positioning operation.
Symbol	

Labels

■Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_uStartNo()	Cd.3: Positioning start No.	Word [unsigned]	1 to 600, 7000 to 7004, 9001 to 9004	Set the positioning start No. corresponding to the control to be started in "Cd.3: Positioning start No." • 1 to 600: Positioning data No. • 7000 to 7004: Block start designation • 9001: Machine home position return • 9002: Fast home position return • 9003: Current value changing • 9004: Simultaneous starting of multiple axes

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that executing this FB has been completed. However, this label does not turn ON when a module error occurs at the start.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	410 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the control corresponding to i_uStartNo (Cd.3: Positioning start No.) is started. This FB is activated by turning ON the positioning start signal (Y10 to Y1F). Only when the conditions are met, the positioning start signal (Y10 to Y1F) is turned ON by turning ON i_bEN (Execution command). If any of the conditions is not met, the error code (200H) is stored in o_uErrId (Error code). <Conditions> <ul style="list-style-type: none"> READY signal (X0): ON Positioning start signal (Y10 to Y1F): OFF Start complete signal ([Md.31] Status: b14): OFF BUSY signal (X10 to X1F): OFF When the start complete signal ([Md.31] Status: b14) is turned ON or i_bEN (Execution command) is turned OFF, the positioning start signal (Y10 to Y1F) is turned OFF. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When the setting value of the positioning start No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (102H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>	

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. This FB turns ON and OFF the positioning start signal (Y10 to Y1F). Thus, do not turn ON or OFF the positioning start signal (Y10 to Y1F) by the other means while this FB is being executed. When this FB is used twice or more or other FB that operates the Y signal same as the signal this FB does, create an interlock to prevent the FBs from being activated at the same time. When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. When this FB is used in two or more places, a duplicated coil warning may occur during compile operation due to the Y signal being operated by the module label. However, this is not a problem and the FB will operate without an error. This FB does not set the data when started. Data required for controlling the start No. must be set on the parameter or buffer memory. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
102H	The setting value of i_uStartNo (Cd.3: Positioning start No.) is out of the range. The positioning start No. is not within the range of 1 to 600, 7000 to 7004, and 9001 to 9004.	Please try again after confirming the setting.
200H	The condition for positioning start is not met. Any of the following conditions is not met. <ul style="list-style-type: none"> READY (X0): ON Positioning start signal (Y10 to Y1F): OFF Start complete signal ([Md.31] Status: b14): OFF BUSY signal (X10 to X1F): OFF 	Execute the FB when all of the following conditions are met. <ul style="list-style-type: none"> READY (X0): ON Positioning start signal (Y10 to Y1F): OFF Start complete signal ([Md.31] Status: b14): OFF BUSY signal (X10 to X1F): OFF

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.3 M+RD78GS_JOG

Name

M+RD78GS_JOG

Overview

Item	Description																																			
Function overview	Performs the JOG operation or inching operation.																																			
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_JOG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B</td> <td style="width: 10%;">(8)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(9)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B</td> <td>(10)</td> </tr> <tr> <td>(4) —</td> <td>B : i_bFJog</td> <td></td> <td>o_uErrId : UW</td> <td>(11)</td> </tr> <tr> <td>(5) —</td> <td>B : i_bRJog</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(6) —</td> <td>UD : i_udJogSpeed</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UW : i_ulInching</td> <td></td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B	(8)	(2) —	DUT : i_stModule		o_bOK : B	(9)	(3) —	UW : i_uAxis		o_bErr : B	(10)	(4) —	B : i_bFJog		o_uErrId : UW	(11)	(5) —	B : i_bRJog				(6) —	UD : i_udJogSpeed				(7) —	UW : i_ulInching			
(1) —	B : i_bEN		o_bENO : B	(8)																																
(2) —	DUT : i_stModule		o_bOK : B	(9)																																
(3) —	UW : i_uAxis		o_bErr : B	(10)																																
(4) —	B : i_bFJog		o_uErrId : UW	(11)																																
(5) —	B : i_bRJog																																			
(6) —	UD : i_udJogSpeed																																			
(7) —	UW : i_ulInching																																			

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_bFJog	Forward run JOG command	Bit	ON, OFF	Turn ON this label when performing the forward run JOG operation or forward run inching operation.
(5)	i_bRJog	Reverse run JOG command	Bit	ON, OFF	Turn ON this label when performing the reverse run JOG operation or reverse run inching operation.
(6)	i_udJogSpeed	Cd.17: JOG speed	Double word [unsigned]	*1	Specify the JOG speed. For inching operation, set 0.
(7)	i_ulInching	Cd.16: Inching movement amount	Word [unsigned]	0 to 65535	Specify the inching movement amount. For JOG operation, set 0. • 0: JOG operation • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}$ mm/min)	inch ($\times 10^{-3}$ inch/min)	degree ($\times 10^{-3}$ degree/min) ^{*2}	pulse (pulse/s)
0 to 2000000000	0 to 2000000000	0 to 2000000000	0 to 1000000000

*2 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled is 0 to 2000000000 ($\times 10^{-2}$ degree/min).

■ Output labels

No.	Variable name	Name	Data type	Default value	Description
(8)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(9)	o_bOK	Completed without error	Bit	OFF	ON: The JOG command is ON. OFF: The JOG command is OFF.
(10)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(11)	o_uErrId	Error code	Word [unsigned]	0	The generated error code is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	384 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bFJog (Forward run JOG command) or i_bRJog (Reverse run JOG command) after i_bEN (Execution command) is turned ON, the JOG operation or inching operation is performed. When i_bFJog (Forward run JOG command) and i_bRJog (Reverse run JOG command) are ON at the same time, the operation stops. When i_bEN (Execution command) is turned OFF from ON during operation that has been started by i_bFJog (Forward run JOG command) or i_bRJog (Reverse run JOG command), the operation stops. When i_bRJog (Reverse run JOG command) is turned ON during forward run JOG operation, the operation stops. However, when i_bRJog (Reverse run JOG command) is turned OFF from ON, the forward run JOG operation restarts. (This relation is also applied to the reverse run JOG operation and i_bFJog (Forward run JOG command).) When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Real-time execution	

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • This FB turns ON and OFF the "Cd.181: forward run JOG start signal" or "Cd.182: Reverse run JOG start signal". Thus, do not turn ON or OFF the "Cd.181: Forward run JOG start signal" or "Cd.182: Reverse run JOG start signal" by the other means while this FB is being executed. • When this FB is used twice or more or other FB that operates the Y signal same as the signal this FB does, create an interlock to prevent the FBs from being activated at the same time. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Setting a large value for the JOG speed from the beginning is dangerous. For the safety, set a small value first, and increase the value gradually while checking the operation to determine the value optimal for the control. • When values other than 0 are set in both i_ulnching (Cd.16: Inching movement amount) and i_udJogSpeed (Cd.17: JOG speed), inching operation is performed. • When this FB is used in two or more places, a duplicated coil warning may occur during compile operation due to the Y signal being operated by the module label. However, this is not a problem and the FB will operate without an error. • Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting. (Turn OFF the forward run JOG command or reverse run JOG command, turn ON i_bEN from OFF, and turn ON the forward run JOG command or reverse run JOG command again.)

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.4 M+RD78GS_MPG

Name

M+RD78GS_MPG

Overview

Item	Description
Function overview	Performs the manual pulse generator operation.
Symbol	<pre> graph LR subgraph M+RD78GS_MPG direction TB B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW["(3) UW : i_uAxis"] UD["(4) UD : i_udMPGInputMagnification"] B --- DUT --- UW --- UD end B --- o_bENO["(5) o_bENO : B"] DUT --- o_bOK["(6) o_bOK : B"] UW --- o_bErr["(7) o_bErr : B"] UD --- o_uErrId["(8) o_uErrId : UW"] </pre>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_udMPGInputMagnification	Cd.20: Manual pulse generator 1 pulse input magnification	Double word [unsigned]	1 to 10000	Set the input magnification of the manual pulse generator 1 pulse. When the setting value is "0", the magnification is "1". When the setting value is "10001" or higher, the magnification is "10000".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the manual pulse generator operation has been enabled.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	336 steps	

Item	Description
Function description	<ul style="list-style-type: none"> By turning ON or OFF i_bEN (Execution command), manual pulse generator operation is enabled or disabled. This FB is constantly executed after i_bEN (Execution command) is turned ON. The workpiece moves according to the pulses input from the manual pulse generator while o_bOK (Completed without error) is ON. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Real-time execution
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. Do not change i_uAxis (Target axis) while i_bEN (Execution command) is ON. When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.5 M+RD78GS_ChangeSpeed

Name

M+RD78GS_ChangeSpeed

Overview

Item	Description
Function overview	Changes the speed.
Symbol	<pre> graph LR subgraph M+RD78GS_ChangeSpeed direction TB i_bEN((1) B : i_bEN) i_stModule((2) DUT : i_stModule) i_uAxis((3) UW : i_uAxis) i_udSpeedChangeValue((4) UD : i_udSpeedChangeValue) o_bENO((5) o_bENO : B) o_bOK((6) o_bOK : B) o_bErr((7) o_bErr : B) o_uErrId((8) o_uErrId : UW) end </pre>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_udSpeedChangeValue	Cd.14: New speed value	Double word [unsigned]	*1	Set a new speed.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}$ mm/min)	inch ($\times 10^{-3}$ inch/min)	degree ($\times 10^{-3}$ degree/min) ^{*2}	pulse (pulse/s)
0 to 2000000000	0 to 2000000000	0 to 2000000000	0 to 1000000000

*2 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled is 0 to 2000000000 ($\times 10^{-2}$ degree/min).

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing the speed has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The generated error code is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	210 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the speed used for the control is changed to a new speed. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>	
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. Every input must be provided with a value for proper FB operation. When i_bEN (Execution command) is turned ON while the BUSY signal (X10 to X1F) is OFF, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (201H) is stored in o_uErrId (Error code). 	

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
201H	This FB is executed before positioning operation starts.	Please try again during positioning operation.

Version upgrade history

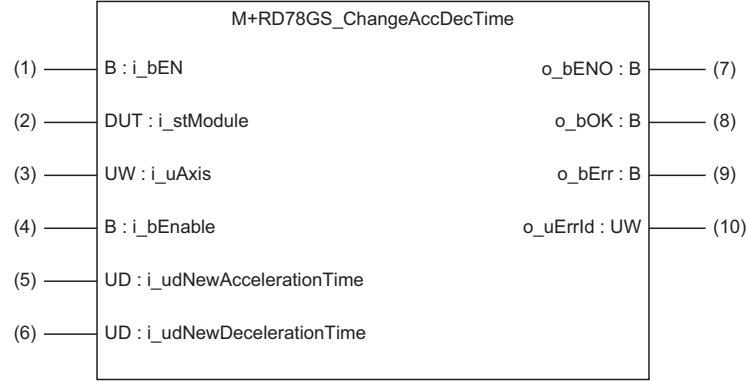
Version	Date	Description
00A	2021/04/30	First edition

2.6 M+RD78GS_ChangeAccDecTime

Name

M+RD78GS_ChangeAccDecTime

Overview

Item	Description
Function overview	Changes the acceleration/deceleration time at a speed change.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_bEnable	Acceleration/ deceleration time change enabled flag	Bit	ON, OFF	Set this label to enable or disable acceleration/deceleration time changes. • ON: Enabled • OFF: Disabled
(5)	i_udNewAccelerationTime	Cd.10: New acceleration time value	Double word [unsigned]	0 to 8388608 (ms)	Set a new acceleration time. When 0 is set, the acceleration time is not changed after the speed is changed. In this case, the previously set acceleration time is applied to the control.
(6)	i_udNewDecelerationTime	Cd.11: New deceleration time value	Double word [unsigned]	0 to 8388608 (ms)	Set a new deceleration time. When 0 is set, the deceleration time is not changed after the speed is changed. In this case, the previously set deceleration time is applied to the control.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(7)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(8)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that setting acceleration/ deceleration time change has been completed.
(9)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(10)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	212 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the setting of the acceleration/deceleration time is changed according to i_bEnable (Acceleration/deceleration time change enabled flag). When i_bEnable (Acceleration/deceleration time change enabled flag) is ON, i_udNewAccelerationTime (Cd.10: New acceleration time value) and i_udNewDecelerationTime (Cd.11: New deceleration time value) are set and Cd.12: Acceleration/deceleration time change value during speed change, enable/disable selection is changed to 1: Enables modifications to acceleration/deceleration time. When i_bEnable (Acceleration/deceleration time change enabled flag) is OFF, i_udNewAccelerationTime (Cd.10: New acceleration time value) and i_udNewDecelerationTime (Cd.11: New deceleration time value) are not set and Cd.12: Acceleration/deceleration time change value during speed change, enable/disable selection is changed to 0: Disables modifications to acceleration/deceleration time. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (single scan execution type)	
Timing chart	<p>■ When operation completes without an error</p> <ul style="list-style-type: none"> When "Cd.12: Acceleration/deceleration time change value during speed change, enable/disable" selection is "enabled" <p>The timing chart illustrates the sequence of events for the function. It shows the following signals and their states over time:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A single pulse that initiates the function. o_bENO (Execution status): A pulse that occurs during the execution period. i_bEnable (Acceleration/deceleration time change enabled flag): A pulse that enables the time change. Cd.10/Cd.11: New acceleration time value/New deceleration time value: Shows a transition from a 'Current value' to a 'New value' during the execution period. Cd.12: Acceleration/deceleration time change value during speed change, enable/disable: Shows a transition from 'Disabled' to 'Enabled' during the execution period. o_bOK (Completed without error): A pulse that occurs at the end of the execution period. o_bErr (Error flag): Remains at 0 throughout the execution. o_uErrId (Error code): Remains at 0 throughout the execution. 	

Item	Description
Timing chart	<p>• When "Cd.12: Acceleration/deceleration time change value during speed change, enable/disable" selection is "disabled"</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • A duplicated coil warning may occur during compile operation. However, this is not a problem and the FB will operate without an error. • Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.7 M+RD78GS_ChangePosition

Name

M+RD78GS_ChangePosition

Overview

Item	Description
Function overview	Changes the target position.
Symbol	<pre> graph LR subgraph M+RD78GS_ChangePosition B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW["(3) UW : i_uAxis"] D["(4) D : i_dTargetNewPosition"] UD["(5) UD : i_udTargetNewSpeed"] end B --- O6["(6) o_bENO : B"] DUT --- O7["(7) o_bOK : B"] UW --- O8["(8) o_bErr : B"] D --- O9["(9) o_uErrId : UW"] UD --- O9 </pre>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dTargetNewPosition	Cd.27: Target position change value (New address)	Double word [signed]	*1	Set the new positioning address when changing the target position during positioning operation.
(5)	i_udTargetNewSpeed	Cd.28: Target position change value (New speed)	Double word [unsigned]	*2	Set the new speed when changing the target position during positioning operation. When 0 is set, the speed is not changed.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

	mm ($\times 10^{-1}\mu\text{m}$)	inch ($\times 10^{-5}\text{inch}$)	degree ($\times 10^{-5}\text{degree}$)	pulse (pulse)
ABS	-2147483648 to 2147483647	-2147483648 to 2147483647	0 to 35999999	-2147483648 to 2147483647
INC			-2147483648 to 2147483647	

*2 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}\text{mm/min}$)	inch ($\times 10^{-3}\text{inch/min}$)	degree ($\times 10^{-3}\text{degree/min}$)*3	pulse (pulse/s)
0 to 2000000000	0 to 2000000000	0 to 2000000000	0 to 1000000000

*3 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled is 0 to 2000000000 ($\times 10^{-2}\text{degree/min}$).

■Output labels

No.	Variable name	Name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(7)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the module has accepted the target position change values.
(8)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [unsigned]	0	The generated error code is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	254 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the target position is changed according to the value set in i_dTargetNewPosition (Cd.27: Target position change value (New address)) and the speed is changed according to the value set in i_udTargetNewSpeed (Cd.28: Target position change value (New speed)) during position control. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • When i_bEN (Execution command) is turned ON while the BUSY signal (X10 to X1F) is OFF, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (201H) is stored in o_uErrId (Error code).

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
201H	This FB is executed before positioning operation starts.	Please try again during positioning operation.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.8 M+RD78GS_Restart

Name

M+RD78GS_Restart

Overview

Item	Description
Function overview	Restarts the axis being stopped.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16

Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(5)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the module has accepted the restart command request.
(6)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [unsigned]	0	The generated error code is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	263 steps	
Function description	<ul style="list-style-type: none"> Only when the conditions are met, the positioning operation that is stopped due to an error is restarted by turning ON i_bEN (Execution command). If any of the conditions is not met, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (202H) is stored in o_uErrId (Error code). <Conditions> · Positioning complete signal ([Md.31] Status: b15): OFF · Axis operation status: Stop When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	

Item	Description
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
202H	The conditions for positioning restart are not met. Any of the following conditions is not met. <ul style="list-style-type: none"> • Positioning complete signal ([Md.31] Status: b15): OFF • Axis operation status: Stop 	Please try again after confirming the setting. <ul style="list-style-type: none"> • Positioning complete signal ([Md.31] Status: b15): OFF • Axis operation status: Stop

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.9 M+RD78GS_OperateError

Name

M+RD78GS_OperateError

Overview

Item	Description
Function overview	Monitors errors and warnings, and resets errors.
Symbol	<p>The diagram shows a rectangular block labeled 'M+RD78GS_OperateError'. On the left side, there are four input terminals: (1) B : i_bEN, (2) DUT : i_stModule, (3) UW : i_uAxis, and (4) B : i_bErrReset. On the right side, there are eight output terminals: (5) o_bENO : B, (6) o_bOK : B, (7) o_bModuleErr : B, (8) o_uModuleErrId : UW, (9) o_bModuleWarn : B, (10) o_uModuleWarnId : UW, (11) o_bErr : B, and (12) o_uErrId : UW.</p>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_bErrReset	Error reset command	Bit	ON, OFF	ON: Errors are reset. OFF: Errors are not reset.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that resetting the error has been completed.
(7)	o_bModuleErr	Axis error detection	Bit	OFF	When ON, it indicates that an axis error has occurred.
(8)	o_uModuleErrId	Axis error code	Word [unsigned]	0	An error code of an error that has occurred in the module of the specified axis is stored.
(9)	o_bModuleWarn	Axis warning detection	Bit	OFF	When ON, it indicates that an axis warning has occurred.
(10)	o_uModuleWarnId	Axis warning code	Word [unsigned]	0	A warning code of a warning that has occurred in the module of the specified axis is stored.
(11)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	o_uErrId	Error code	Word [unsigned]	0	The generated error code is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	407 steps	
Function description	<ul style="list-style-type: none"> • By turning ON i_bEN (Execution command), errors of the target axis are monitored. • When a module error occurs, an error code is stored in o_uModuleErrId (Axis error code). • After i_bEN (Execution command) is turned ON, the generated error is reset by turning ON i_bErrReset (Error reset command). • When a warning occurs in the module, the warning can be reset by turning ON i_bErrReset (Error reset command). • When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Real-time execution	

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Do not change i_uAxis (Target axis) while i_bEN (Execution command) is ON. • Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

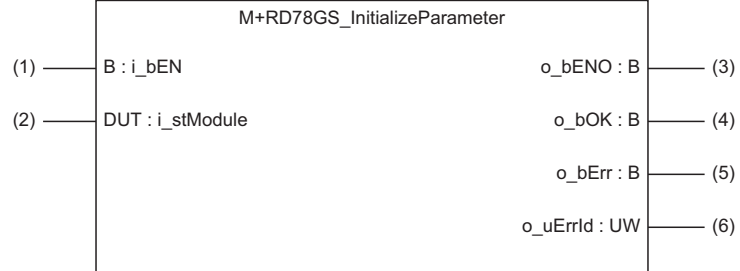
Version	Date	Description
00A	2021/04/30	First edition

2.10 M+RD78GS_InitializeParameter

Name

M+RD78GS_InitializeParameter

Overview

Item	Description
Function overview	Initializes the parameter.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(4)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that initializing the parameter has been completed.
(5)	o_bErr	Error flag	Bit	OFF	Always OFF
(6)	o_uErrId	Error code	Word [unsigned]	0	Always 0

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	45 steps	
Function description	By turning ON i_bEN (Execution command), the setting data stored in the buffer memory and the flash ROM of the RD78G is reset to the factory setting.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>The timing chart illustrates the sequence of events for the module initialization process. It features six horizontal signal lines:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A pulse that starts high, then drops to low, and returns high. o_bENO (Execution status): A signal that transitions from low to high when i_bEN starts, and returns to low when i_bEN ends. Cd.2: Module initialization request: A signal that starts at 0, transitions to 1 during the execution period, and returns to 0 after completion. o_bOK (Completed without error): A signal that transitions from low to high when the initialization request starts, and returns to low when the request ends. o_bErr (Error flag): A signal that remains at a constant low level throughout the process. o_uErrId (Error code): A signal that remains at a constant value of 0 throughout the process.

Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • Every input must be provided with a value for proper FB operation. • Before using this FB, make sure that the PLC READY signal (Y0) is OFF. • After the setting data is initialized, turn ON the power again or reset the CPU module.
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Error codes

This FB does not have any error codes.

Version upgrade history

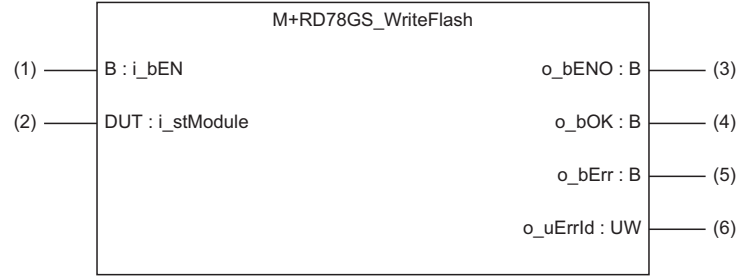
Version	Date	Description
00A	2021/04/30	First edition

2.11 M+RD78GS_WriteFlash

Name

M+RD78GS_WriteFlash

Overview

Item	Description
Function overview	Writes the parameter, positioning data, and block start data in the buffer memory to the flash ROM.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(3)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(4)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that writing the setting data to the flash ROM has been completed.
(5)	o_bErr	Error flag	Bit	OFF	Always OFF
(6)	o_uErrId	Error code	Word [unsigned]	0	Always 0

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	45 steps	
Function description	By turning ON i_bEN (Execution command), the setting data in the buffer memory is written to the flash ROM.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>The timing chart illustrates the sequence of events for the Flash ROM writing request. It shows six signals over time:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A pulse that starts high and then returns to low. o_bENO (Execution status): A signal that transitions from low to high when i_bEN starts and returns to low when i_bEN ends. Cd.1: Flash ROM writing request: A signal that transitions from 0 to 1 when i_bEN starts and returns to 0 when i_bEN ends. o_bOK (Completed without error): A signal that transitions from low to high during the high period of Cd.1 and returns to low when Cd.1 returns to 0. o_bErr (Error flag): A signal that remains low throughout the entire process. o_uErrId (Error code): A signal that remains at 0 throughout the entire process.
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • Every input must be provided with a value for proper FB operation. • Before using this FB, make sure that the PLC READY signal (Y0) is OFF.

Error codes

This FB does not have any error codes.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.12 M+RD78GS_ChangeTorqueControlMode

Name

M+RD78GS_ChangeTorqueControlMode

Overview

Item	Description																												
Function overview	Activates the torque control mode.																												
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p style="text-align: center;">M+RD78GS_ChangeTorqueControlMode</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (8)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (9)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B — (10)</td> </tr> <tr> <td>(4) —</td> <td>W : i_wCommandTorque</td> <td></td> <td>o_uErrId : UW — (11)</td> </tr> <tr> <td>(5) —</td> <td>UW : i_uTorqueTimeConstDrivingMode</td> <td></td> <td></td> </tr> <tr> <td>(6) —</td> <td>UW : i_uTorqueTimeConstRegenerativeMode</td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UD : i_udSpeedLimit</td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B — (8)	(2) —	DUT : i_stModule		o_bOK : B — (9)	(3) —	UW : i_uAxis		o_bErr : B — (10)	(4) —	W : i_wCommandTorque		o_uErrId : UW — (11)	(5) —	UW : i_uTorqueTimeConstDrivingMode			(6) —	UW : i_uTorqueTimeConstRegenerativeMode			(7) —	UD : i_udSpeedLimit		
(1) —	B : i_bEN		o_bENO : B — (8)																										
(2) —	DUT : i_stModule		o_bOK : B — (9)																										
(3) —	UW : i_uAxis		o_bErr : B — (10)																										
(4) —	W : i_wCommandTorque		o_uErrId : UW — (11)																										
(5) —	UW : i_uTorqueTimeConstDrivingMode																												
(6) —	UW : i_uTorqueTimeConstRegenerativeMode																												
(7) —	UD : i_udSpeedLimit																												

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_wCommandTorque	Cd.143: Command torque at torque control mode	Word [signed]	-10000 to 10000	Set the command torque at torque control mode.
(5)	i_uTorqueTimeConstDrivingMode	Cd.144: Torque time constant at torque control mode (Forward direction)	Word [unsigned]	0 to 65535	Set the time constant for the driving of torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(6)	i_uTorqueTimeConstRegenerativeMode	Cd.145: Torque time constant at torque control mode (Negative direction)	Word [unsigned]	0 to 65535	Set the time constant for the regeneration of torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(7)	i_udSpeedLimit	Cd.146: Speed limit value at torque control mode	Double word [unsigned]	*1	Set the speed limit value at torque control mode.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}$ mm/min)	inch ($\times 10^{-3}$ inch/min)	degree ($\times 10^{-3}$ degree/min) ^{*2}	pulse (pulse/s)
0 to 2000000000	0 to 2000000000	0 to 2000000000	0 to 1000000000

*2 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled is 0 to 2000000000 ($\times 10^{-2}$ degree/min).

Output labels

No.	Variable name	Name	Data type	Default value	Description
(8)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(9)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing control mode has been completed.
(10)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(11)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	347 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the torque control mode is activated for the specified axis. When this FB is executed under torque control, the command torque and speed limit value are changed. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>	

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • When this FB fails switching the mode, o_bOK (Completed without error) does not turn ON.

Error codes

Error code	Description	Action
100H	<p>The setting value of i_uAxis (Target axis) is out of the range.</p> <p>The target axis is not within the range of 1 to 16.</p>	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.13 M+RD78GS_ChangeSpeedControlMode

Name

M+RD78GS_ChangeSpeedControlMode

Overview

Item	Description																								
Function overview	Activates the speed control mode.																								
Symbol	<p style="text-align: center;">M+RD78GS_ChangeSpeedControlMode</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (7)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (8)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B — (9)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dCommandSpeed</td> <td></td> <td>o_uErrId : UW — (10)</td> </tr> <tr> <td>(5) —</td> <td>UW : i_uSpeedAccelerationTime</td> <td></td> <td></td> </tr> <tr> <td>(6) —</td> <td>UW : i_uSpeedDecelerationTime</td> <td></td> <td></td> </tr> </table>	(1) —	B : i_bEN		o_bENO : B — (7)	(2) —	DUT : i_stModule		o_bOK : B — (8)	(3) —	UW : i_uAxis		o_bErr : B — (9)	(4) —	D : i_dCommandSpeed		o_uErrId : UW — (10)	(5) —	UW : i_uSpeedAccelerationTime			(6) —	UW : i_uSpeedDecelerationTime		
(1) —	B : i_bEN		o_bENO : B — (7)																						
(2) —	DUT : i_stModule		o_bOK : B — (8)																						
(3) —	UW : i_uAxis		o_bErr : B — (9)																						
(4) —	D : i_dCommandSpeed		o_uErrId : UW — (10)																						
(5) —	UW : i_uSpeedAccelerationTime																								
(6) —	UW : i_uSpeedDecelerationTime																								

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dCommandSpeed	Cd.140: Command speed at speed control mode	Double word [signed]	*1	Set the command speed at speed control mode.
(5)	i_uSpeedAccelerationTime	Cd.141: Acceleration time at speed control mode	Word [unsigned]	0 to 65535	Set the acceleration time at speed control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(6)	i_uSpeedDecelerationTime	Cd.142: Deceleration time at speed control mode	Word [unsigned]	0 to 65535	Set the deceleration time at speed control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}$ mm/min)	inch ($\times 10^{-3}$ inch/min)	degree ($\times 10^{-3}$ degree/min)*2	pulse (pulse/s)
-2000000000 to 2000000000	-2000000000 to 2000000000	-2000000000 to 2000000000	-1000000000 to 1000000000

*2 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled -2000000000 to 2000000000 ($\times 10^{-2}$ degree/min).

Output labels

No.	Variable name	Name	Data type	Default value	Description
(7)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(8)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing control mode has been completed.
(9)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(10)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	303 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the speed control mode is activated for the specified axis. When this FB is executed under speed control, the command speed is changed. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>	

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • When this FB fails switching the mode, o_bOK (Completed without error) does not turn ON.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.14 M+RD78GS_ChangePositionControlMode

Name

M+RD78GS_ChangePositionControlMode

Overview

Item	Description
Function overview	Activates the position control mode.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16

Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(5)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing control mode has been completed.
(6)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	347 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the position control mode is activated for the specified axis. When this FB is executed during position control, the execution is completed without any processing. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • When this FB fails switching the mode, o_bOK (Completed without error) does not turn ON.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.15 M+RD78GS_ChangeContinuousTorqueMode

Name

M+RD78GS_ChangeContinuousTorqueMode

Overview

Item	Description																																																							
Function overview	Activates the continuous operation to torque control mode.																																																							
Symbol	<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: center;">M+RD78GS_ChangeContinuousTorqueMode</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: right;">(1)</td> <td style="width: 55%;">B : i_bEN</td> <td style="width: 15%;"></td> <td style="width: 25%; text-align: left;">o_bENO : B</td> <td style="width: 5%; text-align: right;">(12)</td> </tr> <tr> <td>(2)</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(13)</td> </tr> <tr> <td>(3)</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B</td> <td>(14)</td> </tr> <tr> <td>(4)</td> <td>D : i_dSpeedLimit</td> <td></td> <td>o_uErrId : UW</td> <td>(15)</td> </tr> <tr> <td>(5)</td> <td>UW : i_uSpeedAccelerationTime</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(6)</td> <td>UW : i_uSpeedDecelerationTime</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(7)</td> <td>W : i_wCommandTorque</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(8)</td> <td>UW : i_uTorqueTimeConstDrivingMode</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(9)</td> <td>UW : i_uTorqueTimeConstRegenerativeMode</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(10)</td> <td>UW : i_uAutoSwitchingMode</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(11)</td> <td>D : i_dAutoSwitchingParameter</td> <td></td> <td></td> <td></td> </tr> </table> </div>	(1)	B : i_bEN		o_bENO : B	(12)	(2)	DUT : i_stModule		o_bOK : B	(13)	(3)	UW : i_uAxis		o_bErr : B	(14)	(4)	D : i_dSpeedLimit		o_uErrId : UW	(15)	(5)	UW : i_uSpeedAccelerationTime				(6)	UW : i_uSpeedDecelerationTime				(7)	W : i_wCommandTorque				(8)	UW : i_uTorqueTimeConstDrivingMode				(9)	UW : i_uTorqueTimeConstRegenerativeMode				(10)	UW : i_uAutoSwitchingMode				(11)	D : i_dAutoSwitchingParameter			
(1)	B : i_bEN		o_bENO : B	(12)																																																				
(2)	DUT : i_stModule		o_bOK : B	(13)																																																				
(3)	UW : i_uAxis		o_bErr : B	(14)																																																				
(4)	D : i_dSpeedLimit		o_uErrId : UW	(15)																																																				
(5)	UW : i_uSpeedAccelerationTime																																																							
(6)	UW : i_uSpeedDecelerationTime																																																							
(7)	W : i_wCommandTorque																																																							
(8)	UW : i_uTorqueTimeConstDrivingMode																																																							
(9)	UW : i_uTorqueTimeConstRegenerativeMode																																																							
(10)	UW : i_uAutoSwitchingMode																																																							
(11)	D : i_dAutoSwitchingParameter																																																							

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSpeedLimit	Cd.147: Speed limit value at continuous operation to torque control mode	Double word [signed]	*1	Set the speed limit value at continuous operation to torque control mode.
(5)	i_uSpeedAccelerationTime	Cd.148: Acceleration time at continuous operation to torque control mode	Word [unsigned]	0 to 65535	Set the acceleration time at continuous operation to torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(6)	i_uSpeedDecelerationTime	Cd.149: Deceleration time at continuous operation to torque control mode	Word [unsigned]	0 to 65535	Set the deceleration time at continuous operation to torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.

No.	Variable name	Name	Data type	Setting range	Description
(7)	i_wCommandTorque	Cd.150: Target torque at continuous operation to torque control mode	Word [signed]	-10000 to 10000	Set the target torque at continuous operation to torque control mode.
(8)	i_uTorqueTimeConstantDrivingMode	Cd.151: Torque time constant at continuous operation to torque control mode (Forward direction)	Word [unsigned]	0 to 65535	Set the time constant for the driving at continuous operation to torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(9)	i_uTorqueTimeConstantRegenerativeMode	Cd.152: Torque time constant at continuous operation to torque control mode (Negative direction)	Word [unsigned]	0 to 65535	Set the time constant for the regeneration at continuous operation to torque control mode. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.
(10)	i_uAutoSwitchingMode	Cd.153: Control mode auto-shift selection	Word [unsigned]	0 to 2	Set the switching condition of the control mode to switch to continuous operation to torque control mode. • 0: No switching condition • 1: Feed current value pass • 2: Real current value pass
(11)	i_dAutoSwitchingParameter	Cd.154: Control mode auto-shift parameter	Double word [signed]	*3	Set the condition value when the control mode auto-shift selection is set to 1 or 2.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-2}$ mm/min)	inch ($\times 10^{-3}$ inch/min)	degree ($\times 10^{-3}$ degree/min) ^{*2}	pulse (pulse/s)
-2000000000 to 2000000000	-2000000000 to 2000000000	-2000000000 to 2000000000	-1000000000 to 1000000000

*2 The setting for which "Pr.83: Speed control 10 × multiplier for degree axis" is enabled is -2000000000 to 2000000000 ($\times 10^{-2}$ degree/min).

*3 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

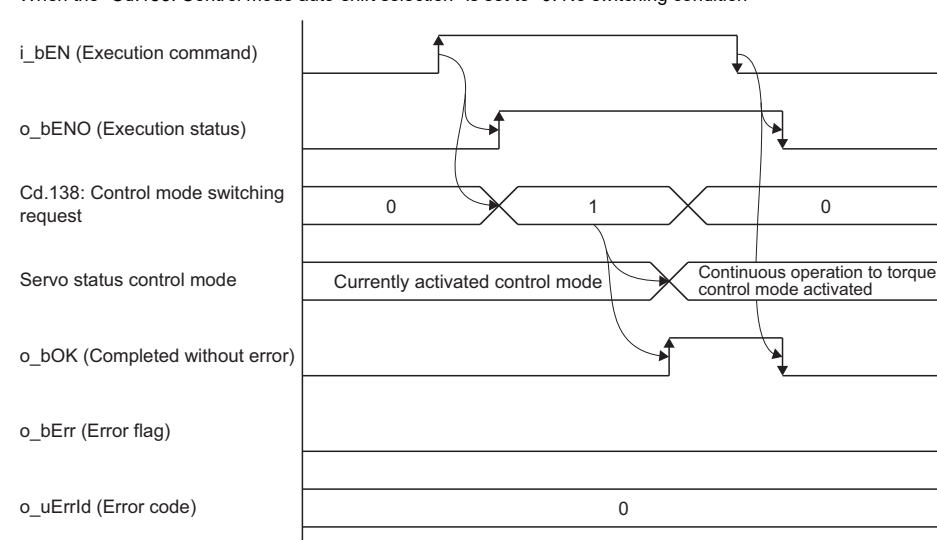
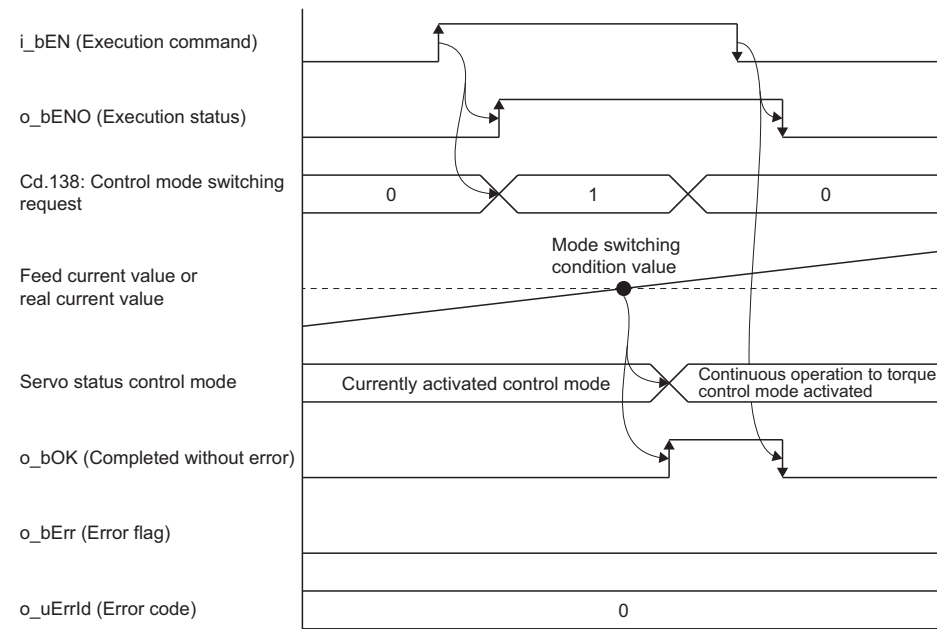
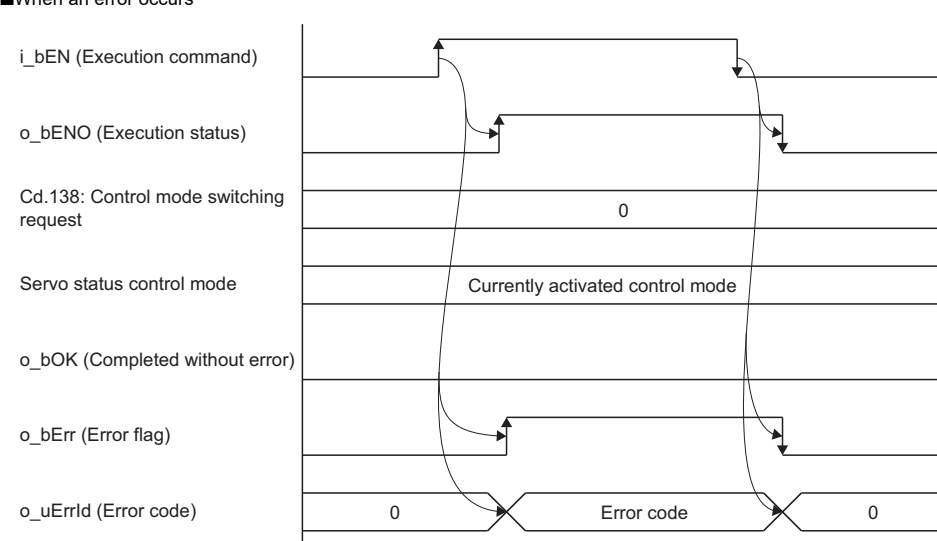
mm ($\times 10^{-1}$ μm)	inch ($\times 10^{-5}$ inch)	degree ($\times 10^{-5}$ degree)	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	0 to 35999999	-2147483648 to 2147483647

Output labels

No.	Variable name	Name	Data type	Default value	Description
(12)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(13)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing control mode has been completed.
(14)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(15)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	523 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the continuous operation to torque control mode is activated for the specified axis. When this FB is executed during continuous operation to torque control mode, the speed limit value and target torque are changed. When the setting value of the target axis is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p> ■When operation completes without an error • When the "Cd.153: Control mode auto-shift selection" is set to "0: No switching condition" </p>  <p> ■When the "Cd.153: Control mode auto-shift selection" is set to "1: Feed current value pass", or "2: Real current value pass" </p>  <p> ■When an error occurs </p> 

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • When this FB fails switching the mode, o_bOK (Completed without error) does not turn ON.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.16 M+RD78GS_Sync

Name

M+RD78GS_Sync

Overview

Item	Description
Function overview	Starts and ends the synchronous control.
Symbol	<p>The diagram shows a rectangular block labeled 'M+RD78GS_Sync'. On the left side, there are three input terminals: (1) B : i_bEN, (2) DUT : i_stModule, and (3) UW : i_uOutputAxis. On the right side, there are four output terminals: (4) o_bENO : B, (5) o_bOK : B, (6) o_bErr : B, and (7) o_uErrId : UW.</p>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Specify the axis number for which synchronous control is started. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16

Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(5)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that synchronous control has been started.
(6)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	178 steps	

Item	Description
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), synchronous control of the output axis No. is started. Turning OFF i_bEN (Execution command) ends the synchronous control. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). The synchronous control does not start during any of the following: <ul style="list-style-type: none"> READY signal (X0): OFF BUSY signal (X10 to X1F): ON Error detection signal ([Md.31] Status (b13)): ON
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.17 M+RD78GS_ChangeSyncEncoderPosition

Name

M+RD78GS_ChangeSyncEncoderPosition

Overview

Item	Description																				
Function overview	Changes the synchronous encoder axis current value and synchronous encoder axis current value per cycle.																				
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_ChangeSyncEncoderPosition</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (6)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (7)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uSyncEncAxis</td> <td></td> <td>o_bErr : B — (8)</td> </tr> <tr> <td>(4) —</td> <td>UW : i_uStartControl</td> <td></td> <td>o_uErrId : UW — (9)</td> </tr> <tr> <td>(5) —</td> <td>D : i_dNewPosition</td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B — (6)	(2) —	DUT : i_stModule		o_bOK : B — (7)	(3) —	UW : i_uSyncEncAxis		o_bErr : B — (8)	(4) —	UW : i_uStartControl		o_uErrId : UW — (9)	(5) —	D : i_dNewPosition		
(1) —	B : i_bEN		o_bENO : B — (6)																		
(2) —	DUT : i_stModule		o_bOK : B — (7)																		
(3) —	UW : i_uSyncEncAxis		o_bErr : B — (8)																		
(4) —	UW : i_uStartControl		o_uErrId : UW — (9)																		
(5) —	D : i_dNewPosition																				

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uSyncEncAxis	Synchronous encoder axis No.	Word [unsigned]	1 to 16	Set the synchronous encoder axis number whose current value is to be changed.
(4)	i_uStartControl	Cd.320: Synchronous encoder axis control start	Word [unsigned]	1, 101 to 116	When 1 is set, synchronous encoder axis control is started. When 101 to 116 is set, the synchronous encoder axis control starts based on the high-speed input request (external command signal). • 1: Start for synchronous encoder axis control • 101 to 116: High-speed input start for synchronous encoder axis control (axis 1 to axis 16) *: The setting range differs depending on the module used.
(5)	i_dNewPosition	Cd.322: Synchronous encoder axis current value setting address	Double word [signed]	• -2147483648 to 2147483647* ¹	Set the new current value after a current value change.

*1 The setting ranges are in the following table and depend on the "Pr.321: Synchronous encoder axis unit setting" setting.

mm ($\times 10^{-\square} \text{mm}$)* ²	inch ($\times 10^{-\square} \text{inch}$)* ²	degree ($\times 10^{-\square} \text{degree}$)* ²	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 \square is a value that corresponds to the "number of decimal places" set in "Pr.321: Synchronous encoder axis unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(7)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that setting the synchronous encoder axis current value change has been completed.
(8)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	215 steps	
Function description	<ul style="list-style-type: none"> The operation method differs depending on the setting value of the <code>i_uStartControl</code> (Cd.320: Synchronous encoder axis control start). When the setting value is "1: Synchronous encoder axis control start", the synchronous encoder axis counter is disabled by turning ON <code>i_bEN</code> (Execution command). When the setting value is "101 to 116: High-speed input start for synchronous encoder axis control", the synchronous encoder axis counter is disabled by the high speed input request [DI] after <code>i_bEN</code> (Execution command) is turned ON. When the setting value of the synchronous encoder axis No. is out of the range, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in <code>o_uErrId</code> (Error code). When this FB is executed for the synchronous encoder axis for which the synchronous encoder axis enabled flag is OFF, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (301H) is stored in <code>o_uErrId</code> (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (single scan execution type)	
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>	
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the synchronous encoder axis No. Every input must be provided with a value for proper FB operation. 	

Error codes

Error code	Description	Action
100H	The synchronous encoder axis No. is not within the setting range.	Please try again after confirming the setting.
301H	The synchronous encoder axis enabled flag of the synchronous encoder axis No. is OFF.	Please try again after confirming the setting.

Version upgrade history

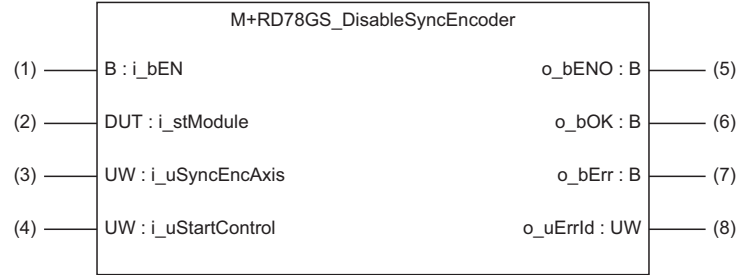
Version	Date	Description
00A	2021/04/30	First edition

2.18 M+RD78GS_DisableSyncEncoder

Name

M+RD78GS_DisableSyncEncoder

Overview

Item	Description
Function overview	Disables inputs from the synchronous encoder axis.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uSyncEncAxis	Synchronous encoder axis No.	Word [unsigned]	1 to 16	Set the synchronous encoder axis number from which inputs are to be disabled.
(4)	i_uStartControl	Cd.320: Synchronous encoder axis control start	Word [unsigned]	1, 101 to 116	When 1 is set, synchronous encoder axis control is started. When 101 to 116 is set, the synchronous encoder axis control starts based on the high-speed input request (external command signal). <ul style="list-style-type: none"> • 1: Start for synchronous encoder axis control • 101 to 116: High-speed input start for synchronous encoder axis control (axis 1 to axis 16) *: The setting range differs depending on the module used.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that disabling the synchronous encoder axis counter has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	170 steps	

Item	Description
Function description	<ul style="list-style-type: none"> The operation method differs depending on the setting value of the <code>i_uStartControl</code> (Cd.320: Synchronous encoder axis control start). When the setting value is "1: Synchronous encoder axis control start", the synchronous encoder axis counter is disabled by turning ON <code>i_bEN</code> (Execution command). When the setting value is "101 to 116: High-speed input start for synchronous encoder axis control", the synchronous encoder axis counter is disabled by the high speed input request [DI] after <code>i_bEN</code> (Execution command) is turned ON. When the setting value of the synchronous encoder axis No. is out of the range, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in <code>o_uErrId</code> (Error code). When this FB is executed for the synchronous encoder axis for which the synchronous encoder axis enabled flag is OFF, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (301H) is stored in <code>o_uErrId</code> (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (single scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the synchronous encoder axis No. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The synchronous encoder axis No. is not within the setting range.	Please try again after confirming the setting.
301H	The synchronous encoder axis enabled flag of the synchronous encoder axis No. is OFF.	Execute the FB again after turning ON the synchronous encoder axis setting enabled flag.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.19 M+RD78GS_EnableSyncEncoder

Name

M+RD78GS_EnableSyncEncoder

Overview

Item	Description
Function overview	Enables inputs from the synchronous encoder axis.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uSyncEncAxis	Synchronous encoder axis No.	Word [unsigned]	1 to 16	Set the synchronous encoder axis number from which inputs are to be enabled.
(4)	i_uStartControl	Cd.320: Synchronous encoder axis control start	Word [unsigned]	1, 101 to 116	When 1 is set, synchronous encoder axis control is started. When 101 to 116 is set, the synchronous encoder axis control starts based on the high-speed input request (external command signal). <ul style="list-style-type: none"> • 1: Start for synchronous encoder axis control • 101 to 116: High-speed input start for synchronous encoder axis control (axis 1 to axis 16) The setting range differs depending on the module used.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that enabling the synchronous encoder axis counter has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	170 steps	

Item	Description
Function description	<ul style="list-style-type: none"> The operation method differs depending on the setting value of the <code>i_uStartControl</code> (Cd.320: Synchronous encoder axis control start). When the setting value is "1: Synchronous encoder axis control start", the synchronous encoder axis counter is enabled by turning ON <code>i_bEN</code> (Execution command). When the setting value is "101 to 116: High-speed input start for synchronous encoder axis control", the synchronous encoder axis counter is enabled by the high speed input request [DI] after <code>i_bEN</code> (Execution command) is turned ON. When the setting value of the synchronous encoder axis No. is out of the range, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in <code>o_uErrId</code> (Error code). When this FB is executed for the synchronous encoder axis for which the synchronous encoder axis enabled flag is OFF, <code>o_bErr</code> (Error flag) turns ON, the FB processing is interrupted, and the error code (301H) is stored in <code>o_uErrId</code> (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (single scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the synchronous encoder axis No. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The synchronous encoder axis No. is not within the setting range.	Please try again after confirming the setting.
301H	The synchronous encoder axis enabled flag of the synchronous encoder axis No. is OFF.	Execute the FB again after turning ON the synchronous encoder axis setting enabled flag.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.20 M+RD78GS_ResetSyncEncoderError

Name

M+RD78GS_ResetSyncEncoderError

Overview

Item	Description
Function overview	Reads error information from the synchronous encoder axis, and resets the error.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uSyncEncAxis	Synchronous encoder axis No.	Word [unsigned]	1 to 16	Set the synchronous encoder axis number from which the error No. and warning No. are read.
(4)	i_bResetError	Error reset request	Bit	ON, OFF	Turn ON this label to reset errors. Turn OFF this label after the error reset is completed.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the error detection flag and warning detection flag of the synchronous encoder axis status have been turned OFF.
(7)	o_bModuleErr	Error detection	Bit	OFF	When ON, it indicates that the synchronous encoder axis error has occurred.
(8)	o_uErrorNo	Error No.	Word [unsigned]	0	When the synchronous encoder axis error is detected, the error code corresponding to the error is stored.
(9)	o_bModuleWarn	Warning detection	Bit	OFF	When ON, it indicates that the synchronous encoder axis warning has occurred.
(10)	o_uWarningNo	Warning No.	Word [unsigned]	0	When the synchronous encoder axis warning is detected, the warning code corresponding to the warning is stored.
(11)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	360 steps	
Function description	<ul style="list-style-type: none"> • By turn ON i_bEN (Execution command), the synchronous encoder axis error and warning information of the synchronous encoder axis No. are read. • When the error reset request is ON, the error and warning are reset. • When the setting value of the synchronous encoder axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). 	
Compiling method	Macro type	
FB operation type	Real-time execution	

Item	Description
Timing chart	<p>■ When operation completes without an error</p> <ul style="list-style-type: none"> • Error reset <p>The error reset timing chart shows the following sequence of events:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A pulse that starts the operation. o_bENO (Execution status): Goes high when the operation starts and returns to low when it completes. i_bResetError (Error reset request): A pulse that occurs during the operation. Synchronous encoder axis reset: A pulse that occurs during the operation. o_uErrorNo (Error No.): Shows a transition from 0 to a specific Error No. and back to 0. Synchronous encoder axis error flag: Goes high during the error period. o_bModuleErr (Error detection): Goes high during the error period. o_bOK (Completed without error): Goes high when the operation completes successfully. o_bErr (Error flag): Remains low throughout. o_uErrId (Error code): Shows 0. <ul style="list-style-type: none"> • Warning reset <p>The warning reset timing chart shows the following sequence of events:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A pulse that starts the operation. o_bENO (Execution status): Goes high when the operation starts and returns to low when it completes. i_bResetError (Error reset request): A pulse that occurs during the operation. Synchronous encoder axis reset: A pulse that occurs during the operation. o_uWarningNo (Warning No.): Shows a transition from 0 to a specific Warning No. and back to 0. Synchronous encoder axis warning flag: Goes high during the warning period. o_bModuleErr (Error detection): Goes high during the warning period. o_bOK (Completed without error): Goes high when the operation completes successfully. o_bErr (Error flag): Remains low throughout. o_uErrId (Error code): Shows 0.

Item	Description
Timing chart	<p>■When an error occurs</p> <p>The timing chart illustrates the behavior of the function block during an error event. It shows the relationship between various input and output signals. Key events include the start of execution (i_bEN), the detection of an error (o_bModuleErr), the setting of error flags (o_bErr, Synchronous encoder axis error flag), and the output of an error code (o_uErrId). The error code signal is shown as a pulse that returns to 0 after the error is detected.</p>

Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • When this FB is used twice or more, precaution must be taken to avoid repetition of the synchronous encoder axis No. • Every input must be provided with a value for proper FB operation.
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Error codes

Error code	Description	Action
100H	The synchronous encoder axis No. is not within the setting range.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.21 M+RD78GS_ConnectSyncEncoder

Name

M+RD78GS_ConnectSyncEncoder

Overview

Item	Description
Function overview	Connects a synchronous encoder via CPU.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uSyncEncAxis	Synchronous encoder axis No.	Word [unsigned]	1 to 16	Set the synchronous encoder axis number for which the connection command of the synchronous encoder via CPU is executed.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(4)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(5)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the connecting valid flag of the synchronous encoder axis status has been turned ON.
(6)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(7)	o_uErr_ld	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	176 steps	
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the synchronous encoder of the synchronous encoder axis No. is connected via CPU. When the setting value of the synchronous encoder axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrld (Error code). When this FB is executed for the synchronous encoder axis for which the synchronous encoder axis enabled flag is OFF, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (301H) is stored in o_uErrld (Error code). 	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • The FB cannot be used in an interrupt program. • When this FB is used twice or more, precaution must be taken to avoid repetition of the synchronous encoder axis No. • Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The synchronous encoder axis No. is not within the setting range.	Please try again after confirming the setting.
301H	The synchronous encoder axis enabled flag of the synchronous encoder axis No. is OFF.	Execute the FB again after turning ON the synchronous encoder axis setting enabled flag.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.22 M+RD78GS_MoveCamReferencePosition

Name

M+RD78GS_MoveCamReferencePosition

Overview

Item	Description
Function overview	Adds the movement amount set in the synchronous control change value to the cam reference position to move the cam reference position.
Symbol	<pre> graph LR subgraph M+RD78GS_MoveCamReferencePosition B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW1["(3) UW : i_uOutputAxis"] D["(4) D : i_dSyncCtrlChangeValue"] UW2["(5) UW : i_uSyncCtrlReflectionTime"] o_bENO["(6) o_bENO : B"] o_bOK["(7) o_bOK : B"] o_bErr["(8) o_bErr : B"] o_uErrId["(9) o_uErrId : UW"] end B --- o_bENO DUT --- o_bOK UW1 --- o_bErr D --- o_uErrId UW2 --- o_uErrId </pre>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Set the axis number whose cam reference position is to be moved. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSyncCtrlChange Value	Cd.408: Synchronous control change value	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the amount of the cam reference position movement.
(5)	i_uSyncCtrlReflectionTime	Cd.409: Synchronous control reflection time	Word [unsigned]	0 to 65535 (ms)	Set the reflection time for the synchronous control change. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.

*1 The setting ranges of the units for the output axis position are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-4}$ mm ($\times 10^{-1}$ μ m))	inch ($\times 10^{-5}$ inch)	degree ($\times 10^{-5}$ degree)	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

Output labels

No.	Variable name	Name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(7)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that moving the cam reference position has been completed.
(8)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(9)	o_uErr_Id	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	355 steps
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the cam reference position of the output axis No. is moved. If i_bEN (Execution command) is turned OFF during movement of the cam reference position, the operation stops during the movement and o_bOK (Completed without error) does not turn ON. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When this FB is executed for the output axis No. with which synchronous control is not executed, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (300H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. If this FB is used together with other synchronous control change FBs that have the same output axis No., secure one operation cycle or more after o_bOK (Completed without error) of this FB turns ON and before the FBs are executed. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.
300H	The FB is executed for the output axis No. with which synchronous control is not executed.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.23 M+RD78GS_ChangeCamPositionPerCycle

Name

M+RD78GS_ChangeCamPositionPerCycle

Overview

Item	Description																				
Function overview	Changes the cam axis current value per cycle to a synchronous control change value.																				
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_ChangeCamPositionPerCycle</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B</td> <td style="width: 10%;">(5)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(6)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uOutputAxis</td> <td></td> <td>o_bErr : B</td> <td>(7)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dSyncCtrlChangeValue</td> <td></td> <td>o_uErrId : UW</td> <td>(8)</td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B	(5)	(2) —	DUT : i_stModule		o_bOK : B	(6)	(3) —	UW : i_uOutputAxis		o_bErr : B	(7)	(4) —	D : i_dSyncCtrlChangeValue		o_uErrId : UW	(8)
(1) —	B : i_bEN		o_bENO : B	(5)																	
(2) —	DUT : i_stModule		o_bOK : B	(6)																	
(3) —	UW : i_uOutputAxis		o_bErr : B	(7)																	
(4) —	D : i_dSyncCtrlChangeValue		o_uErrId : UW	(8)																	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Set the axis number whose cam axis current value per cycle is to be changed. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSyncCtrlChange Value	Cd.408: Synchronous control change value	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the cam axis current value per cycle to be changed. The setting value is converted within the range from 0 to (Cam axis length per cycle - 1).

*1 The setting ranges of the units for the cam axis cycle are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm ($\times 10^{-\square} \text{mm}$) ^{*2}	inch ($\times 10^{-\square} \text{inch}$) ^{*2}	degree ($\times 10^{-\square} \text{degree}$) ^{*2}	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 \square is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing the cam axis current value per cycle has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErr_Id	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	213 steps
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the cam axis current value per cycle of the output axis No. is changed. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When this FB is executed for the output axis No. with which synchronous control is not executed, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (300H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. If this FB is used together with other synchronous control change FBs that have the same output axis No., secure one operation cycle or more after o_bOK (Completed without error) of this FB turns ON and before the FBs are executed. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.
300H	The FB is executed for the output axis No. with which synchronous control is not executed.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.24 M+RD78GS_ChangeMainShaftGearPositionPerCycle

Name

M+RD78GS_ChangeMainShaftGearPositionPerCycle

Overview

Item	Description
Function overview	Changes the current value per cycle after main shaft gear to a synchronous control change value.
Symbol	<pre> graph LR subgraph M+RD78GS_ChangeMainShaftGearPositionPerCycle B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW["(3) UW : i_uOutputAxis"] D["(4) D : i_dSyncCtrlChangeValue"] o_bENO["(5) o_bENO : B"] o_bOK["(6) o_bOK : B"] o_bErr["(7) o_bErr : B"] o_uErrId["(8) o_uErrId : UW"] end B --- o_bENO DUT --- o_bOK UW --- o_bErr D --- o_uErrId </pre>

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Set the axis whose current value per cycle after main shaft gear is to be changed. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSyncCtrlChange Value	Cd.408: Synchronous control change value	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the current value per cycle after main shaft gear to be changed. The setting value is converted within the range from 0 to (Cam axis length per cycle - 1).

*1 The setting ranges of the units for the cam axis cycle are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm (×10 ^{-□} mm) ^{*2}	inch (×10 ^{-□} inch) ^{*2}	degree (×10 ^{-□} degree) ^{*2}	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 □ is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing the current value per cycle after main shaft gear has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErr_Id	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	213 steps
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the current value per cycle after main shaft gear of the output axis No. is changed. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When this FB is executed for the output axis No. with which synchronous control is not executed, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (300H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. If this FB is used together with other synchronous control change FBs that have the same output axis No., secure one operation cycle or more after o_bOK (Completed without error) of this FB turns ON and before the FBs are executed. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.
300H	The FB is executed for the output axis No. with which synchronous control is not executed.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.25 M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle

Name

M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle

Overview

Item	Description																
Function overview	Changes the current value per cycle after auxiliary shaft gear to a synchronous control change value.																
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (5)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (6)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uOutputAxis</td> <td></td> <td>o_bErr : B — (7)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dSyncCtrlChangeValue</td> <td></td> <td>o_uErrId : UW — (8)</td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B — (5)	(2) —	DUT : i_stModule		o_bOK : B — (6)	(3) —	UW : i_uOutputAxis		o_bErr : B — (7)	(4) —	D : i_dSyncCtrlChangeValue		o_uErrId : UW — (8)
(1) —	B : i_bEN		o_bENO : B — (5)														
(2) —	DUT : i_stModule		o_bOK : B — (6)														
(3) —	UW : i_uOutputAxis		o_bErr : B — (7)														
(4) —	D : i_dSyncCtrlChangeValue		o_uErrId : UW — (8)														

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Set the axis whose current value per cycle after auxiliary shaft gear is to be changed. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSyncCtrlChangeValue	Cd.408: Synchronous control change value	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the current value per cycle after auxiliary shaft gear to be changed. The setting value is converted within the range from 0 to (Cam axis length per cycle - 1).

*1 The setting ranges of the units for the cam axis cycle are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm ($\times 10^{-\square} \text{mm}$) ^{*2}	inch ($\times 10^{-\square} \text{inch}$) ^{*2}	degree ($\times 10^{-\square} \text{degree}$) ^{*2}	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 \square is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(5)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(6)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that changing the current value per cycle after auxiliary shaft gear has been completed.
(7)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(8)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	213 steps
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the current value per cycle after auxiliary shaft gear of the output axis No. is changed. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When this FB is executed for the output axis No. with which synchronous control is not executed, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (300H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. If this FB is used together with other synchronous control change FBs that have the same output axis No., secure one operation cycle or more after o_bOK (Completed without error) of this FB turns ON and before the FBs are executed. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.
300H	The FB is executed for the output axis No. with which synchronous control is not executed.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.26 M+RD78GS_MoveCamPositionPerCycle

Name

M+RD78GS_MoveCamPositionPerCycle

Overview

Item	Description
Function overview	Adds the movement amount set in the synchronous control change value to a cam axis current value per cycle to move the cam axis current value per cycle.
Symbol	

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uOutputAxis	Output axis No.	Word [unsigned]	1 to 16	Set the axis number whose cam axis current value per cycle is to be moved. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	i_dSyncCtrlChange Value	Cd.408: Synchronous control change value	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the amount of the cam axis current value per cycle movement.
(5)	i_uSyncCtrlReflectionTime	Cd.409: Synchronous control reflection time	Word [unsigned]	0 to 65535 (ms)	Set the reflection time for the synchronous control change. • 0 to 32767: Set by decimal number. • 32768 to 65535: Convert the number to a hexadecimal number and set.

*1 The setting ranges of the units for the cam axis cycle are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm (×10 ^{-□} mm) ^{*2}	inch (×10 ^{-□} inch) ^{*2}	degree (×10 ^{-□} degree) ^{*2}	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 □ is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(6)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(7)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that moving the cam axis current value per cycle has been completed.
(8)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(9)	o_uErrId	Error code	Word [unsigned]	0	The error code generated in the FB is stored.

Function details

Item	Description
Applicable hardware and software	Applicable module RD78G4, RD78G8, RD78G16
	Applicable CPU MELSEC iQ-R series
	Applicable engineering software GX Works3
Programming language	Ladder
Number of steps (maximum)	355 steps
Function description	<ul style="list-style-type: none"> By turning ON i_bEN (Execution command), the cam axis current value per cycle of the output axis No. is moved. If i_bEN (Execution command) is turned OFF during movement of the cam axis current value per cycle, the operation stops during the movement and o_bOK (Completed without error) does not turn ON. When the setting value of the output axis No. is out of the range, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (100H) is stored in o_uErrId (Error code). When this FB is executed for the output axis No. with which synchronous control is not executed, o_bErr (Error flag) turns ON, the FB processing is interrupted, and the error code (300H) is stored in o_uErrId (Error code).
Compiling method	Macro type
FB operation type	Pulsed execution (multiple scan execution type)
Timing chart	<p>■When operation completes without an error</p> <p>■When an error occurs</p>
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. When this FB is used twice or more, precaution must be taken to avoid repetition of the output axis No. If this FB is used together with other synchronous control change FBs that have the same output axis No., secure one operation cycle or more after o_bOK (Completed without error) of this FB turns ON and before the FBs are executed. Every input must be provided with a value for proper FB operation.

Error codes

Error code	Description	Action
100H	The output axis No. is not within the setting range.	Please try again after confirming the setting.
300H	The FB is executed for the output axis No. with which synchronous control is not executed.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.27 M+RD78GS_MakeRotaryCutterCam

Name

M+RD78GS_MakeRotaryCutterCam

Overview

Item	Description																																													
Function overview	Automatically generates the cam for a rotary cutter.																																													
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center; margin: 0;">M+RD78GS_MakeRotaryCutterCam</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%; text-align: right;">(1) —</td> <td style="width: 60%;">B : i_bEN</td> <td style="width: 15%;"></td> <td style="width: 20%; text-align: left;">o_bENO : B</td> <td style="width: 5%; text-align: right;">(10)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(11)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uCamNo</td> <td></td> <td>o_bErr : B</td> <td>(12)</td> </tr> <tr> <td>(4) —</td> <td>UW : i_uResolution</td> <td></td> <td>o_uErrId : UW</td> <td>(13)</td> </tr> <tr> <td>(5) —</td> <td>UD : i_udSheetLength</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(6) —</td> <td>UD : i_udSheetSyncWidth</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UD : i_udSyncAxisLength</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(8) —</td> <td>UD : i_udSyncStartPoint</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(9) —</td> <td>W : i_wSyncSectionAccelerationRatio</td> <td></td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B	(10)	(2) —	DUT : i_stModule		o_bOK : B	(11)	(3) —	UW : i_uCamNo		o_bErr : B	(12)	(4) —	UW : i_uResolution		o_uErrId : UW	(13)	(5) —	UD : i_udSheetLength				(6) —	UD : i_udSheetSyncWidth				(7) —	UD : i_udSyncAxisLength				(8) —	UD : i_udSyncStartPoint				(9) —	W : i_wSyncSectionAccelerationRatio			
(1) —	B : i_bEN		o_bENO : B	(10)																																										
(2) —	DUT : i_stModule		o_bOK : B	(11)																																										
(3) —	UW : i_uCamNo		o_bErr : B	(12)																																										
(4) —	UW : i_uResolution		o_uErrId : UW	(13)																																										
(5) —	UD : i_udSheetLength																																													
(6) —	UD : i_udSheetSyncWidth																																													
(7) —	UD : i_udSyncAxisLength																																													
(8) —	UD : i_udSyncStartPoint																																													
(9) —	W : i_wSyncSectionAccelerationRatio																																													

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uCamNo	Cd.609: Cam auto-generation cam No.	Word [unsigned]	1 to 256	Set the cam number to be automatically generated.
(4)	i_uResolution	Cd.611: Cam auto-generation data (Cam resolution)	Word [unsigned]	256, 512, 1024, 2048, 4096, 8192, 16384, 32768	Set the resolution of the cam to be generated.
(5)	i_udSheetLength	Cd.611: Cam auto-generation data (Sheet length)	Double word [unsigned]	1 to 2147483647 [[Optional] same unit (such as 0.1 mm)]	Set the sheet length. Set this value in the cam axis length per cycle.
(6)	i_udSheetSyncWidth	Cd.611: Cam auto-generation data (Sheet synchronous width)	Double word [unsigned]	1 to 2147483647 [[Optional] same unit (such as 0.1 mm)]	Set the sheet length of the synchronous section.
(7)	i_udSyncAxisLength	Cd.611: Cam auto-generation data (Synchronous axis length)	Double word [unsigned]	1 to 2147483647 [[Optional] same unit (such as 0.1 mm)]	Set the cycle length of the rotary cutter shaft.
(8)	i_udSyncStartPoint	Cd.611: Cam auto-generation data (Synchronization starting point)	Double word [unsigned]	1 to 2147483647 [[Optional] same unit (such as 0.1 mm)]	Set the length from the beginning of the sheet to the start of the synchronous section.

No.	Variable name	Name	Data type	Setting range	Description
(9)	i_wSyncSectionAccelerationRatio	Cd.611: Cam auto-generation data (Synchronous section acceleration ratio)	Word [signed]	-5000 to 5000 [0.01%]	Set this label when the synchronous speed in the synchronous section needs to be adjusted. The speed is "Synchronous speed × (100% + Acceleration ratio)" in the synchronous section.

Output labels

No.	Variable name	Name	Data type	Default value	Description
(10)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(11)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that the cam automatic generation has been completed.
(12)	o_bErr	Error flag	Bit	OFF	Always OFF
(13)	o_uErrId	Error code	Word [unsigned]	0	Always 0

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	66 steps	
Function description	By turning ON i_bEN (Execution command), the cam for a rotary cutter is automatically generated.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>The timing chart illustrates the sequence of events for the cam auto-generation function. It shows four signals over time: i_bEN (Execution command), o_bENO (Execution status), Cd.608: Cam auto-generation request, and o_bOK (Completed without error). The request signal is a pulse that occurs while i_bEN is ON. When the request is active, o_bENO turns ON. Once the request pulse ends, o_bENO turns OFF, and o_bOK turns ON. The request signal is labeled with '0' at the start and end, and '1 or 2' during the active period.</p>	
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. Even if a warning occurs in the execution of this FB, o_bOK (Completed without error) turns ON. The FB cannot be used in an interrupt program. Every input must be provided with a value for proper FB operation. 	

Error codes

This FB does not have any error codes.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.28 M+RD78GS_CalcCamCommandPosition

Name

M+RD78GS_CalcCamCommandPosition

Overview

Item	Description																												
Function overview	Calculates a cam axis feed current value, and outputs the calculation result.																												
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_CalcCamCommandPosition</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (8)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (9)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uCamNo</td> <td></td> <td>o_dResult : D — (10)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dStroke</td> <td></td> <td>o_bErr : B — (11)</td> </tr> <tr> <td>(5) —</td> <td>UD : i_udLengthPerCycle</td> <td></td> <td>o_uErrId : UW — (12)</td> </tr> <tr> <td>(6) —</td> <td>D : i_dReferencePosition</td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UD : i_udCommandPositionPerCycle</td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B — (8)	(2) —	DUT : i_stModule		o_bOK : B — (9)	(3) —	UW : i_uCamNo		o_dResult : D — (10)	(4) —	D : i_dStroke		o_bErr : B — (11)	(5) —	UD : i_udLengthPerCycle		o_uErrId : UW — (12)	(6) —	D : i_dReferencePosition			(7) —	UD : i_udCommandPositionPerCycle		
(1) —	B : i_bEN		o_bENO : B — (8)																										
(2) —	DUT : i_stModule		o_bOK : B — (9)																										
(3) —	UW : i_uCamNo		o_dResult : D — (10)																										
(4) —	D : i_dStroke		o_bErr : B — (11)																										
(5) —	UD : i_udLengthPerCycle		o_uErrId : UW — (12)																										
(6) —	D : i_dReferencePosition																												
(7) —	UD : i_udCommandPositionPerCycle																												

Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uCamNo	Cd.613: Cam No.	Word [unsigned]	0 to 256	Set the cam number used for the calculation cam.
(4)	i_dStroke	Cd.614: Stroke amount	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the cam stroke amount used for the cam position calculation.
(5)	i_udLengthPerCycle	Cd.615: Cam axis length per cycle	Double word [unsigned]	1 to 2147483647 ^{*2}	Set the cam axis length per cycle used for the cam position calculation.
(6)	i_dReferencePosition	Cd.616: Cam reference position	Double word [signed]	-2147483648 to 2147483647 ^{*1}	Set the cam reference position used for the cam position calculation.
(7)	i_udCommandPositionPerCycle	Cd.617: Cam axis current value per cycle	Double word [unsigned]	0 to (Cam axis length per cycle) ^{*2}	Set the cam axis current value per cycle used for the cam position calculation.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm ($\times 10^{-4}$ mm($\times 10^{-1}$ μ m))	inch ($\times 10^{-5}$ inch)	degree ($\times 10^{-5}$ degree)	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 The setting ranges are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm ($\times 10^{-\square}$ mm) ^{*3}	inch ($\times 10^{-\square}$ inch) ^{*3}	degree ($\times 10^{-\square}$ degree) ^{*3}	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*3 \square is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(8)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(9)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that calculating the cam axis feed current value has been completed.
(10)	o_dResult	Cam position calculation result	Double word [signed]	0	The result of the cam axis feed current value calculation is stored.
(11)	o_bErr	Error flag	Bit	OFF	Always OFF
(12)	o_uErrId	Error code	Word [unsigned]	0	Always 0

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	58 steps	
Function description	By turning ON i_bEN (Execution command), the cam axis feed current value is calculated.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>The timing chart illustrates the sequence of events for the cam axis feed current value calculation. It shows five signals over time: i_bEN (Execution command), o_bENO (Execution status), Cd.612: Cam position calculation request, o_dResult (Cam position calculation result), and o_bOK (Completed without error). i_bEN is a pulsed signal that starts high and then goes low. When i_bEN is high, o_bENO also becomes high. The Cd.612 request signal is a pulse that occurs while i_bEN is high. When this request occurs, o_dResult transitions from 0 to a 'Calculation result' and then back to 0. Finally, when the calculation is complete, o_bOK becomes high.</p>	
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. Even if a warning occurs in the execution of this FB, o_bOK (Completed without error) turns ON. The FB cannot be used in an interrupt program. Every input must be provided with a value for proper FB operation. 	

Error codes

This FB does not have any error codes.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.29 M+RD78GS_CalcCamPositionPerCycle

Name

M+RD78GS_CalcCamPositionPerCycle

Overview

Item	Description																																
Function overview	Calculates a cam axis current value per cycle, and outputs the calculation result.																																
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_CalcCamPositionPerCycle</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B — (9)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B — (10)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uCamNo</td> <td></td> <td>o_dResult : D — (11)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dStroke</td> <td></td> <td>o_bErr : B — (12)</td> </tr> <tr> <td>(5) —</td> <td>UD : i_udLengthPerCycle</td> <td></td> <td>o_uErrId : UW — (13)</td> </tr> <tr> <td>(6) —</td> <td>D : i_dReferencePosition</td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UD : i_udCommandPositionPerCycle</td> <td></td> <td></td> </tr> <tr> <td>(8) —</td> <td>D : i_dCommandPosition</td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B — (9)	(2) —	DUT : i_stModule		o_bOK : B — (10)	(3) —	UW : i_uCamNo		o_dResult : D — (11)	(4) —	D : i_dStroke		o_bErr : B — (12)	(5) —	UD : i_udLengthPerCycle		o_uErrId : UW — (13)	(6) —	D : i_dReferencePosition			(7) —	UD : i_udCommandPositionPerCycle			(8) —	D : i_dCommandPosition		
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Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uCamNo	Cd.613: Cam No.	Word [unsigned]	0 to 256	Set the cam number used for the calculation cam.
(4)	i_dStroke	Cd.614: Stroke amount	Double word [signed]	-2147483648 to 2147483647* ¹	Set the cam stroke amount used for the cam position calculation.
(5)	i_udLengthPerCycle	Cd.615: Cam axis length per cycle	Double word [unsigned]	1 to 2147483647* ²	Set the cam axis length per cycle used for the cam position calculation.
(6)	i_dReferencePosition	Cd.616: Cam reference position	Double word [signed]	-2147483648 to 2147483647* ²	Set the cam reference position used for the cam position calculation.
(7)	i_udCommandPositionPerCycle	Cd.617: Cam axis current value per cycle	Double word [unsigned]	0 to (Cam axis length per cycle)* ²	Set the current value from which the cam search used for the cam position calculation is started.
(8)	i_dCommandPosition	Cd.618: Cam axis feed current value	Double word [signed]	-2147483648 to 2147483647* ²	Set the cam axis feed current value used for the cam position calculation.

*1 The setting ranges are in the following table and depend on the "Pr.1: Unit setting" setting.

mm (×10 ⁻⁴ mm(×10 ⁻¹ μm))	inch (×10 ⁻⁵ inch)	degree (×10 ⁻⁵ degree)	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*2 The setting ranges are in the following table and depend on the "Pr.438: Cam axis cycle unit setting" setting.

mm (×10 ^{-□} mm)* ³	inch (×10 ^{-□} inch)* ³	degree (×10 ^{-□} degree)* ³	pulse (pulse)
-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647	-2147483648 to 2147483647

*3 □ is a value that corresponds to the "number of decimal places" set in "Pr.438: Cam axis cycle unit setting".

Output labels

No.	Variable name	Name	Data type	Default value	Description
(9)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(10)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that calculating the cam axis current value per cycle has been completed.
(11)	o_dResult	Cam position calculation result	Double word [signed]	0	The result of the cam axis current value per cycle calculation is stored.
(12)	o_bErr	Error flag	Bit	OFF	Always OFF
(13)	o_uErrId	Error code	Word [unsigned]	0	Always 0

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	63 steps	
Function description	By turning ON i_bEN (Execution command), the cam axis current value per cycle is calculated.	
Compiling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	
Timing chart	<p>The timing chart illustrates the function's behavior. It shows five signals over time: i_bEN (Execution command), o_bENO (Execution status), Cd.612: Cam position calculation request, o_dResult (Cam position calculation result), and o_bOK (Completed without error). i_bEN is a pulsed signal. When it goes ON, o_bENO also turns ON. The calculation request signal (Cd.612) is shown as a pulse with a period of 2 cycles. The o_dResult signal shows a 'Calculation result' pulse that occurs during the request period. o_bOK turns ON after the calculation is complete and i_bEN turns OFF.</p>	
Restrictions and precautions	<ul style="list-style-type: none"> The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. Even if a warning occurs in the execution of this FB, o_bOK (Completed without error) turns ON. The FB cannot be used in an interrupt program. Every input must be provided with a value for proper FB operation. 	

Error codes

This FB does not have any error codes.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

2.30 M+RD78GS_ReadWriteParameter

Name

M+RD78GS_ReadWriteParameter

Overview

Item	Description																																			
Function overview	Reads and writes the slave device parameter (object).																																			
Symbol	<div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_ReadWriteParameter</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">(1) —</td> <td style="width: 40%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 20%;">o_bENO : B</td> <td style="width: 10%;">(7)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(8)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uAxis</td> <td></td> <td>o_udSDOErrorID : UD</td> <td>(9)</td> </tr> <tr> <td>(4) —</td> <td>UD : i_udSDONumber</td> <td></td> <td>o_uSDOStatus : UW</td> <td>(10)</td> </tr> <tr> <td>(5) —</td> <td>UW : i_uSDORequest</td> <td></td> <td>o_bErr : B</td> <td>(11)</td> </tr> <tr> <td>(6) —</td> <td>UW : i_uSDOChannel</td> <td></td> <td>o_uErrId : UW</td> <td>(12)</td> </tr> <tr> <td></td> <td>pb_u4SDOData (13)</td> <td></td> <td></td> <td></td> </tr> </table> </div>	(1) —	B : i_bEN		o_bENO : B	(7)	(2) —	DUT : i_stModule		o_bOK : B	(8)	(3) —	UW : i_uAxis		o_udSDOErrorID : UD	(9)	(4) —	UD : i_udSDONumber		o_uSDOStatus : UW	(10)	(5) —	UW : i_uSDORequest		o_bErr : B	(11)	(6) —	UW : i_uSDOChannel		o_uErrId : UW	(12)		pb_u4SDOData (13)			
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Labels

Input labels

No.	Variable name	Name	Data type	Setting range	Description
(1)	i_bEN	Execution command	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
(2)	i_stModule	Module label	Structure	The setting range differs depending on the module label.	Specify the module label of the MELSEC iQ-R Motion module.
(3)	i_uAxis	Target axis	Word [unsigned]	1 to 16	Specify the axis number. • When using RD78G4: 1 to 4 • When using RD78G8: 1 to 8 • When using RD78G16: 1 to 16
(4)	I_udSDONumber	Optional SDO	Double word [unsigned]	0, 1000H to FFFFFFFFH	Specify the object to conduct servo transient transmission and the object size. *1
(5)	I_uSDORequest	Optional SDO transfer request	Word [unsigned]	1, 11	Request servo transient transmission. *1 • 1: Self read request • 11: Self write request
(6)	i_uSDOChannel	Optional SDO channel	Word [unsigned]	1 to 4	Specify the servo transient transmission channel number.

*1 For details on the setting values, refer to "Servo Transient Transmission Function" in the following manual.

MELSEC iQ-R Motion Module User's Manual (Application for Simple Motion Mode)

Output labels

No.	Variable name	Name	Data type	Default value	Description
(7)	o_bENO	Execution status	Bit	OFF	ON: The execution command is ON. OFF: The execution command is OFF.
(8)	o_bOK	Completed without error	Bit	OFF	When ON, it indicates that calculating the cam axis current value per cycle has been completed.
(9)	o_udSDOErrorID	SDO transfer result	Double word [unsigned]	0	Returns the error code (SDO Abort Code) that occurred in SDO communication.*1
(10)	o_uSDOStatus	SDO transfer status	Word [unsigned]	0	The status of the response object size and the transient request processing are stored.*1
(11)	o_bErr	Error flag	Bit	OFF	When ON, it indicates that an error has occurred in the FB.
(12)	o_uErrId	Error code	Word [unsigned]	0	Returns the error code generated in the FB.

*1 For details on the stored values, refer to "Servo Transient Transmission Function" in the following manual.

 MELSEC iQ-R Motion Module User's Manual (Application for Simple Motion Mode)

Disclosed labels

No.	Variable name	Name	Data type	Valid Range	Description
(13)	pb_u4SDOData	Optional SDO transfer data	Word [signed] (0..3)*1	—	When reading an object, the read data is stored. When writing an object, specify the data to write. This label is 1-dimensional array data and has 4 array elements. This label is treated as optional SDO transfer data 1 to 4 read data or write data.*2

*1 "(0..3)" refers to the arrays. An array sets the number of elements in "[]" after the variable name.

<Example> When setting optional SDO transfer data 1

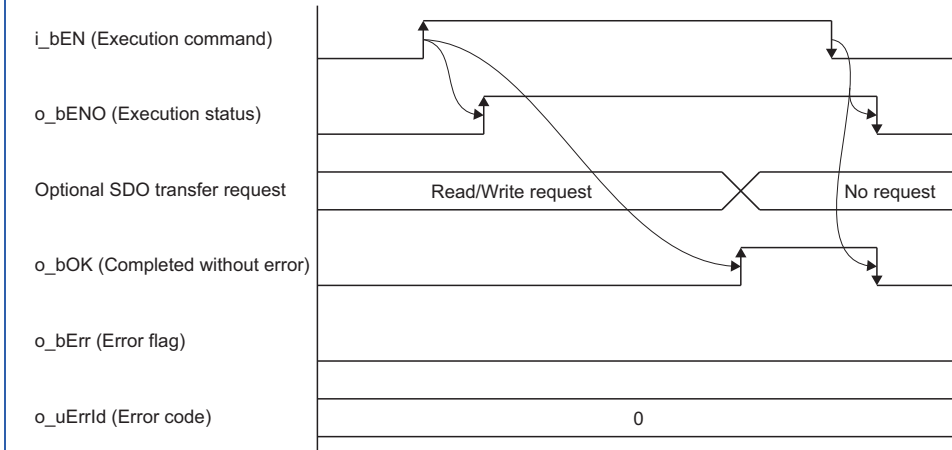
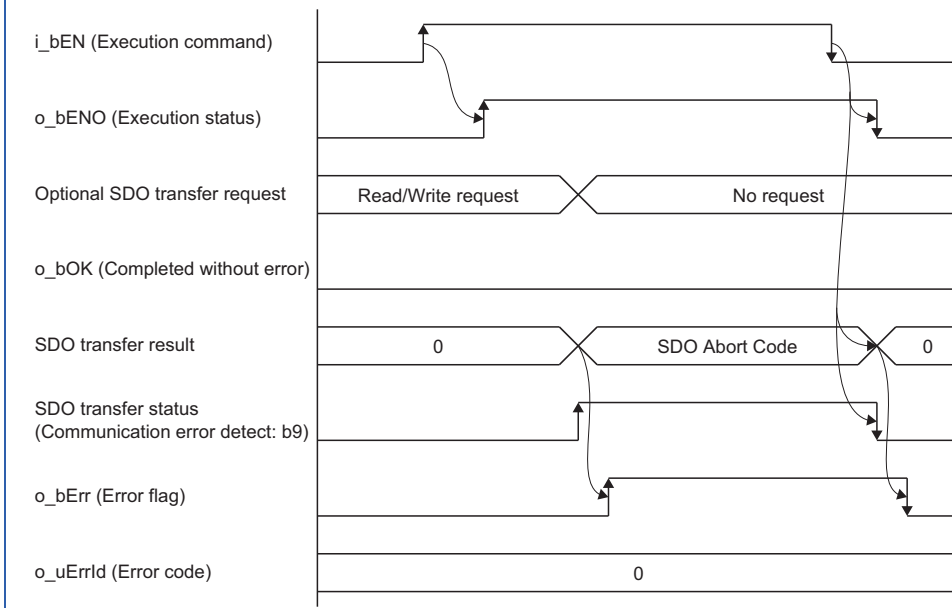
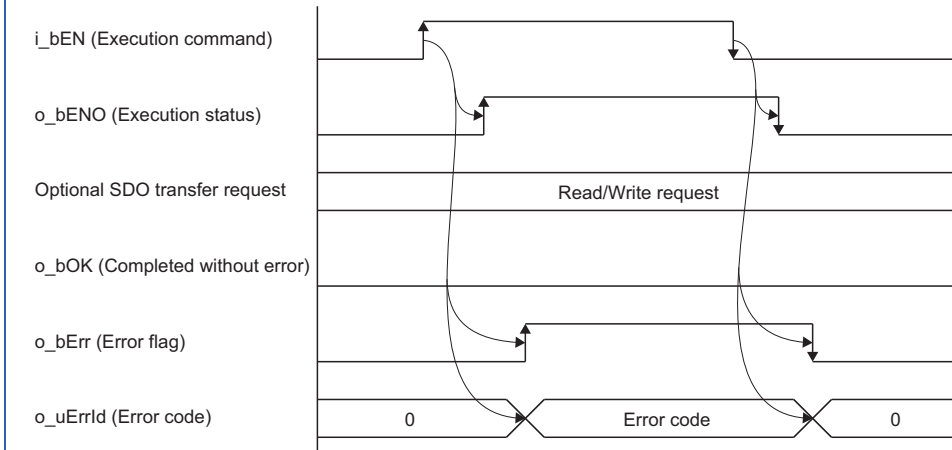
· pb_u4SDOData[0]

*2 For details, refer to "Servo Transient Transmission Function" in the following manual.

 MELSEC iQ-R Motion Module User's Manual (Application for Simple Motion Mode)

Function details

Item	Description	
Applicable hardware and software	Applicable module	RD78G4, RD78G8, RD78G16
	Applicable CPU	MELSEC iQ-R series
	Applicable engineering software	GX Works3
Programming language	Ladder	
Number of steps (maximum)	224 steps	
Function description	By turning ON i_bEN (Execution command), the servo amplifier parameters (Object) are read and written.	
Compling method	Macro type	
FB operation type	Pulsed execution (multiple scan execution type)	

Item	Description
Timing chart	<p>■When operation completes without an error</p>  <p>■When a communications error is detected</p>  <p>■When an error occurs</p> 

Item	Description
Restrictions and precautions	<ul style="list-style-type: none"> • The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. • This FB can read and write parameters using channel 1 to 4. Set the channel to be used in the "optional SDO channel" input label. As this FB only supports reading and writing for 1 channel, add FBs when using multiple channels simultaneously. • The applicable device of this module FB is the servo amplifier only. • Turn OFF i_bEN (Execution status) after o_bOK (Completed without error) or o_bErr (Error flag) have turned ON. When o_bErr (Error flag) turns ON, check the error cause from the stored value o_uErrId (Error code) or o_udSDOErrorID (SDO transfer result). • The FB cannot be used in an interrupt program. • Ensure that i_bEN (Execution command) is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine and FOR-NEXT loop because i_bEN (Execution command) cannot be turned OFF. • When this FB is used twice or more, precaution must be taken to avoid repetition of the target axis. • Every input must be provided with a value for proper FB operation. • Before using this FB, make sure that communication with the servo amplifier is established. When using this FB without establishing communication with the servo amplifier a communication error occurs. • The setting items and range differ depending on the module used in the system.

Error codes

Error code	Description	Action
100H	The setting value of i_uAxis (Target axis) is out of the range. The target axis is not within the range of 1 to 16.	Please try again after confirming the setting.
110H	The setting value of i_uSDCChannel (Optional SDO channel) is out of the range. The optional SDO channel is not within the range of 1 to 4.	Please try again after confirming the setting.

Version upgrade history

Version	Date	Description
00A	2021/04/30	First edition

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M

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MEMO

REVISIONS

*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Description
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January 2022	BCN-B62005-1040ENG-B	■Added or modified parts Section 2.1, 2.17, 2.18, 2.19, 2.20, 2.21

Japanese manual number: BCN-B62005-1039-B

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