

Programmable Controller

MELSEC iQ-R
series

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

CONTENTS

| | | |
|------------------|---|-----------|
| CHAPTER 1 | List of FB | 2 |
| CHAPTER 2 | Motion Module FB | 4 |
| 2.1 | M+RD78GS_SetPositioningData | 4 |
| 2.2 | M+RD78GS_StartPositioning | 10 |
| 2.3 | M+RD78GS_JOG | 13 |
| 2.4 | M+RD78GS_MPG | 17 |
| 2.5 | M+RD78GS_ChangeSpeed | 19 |
| 2.6 | M+RD78GS_ChangeAccDecTime | 22 |
| 2.7 | M+RD78GS_ChangePosition | 25 |
| 2.8 | M+RD78GS_Restart | 28 |
| 2.9 | M+RD78GS_OperateError | 30 |
| 2.10 | M+RD78GS_InitializeParameter | 34 |
| 2.11 | M+RD78GS_WriteFlash | 36 |
| 2.12 | M+RD78GS_ChangeTorqueControlMode | 38 |
| 2.13 | M+RD78GS_ChangeSpeedControlMode | 41 |
| 2.14 | M+RD78GS_ChangePositionControlMode | 44 |
| 2.15 | M+RD78GS_ChangeContinuousTorqueMode | 46 |
| 2.16 | M+RD78GS_Sync | 50 |
| 2.17 | M+RD78GS_ChangeSyncEncoderPosition | 52 |
| 2.18 | M+RD78GS_DisableSyncEncoder | 55 |
| 2.19 | M+RD78GS_EnableSyncEncoder | 57 |
| 2.20 | M+RD78GS_ResetSyncEncoderError | 59 |
| 2.21 | M+RD78GS_ConnectSyncEncoder | 63 |
| 2.22 | M+RD78GS_MoveCamReferencePosition | 65 |
| 2.23 | M+RD78GS_ChangeCamPositionPerCycle | 68 |
| 2.24 | M+RD78GS_ChangeMainShaftGearPositionPerCycle | 71 |
| 2.25 | M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle | 74 |
| 2.26 | M+RD78GS_MoveCamPositionPerCycle | 77 |
| 2.27 | M+RD78GS_MakeRotaryCutterCam | 80 |
| 2.28 | M+RD78GS_CalcCamCommandPosition | 82 |
| 2.29 | M+RD78GS_CalcCamPositionPerCycle | 84 |
| 2.30 | M+RD78GS_ReadWriteParameter | 86 |
| | INSTRUCTION INDEX | 90 |
| | REVISIONS | 92 |

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 | Set positioning data ([Da.1] to [Da.10], [Da.20] to [Da.22], [Da.27] to [Da.29]). |
| M+RD78GS_StartPositioning | Start the positioning operation. |
| M+RD78GS_JOG | Perform the JOG operation or inching operation. |
| M+RD78GS_MPG | Perform the manual pulse generator operation. |
| M+RD78GS_ChangeSpeed | Change the speed. |
| M+RD78GS_ChangeAccDecTime | Change the acceleration/deceleration time at a speed change. |
| M+RD78GS_ChangePosition | Change the target position. |
| M+RD78GS_Restart | Restart the axis being stopped. |
| M+RD78GS_OperateError | Monitor errors and warnings, and reset errors. |
| M+RD78GS_InitializeParameter | Initialize the parameter. |
| M+RD78GS_WriteFlash | Write the parameter, positioning data, and block start data in the buffer memory to the flash ROM. |
| M+RD78GS_ChangeTorqueControlMode | Activate the torque control mode. |
| M+RD78GS_ChangeSpeedControlMode | Activate the speed control mode. |
| M+RD78GS_ChangePositionControlMode | Activate the position control mode. |
| M+RD78GS_ChangeContinuousTorqueMode | Activate the continuous operation to torque control mode. |
| M+RD78GS_Sync | Start and end the synchronous control. |
| M+RD78GS_ChangeSyncEncoderPosition | Change the synchronous encoder axis current value and synchronous encoder axis current value per cycle. |
| M+RD78GS_DisableSyncEncoder | Disable inputs from the synchronous encoder axis. |
| M+RD78GS_EnableSyncEncoder | Enable inputs from the synchronous encoder axis. |
| M+RD78GS_ResetSyncEncoderError | Read error information from the synchronous encoder axis, and reset the error. |
| M+RD78GS_ConnectSyncEncoder | Connect a synchronous encoder via CPU. |
| M+RD78GS_MoveCamReferencePosition | Add the movement amount set in the synchronous control change value to the cam reference position to move the cam reference position. |
| M+RD78GS_ChangeCamPositionPerCycle | Change the cam axis current value per cycle to a synchronous control change value. |
| M+RD78GS_ChangeMainShaftGearPositionPerCycle | Change the current value per cycle after main shaft gear to a synchronous control change value. |
| M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle | Change the current value per cycle after auxiliary shaft gear to a synchronous control change value. |
| M+RD78GS_MoveCamPositionPerCycle | Add 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 generate the cam for a rotary cutter. |
| M+RD78GS_CalcCamCommandPosition | Calculate a cam axis feed current value, and output the calculation result. |
| M+RD78GS_CalcCamPositionPerCycle | Calculate a cam axis current value per cycle, and output the calculation result. |
| M+RD78GS_ReadWriteParameter | Read and write the device parameter (object). |

Restriction

When using these FBs, 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 | Set 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 0;"> <p style="text-align: center;">M+RD78GS_SetPositioningData</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_uAxis</td> <td></td> <td>o_bErr : B — (7)</td> </tr> <tr> <td>(4) —</td> <td>UW : i_uDataNo</td> <td></td> <td>o_uErrId : UW — (8)</td> </tr> </table> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding-left: 40px;">pb_uOpePattern</td><td>(9)</td></tr> <tr><td style="padding-left: 40px;">pb_uCtrlSys</td><td>(10)</td></tr> <tr><td style="padding-left: 40px;">pb_uAccTimeNo</td><td>(11)</td></tr> <tr><td style="padding-left: 40px;">pb_uDecTimeNo</td><td>(12)</td></tr> <tr><td style="padding-left: 40px;">pb_uMcode</td><td>(13)</td></tr> <tr><td style="padding-left: 40px;">pb_uDwellTime</td><td>(14)</td></tr> <tr><td style="padding-left: 30px;">pb_uMcodeOnTiming</td><td>(15)</td></tr> <tr><td style="padding-left: 40px;">pb_uABS</td><td>(16)</td></tr> <tr><td style="padding-left: 30px;">pb_uInterpolateSpd</td><td>(17)</td></tr> <tr><td style="padding-left: 40px;">pb_udCmdSpd</td><td>(18)</td></tr> <tr><td style="padding-left: 40px;">pb_dPositAdr</td><td>(19)</td></tr> <tr><td style="padding-left: 40px;">pb_dArcAdr</td><td>(20)</td></tr> <tr><td style="padding-left: 30px;">pb_uInterpolationAxisNo1</td><td>(21)</td></tr> <tr><td style="padding-left: 30px;">pb_uInterpolationAxisNo2</td><td>(22)</td></tr> <tr><td style="padding-left: 30px;">pb_uInterpolationAxisNo3</td><td>(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) |
| (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) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 No. • 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 25H, 80H to 84H | <p>Set 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[^] Circular interpolation control with sub point designation (ABS) • 0EH: INC[^] 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[^] Helical interpolation control with sub point designation (ABS) • 21H: INCH[^] 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 pb_uCtrlSys (Da.2: Control system) settings. | Set the "condition data No.", "number of repetitions", "number of pitches" or "M code" for the control system. <ul style="list-style-type: none"> ■When pb_uCtrlSys (Da.2: Control system) is "82H: JUMP" Set the "condition data No." <ul style="list-style-type: none"> • 0 to 10 ■When pb_uCtrlSys (Da.2: Control system) is "83H: LOOP" Set the "number of repetitions". <ul style="list-style-type: none"> • 1 to 65535 ■When pb_uCtrlSys (Da.2: Control system) is "20H to 25H: Helical interpolation" Set the "number of pitches". <ul style="list-style-type: none"> • 0 to 999 ■When pb_uCtrlSys (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 pb_uCtrlSys (Da.2: Control system) settings. | Set the "positioning data No." or "dwell time" for the control system. <ul style="list-style-type: none"> ■When pb_uCtrlSys (Da.2: Control system) is "82H: JUMP" Set the "positioning data No." <ul style="list-style-type: none"> • 1 to 600 ■When pb_uCtrlSys (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. <ul style="list-style-type: none"> ■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 pb_uCtrlSys (Da.2: Control system) settings. | Specify the target position or movement amount for positioning control. <p>The setting value differs depending on the control system.</p> <ul style="list-style-type: none"> ■When "[Pr.1] Unit setting" is "0: mm, 1: inch, 3: pulse" <ul style="list-style-type: none"> • pb_uCtrlSys (Da.2: Control system) is "06H to 09H": <ul style="list-style-type: none"> 0 to 2147483647 • pb_uCtrlSys (Da.2: Control system) is other than "06H to 09H": <ul style="list-style-type: none"> -2147483648 to 2147483647 ■When "[Pr.1] Unit setting" is "2: degree" <ul style="list-style-type: none"> • pb_uCtrlSys (Da.2: Control system) is "01H, 0AH, 15H, 1AH, 20H, 22H, 23H, 81H": <ul style="list-style-type: none"> 0 to 35999999 • pb_uCtrlSys (Da.2: Control system) is "02H, 03H, 0BH, 0CH, 16H, 17H, 1BH, 1CH, 20H, 22H, 23H": <ul style="list-style-type: none"> -2147483648 to 2147483647 • pb_uCtrlSys (Da.2: Control system) is "06H, 07H": <ul style="list-style-type: none"> 0 to 2147483647 (INC mode) 0 to 35999999 (ABS mode) • pb_uCtrlSys (Da.2: Control system) is "08H, 09H": <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> ■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 in two or more places, 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. |
| 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 | Start 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 No. • 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. • 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 all of the following 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 any other means while this FB is being executed. When this FB is used in two or more places, or when another FB that operates the same Y signal as the signal this FB does is used, create an interlock to prevent the FBs from being activated at the same time. When this FB is used in two or more places, 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 | Perform the JOG operation or inching operation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: auto;"> <p style="text-align: center;">M+RD78GS_JOG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; text-align: right;">(1) —</td> <td style="width: 45%;">B : i_bEN</td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 10%;"></td> <td style="width: 15%; text-align: left;">o_bENO : B — (8)</td> </tr> <tr> <td style="text-align: right;">(2) —</td> <td>DUT : i_stModule</td> <td></td> <td></td> <td></td> <td style="text-align: left;">o_bOK : B — (9)</td> </tr> <tr> <td style="text-align: right;">(3) —</td> <td>UW : i_uAxis</td> <td></td> <td></td> <td></td> <td style="text-align: left;">o_bErr : B — (10)</td> </tr> <tr> <td style="text-align: right;">(4) —</td> <td>B : i_bFJog</td> <td></td> <td></td> <td style="text-align: left;">o_uErrId : UW — (11)</td> <td></td> </tr> <tr> <td style="text-align: right;">(5) —</td> <td>B : i_bRJog</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(6) —</td> <td>UD : i_udJogSpeed</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(7) —</td> <td>UW : i_ulnching</td> <td></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_ulnching | | | | |
| (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_ulnching | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 No. • 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_ulnching | 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 any other means while this FB is being executed. • When this FB is used in two or more places, or when another FB that operates the same Y signal as the signal this FB does is used, create an interlock to prevent the FBs from being activated at the same time. • When this FB is used in two or more places, 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 | Perform the manual pulse generator operation. |
| Symbol | <pre> graph LR subgraph M+RD78GS_MPG B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW["(3) UW : i_uAxis"] UD["(4) UD : i_udMPGInputMagnification"] 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 UD --- 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_uAxis | Target axis | Word [unsigned] | 1 to 16 | Specify the axis No. • 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), the 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 in two or more places, 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 | Change the speed. |
| 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 No. • 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 in two or more places, 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 | Change the acceleration/deceleration time at a speed change. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_ChangeAccDecTime</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px;">(1)</td> <td style="width: 20px;">—</td> <td style="width: 50%;">B : i_bEN</td> <td style="width: 20px;"></td> <td style="width: 20px;">o_bENO : B</td> <td style="width: 20px;">—</td> <td style="width: 20px;">(7)</td> </tr> <tr> <td>(2)</td> <td>—</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>—</td> <td>(8)</td> </tr> <tr> <td>(3)</td> <td>—</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B</td> <td>—</td> <td>(9)</td> </tr> <tr> <td>(4)</td> <td>—</td> <td>B : i_bEnable</td> <td></td> <td>o_uErrId : UW</td> <td>—</td> <td>(10)</td> </tr> <tr> <td>(5)</td> <td>—</td> <td>UD : i_udNewAccelerationTime</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>(6)</td> <td>—</td> <td>UD : i_udNewDecelerationTime</td> <td></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_bErr : B | — | (9) | (4) | — | B : i_bEnable | | o_uErrId : UW | — | (10) | (5) | — | UD : i_udNewAccelerationTime | | | | | (6) | — | UD : i_udNewDecelerationTime | | | | |
| (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) | — | B : i_bEnable | | o_uErrId : UW | — | (10) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (5) | — | UD : i_udNewAccelerationTime | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (6) | — | UD : i_udNewDecelerationTime | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 No. • 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 | 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 | 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 signal that transitions from Disabled to Enabled when i_bEN is active, and returns to Disabled after i_bEN ends. Time Values: <ul style="list-style-type: none"> i_udNewAccelerationTime (Cd.10): Changes from a 'Current value' to a 'New value' when i_bEnable becomes Enabled. i_udNewDecelerationTime (Cd.11): Similarly changes from a 'Current value' to a 'New value' when i_bEnable becomes Enabled. [Cd.12] Selection: Transitions from Disabled to Enabled when i_bEnable becomes Enabled, and returns to Disabled when i_bEnable becomes Disabled. o_bOK (Completed without error): A pulse that occurs after the function completes successfully. o_bErr (Error flag): Remains at a low level (0), indicating no error. o_uErrId (Error code): Remains at 0. | |

| 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 in two or more places, 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 | Change the target position. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p style="text-align: center;">M+RD78GS_ChangePosition</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%;">(6)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(7)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uAxis</td> <td></td> <td>o_bErr : B</td> <td>(8)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dTargetNewPosition</td> <td></td> <td>o_uErrId : UW</td> <td>(9)</td> </tr> <tr> <td>(5) —</td> <td>UD : i_udTargetNewSpeed</td> <td></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_uAxis | | o_bErr : B | (8) | (4) — | D : i_dTargetNewPosition | | o_uErrId : UW | (9) | (5) — | UD : i_udTargetNewSpeed | | | |
| (1) — | B : i_bEN | | o_bENO : B | (6) | | | | | | | | | | | | | | | | | | | | | | |
| (2) — | DUT : i_stModule | | o_bOK : B | (7) | | | | | | | | | | | | | | | | | | | | | | |
| (3) — | UW : i_uAxis | | o_bErr : B | (8) | | | | | | | | | | | | | | | | | | | | | | |
| (4) — | D : i_dTargetNewPosition | | o_uErrId : UW | (9) | | | | | | | | | | | | | | | | | | | | | | |
| (5) — | UD : i_udTargetNewSpeed | | | | | | | | | | | | | | | | | | | | | | | | | |

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 No. • 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 in two or more places, 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 | Restart 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 No. • 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 all of the following 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> <ul style="list-style-type: none"> 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 in two or more places, 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 | Monitor errors and warnings, and reset errors. |
| Symbol | <p>The diagram shows a rectangular block labeled 'M+RD78GS_OperateError'. On the left side, there are four input variables: (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 variables: (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 No. • 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 in two or more places, 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

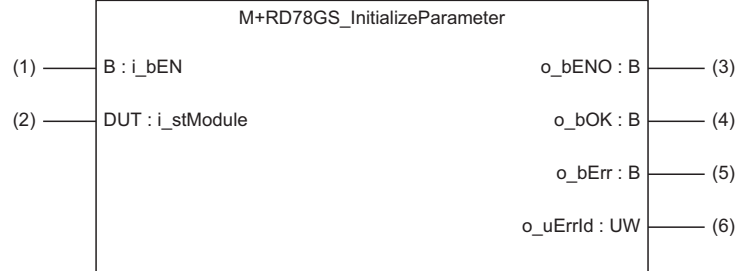
| Version | Date | Description |
|---------|------------|---------------|
| 00A | 2021/04/30 | First edition |

2.10 M+RD78GS_InitializeParameter

Name

M+RD78GS_InitializeParameter

Overview

| Item | Description |
|-------------------|--|
| Function overview | Initialize 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 | |
| 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. |

Error codes

This FB does not have any error codes.

Version upgrade history

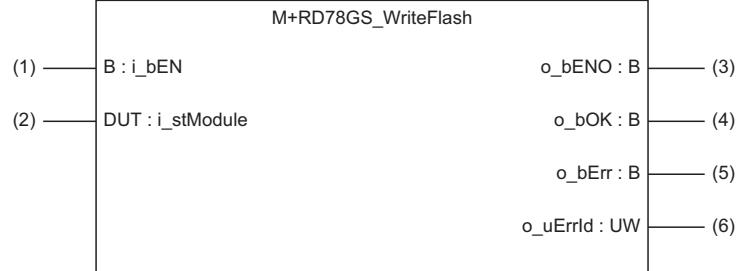
| Version | Date | Description |
|---------|------------|---------------|
| 00A | 2021/04/30 | First edition |

2.11 M+RD78GS_WriteFlash

Name

M+RD78GS_WriteFlash

Overview

| Item | Description |
|-------------------|--|
| Function overview | Write 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 execution cycle of the Flash ROM writing request. The input <i>i_bEN</i> (Execution command) is a pulse that starts at a high level. When it transitions from high to low, the output <i>o_bENO</i> (Execution status) transitions from low to high. Simultaneously, the <i>[Cd.1] Flash ROM writing request</i> signal transitions from 0 to 1. When the request returns to 0, <i>o_bENO</i> transitions back to low. The output <i>o_bOK</i> (Completed without error) transitions from low to high during the high pulse of the writing request. The error flag <i>o_bErr</i> and error code <i>o_uErrId</i> (which is constant at 0) remain at their default low and 0 states throughout the process.</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>i_bEN</i> (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>i_bEN</i> (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 | Activate the torque control mode. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 0 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 No. • 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 in two or more places, 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 |

2.13 M+RD78GS_ChangeSpeedControlMode

Name

M+RD78GS_ChangeSpeedControlMode

Overview

| Item | Description |
|-------------------|---|
| Function overview | Activate the speed control mode. |
| Symbol | <p>The diagram shows a central box labeled "M+RD78GS_ChangeSpeedControlMode". On the left side, there are six input variables: (1) B : i_bEN, (2) DUT : i_stModule, (3) UW : i_uAxis, (4) D : i_dCommandSpeed, (5) UW : i_uSpeedAccelerationTime, and (6) UW : i_uSpeedDecelerationTime. On the right side, there are four output variables: o_bENO : B (7), o_bOK : B (8), o_bErr : B (9), and o_uErrId : UW (10).</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 No. • 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 in two or more places, 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 | Activate 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 No. • 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 in two or more places, 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 | Activate 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 No. • 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] | *2 | 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) ^{*3} | pulse (pulse/s) |
|-------------------------------|-----------------------------------|---|---------------------------|
| -2000000000 to 2000000000 | -2000000000 to 2000000000 | -2000000000 to 2000000000 | -1000000000 to 1000000000 |

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

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

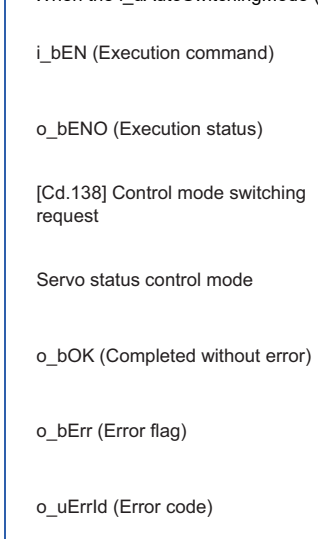
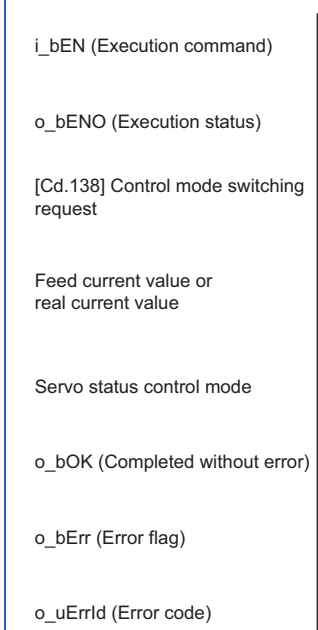
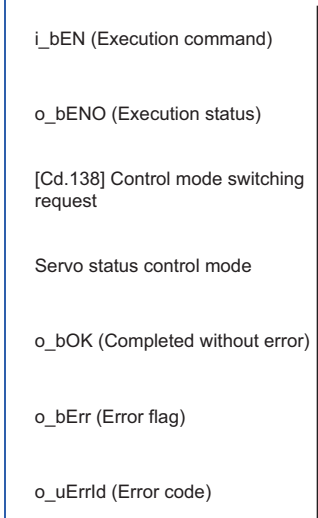
*3 The setting for which "[Pr.83] Speed control 10 \times multiplier for degree axis" is enabled is -2000000000 to 2000000000 ($\times 10^{-2}$ degree/min).

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 <code>i_uAutoSwitchingMode</code> (Cd.153: Control mode auto-shift selection) is set to "0: No switching condition" </p>  <p> • When the <code>i_uAutoSwitchingMode</code> (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 in two or more places, 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 | Start and end the synchronous control. |
| Symbol | <p>The diagram shows a rectangular box labeled 'M+RD78GS_Sync'. On the left side, there are three input lines labeled (1) B : i_bEN, (2) DUT : i_stModule, and (3) UW : i_uOutputAxis. On the right side, there are four output lines labeled (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 No. 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 in two or more places, 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 | Change the synchronous encoder axis current value and synchronous encoder axis current value per cycle. |
| Symbol | <pre> graph LR subgraph M+RD78GS_ChangeSyncEncoderPosition direction TB B["(1) B : i_bEN"] DUT["(2) DUT : i_stModule"] UW1["(3) UW : i_uSyncEncAxis"] UW2["(4) UW : i_uStartControl"] D["(5) D : i_dNewPosition"] end B --- O6["(6) o_bENO : B"] DUT --- O7["(7) o_bOK : B"] UW1 --- O8["(8) o_bErr : B"] UW2 --- O9["(9) 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_uSyncEncAxis | Synchronous encoder axis No. | Word [unsigned] | 1 to 16 | Set the synchronous encoder axis No. 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 i_uStartControl (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 i_bEN (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 i_bEN (Execution command) is turned ON. 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). 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_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> <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 in two or more places, 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 | Disable 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 No. 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). • 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 i_uStartControl (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 i_bEN (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 i_bEN (Execution command) is turned ON. 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). 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_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> <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 in two or more places, 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 | Enable 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 No. 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). • 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 i_uStartControl (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 i_bEN (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 i_bEN (Execution command) is turned ON. 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). 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_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> <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 in two or more places, 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 | Read error information from the synchronous encoder axis, and reset 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 No. 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 turning 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 <ul style="list-style-type: none"> • Warning reset |

| Item | Description |
|------------------------------|---|
| Timing chart | <p>■When an error occurs</p> <p>The timing chart illustrates the behavior of the synchronous encoder axis error reset function. 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 the error flag (o_bErr), and the subsequent error code (o_uErrId) being output. The chart also shows the effect of a reset request (i_bResetError) and the resulting status (o_bENO).</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 in two or more places, 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. |

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 | Connect 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 No. 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_uErrld | 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 in two or more places, 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 | Add the movement amount set in the synchronous control change value to the cam reference position to move the cam reference position. |
| Symbol | <p>The diagram shows a rectangular block labeled 'M+RD78GS_MoveCamReferencePosition'. On the left side, there are five input lines labeled (1) through (5): (1) B : i_bEN (2) DUT : i_stModule (3) UW : i_uOutputAxis (4) D : i_dSyncCtrlChangeValue (5) UW : i_uSyncCtrlReflectionTime On the right side, there are five output lines labeled (6) through (9): (6) o_bENO : B (7) o_bOK : B (8) o_bErr : B (9) 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 | Set the axis No. 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 | 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 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_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 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 an output axis No. for 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 in two or more places, 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., make sure there is one operation cycle or more after o_bOK (Completed without error) of this FB turns ON before the execution of the other FBs. 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 an output axis No. for 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 | Change 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 No. 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 are in the following table and depend on the "[Pr.438] Cam axis cycle unit setting" setting.

| mm ($\times 10^{-\square}$ mm) ^{*2} | inch ($\times 10^{-\square}$ inch) ^{*2} | degree ($\times 10^{-\square}$ 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_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 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 an output axis No. for 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 in two or more places, 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., make sure there is one operation cycle or more after o_bOK (Completed without error) of this FB turns ON before the execution of the other FBs. 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 an output axis No. with which synchronous control is not executed. | Please try again after confirming the setting. |

Version upgrade history

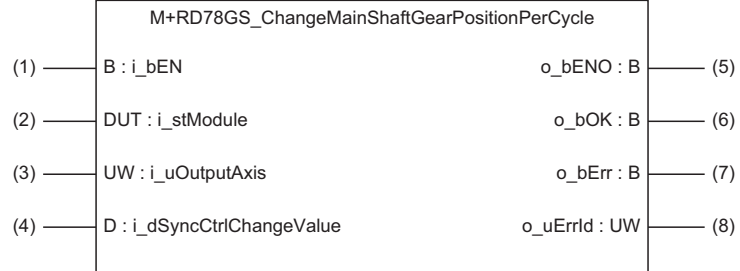
| Version | Date | Description |
|---------|------------|---------------|
| 00A | 2021/04/30 | First edition |

2.24 M+RD78GS_ChangeMainShaftGearPositionPerCycle

Name

M+RD78GS_ChangeMainShaftGearPositionPerCycle

Overview

| Item | Description |
|-------------------|---|
| Function overview | Change the current value per cycle after main shaft gear to a synchronous control change value. |
| 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 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 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_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 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 an output axis No. for 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 in two or more places, 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., make sure there is one operation cycle or more after o_bOK (Completed without error) of this FB turns ON before the execution of the other FBs. 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 an output axis No. for 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 | Change 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: 0 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_dSyncCtrlChange Value | 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 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 an output axis No. for 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 in two or more places, 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., make sure there is one operation cycle or more after o_bOK (Completed without error) of this FB turns ON before the execution of the other FBs. 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 an output axis No. for 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 | Add 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 | <pre> graph LR subgraph M+RD78GS_MoveCamPositionPerCycle direction TB 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"] B --- DUT --- UW1 --- D --- UW2 end B --- o_bENO["(6) o_bENO : B"] DUT --- o_bOK["(7) o_bOK : B"] UW1 --- o_bErr["(8) o_bErr : B"] D --- o_uErrId["(9) o_uErrId : UW"] 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 No. 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 | 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 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 an output axis No. for 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 in two or more places, 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., make sure there is one operation cycle or more after o_bOK (Completed without error) of this FB turns ON before the execution of the other FBs. 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 an output axis No. for 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 generate the cam for a rotary cutter. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Symbol | <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="text-align: center;">M+RD78GS_MakeRotaryCutterCam</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: 20%;"></td> <td style="width: 20%; text-align: left;">o_bENO : B</td> <td style="width: 10%; text-align: right;">(11)</td> </tr> <tr> <td style="text-align: right;">(2)</td> <td>DUT : i_stModule</td> <td></td> <td style="text-align: left;">o_bOK : B</td> <td style="text-align: right;">(12)</td> </tr> <tr> <td style="text-align: right;">(3)</td> <td>UW : i_uCamRequest</td> <td></td> <td style="text-align: left;">o_bErr : B</td> <td style="text-align: right;">(13)</td> </tr> <tr> <td style="text-align: right;">(4)</td> <td>UW : i_uCamNo</td> <td></td> <td style="text-align: left;">o_uErrId : UW</td> <td style="text-align: right;">(14)</td> </tr> <tr> <td style="text-align: right;">(5)</td> <td>UW : i_uResolution</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(6)</td> <td>UD : i_udSheetLength</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(7)</td> <td>UD : i_udSheetSyncWidth</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(8)</td> <td>UD : i_udSyncAxisLength</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(9)</td> <td>UD : i_udSyncStartPoint</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">(10)</td> <td>W : i_wSyncSectionAccelerationRatio</td> <td></td> <td></td> <td></td> </tr> </table> </div> | (1) | B : i_bEN | | o_bENO : B | (11) | (2) | DUT : i_stModule | | o_bOK : B | (12) | (3) | UW : i_uCamRequest | | o_bErr : B | (13) | (4) | UW : i_uCamNo | | o_uErrId : UW | (14) | (5) | UW : i_uResolution | | | | (6) | UD : i_udSheetLength | | | | (7) | UD : i_udSheetSyncWidth | | | | (8) | UD : i_udSyncAxisLength | | | | (9) | UD : i_udSyncStartPoint | | | | (10) | W : i_wSyncSectionAccelerationRatio | | | |
| (1) | B : i_bEN | | o_bENO : B | (11) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (2) | DUT : i_stModule | | o_bOK : B | (12) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (3) | UW : i_uCamRequest | | o_bErr : B | (13) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (4) | UW : i_uCamNo | | o_uErrId : UW | (14) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (5) | UW : i_uResolution | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (6) | UD : i_udSheetLength | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (7) | UD : i_udSheetSyncWidth | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (8) | UD : i_udSyncAxisLength | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (9) | UD : i_udSyncStartPoint | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (10) | 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_uCamRequest | Cd.608: Cam auto-generation request | Word [unsigned] | 1, 2 | Set the cam auto-generation request. |
| (4) | i_uCamNo | Cd.609: Cam auto-generation cam No. | Word [unsigned] | 1 to 256 | Set the cam number to be automatically generated. |
| (5) | 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. |
| (6) | 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. |
| (7) | 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. |
| (8) | 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. |

| No. | Variable name | Name | Data type | Setting range | Description |
|------|---------------------------------|---|------------------------|---|---|
| (9) | 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. |
| (10) | 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 |
|------|---------------|-------------------------|-----------------|---------------|---|
| (11) | o_bENO | Execution status | Bit | OFF | ON: The execution command is ON. OFF: The execution command is OFF. |
| (12) | o_bOK | Completed without error | Bit | OFF | When ON, it indicates that the cam automatic generation has been completed. |
| (13) | o_bErr | Error flag | Bit | OFF | Always OFF |
| (14) | 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: <ul style="list-style-type: none"> i_bEN (Execution command): A pulsed signal that starts high and then returns to low. o_bENO (Execution status): A signal that transitions from low to high when i_bEN is first turned on, and returns to low when i_bEN is turned off. i_uCamRequest (Cd.608: Cam auto-generation request): A signal that starts at 0, transitions to 1 or 2 when i_bEN is turned on, and returns to 0 when i_bEN is turned off. o_bOK (Completed without error): A signal that transitions from low to high after a delay following the start of i_uCamRequest, and returns to low when i_bEN is turned 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 |

2.28 M+RD78GS_CalcCamCommandPosition

Name

M+RD78GS_CalcCamCommandPosition

Overview

| Item | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------|--|-------|----------------------|--|------------------|-------|------------------|--|-----------------|-------|---------------|--|----------------------|-------|---------------|--|-------------------|-------|-------------------------|--|----------------------|-------|--------------------------|--|--|-------|----------------------------------|--|--|
| Function overview | Calculate a cam axis feed current value, and output 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:</p> <ul style="list-style-type: none"> i_bEN (Execution command): A pulse that starts the calculation process. o_bENO (Execution status): Turns ON when i_bEN is ON and turns OFF when i_bEN turns OFF. [Cd.612] Cam position calculation request: A pulse that occurs when i_bEN is ON. It is labeled '1: Cam axis feed current value calculation request'. o_dResult (Cam position calculation result): Shows a transition from 0 to a 'Calculation result' when the request pulse occurs, and then returns to 0. o_bOK (Completed without error): Turns ON when the calculation is completed and i_bEN is still ON, and turns OFF when i_bEN turns OFF. | |
| 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 | Calculate a cam axis current value per cycle, and output 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: 50%;">B : i_bEN</td> <td style="width: 20%;"></td> <td style="width: 10%;">o_bENO : B</td> <td style="width: 10%;">(9)</td> </tr> <tr> <td>(2) —</td> <td>DUT : i_stModule</td> <td></td> <td>o_bOK : B</td> <td>(10)</td> </tr> <tr> <td>(3) —</td> <td>UW : i_uCamNo</td> <td></td> <td>o_dResult : D</td> <td>(11)</td> </tr> <tr> <td>(4) —</td> <td>D : i_dStroke</td> <td></td> <td>o_bErr : B</td> <td>(12)</td> </tr> <tr> <td>(5) —</td> <td>UD : i_udLengthPerCycle</td> <td></td> <td>o_uErrId : UW</td> <td>(13)</td> </tr> <tr> <td>(6) —</td> <td>D : i_dReferencePosition</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(7) —</td> <td>UD : i_udCommandPositionPerCycle</td> <td></td> <td></td> <td></td> </tr> <tr> <td>(8) —</td> <td>D : i_dCommandPosition</td> <td></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 | | | |
| (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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 ($\times 10^{-4}$ mm($\times 10^{-1}$ μm)) | 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 |
|------|---------------|---------------------------------|----------------------|---------------|---|
| (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 operation. 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 i_bEN is ON, o_bENO turns ON. The [Cd.612] Cam position calculation request is a pulse with a width of 2 cycles, labeled '2: Cam axis current calculation request per cycle'. During this pulse, o_dResult shows a 'Calculation result' pulse. After the calculation request pulse ends, o_bOK turns ON. The chart shows that o_bENO remains ON as long as i_bEN is ON, and o_bOK turns ON after the calculation request pulse ends.</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 | Read and write the 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) | | | |
| (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) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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 No. • 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 No. |

*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 reading and writing the device object 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

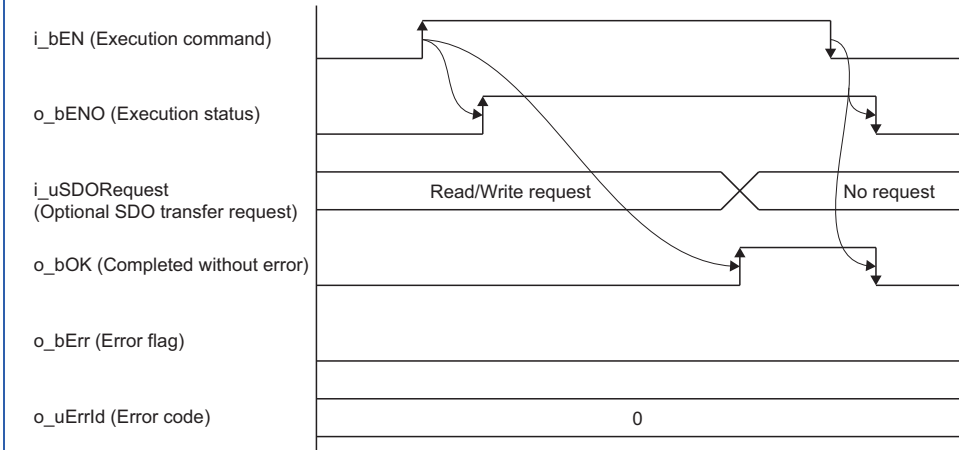
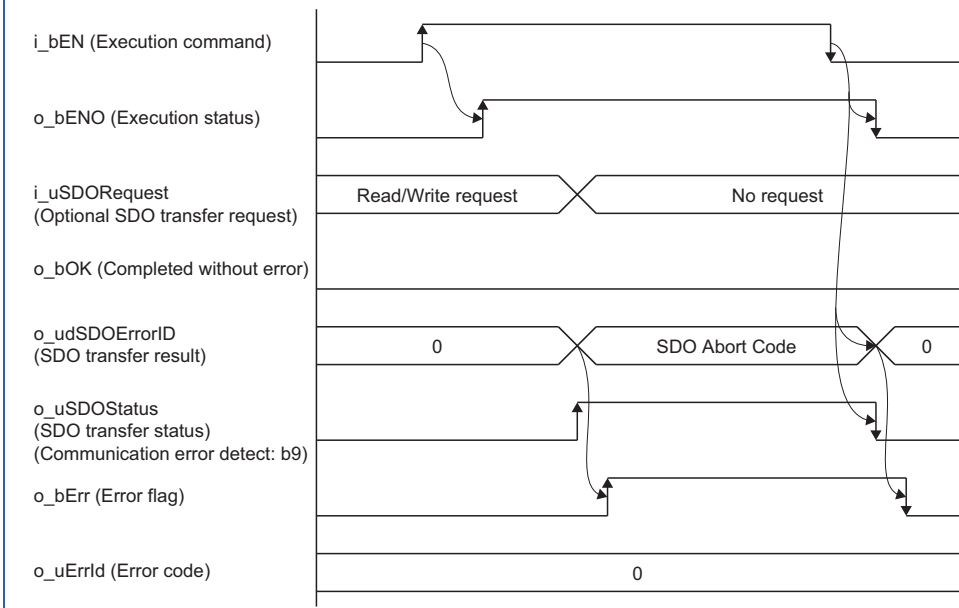
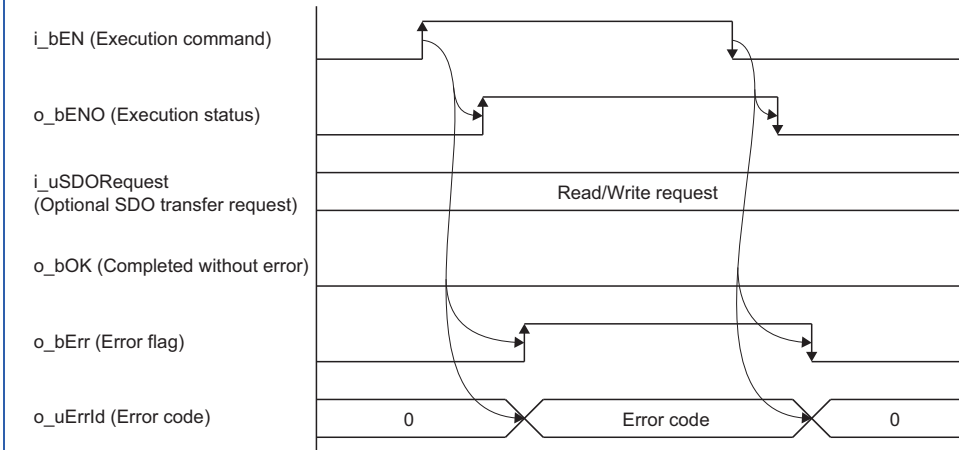
· pb_u4SDOData[0]

*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. | |
| 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>The timing chart shows the following sequence of events:</p> <ul style="list-style-type: none"> i_bEN (Execution command): Transitions from low to high, then back to low. o_bENO (Execution status): Transitions from low to high when i_bEN goes high, and back to low when i_bEN goes low. i_uSDORequest (Optional SDO transfer request): Shows a pulse labeled "Read/Write request" while i_bEN is high, followed by a period labeled "No request" when i_bEN is low. o_bOK (Completed without error): Transitions from low to high during the "Read/Write request" period, and back to low when i_bEN goes low. o_bErr (Error flag): Remains at a low level throughout the entire process. o_uErrId (Error code): Remains at a constant value of 0. <p>■When a communications error is detected</p>  <p>The timing chart shows the following sequence of events:</p> <ul style="list-style-type: none"> i_bEN (Execution command): Transitions from low to high, then back to low. o_bENO (Execution status): Transitions from low to high when i_bEN goes high, and back to low when i_bEN goes low. i_uSDORequest (Optional SDO transfer request): Shows a pulse labeled "Read/Write request" while i_bEN is high, followed by a period labeled "No request" when i_bEN is low. o_bOK (Completed without error): Remains at a low level throughout the process. o_udSDOErrorID (SDO transfer result): Starts at 0, then transitions to a pulse labeled "SDO Abort Code" during the "Read/Write request" period, and returns to 0 when i_bEN goes low. o_uSDOStatus (SDO transfer status) (Communication error detect: b9): Transitions from low to high during the "SDO Abort Code" period, and back to low when i_bEN goes low. o_bErr (Error flag): Transitions from low to high during the "SDO Abort Code" period, and back to low when i_bEN goes low. o_uErrId (Error code): Remains at a constant value of 0. <p>■When an error occurs</p>  <p>The timing chart shows the following sequence of events:</p> <ul style="list-style-type: none"> i_bEN (Execution command): Transitions from low to high, then back to low. o_bENO (Execution status): Transitions from low to high when i_bEN goes high, and back to low when i_bEN goes low. i_uSDORequest (Optional SDO transfer request): Shows a pulse labeled "Read/Write request" while i_bEN is high. o_bOK (Completed without error): Remains at a low level throughout the process. o_bErr (Error flag): Transitions from low to high during the "Read/Write request" period, and back to low when i_bEN goes low. o_uErrId (Error code): Starts at 0, then transitions to a pulse labeled "Error code" during the "Read/Write request" period, and returns to 0 when i_bEN goes low. |

| 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 in two or more places, 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 |

INSTRUCTION INDEX

M

| | |
|---|----|
| M+RD78GS_CalcCamCommandPosition | 82 |
| M+RD78GS_CalcCamPositionPerCycle | 84 |
| M+RD78GS_ChangeAccDecTime | 22 |
| M+RD78GS_ChangeAuxiliaryShaftGearPositionPerCycle | 74 |
| M+RD78GS_ChangeCamPositionPerCycle | 68 |
| M+RD78GS_ChangeContinuousTorqueMode | 46 |
| M+RD78GS_ChangeMainShaftGearPositionPerCycle | 71 |
| M+RD78GS_ChangePosition | 25 |
| M+RD78GS_ChangePositionControlMode | 44 |
| M+RD78GS_ChangeSpeed | 19 |
| M+RD78GS_ChangeSpeedControlMode | 41 |
| M+RD78GS_ChangeSyncEncoderPosition | 52 |
| M+RD78GS_ChangeTorqueControlMode | 38 |
| M+RD78GS_ConnectSyncEncoder | 63 |
| M+RD78GS_DisableSyncEncoder | 55 |
| M+RD78GS_EnableSyncEncoder | 57 |
| M+RD78GS_InitializeParameter | 34 |
| M+RD78GS_JOG | 13 |
| M+RD78GS_MakeRotaryCutterCam | 80 |
| M+RD78GS_MoveCamPositionPerCycle | 77 |
| M+RD78GS_MoveCamReferencePosition | 65 |
| M+RD78GS_MPG | 17 |
| M+RD78GS_OperateError | 30 |
| M+RD78GS_ReadWriteParameter | 86 |
| M+RD78GS_ResetSyncEncoderError | 59 |
| M+RD78GS_Restart | 28 |
| M+RD78GS_SetPositioningData | 4 |
| M+RD78GS_StartPositioning | 10 |
| M+RD78GS_Sync | 50 |
| M+RD78GS_WriteFlash | 36 |

MEMO

REVISIONS

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

| Revision date | *Manual number | Description |
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| August 2021 | BCN-B62005-1040ENG-A | First edition |
| January 2022 | BCN-B62005-1040ENG-B | ■Added or modified parts Section 2.1, 2.17, 2.18, 2.19, 2.20, 2.21 |
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