MELSEC-Q Digital-Analog Converter Module FB Library Reference Manual

Applicable modules:

Q64DA, Q64DAN

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Reference Manual Revision History

Reference Manual Number	Date	Description
FBM-M042-A	2010/12/10	First edition
FBM-M042-B	2015/03/27	1) Added applicable GX Works2 Version. •This FB is able to install on GX Works2 of all language versions. 2) Added the following "FB Version Upgrade History". •M+Q64DA_SetOffsetVal •M+Q64DA_SetGainVal

1. Overview

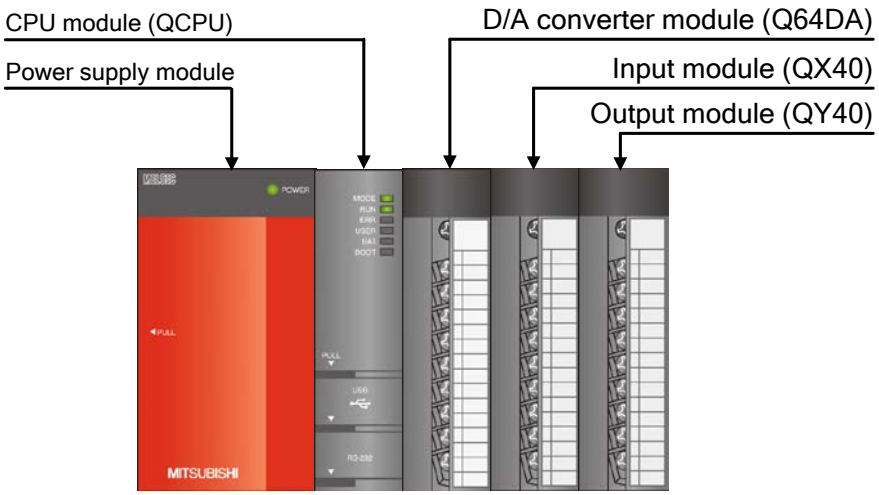
1.1. Overview of the FB Library

This FB Library is for using the MELSEC-Q Digital-Analog Converter Module.

1.2. Function of the FB Library

Item	Description
M+Q64DA_WriteDAVal	Writes DA conversion data of a specified channel.
M+Q64DA_WriteAllDAVal	Writes DA conversion data of all channels.
M+Q64DA_SetDAConversion	Sets the DA conversion enable/disable setting of a specified channel or all channels.
M+Q64DA_SetDAOutput	Sets the DA output enable/disable setting of a specified channel or all channels.
M+Q64DA_RequestSetting	Enables settings of each function.
M+Q64DA_SetOffsetVal	Performs offset setting of a specified channel.
M+Q64DA_SetGainVal	Performs gain setting of a specified channel.
M+Q64DA_ErrorOperation	Monitors error codes and performs error reset.

1.3. System Configuration Example



1.4. Relevant Manuals

- Digital-Analog Converter Module User's Manual
- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- GX Works2 Version 1 Operating Manual (Common)
- GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

1.5. Note

Please make sure to read user's manuals for the corresponding products before using the products.

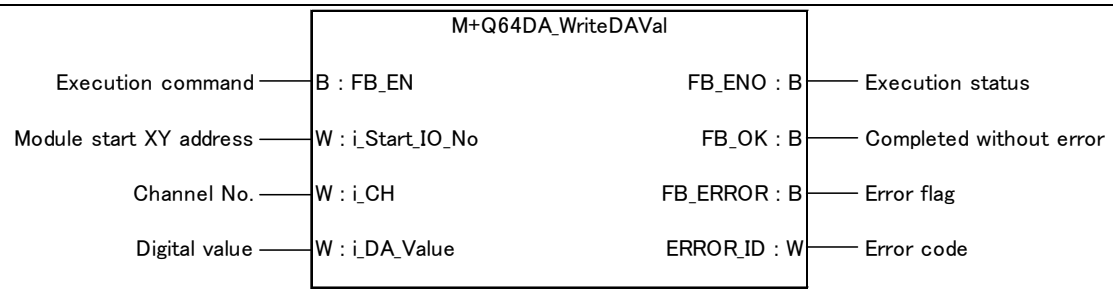
2. Details of the FB Library

2.1. M+Q64DA_WriteDAVal (DA conversion data write)

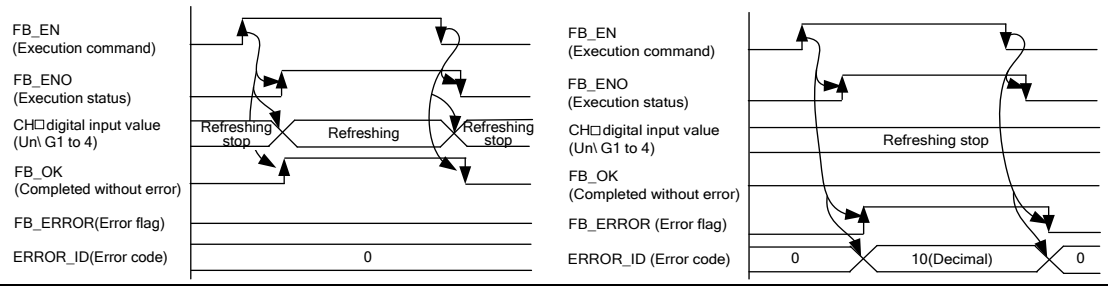
FB Name

M+Q64DA_WriteDAVal

Function Overview

Item	Description	
Function overview	Writes DA conversion data of a specified channel.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DA, Q64DAN
	CPU module	Series: MELSEC-Q Series* — Model: High performance model, Universal model * Not applicable for QCPU (A mode)
	Engineering software	GX Works2 *1 Language / Software version: Japanese version — Version1.86Q or later; English version — Version1.24A or later; Chinese (Simplified) version — Version1.49B or later; Chinese (Traditional) version — Version1.49B or later; Korean version — Version1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant Manuals".
Programming language	Ladder	
Number of steps	181 steps (for MELSEC-Q series universal model CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) By turning ON FB_EN (Execution command), DA conversion data is written to the specified channel. 2) The DA conversion data to be written depends on the resolution mode setting. 3) When the input value is invalid, the FB_ERROR output turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) If the auto refresh is set using GX Configurator-DA or the configuration function of GX Works 2, using this FB is unnecessary. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] [When an error occurs]



Item	Description
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
10 (Decimal)	The specified target channel is not valid. The target channel is not within the range of the number of channels of the mounted module. Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel No.	i_CH	Word	1~4	Specify the channel number.
Digital value	i_DA_Value	Word	Depends on the output range setting and resolution setting of the specified channel.	For details on the setting range of the digital value, refer to the relevant manual.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that DA conversion value is being written.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

Note

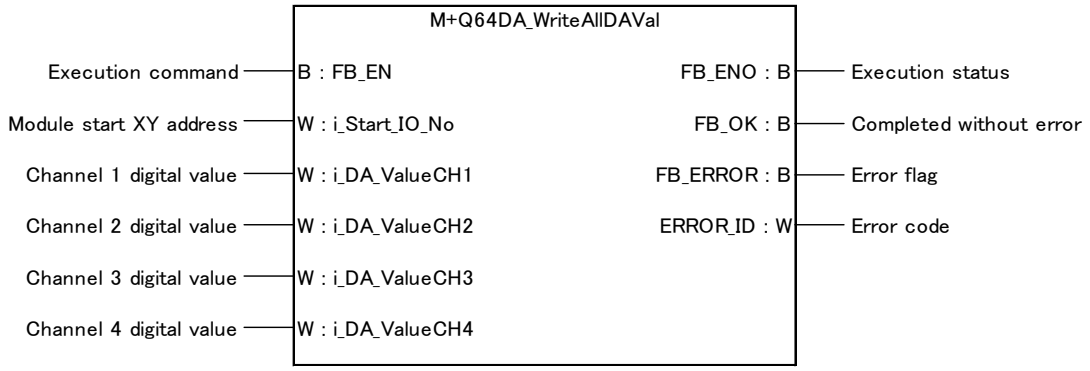
This chapter includes information related to the M+Q64DA_WriteDAVal function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

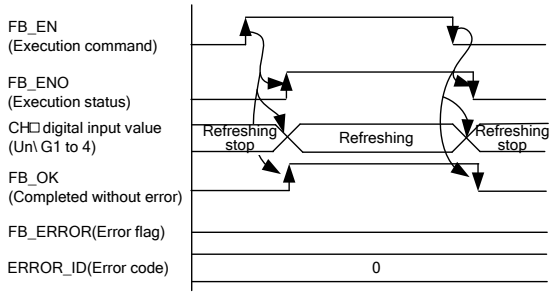
2.2. M+Q64DA_WriteAllDAVal (DA conversion data write (All CHs))

FB Name

M+Q64DA_WriteAllDAVal

Function Overview

Item	Description	
Function overview	Writes DA conversion data of all channels.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DA, Q64DAN
	CPU module	<table><tr><th>Series</th><th>Model</th></tr><tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr><tr><td>Universal model</td></tr></table> * Not applicable for QCPU (A mode)
	Engineering software	GX Works2 *1 <table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table> *1 For software versions applicable to the modules used, refer to "Relevant Manuals".
Programming language	Ladder	
Number of steps	177 steps (for MELSEC-Q series universal model CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) By turning ON FB_EN (Execution command), DA conversion data is written to the all channels. 2) The DA conversion data to be written to the all channels depends on the resolution mode setting.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) If the auto refresh is set using GX Configurator-DA or the configuration function of GX Works 2, using this FB is unnecessary. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
None	No errors are stored for this FB.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel 1 digital value	i_DA_ValueCH1	Word	Depends on the output range setting and resolution setting of the channel 1.	Writes the digital conversion value of the channel 1.
Channel 2 digital value	i_DA_ValueCH2	Word	Depends on the output range setting and resolution setting of the channel 2.	Writes the digital conversion value of the channel 2.
Channel 3 digital value	i_DA_ValueCH3	Word	Depends on the output range setting and resolution setting of the channel 3.	Writes the digital conversion value of the channel 3.
Channel 4 digital value	i_DA_ValueCH4	Word	Depends on the output range setting and resolution setting of the channel 4.	Writes the digital conversion value of the channel 4.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that DA conversion values of all channels are being written.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

Note

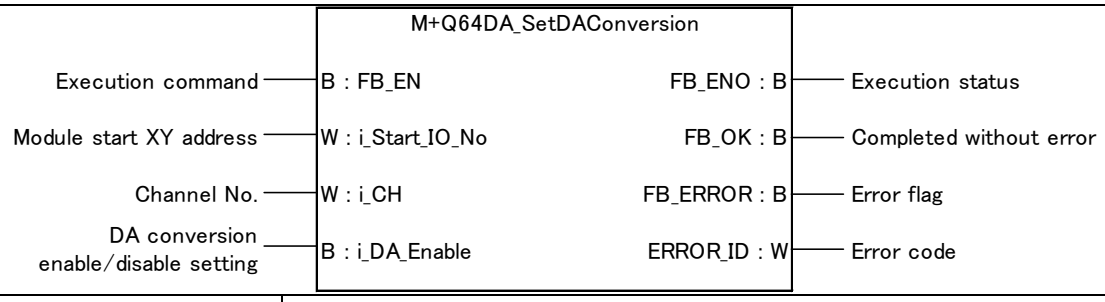
This chapter includes information related to the M+Q64DA_WriteAllDAVal function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

2.3. M+Q64DA_SetDAConversion (DA conversion enable/disable setting)

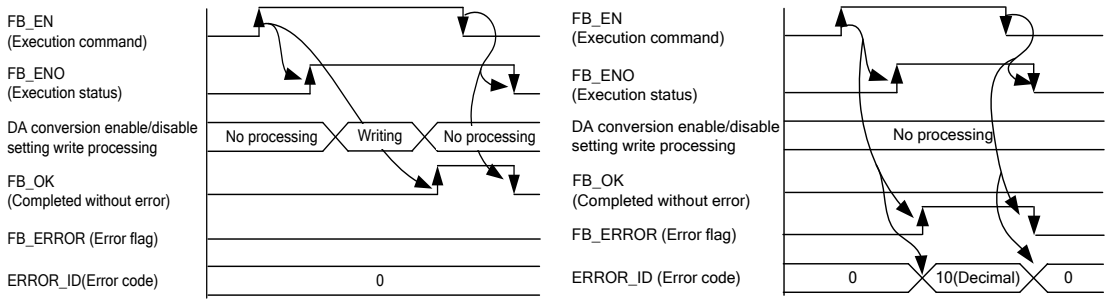
FB Name

M+Q64DA_SetDAConversion

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Sets the DA conversion enable/disable setting of a specified channel or all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DA, Q64DAN</td></tr>
<tr><td>CPU module</td><td><table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable for QCPU (A mode)</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant Manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">245 steps (for MELSEC-Q series universal model CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the DA conversion enable/disable setting of the specified channel is set. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The setting value is enabled by turning ON the operating condition setting request signal (Y9) or by executing the operating condition setting request FB (M+Q64DA_RequestSetting). 4) When the input value is invalid, the FB_ERROR output turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) If the auto refresh is set using GX Configurator-DA or the configuration function of GX Works 2, using this FB is unnecessary. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".

Item	Description
Timing chart	[When operation completes without error] [When an error occurs] 
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
10 (Decimal)	The specified target channel is not valid. The target channel is not within the range of the number of channels of the mounted module. Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel No.	i_CH	Word	As shown on the right.	Specify the channel number. •Q64DA, Q64DAN: 1~4 •All channels at once: 15(0FH)
DA conversion enable/disable setting	i_DA_Enable	Bit	ON, OFF	ON: DA conversion enabled. OFF: DA conversion disabled.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that DA conversion enable/disable setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

Note

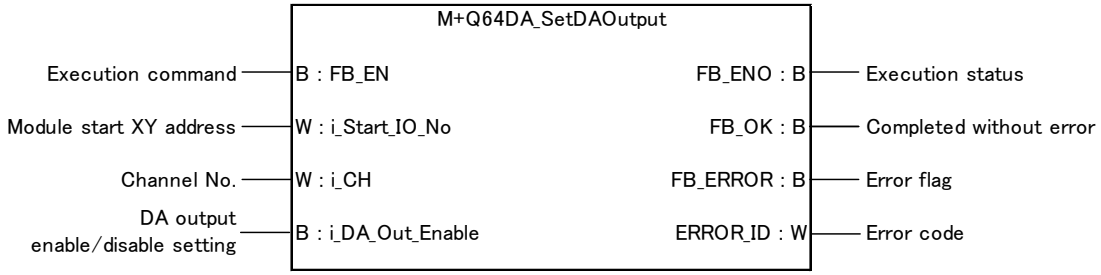
This chapter includes information related to the M+Q64DA_SetDAConversion function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

2.4. M+Q64DA_SetDAOutput (DA output enable/disable setting)

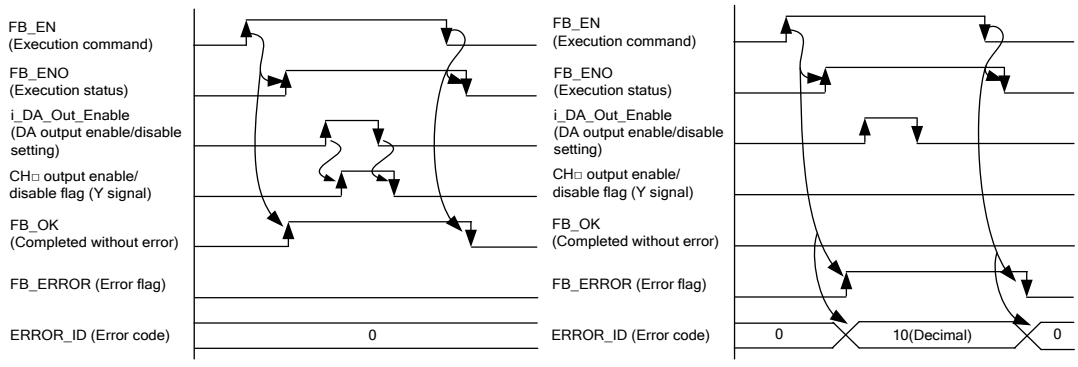
FB Name

M+Q64DA_SetDAOutput

Function Overview

Item	Description	
Function overview	Sets the DA output enable/disable setting of a specified channel or all channels.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DA, Q64DAN
	CPU module	Series: MELSEC-Q Series* — Model: High performance model, Universal model * Not applicable for QCPU (A mode)
	Engineering software	Compatible software: GX Works2 *1 Language: Japanese version — Software version: Version1.86Q or later Language: English version — Software version: Version1.24A or later Language: Chinese (Simplified) version — Software version: Version1.49B or later Language: Chinese (Traditional) version — Software version: Version1.49B or later Language: Korean version — Software version: Version1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant Manuals".
Programming language	Ladder	
Number of steps	218 steps (for MELSEC-Q series universal model CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) By turning ON FB_EN (Execution command), DA output enable/disable setting of the specified channel or all channels is set. 2) When the input value is invalid, the FB_ERROR output turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) 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 index modification. However this is not a problem and the FB will operate without error. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] [When an error occurs]



Item	Description
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
10 (Decimal)	The specified target channel is not valid. The target channel is not within the range of the number of channels of the mounted module. Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel No.	i_CH	Word	As shown on the right.	Specify the channel number. •Q64DA, Q64DAN: 1~4 •All channels at once: 15(0FH)
DA output enable/disable setting	i_DA_Out_Enable	Bit	ON, OFF	ON: Outputs the D/A conversion value. OFF: Outputs the offset value.

MELSOFT Library

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that DA output enable/disable setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

Note

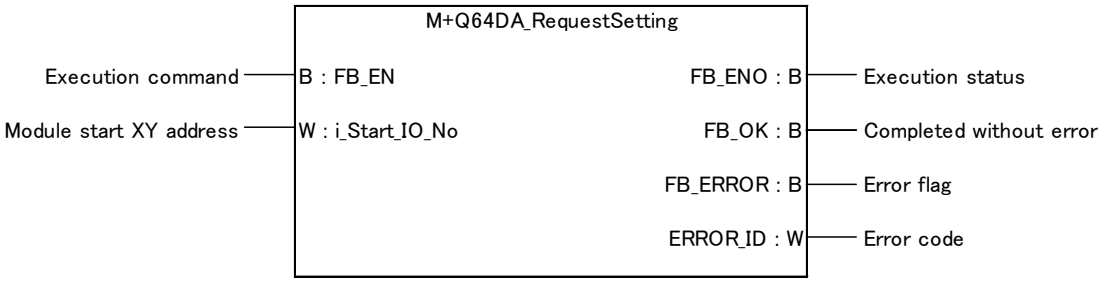
This chapter includes information related to the M+Q64DA_SetDAOutput function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

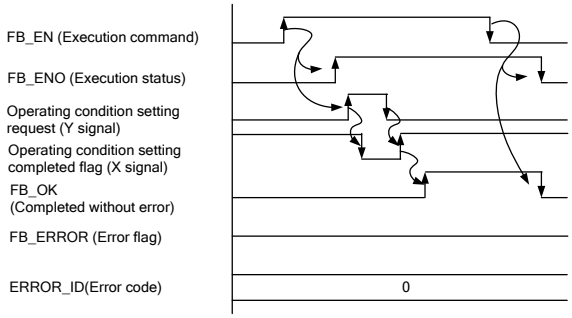
2.5. M+Q64DA_RequestSetting (Operating condition setting request operation)

FB Name

M+Q64DA_RequestSetting

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Enables settings of each function.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DA, Q64DAN</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable for QCPU (A mode)
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant Manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">173 steps (for MELSEC-Q series universal model CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), settings of each function are enabled. 2) The buffer memory is updated by executing the DA conversion enable/disable setting FB/DA output enable/disable setting FB. The set data, however, is not enabled. Execute this FB to enable the settings.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB turns ON/OFF the operating condition setting request signal. Please note that the DA conversion is stopped during operation of this FB. 6) This FB uses index register Z9. Please do not use this index register in an interrupt program. 7) Every input must be provided with a value for proper FB operation. 8) 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 index modification. However this is not a problem and the FB will operate without error. 9) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	

Item	Description
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
None	No errors are stored for this FB.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the enabled operation of each setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

Note

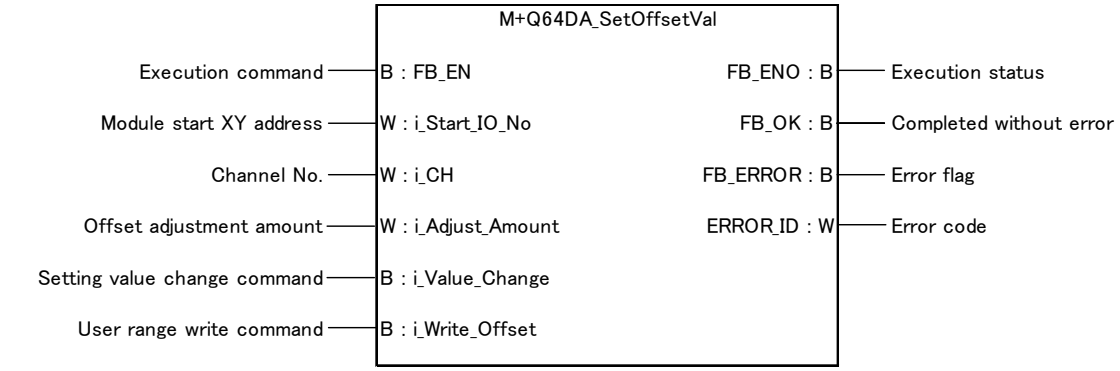
This chapter includes information related to the M+Q64DA_RequestSetting function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

2.6. M+Q64DA_SetOffsetVal (Offset setting)

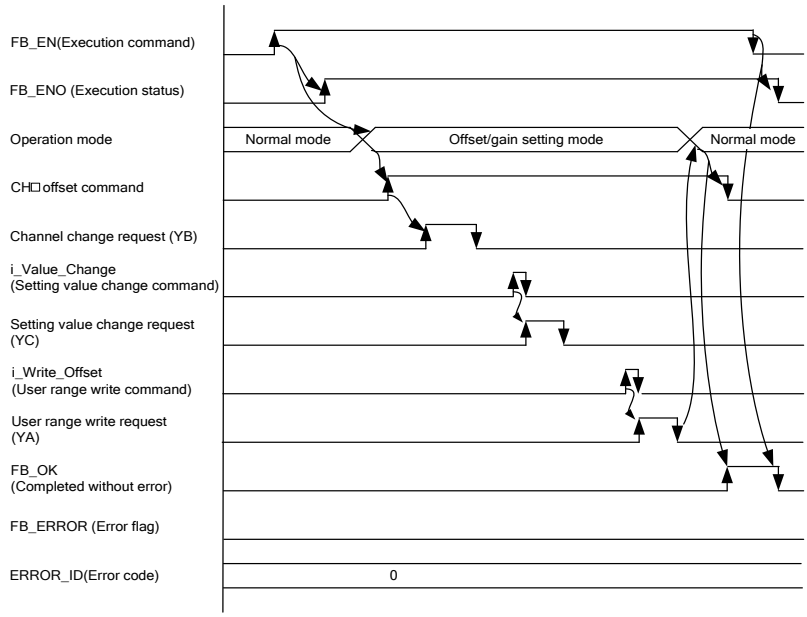
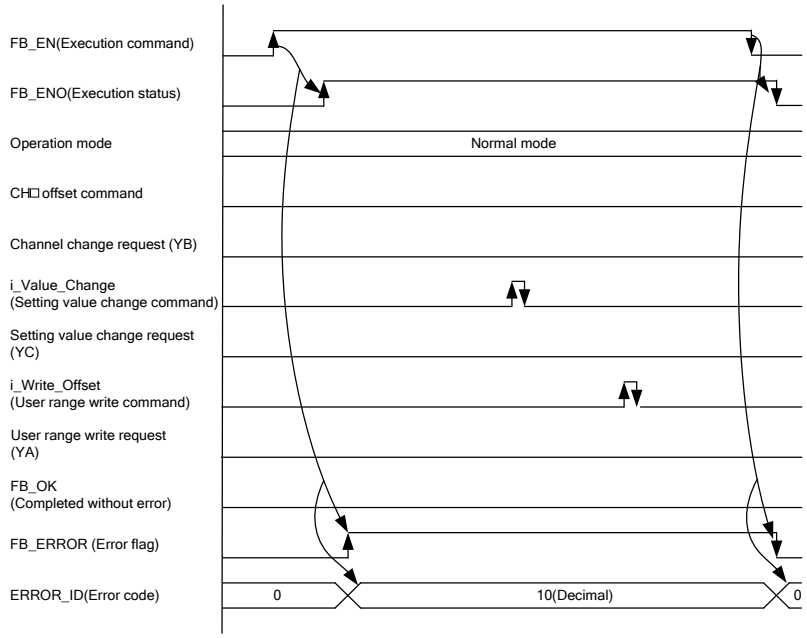
FB Name

M+Q64DA_SetOffsetVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Performs offset setting of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DA, Q64DAN</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable for QCPU (A mode)
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant Manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">327 steps (for MELSEC-Q series universal model CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the offset value of the specified channel is set. 2) To adjust the D/A output, set i_Adjust_Amount (Offset/gain adjustment amount) and turn OFF i_Value_Change (Setting value change command) and then ON while FB_EN (Execution command) is ON. 3) When the input value is invalid, the FB_ERROR output turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) 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 index modification. However this is not a problem and the FB will operate without error. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".

Item	Description
Timing chart	[When operation completes without error]  [When an error occurs] 
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
10 (Decimal)	The specified target channel is not valid. The target channel is not within the range of the number of channels of the mounted module. Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel No.	i_CH	Word	1~4	Specify the channel number.
Offset adjustment amount	i_Adjust_Amount	Word	-3000~3000	Set the offset adjustment amount of the specified channel.
Setting value change command	i_Value_Change	Bit	ON, OFF	Turn ON to change the D/A output. Turn OFF after changing the output.
User range write command	i_Write_Offset	Bit	ON, OFF	Turn ON to write the adjusted offset value to the flash memory. Turn OFF after writing is completed.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the offset setting of the specified channel is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition
1.01B	2015/03/27	Optimized program (Not change this FB function)

Note

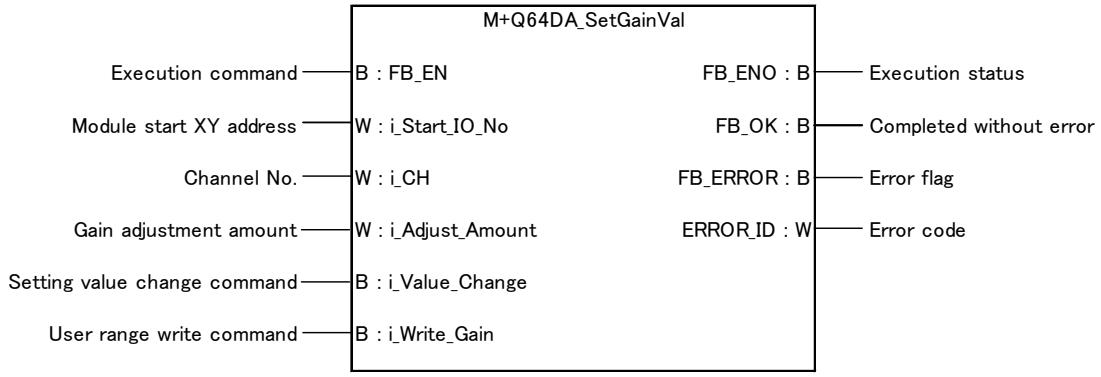
This chapter includes information related to the M+Q64DA_SetOffsetVal function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

2.7. M+Q64DA_SetGainVal (Gain setting)

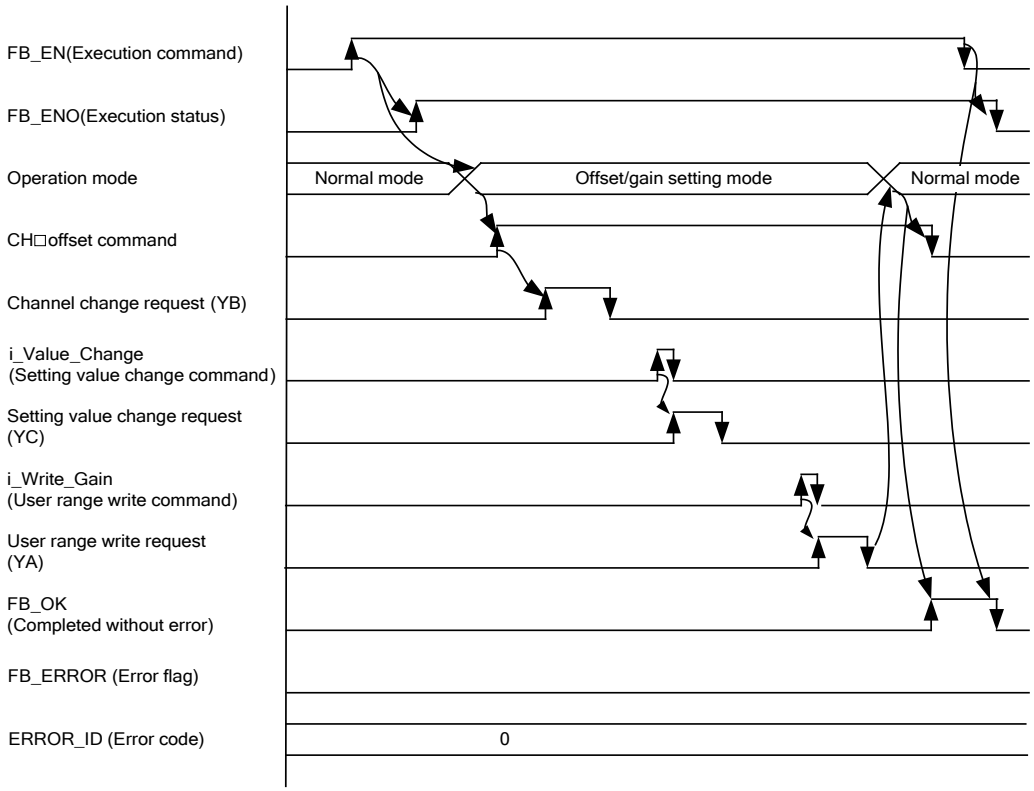
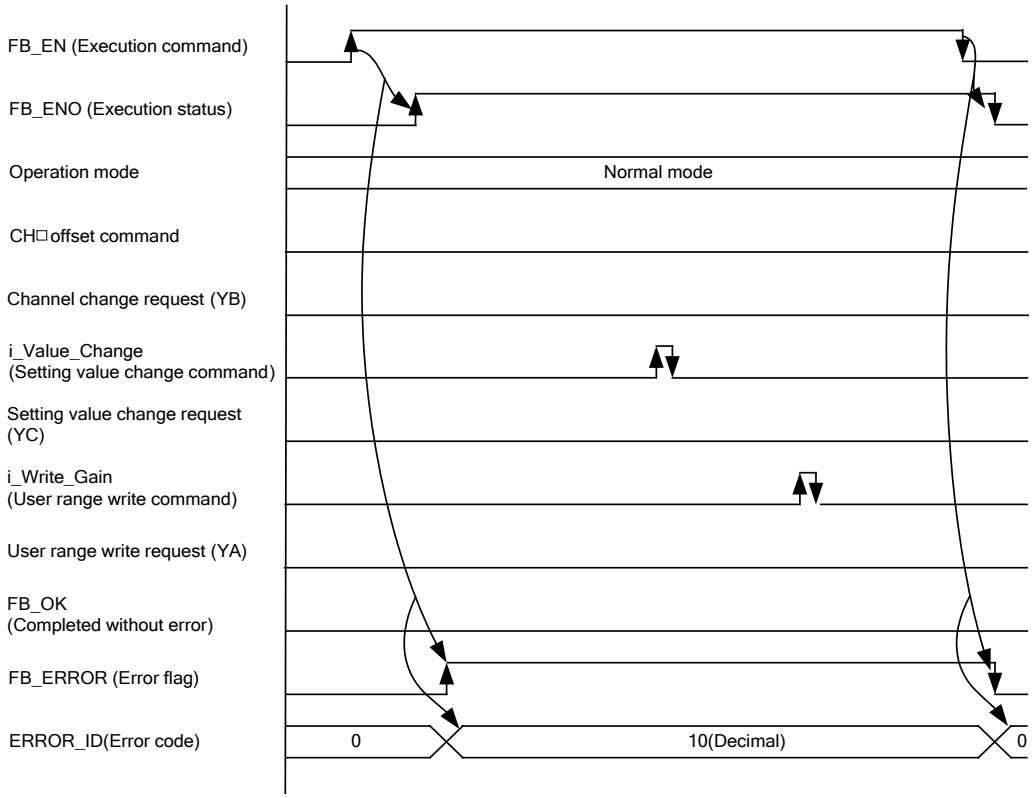
FB Name

M+Q64DA_SetGainVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Performs gain setting of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DA, Q64DAN</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable for QCPU (A mode)
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant Manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">325 steps (for MELSEC-Q series universal model CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the gain value of the specified channel is set. 2) To adjust the D/A output, set i_Adjust_Amount (Offset/gain adjustment amount) and turn OFF i_Value_Change (Setting value change command) and then ON while FB_EN (Execution command) is ON. 3) When the input value is invalid, the FB_ERROR output turns ON, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel. 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) 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 index modification. However this is not a problem and the FB will operate without error. 8) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".

Item	Description
Timing chart	[When operation completes without error]  [When an error occurs] 

Item	Description
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
10 (Decimal)	The specified target channel is not valid. The target channel is not within the range of the number of channels of the mounted module. Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Channel No.	i_CH	Word	1~4	Specify the channel number.
Gain adjustment amount	i_Adjust_Amount	Word	-3000~3000	Specify the gain adjustment amount of the specified channel.
Setting value change command	i_Value_Change	Bit	ON, OFF	Turn ON to change the D/A output. Turn OFF after changing the output.
User range write command	i_Write_Gain	Bit	ON, OFF	Turn ON to write the adjusted gain value to the flash memory. Turn OFF after writing is completed.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the gain setting of the specified channel is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition
1.01B	2015/03/27	Optimized program (Not change this FB function)

Note

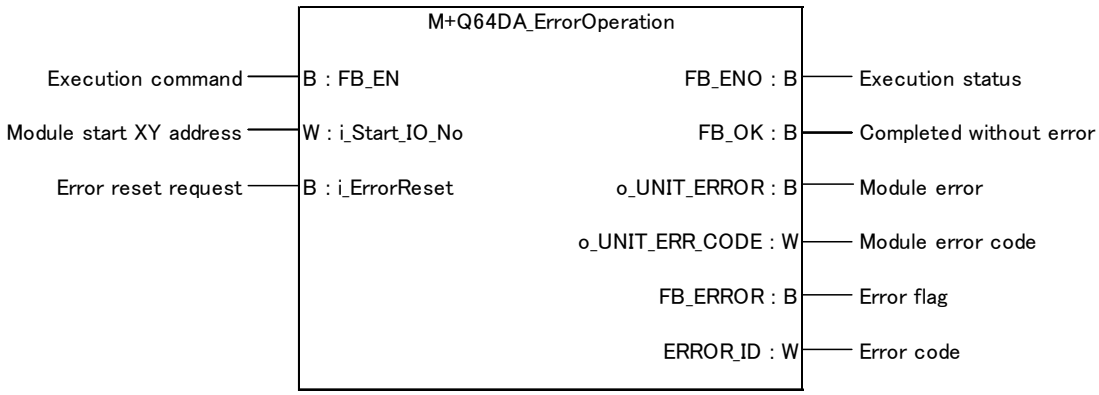
This chapter includes information related to the M+Q64DA_SetGainVal function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

2.8. M+Q64DA_ErrorOperation (Error operation)

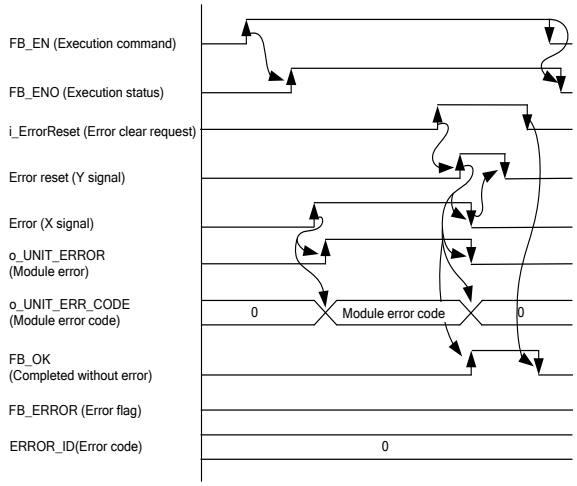
FB Name

M+Q64DA_ErrorOperation

Function Overview

Item	Description	
Function overview	Monitors error codes and performs error reset.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DA, Q64DAN
	CPU module	<table><tr><th>Series</th><th>Model</th></tr><tr><td rowspan="2">MELSEC-Q Series*</td><td>High performance model</td></tr><tr><td>Universal model</td></tr></table> * Not applicable for QCPU (A mode)
	Engineering software	GX Works2 *1 <table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table> *1 For software versions applicable to the modules used, refer to "Relevant Manuals".
Programming language	Ladder	

MELSOFT Library

Item	Description
Number of steps	185 steps (for MELSEC-Q series universal model CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.
Function description	1) By turning ON FB_EN (Execution command), error information is read. 2) When the error reset request is ON, error clear is performed.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN signal 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, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided with a value for proper FB operation. 6) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 7) The output range, synchronous output mode, resolution mode, and operation mode must be configured to match devices and systems connected to the Q64DA module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	

Item	Description
Relevant manual	•Digital-Analog Converter Module User's Manual •QCPU User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version 1 Operating Manual (Common) •GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

Error codes

●Error code list

Error code	Description
None	No errors are stored for this FB.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DA module is mounted. (For example, enter H10 for X10.)
Error reset request	i_ErrorReset	Bit	ON, OFF	Turn ON to perform the error reset. Turn OFF after error reset is completed.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. (Module error being monitored) OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates executing the error reset command is completed.
Module error	o_UNIT_ERROR	Bit	OFF	When ON, it indicates a module error has occurred.
Module error code	o_UNIT_ERR_CODE	Word	0	Store a code for an error occurring.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/12/10	First edition

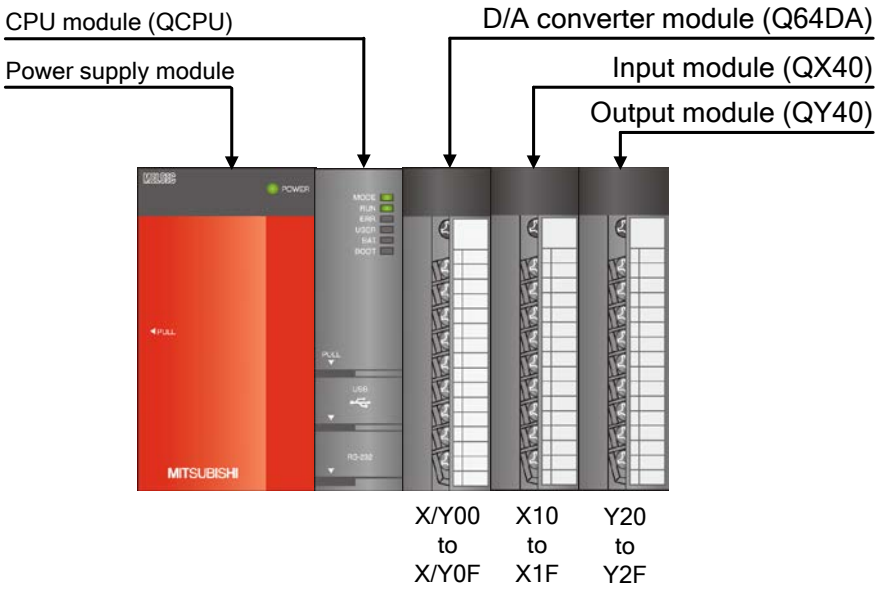
Note

This chapter includes information related to the M+Q64DA_ErrorOperation function block.
It does not include information on restrictions of use such as combination with digital-analog converter modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all the relevant manuals.

Appendix 1. FB Library Application Examples

Q64DA FB application examples are as follows.

1) System configuration



Reminder

- Every input must be provided with a value for proper FB operation.
  If not set, the values will be unspecified.
- Abbreviations may be used in the label comments due to the limitation on the number of the characters to display in GX Works2.

2) List of devices

External input (commands)

Device	FB function name	Application (ON details)
X10	Error operation	Error reset request

External output (checks)

Device	FB function name	Application (ON details)
Y20	DA conversion data write	DA conversion data write FB error
Y21	DA conversion data write (All CHs)	DA conversion data write (All CHs) FB error
Y22	DA conversion enable/disable setting	DA conversion enable/disable FB error
Y23	DA output enable/disable setting	DA output enable/disable FB error
Y24	Operating condition setting request operation	Operating condition setting request operation FB error
Y25	Offset setting	Offset setting FB error
Y26	Gain setting	Gain setting FB error
Y27	Error operation	Module error
Y28		Error operation FB error

Data register

Device	FB function name	Application (ON details)
D0	DA conversion data write	DA conversion data write FB error code
D1	DA conversion data write (All CHs)	DA conversion data write (All CHs) FB error code
D2	DA conversion enable/disable setting	DA output enable/disable FB error code
D3	DA output enable/disable setting	DA conversion enable/disable FB error code
D4	Operating condition setting request operation	Operating condition setting request operation FB error code
D5	Offset setting	Offset setting FB error code
D6	Gain setting	Gain setting FB error code
D7	Error operation	Error operation FB error code
D8		Module error code

Relay

Device	FB function name	Application (ON details)
M0	DA conversion data write	DA conversion data write request
M1		DA conversion data write FB ready
M2		DA conversion data write complete
M3	DA conversion data write (All CHs)	DA conversion data write (All CHs) request
M4		DA conversion data write (All CHs) FB ready
M5		DA conversion data write (All CHs) complete
M6	DA conversion enable/disable setting	DA conversion enable/disable setting request
M7		DA conversion enable/disable setting
M8		DA conversion enable/disable setting FB ready
M9		DA conversion enable/disable setting complete
M10	DA output enable/disable setting	DA output enable/disable setting request
M11		DA output enable/disable setting
M12		DA output enable/disable setting FB ready
M13		DA output enable/disable setting complete
M14	Operating condition setting request operation	Operating condition setting request
M15		Operating condition setting request FB ready
M16		Operating condition setting request operation FB complete
M17	Offset setting	Offset setting request
M18		Setting value change command
M19		User range write command
M20		Offset setting FB ready
M21		Offset setting complete
M22	Gain setting	Gain setting request
M23		Setting value change command
M24		User range write command
M25		Gain setting FB ready
M26		Gain setting complete
M27	Error operation	Error operation request
M28		Error operation ready
M29		Error operation complete

3) Global label setting

None

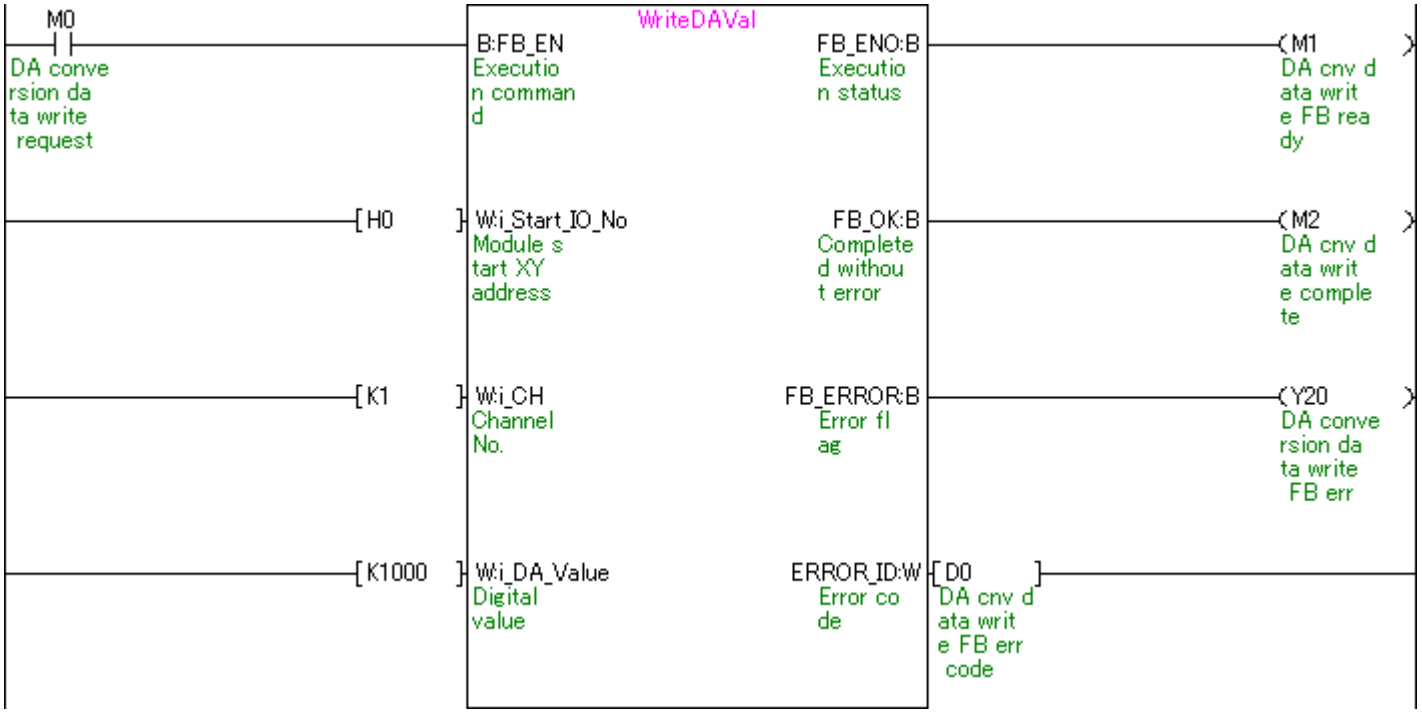
4) Application example settings

a) Common setting

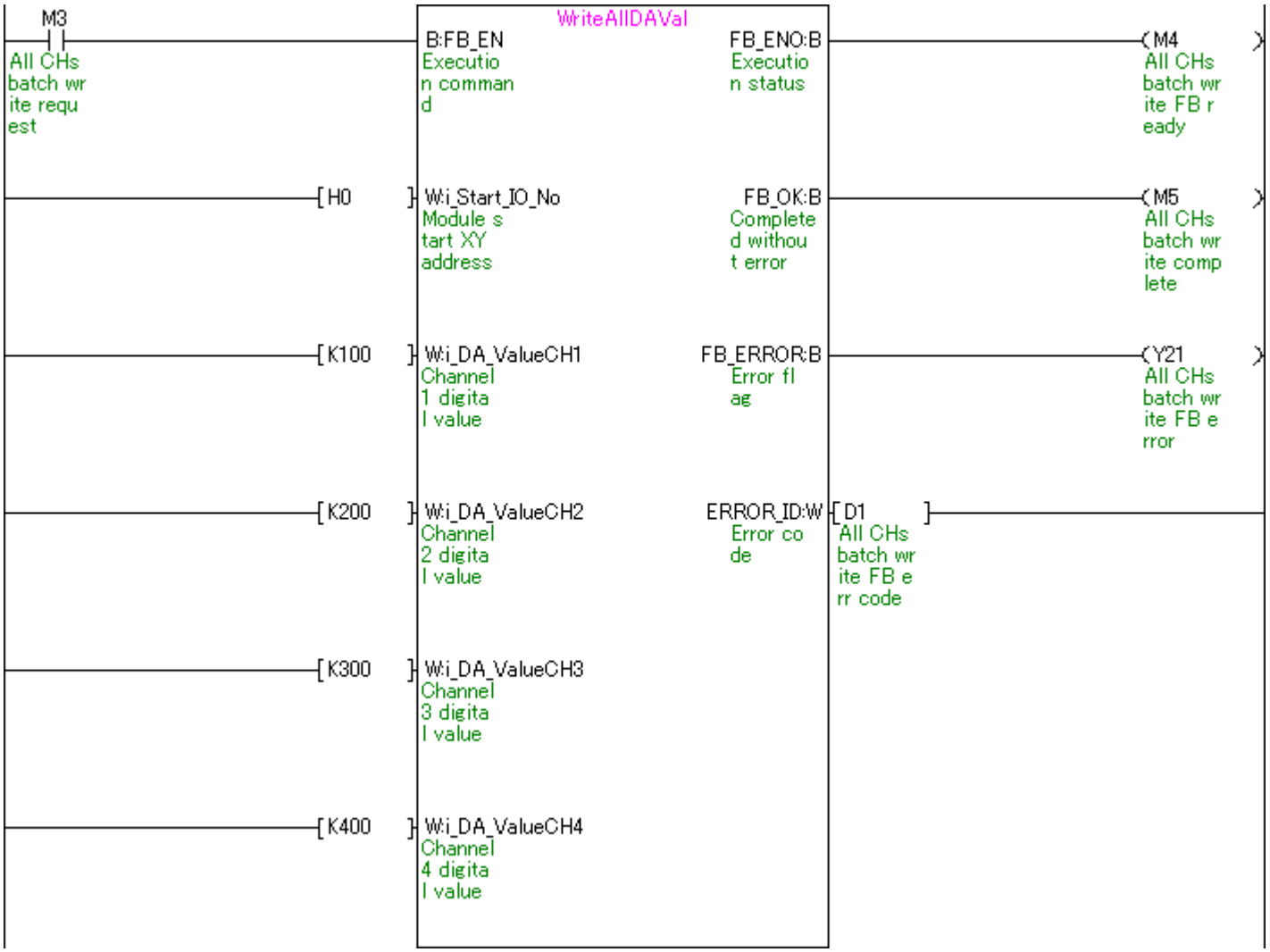
Input and output item	Value	Description
Module start XY address	0	Specify the starting XY address where the Q64DA is mounted.

5) Programs

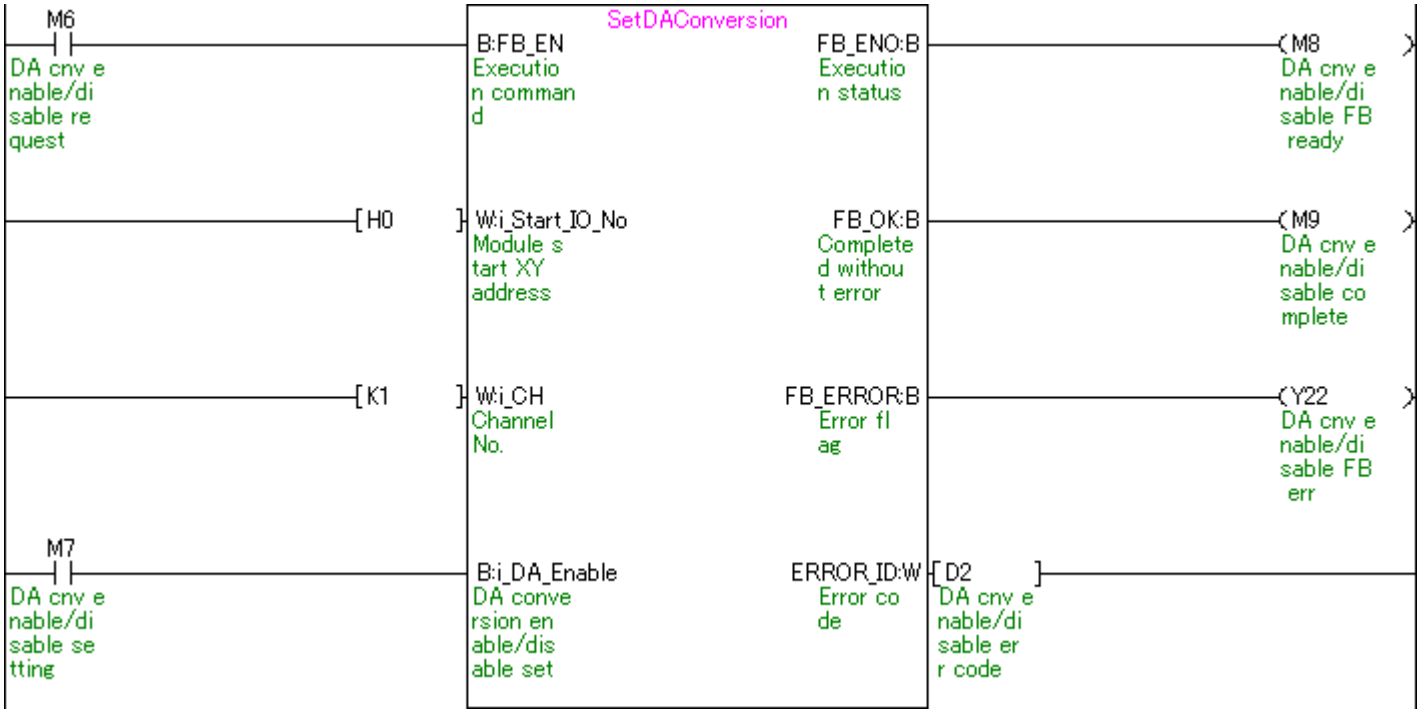
M+Q64DA_WriteDAVal (DA conversion data write)



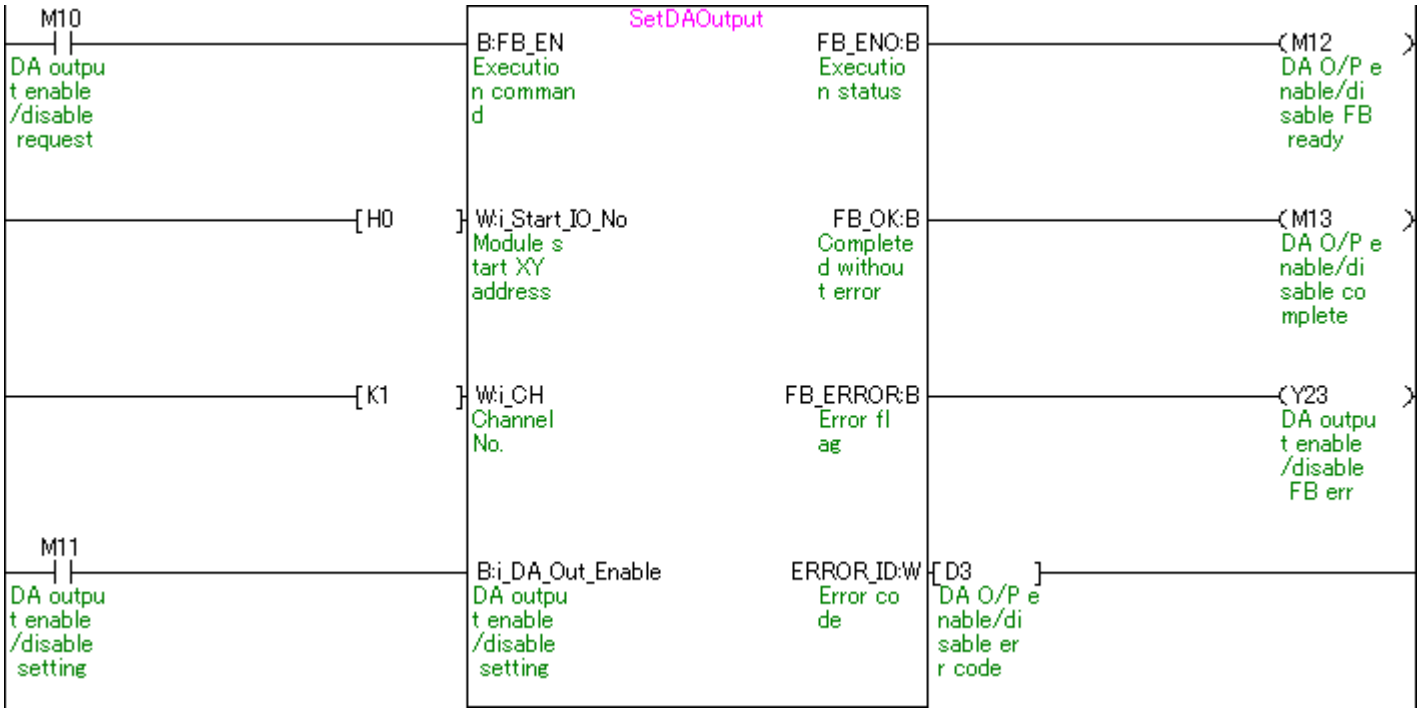
M+Q64DA_WriteAllDAVal (DA conversion data write (All CHs))



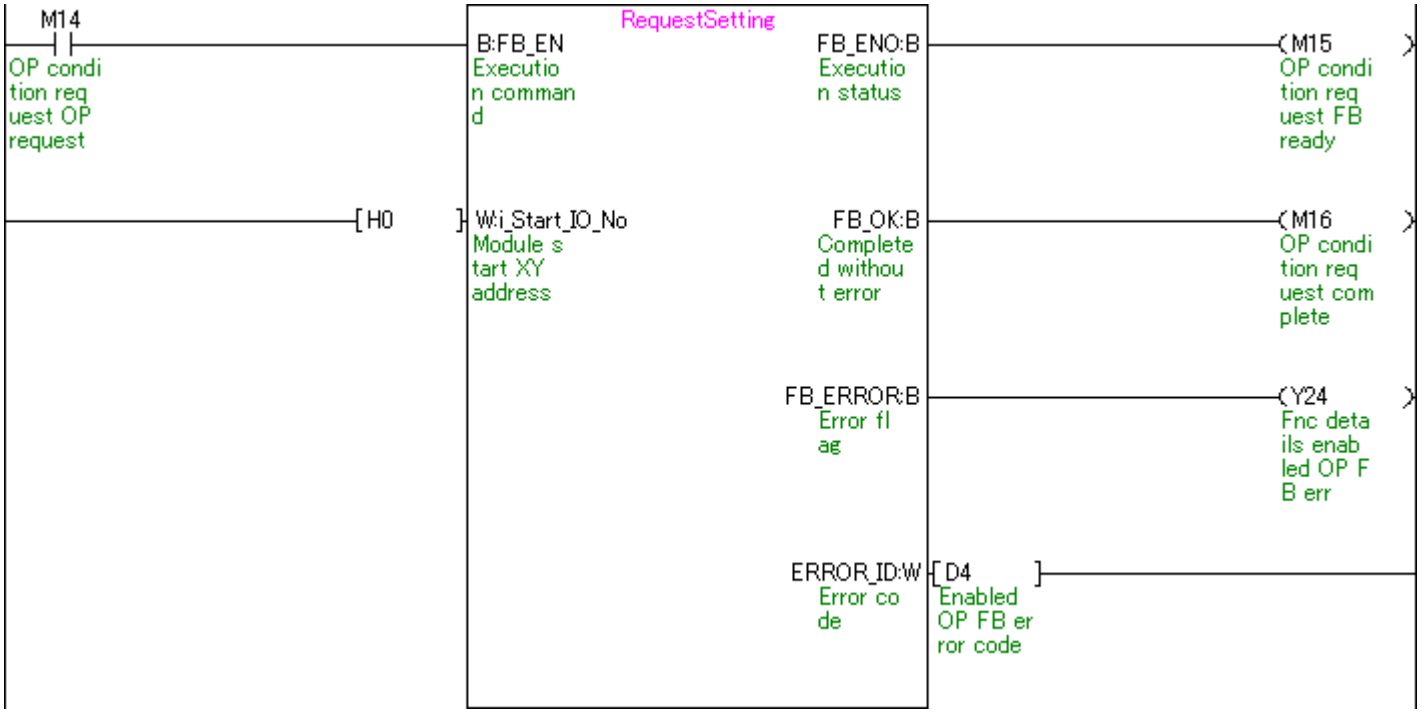
M+Q64DA_SetDAConversion (DA conversion enable/disable setting)



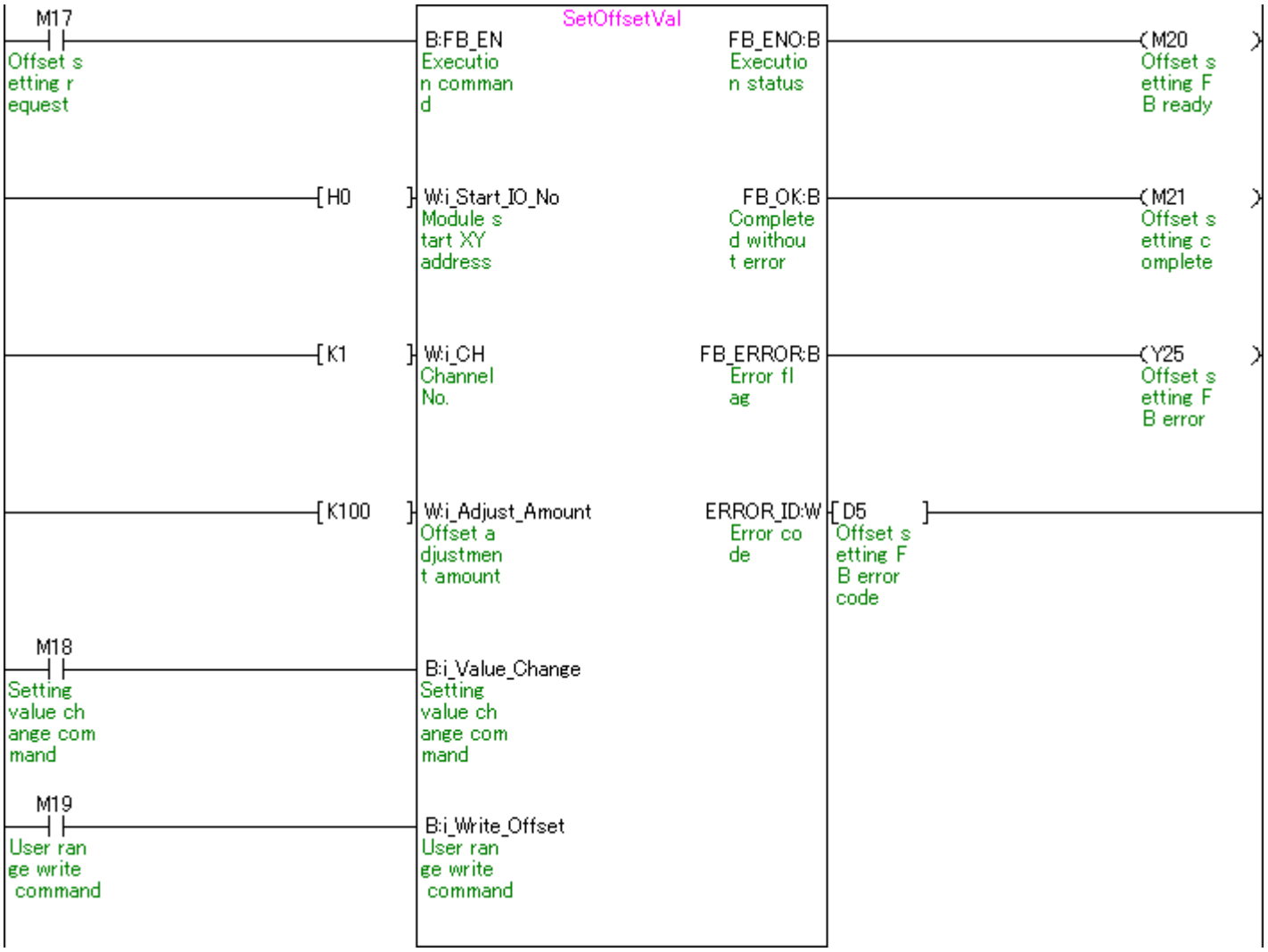
M+Q64DA_SetDAOutput (DA output enable/disable setting)



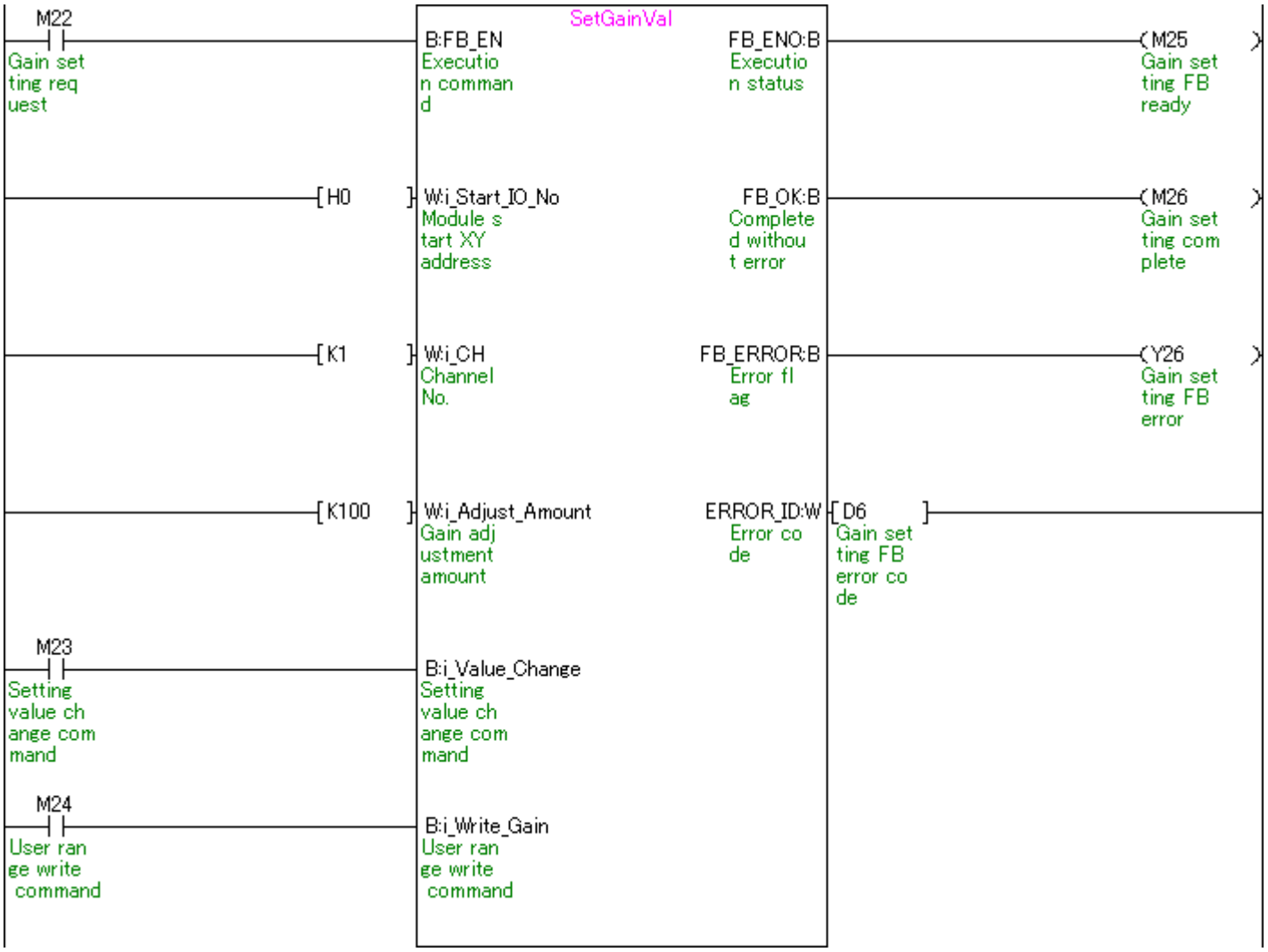
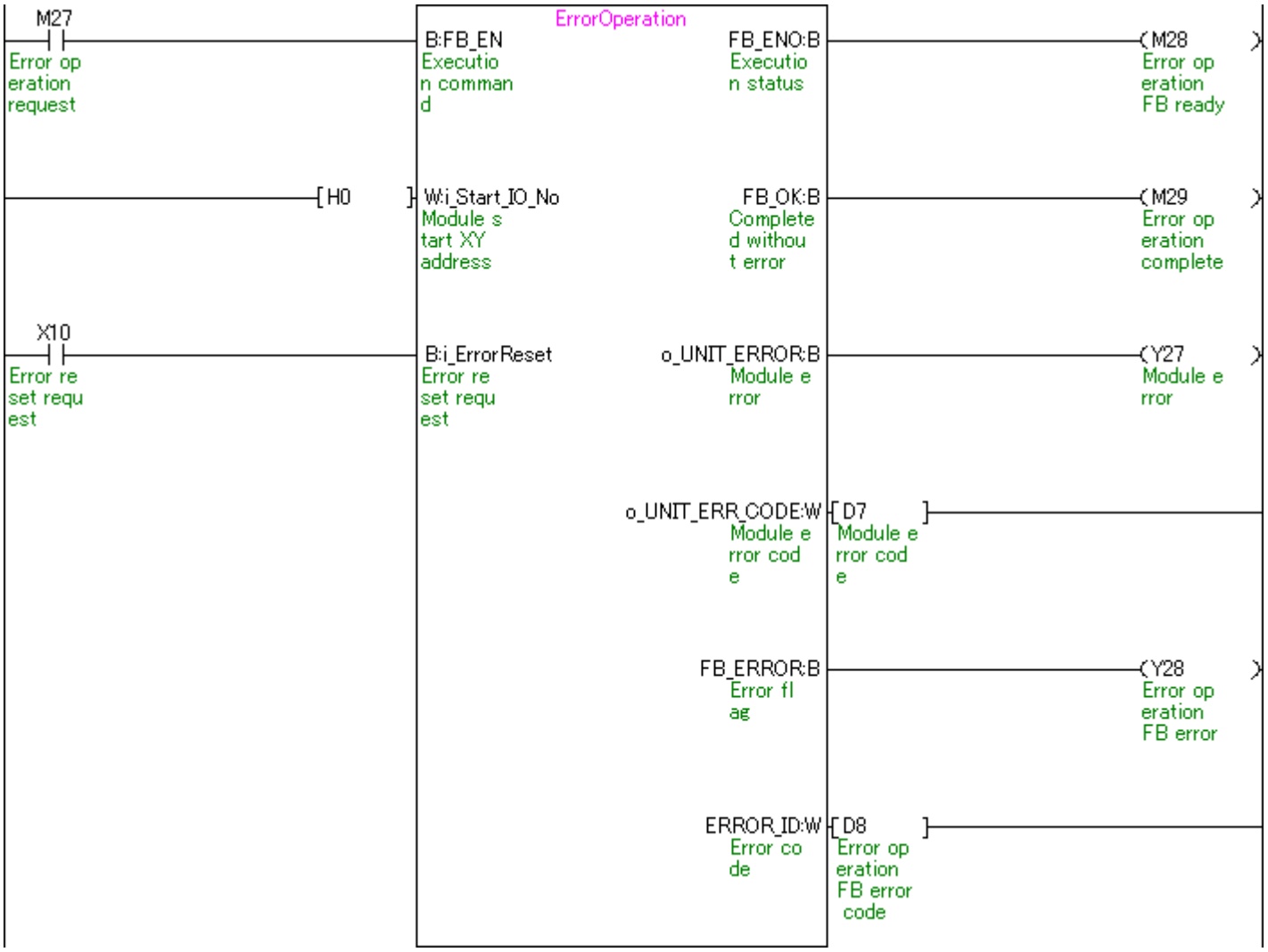
M+Q64DA_RequestSetting (Operating condition setting request operation)



M+Q64DA_SetOffsetVal (Offset setting)



M+Q64DA_SetGainVal (Gain setting)



M+Q64DA_ErrorOperation (Error operation)