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

Applicable modules:
Q64DAH

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Reference Manual Revision History

Reference Manual Number	Date	Description
FBM-M087-A	2013/04/15	First edition
FBM-M087-B	2015/03/27	1) Added applicable GX Works2 Version. •This FB is able to install on GX Works2 of all language versions.

1. Overview

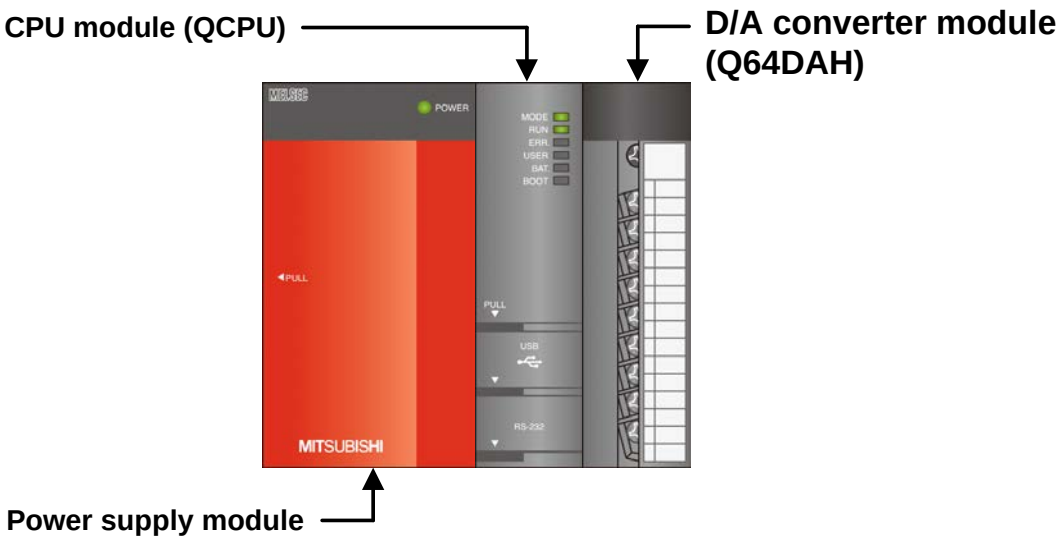
1.1. Overview of the FB Library

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

1.2. Function of the FB Library

Item	Description
M+Q64DAH_WriteDAVal	Writes the D/A conversion data of the specified channel.
M+Q64DAH_WriteAllDAVal	Writes the D/A conversion data of all channels.
M+Q64DAH_SetDAConversion	Enables or disables the D/A conversion for the specified channel or all channels.
M+Q64DAH_SetDAOutput	Enables or disables the D/A output for the specified channel or all channels.
M+Q64DAH_SetScaling	Sets the scaling of the specified channel.
M+Q64DAH_SetAlarm	Sets the alert output of the specified channel.
M+Q64DAH_RequestSetting	Validates the setting contents of each function.
M+Q64DAH_SetOffsetVal	Sets the offset of the specified channel.
M+Q64DAH_SetGainVal	Sets the gain of the specified channel.
M+Q64DAH_ShiftOperation	Adds the input value shift amount to the digital value.
M+Q64DAH_ErrorOperation	Monitors error codes and resets errors.
M+Q64DAH_WaveDataStoreCsv	Reads data from the CSV file where parameters and wave data (wave data points and wave data) of the wave output function are stored, then writes them to the buffer memory of the D/A converter module.
M+Q64DAH_WaveDataStoreDev	Reads data from the file register (ZR) where parameters and wave data (wave data points and wave data) of the wave output function are stored, then writes them to the buffer memory of the D/A converter module.
M+Q64DAH_WaveOutputSetting	Sets the wave output for the specified channel or all channels.
M+Q64DAH_WaveOutputReqSetting	Sets the starting, stopping, or pausing of the wave output for the specified channel or all channels.

1.3. System Configuration Example



1.4. Relevant Manuals

- MELSEC-Q High Speed 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.

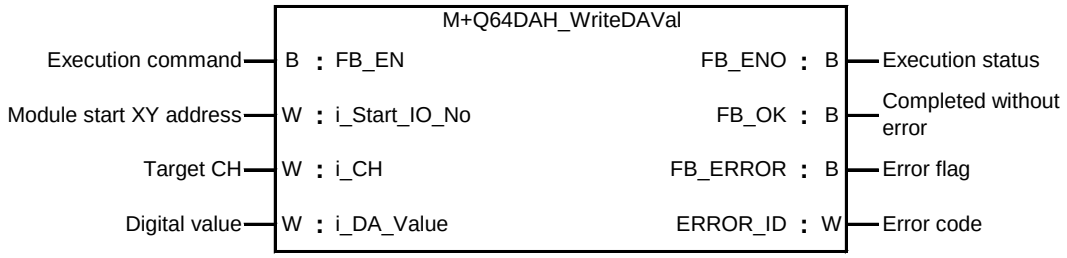
2. Details of the FB Library

2.1. M+Q64DAH_WriteDAVal (Write D/A conversion data)

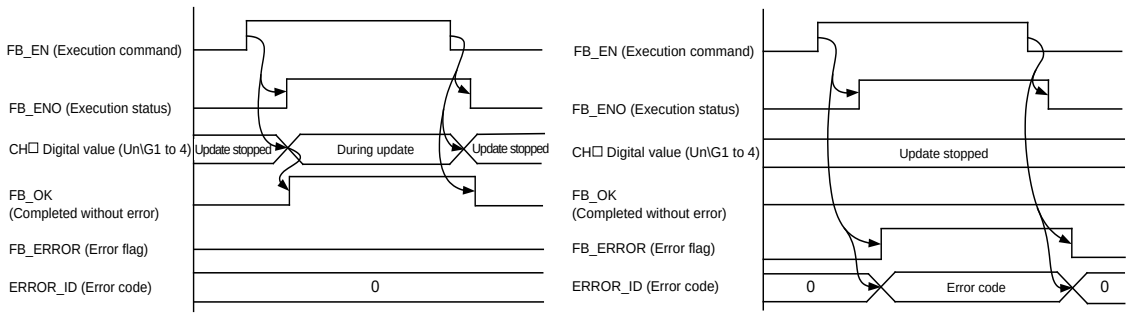
FB Name

M+Q64DAH_WriteDAVal

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Writes the D/A conversion data of the 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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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">222 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 digital value of the specified channel is written. 2) The digital value to be written depends on the output range setting. When the scaling function of the Q64DAH is enabled, the digital value is scaled before the D/A conversion. 3) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 4) When the digital value is set in the auto refresh setting of the intelligent function module, this FB is unnecessary.
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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. The target channel is not within the range of 1 to 4.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4	Specify the channel number.
Digital value	i_DA_Value	Word	-32,000 to 32,000	Specify the digital value. The output range and scaling function may decrease the setting range.

●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 digital 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	2013/04/15	First edition

Note

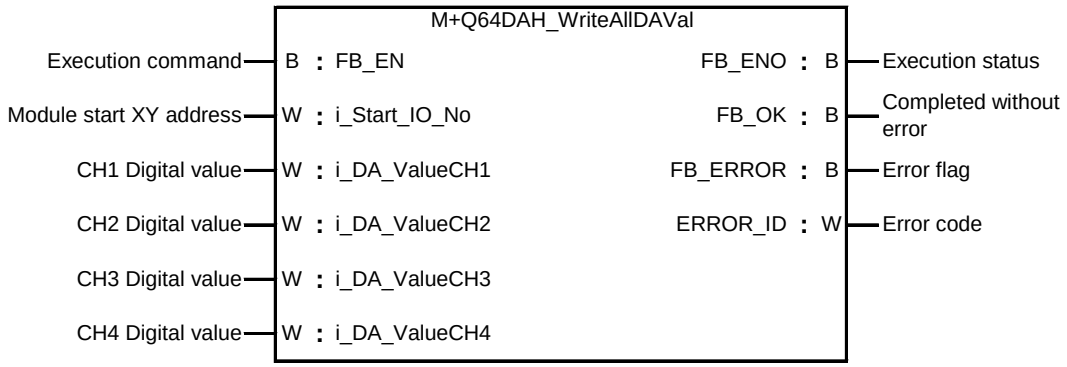
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

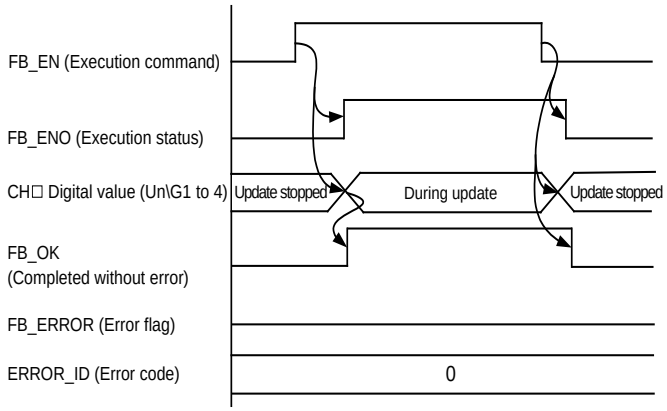
2.2. M+Q64DAH_WriteAllDAVal (Write D/A conversion data (all CHs))

FB Name

M+Q64DAH_WriteAllDAVal

Function Overview

Item	Description	
Function overview	Writes the D/A conversion data of all channels.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DAH
	CPU module	<table><tr><th>Series</th><th>Model</th></tr><tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr><tr><td>High performance model</td></tr><tr><td>Universal model</td></tr></table> * Not applicable to QCPU (A mode)
	Engineering software	GX Works2 *1 <table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version 1.86Q or later</td></tr><tr><td>English version</td><td>Version 1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr><tr><td>Korean version</td><td>Version 1.49B or later</td></tr></table> *1 For software versions applicable to the modules used, refer to "Relevant manuals".
Programming language	Ladder	

Item	Description
Number of steps	204 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), the digital values of all channels are written. 2) The digital value to be written depends on the output range setting. When the scaling function of the Q64DAH is enabled, the digital value is scaled before the D/A conversion. 3) When the digital value is set in the auto refresh setting of the intelligent function module, this FB is unnecessary.
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 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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] 

Item	Description
Relevant manuals	•MELSEC-Q High Speed 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	Action
None	None	None

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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
CH1 Digital value	i_DA_ValueCH1	Word	-32,000 to 32,000 *1	Specify the digital value of channel 1. *1 The available setting range differs depending on the scaling function and output range setting.
CH2 Digital value	i_DA_ValueCH2	Word	-32,000 to 32,000 *1	Specify the digital value of channel 2. *1 The available setting range differs depending on the scaling function and output range setting.
CH3 Digital value	i_DA_ValueCH3	Word	-32,000 to 32,000 *1	Specify the digital value of channel 3. *1 The available setting range differs depending on the scaling function and output range setting.

Name (Comment)	Label name	Data type	Setting range	Description
CH4 Digital value	i_DA_ValueCH4	Word	-32,000 to 32,000 *1	Specify the digital value of channel 4. *1 The available setting range differs depending on the scaling function and output range setting.

●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 digital value is being written.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2013/04/15	First edition

Note

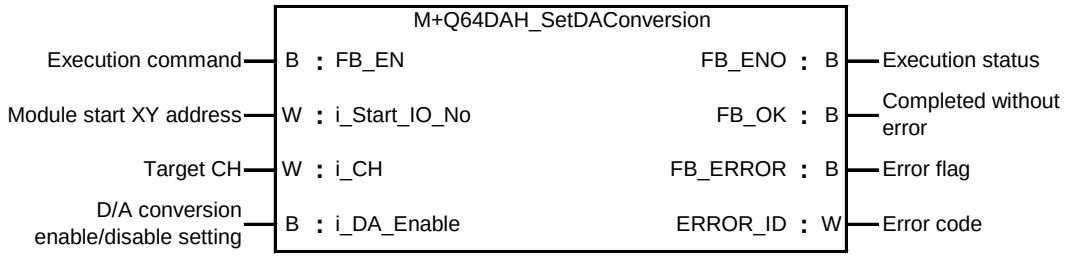
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

2.3. M+Q64DAH_SetDAConversion (D/A conversion enable/disable setting)

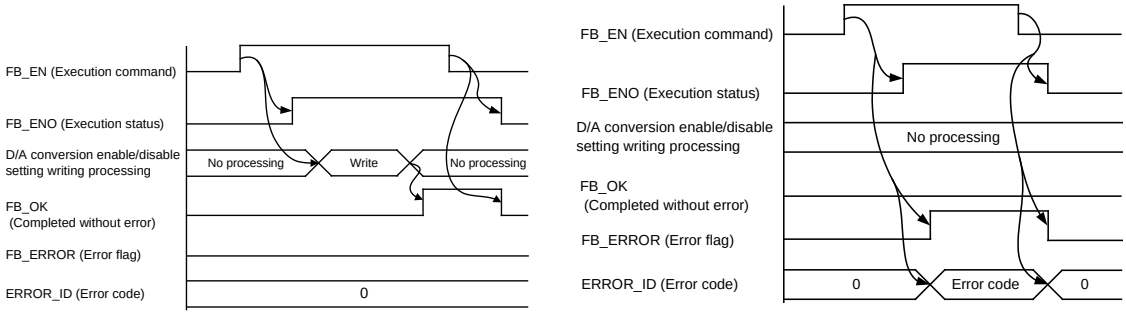
FB Name

M+Q64DAH_SetDAConversion

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Enables or disables the D/A conversion for the 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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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">276 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 D/A conversion enable/disable setting for the specified channel is configured. 2) FB operation is one-shot only, triggered by the FB_EN signal. 1) The setting value is validated when the Operating condition setting request signal (Yn9) is turned OFF → ON → OFF or the Operating condition setting request FB (M+Q64DAH_RequestSetting) is executed. 3) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] [When an error occurs]



Item	Description
Relevant manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. Set 1 to 4 or 15 to the target channel.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4 and 15	1 to 4: Specify the channel number. 15: Specify all the channels.
D/A conversion enable/disable setting	i_DA_Enable	Bit	ON, OFF	ON: D/A conversion enabled OFF: D/A 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 the 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	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

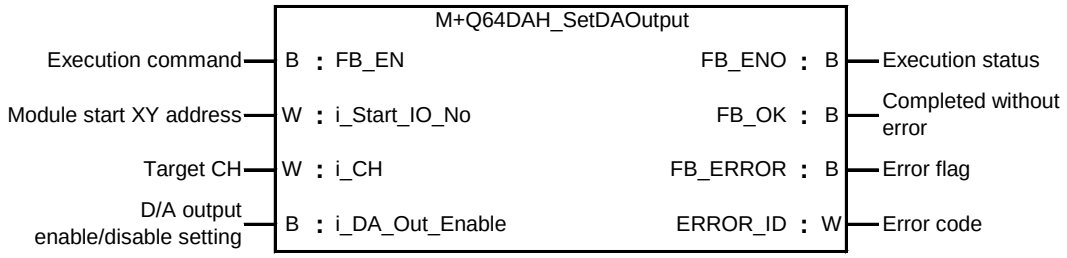
Please make sure to read user's manuals for the corresponding products before using the products.

2.4. M+Q64DAH_SetDAOutput (D/A output enable/disable setting)

FB Name

M+Q64DAH_SetDAOutput

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Enables or disables the D/A output for the 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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
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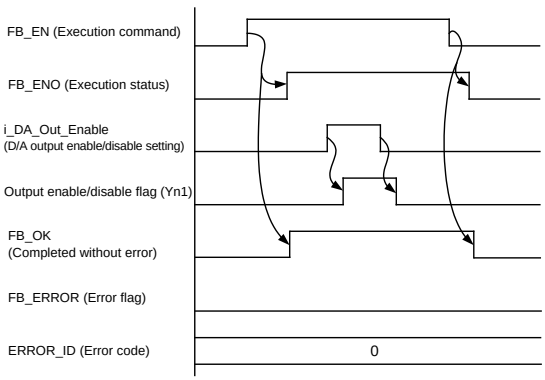
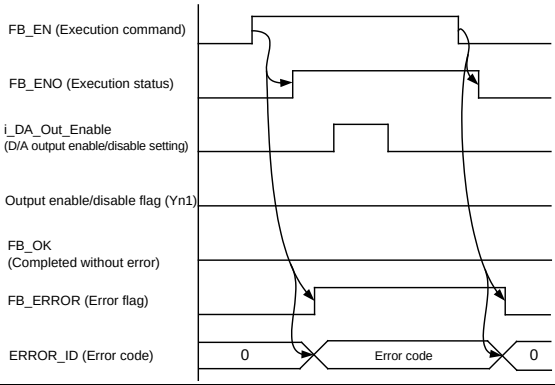
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">249 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 D/A output enable/disable setting for the specified channel is configured. 2) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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] (CH1)  [When an error occurs] (CH1) 

Item	Description
Relevant manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. Set 1 to 4 or 15 to the target channel.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4 or 15	1 to 4: Specify the channel number. 15: Specify all the channels.
D/A output enable/disable setting	i_DA_Out_Enable	Bit	ON, OFF	ON: D/A output enabled OFF: D/A output 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 the FB is being executed properly.
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	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

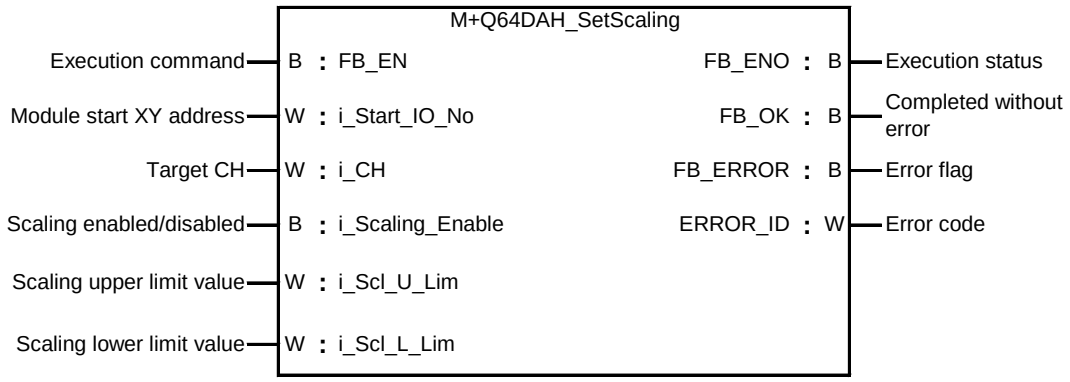
Please make sure to read user's manuals for the corresponding products before using the products.

2.5. M+Q64DAH_SetScaling (Scaling setting)

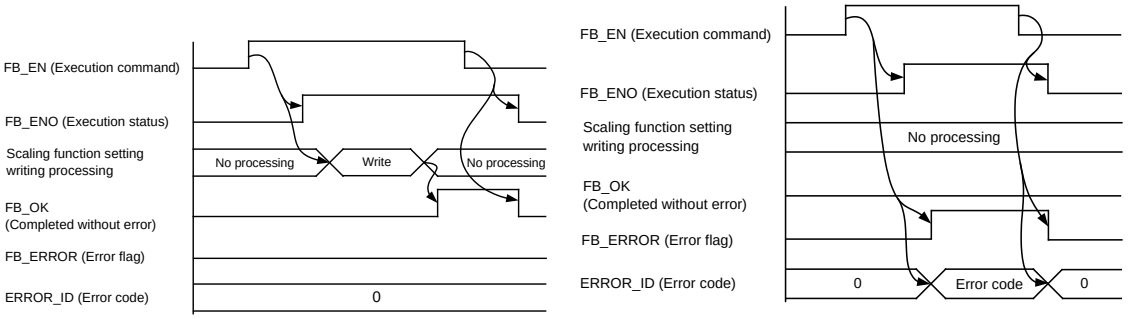
FB Name

M+Q64DAH_SetScaling

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Sets the scaling of the specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="2">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to QCPU (A mode)
</td></tr>
<tr><td></td><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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>
</table>

Item	Description
Number of steps	266 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), the scaling function setting of the specified channel is configured. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The setting value is validated when the Operating condition setting request signal (Yn9) is turned OFF → ON → OFF or the Operating condition setting request FB (M+Q64DAH_RequestSetting) is executed. 4) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. The target channel is not within the range of 1 to 4.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4	Specify the channel number.
Scaling enabled/disabled	i_Scaling_Enable	Bit	ON, OFF	ON: Enabled OFF: Disabled
Scaling upper limit value	i_Scl_U_Lim	Word	-32,000 to 32,000	Specify the scaling upper limit value.
Scaling lower limit value	i_Scl_L_Lim	Word	-32,000 to 32,000	Specify the scaling lower limit value.

●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 scaling function 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	2013/04/15	First edition

Note

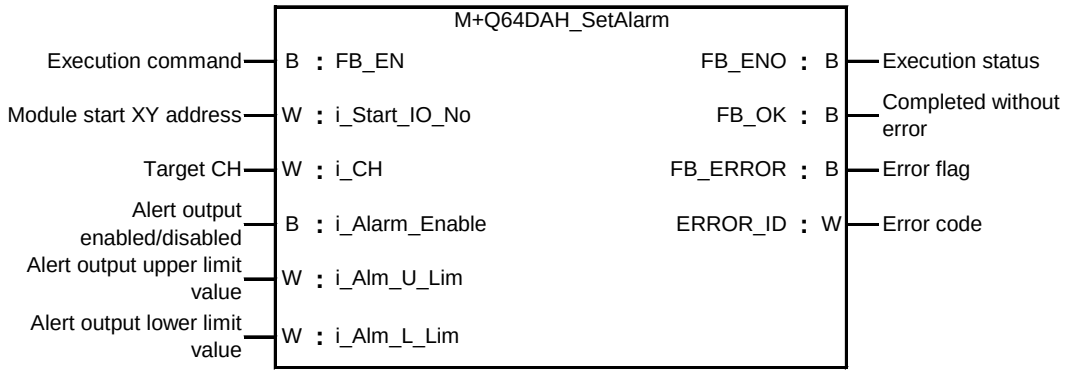
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

2.6. M+Q64DAH_SetAlarm (Alert output setting)

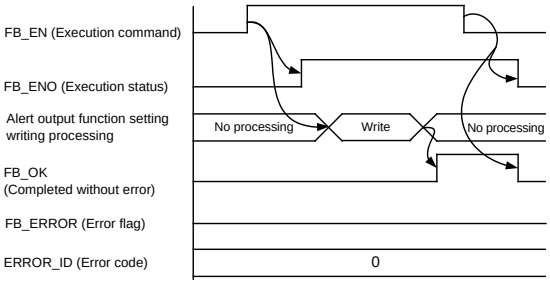
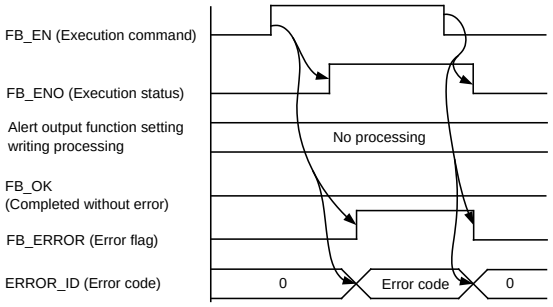
FB Name

M+Q64DAH_SetAlarm

Function Overview

Item	Description	
Function overview	Sets the alert output of the specified channel.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DAH
	CPU module	<table><tr><th>Series</th><th>Model</th></tr><tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr><tr><td>High performance model</td></tr><tr><td>Universal model</td></tr></table> * Not applicable to QCPU (A mode)
	Engineering software	GX Works2 *1 <table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version 1.86Q or later</td></tr><tr><td>English version</td><td>Version 1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr><tr><td>Korean version</td><td>Version 1.49B or later</td></tr></table> *1 For software versions applicable to the modules used, refer to "Relevant manuals".
Programming language	Ladder	

Item	Description
Number of steps	248 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), the alert output function setting of the specified channel is configured. 2) FB operation is one-shot only, triggered by the FB_EN signal. 3) The setting value is validated when the Operating condition setting request signal (Yn9) is turned OFF → ON → OFF or the Operating condition setting request FB (M+Q64DAH_RequestSetting) is executed. 4) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. The target channel is not within the range of 1 to 4.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4	Specify the channel number.
Alert output enabled/disabled	i_Alarm_Enable	Bit	ON, OFF	ON: Enabled OFF: Disabled
Alert output upper limit value	i_Alm_U_Lim	Word	-32,768 to 32,767	Specify the alert output upper limit value.
Alert output lower limit value	i_Alm_L_Lim	Word	-32,768 to 32,767	Specify the alert output lower limit value.

●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 alert output function 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	2013/04/15	First edition

Note

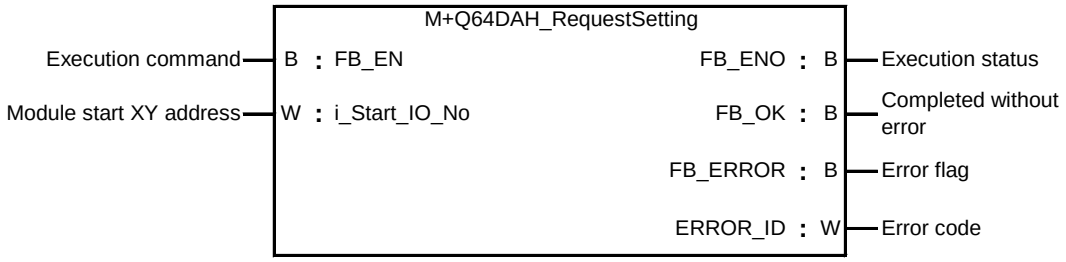
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

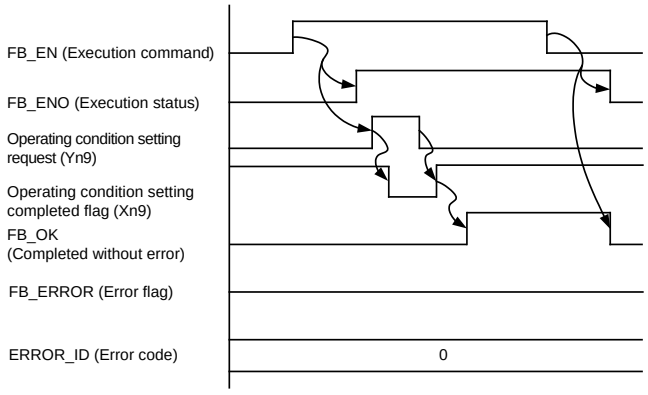
2.7. M+Q64DAH_RequestSetting (Operating condition setting request)

FB Name

M+Q64DAH_RequestSetting

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Validates the setting contents 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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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">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.</td></tr>
</table>

Item	Description
Function description	1) By turning ON FB_EN (Execution command), the setting contents of all channels are validated. 2) After FB_EN (Execution command) is turned ON, the execution of this FB continues until each function setting is completed.
Compiling method	Macro type
Restrictions and precautions	1) When this FB is executed, the D/A conversion is stopped and the D/A output is held. The conversion restarts after FB_OK turns ON. 2) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 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 because it is impossible to turn OFF. 4) The FB cannot be used in an interrupt program. 5) This FB uses index register 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] 

Item	Description
Relevant manuals	•MELSEC-Q High Speed 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	Action
None	None	None

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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH 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 operation condition setting is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

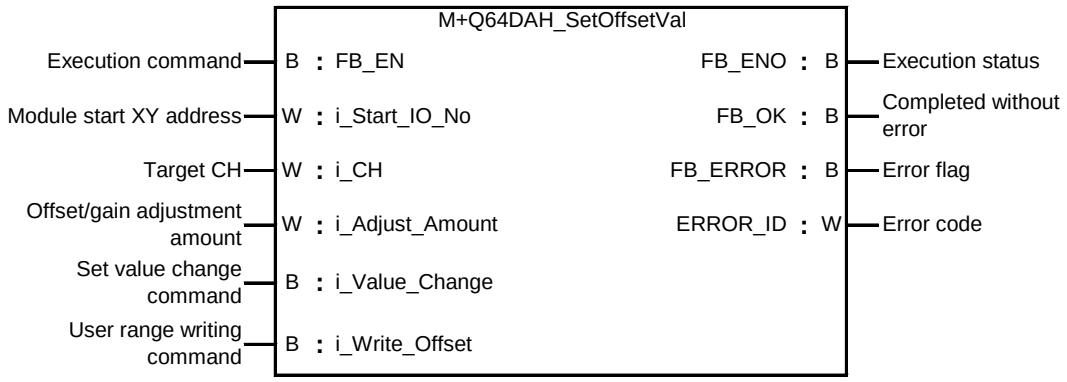
Please make sure to read user's manuals for the corresponding products before using the products.

2.8. M+Q64DAH_SetOffsetVal (Offset setting)

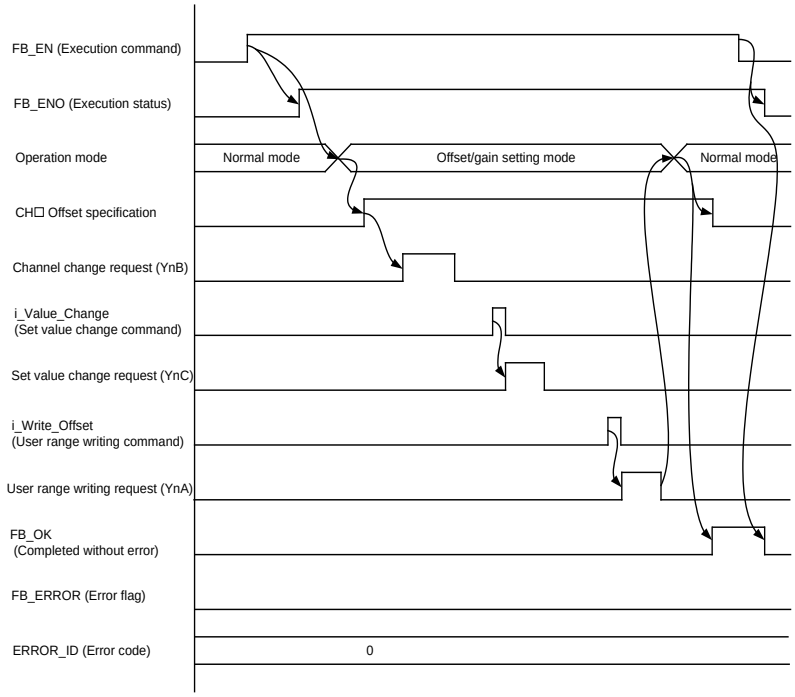
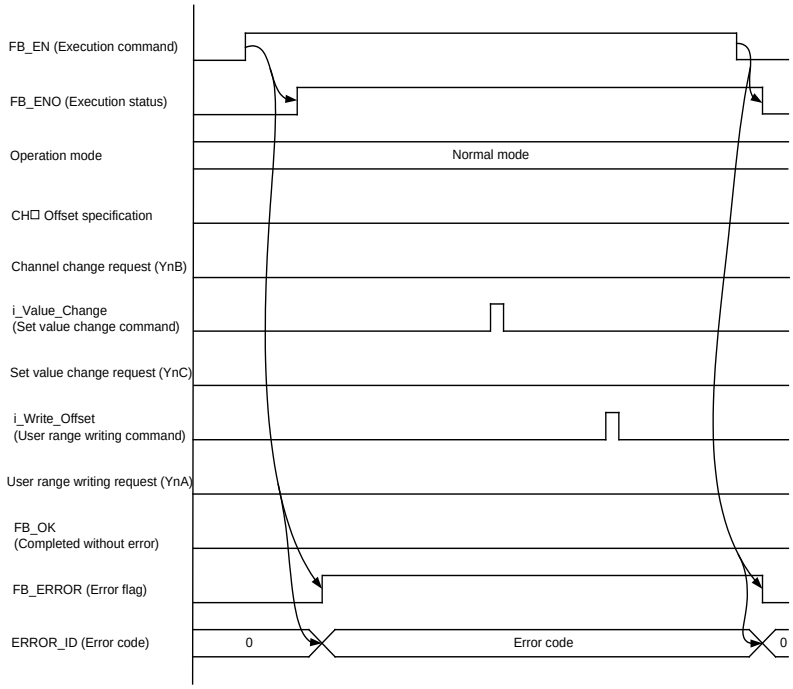
FB Name

M+Q64DAH_SetOffsetVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Sets the offset of the 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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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>
</table>

Item	Description
Number of steps	440 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), 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 ON from OFF i_Value_Change (Set value change command) during the FB_EN (Execution command) ON. 3) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. The target channel is not within the range of 1 to 4.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4	Specify the channel number.
Offset/gain adjustment amount	i_Adjust_Amount	Word	-3,000 to 3,000	Specify the adjustment amount for the D/A output adjustment.
Set value change command	i_Value_Change	Bit	ON, OFF	Turn ON for D/A output change. Turn OFF after the D/A output change.
User range writing command	i_Write_Offset	Bit	ON, OFF	Turn ON for the adjusted offset value writing to a flash memory. Turn OFF after the writing.

●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 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	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

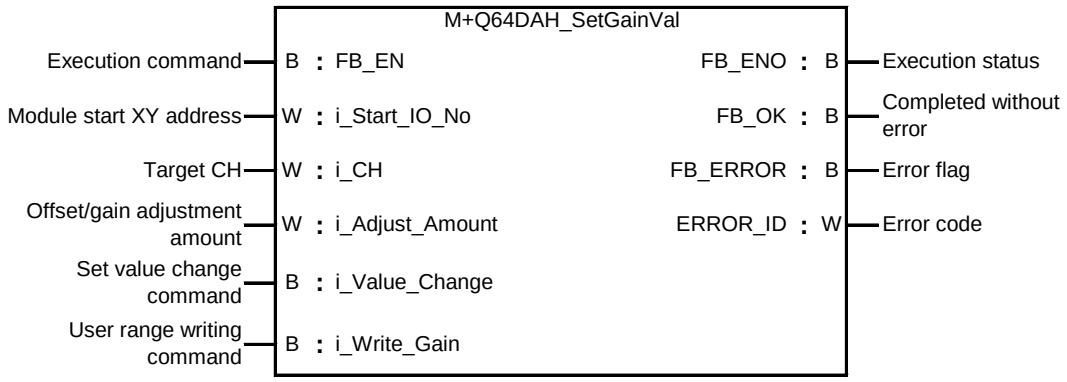
Please make sure to read user's manuals for the corresponding products before using the products.

2.9. M+Q64DAH_SetGainVal (Gain setting)

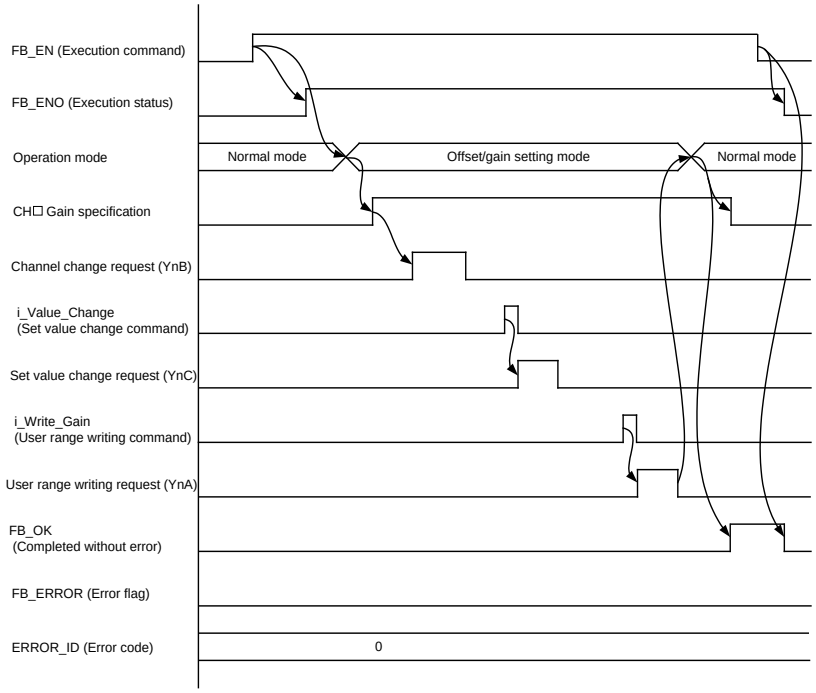
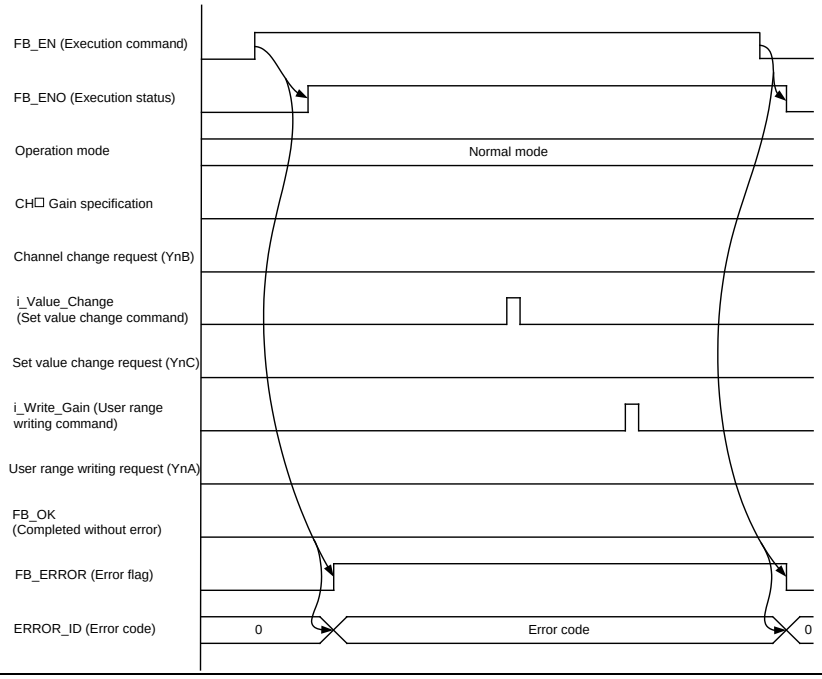
FB Name

M+Q64DAH_SetGainVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Sets the gain of the specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="2">Applicable hardware and software</td><td>Digital-analog converter module</td><td>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to QCPU (A mode)
</td></tr>
<tr><td></td><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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>
</table>

Item	Description
Number of steps	408 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), 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 ON from OFF i_Value_Change (Set value change command) during the FB_EN (Execution command) ON. 3) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. The target channel is not within the range of 1 to 4.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4	Specify the channel number.
Offset/gain adjustment amount	i_Adjust_Amount	Word	-3,000 to 3,000	Specify the adjustment amount for the D/A output adjustment.
Set value change command	i_Value_Change	Bit	ON, OFF	Turn ON for D/A output change. Turn OFF after the D/A output change.
User range writing command	i_Write_Gain	Bit	ON, OFF	Turn ON for the adjusted gain value writing to a flash memory. Turn OFF after the writing.

●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 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	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

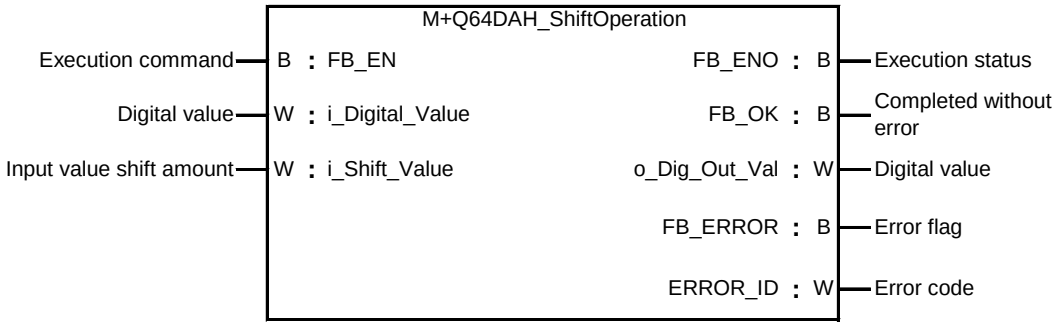
Please make sure to read user's manuals for the corresponding products before using the products.

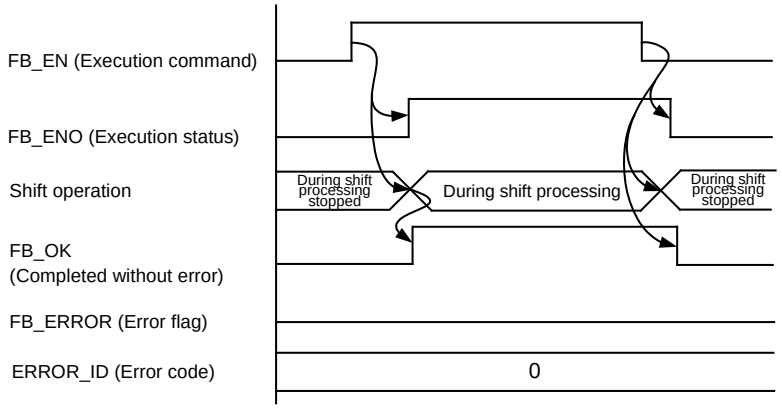
2.10. M+Q64DAH_ShiftOperation (Shift operation)

FB Name

M+Q64DAH_ShiftOperation

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Adds the input value shift amount to the digital value.</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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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">164 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 input value shift amount is added to the digital value. 2) When the addition result falls below -32,768 (exceeds 32,767), the value is fixed to -32,768 (32,767).
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 because it is impossible to turn OFF. 4) Every input must be provided with a value for proper FB operation. 5) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 Operating Manual (Common). 6) When FB_OK (Normal completion) is ON, o_Dig_Out_Val (Digital output value) is effective. 7) By turning OFF FB_EN, o_Dig_Out_Val (Digital output value) is cleared to 0.
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] 
Relevant manuals	•MELSEC-Q High Speed 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	Action
None	None	None

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.
Digital value	i_Digital_Value	Word	-32,768 to 32,767	Specify the digital value.
Input value shift amount	i_Shift_Value	Word	-32,768 to 32,767	Specify the shift amount.

●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 shift operation is being executed.
Digital value	o_Dig_Out_Val	Word	0	The digital value to which the input value shift amount is added is stored.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

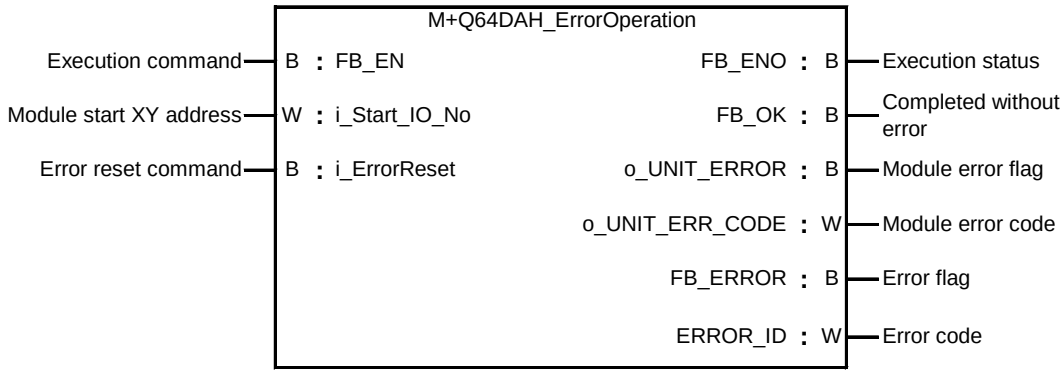
Please make sure to read user's manuals for the corresponding products before using the products.

2.11. M+Q64DAH_ErrorOperation (Error operation)

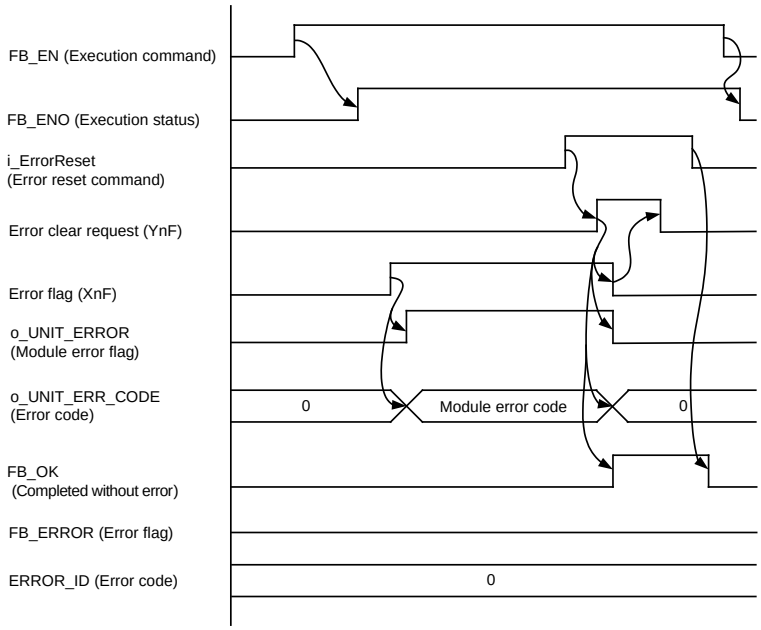
FB Name

M+Q64DAH_ErrorOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Monitors error codes and resets errors.</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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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>
</table>

Item	Description
Number of steps	232 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) When FB_EN (Execution command) is turned ON, an error of the target module is monitored. 2) After FB_EN (Execution command) is turned ON, an error is reset when i_ErrorReset (Error reset command) is turned ON during error occurrence.
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 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 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. 7) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".

Item	Description
Timing chart	[When operation completes without error] 
Relevant manuals	•MELSEC-Q High Speed 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	Action
None	None	None

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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Error reset command	i_ErrorReset	Bit	ON, OFF	Turn ON for the error reset. Turn OFF after the error reset.

●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 an error reset is completed.
Module error flag	o_UNIT_ERROR	Bit	OFF	When ON, it indicates that a module error has occurred.
Module error code	o_UNIT_ERR_CODE	Word	0	Stores the error code of the current error.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2013/04/15	First edition

Note

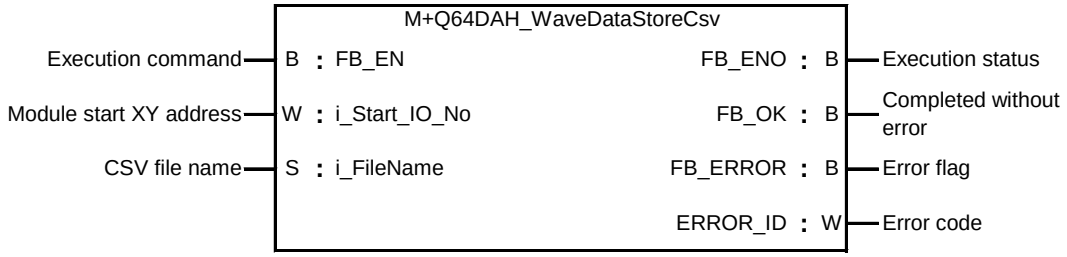
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

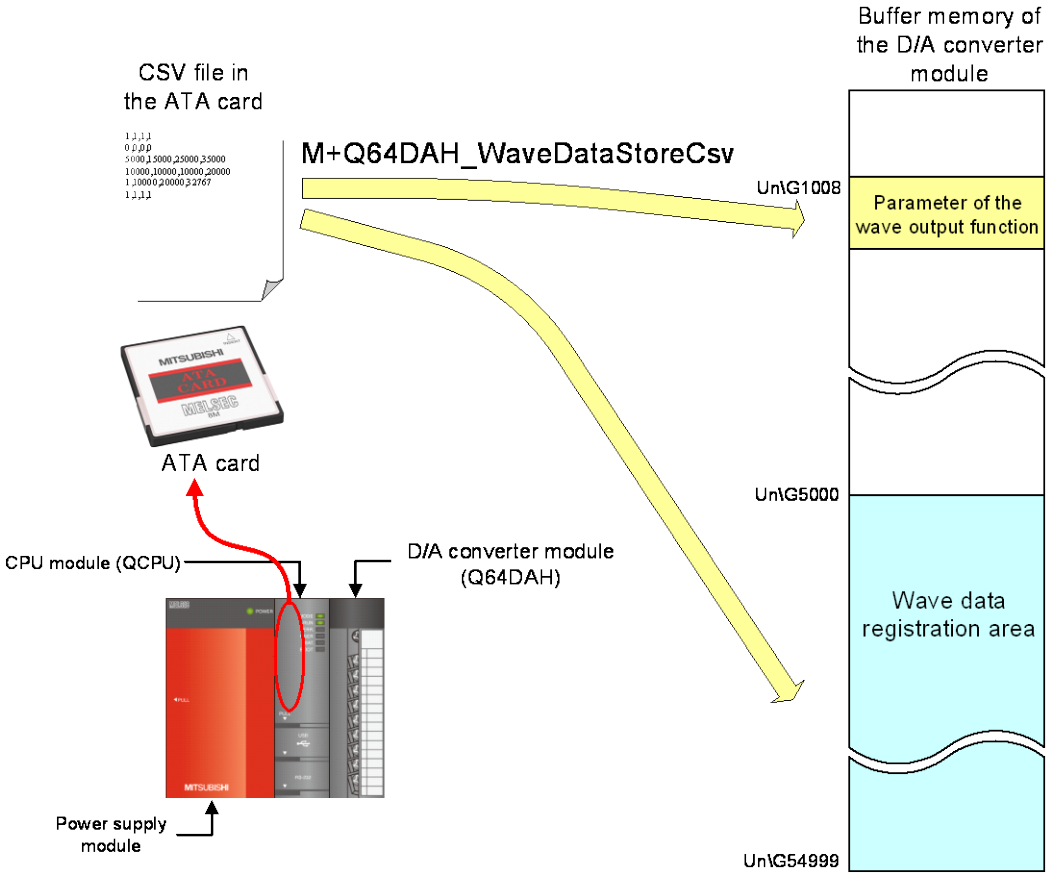
2.12. M+Q64DAH_WaveDataStoreCsv (Read wave data (CSV file))

FB Name

M+Q64DAH_WaveDataStoreCsv

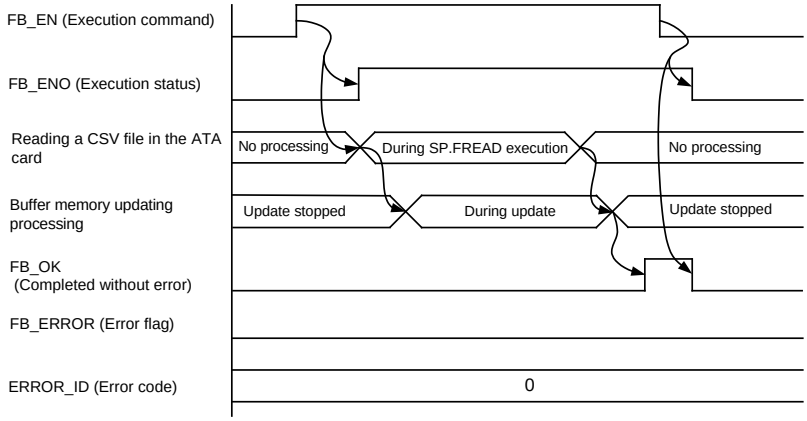
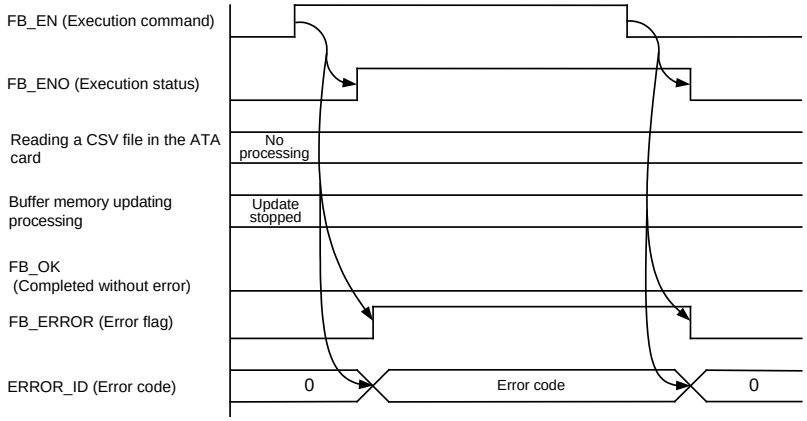
Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Reads data from the CSV file where parameters and wave data (wave data points and wave data) of the wave output function are stored, then writes them to the buffer memory of the D/A converter module.</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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="2">MELSEC-Q Series *1</td><td>High performance model</td></tr>
<tr><td>Universal model *2</td></tr>
</table>
*1 Not applicable to QCPU (A mode)
*2 This FB is not applicable to Q00UJCPU, Q00UCPU, and Q01UCPU because an ATA card cannot be inserted to these CPUs.
</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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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>
</table>

Item	Description
Number of steps	994 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), the parameters and wave data of the wave output function is read from the CSV file stored in the ATA card inserted in the CPU module and stored in the buffer memory of the D/A converter module.  For the wave output function, refer to MELSEC-Q High Speed Digital-Analog Converter Module User's Manual. 2) "Table 1 Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory" in Appendix 2. lists "parameters and data of the wave output function" and the storage location buffer memory address that this FB processes. Describe the parameters and data in the list to a file according to "Appendix 3. CSV File Format for Wave Data Reading FB (CSV File)" and save the file in the root folder (directory) of the ATA card. This FB reads all the parameters of the wave output function from the CSV file and stores them in the buffer memory areas Un\G1008 or later. Then, this FB reads "Wave data" specified in "Number of wave data" of the line 100 in the CSV file from the line 101 in order for the number of specified points, and stores them into the start address (Un\G5000) or later of the wave data registration area of the buffer memory.

Item	Description
	The CSV file of the wave output function can be created easily with the "Create wave output data" tool of GX Works2. 3) When this FB is executed without inserting the ATA card to the CPU module, the FB_ERROR output turns ON and processing is interrupted, and the error code 10 (decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 4) When the CSV file specified by i_FileName (CSV file name) does not exist in the ATA card inserted to the CPU module, a CPU error (Error code: 2410) occurs. *When the CPU is set to stop at the CPU error occurrence, FB_ERROR and ERROR_ID are not updated. The operation status of the CPU module (RUN/STOP) for when the CPU error occurs can be set in [PLC RAS] *1. *1: [Parameter]⇨[PLC Parameter]⇨[PLC RAS]⇨"File Access Error " in "When There is an Error" 5) When FB_EN (Execution command) is turned OFF before the execution of this FB is completed, the processing is interrupted. At that time, the data stored in the buffer memory is not cleared. When the FB is executed again, the reading processing is started from the beginning. 6) Do not remove the ATA card during the execution of this FB. For the insertion or removal method of the ATA card, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection).
Compiling method	Macro type

Item	Description
Restrictions and precautions	1) This FB requires many scans and takes long time to complete the processing. Therefore, this FB should be executed during the warm up of the Q64DAH. 2) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 3) The FB cannot be used in an interrupt program. 4) 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 because it is impossible to turn OFF. 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program. 6) This FB uses the SP.FREAD command. Thus, when an execution error of the SP.FREAD command occurs, a CPU error occurs. 7) When processes for accessing the ATA card are executed simultaneously, the time for completing this FB may extend or an error 40 (timeout) may occur. 8) When two or more of these FBs are used, they cannot be used simultaneously. 9) Every input must be provided with a value for proper FB operation. 10) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	This FB is executed with no ATA card inserted to the CPU module.	Execute this FB again after inserting the ATA card where the target CSV file is saved to the CPU module. Or execute this FB again after inserting the available ATA card and saving the target CSV file to the ATA card using "Write PLC User Data" of GX Works2.
40 (Decimal)	The wave data reading processing timeout occurred because accesses to the ATA card are frequently made in addition to this FB.	Reduce the frequency of the access processing to the ATA card.
50 (Decimal)	Accessing to the ATA card is unavailable.	Check the ATA card. When the error still occurs, the ATA card may be faulty. Replace the ATA card with a new one.
4-digit error code	The error code of the CPU module	For details on the caused error code, refer to Appendix 1. Error Code Lists of QCPU User's Manual (Hardware Design, Maintenance and Inspection).

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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)

Name (Comment)	Label name	Data type	Setting range	Description
CSV file name	i_FileName	Character string	12 characters or less	Specify the name of the CSV file in which the parameters and the wave data of the wave output function are stored. (Only CSV is valid for a file attribute.) For details of the CSV file format, refer to "Appendix 3. CSV File Format for Wave Data Reading FB (CSV File)".

●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 writing the parameters and wave data of the wave output function in the CSV file to the buffer memory of the D/A converter module 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	2013/04/15	First edition

Note

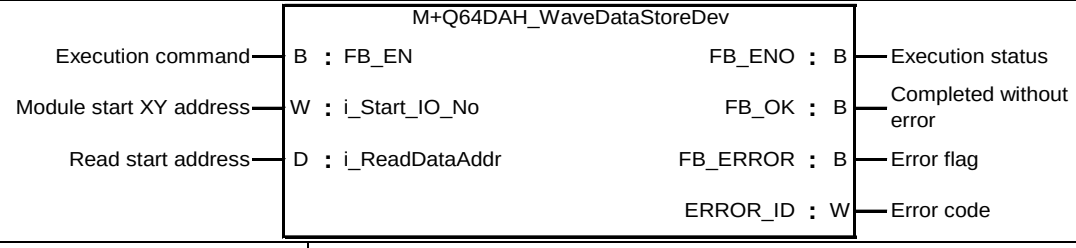
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

2.13. M+Q64DAH_WaveDataStoreDev (Read wave data (device))

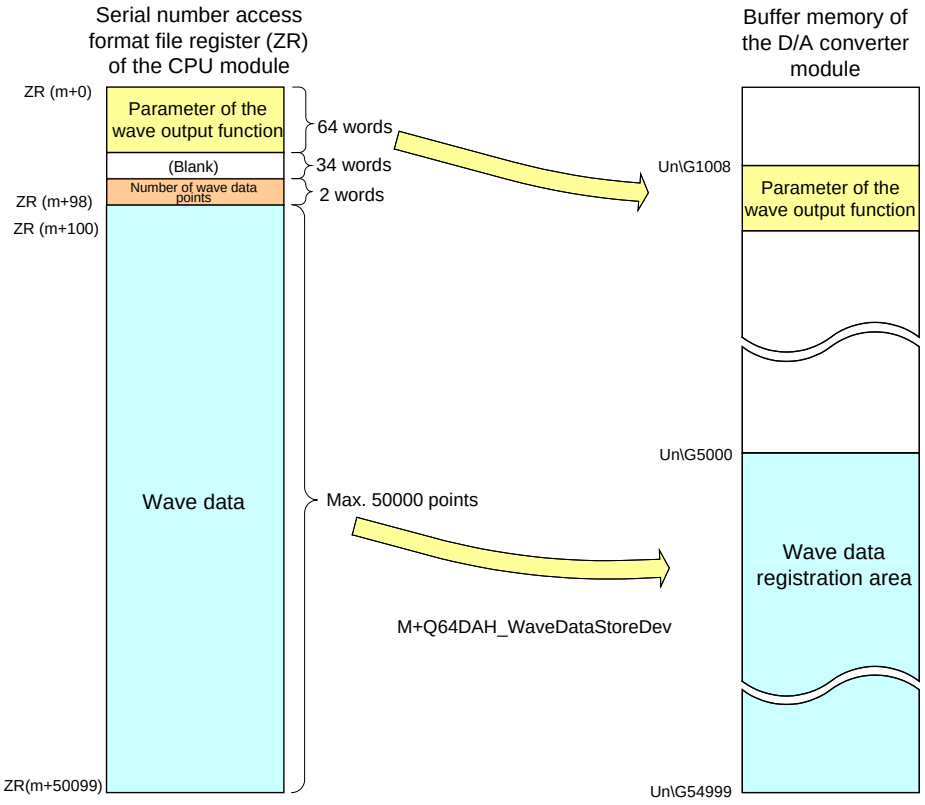
FB Name

M+Q64DAH_WaveDataStoreDev

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Reads data from the file register (ZR) where parameters and wave data (wave data points and wave data) of the wave output function are stored, then writes them to the buffer memory of the D/A converter module.</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>Q64DAH</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr>
<tr><td>High performance model</td></tr>
<tr><td>Universal model</td></tr>
</table>
* Not applicable to 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>Version 1.86Q or later</td></tr>
<tr><td>English version</td><td>Version 1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version 1.49B 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">542 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 parameters and the wave data of the wave output function is read from the serial number access format file register (ZR) and stored in the buffer memory of the D/A converter module.



For the wave output function, refer to MELSEC-Q High Speed Digital-Analog Converter Module User's Manual.

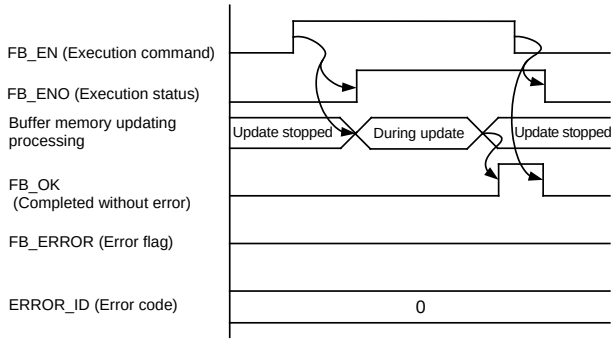
2) "Table 1 Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory" in Appendix 2. lists "parameters and data of the wave output function" and the storage location buffer memory address that this FB processes. Save the parameter and the data in the file register (ZR) described in "Storage source" in the table.

This FB reads the parameters of the wave output function from ZR(m+0) specified by i_ReadDataAddr (read start address) and stores them in the buffer memory area Un\G1008 or later. Then, this FB reads "Wave data" of specified points specified in "Number of wave data" of ZR(m+98,99) from ZR(m+100) in order, and stores them into the Start address (Un\G5000) or later of the wave data registration area of the buffer memory.

The file register (ZR) data of the wave output function can be created easily with the "Create wave output data" tool of GX Works2.

*m: File register (ZR) read start address. Specifying the points to be used in [PLC File][*1] and the device points of the file register (ZR) in [Device][*2] can reserve the points of the file register and arrange the data in the desired address.

Item	Description
	*1 [Parameter]⇨[PLC Parameter]⇨[PLC File]⇨"File Register" *2 [Parameter]⇨[PLC Parameter]⇨[Device]⇨"File Register Extension Setting" 3) Reserve "Number of wave data" +100 points or more for the file register (ZR) to be used. When this FB is executed with the points specified in i_ReadDataAddr (Read start address) less than "Number of wave data" +100 of ZR(m+98,99), the available range of the file register (ZR) is exceeded and a CPU error (Error code: 4101) occurs. 4) When FB_EN (Execution command) is turned OFF before the execution of this FB is completed, the processing is interrupted. At that time, the data stored in the buffer memory is not cleared. When the FB is executed again, the reading processing is started from the beginning.
Compiling method	Macro type
Restrictions and precautions	1) This FB requires many scans and takes long time to complete the processing. Therefore, this FB should be executed during the warm up of the Q64DAH. 2) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 3) The FB cannot be used in an interrupt program. 4) 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 because it is impossible to turn OFF. 5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program. 6) When two or more of these FBs are used, they cannot be used simultaneously. 7) Every input must be provided with a value for proper FB operation. 8) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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] 
Relevant manuals	•MELSEC-Q High Speed 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	Action
None	None	None

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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Read start address	i_ReadDataAddr	Double Word	Effective device range	Specify the start address of the file register (ZR) in which the parameters and the wave data of the wave output function are stored.

●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 writing the parameters and the wave data of the wave output function in the file register (ZR) to the buffer memory of the D/A converter module is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

FB Version Upgrade History

Version	Date	Description
1.00A	2013/04/15	First edition

Note

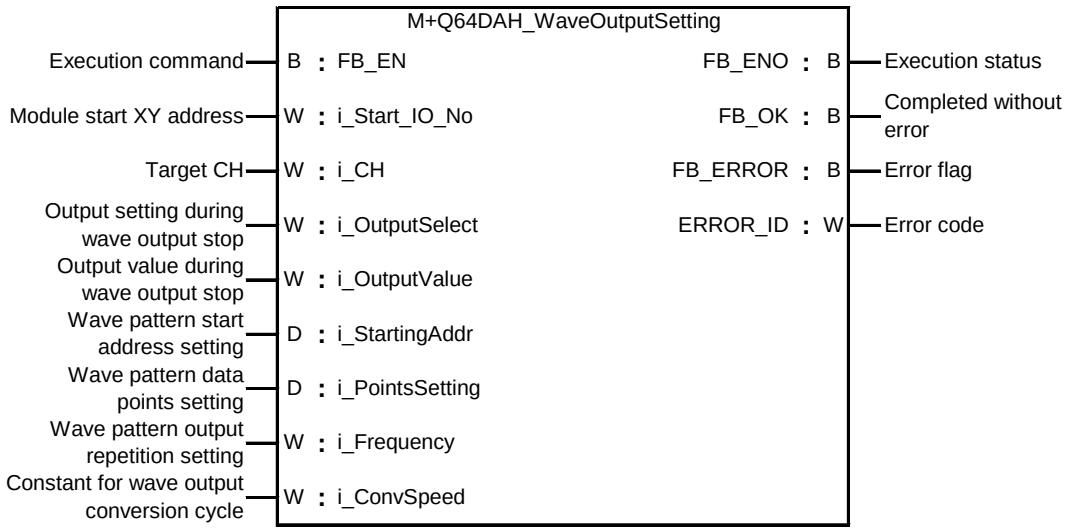
This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

2.14. M+Q64DAH_WaveOutputSetting (Wave output setting)

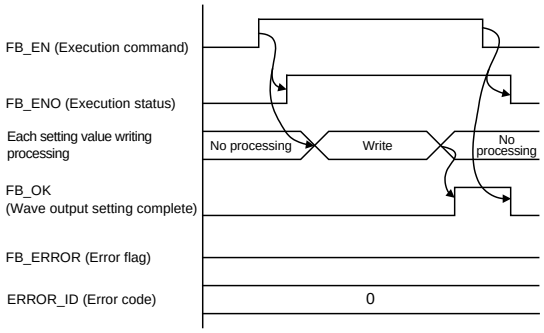
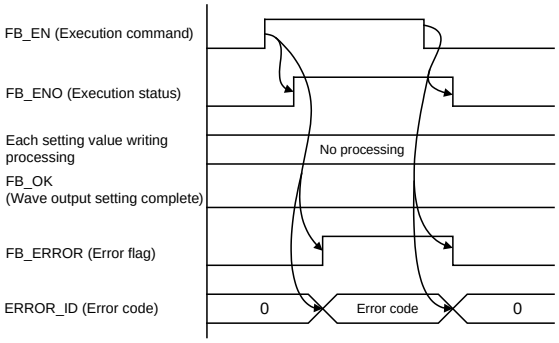
FB Name

M+Q64DAH_WaveOutputSetting

Function Overview

Item	Description	
Function overview	Sets the wave output for the specified channel or all channels.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DAH
	CPU module	<table><tr><th>Series</th><th>Model</th></tr><tr><td rowspan="3">MELSEC-Q Series*</td><td>Basic model</td></tr><tr><td>High performance model</td></tr><tr><td>Universal model</td></tr></table> * Not applicable to QCPU (A mode)
	Engineering software	GX Works2 *1 <table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version 1.86Q or later</td></tr><tr><td>English version</td><td>Version 1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version 1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version 1.49B or later</td></tr><tr><td>Korean version</td><td>Version 1.49B or later</td></tr></table> *1 For software versions applicable to the modules used, refer to "Relevant manuals".

Item	Description
Programming language	Ladder
Number of steps	357 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), the wave output settings of the specified channel or all the channels are written. 2) The wave output setting is enabled only when the output mode setting is set to "Wave output mode". Set the wave output data for the analog output in advance. 3) The setting value is validated when the Operating condition setting request signal (Yn9) is turned OFF → ON → OFF or the Operating condition setting request FB (M+Q64DAH_RequestSetting) is executed. 4) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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 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 Z6 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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 manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. Set 1 to 4 or 15 to the target channel.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4 and 15	1 to 4: Specify the channel number. 15: Specify all the channels.
Output setting during wave output stop	i_OutputSelect	Word	0: 0V/0mA 1: Offset value 2: Output value during wave output stop	Specify the output value during the wave output stop.

Name (Comment)	Label name	Data type	Setting range	Description
Output value during wave output stop	i_OutputValue	Word	•0 to 20,479: (For range of 0 to 5V, 1 to 5V, 0 to 20mA, and 4 to 20mA) •-20,480 to 20,479: (For range of -10 to 10V)	Set the value to be output when "2: Output value during wave output stop" is selected in "Output setting during wave output stop".
Wave pattern start address setting	i_StartingAddr	Double Word	5,000 to 54,999	Set the start address of the wave pattern to be output.
Wave pattern data points setting	i_PointsSetting	Double Word	1 to 50,000 (points)	Set the data points of the wave pattern to be output.
Wave pattern output repetition setting	i_Frequency	Word	•-1: Unlimited repetition •1 to 32,767: Specified number of times	Set the output times of the wave pattern.
Constant for wave output conversion cycle	i_ConvSpeed	Word	1 to 5,000	Set the constant to determine the conversion cycle of the wave output.

●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 wave output 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	2013/04/15	First edition

Note

This chapter includes information related to the function block.

It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.

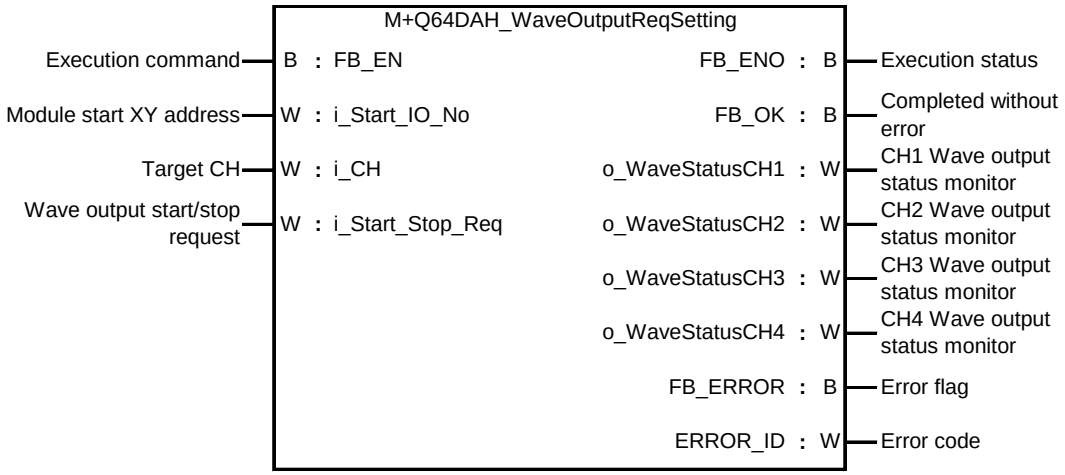
Please make sure to read user's manuals for the corresponding products before using the products.

2.15. M+Q64DAH_WaveOutputReqSetting (Wave output start/stop request)

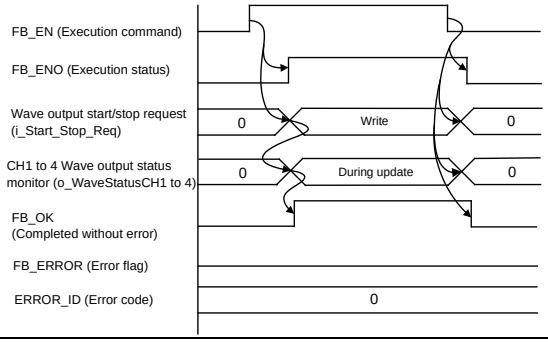
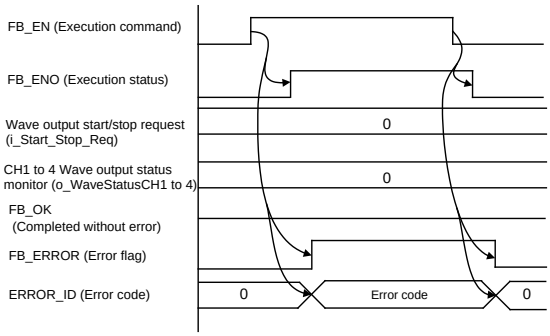
FB Name

M+Q64DAH_WaveOutputReqSetting

Function Overview

Item	Description	
Function overview	Sets the starting, stopping, or pausing of the wave output for the specified channel or all channels.	
Symbol		
Applicable hardware and software	Digital-analog converter module	Q64DAH
	CPU module	Series: MELSEC-Q Series* — Model: Basic model / High performance model / Universal model * Not applicable to QCPU (A mode)
	Engineering software	GX Works2 *1 Language: Japanese version — Software version: Version 1.86Q or later Language: English version — Software version: Version 1.24A or later Language: Chinese (Simplified) version — Software version: Version 1.49B or later Language: Chinese (Traditional) version — Software version: Version 1.49B or later Language: Korean version — Software version: Version 1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant manuals".

Item	Description
Programming language	Ladder
Number of steps	309 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), the start or stop request for wave output of the specified channel or all the channels is set. 2) By turning ON FB_EN (Execution command), the value of the wave output status monitor (Un\G1100 to Un\G1103) is output. When a channel is specified in the input label, only the wave output status monitor value of the specified channel is updated. For other channels, "0" is output. When all channels are set in the input label, the wave output status monitor values of all the channels are output. 3) After FB_EN (Execution command) is turned ON, the FB is always executed. 4) To restart the wave output, after the wave output is finished, set i_Start_Stop_Req (Wave output start/stop request) to "1 (Wave output start request)", "0 (Wave output stop request)", then "1 (Wave output start request)". 5) The wave output setting is enabled only when the output mode setting is set to "Wave output mode". 6) When the setting value of the target channel is out of range, the FB_ERROR output turns ON and 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

Item	Description
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 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 to 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) To operate the Q64DAH, set the output range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Version1 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] 
Relevant manuals	•MELSEC-Q High Speed 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	Action
10 (Decimal)	The specified channel is not valid. Set 1 to 4 or 15 to the target channel.	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 of the CPU. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q64DAH is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1 to 4 and 15	1 to 4: Specify the channel number. 15: Specify all the channels.
Wave output start/stop request	i_Start_Stop_Req	Word	0: Wave output stop request 1: Wave output start request 2: Wave output pause request	Specify the request for the wave output start or stop.

●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 FB is being executed properly.
CH1 Wave output status monitor	o_WaveStatusCH1	Word	0	Outputs the wave output status value (stop, during output, pause). 0: Wave output stop 1: Wave output 2: Wave output pause 3: Wave output step action *1 *1: The wave output step action function is unavailable with the FB. To execute, refer to Section 4.8 Wave Output Function of MELSEC-Q High Speed Digital-Analog Converter Module User's Manual and use the device test function of GX Works2.
CH2 Wave output status monitor	o_WaveStatusCH2	Word	0	
CH3 Wave output status monitor	o_WaveStatusCH3	Word	0	
CH4 Wave output status monitor	o_WaveStatusCH4	Word	0	
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	2013/04/15	First edition

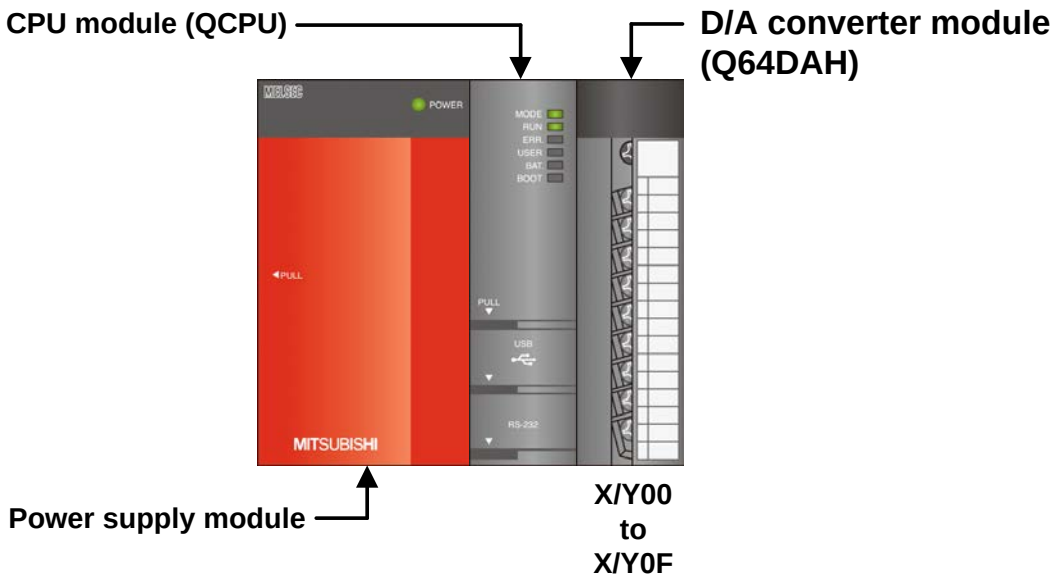
Note

This chapter includes information related to the function block.
It does not include information on restrictions of use such as combination with modules or programmable controller CPUs.
Please make sure to read user's manuals for the corresponding products before using the products.

Appendix 1. FB Library Application Examples

Q64DAH 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

a) External input (commands)

Device	FB name	Application (ON details)
M0	M+Q64DAH_WriteDAVal	D/A conversion data write req.
M10	M+Q64DAH_WriteAllDAVal	D/A cnv data write req all chnls
M20	M+Q64DAH_SetDAConversion	D/A conv enable/disable set req.
M21		D/A conv enable/disable setting
M30	M+Q64DAH_SetDAOutput	DA output enable/disable set req
M31		DA output enable/disable setting
M40	M+Q64DAH_SetScaling	Scaling setting request
M41		Scaling enabled:ON/disabled:OFF
M50	M+Q64DAH_SetAlarm	Alert output setting request
M51		Alrt outpt enable:ON/disable:OFF
M60	M+Q64DAH_RequestSetting	Operating condition set request
M70	M+Q64DAH_SetOffsetVal	Offset setting request
M71		Offset value change request
M72		Offset value writing request
M80	M+Q64DAH_SetGainVal	Gain setting request
M81		Gain value change request
M82		Gain value writing request
M90	M+Q64DAH_ShiftOperation	Shift function execution request
D90		Digital value
M100	M+Q64DAH_ErrorOperation	Error operation request
M101		Error reset request
M110	M+Q64DAH_WaveDataStoreCsv	Wave data read (CSV) request
M120	M+Q64DAH_WaveDataStoreDev	Wave data read (dev) request
M130	M+Q64DAH_WaveOutputSetting	Wave output setting request
M140	M+Q64DAH_WaveOutputReqSetting	Wave output start/stop request

b) External output (checks)

Device	FB name	Application (ON details)
M1	M+Q64DAH_WriteDAVal	D/A conversion data write FB rdy
M2		D/A conversion data write comp.
F0		D/A conv data write FB error
D0		DA conv data write FB error code
M11	M+Q64DAH_WriteAllDAVal	D/A data write all chnls FB rdy.
M12		D/A data write all chnls comp.
M22	M+Q64DAH_SetDAConversion	D/A conv enable/disable set rdy.
M23		D/A conv enable/disable set comp
F5		D/A conv enable/disable FB error
D20		DA conv enable/disable FB er cod
M32	M+Q64DAH_SetDAOutput	D/A output enable/disable FB rdy
M33		DA outpt enable/disable set comp
F10		D/A output enable/disable FB err
D30		DA otpt enable/disable FB er cod
M42	M+Q64DAH_SetScaling	Scaling value setting FB ready
M43		Scaling value ave proc set comp.
F15		Scaling value set FB error
D40		Scaling setting FB error code
M52	M+Q64DAH_SetAlarm	Alert output setting FB ready
M53		Alert output setting complete
F20		Alert output set FB error
D50		Alert output setting FB err code
M61	M+Q64DAH_RequestSetting	OP condition request FB ready
M62		OP condition request FB complete
M73	M+Q64DAH_SetOffsetVal	Offset setting FB ready
M74		Offset setting complete
F25		Offset setting FB error
D70		Offset setting FB error code
M83	M+Q64DAH_SetGainVal	Gain setting FB ready
M84		Gain setting complete
F30		Gain setting FB error
D80		Gain setting FB error code

Device	FB name	Application (ON details)
M91	M+Q64DAH_ShiftOperation	Shift function FB ready
M92		Shift function complete
D91		Shift conversion value
M102	M+Q64DAH_ErrorOperation	Error operation FB ready
M103		Error operation complete
M104		Module error
D100		Module error code
M111	M+Q64DAH_WaveDataStoreCsv	Wave data read (CSV) FB ready
M112		Wave data read (CSV) complete
F35		Wave data read (CSV) FB error
D110		Wave data read (CSV) FB err code
M121	M+Q64DAH_WaveDataStoreDev	Wave data read (dev) FB ready
M122		Wave data read (dev) complete
M131	M+Q64DAH_WaveOutputSetting	Wave output setting FB ready
M132		Wave output setting complete
F40		Wave output setting FB error
D130		Wave output setting FB err code
M141	M+Q64DAH_WaveOutputReqSetting	Wave output start/stop FB ready
M142		Wave output start/stop complete
D140		CH1 Wave output status monitor
D141		CH2 Wave output status monitor
D142		CH3 Wave output status monitor
D143		CH4 Wave output status monitor
F45		Wave output start/stop FB error
D144		Wave output start/stop err code

3) Global label setting

None

4) Application example settings

a) Common setting

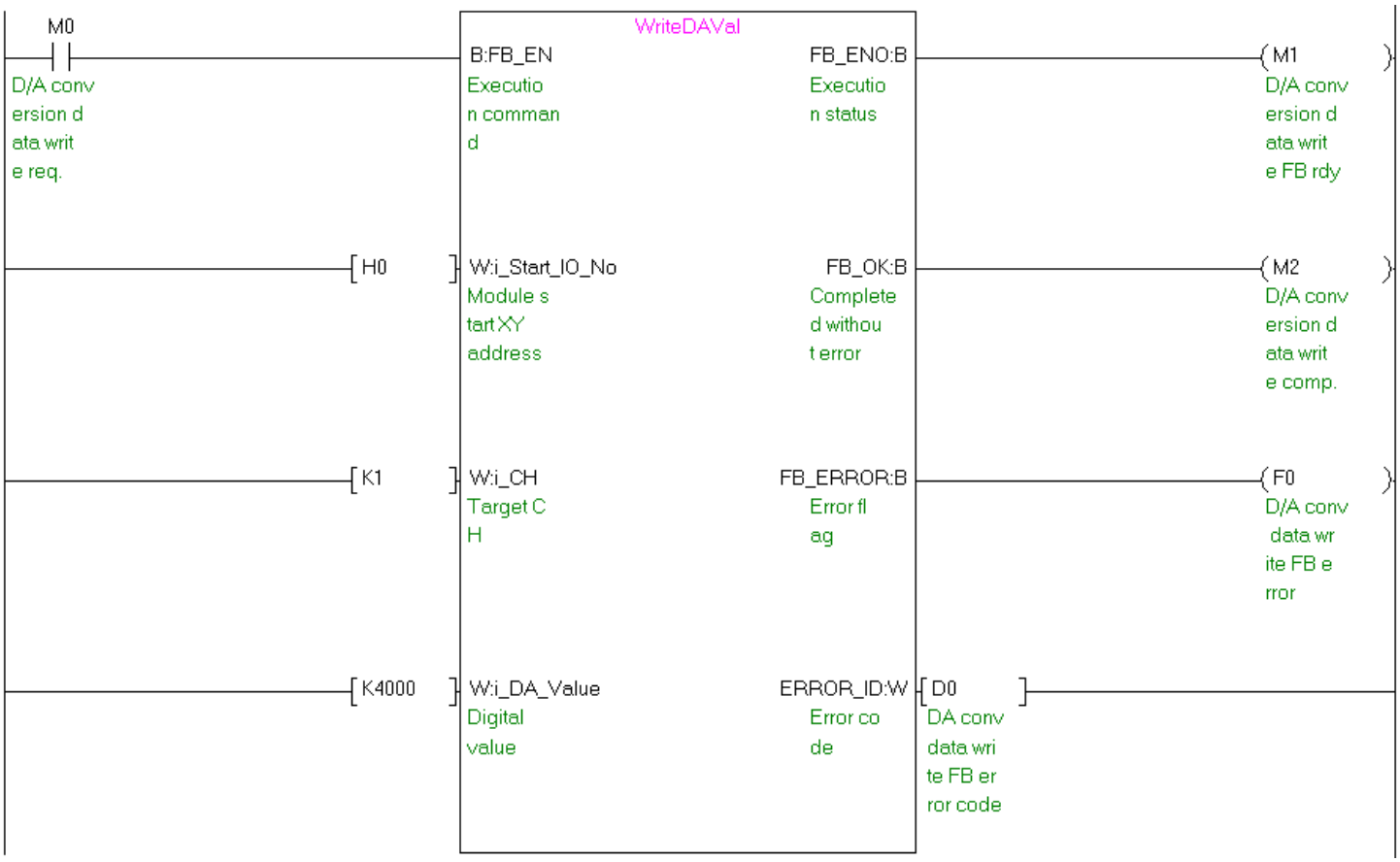
Input and output item	Value	Description
Module start XY address	0	Specify the starting XY address where the Q64DAH is mounted.

5) Programs

M+Q64DAH_WriteDAVal (Write D/A conversion data)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_DA_Value	K4000	Set the digital value to 4,000.

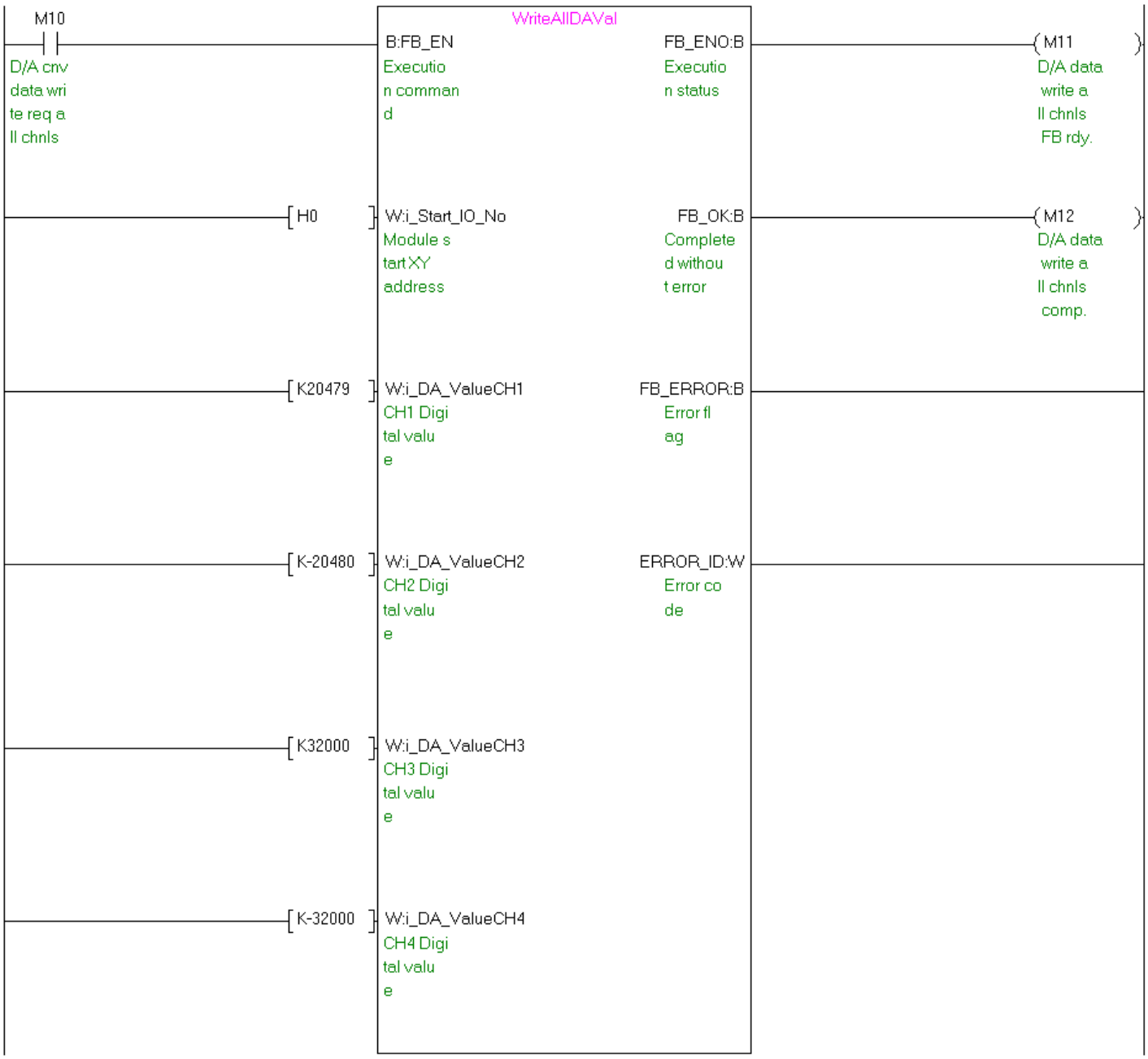
By turning ON M0, the digital value of channel 1 is written to the buffer memory.



M+Q64DAH_WriteAllDAVal (Write D/A conversion data (all CHs))

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_DA_ValueCH1	K20479	Set the digital value of channel 1 to 20,479.
i_DA_ValueCH2	K-20480	Set the digital value of channel 2 to -20,480.
i_DA_ValueCH3	K32000	Set the digital value of channel 3 to 32,000.
i_DA_ValueCH4	K-32000	Set the digital value of channel 4 to -32,000.

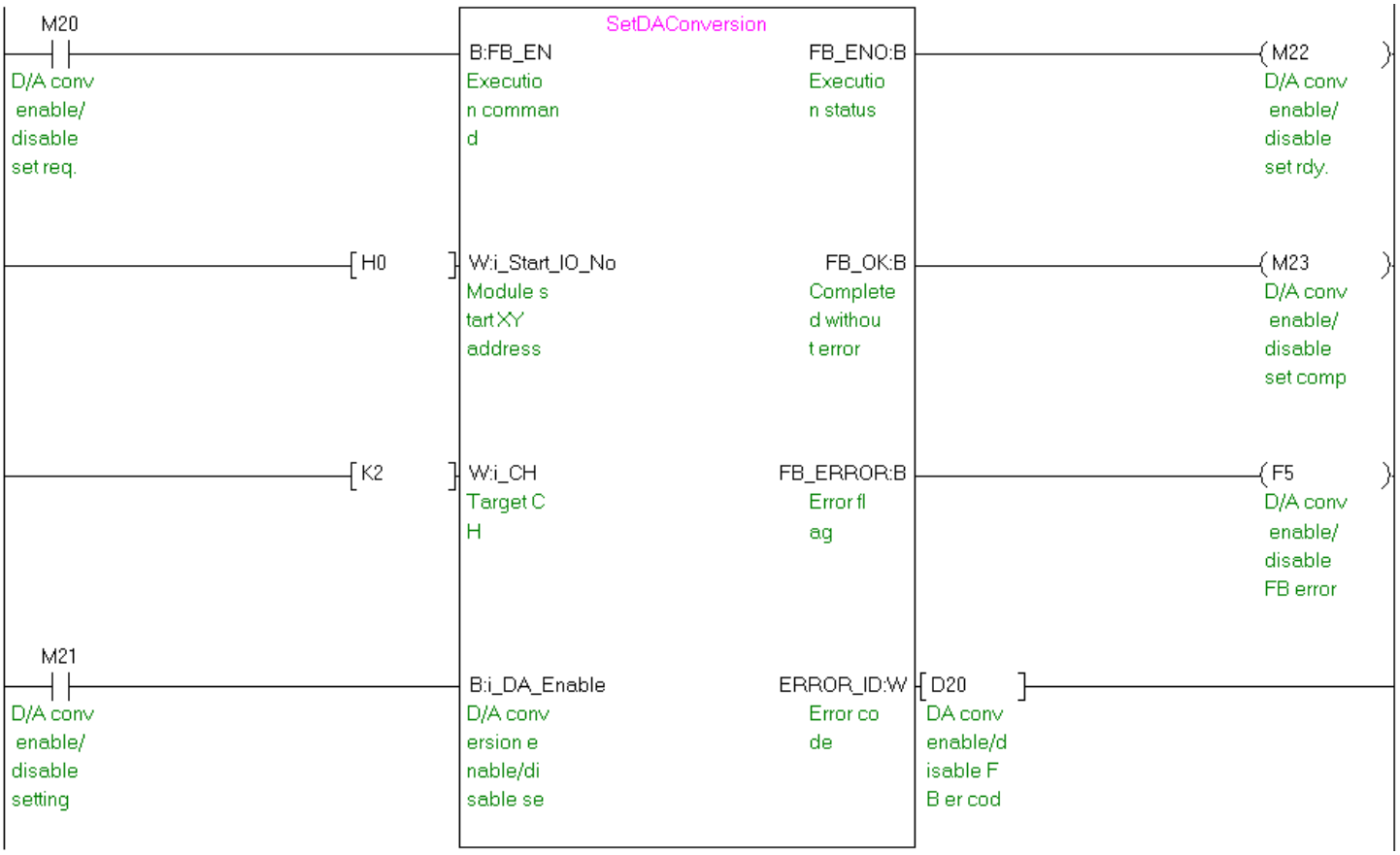
By turning ON M10, the digital values of all the channels are written to the buffer memory.



M+Q64DAH_SetDAConversion (D/A conversion enable/disable setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_DA_Enable	ON/OFF	By turning ON, the D/A conversion of the target channel is set to "Enabled".

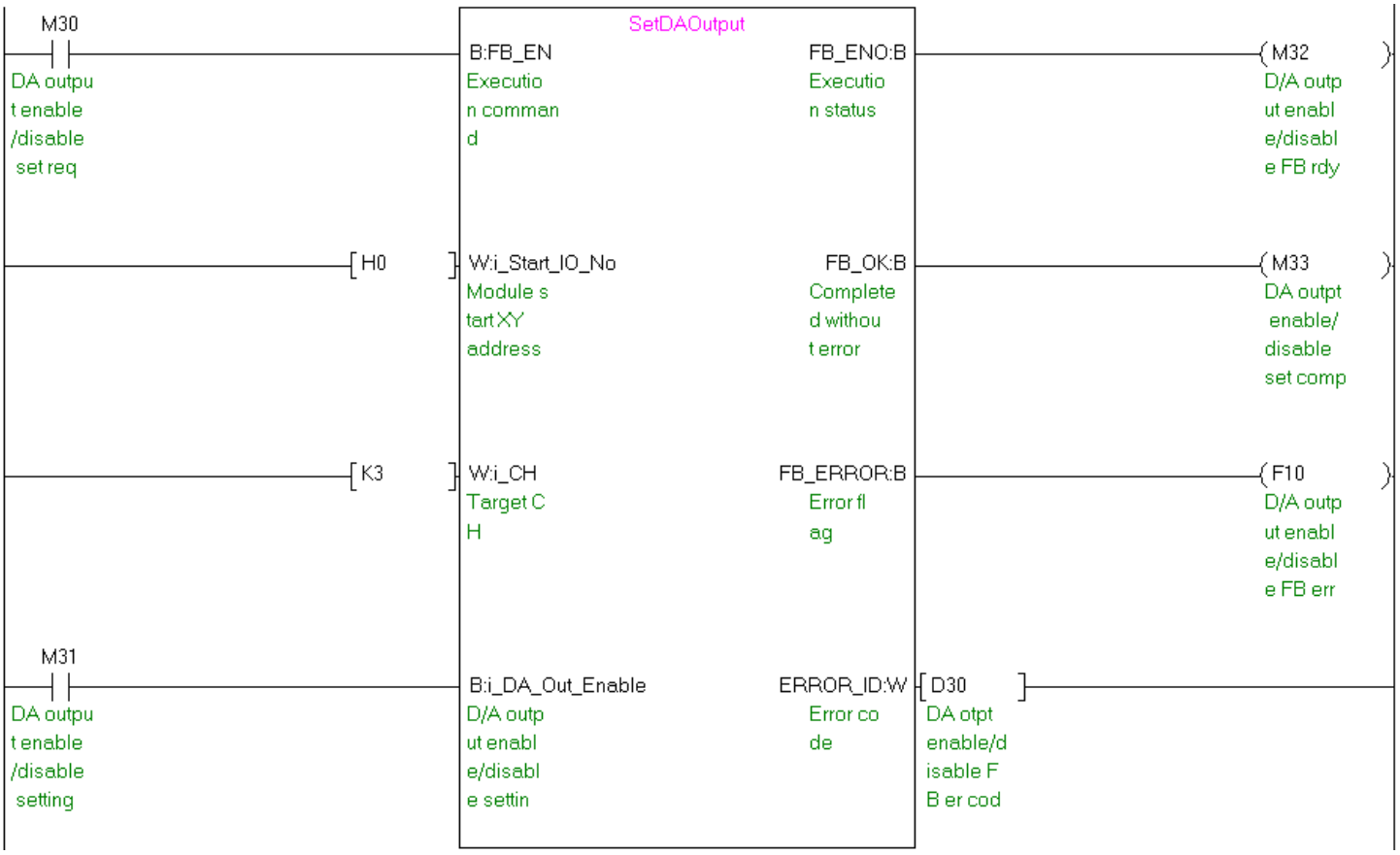
By turning ON M20, the value for the D/A conversion enable/disable setting of channel 2 is written to the buffer memory.



M+Q64DAH_SetDAOutput (D/A output enable/disable setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K3	Set the target channel to channel 3.
i_DA_Out_Enable	ON/OFF	By turning ON, the D/A output of the target channel is set to "Enabled".

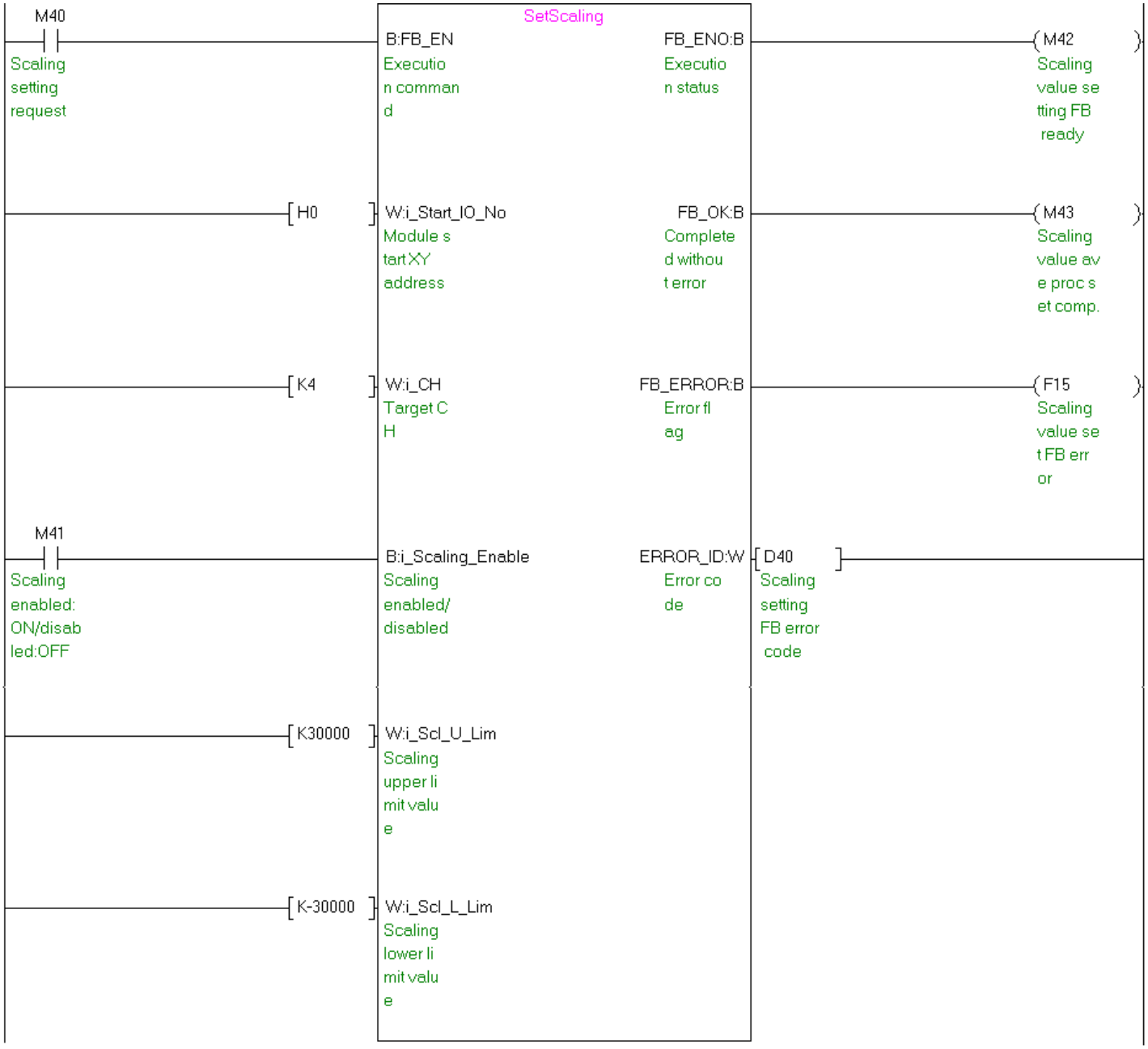
By turning ON M30, the D/A output of channel 3 is enabled.



M+Q64DAH_SetScaling (Scaling setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K4	Set the target channel to channel 4.
i_Scaling_Enable	ON/OFF	By turning ON, the scaling is enabled.
i_Scl_U_Lim	K30000	Set the scaling upper limit value to 30,000.
i_Scl_L_Lim	K-30000	Set the scaling lower limit value to -30,000.

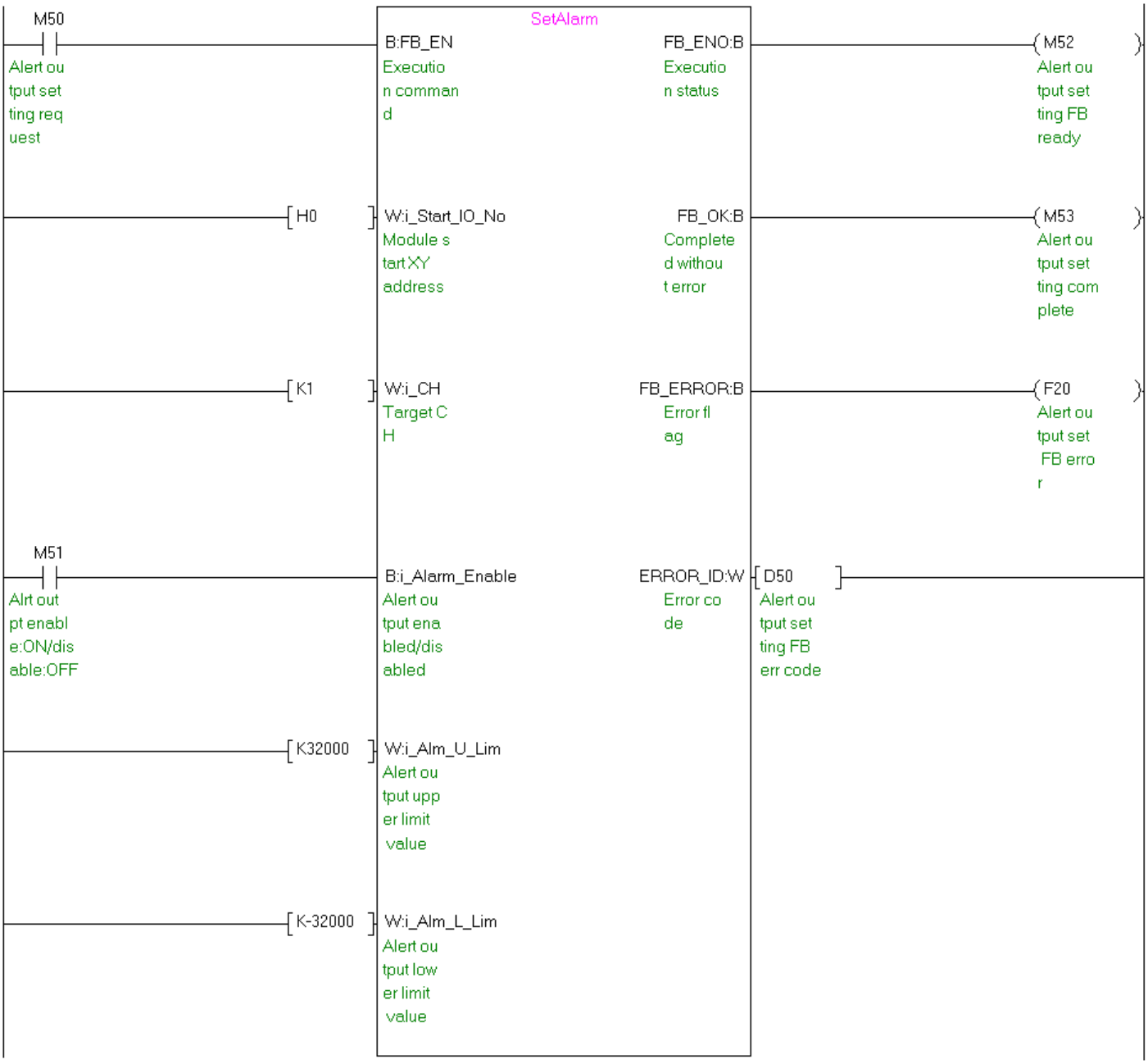
By turning ON M40, the value for the scaling setting of channel 4 is written to the buffer memory.



M+Q64DAH_SetAlarm (Alert output setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Alarm_Enable	ON/OFF	By turning ON, the alert output is enabled.
i_Alm_U_Lim	K32000	Set the alert output upper limit value to 32,000.
i_Alm_L_Lim	K-32000	Set the alert output lower limit value to -32,000.

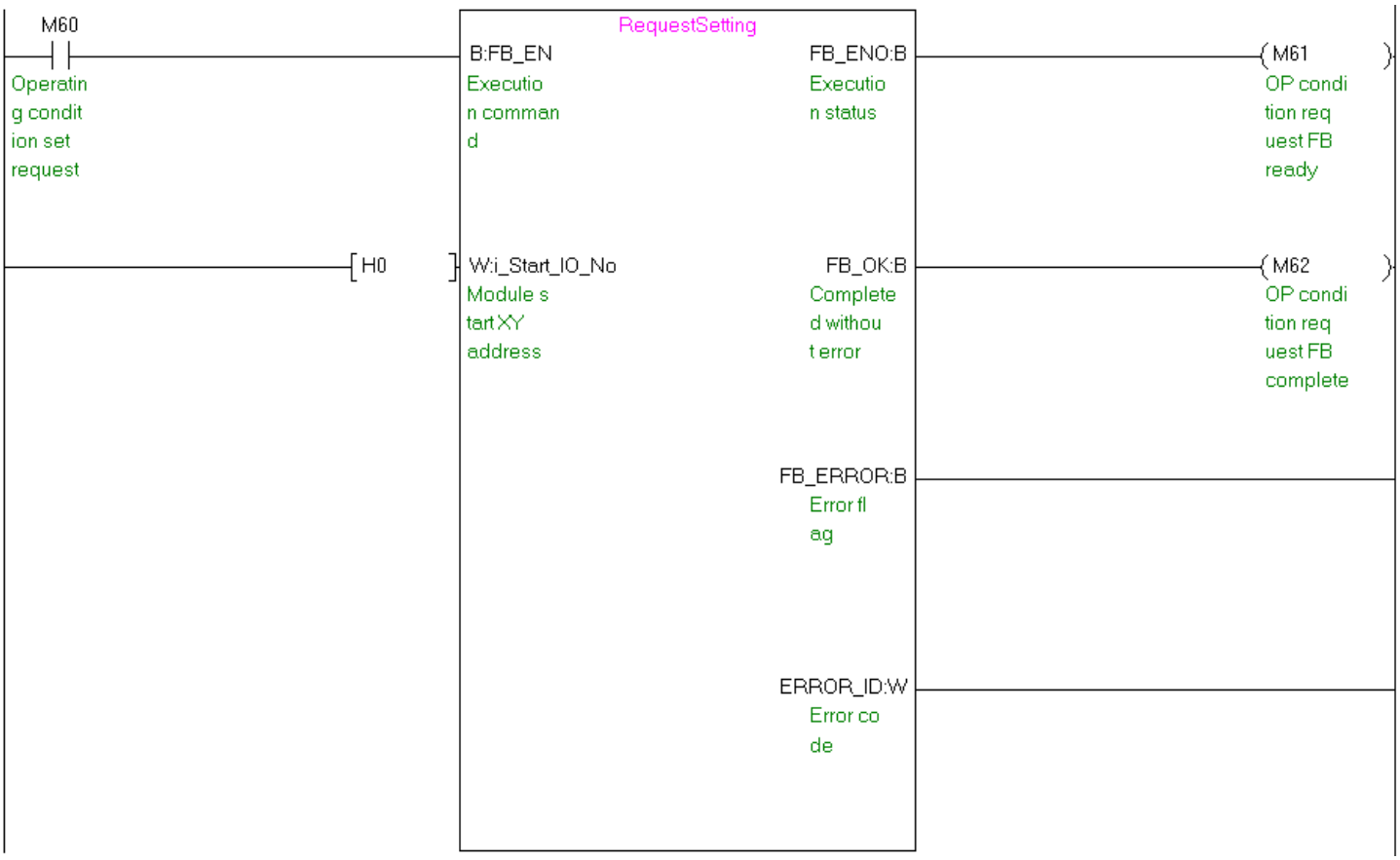
By turning ON M50, the value for the alert output setting of channel 1 is written to the buffer memory.



M+Q64DAH_RequestSetting (Operating condition setting request)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.

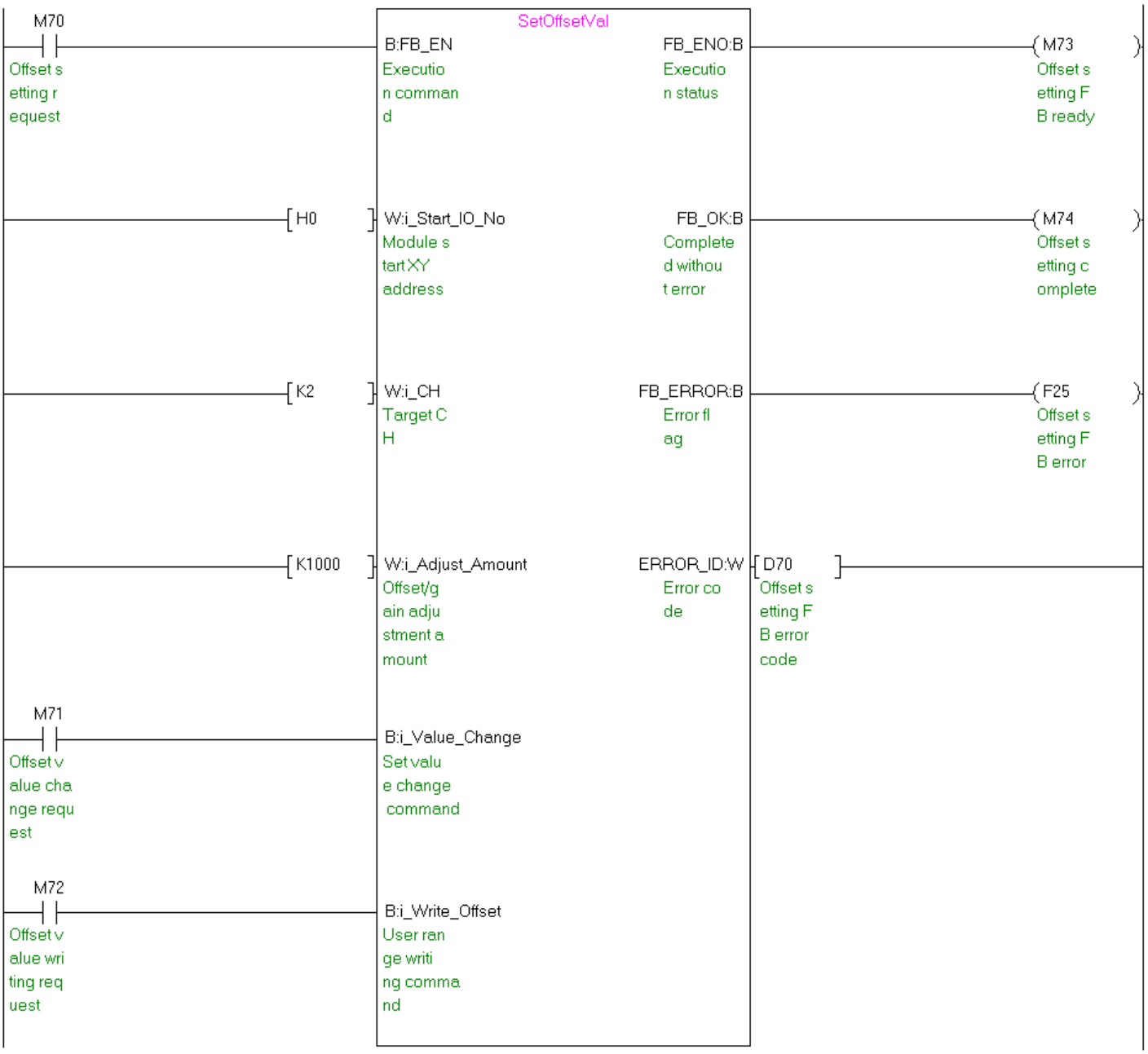
By turning ON M60, the setting contents of the D/A conversion enable/disable setting, alert output setting, scaling function setting, and wave output function setting are enabled.



M+Q64DAH_SetOffsetVal (Offset setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Adjust_Amount	K1000	Set the offset/gain adjustment amount to 1,000.
i_Value_Change	ON/OFF	By turning ON, the offset value is changed.
i_Write_Offset	ON/OFF	By turning ON, the user range is written.

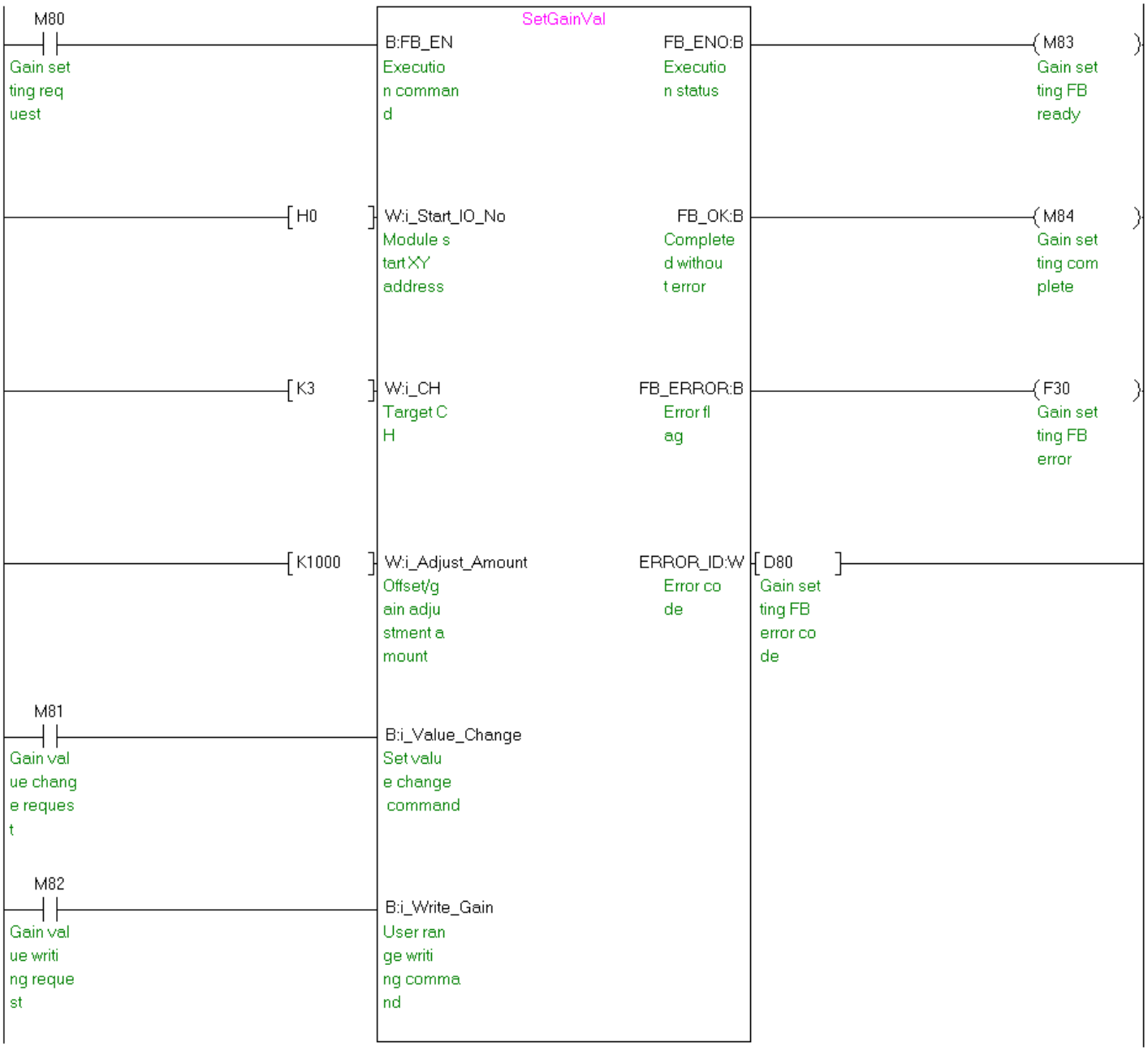
By turning ON M71 after turning ON M70, the offset value of channel 2 is changed. By turning ON M72, the user range is written.



M+Q64DAH_SetGainVal (Gain setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K3	Set the target channel to channel 3.
i_Adjust_Amount	K1000	Set the offset/gain adjustment amount to 1,000.
i_Value_Change	ON/OFF	By turning ON, the gain value is changed.
i_Write_Gain	ON/OFF	By turning ON, the user range is written.

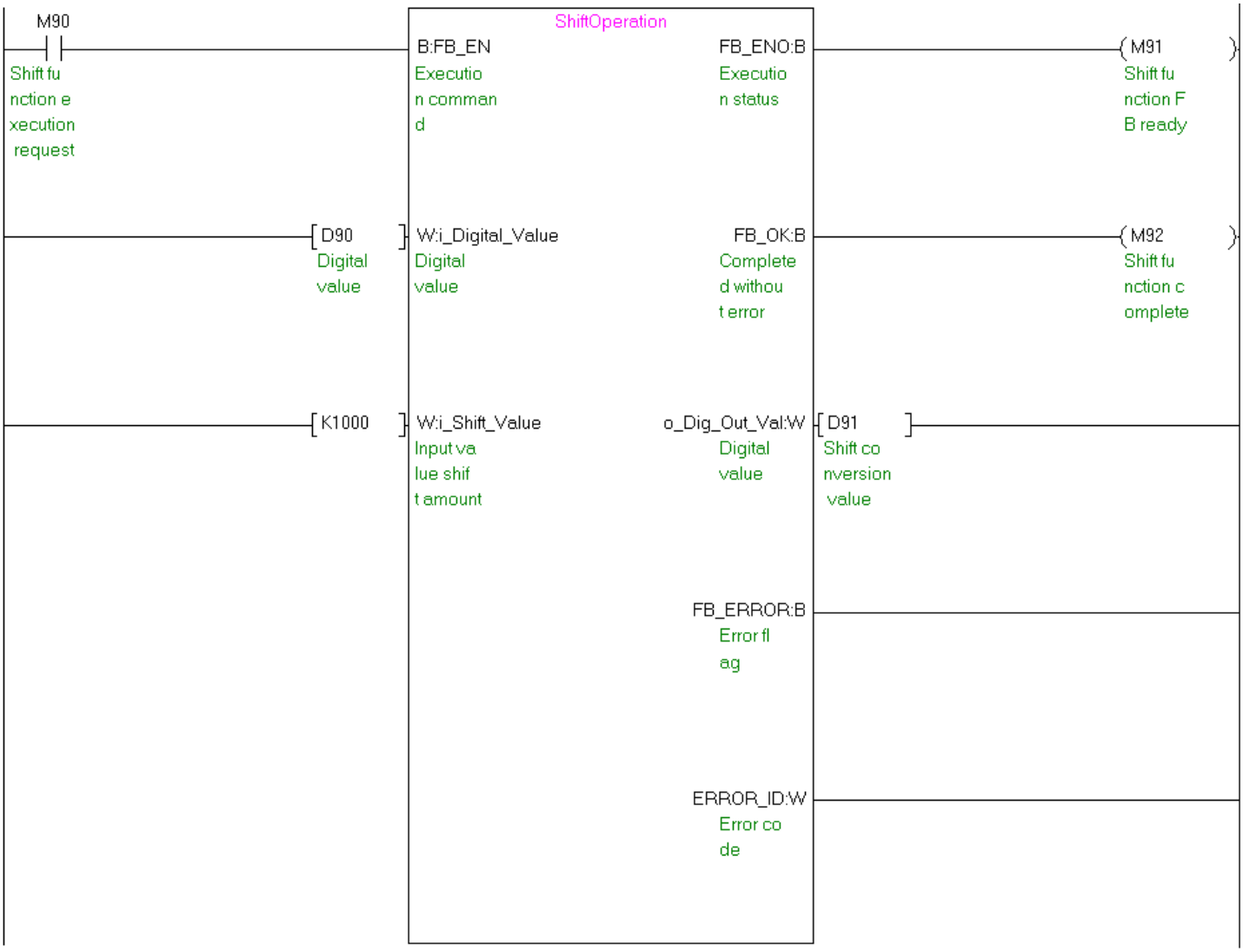
By turning ON M81 after turning ON M80, the gain value of channel 3 is changed. By turning ON M82, the user range is written.



M+Q64DAH_ShiftOperation (Shift operation)

Label name	Setting value	Description
i_Digital_Value	-	Set the digital value.
i_Shift_Value	K1000	Set the shift amount to 1,000.

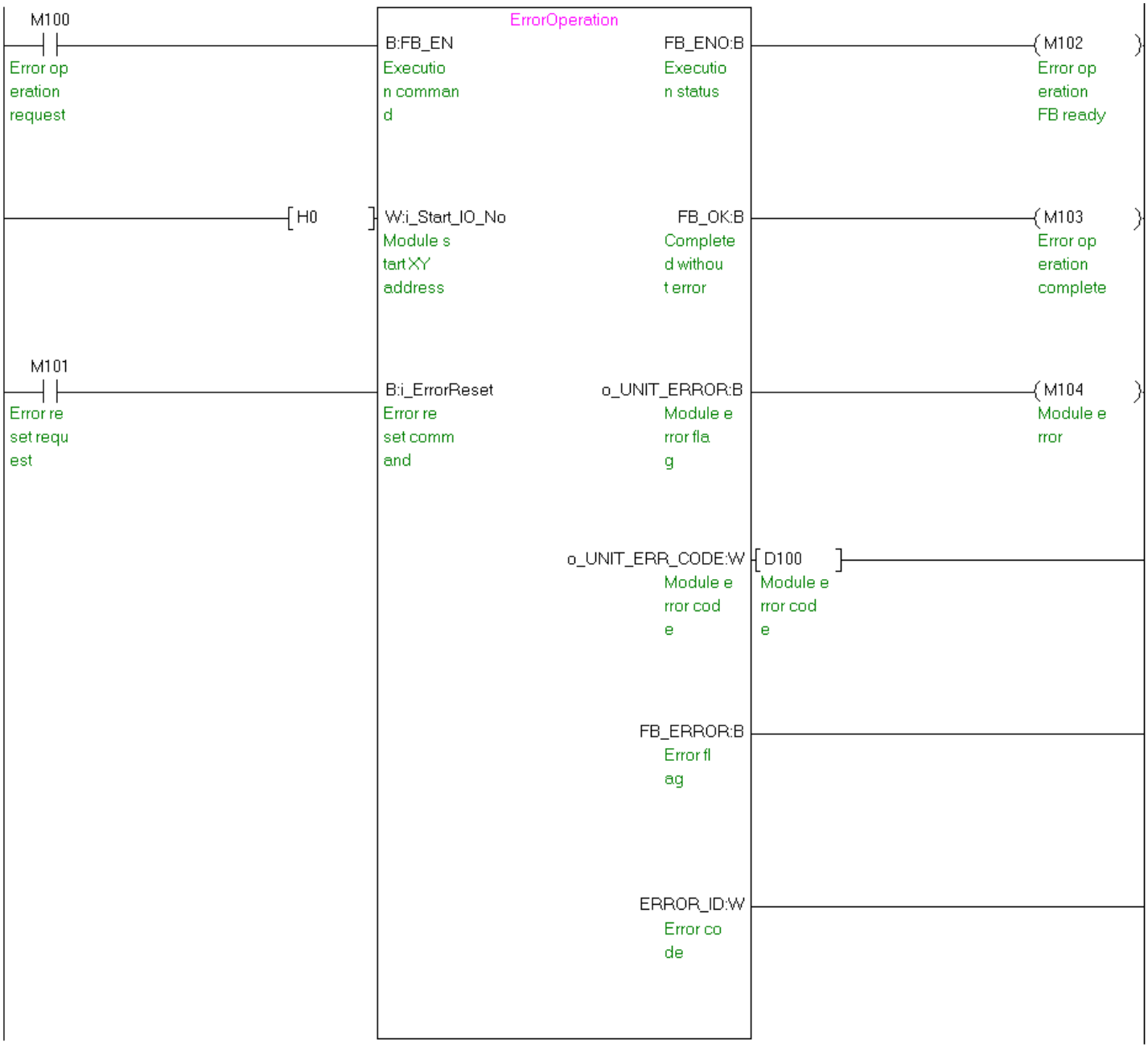
By turning ON M90, the digital value to which the input value shift amount is added is output.



M+Q64DAH_ErrorOperation (Error operation)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_ErrorReset	ON/OFF	Turn ON for the error reset.

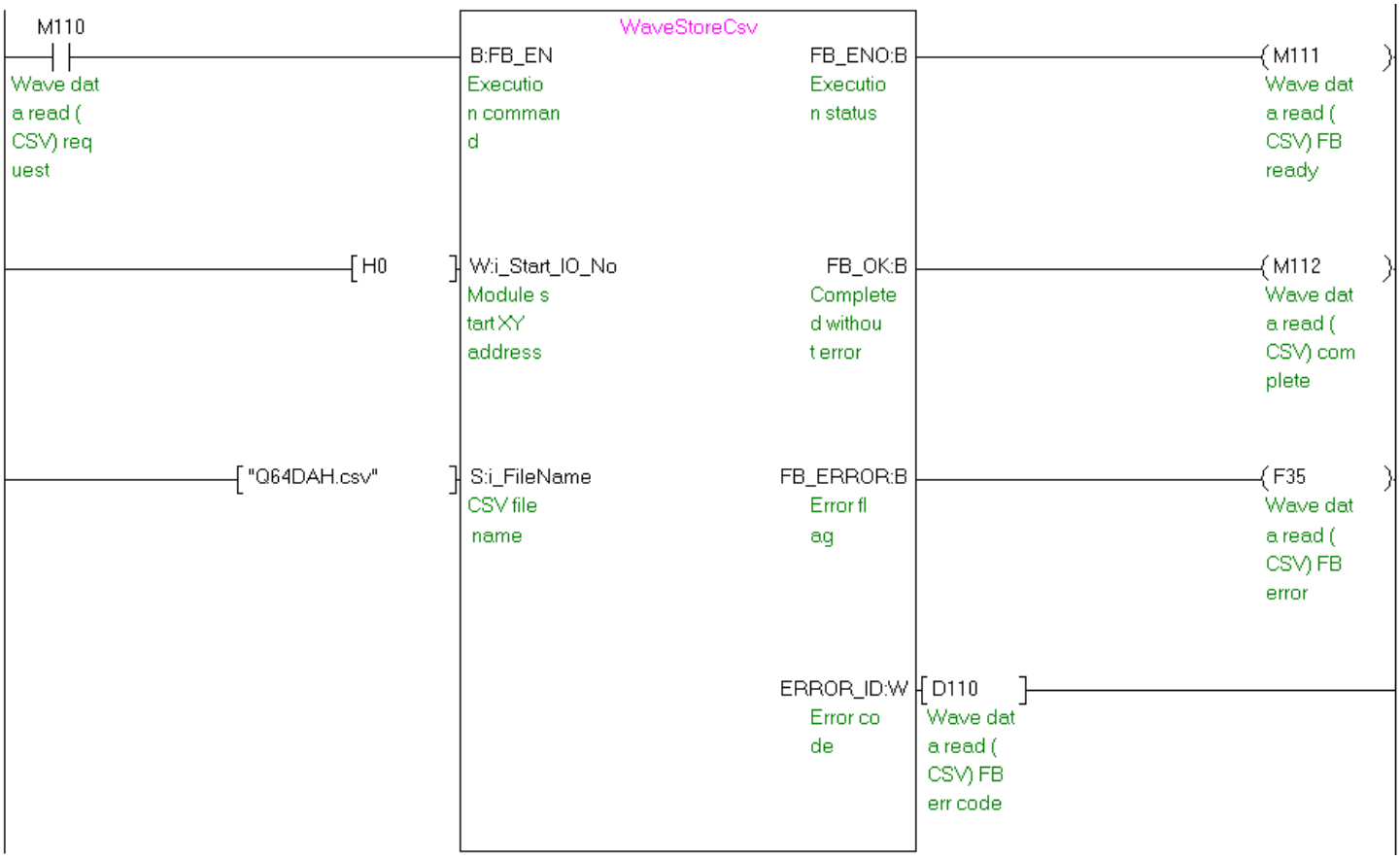
By turning ON M100, the error code is output when an error occurs. By turning ON M101 after the error output, the error is reset.



M+Q64DAH_WaveDataStoreCsv (Read wave data (CSV file))

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_FileName	"Q64DAH.csv"	Set "Q64DAH.csv" as the name of the CSV file where the parameters and the wave data of the wave output function are stored.

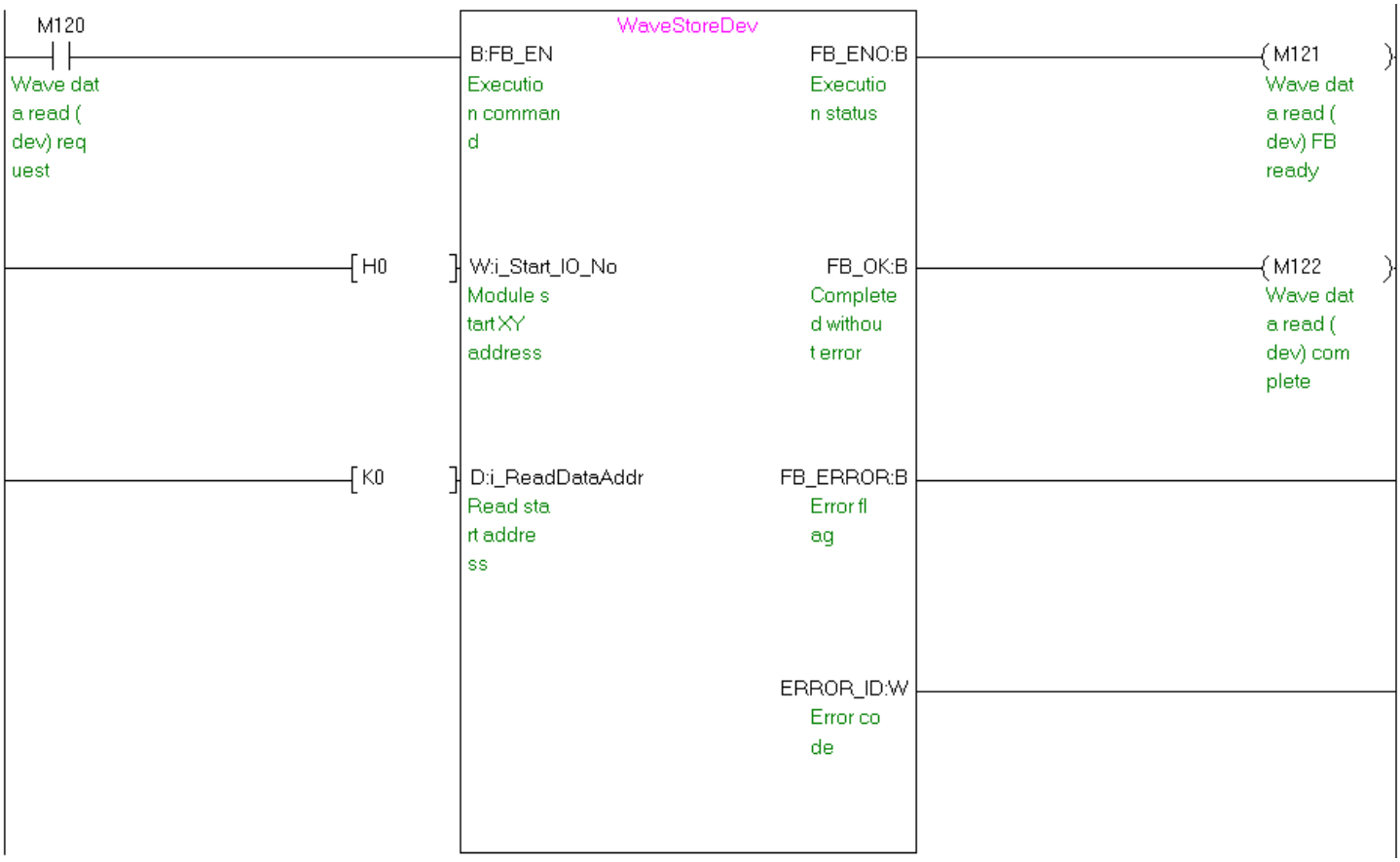
By turning ON M110, the parameters and wave data of the wave output function are read from "Q64DAH.csv" and stored in the buffer memory.



M+Q64DAH_WaveDataStoreDev (Read wave data (device))

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_ReadDataAddr	K0	Set ZR0 as the read start address where the parameters and the wave data of the wave output function are stored.

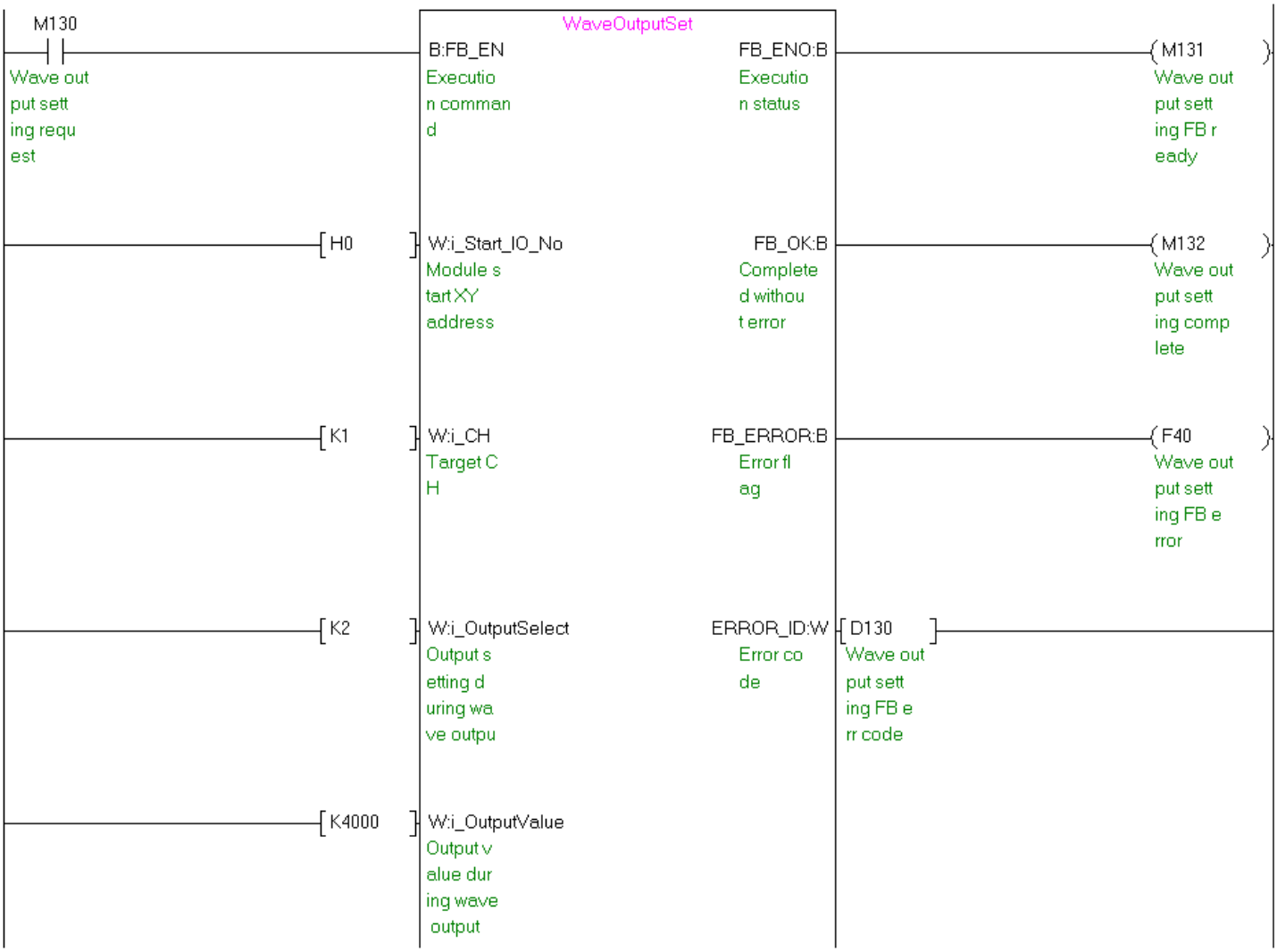
By turning ON M120, the parameters and wave data of the wave output function are read from the file register ZR0 or later, and stored in the buffer memory.



M+Q64DAH_WaveOutputSetting (Wave output setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_OutputSelect	K2	Set "Output setting during wave output stop" to 2 (Output value during wave output stop).
i_OutputValue	K4000	Set the output setting value during the wave output stop to 4,000.
i_StartingAddr	K5000	Set the start address of the wave pattern to be output to 5,000.
i_PointsSetting	K10000	Set the data points of the wave pattern to be output to 10,000.
i_Frequency	K2000	Set the wave output times to 2,000.
i_ConvSpeed	K1	Set the constant for wave output conversion cycle to 1.

By turning ON M130, the wave output setting of channel 1 is performed.



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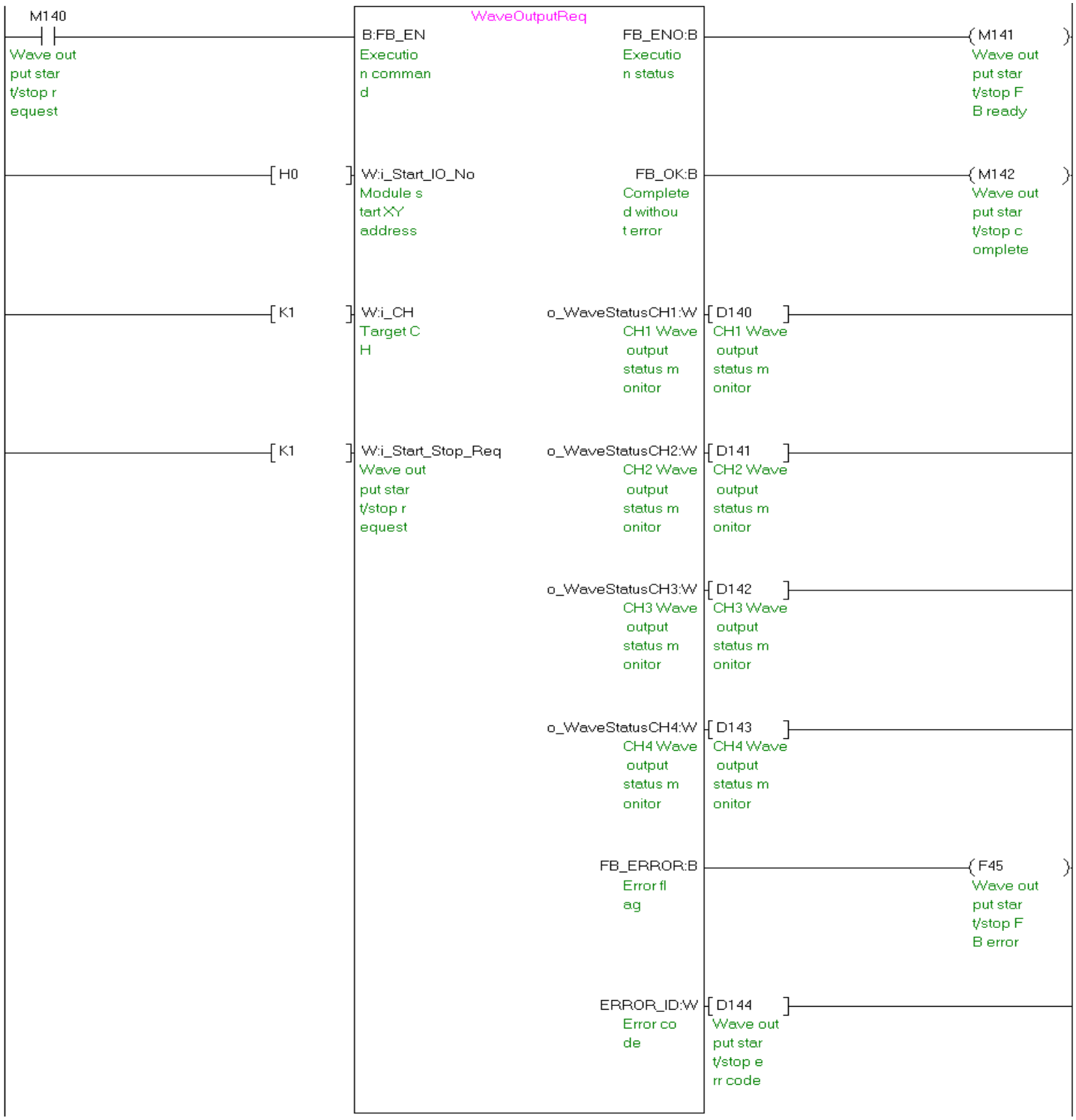
M+Q64DAH_WaveOutputReqSetting (Wave output start/stop request)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q64DAH is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Start_Stop_Req	K1	Set Wave output start/stop request to "1: Wave output start request".

By turning ON M140, the wave output of channel 1 is started.



Appendix 2. Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory

The following table lists the relation between the storage source "Wave output function parameter and data" and the storage location buffer memory handled by the following FBs.

•M+Q64DAH_WaveDataStoreCsv (Read wave data (CSV file))

•M+Q64DAH_WaveDataStoreDev (Read wave data (device))

Table 1 Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory

No.	Parameter/data of the wave output function	Setting range (decimal)		CH	Storage source			Storage location
					CSV file in the ATA card		Serial number access format file register (ZR) (m: Read start address)	Buffer memory of the D/A converter module (n: Module start XY address upper)
					Row	Column		
1)	Output setting during wave output stop Select the output during the wave output stop for each channel.	0: 0V/0mA 1: Offset value 2: Output value during wave output stop		1	1	1	ZR (m + 0)	Un\G1008
				2	1	2	ZR (m + 1)	Un\G1009
				3	1	3	ZR (m + 2)	Un\G1010
				4	1	4	ZR (m + 3)	Un\G1011
2)	Output value during wave output stop Set the value to be output for each channel when "2: Output value during wave output stop" is selected in "Output setting during wave output stop".	(*1)	0 to 20,479 (practical range: 0 to 20,000)	1	2	1	ZR (m + 8)	Un\G1016
				2	2	2	ZR (m + 9)	Un\G1017
				3	2	3	ZR (m + 10)	Un\G1018
		(*2)	-20,480 to 20,479 (practical range: -20,000 to 20,000)	4	2	4	ZR (m + 11)	Un\G1019
3)	Wave pattern start address setting Set the start address of the wave pattern to be output for each channel.	5,000 to 54,999		1	3	1	ZR (m + 16 and 17)	Un\G1024 and 1025
				2	3	2	ZR (m + 18 and 19)	Un\G1026 and 1027
				3	3	3	ZR (m + 20 and 21)	Un\G1028 and 1029
				4	3	4	ZR (m + 22 and 23)	Un\G1030 and 1031
4)	Wave pattern data points setting Set the data points of the wave pattern to be output for each channel.	1 to 50,000 (points)		1	4	1	ZR (m + 32 and 33)	Un\G1040 and 1041
				2	4	2	ZR (m + 34 and 35)	Un\G1042 and 1043
				3	4	3	ZR (m + 36 and 37)	Un\G1044 and 1045
				4	4	4	ZR (m + 38 and 39)	Un\G1046 and 1047
5)	Wave pattern output repetition setting Set the output times of the wave pattern for each channel.	-1: Unlimited repetition 1 to 32,767: Specified number of times		1	5	1	ZR (m + 48)	Un\G1056
				2	5	2	ZR (m + 49)	Un\G1057
				3	5	3	ZR (m + 50)	Un\G1058
				4	5	4	ZR (m + 51)	Un\G1059
6)	Constant for wave output conversion cycle Set the constant to determine the conversion cycle (multiple of the conversion speed) for each channel.	1 to 5,000		1	6	1	ZR (m + 56)	Un\G1064
				2	6	2	ZR (m + 57)	Un\G1065
				3	6	3	ZR (m + 58)	Un\G1066
				4	6	4	ZR (m + 59)	Un\G1067
7)	Number of wave data points Set the total points of the wave data.	1 to 50,000 (points)			100	1	ZR (m + 98 and 99)	-
8)	Wave data	-20,480 to 20,479 (practical range: -20,000 to 20,000)			101 to 50,100	1	ZR (m + 100) to ZR (m + 50099)	Un\G5000 to Un\54999

*1: When the output range of the D/A converter module is 0 to 5V, 1 to 5V, 0 to 20mA, or 4 to 20mA

*2: When the output range of the D/A converter module is -10 to 10V

* The number 1) to 8) in the table corresponds to the number in the row and column example of a CSV file in Appendix 3.

Appendix 3. CSV File Format for Wave Data Reading FB (CSV File)

This section shows the CSV file format that M+Q64DAH_WaveDataStoreCsv (Read wave data (CSV file)) handles. (A CSV file has an extension ".csv" and can be opened in general applications such as Microsoft Excel and Notepad.)

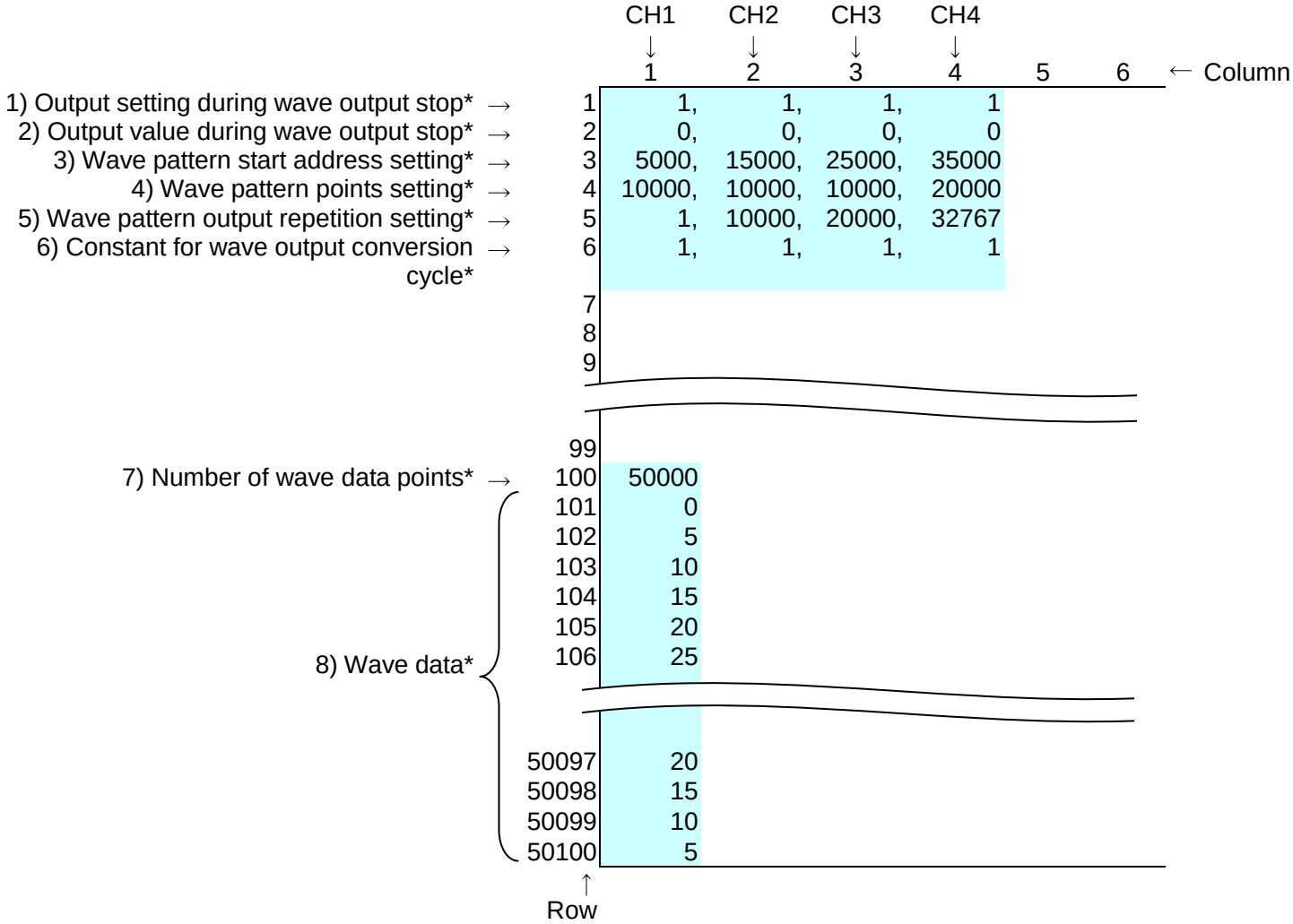
The following table lists the CSV format specification.

Item	Description
Delimiter	Comma (,)
Linefeed code	CRLF (0x0D, 0x0A)
Character code	ASCII or Shift JIS

The number of characters for the CSV file name must be within 12 including the extension ".csv". (Two-byte characters can be used. One two-byte character equals to two one-byte characters.)

(Example) Q64DAH_1.csv, wd000001.csv, WaveData.csv

The following figure shows a row and column example of a CSV file. In this example, the number of wave data points is 50000 (points) (maximum).



* The number 1) to 8) corresponds to each item of "Table 1 Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory" in Appendix 2. For details on the items, refer to the table.