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

Applicable module:

L60DAIL8, L60DAVL8

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Reference Manual Revision History

Reference Manual Number	Date	Description
FBM-M158-A	2016/08	First edition

1. Overview

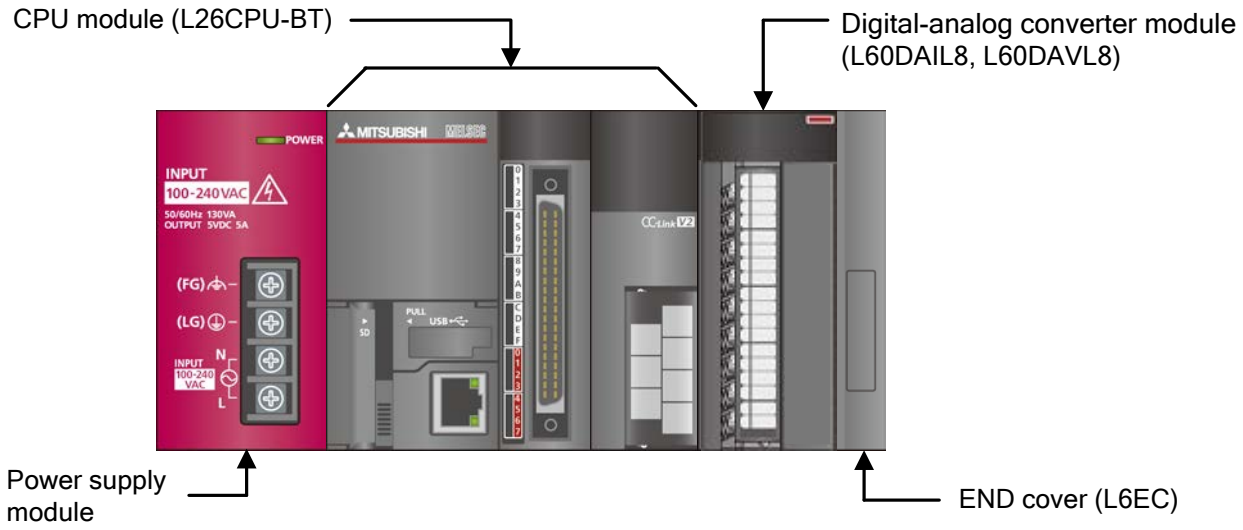
1.1 Overview of the FB Library

This FB library is for using the MELSEC-L L60DAIL8, L60DAVL8 digital-analog converter module. (hereinafter L60DAIL8 and L60DAVL8)

1.2 Function of the FB Library

Item	Description
M+L60DAL8_WriteDAVal	Write a D/A conversion data value for a specified channel.
M+L60DAL8_WriteAllDAVal	Write D/A conversion data values for all specified channels.
M+L60DAL8_SetDAConversion	Enable or disable D/A conversion for a specified channel or all channels.
M+L60DAL8_SetDAOutput	Enable or disable D/A output for a specified channel or all channels.
M+L60DAL8_SetScaling	Configure a specified channel's scaling function settings.
M+L60DAL8_SetAlarm	Configure the warning output settings for a specified channel.
M+L60DAL8_RequestSetting	Make changes made to each function's operational condition settings effective (valid).
M+L60DAL8_SetOffsetVal	Set the offset value of a specified channel.
M+L60DAL8_SetGainVal	Set the gain value of a specified channel.
M+L60DAL8_ShiftOperation	Add the desired shift amount to a digital value.
M+L60DAL8_ErrorOperation	Perform monitoring and reset of intelligent function module error codes.
M+L60DAL8_OGBackup	Read the offset and gain values from the user range setting, and save to file.
M+L60DAL8_OGRestore	Restore the user range offset / gain settings to a module from a file.
M+L60DAL8_WaveDataStoreCsv	Read the wave output function parameters and wave data (wave data points and wave data) from the CSV file, and write them to the buffer memory of the D/A converter module.
M+L60DAL8_WaveDataStoreDev	Read the wave output function parameters and wave data (wave data points and wave data) from the file register (ZR), and write them to the buffer memory of the L60DAIL8 or L60DAVL8.
M+L60DAL8_WaveOutputSetting	Configure the wave output setting for a specified channel or all channels.
M+L60DAL8_WaveOutputReqSetting	Specify a start, stop or temporary stop of the wave output for a specified channel or all channels.

1.3 System Configuration Example



1.4 Relevant Manual

•MELSEC-L Digital-Analog Converter Module User's Manual

•MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)

•GX Works2 Version1 Operating Manual (Common)

•GX Works2 Version1 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.

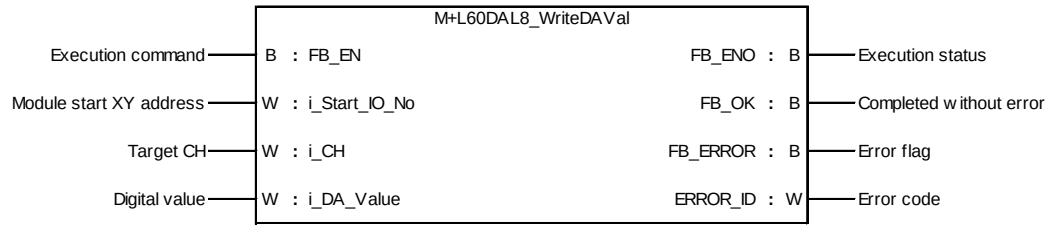
2. Details of the FB Library

2.1 M+L60DAL8_WriteDAVal (Write D/A conversion data)

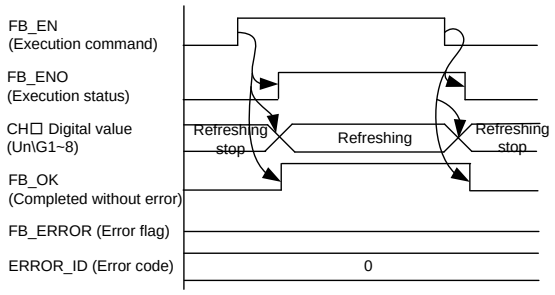
FB Name

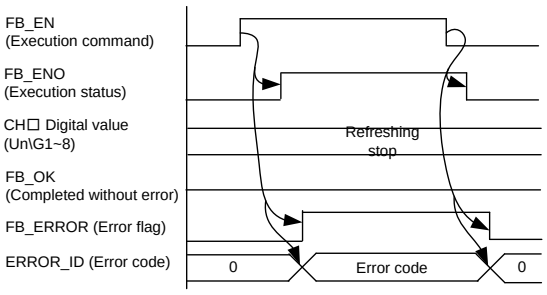
M+L60DAL8_WriteDAVal

Function Overview

Item	Description	
Function overview	Write a D/A conversion data value for a specified channel.	
Symbol		
Applicable hardware and software	Digital-Analog converter module.	L60DAIL8, L60DAVL8
	CPU module	Series: MELSEC-L Series; Model: LCPU
	Engineering software	GX Works2 *1 Japanese version: Version1.86Q or later English version: Version1.24A or later Chinese (Simplified) version: Version1.49B or later Chinese (Traditional) version: Version1.49B or later Korean version: Version1.49B or later *1 For software versions applicable to the modules used, refer to "Relevant manuals".
Programming language	Ladder	
Number of steps	252 steps (for MELSEC-L series CPU) * The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.	

Item	Description
Function description	1) Write a digital value for a specified channel when FB_EN (Execution command) turns ON. 2) The digital value written depends on the output range setting. In addition, if the scaling function is enabled, the D/A conversion is executed after scaling processing of the digital value is completed. 3) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 4) If the Intelligent function module is set to auto refresh the digital output value, it is unnecessary to use this FB.
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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8	Specify the CH number.
Digital value	i_DA_Value	Word	-32,000~32,000 *1	Specify a digital value. *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 instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the digital value is being written and there is no error.
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	2016/08	First edition

Note

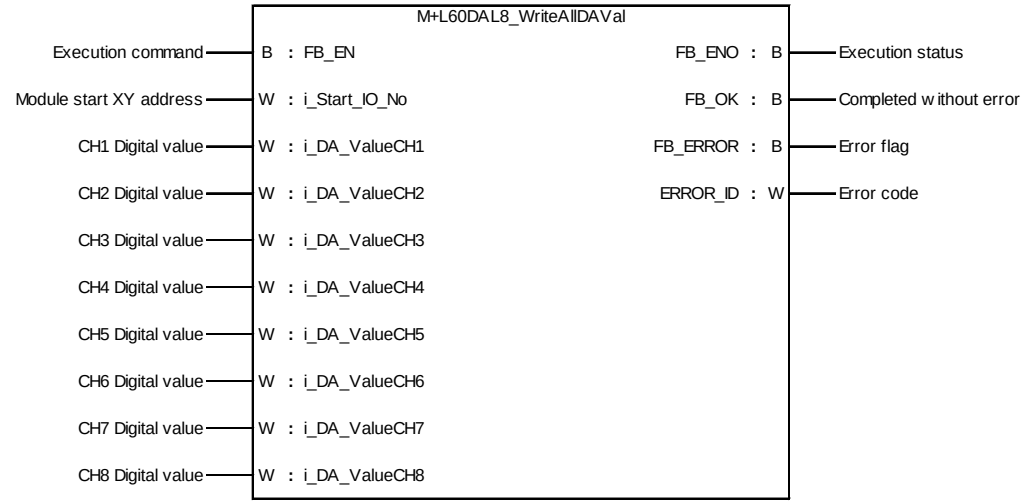
This chapter includes information related to the M+L60DAL8_WriteDAVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

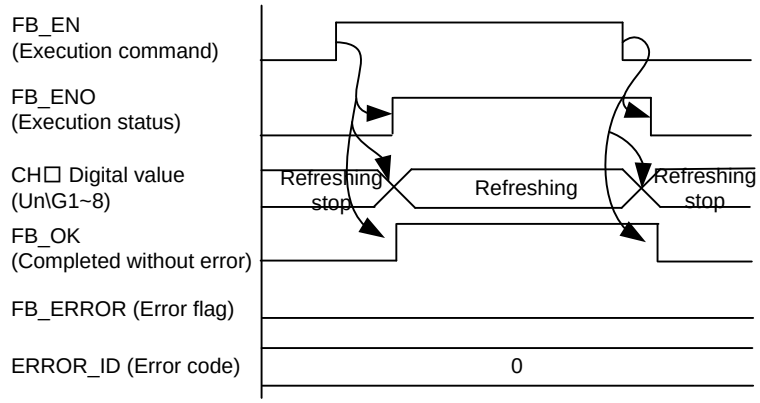
2.2 M+L60DAL8_WriteAllDAVal (Write D/A conversion data (all CHs))

FB Name

M+L60DAL8_WriteAllDAVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Write D/A conversion data values for all specified 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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td>MELSEC-L Series</td><td>LCPU</td></tr>
</table>
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
</table>

Item	Description
Number of steps	249 steps (for MELSEC-L series 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) Digital values for all specified channels are written when FB_EN (Execution command) turns ON. 2) The digital values written depend on the output range setting. In addition, if the scaling function is enabled, the D/A conversion is executed after scaling processing of the digital value is completed. 3) If the Intelligent function module is set to auto refresh digital output values, it is unnecessary to use this FB.
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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 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. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
CH1 Digital value	i_DA_ValueCH1	Word	-32,000~32,000 *1	Specify a digital value for CH1. *1 The allowable setting range depends on the scaling function and output range setting.
CH2 Digital value	i_DA_ValueCH2	Word	-32,000~32,000 *1	Specify a digital value for CH2. *1 The allowable setting range depends on the scaling function and output range setting.
CH3 Digital value	i_DA_ValueCH3	Word	-32,000~32,000 *1	Specify a digital value for CH3. *1 The allowable setting range depends on the scaling function and output range setting.
CH4 Digital value	i_DA_ValueCH4	Word	-32,000~32,000 *1	Specify a digital value for CH4. *1 The allowable setting range depends on the scaling function and output range setting.

Name (Comment)	Label name	Data type	Setting range	Description
CH5 Digital value	i_DA_ValueCH5	Word	-32,000~32,000 *1	Specify a digital value for CH5. *1 The allowable setting range depends on the scaling function and output range setting.
CH6 Digital value	i_DA_ValueCH6	Word	-32,000~32,000 *1	Specify a digital value for CH6. *1 The allowable setting range depends on the scaling function and output range setting.
CH7 Digital value	i_DA_ValueCH7	Word	-32,000~32,000 *1	Specify a digital value for CH7. *1 The allowable setting range depends on the scaling function and output range setting.
CH8 Digital value	i_DA_ValueCH8	Word	-32,000~32,000 *1	Specify a digital value for CH8. *1 The allowable setting range depends 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 instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the digital values are being written and there is no 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	2016/08	First edition

Note

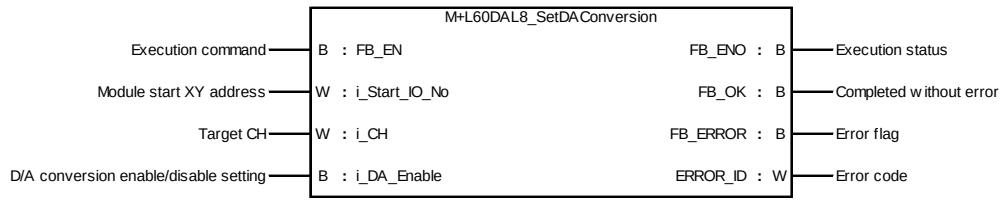
This chapter includes information related to the M+L60DAL8_WriteAllDAVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

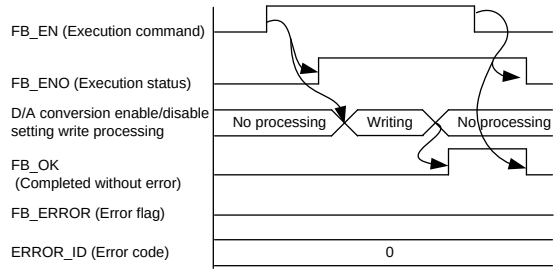
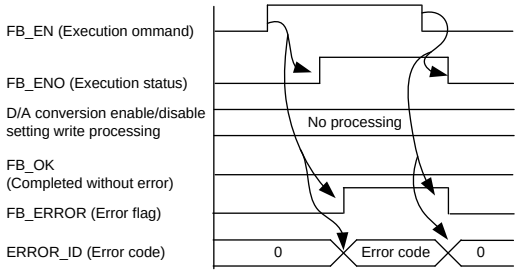
2.3 M+L60DAL8_SetDAConversion (D/A conversion enable/disable setting)

FB Name

M+L60DAL8_SetDAConversion

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Enable or disable D/A conversion for a specified channel or all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module.</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">305 steps (for MELSEC-L series 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) Enable or disable D/A conversion for a specified channel or all channels when the FB_EN (Execution command) signal is turned ON. 2) FB operation is one-shot only, triggered by the FB_EN (Execution command) signal. 3) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed. 4) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8 or 15.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8 or 15	Specify a CH number, 1 to 8 or 15. Use 15 to specify all CH.
D/A conversion enable/disable setting	i_DA_Enable	Bit	ON, OFF	ON: Enable D/A conversion OFF: Disable D/A conversion

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the D/A conversion disable/enable setting has been 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	2016/08	First edition

Note

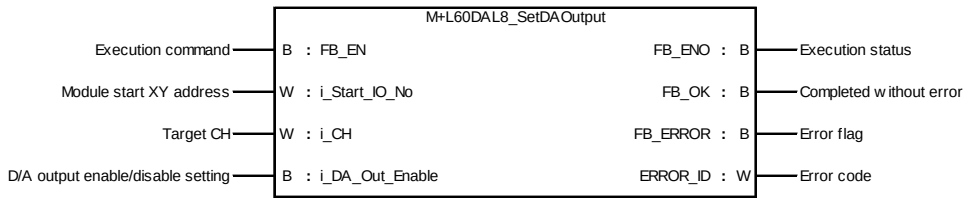
This chapter includes information related to the M+L60DAL8_SetDAConversion function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

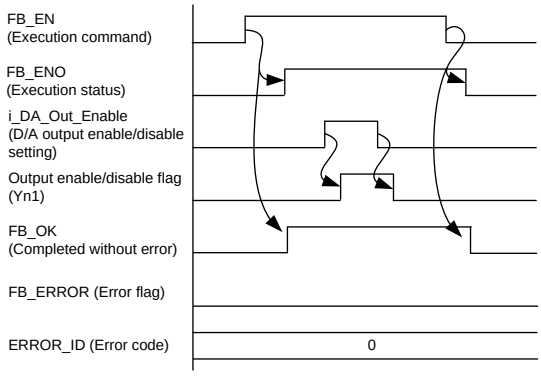
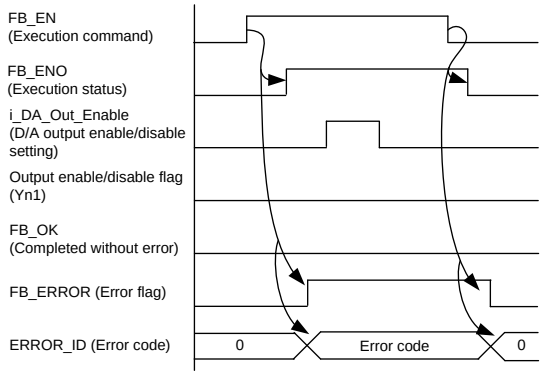
2.4 M+L60DAL8_SetDAOutput (D/A output enable/disable setting)

FB Name

M+L60DAL8_SetDAOutput

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Enable or disable D/A output for a specified channel or all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module.</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">278 steps (for MELSEC-L series 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) Enable or disable D/A output for a specified channel or all channels by turning on FB_EN (Execution command). 2) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z8, Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) Every input must be provided a value for proper FB operation. When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 8) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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 using CH1)  [When an error occurs] (When using CH1) 

Item	Description
Relevant manuals	•MELSEC-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8 or 15.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8 or 15	Specify a CH number, 1 to 8 or 15. Use 15 to specify all CH.
D/A output enable/disable setting	i_DA_Out_Enable	Bit	ON, OFF	ON: Enable D/A output OFF: Disable D/A output

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the D/A output disable/enable setting has been 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	2016/08	First edition

Note

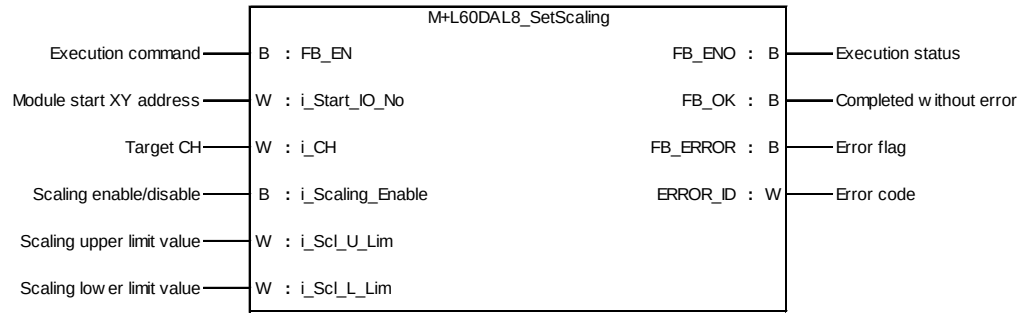
This chapter includes information related to the M+L60DAL8_SetDAOutput function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.5 M+L60DAL8_SetScaling (Scaling setting)

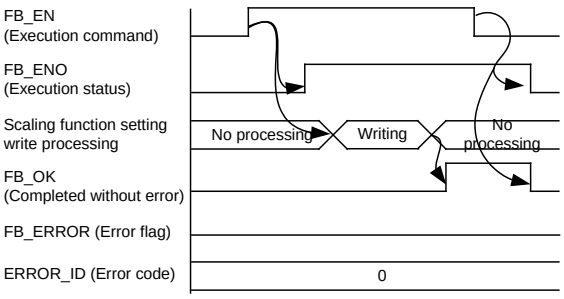
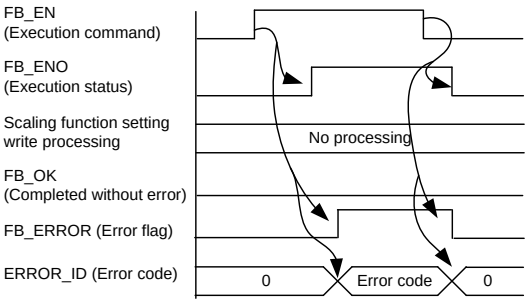
FB Name

M+L60DAL8_SetScaling

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Configure a specified channel's scaling function settings.</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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">300 steps (for MELSEC-L series 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) Configure a specified channel's scaling function settings by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN (Execution command) signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed. 4) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common). 8) In either of the following cases 1) and 2), no errors occur in this FB; however an error occurs in the module at an operating condition setting. Please read the MELSEC-L Digital-Analog Converter Module User's Manual for the errors on the module. 1) When a value set for i_Scl_U_Lim (Scaling upper limit value) or i_Scl_L_Lim (Scaling lower limit value) is out of the setting range 2) When a value equal to or greater than the value set for i_Scl_U_Lim (Scaling upper limit value) is set for i_Scl_L_Lim (Scaling lower limit value)
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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8	Specify the CH number.
Scaling enable/disable	i_Scaling_Enable	Bit	ON, OFF	ON: enabled OFF: disabled
Scaling upper limit value	i_Scl_U_Lim	Word	-32,000~32,000	Specify the scaling upper limit value.
Scaling lower limit value	i_Scl_L_Lim	Word	-32,000~32,000	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 instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the scaling function settings have been set.
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	2016/08	First edition

Note

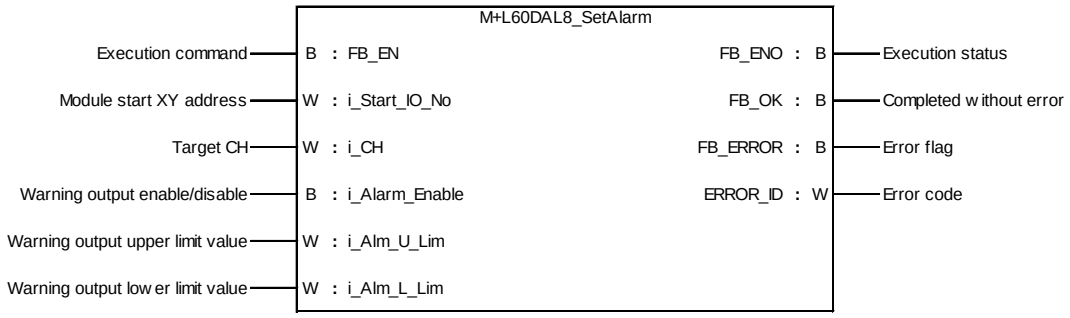
This chapter includes information related to the M+L60DAL8_SetScaling function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.6 M+L60DAL8_SetAlarm (Warning output setting)

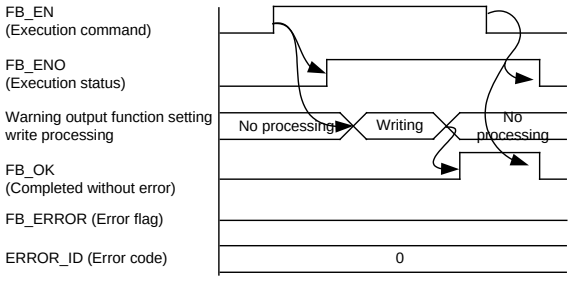
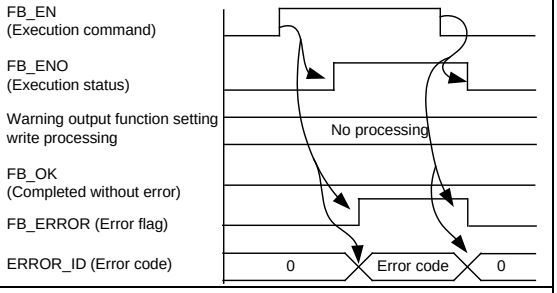
FB Name

M+L60DAL8_SetAlarm

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Configure the warning output settings for a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module.</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">279 steps (for MELSEC-L series 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) Configure the alarm warning output settings for a specified channel by turning on FB_EN (Execution command). 2) FB operation is one-shot only, triggered by the FB_EN (Execution command) signal. 3) The new setting will not take effect until the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed. 4) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. 8) For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common). 9) In the following case, no errors occur in this FB; however an error occurs in the module at an operating condition setting. Please read the MELSEC-L Digital-Analog Converter Module User's Manual for the errors on the module. • When a value equal to or greater than the value set for i_Alm_U_Lim (Warning output upper limit value) is set for i_Alm_L_Lim (Warning output lower limit value)
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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8	Specify the CH number.
Warning output enable/disable	i_Alarm_Enable	Bit	ON, OFF	ON: enable OFF: disable
Warning output upper limit value	i_Alm_U_Lim	Word	-32,768~32,767	Specify the warning output upper limit value.
Warning output lower limit value	i_Alm_L_Lim	Word	-32,768~32,767	Specify the warning output lower limit value.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the warning output setting is complete.
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	2016/08	First edition

Note

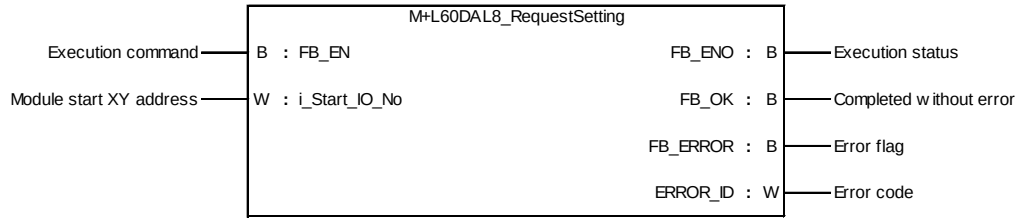
This chapter includes information related to the M+L60DAL8_SetAlarm function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

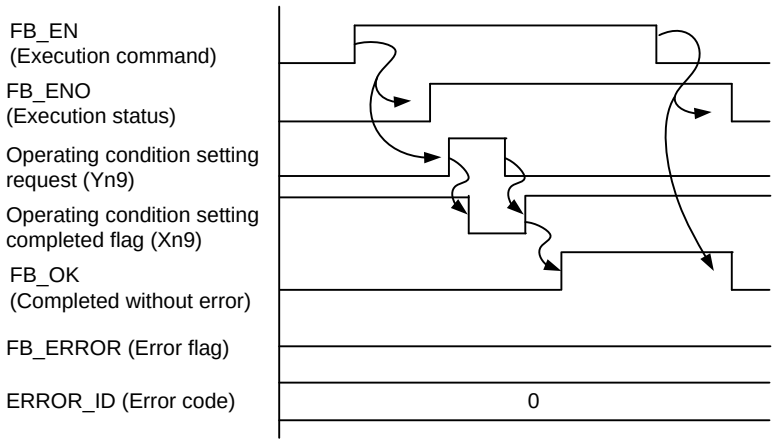
2.7 M+L60DAL8_RequestSetting (Operating condition setting request)

FB Name

M+L60DAL8_RequestSetting

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Make changes made to each function's operational condition settings effective (valid).</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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">293 steps (for MELSEC-L series 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) Make changes made to each function's operational condition settings effective by turning on FB_EN (Execution command). For the setting contents to be enabled, refer to MELSEC-L Digital-Analog Converter Module User's Manual. 2) When FB_EN (Execution command) is turned ON, the FB will continue to execute until the settings for each function are completed.
Compiling method	Macro type
Restrictions and precautions	1) When this FB is executed while the L60DAIL8 or L60DAVL8 is being operated, D/A conversion is stopped. The D/A output before the stop is held. The conversion restarts after FB_OK (Completed without error) 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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) The FB cannot be used in an interrupt program. 5) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 8) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 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. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the operating condition settings have been 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	2016/08	First edition

Note

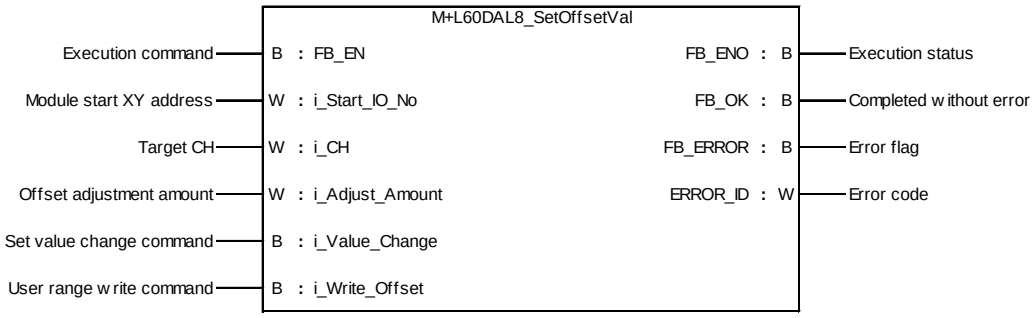
This chapter includes information related to the M+L60DAL8_RequestSetting function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.8 M+L60DAL8_SetOffsetVal (Offset setting)

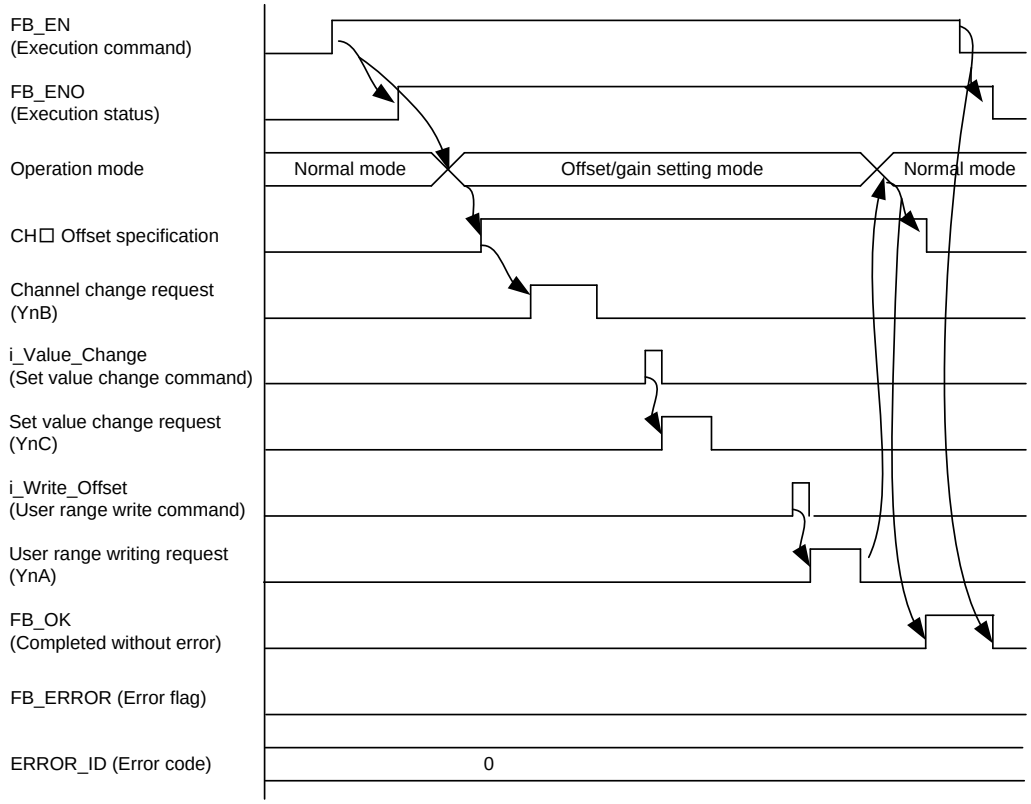
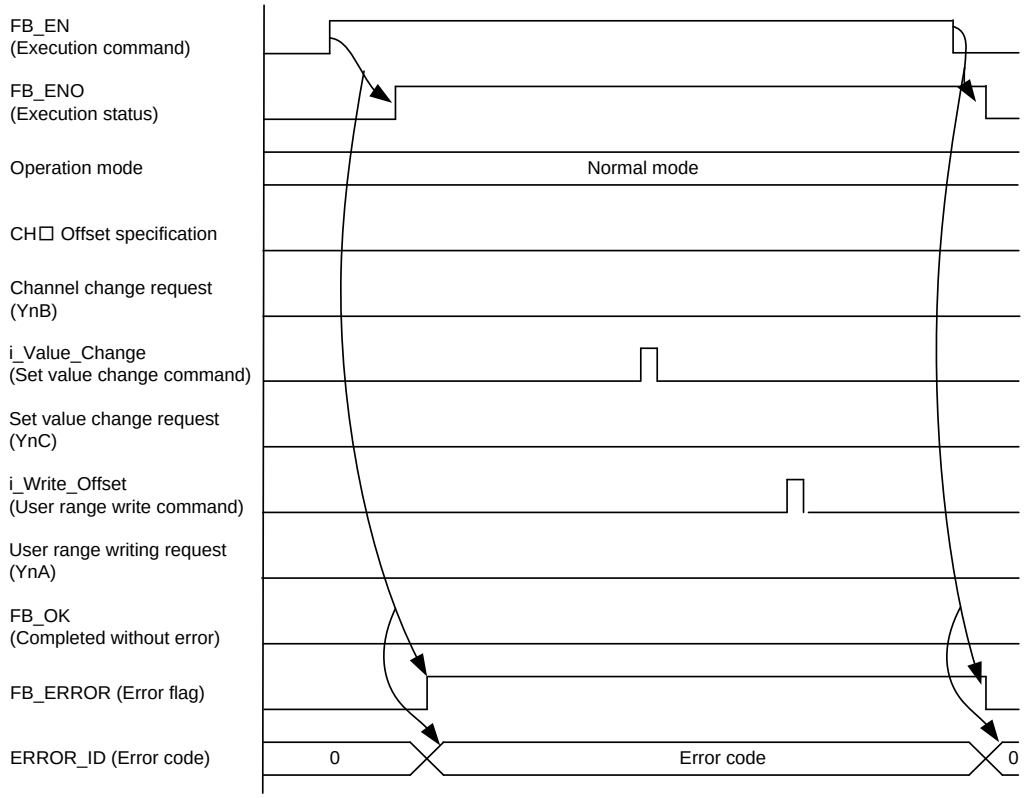
FB Name

M+L60DAL8_SetOffsetVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the offset value of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module.</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">470 steps (for MELSEC-L series 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) Set the offset value of a specified channel by turning on FB_EN (Execution command). 2) To write the offset value, FB_EN (Execution command), i_Write_Offset (User range write command), and i_Value_Change (Set value change command) must be ON. 3) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The D/A conversion process is interrupted by executing this FB. After the FB execution is complete and FB_OK (Completed without error) turns ON, the D/A conversion process will resume. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) Externally implement an interlock to prevent the following FBs from being executed simultaneously. Do not use two or more of these FBs simultaneously. When these FBs are executed simultaneously, the offset or gain cannot be set properly. • M+L60DAL8_SetOffsetVal • M+L60DAL8_SetGainVal 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 8) This FB uses the Y signals (YA, YB, and YC). Thus, when this FB is used together with the gain setting FB (M+L60DAL8_SetGainVal), a duplicated coil warning may occur during compile operation. However this is not a problem and the FB will operate without errors. 9) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application Examples"

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

Item	Description
Relevant manuals	•MELSEC-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8	Specify the CH number.
Offset adjustment amount	i_Adjust_Amount	Word	-3,000~3,000	Specify the D/A output offset adjustment value.
Set value change command	i_Value_Change	Bit	ON, OFF	Turn ON to change the D/A output to reflect changes made to the offset value. Please turn OFF after changing the offset.
User range write command	i_Write_Offset	Bit	ON, OFF	ON: The user range will be written. OFF: Nothing will be written.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that writing of the offset value has 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	2016/08	First edition

Note

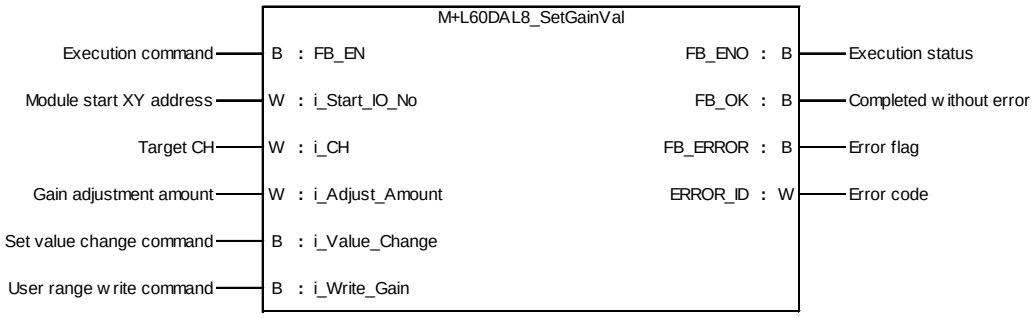
This chapter includes information related to the M+L60DAL8_SetOffsetVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.9 M+L60DAL8_SetGainVal (Gain setting)

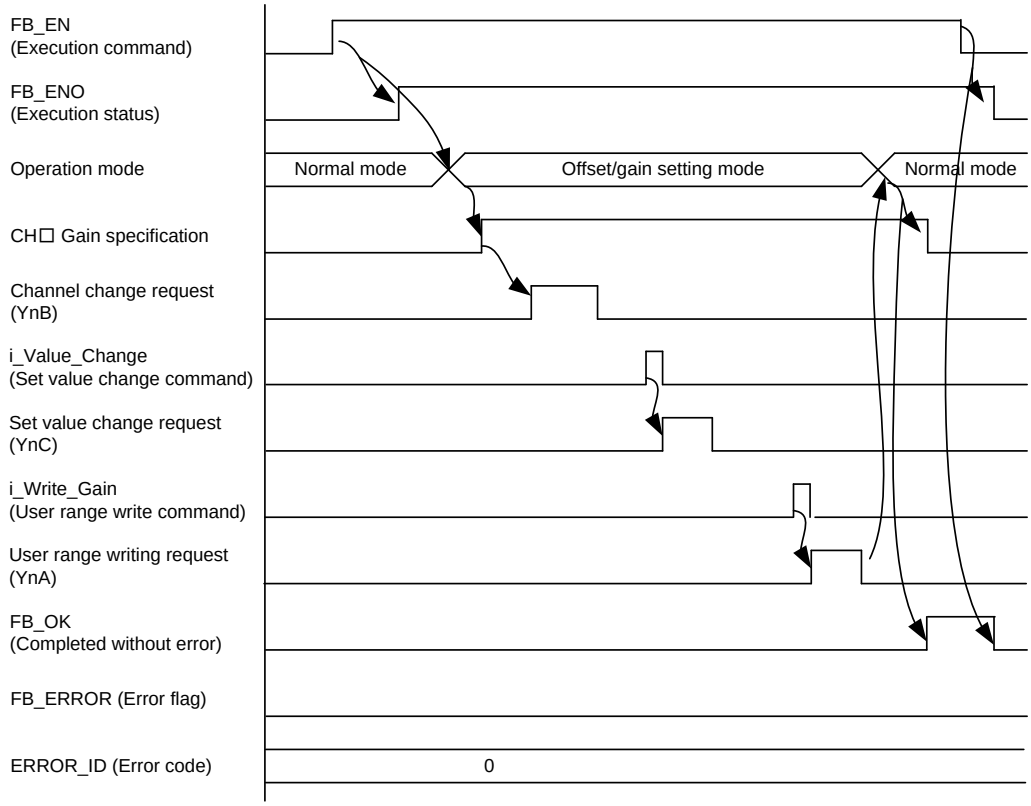
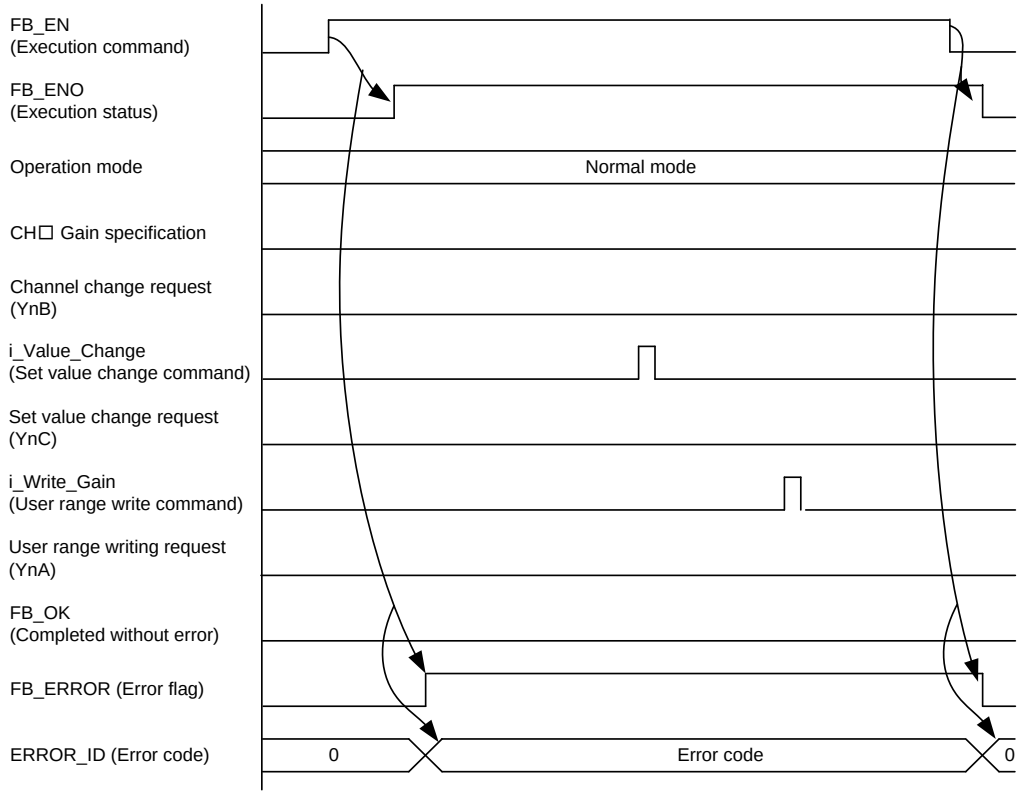
FB Name

M+L60DAL8_SetGainVal

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Set the gain value of a specified channel.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module.</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">438 steps (for MELSEC-L series 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) Set the gain value of a specified channel by turning on FB_EN (Execution command). 2) To write the gain value, FB_EN (Execution command), i_Write_Offset (User range write command), and i_Value_Change (Set value change command) must be ON. 3) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns on, processing is interrupted, and the error code is stored in ERROR_ID (Error code). Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and precautions	1) The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. 2) The FB cannot be used in an interrupt program. 3) Please ensure that the FB_EN (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) Externally implement an interlock to prevent the following FBs from being executed simultaneously. Do not use two or more of these FBs simultaneously. When these FBs are executed simultaneously, the offset or gain cannot be set properly. • M+L60DAL8_SetOffsetVal • M+L60DAL8_SetGainVal 5) This FB uses index registers Z7, Z8, and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided a value for proper FB operation. 7) If the parameter is set using GX Configurator-D/A or the configuration function of GX Works 2, using this FB is unnecessary. 8) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 9) This FB uses the Y signals (YA, YB, and YC). Thus, when this FB is used together with the offset setting FB (M+L60DAL8_SetOffsetVal), a duplicated coil warning may occur during compile operation. However this is not a problem and the FB will operate without errors. 10) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1 - FB Library Application Examples"

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

Item	Description
Relevant manuals	•MELSEC-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Target CH	i_CH	Word	1~8	Specify the CH number.
Gain adjustment amount	i_Adjust_Amount	Word	-3,000~3,000	Specify the D/A output gain adjustment value.
Set value change command	i_Value_Change	Bit	ON, OFF	Turn ON to change the D/A output to reflect changes made to the offset value. Please turn OFF after changing the offset.
User range write command	i_Write_Gain	Bit	ON, OFF	ON: The user range will be written. OFF: Nothing will be written.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction 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	2016/08	First edition

Note

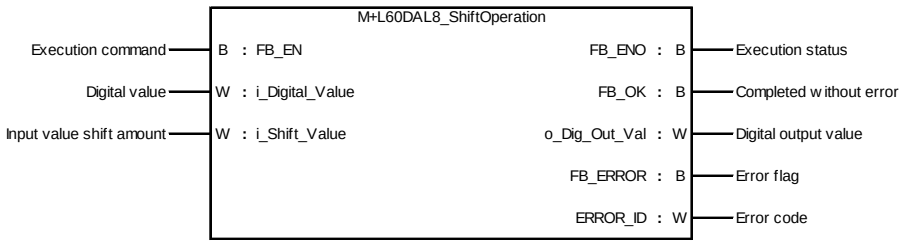
This chapter includes information related to the M+L60DAL8_SetGainVal function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

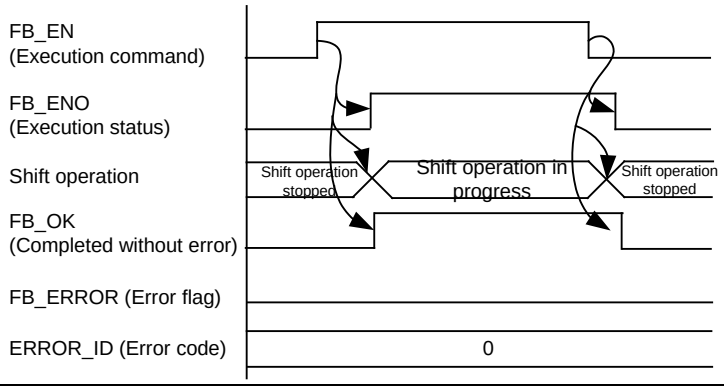
2.10 M+L60DAL8_ShiftOperation (Shift operation)

FB Name

M+L60DAL8_ShiftOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Add the desired shift amount to a 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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">183 steps (for MELSEC-L series 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) The input value shift amount is added to the digital value by turning on FB_EN (Execution command). 2) When the addition result is -32768 or less, the digital output value remains -32768. When the addition result is 32767 or greater, the digital output value remains 32767.
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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) Every input must be provided a value for proper FB operation. 5) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common). 6) The o_Dig_Out_Val(Digital output value) is valid while FB_OK (Completed without error) is ON. 7) o_Dig_Out_Val(Digital output value) is cleared to zero when FB_EN (Execution command) turns OFF.
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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 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	-32,768~32,767	Specify the digital value
Input value shift amount	i_Shift_Value	Word	-32,768~32,767	Specify the shift amount

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	Turns ON while performing shift operations.
Digital output value	o_Dig_Out_Val	Word	0	The result of adding i_Shift_Value and i_Digital_Value.
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	2016/08	First edition

Note

This chapter includes information related to the M+L60DAL8_ShiftOperation function block.

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

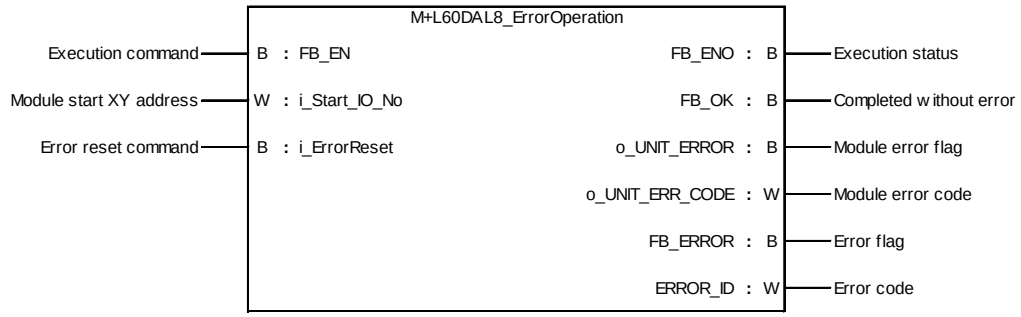
Before using any Mitsubishi products, please read all relevant manuals.

2.11 M+L60DAL8_ErrorOperation (Error operation)

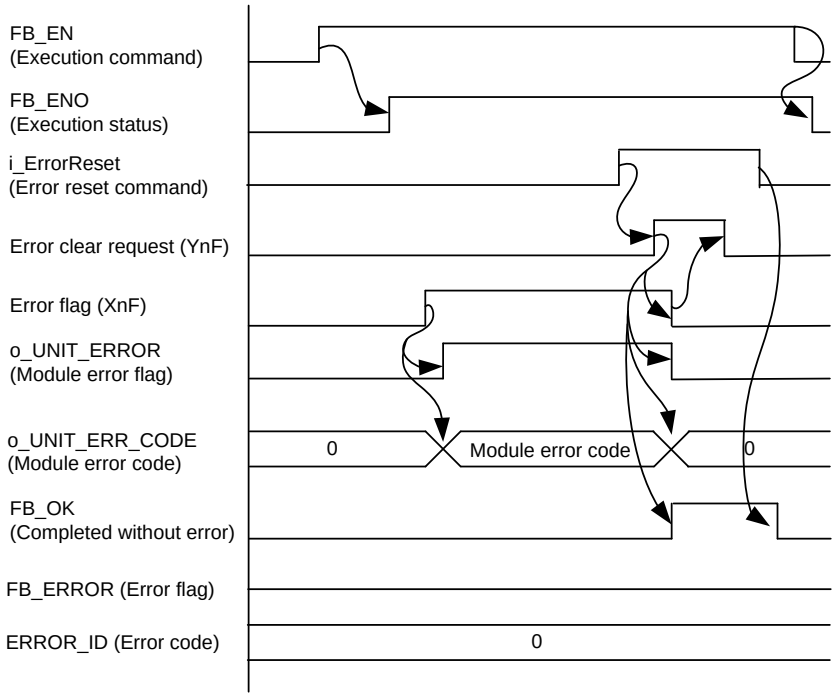
FB Name

M+L60DAL8_ErrorOperation

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Perform monitoring and reset of intelligent function module error codes.</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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">312 steps (for MELSEC-L series 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 current error code in the target intelligent function module is output. 2) After turning ON FB_EN (Execution command), the error may be reset by turning ON i_ErrorReset (Error reset command) during the 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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index registers Z8, and Z9. Please do not use these index registers in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) When this FB is used in two or more places, a duplicated coil warning will occur during compile operation due to the Y signal being operated by index modification. However this is not a problem and the FB will operate without error. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 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. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.
Error reset command	i_ErrorReset	Bit	ON, OFF	Turn ON to perform an error reset. After error reset is completed, please turn this input OFF.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. (Module errors are being monitored.) OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the error reset is completed.
Module error flag	o_UNIT_ERROR	Bit	OFF	When ON, it indicates the presence of a module error.
Module error code	o_UNIT_ERR_CODE	Word	0	Specified module error code output.
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	2016/08	First edition

Note

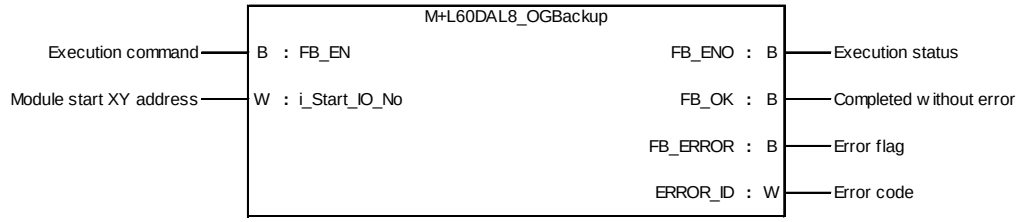
This chapter includes information related to the M+L60DAL8_ErrorOperation function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.12 M+L60DAL8_OGBackup (Offset/gain value save)

FB Name

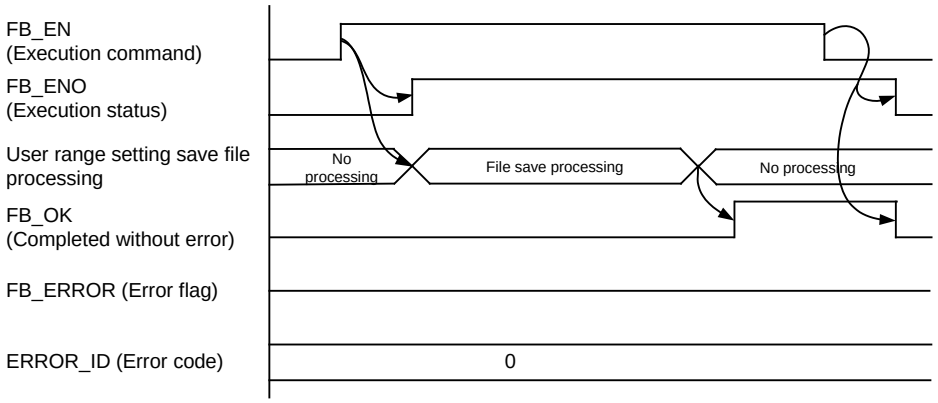
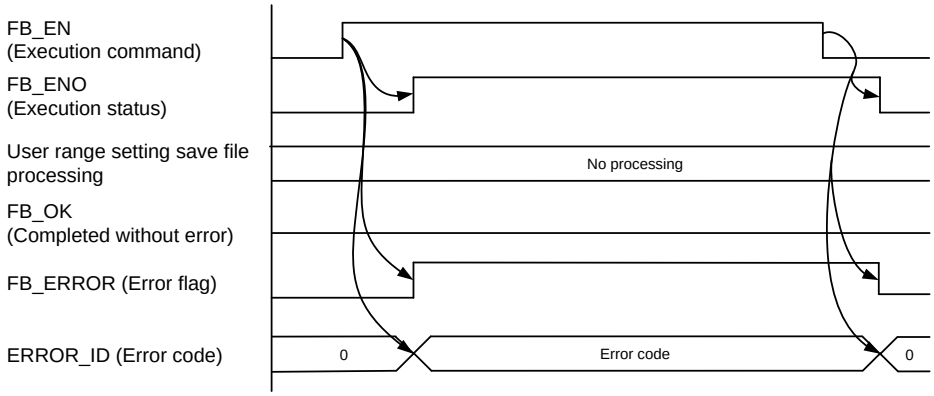
M+L60DAL8_OGBackup

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Read the offset and gain values from the user range setting, and save to file.</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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td>MELSEC-L Series</td><td>LCPU *</td></tr>
</table>
* Only the model that has the SD memory card slot is applicable.
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">571 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning on FB_EN (Execution command), the offset and gain user range settings are read from the CPU module and saved to a file on the SD memory card. 2) FB operation is one-shot only, triggered by the FB_EN (Execution command) signal. 3) The name of the file which this FB creates is "LDAL" + "Module start XY address" + ".BIN". [File name example] When the module start XY address is H0120, the file name is "LDAL0120.BIN". 4) When a file with the same name exists in the SD memory card, the existing file is replaced with a new BIN file created by this FB. 5) When the installed SD memory card does not have enough capacity or when the number of files to be created exceeds the number of storable files *1, a CPU error *2 occurs. *1 For information on the size of the SD memory card and the number of files that can be saved, refer to MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection). *2 Setting the operation status of the CPU module (RUN/STOP) when an access error to the SD memory card occurs is available with parameters.
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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 5) Every input must be provided a value for proper FB operation. 6) Do not use this FB when the CPU module that does not have an SD memory slot is used. Even if used with such a CPU module, this FB does not operate. 7) If this FB is executed while the protect switch of the SD memory card is set to ON, the offset/gain value cannot be saved. In this case, FB_ERROR (Error flag) turns ON and the processing is interrupted. The error code 31 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 8) When this FB is executed without an SD memory card on the CPU module, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 33 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 9) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) being OFF (Remove/insert enabled), which can be set by sliding the SD memory card disabling switch upward, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 35 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 10) When this FB is executed with SM606 (SD memory card forced disable instruction) ON, the SP.FWRITE instruction is not processed and the offset/gain value cannot be saved. In this case, FB_ERROR (Error flag) turns ON and the processing is interrupted. The error code 36 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 11) When this FB is executed with the SD memory card accessed by, for example, the data logging function of the LCPU, the time for completing this FB may extend or a timeout error (Error code 40 (Decimal)) may occur. For details, refer to Section 13.2.4 Troubleshooting on the entire system during operation of the data logging function of QnUDVCPU/LCPU User's Manual (Data Logging Function). 12) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).

Item	Description
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]  [When an error occurs] 
Relevant manuals	•MELSEC-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
31 (Decimal)	SM601 (Memory card protect flag) is ON (Write disable) and writing to the SD memory card is unavailable.	Set the protect switch of the SD memory card to OFF (Write enable). Execute the FB again after confirming that SM601 turns OFF.
33 (Decimal)	An attempt was made to execute this FB without inserting an SD memory card in the CPU module.	Insert an SD memory card, which saves the target file, on the CPU module and please try again.

35 (Decimal)	Not possible to access the SD memory card because SM605 (Memory card remove/insert prohibit flag) is off (Remove/insert enabled).	Slide the SD memory card lock switch down to turn on SM605 (Memory card remove/insert prohibit flag) (Remove/insert prohibited), and please try again.
36 (Decimal)	Not possible to access the SD memory card because SM606 (SD memory card forced disable instruction) is on.	Turn OFF SM606 (SD memory card forced disable instruction) (disable the SD memory card forced disable instruction), confirm that SM607 (SD memory card use force stop condition flag) is OFF, and please try again.
40 (Decimal)	The offset/gain value saving processing timeout occurred because accesses to the SD memory card were frequently made in addition to this FB.	Reduce the frequency of the access processing to the SD memory card.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the file save 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	2016/08	First edition

Note

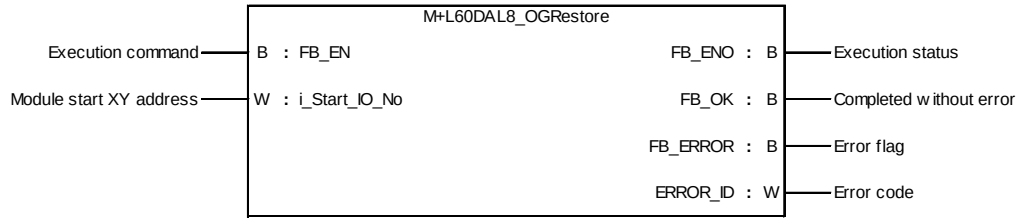
This chapter includes information related to the M+L60DAL8_OGBackup function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.13 M+L60DAL8_OGRestore (Offset/gain value restore)

FB Name

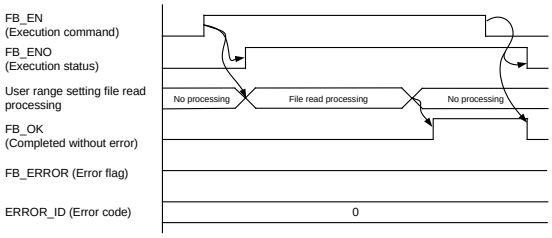
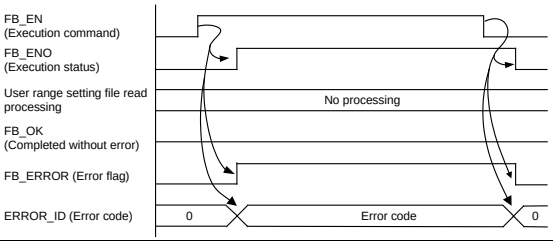
M+L60DAL8_OGRestore

Function Overview

<table>
<tr><td>Item</td><td colspan="2">Description</td></tr>
<tr><td>Function overview</td><td colspan="2">Restore the user range offset / gain settings to a module from a file.</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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU *</td></tr></table>* Only the model that has the SD memory card slot is applicable.</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">593 steps (for MELSEC-L series CPU)
* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</td></tr>
</table>

Item	Description
Function description	1) By turning on FB_EN (Execution command), the offset and gain user range settings are read from the CPU module SD memory card and restored to the module. 2) FB operation is one-shot only, triggered by the FB_EN (Execution command) signal. 3) This FB can only be operated when the conversion enable/disable settings of all CH are disabled. 4) Only execute this FB after the M+L60DAL8_OGBackup (Offset/gain value save) FB has been executed. When reading a file created other than by M+L60DAL8_OGBackup, a module error (Error code: 163) occurs. 5) The name of the file which this FB reads from the SD memory card is "LDAL" + "Module start XY address" + ".BIN". [File name example] When the module start XY address is H0120, the file name to be read is "LDAL0120.BIN". 6) When no target file containing the user range setting exists in the installed SD memory card, a CPU error *1 occurs. *1 Setting the operation status of the CPU module (RUN/STOP) when an access error to the SD memory card occurs is available with parameters.
Compiling method	Macro type

Item	Description
Restrictions and precautions	1) Please only execute this FB after all CH are disabled (A/D conversion enable/disable setting). Digital output values may change suddenly if a CH is enabled. 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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) The FB cannot be used in an interrupt program. 5) This FB uses index register Z9. Please do not use Z9 in an interrupt program. 6) This FB cannot restore the user range setting from a file created other than by M+L60DAL8_OGBackup. 7) Every input must be provided a value for proper FB operation. 8) Do not use this FB when the CPU module that does not have an SD memory slot is used. Even if used with such a CPU module, this FB does not operate. 9) When this FB is executed without an SD memory card on the CPU module, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 33 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 10) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) being OFF (Remove/insert enabled), which can be set by sliding the SD memory card disabling switch upward, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 35 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 11) When this FB is executed with SM606 (SD memory card forced disable instruction) being ON, the SP.FREAD instruction is not processed and the offset/gain value cannot be restored. In this case, FB_ERROR (Error flag) turns ON and the processing is interrupted. The error code 36 (Decimal) is stored in ERROR_ID (Error code). Refer to the error code explanation section for details. 12) When this FB is executed with the SD memory card accessed by, for example, the data logging function of the LCPU, the time for completing this FB may extend or a timeout error (Error code 40 (Decimal)) may occur. For details, refer to Section 13.2.4 Troubleshooting on the entire system during operation of the data logging function of QnUDVCPU/LCPU User's Manual (Data Logging Function). 13) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation Manual (Common).

Item	Description
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]  [When an error occurs] 
Relevant manuals	•MELSEC-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
33 (Decimal)	An attempt was made to execute this FB without inserting an SD memory card in the CPU module.	Insert an SD memory card, which saves the target file, on the CPU module and please try again.
35 (Decimal)	Not possible to access the SD memory card because SM605 (Memory card remove/insert prohibit flag) is off (Remove/insert enabled).	Slide the SD memory card lock switch down to turn on SM605 (Memory card remove/insert prohibit flag) (Remove/insert prohibited), and please try again.
36 (Decimal)	Not possible to access the SD memory card because SM606 (SD memory card forced disable instruction) is on.	Turn OFF SM606 (SD memory card forced disable instruction) (disable the SD memory card forced disable instruction), confirm that SM607 (SD memory card use force stop condition flag) is OFF, and please try again.
40 (Decimal)	The offset/gain value reading processing timeout occurred because accesses to the SD memory card were frequently made in addition to this FB.	Reduce the frequency of the access processing to the SD memory card.
90 (Decimal)	The conversion setting of at least one channel is still enabled.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted.

●Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution instruction is ON. OFF: Execution instruction is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the file restore has been 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	2016/08	First edition

Note

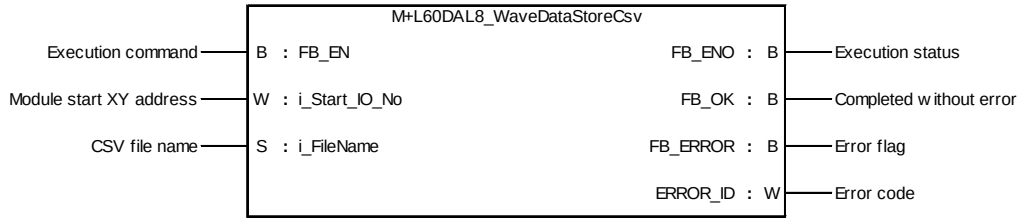
This chapter includes information related to the M+L60DAL8_OGRestore function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.14 M+L60DAL8_WaveDataStoreCsv (Read wave data (CSV file))

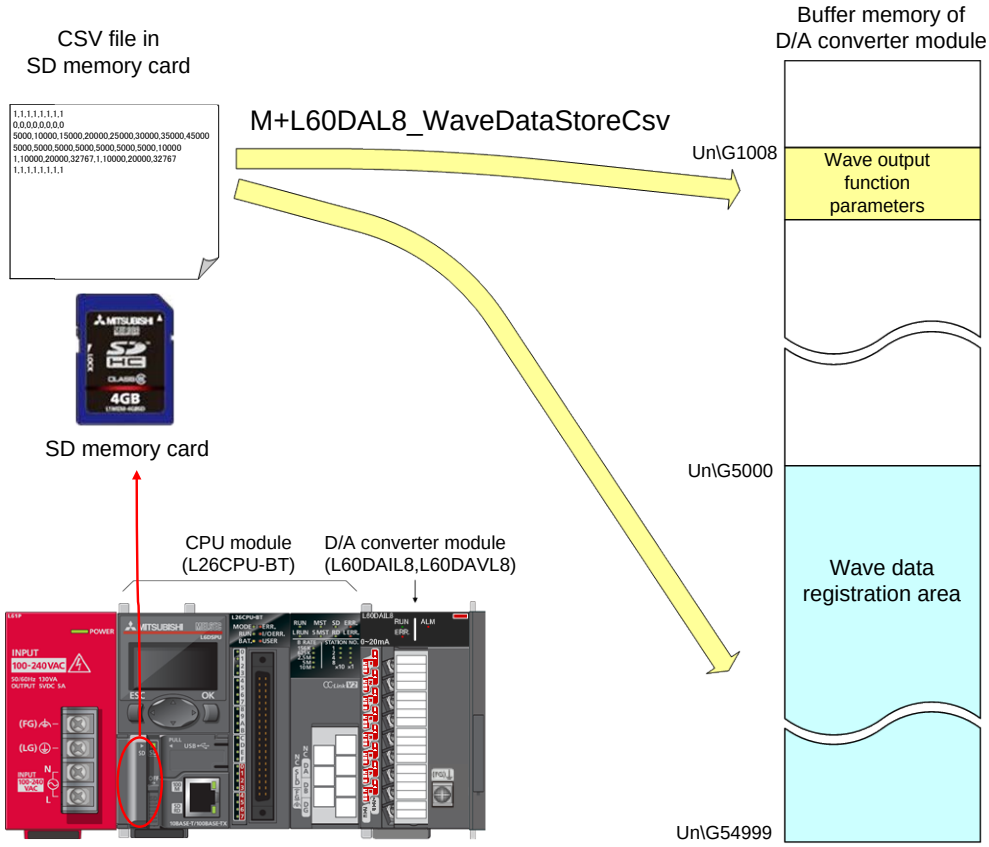
FB Name

M+L60DAL8_WaveDataStoreCsv

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Read the wave output function parameters and wave data (wave data points and wave data) from the CSV file, and write 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>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td>
<table>
<tr><th>Series</th><th>Model</th></tr>
<tr><td>MELSEC-L Series</td><td>LCPU *</td></tr>
</table>
* Only the model that has the SD memory card slot is applicable.
</td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1
<table>
<tr><th>Language</th><th>Software version</th></tr>
<tr><td>Japanese version</td><td>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant manuals".
</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">1134 steps (for MELSEC-L series 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) When FB_EN (Execution command) is turned ON, the parameters and wave data of the wave output function is read from the CSV file stored in the SD memory card inserted in the CPU module and stored in the buffer memory of the L60DAIL8 or L60DAVL8.



For information on the wave output function, refer to MELSEC-L Digital-Analog Converter Module User's Manual.

2) The read parameters of the wave output function will take effect the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed.

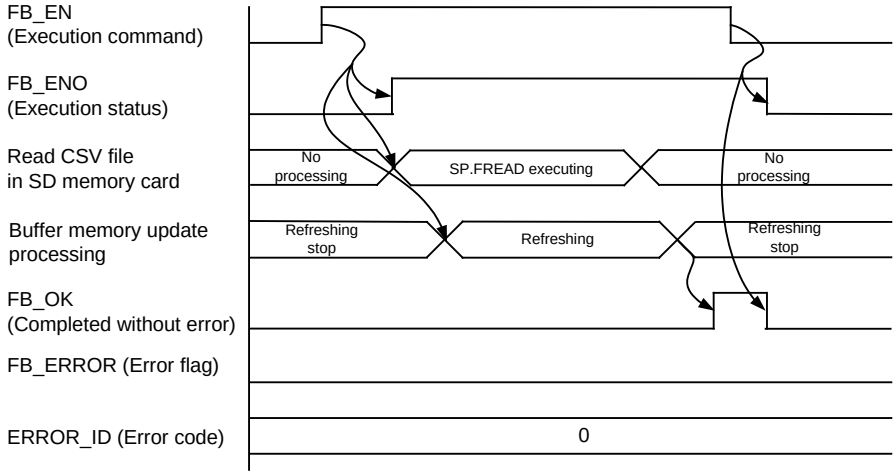
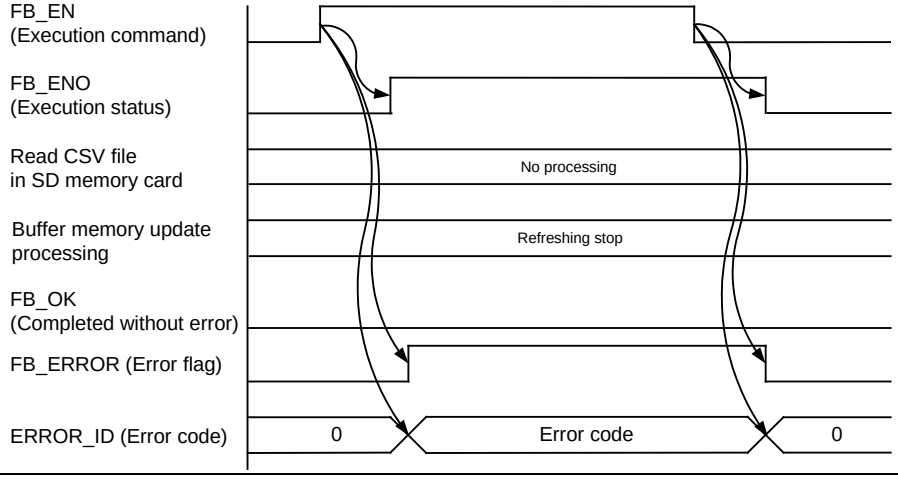
3) The wave output function parameters/data handled by this FB and the storage destination buffer memory addresses are described in "Table 1 Storage sources (wave output function parameters/data) and storage destination buffer memory". The parameters/data described in the table must be written in a file according to "CSV File Format for Wave Data Read (CSV File) FB", and this file must be saved in the root folder (directory) of the SD memory card beforehand.

This FB firstly reads all wave output function parameters from the CSV file and stores them in Un\G1008 and subsequent buffer memory addresses. Then, it reads the "wave data" from 101st row for the number of points specified with "Wave data points" in 100th row, and stores them in the start address (Un\G5000) and subsequent addresses of the

Item	Description
	wave data registration area buffer memory. A CSV file of the wave output function can be easily created by using the "Create Wave Output Data" tool of GX Works2. 4) If the CSV file specified with i_FileName (CSV file name) does not exist in the SD memory card inserted in the CPU module, a CPU error (error code: 2410) will occur. *When a CPU error causes a stop error in the CPU module, FB_ERROR (Error flag) and ERROR_ID (Error code) is not updated. The CPU operation state (continue/stop) for when a CPU error occurs can be set in [PLC RAS]*1. *1 [Parameter] -> [PLC Parameter] -> [PLC RAS] -> "Operating Mode When There is an Error" -> "File Access Error" 5) If FB_EN (Execution command) is turned off before the FB operation is completed, processing is interrupted. In this case, the data already stored in the buffer memory is not cleared. When the FB is re-executed, the read operation is performed again. 6) This FB is available only when "Output mode setting" is set to "Wave output mode". 7) Do not remove the SD memory card during execution of this FB. For information on how to insert/remove an SD memory card, refer to MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection).
Compiling method	Macro type

Item	Description
Restrictions and precautions	1) This FB requires many scans to complete the processing and thus it takes so long to complete the processing. It is recommended to execute this FB during warm-up operation of L60DAIL8, L60DAVL8. 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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) This FB uses a SP.FREAD instruction. Therefore, if an error occurs during execution of the SP.FREAD instruction, a CPU error occurs. 7) Do not use this FB when the CPU module that does not have an SD memory slot is used. Even if used with such a CPU module, this FB does not operate. 8) When this FB is executed without an SD memory card on the CPU module, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 33 (Decimal) is stored in ERROR_ID (Error code). This error is the same as the error code 10 (Decimal) of M+L60DA4_WaveDataStoreCsv, which is for the MELSEC-L D/A converter module (L60DA4). Refer to the error code explanation section for details. 9) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) being OFF (Remove/insert enabled), which can be set by sliding the SD memory card disabling switch upward, FB_ERROR (Error flag) is turned ON and the processing is interrupted. The error code 35 (Decimal) is stored in ERROR_ID (Error code). This error is the same as the error code 20 (Decimal) of M+L60DA4_WaveDataStoreCsv, which is for the MELSEC-L D/A converter module (L60DA4). Refer to the error code explanation section for details.

Item	Description
	10) When this FB is executed with SM606 (SD memory card forced disable instruction) being ON, the SP.FREAD instruction is not processed and the wave data cannot be read. In this case, FB_ERROR (Error flag) turns ON and the processing is interrupted. The error code 36 (Decimal) is stored in ERROR_ID (Error code). This error is the same as the error code 30 (Decimal) of M+L60DA4_WaveDataStoreCsv, which is for the MELSEC-L D/A converter module (L60DA4). Refer to the error code explanation section for details. 11) When this FB is executed with the SD memory card accessed by, for example, the data logging function of the LCPU, the time for completing this FB may extend or a timeout error (Error code 40 (Decimal)) may occur. For details, refer to Section 13.2.4 Troubleshooting on the entire system during operation of the data logging function of QnUDVCPU/LCPU User's Manual (Data Logging Function). 12) When two or more of these FBs are used, they cannot be used simultaneously. 13) Every input must be provided with a value for proper FB operation. 14) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •QnUDVCPU/LCPU User's Manual (Data Logging Function) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action

33 (Decimal)	An attempt was made to execute this FB without inserting an SD memory card in the CPU module.	Insert an SD memory card, which saves the target CSV file, on the CPU module and please try again. Or, insert a usable SD memory card in the CPU module, save the target CSV file in the SD memory card by using [Write PLC User Data] of GX Works2, and please try again.
35 (Decimal)	Not possible to access the SD memory card because SM605 (Memory card remove/insert prohibit flag) is off (Remove/insert enabled).	Slide the SD memory card lock switch down to turn on SM605 (Memory card remove/insert prohibit flag) (remove/insert prohibited), and please try again.
36 (Decimal)	Not possible to access the SD memory card because SM606 (SD memory card forced disable instruction) is on.	Turn OFF SM606 (SD memory card forced disable instruction) (disable the SD memory card forced disable instruction), confirm that SM607 (SD memory card use force stop condition flag) is OFF, and please try again.
40 (Decimal)	The wave data reading processing timeout occurred because accesses to the SD memory card were frequently made in addition to this FB.	Reduce the frequency of the access processing to the SD memory card.
Error codes other than above	CPU module error code	For details on the error codes, refer to Appendix 1 Error Code Lists in the MELSEC-L CPU Module 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. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted. (For example, enter H10 for X10.)
CSV file name	i_FileName	Character string	12 characters or less	Specify the name of the CSV file that stores the wave output function parameters and wave data. (Only CSV file is valid.) For details on CSV file format, refer to CSV File Format for Wave Data Read (CSV File) FB.

●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 wave output function parameters and wave data from the CSV file to the buffer memory of the L60DAIL8 or L60DAVL8 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	2016/08	First edition

Note

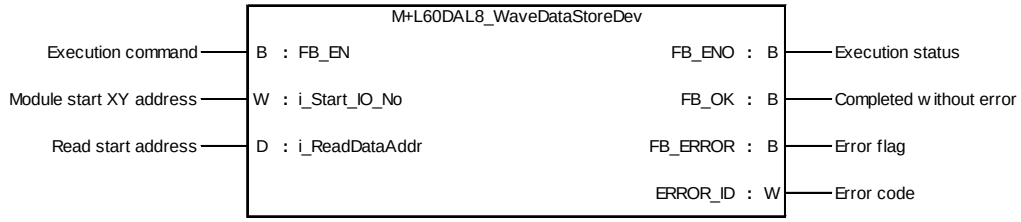
This chapter includes information related to the M+L60DAL8_WaveDataStoreCsv function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

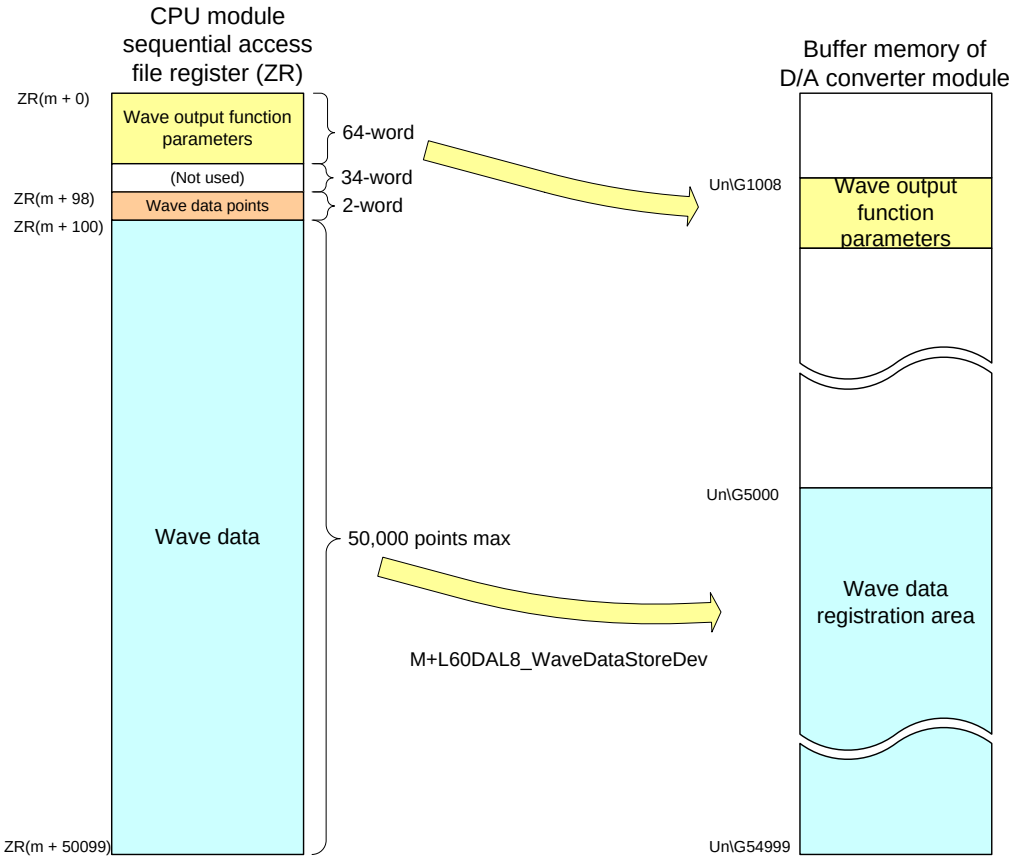
2.15 M+L60DAL8_WaveDataStoreDev (Read wave data (device))

FB Name

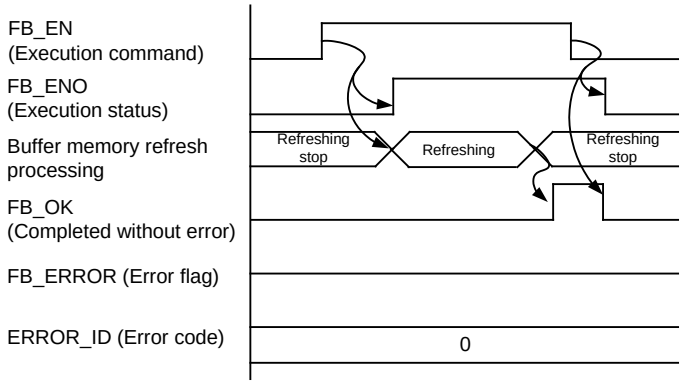
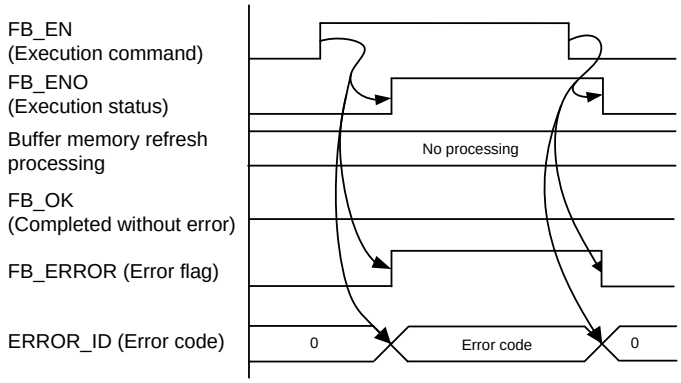
M+L60DAL8_WaveDataStoreDev

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Read the wave output function parameters and wave data (wave data points and wave data) from the file register (ZR), and write them to the buffer memory of the L60DAIL8 or L60DAVL8.</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>L60DAIL8, L60DAVL8
* Applicable to D/A converter module whose first five digits of the product information are "14041" or later</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">572 steps (for MELSEC-L series 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) When FB_EN (Execution command) is turned ON, read the wave output function parameters and wave data from the sequential access file register (ZR) and they are stored in the buffer memory of the D/A converter module.  For information on the wave output function, refer to MELSEC-L Digital-Analog Converter Module User's Manual. 2) The read parameters of the wave output function will take effect the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed. 3) The wave output function parameters/data handled by this FB and the storage destination buffer memory addresses are described in "Table 1 Storage sources (wave output function parameters/data) and storage destination buffer memory" in Appendix 2. The parameters/data described in the table must be saved in the file register (ZR) indicated in the "storage sources" column beforehand. This FB firstly reads the wave output function parameters from ZR(m+0) that is specified with i_ReadDataAddr (Read start address), and then stores them in Un\G1008 and subsequent buffer memory addresses. Then, it reads the "wave data" from ZR(m+100) for the number of points specified with "Wave data points" of ZR(m+98,99), and stores them in the wave data registration area's start address (Un\G5000) and subsequent buffer memory addresses.

Item	Description
	A CSV file of the wave output function can be easily created by using the "Create Wave Output Data" tool of GX Works2. *m: File register (ZR) read start address. To secure desired points of the file register and allocate data to the desired addresses, specify the points with [PLC File] *1 and specify the device points of the file register (ZR) with [Device] *2. *1 [Parameter] -> [PLC Parameter] -> [PLC File] -> "File Register" *2 [Parameter] -> [PLC Parameter] -> [Device] -> "File Register Extended Setting" 4) For file register (ZR), make sure to secure "Wave data points" + 100 (points) or more. If this FB is executed when the points of the file register (ZR) specified with i_ReadDataAddr (Read start address) is less than "Wave data points" of ZR (m+98, 99) + 100 (points), then the applicable range of the file register (ZR) will be exceeded and a CPU error (error code: 4101) will occur. 5) This FB is available only when "Output mode setting" is set to "Wave output mode". 6) If FB_EN (Execution command) is turned off before the FB operation is completed, the processing is interrupted. In this case, the data already stored in the buffer memory is not cleared. When the FB is re-executed, the read operation is performed again.
Compiling method	Macro type
Restrictions and precautions	1) This FB requires many scans to complete the processing and thus it takes so long to complete the processing. It is recommended to execute this FB during warm-up operation of L60DAIL8, L60DAVL8. 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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 5) This FB uses index registers Z7, Z8 and 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 executed simultaneously. 7) Every input must be provided with a value for proper FB operation. 8) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 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 L60DAIL8, L60DAVL8 module is mounted. (For example, enter H10 for X10.)
Read start address	i_ReadDataAddr	Double word	Valid device range	Specify the start address of the file register (ZR) that stores the wave output function parameters and wave data.

●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 wave output function parameters and wave data from 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	2016/08	First edition

Note

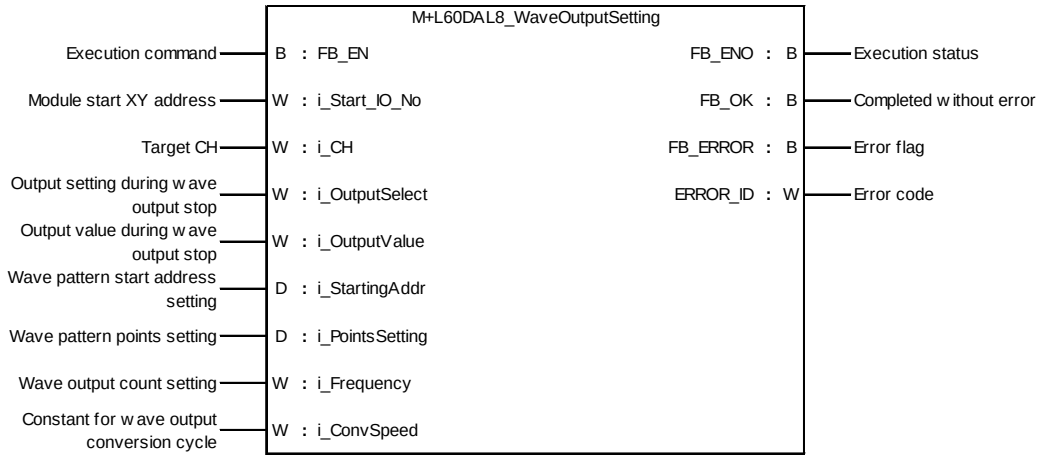
This chapter includes information related to the M+L60DAL8_WaveDataStoreDev function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.16 M+L60DAL8_WaveOutputSetting (Wave output setting)

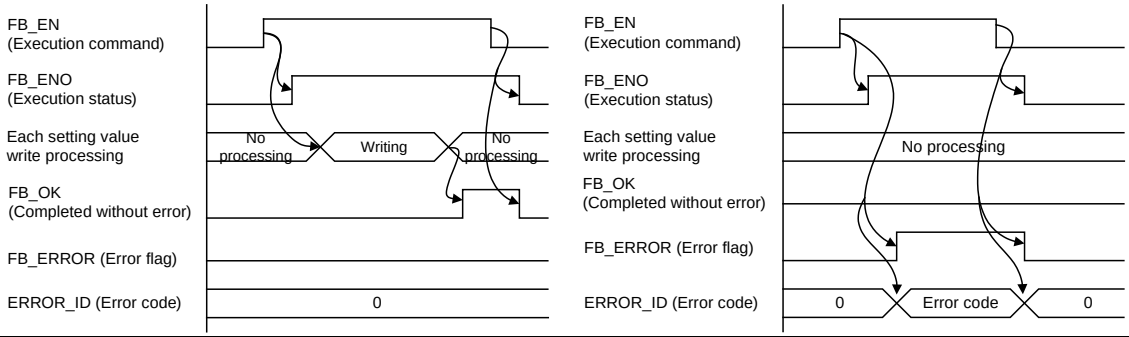
FB Name

M+L60DAL8_WaveOutputSetting

Function Overview

<table>
<tr><th>Item</th><th colspan="2">Description</th></tr>
<tr><td>Function overview</td><td colspan="2">Configure the wave output setting for a specified channel or all channels.</td></tr>
<tr><td>Symbol</td><td colspan="2"> 
</td></tr>
<tr><td rowspan="3">Applicable hardware and software</td><td>Digital-Analog converter module</td><td>L60DAIL8, L60DAVL8</td></tr>
<tr><td>CPU module</td><td><table><tr><th>Series</th><th>Model</th></tr><tr><td>MELSEC-L Series</td><td>LCPU</td></tr></table></td></tr>
<tr><td>Engineering software</td><td>GX Works2 *1<table><tr><th>Language</th><th>Software version</th></tr><tr><td>Japanese version</td><td>Version1.86Q or later</td></tr><tr><td>English version</td><td>Version1.24A or later</td></tr><tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr><tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr><tr><td>Korean version</td><td>Version1.49B or later</td></tr></table>*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">386 steps (for MELSEC-L series 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) The wave output setting of a specified channel or all channels is written when FB_EN (Execution command) is turned on. 2) The new setting value will not take effect until the 'operation condition setting request' signal (Yn9) is turned OFF->ON->OFF or the operating condition setting request FB (M+L60DAL8_RequestSetting) is executed. 3) This FB is available only when "Output mode setting" is set to "Wave output mode". Set the wave output data for the analog output in advance. 4) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns ON, 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.
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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z6, Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8 or 15.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~8, 15	1~8: Specify a channel number. 15: Specify all channels.
Output setting during wave output stop	i_OutputSelect	Word	0: 0V/0mA 1: Offset value 2: Output value during wave output stop	Specify an output value while the wave output is stopped.
Output value during wave output stop	i_OutputValue	Word	•0~8,191 (When using 0~5V, 1~5V, 0~20mA, 4~20mA) •-16,384~16,383 (When using -10~10V)	Set a value to output when "Output setting during wave output stop" is set to "2: Output value during wave output stop".

Name (Comment)	Label name	Data type	Setting range	Description
Wave pattern start address setting	i_StartingAddr	Double word	5,000~54,999	Set the start address of the wave pattern to output.
Wave pattern points setting	i_PointsSetting	Double word	1~50,000 (points)	Set the data points of the wave pattern to output.
Wave output count setting	i_Frequency	Word	-1: Repeat outputs infinitely 1~32,767: Specify an output count.	Set the wave pattern output count.
Constant for wave output conversion cycle	i_ConvSpeed	Word	1~5,000	Set a constant to specify the conversion cycle of the wave output.

●Output labels

Name (Comment)	Label name	Data type	Setting range	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 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	2016/08	First edition

Note

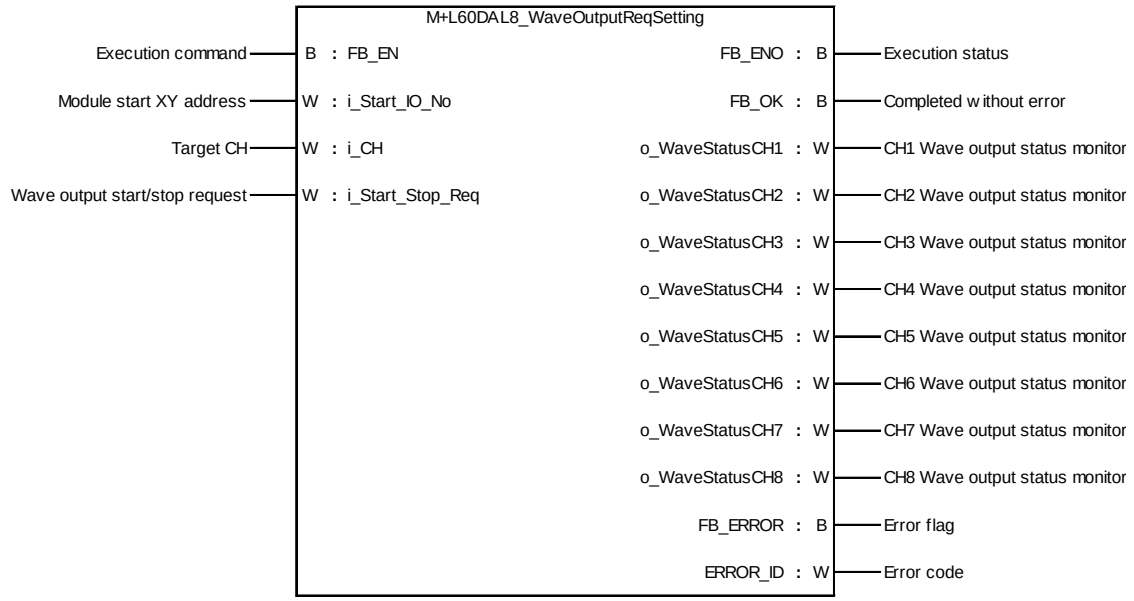
This chapter includes information related to the M+L60DAL8_WaveOutputSetting function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

2.17 M+L60DAL8_WaveOutputReqSetting (Wave output start/stop request)

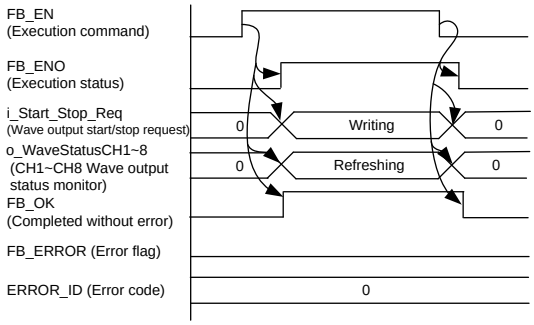
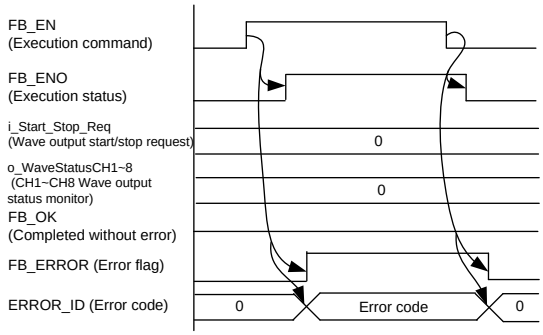
FB Name

M+L60DAL8_WaveOutputReqSetting

Function Overview

Item	Description	
Function overview	Specify a start, stop or temporary stop of the wave output for a specified channel or all channels.	
Symbol		
Applicable hardware and software	Digital-Analog converter module	L60DAIL8, L60DAVL8 * Applicable to D/A converter module whose first five digits of the product information are "14041" or later
	CPU module	Series: MELSEC-L Series; Model: LCPU

<table>
<tr><th>Item</th><th colspan="2">Description</th></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>Version1.86Q or later</td></tr>
<tr><td>English version</td><td>Version1.24A or later</td></tr>
<tr><td>Chinese (Simplified) version</td><td>Version1.49B or later</td></tr>
<tr><td>Chinese (Traditional) version</td><td>Version1.49B or later</td></tr>
<tr><td>Korean version</td><td>Version1.49B or later</td></tr>
</table>
*1 For software versions applicable to the modules used, refer to "Relevant manuals".</td></tr>
<tr><td>Programming language</td><td colspan="2">Ladder</td></tr>
<tr><td>Number of steps</td><td colspan="2">395 steps (for MELSEC-L series 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>
<tr><td>Function description</td><td colspan="2">1) The wave output of the specified channel or all channels is started, stopped, or paused when FB_EN (Execution command) is turned ON.
2) A value of the wave output status monitor (Un\G1100~Un\G1107) is output when FB_EN (Execution command) is turned on.
If a channel is specified for the input label, only the specified channel's wave output status monitor value is updated and 0 is output for other channels.
If all channels are specified for the input label, all channels' wave output status monitor values are output.
3) After FB_EN (Execution command) is turned ON, the FB is always executed.
4) To resume the wave output, set "1 (Wave output start request)", 0 (Wave output stop request)" and then "1 (Wave output start request) again after completing the wave output.
5) This FB is available only when "Output mode setting" is set to "Wave output mode".
6) When the i_CH (Target CH) setting value is out of range, the FB_ERROR (Error flag) output turns ON, 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.</td></tr>
<tr><td>Compiling method</td><td colspan="2">Macro type</td></tr>
</table>

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 (Execution command) signal is capable of being turned OFF by the program. Do not use this FB in programs that are only executed once such as a subroutine, FOR-NEXT loop, etc. because it is impossible to turn OFF. 4) When two or more of these FBs are used, precaution must be taken to avoid repetition of the i_CH (Target CH). 5) This FB uses index registers Z7, Z8 and Z9. Please do not use these index registers in an interrupt program. 6) Every input must be provided with a value for proper FB operation. 7) The output range settings must be properly configured to match devices connected to the L60DAIL8, L60DAVL8 module. Configure the settings by making the GX Works2 switch setting according to the application. For information about intelligent function module switch settings, refer to the GX Works2 Version1 Operation 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-L Digital-Analog Converter Module User's Manual •MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection) •GX Works2 Version1 Operating Manual (Common) •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

●Error code list

Error code	Description	Action
10 (Decimal)	The specified target channel is not valid. The i_CH (Target CH) is not within the range of 1 to 8 or 15.	Please try again after confirming the setting.

Labels

●Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the L60DAIL8, L60DAVL8 module is mounted. (For example, enter H10 for X10.)
Target CH	i_CH	Word	1~8,15	1~8: Specify a channel number. 15: Specify all 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 a start/stop request 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 FB is executed normally.
CH1 Wave output status monitor	o_WaveStatusCH1	Word	0	Output a value of the wave output status (stopped, during output, temporarily stopped). 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 "8.8 Wave Output Function" of the MELSEC-L 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	
CH5 Wave output status monitor	o_WaveStatusCH5	Word	0	
CH6 Wave output status monitor	o_WaveStatusCH6	Word	0	
CH7 Wave output status monitor	o_WaveStatusCH7	Word	0	
CH8 Wave output status monitor	o_WaveStatusCH8	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	2016/08	First edition

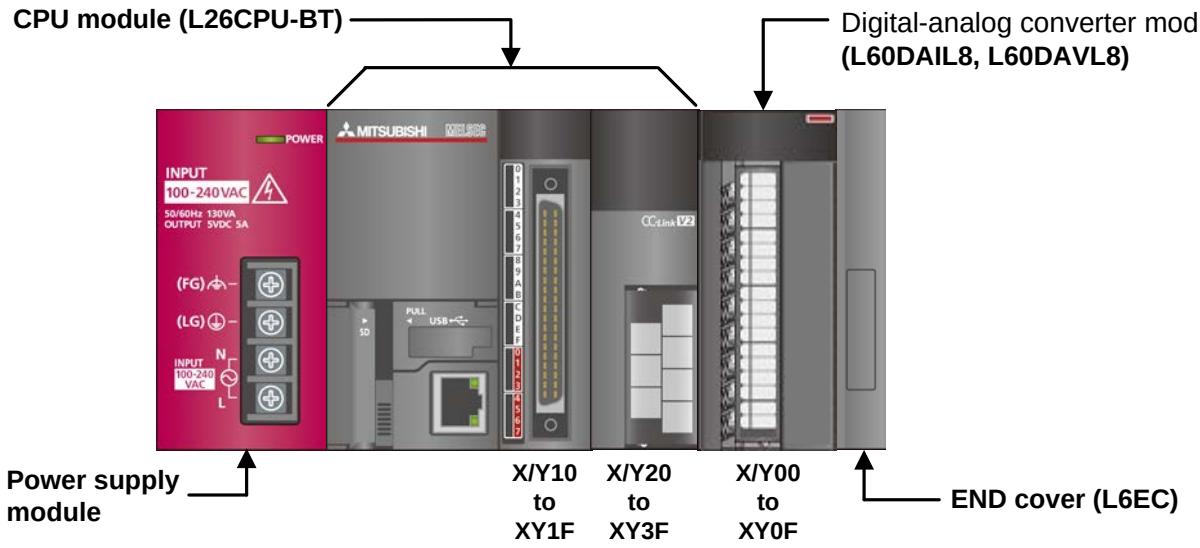
Note

This chapter includes information related to the M+L60DAL8_WaveOutputReqSetting function block.
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.
Before using any Mitsubishi products, please read all relevant manuals.

Appendix 1. FB Library Application Examples

L60DAL8 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) Global label settings

None

3) Application example settings

a) Common setting

Input and output item	Value	Description
Module start XY address	0	Specify the starting XY address where the L60DAIL8, L60DAVL8 module is mounted.

4) List of devices

a) External input (commands)

Device	FB name	Application (ON details)
M0	M+L60DAL8_WriteDAVal	DA conv data write request
M10	M+L60DAL8_WriteAllDAVal	DA conv data write req all CHs
M20	M+L60DAL8_SetDAConversion	DA conv enable/disable set req
M21		DA conv enable/disable setting
M30	M+L60DAL8_SetDAOutput	DA output enable/disable set req
M31		DA output enable/disable setting
M40	M+L60DAL8_SetScaling	Scaling setting request
M41		Scaling enable/disable (ON/OFF)
M50	M+L60DAL8_SetAlarm	Warning output setting request
M51		Wng outpt enable/disable(ON/OFF)
M60	M+L60DAL8_RequestSetting	Operating condition setting req
M70	M+L60DAL8_SetOffsetVal	Offset setting request
M71		Offset value change request
M72		Offset value write request
M80	M+L60DAL8_SetGainVal	Gain setting request
M81		Gain value change request
M82		Gain value write request
M90	M+L60DAL8_ShiftOperation	Shift function execution request
D90		Digital value
M100	M+L60DAL8_ErrorOperation	Error operation request
M101		Error reset request
M110	M+L60DAL8_OGBackup	Offset/gain value save request
M120	M+L60DAL8_OGRestore	Offset/gain value restore req
M130	M+L60DAL8_WaveDataStoreCsv	Wave data (CSV) read request
M140	M+L60DAL8_WaveDataStoreDev	Wave data (device) read request
M150	M+L60DAL8_WaveOutputSetting	Wave output setting request
M160	M+L60DAL8_WaveOutputReqSetting	Wave output start/stop request

b) External output (checks)

Device	FB name	Application (ON details)
M1	M+L60DAL8_WriteDAVal	DA conv data write FB ready
M2		DA conv data write complete
F0		DA conv data write FB error
D0		DA conv data write FB ErrCode
M11	M+L60DAL8_WriteAllDAVal	DA conv data write FB rdy allCHs
M12		DA conv data write comp all CHs
M22	M+L60DAL8_SetDAConversion	DA conv enable/disable FB ready
M23		DA conv enable/disable set comp
F5		DA conv enable/disable FB error
D20		DA conv enabl/disabl FB ErrCode
M32	M+L60DAL8_SetDAOutput	DA output enable/disable FB rdy
M33		DA outpt enable/disable set comp
F10		DA output enable/disable FB err
D30		DA outpt enabl/disabl FB ErrCode
M42	M+L60DAL8_SetScaling	Scaling value setting FB ready
M43		Scaling value ave proc set comp
F15		Scaling value setting FB error
D40		Scaling setting FB Error code
M52	M+L60DAL8_SetAlarm	Warning output setting FB ready
M53		Warning output setting complete
F20		Warning output setting FB error
D50		Warning output seting FB ErrCode
M61	M+L60DAL8_RequestSetting	Operate condition set req FB rdy
M62		Operating condition set req comp
M73	M+L60DAL8_SetOffsetVal	Offset setting FB ready
M74		Offset setting complete
F25		Offset setting FB error
D70		Offset setting FB Error code
M83	M+L60DAL8_SetGainVal	Gain setting FB ready
M84		Gain setting complete
F30		Gain setting FB error
D80		Gain setting FB Error code

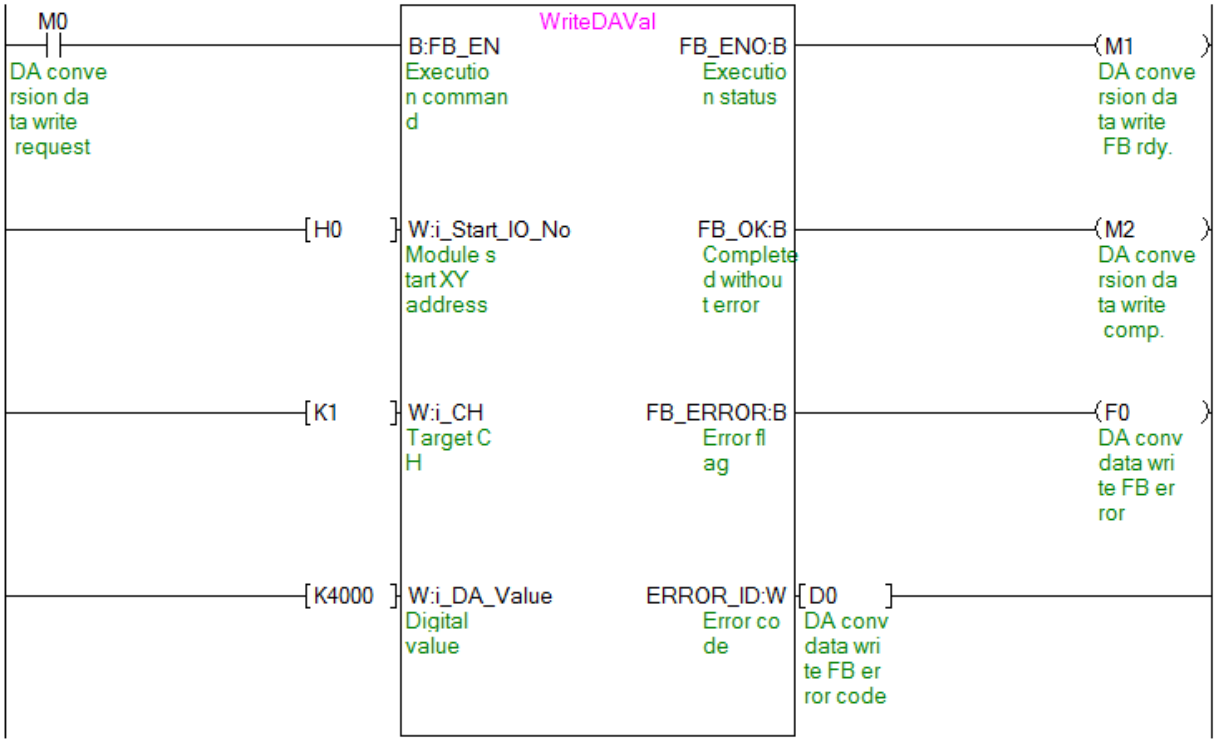
Device	FB name	Application (ON details)
M91	M+L60DAL8_ShiftOperation	Shift function FB ready
M92		Shift function complete
D91		Shift conversion value
M102	M+L60DAL8_ErrorOperation	Error operation ready
M103		Error operation complete
M104		Module error
D100		Module operation Error code
M111	M+L60DAL8_OGBackup	Offset/gain value save ready
M112		Offset/gain value save complete
F35		Offset/gain save file FB error
D110		Offset/gain save file FB ErrCode
M121	M+L60DAL8_OGRestore	Offset/gain value restore ready
M122		Offset/gain value restore comp
F40		Offset/gain value restore FB err
D120		Offset/gain restore FB ErrCode
M131	M+L60DAL8_WaveDataStoreCsv	Wave data (CSV) read ready
M132		Wave data (CSV) read complete
F45		Wave data (CSV) read FB error
D130		Wave data (CSV) read FB ErrCode
M141	M+L60DAL8_WaveDataStoreDev	Wave data (device) read ready
M142		Wave data (device) read complete
M151	M+L60DAL8_WaveOutputSetting	Wave output setting ready
M152		Wave output setting complete
F50		Wave output setting FB error
D150		Wave output setting FB ErrCode
M161	M+L60DAL8_WaveOutputReqSetting	Wave output start/stop ready
M162		Wave output start/stop complete
D160		CH1 Wave output status monitor
D161		CH2 Wave output status monitor
D162		CH3 Wave output status monitor
D163		CH4 Wave output status monitor
D164		CH5 Wave output status monitor
D165		CH6 Wave output status monitor
D166		CH7 Wave output status monitor
D167		CH8 Wave output status monitor
F55		Wave output start/stop FB error
D168		Wave outpt start/stop FB ErrCode

5) Programs

M+L60DAL8_WriteDAVal (Write D/A conversion data)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module 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.

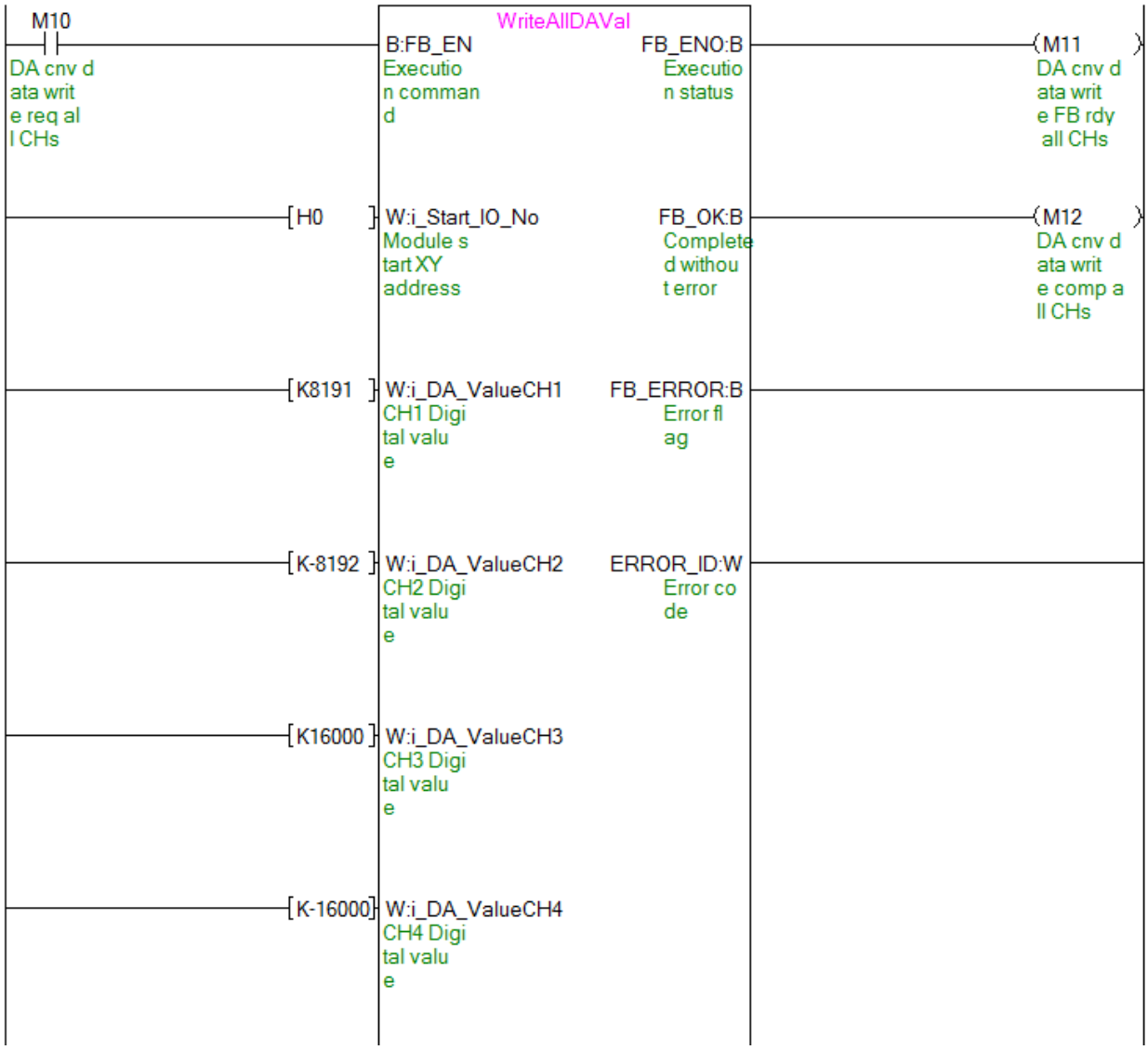
By turning ON M0, the digital value of channel 1 is written to the buffer memory.



M+L60DAL8_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 L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_DA_ValueCH1	K8191	Set the digital value of channel 1 to 8,191.
i_DA_ValueCH2	K-8192	Set the digital value of channel 2 to -8,192.
i_DA_ValueCH3	K16000	Set the digital value of channel 3 to 16,000.
i_DA_ValueCH4	K-16000	Set the digital value of channel 4 to -16,000.
i_DA_ValueCH5	K16383	Set the digital value of channel 5 to 16,383.
i_DA_ValueCH6	K-16384	Set the digital value of channel 6 to -16,384.
i_DA_ValueCH7	K32000	Set the digital value of channel 7 to 32,000.
i_DA_ValueCH8	K-32000	Set the digital value of channel 8 to -32,000.

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



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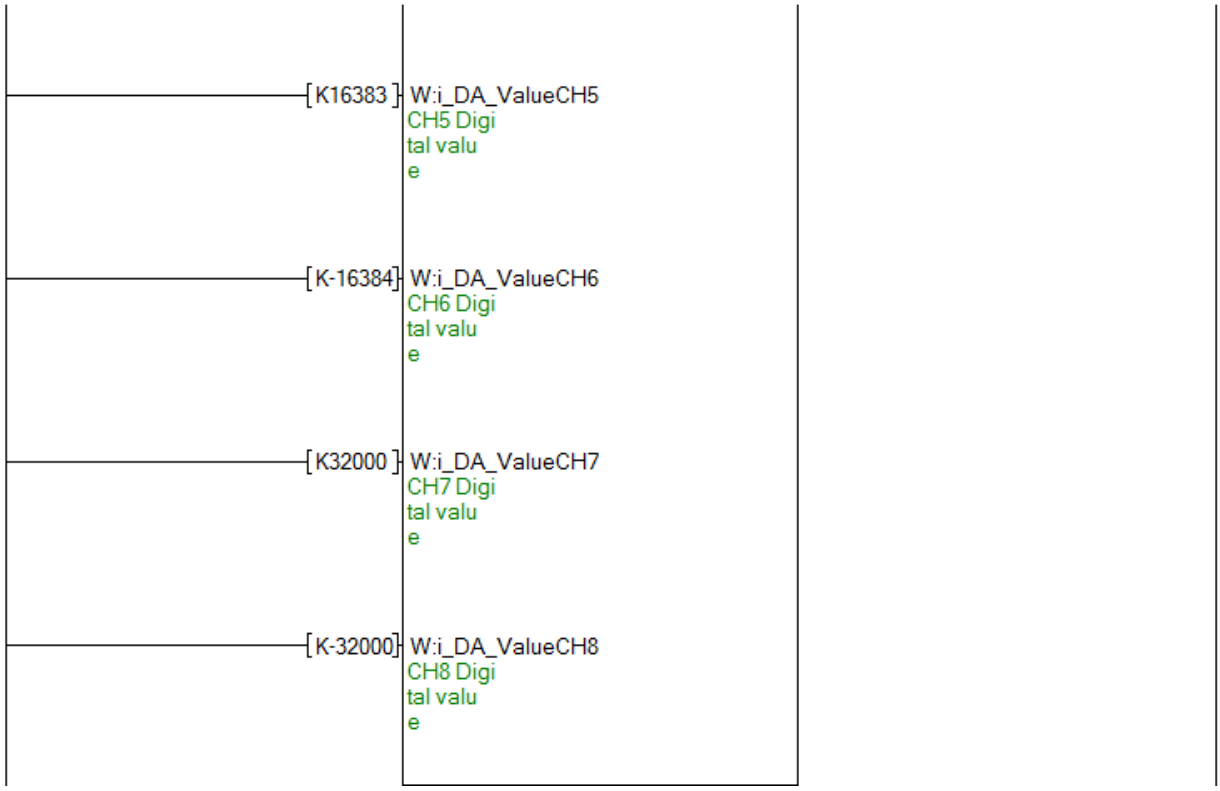
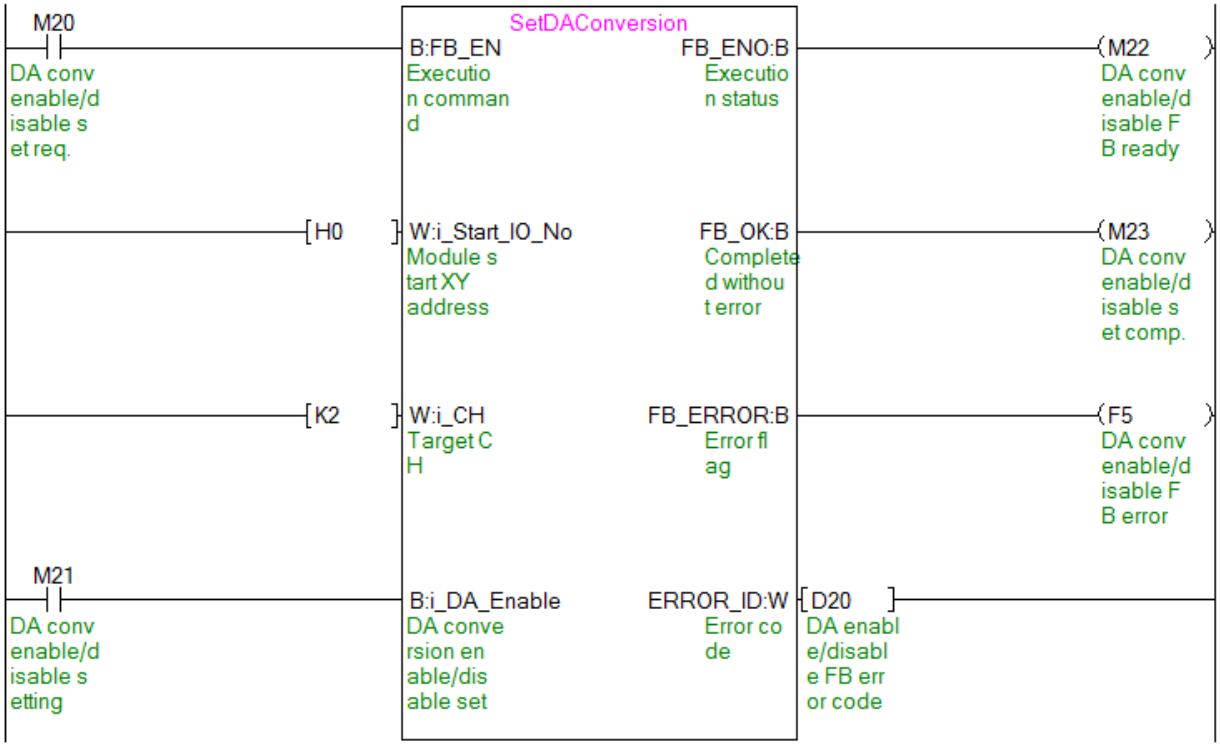

[K16383]
W:i_DA_ValueCH5
CH5 Digi
tal valu
e
[K-16384]
W:i_DA_ValueCH6
CH6 Digi
tal valu
e
[K32000]
W:i_DA_ValueCH7
CH7 Digi
tal valu
e
[K-32000]
W:i_DA_ValueCH8
CH8 Digi
tal valu
e

M+L60DAL8_SetDAConversion (D/A conversion enable/disable setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K2	Set the target channel to channel 2.
i_DA_Enable	ON/OFF	Turn ON to enable the D/A conversion for the target channel.

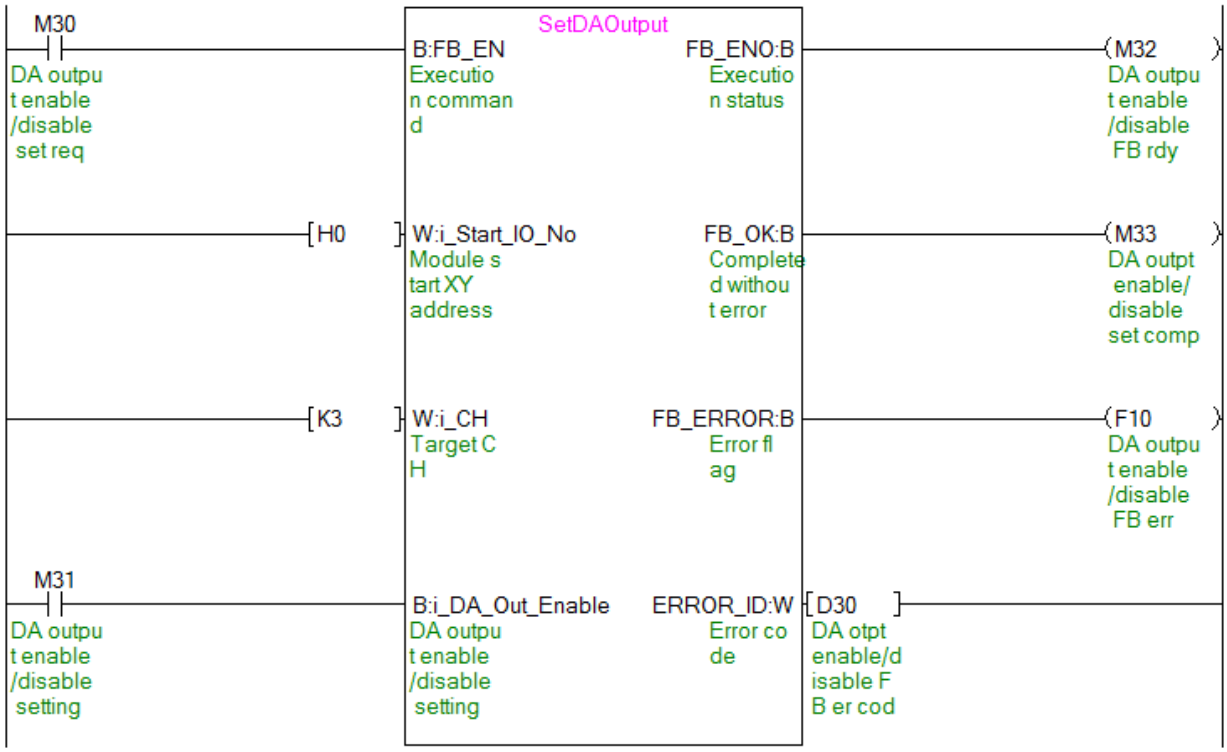
By turning ON M20, the D/A conversion enable/disable setting value of channel 2 is written to the buffer memory.



M+L60DAL8_SetDAOutput (D/A output enable/disable setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K3	Set the target channel to channel 3.
i_DA_Out_Enable	ON/OFF	Turn ON to enable the D/A output enable/disable setting for the target channel.

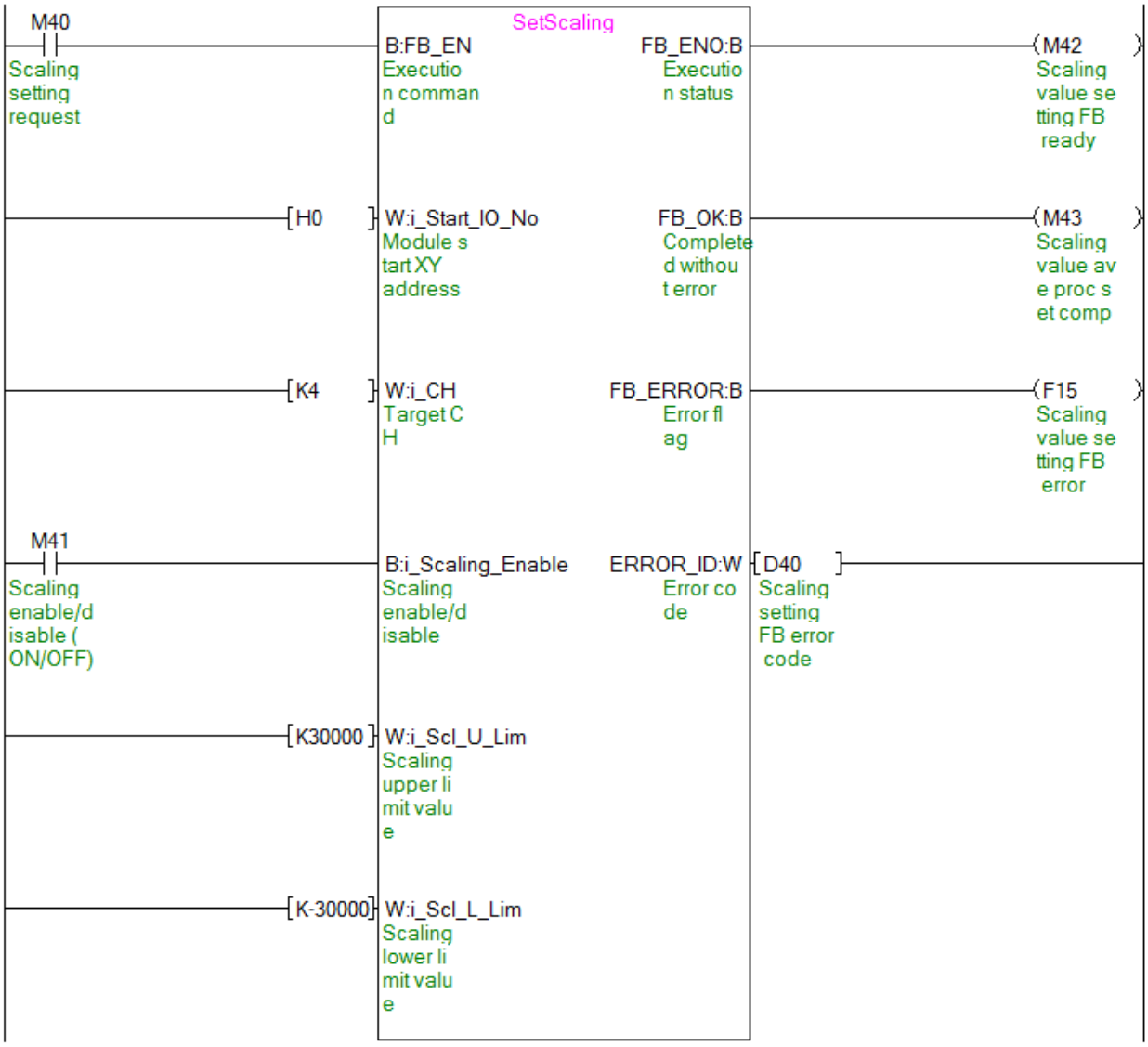
By turning ON M30 and then M31, the D/A output of channel 3 is enabled.



M+L60DAL8_SetScaling (Scaling setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K4	Set the target channel to channel 4.
i_Scaling_Enable	ON/OFF	Turn ON to enable scaling.
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.

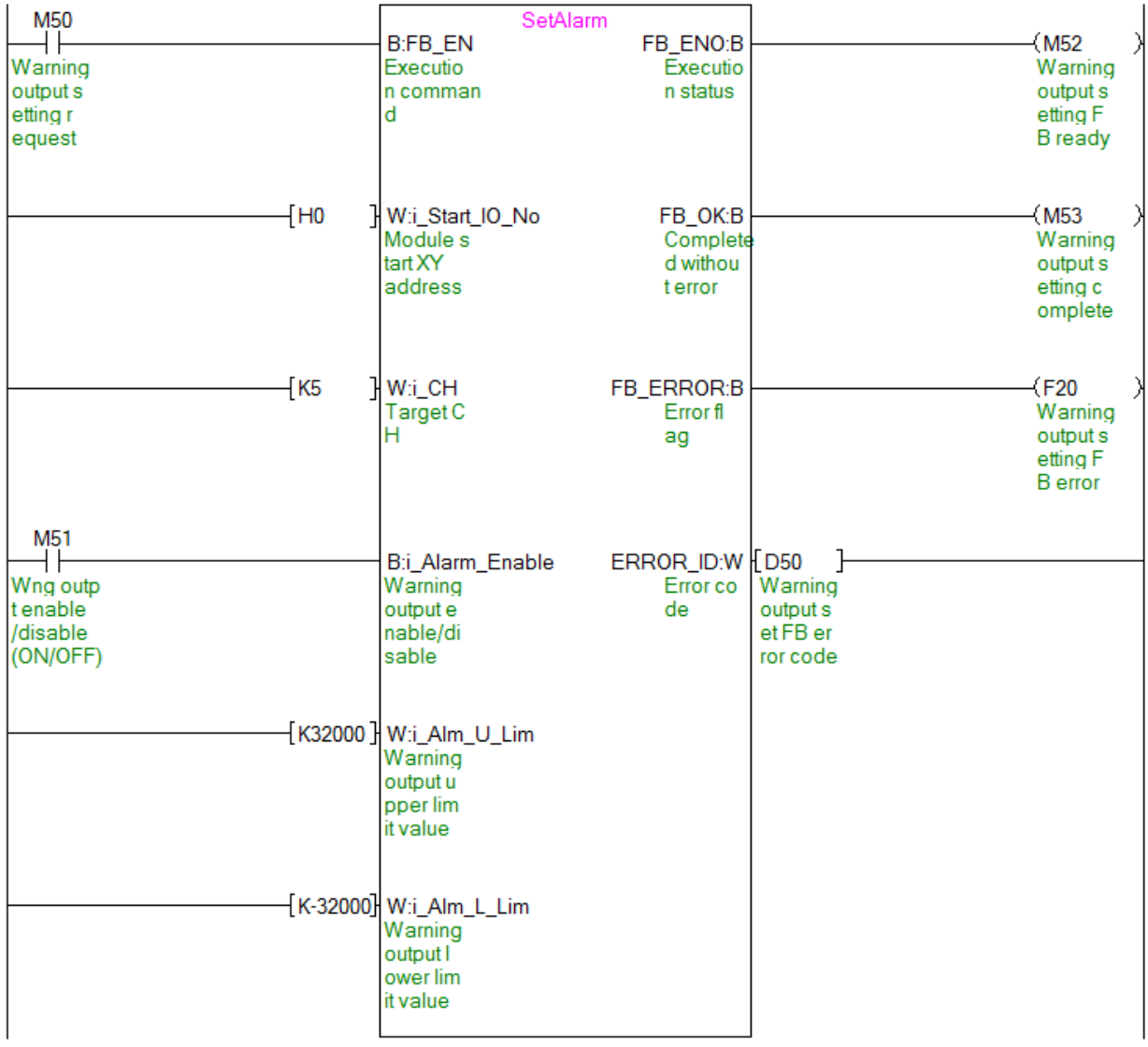
By turning ON M40, the scaling setting value for channel 4 is written to the buffer memory.



M+L60DAL8_SetAlarm (Warning output setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K5	Set the target channel to channel 5.
i_Alarm_Enable	ON/OFF	Turn ON to enable warning output.
i_Alm_U_Lim	K32000	Set the warning output upper limit value to 32,000.
i_Alm_L_Lim	K-32000	Set the warning output lower limit value to -32,000.

By turning ON M50, the warning output setting value for channel 5 is written to the buffer memory.



M+L60DAL8_RequestSetting (Operating condition setting request)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.

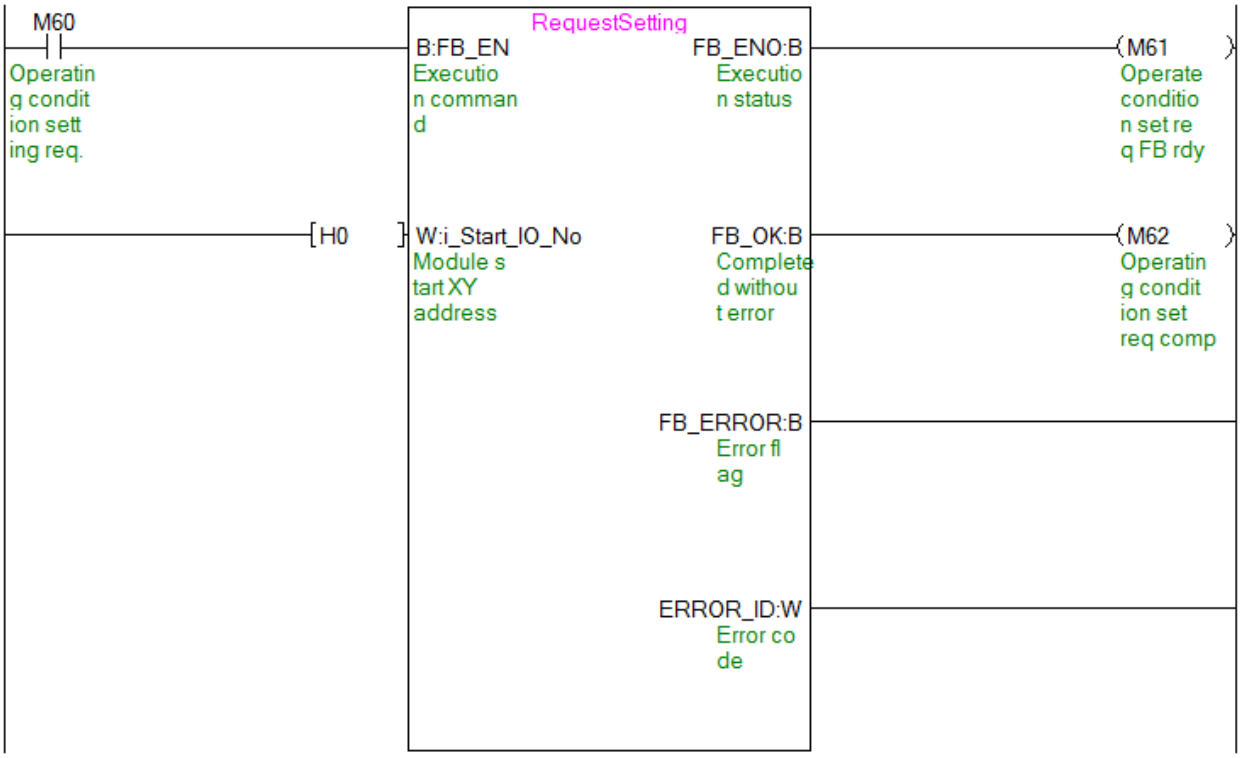
By turning ON M60, the following settings are enabled.

• D/A conversion enable/disable setting

• Warning output setting

• Scaling function setting

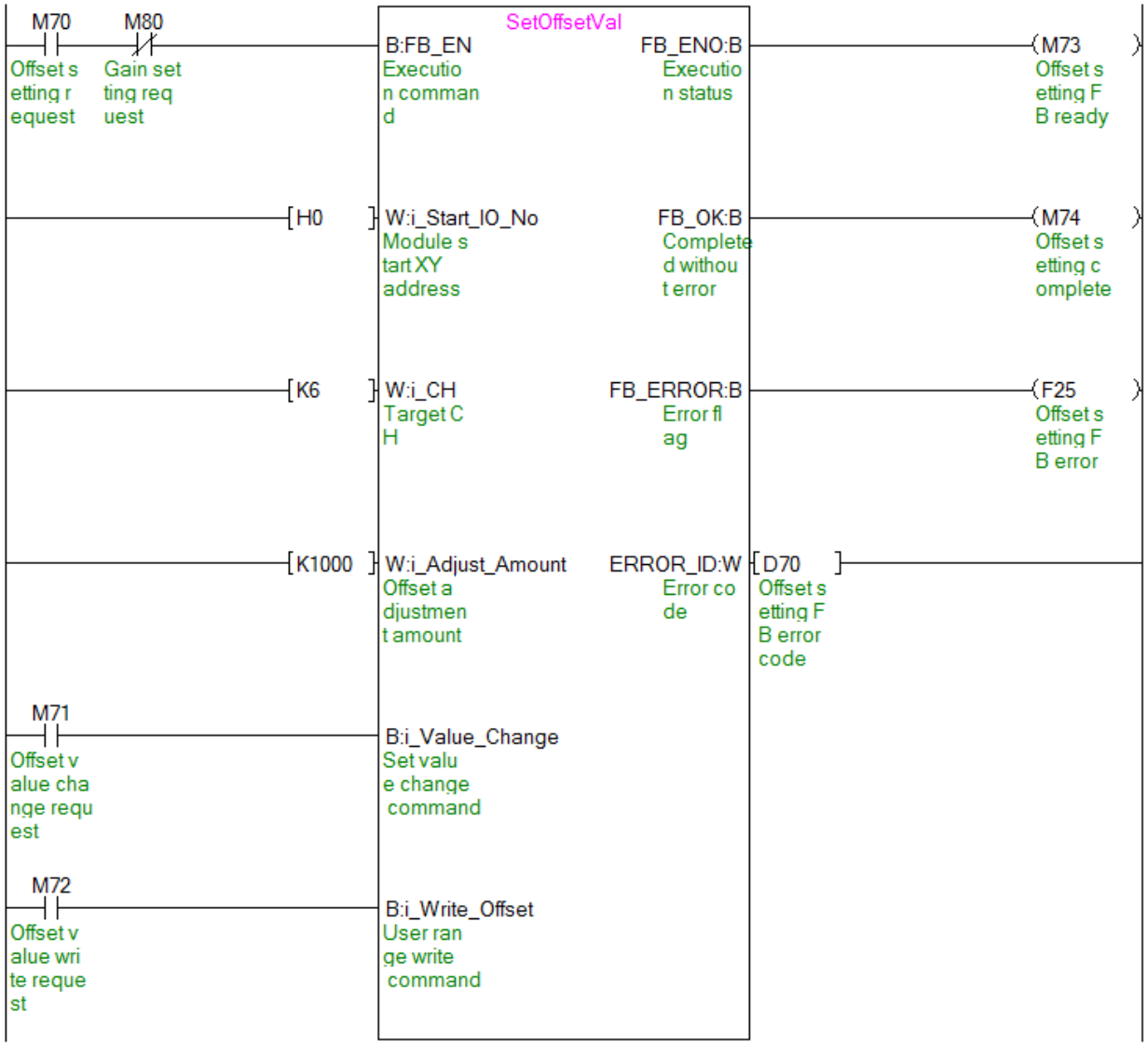
• Wave output function setting



M+L60DAL8_SetOffsetVal (Offset setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K6	Set the target channel to channel 6.
i_Adjust_Amount	K1000	Set the offset adjustment amount to 1,000.
i_Value_Change	ON/OFF	Turn ON to change the offset value.
i_Write_Offset	ON/OFF	Turn ON to write the offset value of channel 6.

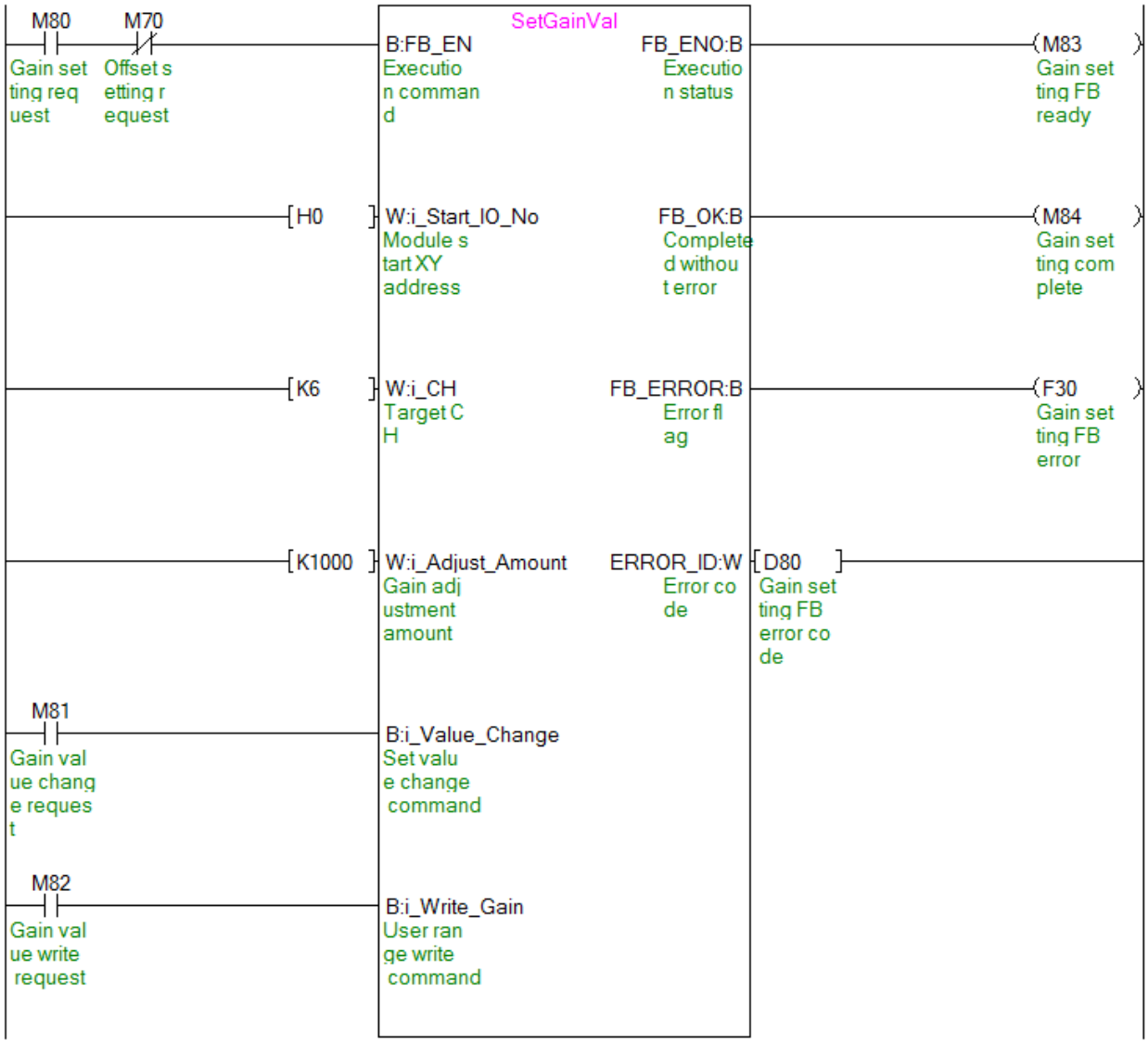
By turning ON M70 and then M71, the offset value of channel 6 is changed. Then, by turning ON M72 the offset value of channel 6 is written.



M+L60DAL8_SetGainVal (Gain setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K6	Set the target channel to channel 6.
i_Adjust_Amount	K1000	Set the gain adjustment amount to 1,000.
i_Value_Change	ON/OFF	Turn ON to change the gain value.
i_Write_Gain	ON/OFF	Turn ON to write the gain value of channel 6.

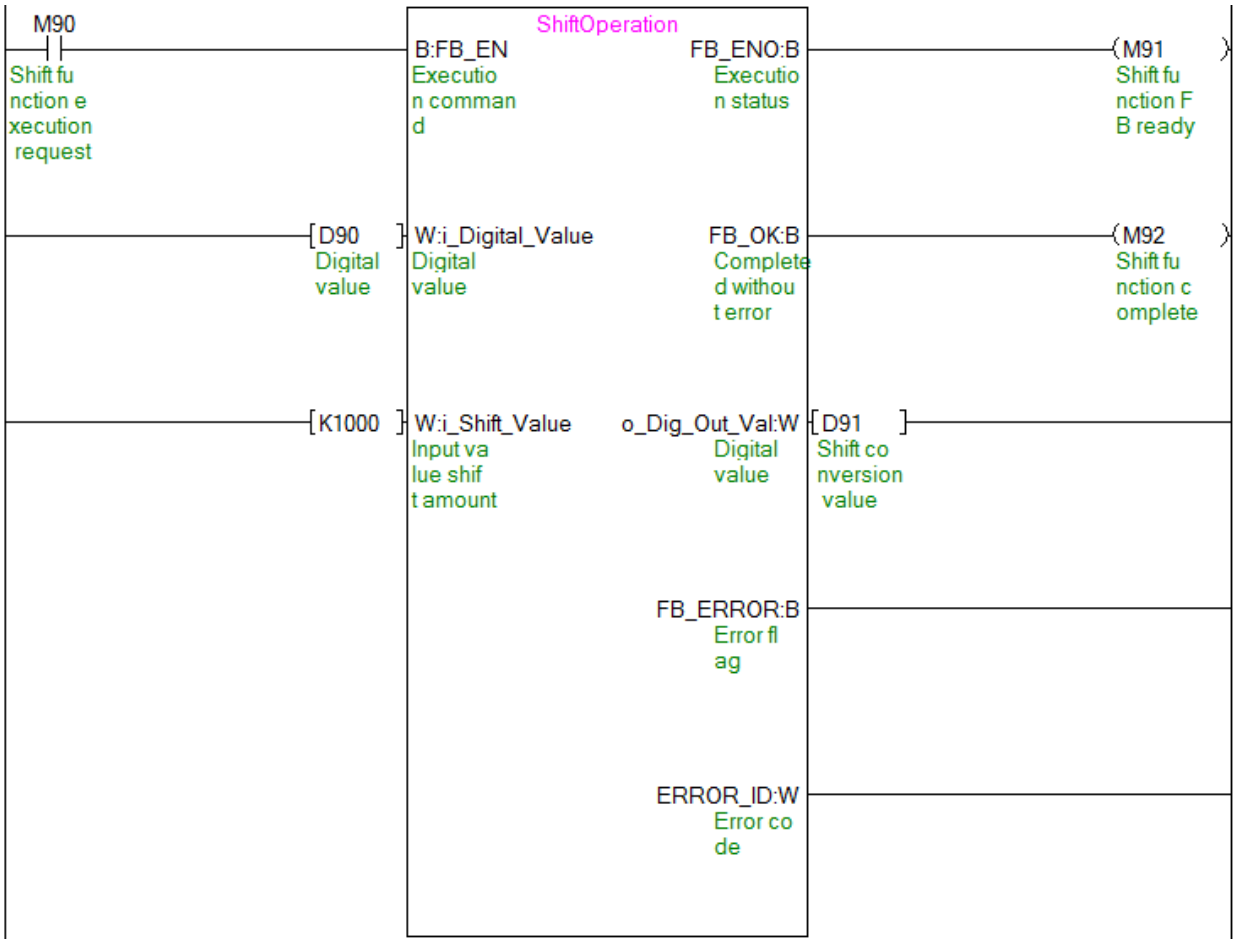
By turning ON M80 and then M81, the gain value of channel 6 is changed. Then, by turning ON M82 the gain value of channel 6 is written.



M+L60DAL8_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.

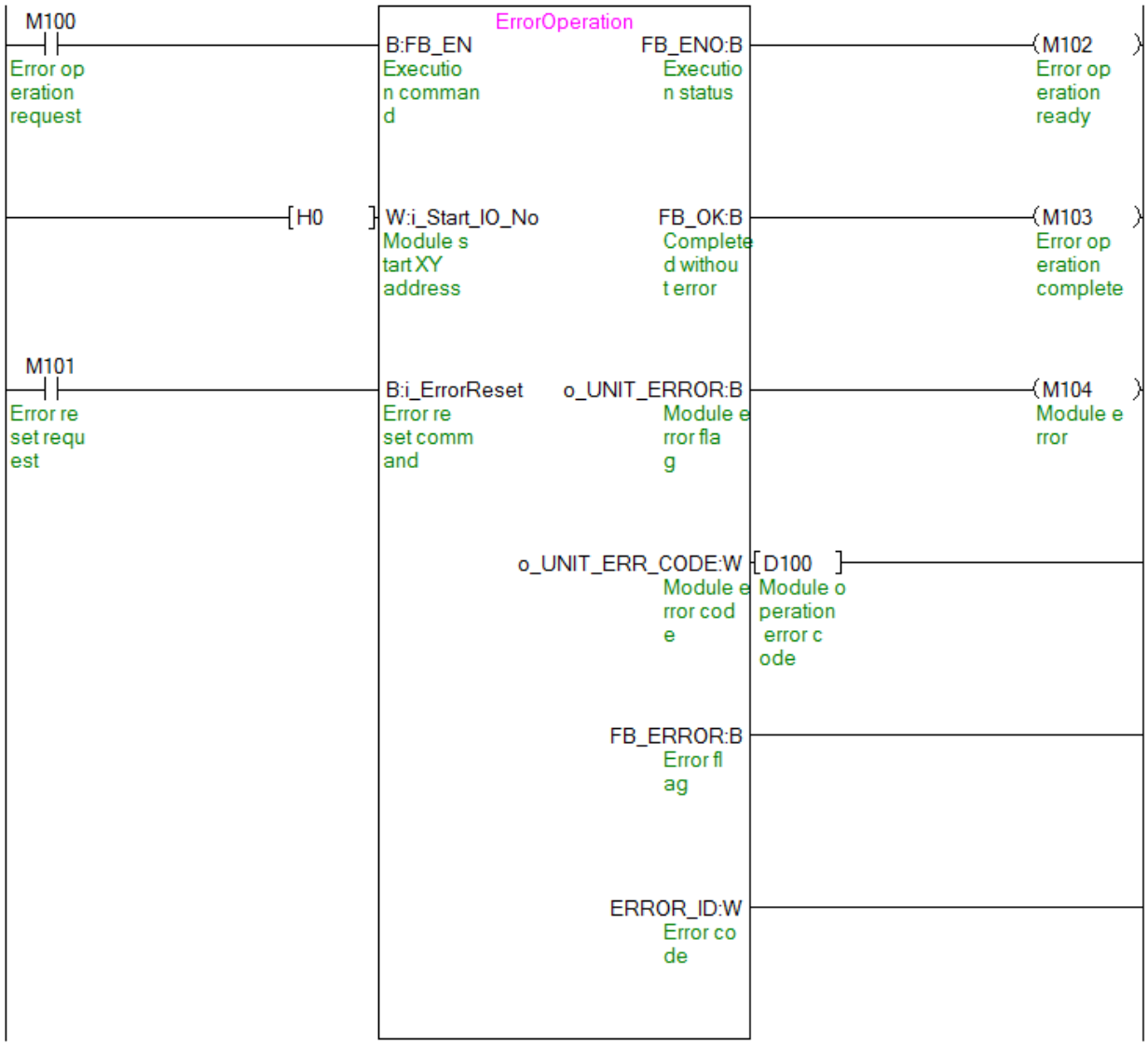
By turning ON M90, the digital value after the shift amount is added is output.



M+L60DAL8_ErrorOperation (Error operation)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_ErrorReset	ON/OFF	Turn ON to reset errors.

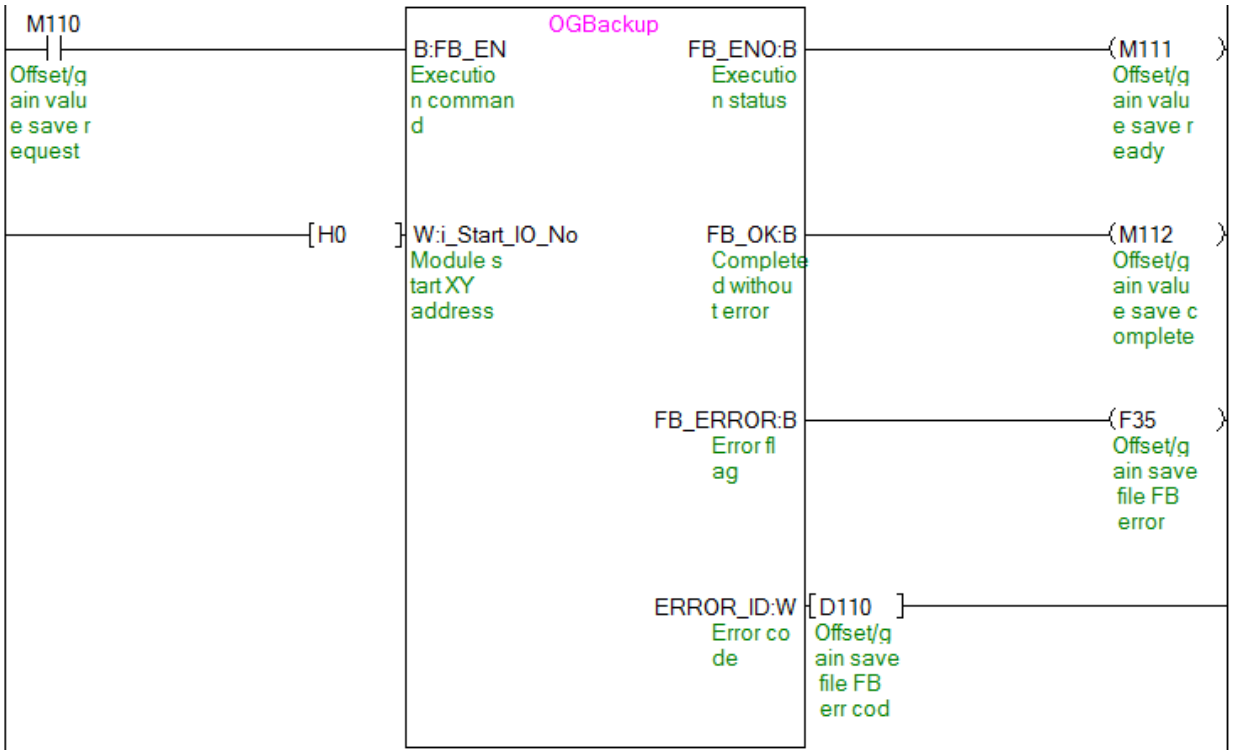
By turning ON M100, an error code is output if an error occurs. After an error output, by turning ON M101, the error is reset.



M+L60DAL8_OGBackup (Offset/gain value save)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.

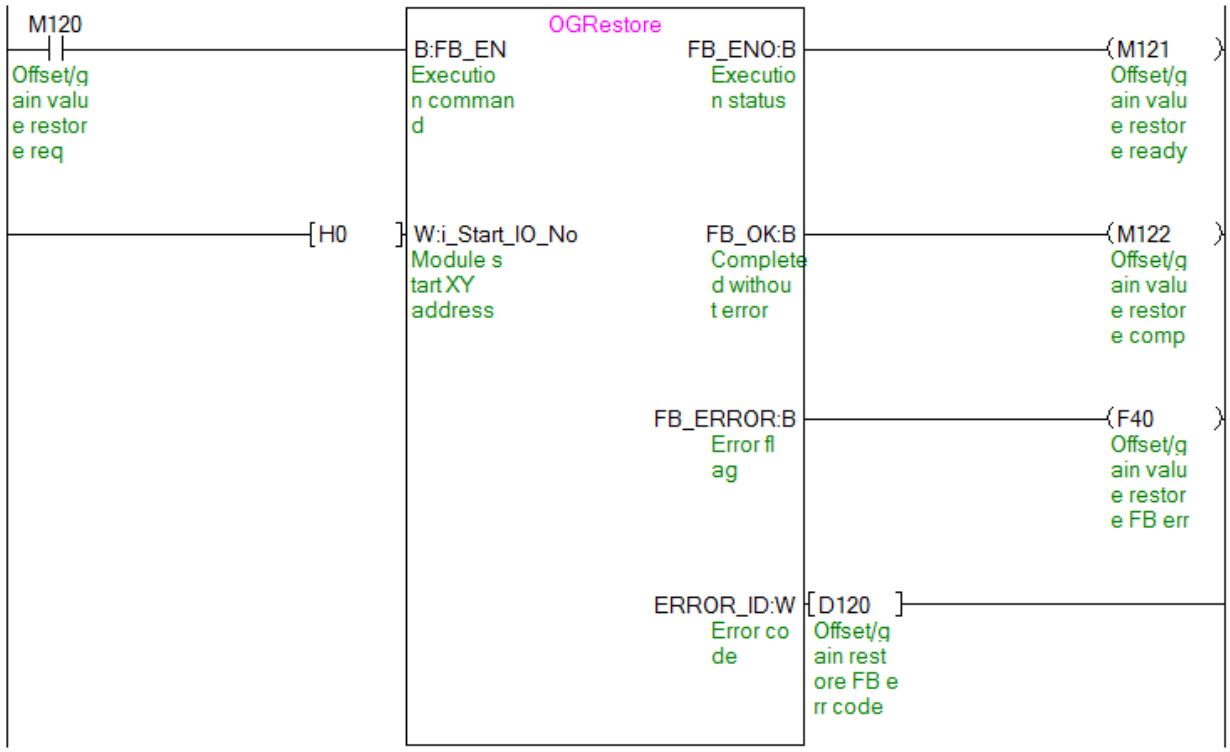
By turning ON M110, the offset/gain values are read from the user range setting and they are saved in the SD memory card inserted in the CPU module.



M+L60DAL8_OGRestore (Offset/gain value restore)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.

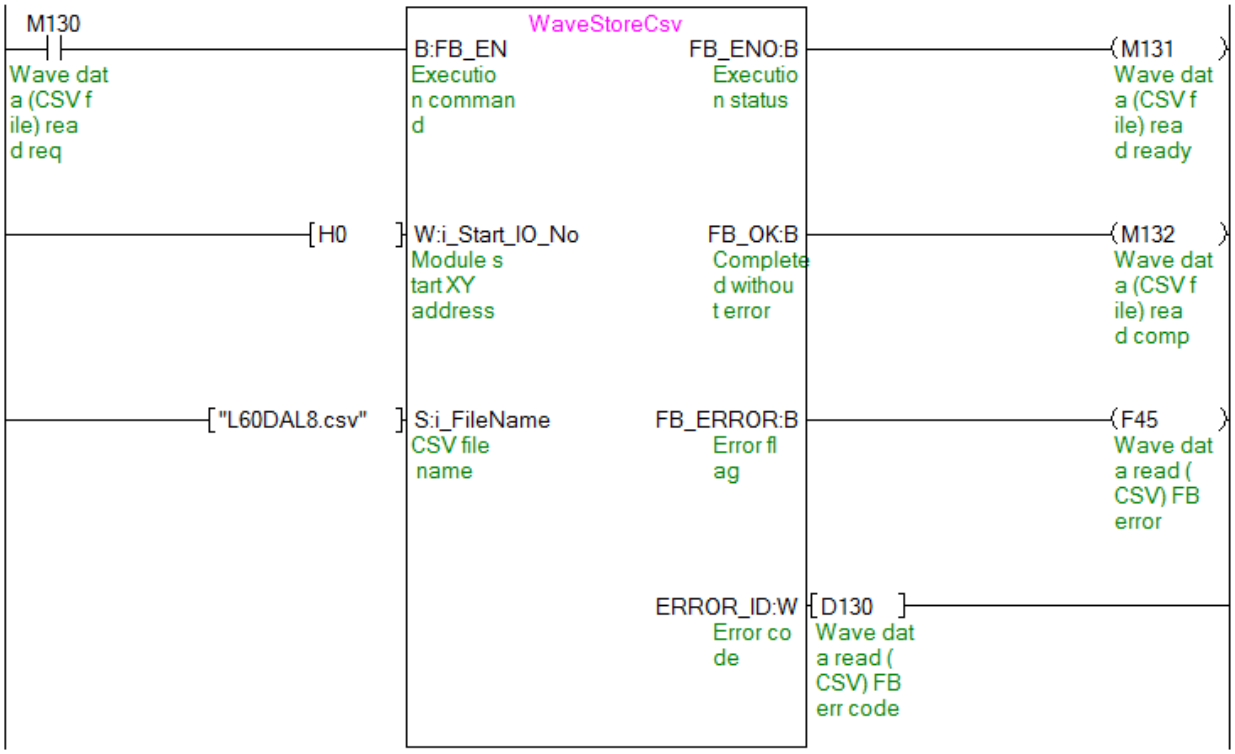
By turning ON M120, the user range offset/gain setting values stored in the file are restored to the module.



M+L60DAL8_WaveDataStoreCsv (Read wave data (CSV file))

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_FileName	"L60DAL8.csv"	Set "L60DAL8.csv" as the name of the CSV file from which the parameters and the wave data of the wave output function are read.

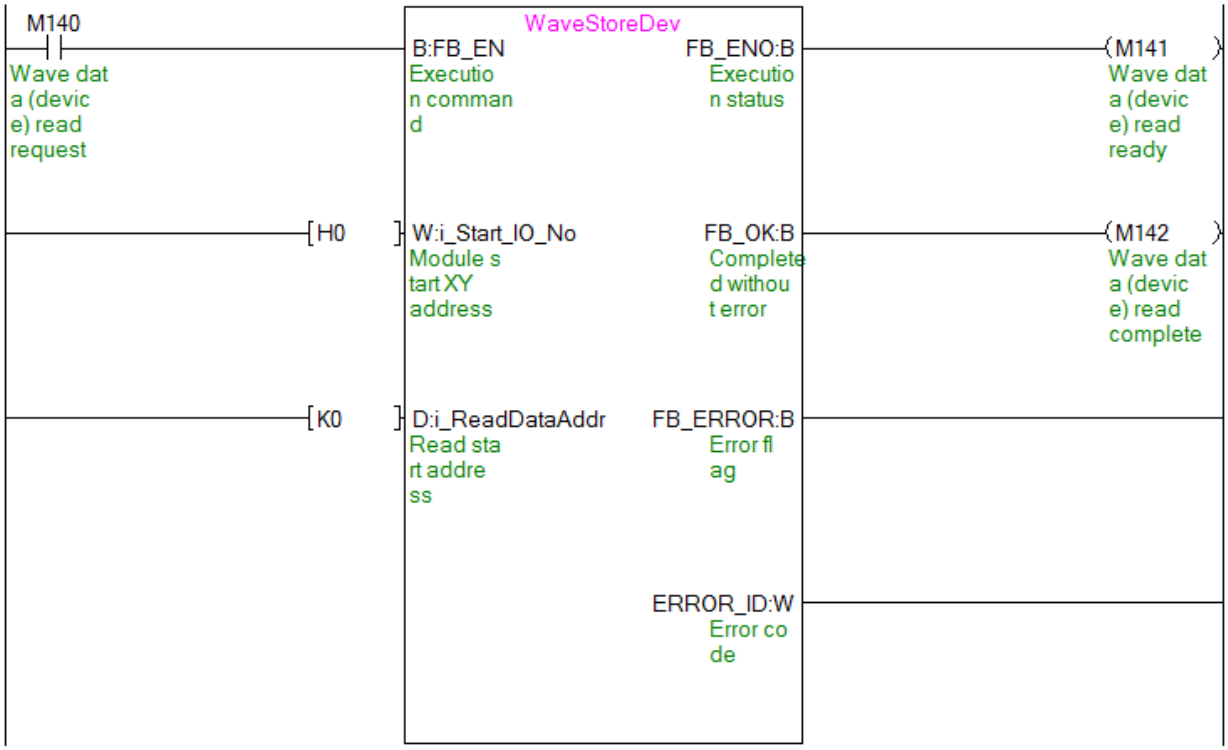
By turnig ON M130, the wave output function parameters and wave data are read from "L60DAL8.csv" in the SD memory card and they are stored in the buffer memory.



M+L60DAL8_WaveDataStoreDev (Read wave data (device))

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_ReadDataAddr	K0	Set the read start address, which stores the wave output function parameters and wave data, to ZR0.

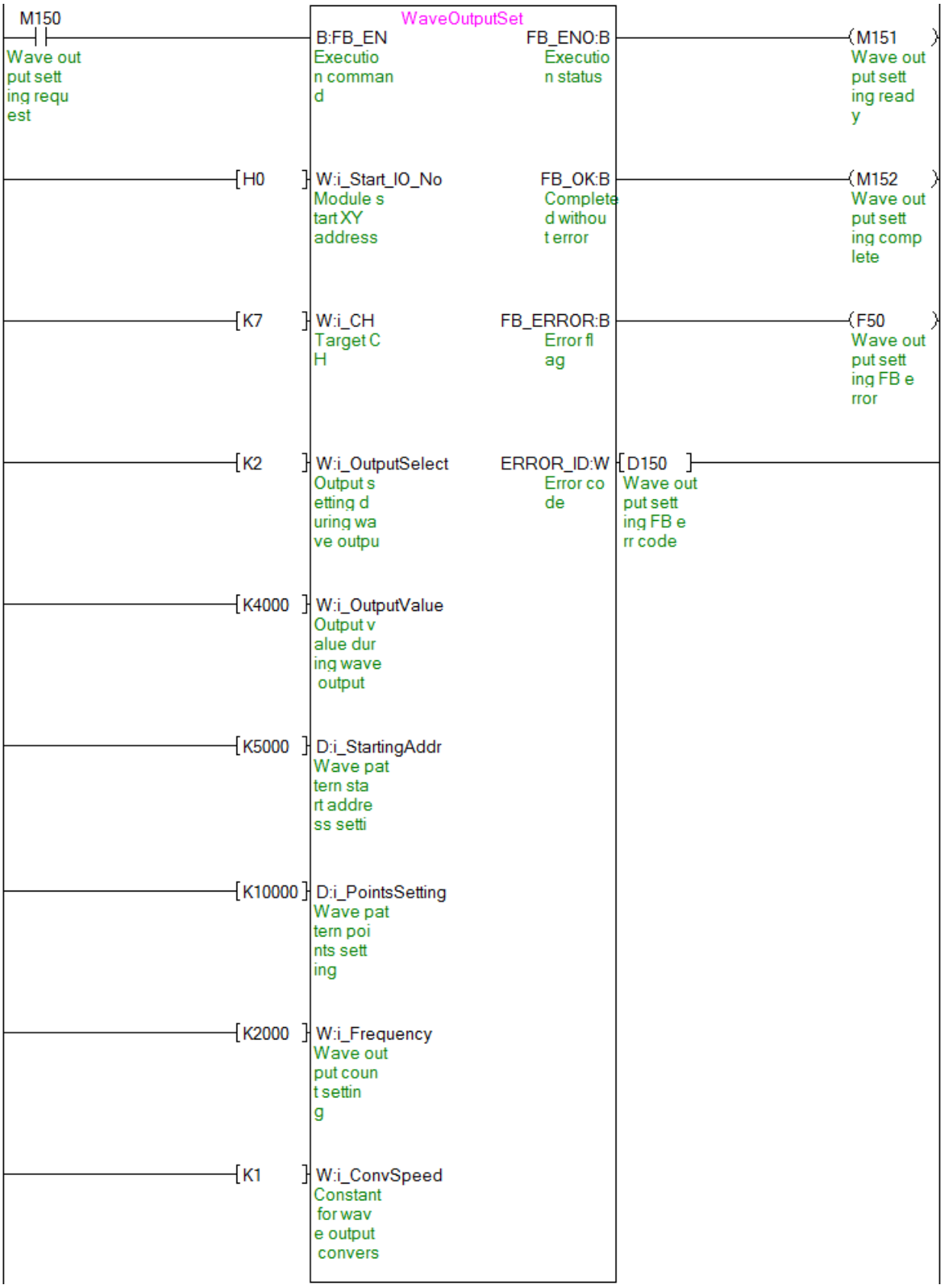
By turning ON M140, the wave output function parameters and wave data are read from file register ZR0 and subsequent addresses and they are stored in the buffer memory.



M+L60DAL8_WaveOutputSetting (Wave output setting)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K7	Set the target channel to channel 7.
i_OutputSelect	K2	Set the Output setting during wave output stop to 2 (Output value during wave output stop).
i_OutputValue	K4000	Set the Output value during wave output stop to 4,000.
i_StartingAddr	K5000	Set the start address of the wave pattern to output to 5,000.
i_PointsSetting	K10000	Set the data points of the wave pattern to output to 10,000.
i_Frequency	K2000	Set the wave output count to 2,000.
i_ConvSpeed	K1	Set the wave output conversion cycle constant to 1.

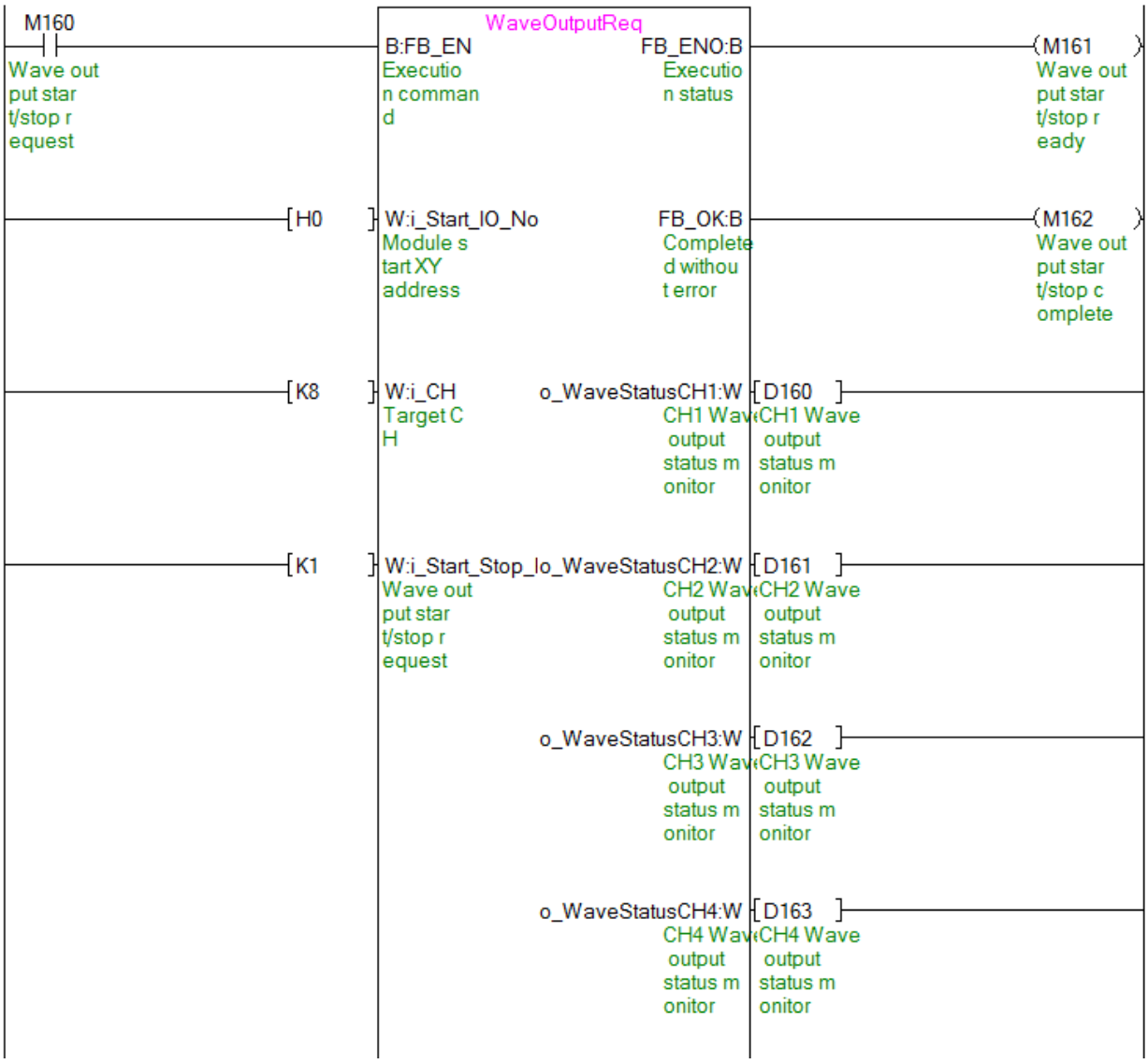
By turning ON M150, the wave output setting for channel 7 is performed.


M150
Wave output setting request
WaveOutputSet
B:FB_EN
Execution command
FB_ENO:B
Execution status
M151
Wave output setting ready
H0
W:i_Start_IO_No
Module start XY address
FB_OK:B
Completed without error
M152
Wave output setting complete
K7
W:i_CH
Target CH
FB_ERROR:B
Error flag
F50
Wave output setting FB error
K2
W:i_OutputSelect
Output setting during wave output
ERROR_ID:W
Error code
D150
Wave output setting FB err code
K4000
W:i_OutputValue
Output value during wave output
K5000
D:i_StartingAddr
Wave pattern start address setti
K10000
D:i_PointsSetting
Wave pattern points setting
K2000
W:i_Frequency
Wave output count setting
K1
W:i_ConvSpeed
Constant for wave output convers

M+L60DAL8_WaveOutputReqSetting (Wave output start/stop request)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the L60DAIL8 (or L60DAVL8) module is mounted to 0H.
i_CH	K8	Set the target channel to channel 8.
i_Start_Stop_Req	K1	Set the wave output start/stop request to "1: Wave output start request".

By turning ON M160, the wave output for channel 8 is started.



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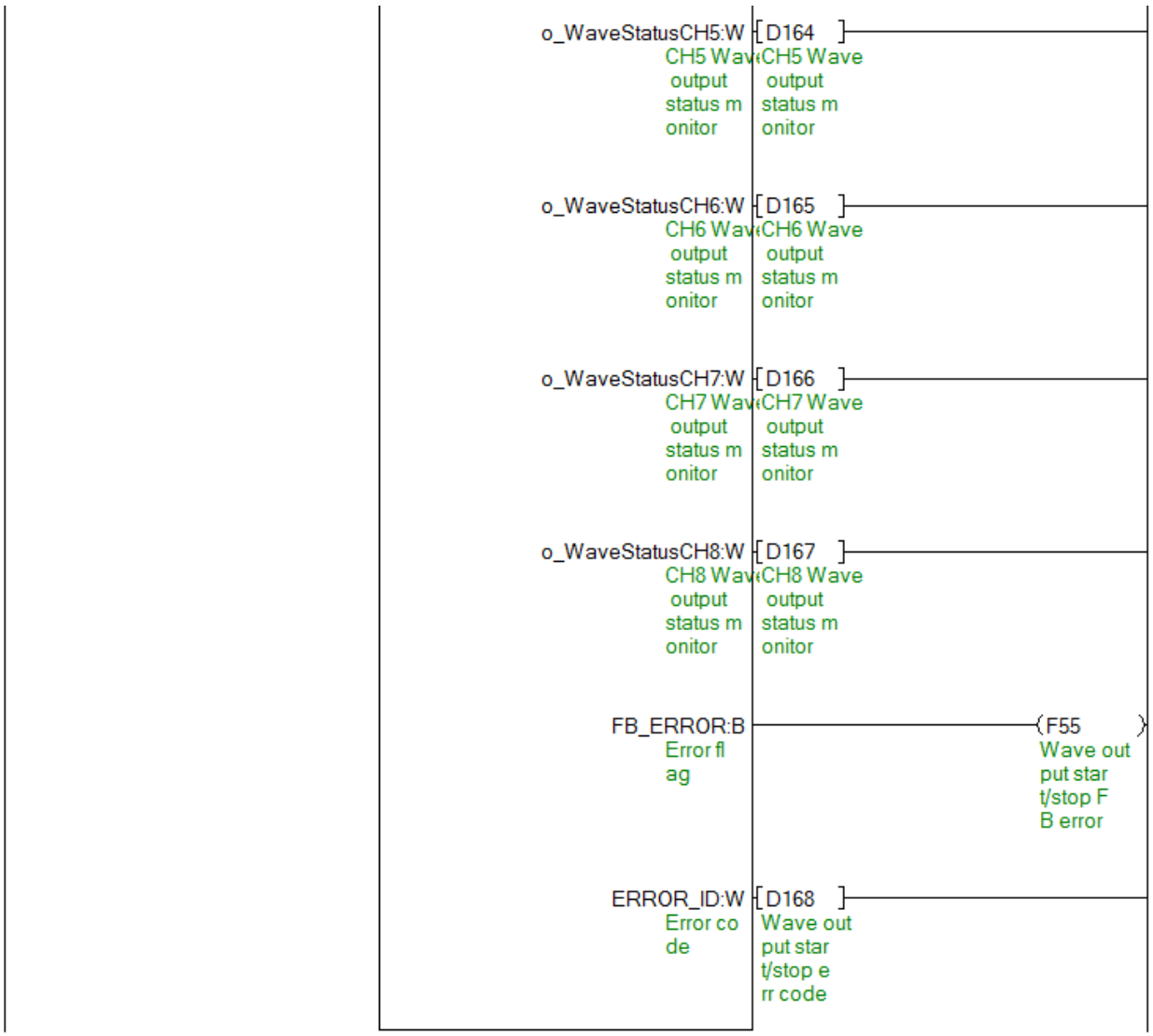

o_WaveStatusCH5:W
CH5 Wave output status monitor
D164
CH5 Wave output status monitor
o_WaveStatusCH6:W
CH6 Wave output status monitor
D165
CH6 Wave output status monitor
o_WaveStatusCH7:W
CH7 Wave output status monitor
D166
CH7 Wave output status monitor
o_WaveStatusCH8:W
CH8 Wave output status monitor
D167
CH8 Wave output status monitor
FB_ERROR:B
Error flag
F55
Wave output start/stop FB error
ERROR_ID:W
Error code
D168
Wave output start/stop err code

Appendix 2. Storage Sources (Wave Output Function Parameters/Data) and Storage Destination Buffer Memory

The following table shows the relationship between the storage sources (wave output function parameters/data), which are handled by M+L60DAL8_WaveDataStoreCsv (Read wave data (CSV file)) and M+L60DAL8_WaveDataStoreDev (Read wave data (device)) and the storage destination buffer memory.

Table 1 Storage sources (wave output function parameters/data) and storage destination buffer memory

No.	Wave output function parameters/data	Setting range (Decimal)	CH	Storage sources			Storage destination
				CSV file in SD memory card		Sequential access file register (ZR) (m: Read start address)	D/A converter module Buffer memory (n: Module start XY address (Upper))
				Row	Column		
(1)	Output setting during wave output stop Select an output value while the wave output is stopped 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
			5	1	5	ZR(m+4)	Un\G1012
			6	1	6	ZR(m+5)	Un\G1013
			7	1	7	ZR(m+6)	Un\G1014
			8	1	8	ZR(m+7)	Un\G1015
(2)	Output value during wave output stop Set a value to output for each channel when "Output setting during wave output stop" is set to "2: Output value during wave output stop".	(*1) 0~8,191 (Practical range: 0~8,191)	1	2	1	ZR(m+8)	Un\G1016
			2	2	2	ZR(m+9)	Un\G1017
			3	2	3	ZR(m+10)	Un\G1018
			4	2	4	ZR(m+11)	Un\G1019
		(*2) -16,384~16,383 (Practical range: -16,000~16,000)	5	2	5	ZR(m+12)	Un\G1020
			6	2	6	ZR(m+13)	Un\G1021
			7	2	7	ZR(m+14)	Un\G1022
			8	2	8	ZR(m+15)	Un\G1023
(3)	Wave pattern start address setting Set the start address of the wave pattern to output for each channel.	5,000~54,999	1	3	1	ZR(m+16, 17)	Un\G1024,1025
			2	3	2	ZR(m+18, 19)	Un\G1026,1027
			3	3	3	ZR(m+20, 21)	Un\G1028,1029
			4	3	4	ZR(m+22, 23)	Un\G1030,1031
			5	3	5	ZR(m+24, 25)	Un\G1032,1033
			6	3	6	ZR(m+26, 27)	Un\G1034,1035
			7	3	7	ZR(m+28, 29)	Un\G1036,1037
			8	3	8	ZR(m+30, 31)	Un\G1038,1039
(4)	Wave pattern points setting Set the data points of the wave pattern to output for each channel.	1~50,000 (points)	1	4	1	ZR(m+32, 33)	Un\G1040,1041
			2	4	2	ZR(m+34, 35)	Un\G1042,1043
			3	4	3	ZR(m+36, 37)	Un\G1044,1045
			4	4	4	ZR(m+38, 39)	Un\G1046,1047
			5	4	5	ZR(m+40, 41)	Un\G1048,1049
			6	4	6	ZR(m+42, 43)	Un\G1050,1051
			7	4	7	ZR(m+44, 45)	Un\G1052,1053
			8	4	8	ZR(m+46, 47)	Un\G1054,1055

No.	Wave output function parameters/data	Setting range (Decimal)	CH	Storage sources			Storage destination
				CSV file in SD memory card		Sequential access file register (ZR) (m: Read start address)	D/A converter module Buffer memory (n: Module start XY address (Upper))
				Row	Column		
(5)	Wave output count setting Set the wave pattern output count for each channel.	-1: Repeat outputs infinitely 1~32,767: Specify an output count.	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
			5	5	5	ZR(m+52)	Un\G1060
			6	5	6	ZR(m+53)	Un\G1061
			7	5	7	ZR(m+54)	Un\G1062
			8	5	8	ZR(m+55)	Un\G1063
(6)	Constant for wave output conversion cycle Set a constant for each channel to specify the conversion cycle (in multiples of conversion speed).	1~5,000	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
			5	6	5	ZR(m+60)	Un\G1068
			6	6	6	ZR(m+61)	Un\G1069
			7	6	7	ZR(m+62)	Un\G1070
			8	6	8	ZR(m+63)	Un\G1071
(7)	Wave data points Set the total wave data points.	0~50,000 (points)		100	1	ZR(m+98,99)	-
(8)	Wave data	(*1) 0~8,191 (Practical range: 0~8,191)		101 ~ 50,100	1	ZR(m+100) ~ ZR(m+50099)	Un\G5000 ~ Un\54999
		(*2) -16,384~16,383 (Practical range: -16,000~16,000)					

*1: D/A converter module output range: When using 0~5V, 1~5V, 0~20mA, 4~20mA

*2: D/A converter module output range: When using -10~10V

* (1) to (8) in the table correspond to the numbers in "example of rows/columns of a CSV file" in Appendix 3.

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

This section describes the CSV file format that can be handled by M+L60DAL8_WaveDataStoreCsv (Read wave data (CSV file)). (The extension of the CSV file must be ".CSV" and the file must be able to open with a general-purpose application such as Excel or Notepad.)

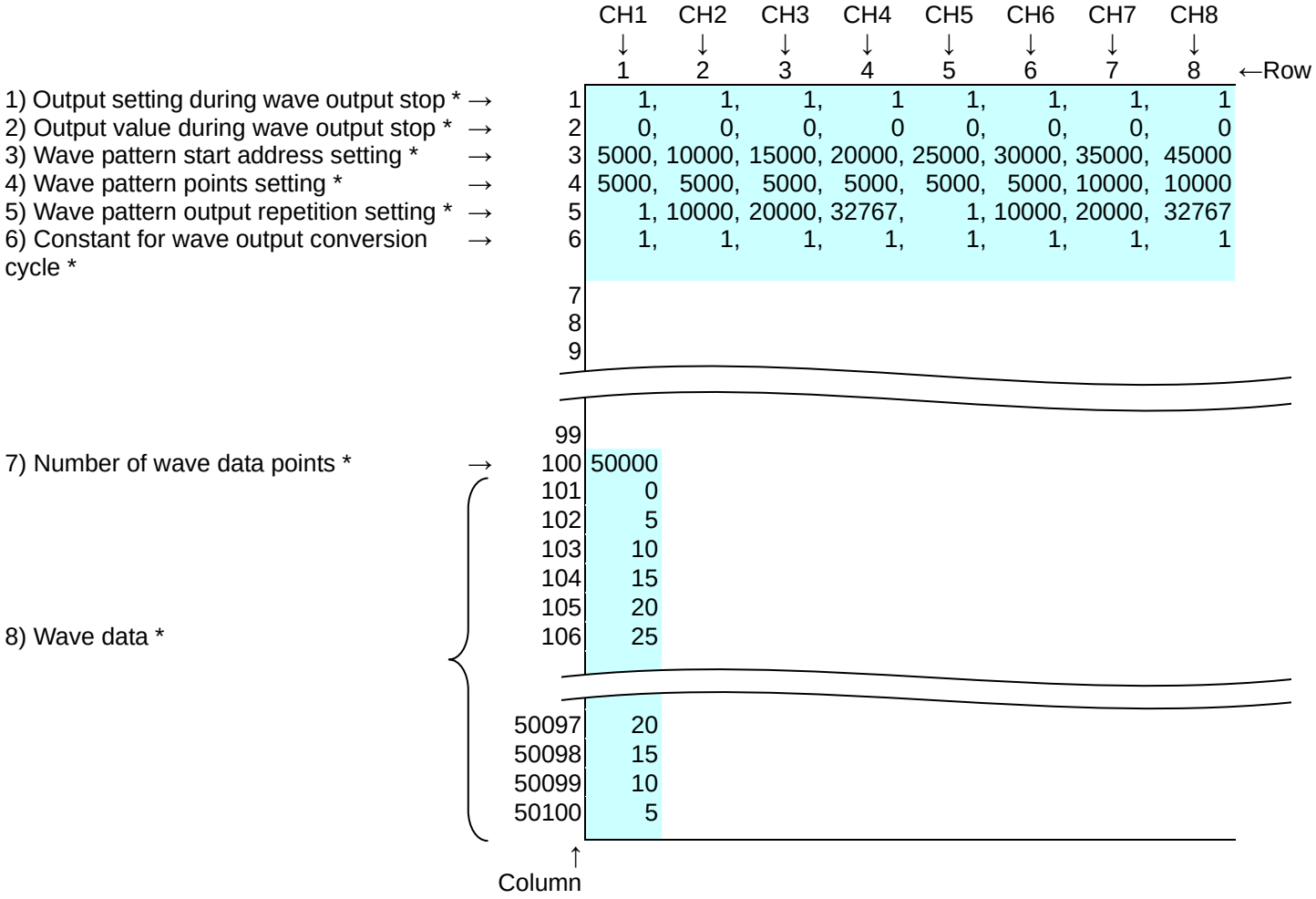
The CSV format specifications are as follows:

Item	Description
Delimiter	Comma (,)
linefeed code	CRLF(0x0D,0x0A)
Character code	ASCII or shift JIS
File size	Maximum 400455 bytes *1

*1 When the number of wave data points is 50000 and all the wave data is negative with 5 digits, the file size is maximum.

The CSV file name must be up to 12 half-width characters including the extension ".CSV". (Two-byte characters can also be used. One full-width character is counted as 2 half-width characters.)
(Example) L60DAVL8.csv, L60DAIL8.csv, wd000001.csv, Wave.csv, etc.

The following figure shows an example of rows/columns of a CSV file. In this example, the wave data points setting is set to 50000 (maximum points).



* (1) to (8) in the table above correspond to the items in Table 1 Storage sources (wave output function parameters/data) and storage destination buffer memory. For details on each item, refer to the table.