# MELSEC-L Analog Input/Output Module FB Library Reference Manual

Applicable modules:

L60AD2DA2

#### <CONTENTS>

Reference Manual Revision History	3
1. Overview	4
1.1. Overview of the FB Library	4
1.2. Function of the FB Library	4
1.3. System Configuration Example	6
1.4. Relevant Manuals	7
1.5. Note	7
2. Details of the FB Library	8
2.1. A/D conversion FB	8
2.1.1. M+L60AD2DA2_AD_ReadADVal (Read A/D conversion data)	8
2.1.2. M+L60AD2DA2_AD_ReadAllADVal (Read A/D conversion data (all CHs))	13
2.1.3. M+L60AD2DA2_AD_ReadScalingVal (Read A/D conversion scaling value)	17
2.1.4. M+L60AD2DA2_AD_ReadAllScalingVal (Read A/D conversion scaling value (all CHs)	)22
2.1.5. M+L60AD2DA2_AD_SetADConversion (A/D conversion enable/disable setting)	
2.1.6. M+L60AD2DA2_AD_SetAverage (A/D conversion averaging process setting)	
2.1.7. M+L60AD2DA2_AD_SetScaling (A/D conversion scaling setting)	35
2.1.8. M+L60AD2DA2_AD_SetInputSignalErr (A/D conversion input signal error detection se	etting) 40
2.1.9. M+L60AD2DA2_AD_SetOffsetVal (A/D conversion offset setting)	45
2.1.10.M+L60AD2DA2_AD_SetGainVal (A/D conversion gain setting)	51
2.1.11. M+L60AD2DA2_AD_ShiftOperation (A/D conversion shift operation)	
2.1.12.M+L60AD2DA2_AD_DiffOperation (A/D difference conversion)	60
2.1.13.M+L60AD2DA2_AD_ClipOperation (A/D conversion digital clipping)	64
2.1.14.M+L60AD2DA2_AD_SetLoggingPARAM (Logging function parameter setting)	68
2.1.15.M+L60AD2DA2_AD_SaveLogging (Logging data save)	73
2.2. D/A conversion FB	82
2.2.1. M+L60AD2DA2_DA_WriteDAVal (Write D/A conversion data)	82
2.2.2. M+L60AD2DA2_DA_WriteAllDAVal (Write D/A conversion data (all CHs))	86
2.2.3. M+L60AD2DA2_DA_SetDAConversion (D/A conversion enable/disable setting)	90
2.2.4. M+L60AD2DA2_DA_SetDAOutput (D/A output enable/disable setting)	94
2.2.5. M+L60AD2DA2_DA_SetScaling (D/A conversion scaling setting)	
2.2.6. M+L60AD2DA2_DA_SetAlarm (D/A conversion alert output setting)	
2.2.7. M+L60AD2DA2_DA_SetOffsetVal (D/A conversion offset setting)	
MELSEC-L Analog Input/Output Module FB Library	Reference Manual FBM-M111-B



2.2.8. M+L60AD2DA2_DA_SetGainVal (D/A conversion gain setting)	113
2.2.9. M+L60AD2DA2_DA_ShiftOperation (D/A conversion shift operation)	119
2.2.10.M+L60AD2DA2_DA_WaveDataStoreCsv (Read wave data (CSV file))	123
2.2.11.M+L60AD2DA2_DA_WaveDataStoreDev (Read wave data (device))	131
2.2.12.M+L60AD2DA2_DA_WaveOutputSetting (Wave output setting)	137
2.2.13.M+L60AD2DA2_DA_WaveOutReqSetting (Wave output start/stop request)	142
2.3. Common FB	147
2.3.1. M+L60AD2DA2_ReadADVal_WriteDAVal (Read A/D conversion data and write D/A conversion data)	147
2.3.2. M+L60AD2DA2_RequestSetting (Operating condition setting request)	152
2.3.3. M+L60AD2DA2_ErrorOperation (Error operation)	156
2.3.4. M+L60AD2DA2_OGBackup (Offset/gain value save)	161
2.3.5. M+L60AD2DA2_OGRestore (Offset/gain value restore)	167
2.3.6. M+L60AD2DA2_FreeCalDataStoreDev (Read calculation expression data)	172
2.3.7. M+L60AD2DA2_FreeConvDataStoreCsv (Read conversion characteristics data (CSV file))	178
2.3.8. M+L60AD2DA2_FreeConvDataStoreDev (Read conversion characteristics data (device))	187
Appendix 1. FB Library Application Examples	193
Appendix 1.1. Application examples of the A/D conversion FBs	194
Appendix 1.2. Application examples of the D/A conversion FBs	214
Appendix 1.3. Application examples of the common FBs	232
Appendix 2. CSV File Format for Logging data save FB	242
Appendix 3. Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory	245
Appendix 4. CSV File Format for Wave Data Reading FB (CSV File)	246
Appendix 5. Storage Source "Parameters and Free Conversion Characteristics Table of the Free Conversion	
Characteristics Function" and Storage Location Buffer Memory	247
Appendix 6. CSV File Format for Conversion Characteristics Data Reading FB (CSV File)	248



# Reference Manual Revision History

Reference Manual	Date	Description	
Number			
FBM-M111-A	2013/08/30	First edition	
FBM-M111-B	2015/04/03	1) The following FB libraries have been added.	
		<ul> <li>M+L60AD2DA2_FreeCalDataStoreDev</li> </ul>	
		<ul> <li>M+L60AD2DA2_FreeConvDataStoreCsv</li> </ul>	
		<ul> <li>M+L60AD2DA2_FreeConvDataStoreDev</li> </ul>	
		2) Added applicable GX Works2 Version.	
		<ul> <li>This FB is able to install on GX Works2 of all language versions.</li> </ul>	



#### 1. Overview

1.1. Overview of the FB Library

This FB Library is for using the MELSEC-L Analog Input/Output Module L60AD2DA2 (hereinafter L60AD2DA2).

#### 1.2. Function of the FB Library

[A/D	conversion
1, 1, 2	controlong

Item	Description
M+L60AD2DA2_AD_ReadADVal	Reads the A/D conversion data of the specified A/D conversion channel
	(CH1 or CH2).
M+L60AD2DA2_AD_ReadAllADVal	Reads the A/D conversion data of the A/D conversion channels (CH1 and
	CH2).
M+L60AD2DA2_AD_ReadScalingVal	Reads the scaling value of the specified A/D conversion channel (CH1 or
	CH2).
M+L60AD2DA2_AD_ReadAllScalingVal	Reads the scaling values of the A/D conversion channels (CH1 and CH2).
M+L60AD2DA2_AD_SetADConversion	Enables or disables the A/D conversion for the specified A/D conversion
	channel (CH1 or CH2) or all the A/D conversion channels (CH1 and CH2).
M+L60AD2DA2_AD_SetAverage	Sets the averaging processing of the specified A/D conversion channel
	(CH1 or CH2).
M+L60AD2DA2_AD_SetScaling	Sets the scaling of the specified A/D conversion channel (CH1 or CH2).
M+L60AD2DA2_AD_SetInputSignalErr	Sets the input signal error detection of the specified A/D conversion
	channel (CH1 or CH2).
M+L60AD2DA2_AD_SetOffsetVal	Sets the offset of the specified A/D conversion channel (CH1 or CH2).
M+L60AD2DA2_AD_SetGainVal	Sets the gain of the specified A/D conversion channel (CH1 or CH2).
M+L60AD2DA2_AD_ShiftOperation	Adds the conversion value shift amount to the digital value.
M+L60AD2DA2_AD_DiffOperation	Outputs the remaining value after subtraction of the reference value from
	the digital value.
M+L60AD2DA2_AD_ClipOperation	Limits the digital value with the upper and lower limit values of the digital
	clipping.
M+L60AD2DA2_AD_SetLoggingPARA	Sets the logging function of the specified A/D conversion channel (CH1 or
М	CH2).
M+L60AD2DA2_AD_SaveLogging	Saves the logging data to a file.



[D/A conversion]

Item	Description		
	Writes the D/A conversion data of the specified D/A conversion channel		
M+L60AD2DA2_DA_WIIIeDAVai	(CH3 or CH4).		
	Writes the D/A conversion data of the D/A conversion channels (CH3		
	and CH4).		
	Enables or disables the D/A conversion for the D/A conversion		
M+L60AD2DA2_DA_SetDAConversion	specified channel (CH3 or CH4) or all the D/A conversion channels		
	(CH3 and CH4).		
	Enables or disables the D/A output of the specified D/A conversion		
M+L60AD2DA2_DA_SetDAOutput	channel (CH3 or CH4) or all the D/A conversion channels (CH3 and		
	CH4).		
M+L60AD2DA2_DA_SetScaling	Sets the scaling of the specified D/A conversion channel (CH3 or CH4).		
Mul 604 D2D 42 DA SotAlorm	Sets the alert output of the specified D/A conversion channel (CH3 or		
	CH4).		
M+L60AD2DA2_DA_SetOffsetVal	Sets the offset of the specified D/A conversion channel (CH3 or CH4).		
M+L60AD2DA2_DA_SetGainVal	Sets the gain of the specified D/A conversion channel (CH3 or CH4).		
M+L60AD2DA2_DA_ShiftOperation	Adds the input value shift amount to the digital value.		
	Reads data from the CSV file where parameters and wave data (wave		
M+L60AD2DA2_DA_WaveDataStoreCsv	data and wave data points) of the wave output function are stored, then		
	writes them to the buffer memory of the L60AD2DA2.		
	Reads data from the file register (ZR) where parameters and wave data		
M+L60AD2DA2_DA_WaveDataStoreDev	(wave data and wave data points) of the wave output function are		
	stored, then writes them to the buffer memory of the L60AD2DA2.		
M+L604D2D42 D4 WayeOutputSetting	Sets the wave output of the specified D/A conversion channel (CH3 or		
	CH4) or all the D/A conversion channels (CH3 and CH4).		
	Sets the starting, stopping, or pausing of the wave output of the		
M+L60AD2DA2_DA_WaveOutReqSetting	specified D/A conversion channel (CH3 or CH4) or all the D/A		
	conversion channels (CH3 and CH4).		



[Common]

Item	Description	
	Reads the A/D conversion data of the A/D conversion channels (CH1 and	
M+L60AD2DA2_ReadADVal_WriteDAVal	CH2) and writes the D/A conversion data of the D/A conversion channels	
	(CH3 and CH4).	
M+L60AD2DA2_RequestSetting	Validates each setting.	
M+L60AD2DA2_ErrorOperation	Monitors error codes and resets errors.	
	Reads the offset/gain setting value of the user range setting and stores it	
M+L60AD2DA2_OGBackup	to a file.	
Mul 604D2D42 OCRostoro	Restores the offset/gain setting values of the user range setting that are	
NI+LOOADZDAZ_OGRESIOIE	saved in a file to the module.	
	Reads calculation expression data of the free calculation function from	
M+L60AD2DA2_FreeCalDataStoreDev	the file register (ZR), and then writes them to the buffer memory of the	
	L60AD2DA2.	
	Reads the parameters and free conversion characteristics table of the	
M+L60AD2DA2_FreeConvDataStoreCsv	free conversion characteristics function from the CSV file, and then writes	
	them to the buffer memory of the L60AD2DA2.	
	Reads the parameters and free conversion characteristics table of the	
M+L60AD2DA2_FreeConvDataStoreDev	free conversion characteristics function from the file register (ZR), and	
	then writes them to the buffer memory of the L60AD2DA2.	

# 1.3. System Configuration Example





MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

- 1.4. Relevant Manuals
- MELSEC-L Analog Input/Output Module User's Manual
- MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
- MELSEC-L CPU Module User's Manual (Data Logging Function)
- GX Works2 Version 1 Operating Manual (Common)
- GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

#### 1.5. Note



### 2. Details of the FB Library

#### 2.1. A/D conversion FB

### 2.1.1. M+L60AD2DA2\_AD\_ReadADVal (Read A/D conversion data)

#### **FB Name**

#### M+L60AD2DA2\_AD\_ReadADVal

Item	Description					
Function overview	Reads the A/D conversion	on data of the specified A	/D conver	sion chann	nel (CH1 or CH2).	
Symbol		M+L60AD2DA2 AD	) ReadAD\	/al		
	Execution command —	B : FB_EN	FI	B_ENO : B		
	Module start XY address —	W:i Start IO No		FB OK : B	-Completed without error	or
	Target CH	W·i CH		Value • W	- A/D conversion data	
	Target Off	w . i_oii				
			FB_E	RROR : B	- Error hag	
			ERR	OR_ID : W	-Error code	
Applicable	Analog I/O module	L60AD2DA2				
hardware and	CPU module					
software		Series		Мс	odel	
		MELSEC-L Series	LCPU			
	Engineering software	GX Works2 *1				
		Language		Soft	tware version	
		Japanese version		Version1.	86Q or later	
		English version		Version1.	24A or later	
		Chinese (Simplified) v	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	Ladder					
language						
Number of steps	324 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	1) By turning ON FB_EN (Execution command), the A/D conversion data of the specified
description	A/D conversion channel (CH1 or CH2) is read.
	2) The read A/D conversion data depends on the settings of the input range and the
	averaging processing function.
	3) When the A/D conversion completed flag (XnE) is OFF, the A/D conversion data of the
	specified channel is not read.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in
	ERROR_ID (Error code).
	Refer to the error code explanation section for details.
	5) When the digital output value is set in the auto refresh setting of the intelligent function
	module, this FB is unnecessary.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Real-time execution
Application	Refer to "Appendix 1. FB Library Application Examples".
example	



Item	Description	
Timing chart	[When operation completes without error]         FB_EN (Execution command)         FB_ENO (Execution status) o_AD_Value (A/D conversion data)         FB_OK (Completed without error)         FB_EROR (Error flag)         ERROR_ID (Error code)         0	[When an error occurs] FB_EN (Execution command) FB_ENO (Execution status) o_AD_Value (A/D conversion data) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0 Error code 0
Relevant manuals	<ul> <li>MELSEC-L Analog Input/Output Module Use</li> <li>MELSEC-L CPU Module User's Manual (Ha</li> <li>GX Works2 Version 1 Operating Manual (Co</li> <li>GX Works2 Version 1 Operating Manual (Single Construction)</li> </ul>	er's Manual Irdware Design, Maintenance and Inspection) ommon) mple Project, Function Block)

### Error codes

### •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	



### Labels

### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN		ON, OFF	ON: The FB is activated.
		Bit		OFF: The FB is not
				activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the start XY
address			range of the CPU.	address (in hexadecimal)
		Word	For details, refer to the CPU	where the L60AD2DA2 is
			user's manual.	connected. (For example,
				enter H10 for X10.)
Target CH	i_CH	Word	1, 2	Specify the channel
		vvolu		number.

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit		ON: Execution command is ON.
		ы	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the A/D
error		DIL		conversion value is being read.
A/D conversion data	o_AD_Value	Word	0	The A/D conversion value is stored.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.



#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.2. M+L60AD2DA2\_AD\_ReadAllADVal (Read A/D conversion data (all CHs))

#### FB Name

M+L60AD2DA2\_AD\_ReadAllADVal

Item	Description			
Function overview	Reads the A/D conversion	data of the A/D conversi	on chanr	nels (CH1 and CH2).
Symbol		M+L60AD2DA2 AD Re	adAllADVa	al
	Execution command — B	: FB_EN	FB_	ENO: B Execution status
	Module start XY address —W	: i_Start_IO_No	FB	_OK : B Completed without error
			CH1 : W-CH1 A/D conversion data	
			FD_EK	
			ERROI	R_ID : W—Error code
Applicable hardware	Analog I/O module	L60AD2DA2		
and software	CPU module			
	Series		Model	
	MELSEC-L Series LCPU			
	Engineering software GX Works2 *1			
			Software version	
		Language Software version		Version1.860 or leter
				Version1.24A or later
		Chinese (Simplified) w	oroion	Version1.24A of later
		Chinese (Simplined) v		Version1.49D or later
		Chinese (Traditional) v	reision	Version1.49B of later
		*1 For offwore version		Version 1.49B of later
	*1 For software versions applicable to the modules used, refer to			
Drogramming	Laddar	Relevant Manuals .		
Programming	Ladder			
Number of store	290 stops (for MELSEC			
Number of Steps	280 steps (for MELSEU-L series UPU)			
	input and output definition	ne ro in a program depe	nus on ti	THE CHO MODEL THAT IS USED AND
	input and output definition.			



Item	Description		
Function description	1) By turning ON FB_EN (Execution command), the A/D conversion data of the A/D		
	conversion channels (CH1 and CH2) is read.		
	2) The read A/D conversion data depends on the settings of the input range and the		
	averaging processing function.		
	3) When the A/D conversion completed flag (XnE) is OFF, the A/D conversion data of		
	channel 1 and channel 2 is not read.		
	4) When the digital output value is set in the auto refresh setting of the intelligent function		
	module, this FB is unnecessary.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop because it is impossible to turn OFF.		
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an		
	interrupt program.		
	Every input must be provided with a value for proper FB operation		
	6) To operate the L60AD2DA2, set the I/O range according to the device and system to be		
	connected. Configure the setting in Switch Setting of GX Works2 according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Version 1 Operating Manual (Common).		
FB operation type	Real-time execution		
Application example	Refer to "Appendix 1. FB Library Application Examples".		
Timing chart	[When operation completes without error]		
	(Execution command)		
	FB_ENO (Execution status)		
	o_AD_Value_CH Update Update Update CH A/D conversion data)		
	FB_OK (Completed without error)		
	FB_ERROR (Error flag)		
	ERROR_ID (Error code) 0		
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual		
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	GX Works2 Version 1 Operating Manual (Common)		
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)		



Error codes			
Error code list			
Error code	Description	Action	
None	None	None	

### Labels

Input labels				
Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the	Specify the start XY address (in
address			I/O point range	hexadecimal) where the
		Word	of the CPU.	L60AD2DA2 is connected. (For
		vvoru	For details, refer	example, enter H10 for X10.)
			to the CPU	
			user's manual.	

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit		ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK	Bit	OFF	When ON, it indicates that the A/D
error		Bit OFF		conversion value is being read.
CH1 A/D conversion	o_AD_Value_CH1	Word	0	The A/D conversion value of channel 1
data				is stored.
CH2 A/D conversion	o_AD_Value_CH2	Word	0	The A/D conversion value of channel 2
data		volu	0	is stored.
Error flag	FB_ERROR			When ON, it indicates that an error has
		DIL		occurred.
Error code	ERROR_ID	Word	0	FB error code output.



#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.3. M+L60AD2DA2\_AD\_ReadScalingVal (Read A/D conversion scaling value)

#### FB Name

M+L60AD2DA2\_AD\_ReadScalingVal

Item	Description			
Function overview	Reads the scaling value	of the specified A/D conv	ersion ch	nannel (CH1 or CH2).
Symbol	Meads the scaling value of the specified A/D conversion character         M+L60AD2DA2_AD_ReadScaling         Execution command         B : FB_EN         Module start XY address         W : i_Start_IO_No         Target CH         W : i_CH         o_Scaling_         FB_ER         Execution command         B : FB_EN         FB_ER         Module start XY address         W : i_CH         o_Scaling_         FB_ER         ERRC		Val B_ENO : B — Execution status B_OK : B — Completed without error Value : W — Scaling value RROR : B — Error flag OR_ID : W — Error code	
	l			
Applicable hardware	Analog I/O module	L60AD2DA2		
and software	CPU module			
		Series Model		
		MELSEC-L Series LCPU		
	Engineering software	GX Works2 *1		
		Language Software version		Software version
		Japanese version Version1.86Q or later		Version1.86Q or later
		English version Version1.24A or later		Version1.24A or later
		Chinese (Simplified) v	ersion	Version1.49B or later
		Chinese (Traditional)	ersion	Version1.49B or later
		Korean version		Version1.49B or later
	*1 For software versions applicable to the modules used, refer to			
	"Relevant Manuals".			
Programming	Ladder			
language				
Number of steps	365 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) By turning ON FB_EN (Execution command), the scaling value of the specified A/D			
	conversion channel (CH1 or CH2) is read.			
	2) The read scaling value depends on the setting of the input range, the averaging			
	processing function, and the scaling function (A/D conversion).			
	3) In the following cases, the scaling data is not read.			
	<ul> <li>When the A/D conversion scaling enable/disable setting (Un\G53) the specified</li> </ul>			
	channel is invalid			
	<ul> <li>When the A/D conversion completed flag (XnE) is OFF</li> </ul>			
	4) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in			
	ERROR_ID (Error code).			
	Refer to the error code explanation section for details.			
	5) When the scaling value is set in the auto refresh setting of the intelligent function			
	module, this FB is unnecessary.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.			
	Do not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition			
	of the target channel.			
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an			
	interrupt program.			
	6) Every input must be provided with a value for proper FB operation			
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1. FB Library Application Examples".			



Item	Description		
Timing chart	[When operation completes without error]	[When an error occurs]	
	FB_EN (Execution command)         FB_ENO (Execution status)         o_Scaling_Value (Scaling value)         FB_OK (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)         0	FB_EN         (Execution command)         FB_ENO         (Execution status)         o_Scaling_Value         (Scaling value)         FB_OK         (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)         0         Error code	
Relevant manuals	<ul> <li>MELSEC-L Analog Input/Output Module User's Manual</li> <li>MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)</li> <li>GX Works2 Version 1 Operating Manual (Common)</li> <li>GX Works2 Version 1 Operating Manual (Simple Project, Function Block)</li> </ul>		

### Error codes

### •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	



### Labels

### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
		vvolu	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	1, 2	Specify the channel number.

#### 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	FB_OK			When ON, it indicates that the scaling value
error		DIL	OFF	is being read.
Scaling value	o_Scaling_Value	Word	0	The scaling value is stored.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL		occurred.
Error code	ERROR_ID	Word	0	FB error code output.



#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.4. M+L60AD2DA2\_AD\_ReadAllScalingVal (Read A/D conversion scaling value (all CHs))

#### FB Name

M+L60AD2DA2\_AD\_ReadAllScalingVal

Item	Description				
Function overview	Reads the scaling values of the A/D conversion channels (CH1 and CH2).				
Symbol	M+I 60AD2DA2 AD ReadAllScalingVal				
	Execution command —	B : FB_EN	FE	B_ENO : B Execution status	
	Module start XY address -	W:i_Start_IO_No	I	FB_OK : B Completed without error	
			o_Scalin	g_CH1 : W—CH1 Scaling value	
			o_Scalin	g_CH2 :W—CH2 Scaling value	
			FB_E	RROR : B - Error flag	
			ERR	OR_ID : W—Error code	
				_	
Applicable bardware	Analog I/O module				
and software	CPU module				
		Series		Model	
		MELSEC-L Series	LCPU		
	Engineering software	GX Works2 *1		1	
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	ersion/	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	312 steps (for MELSEC	C-L series CPU)			
	* The number of steps of	of the FB in a program de	pends or	n the CPU model that is used and	
	input and output definit	ition.			



Item	Description			
Function description	1) By turning ON FB_EN (Execution command), the scaling values of the A/D conversion			
	channels (CH1 and CH2) are read.			
	2) The read scaling value depends on the setting of the input range, the averaging			
	processing function, and the scaling function (A/D conversion).			
	3) The scaling value of the channel for which the A/D conversion scaling enable/disable			
	setting (Un\G53) is invalid is not read.			
	4) When the A/D conversion completed flag (XnE) is OFF, the scaling values of the			
	channels (CH1 and CH2) are not read.			
	5) When the scaling value is set in the auto refresh setting of the intelligent function			
	module, this FB is unnecessary.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.			
	Do not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an			
	interrupt program.			
	5) Every input must be provided with a value for proper FB operation			
	6) To operate the L60AD2DA2, set the I/O range according to the device and system to			
	be connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1. FB Library Application Examples".			
Timing chart	[When operation completes without error]			
	FB_EN			
	(Execution status) o_Scaling_CHD Update Update Stopped During update Stopped			
	FB_OK (Completed without error)			
	FB_ERROR (Error flag)			
	ERROR_ID (Error code) 0			



Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

### Error codes

●Error code list		
Error code	Description	Action
None	None	None

### Labels

#### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
		vvord	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO			ON: Execution command is ON.
		DIL		OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the scaling value
error		DIL		is being read.
CH1 Scaling value	o_Scaling_CH1	Word	0	The scaling value of channel 1 is stored.
CH2 Scaling value	o_Scaling_CH2	Word	0	The scaling value of channel 2 is stored.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.



#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.5. M+L60AD2DA2\_AD\_SetADConversion (A/D conversion enable/disable setting)

#### FB Name

M+L60AD2DA2\_AD\_SetADConversion

Item	Description	Description			
Function overview	Enables or disables the	A/D conversion for the sp	pecified A	/D conversion channel (CH1 or	
	CH2) or all the A/D conversion channels (CH1 and CH2).				
Symbol		M+L60AD2DA2_	AD_SetADC	Conversion	
	Execution com	nmand — B : FB_EN		FB_ENO : B Execution status	
	Module start XY ac	ddress - W : i_Start_IO_No		FB_OK : B Completed without error	
	Targ	get CH—W:i_CH		FB_ERROR : B Error flag	
	A/D conversion enable/disable s	setting B : i_AD_Enable		ERROR_ID : W—Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Model	
		MELSEC-L Series	LCPU		
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) v	ersion	Version1.49B or later	
		Chinese (Traditional)	version	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software version	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	385 steps (for MELSEC-L series CPU)				
	* The number of steps o	f the FB in a program de	pends on	the CPU model that is used and	
	input and output definit	tion.			



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the A/D conversion for the specified A/D
	conversion channel (CH1 or CH2) or all the A/D conversion channels (CH1 and CH2) is
	enabled or disabled.
	2) FB operation is one-shot only, triggered by the FB_EN signal.
	3) The setting value is validated when the Operating condition setting request signal (Yn9)
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB
	(M+L60AD2DA2_RequestSetting) is executed.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code 10 (Decimal) is stored in
	ERROR_ID (Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description		
Timing chart	[When operation completes without error]         FB_EN (Execution command)         FB_ENO (Execution status)         A/D conversion enable/disable         setting writing processing         FB_OK         (Corrected without error)	[When an error occurs] FB_EN (Execution command) FB_ENO (Execution status) A/D conversion enable/ disable setting writing processing	
	(Completed without error)       FB_ERROR (Error flag)       ERROR_ID (Error code)	FB_OK       (Completed without error)       FB_ERROR (Error flag)       ERROR_ID (Error code)       0       Error code	
Relevant manuals	MELSEC-L Analog Input/Output Module Us	er's Manual	
	• MELSEC-L CPU Module User's Manual (Ha	ardware Design, Maintenance and Inspection)	
	• GX Works2 Version 1 Operating Manual (C	ommon)	
	• GX Works2 Version 1 Operating Manual (Si	imple Project, Function Block)	

### Error codes

# •Error code list

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

# Labels

#### Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated.
		Dit		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the L60AD2DA2
		Word	CPU.	is connected. (For example, enter H10
			For details, refer to the	for X10.)
			CPU user's manual.	
Target CH	i_CH	Word	1, 2, 15	1 or 2: Specify the channel number.
		word		15: Specify channel 1 and channel 2.
A/D conversion	i_AD_Enable		ON, OFF	ON: A/D conversion enabled
enable/disable		Bit		OFF: A/D conversion disabled
setting				



#### Output labels

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

#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.6. M+L60AD2DA2\_AD\_SetAverage (A/D conversion averaging process setting)

#### **FB Name**

M+L60AD2DA2\_AD\_SetAverage

Item	Description				
Function overview	Sets the averaging processing of the specified A/D conversion channel (CH1 or CH2).				
Symbol	Execution command		M+L60AD2DA2_ B : FB_EN	AD_SetAve	rage FB_ENO : B— Execution status
	Module start XY addr	ess —	W:i_Start_IO_No		FB_OK : B Completed without error
	Target	сн—	W : i_CH	FB	_ERROR : BError flag
	Averaging process set Time average/Count average/Mo aver	ting— ving age	W:i_Average_Type W:i_Average_Times	EF	RROR_ID : W— Error code
Applicable hardware	Analog I/O module	L60	AD2DA2		
and software	CPU module				
			Series		Model
		Μ	ELSEC-L Series	LCPU	
	Engineering software	GX	Works2 *1		
			Language		Software version
		Ja	panese version		Version1.86Q or later
		Er	nglish version		Version1.24A or later
		CI	ninese (Simplified) v	ersion	Version1.49B or later
		CI	ninese (Traditional) v	ersion	Version1.49B or later
		Ko	orean version		Version1.49B or later
		*1 F	For software versions	s applica	ble to the modules used, refer to
			Relevant Manuals".		
Programming	Ladder				
language					
Number of steps	421 steps (for MELSEC-L	serie	es CPU)		
	* The number of steps of t	he F	B in a program depe	ends on t	he CPU model that is used and
	input and output definition	on.			



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the averaging processing of the specified
	A/D conversion channel (CH1 or CH2) is set.
	2) FB operation is one-shot only, triggered by the FB_EN signal.
	3) The setting value is validated when the Operating condition setting request signal (Yn9)
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB
	(M+L60AD2DA2_RequestSetting) is executed.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error] [When an error occurs]
	FB_EN (Execution command)
	FB_ENO (Execution status)     FB_ENO (Execution status)
	Averaging process setting writing processing         No processing         Write         No processing         Averaging process setting writing processing         Averaging process setting
	FB_OK (Completed without error)     FB_OK (Completed without error)
	FB_ERROR (Error flag)
	ERROR_ID (Error code)   0   Error code   0



Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

# Error codes

### •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	
11 (Decimal)	The specified averaging processing type is	Please try again after confirming the setting.
	not valid. The averaging processing type is	
	not set within the range of 0 to 3H.	



### Labels

### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		BI		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		\A/e rel	CPU.	L60AD2DA2 is connected. (For
		vvora	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	1, 2	Specify the channel number.
Averaging process	i_Average_Type		0H: Sampling	Specify the averaging processing
setting			processing	type.
		Word	1H: Time average	
			2H: Count average	
			3H: Moving average	
Time average/Count	i_Average_Times		Time average	Set the time average, count
average/Moving			2 to 5000 (ms)	average, and moving average of
average		\\/ord	Count average	the channel specified for the
		word	4 to 65000 (times)	averaging processing.
			Moving average	
			2 to 1000 (times)	

### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO			ON: Execution command is ON.
		DIL		OFF: Execution command is OFF.
Completed without	FB_OK	Dit	055	When ON, it indicates that the averaging
error				processing is completed.
Error flag	FB_ERROR			When ON, it indicates that an error has
		ы	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.



#### FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



### 2.1.7. M+L60AD2DA2\_AD\_SetScaling (A/D conversion scaling setting)

#### FB Name

M+L60AD2DA2\_AD\_SetScaling

Item	Description						
Function overview	Sets the scaling of the specified A/D conversion channel (CH1 or CH2).						
Symbol	Execution command – Module start XY address – Target CH – A/D conversion scaling enable/disable – A/D conversion scaling upper limit value –		M+L60AD2DA2_ B : FB_EN W : i_Start_IO_No W : i_CH B : i_Scaling_Enable W : i_Scl_U_Lim	AD_SetSca FB_	ling FB_ENO : B FB_OK : B _ERROR : B RROR_ID : W	Execution status Completed without error Error flag Error code	
	A/D conversion scaling lower limit va	aiue —	W : I_SCI_L_LIM				
Applicable hardware	Analog I/O module	L60AD2DA2					
and software	CPU module						
		Series Model		odel			
		M	ELSEC-L Series	LCPU			
	Engineering coffware	GY Works2 *1					
	Engineering software	LanguageSoftware versJapanese versionVersion1.86Q or latEnglish versionVersion1.24A or lateChinese (Simplified) versionVersion1.49B or lateChinese (Traditional) versionVersion1.49B or lateKorean versionVersion1.49B or late		ftware version			
				Version1 86Q or later			
				Version1.24A or later			
				Version1.49B or later			
				Version1.49B or later			
				Version1	Version1.49B or later		
		*1 For software versions applicable to the modules used, refer to "Relevant Manuals".					
Programming	Ladder						
language							
Number of steps	375 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) By turning ON FB_EN (Execution command), the scaling of the specified A/D		
	conversion channel (CH1 or CH2) is set.		
	2) FB operation is one-shot only, triggered by the FB_EN signal.		
	3) The setting value is validated when the Operating condition setting request signal (Yn9)		
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB		
	(M+L60AD2DA2_RequestSetting) is executed.		
	4) When the setting value of the target channel is out of range, the FB_ERROR output		
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID		
	(Error code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	) The FB does not include error recovery processing. Program the error recovery		
precautions	processing separately in accordance with the required system operation.		
	The FB cannot be used in an interrupt program.		
	Please ensure that the FB_EN signal is capable of being turned OFF by the program.		
	Do not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition		
	of the target channel.		
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an		
	interrupt program.		
	6) Every input must be provided with a value for proper FB operation.		
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be		
	connected. Configure the setting in Switch Setting of GX Works2 according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Version 1 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1. FB Library Application Examples".		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN (Execution command)		
	FB_ENO (Execution status)		
	Scaling function setting writing processing Write No processing (Execution status) Scaling function setting		
	FB_OK (Completed without error)     No processing		
	FB_ERROR (Error flag)     (Completed without error)       FB_ERROR (Error flag)     FB_ERROR (Error flag)		
	ERROR_ID (Error code)     0     Error code)     0     Error code     0		



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B
Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

## Error codes

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	



## Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the	Specify the start XY address (in
address			I/O point range	hexadecimal) where the
		Mord	of the CPU.	L60AD2DA2 is connected. (For
		vvolu	For details, refer	example, enter H10 for X10.)
			to the CPU	
			user's manual.	
Target CH	i_CH	Word	1, 2	Specify the channel number.
A/D conversion	i_Scaling_Enable		ON, OFF	ON: Enabled
scaling		Bit		OFF: Disabled
enable/disable				
A/D conversion	i_Scl_U_Lim		-32,000 to	Specify the A/D conversion scaling
scaling upper limit		Word	32,000	upper limit value.
value				
A/D conversion	i_Scl_L_Lim		-32,000 to	Specify the A/D conversion scaling
scaling lower limit		Word	32,000	lower limit value.
value				

## Output labels

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



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.8. M+L60AD2DA2\_AD\_SetInputSignalErr (A/D conversion input signal error detection setting)

#### FB Name

M+L60AD2DA2\_AD\_SetInputSignalErr

Item	Description					
Function overview	Sets the input signal error detection of the specified A/D conversion channel (CH1 or CH2).					
Symbol	Execution co Module start XY Ta Input signal error detection Input signal error detection setti	ommand — address — arget CH — n setting — ng value —	M+L60AD2DA2 B : FB_EN W : i_Start_IO_No W : i_CH W : i_Sig_Err_Type W : i_Sig_Err_Level	2_AD_SetInp	utSignalErr FB_ENO : B — Execution status FB_OK : B — Completed without error FB_ERROR : B — Error flag ERROR_ID : W — Error code	
Applicable hardware	Analog I/O module	L60AD	02DA2			
and software	CPU module	MELS	Series MELSEC-L Series LCPU		Model	
	Engineering software	GX Works2 *1				
			Language		Software version	
		Japa	nese version		Version1.86Q or later	
		Engli	sh version		Version1.24A or later	
		Chine	ese (Simplified) v	ersion	Version1.49B or later	
		Chine	ese (Traditional) v	version	Version1.49B or later	
		Korea	an version		Version1.49B or later	
		*1 For	software version	s applica	ble to the modules used, refer to	
		"Re	levant Manuals".			
Programming	Ladder					
language						
Number of steps	<ul> <li>398 steps (for MELSEC-L series CPU)</li> <li>* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</li> </ul>					



Item D	Description				
Function description 1	1) By turning ON FB_EN (Execution command), the input signal error detection of the				
	specified A/D conversion channel (CH1 or CH2) is set.				
2)	3 operation is one-shot only, triggered by the FB_EN signal.				
3)	) The setting value is validated when the Operating condition setting request signal (Yn9)				
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB				
	(M+L60AD2DA2_RequestSetting) is executed.				
4)	) When the setting value of the target channel is out of range, the FB_ERROR output				
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID				
	(Error code).				
	Refer to the error code explanation section for details.				
Compiling method M	facro type				
Restrictions and 1)	) The FB does not include error recovery processing. Program the error recovery				
precautions	processing separately in accordance with the required system operation.				
2)	) The FB cannot be used in an interrupt program.				
3)	) Please ensure that the FB_EN signal is capable of being turned OFF by the program.				
	Do not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
4)	) When two or more of these FBs are used, precaution must be taken to avoid repetition				
	of the target channel.				
5)	) This FB uses index registers Z7 to Z9. Please do not use these index registers in an				
	interrupt program.				
6)	) Every input must be provided with a value for proper FB operation.				
7)	) To operate the L60AD2DA2, set the I/O range according to the device and system to be				
	connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Version 1 Operating Manual (Common).				
FB operation type P	ulsed execution (1 scan execution type)				
Application example R	Refer to "Appendix 1. FB Library Application Examples".				
Timing chart [V	[When operation completes without error] [When an error occurs]				
FB	3_EN (Execution command)				
FB	3_ENO (Execution status)				
Inp	put signal error detection No processing Write Nd processing (Execution status)				
FB (C4	Input signal error detection				
	3_OK completed without error)  FB_OK  FB_OK				
FB	3_OK     Input signal error detection       3_OK       completed without error)       3_ERROR (Error flag)         FB_OK       (Completed without error)         FB_OK         FB_OK         FB_OK         FB_OK         FB_OK         FB_OK         FB_OK         FB_FROR (Error flag)				



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

Item	Description	
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual	
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)	
	GX Works2 Version 1 Operating Manual (Common)	
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)	

## Error codes

●Error code list	
Error code	

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The target	Please try again after confirming the
	channel is not within the range of 1 or 2.	setting.
11 (Decimal)	The input signal error detection setting is not	Please try again after confirming the
	valid. The input signal error detection setting is	setting.
	not within the range of 0 to 4.	



## Input labels

Name	Label name	Data type	Setting range	Description
(Comment)				
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Target CH	i_CH	Word	1, 2	Specify the channel number.
Input signal error	i_Sig_Err_Type		0H: Disabled	Set the input signal error detection.
detection setting			1H: Upper lower limit	
			detection	
		Word	2H: Lower limit detection	
			3H: Upper limit detection	
			4H: Disconnection	
			detection	
Input signal error	i_Sig_Err_Level		0 to 250	Specify the input signal error
detection setting		Word	(unit: 0.1%)	detection setting value.
value				

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description		
Execution status	FB_ENO	Bit OFF		ON: Execution command is ON.		
				OFF: Execution command is OFF.		
Completed without	FB_OK	Bit OFF 6		When ON, it indicates that the input signal		
error				error detection setting is completed.		
Error flag	FB_ERROR			When ON, it indicates that an error has		
		DIL	OFF	occurred.		
Error code	ERROR_ID	Word	0	FB error code output.		



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.9. M+L60AD2DA2\_AD\_SetOffsetVal (A/D conversion offset setting)

#### FB Name

M+L60AD2DA2\_AD\_SetOffsetVal

Item	Description				
Function overview	Sets the offset of the specified A/D conversion channel (CH1 or CH2).				
Symbol	Execution command - Module start XY address - Target CH - User range write command -	M+L60AD2DA2_A B : FB_EN W : i_Start_IO_No W : i_CH B : i_Write_Offset	D_SetOffse	etVal FB_ENO : B FB_OK : B ERROR : B ROR_ID : W	Execution status Completed without error Error flag Error code
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Mo	odel
	Engineering software	GX Works2 *1			
		Language		Soft	tware version
		Japanese version		Version1.	86Q or later
		English version	orcion	Version1.	
		Chinese (Simplified) V			
		Korean version	76131011	Version1	49B or later
		*1 For software version: "Relevant Manuals".	s applica	ble to the n	nodules used, refer to
Programming	Ladder				
language					
Number of steps	<ul> <li>491 steps (for MELSEC-L series CPU)</li> <li>* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</li> </ul>				



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the offset of the specified A/D conversion
	channel (CH1 or CH2) is set.
	2) By turning ON the user range write command while FB_EN (Execution command) is ON,
	the offset value is written.
	3) After FB_EN (Execution command) is turned ON, the execution of this FB continues until
	the setting of the offset value of the specified channel is completed.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type



Item	Description
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When the following FBs are used, implement an external interlock to prevent them from
	being executed simultaneously. Do not use two or more of these FBs simultaneously. If
	two or more of these FBs are executed simultaneously, the offset/gain is set incorrectly.
	M+L60AD2DA2_AD_SetOffsetVal
	M+L60AD2DA2_AD_SetGainVal
	M+L60AD2DA2_DA_SetOffsetVal
	M+L60AD2DA2_DA_SetGainVal
	5) This FB cannot configure the offset/gain settings of channel 1 and channel 2
	simultaneously. To configure the offset/gain settings simultaneously, create a program
	instead of the use of this FB.
	6) This FB uses index registers Z7 to Z9. Please do not use these index registers with an
	interrupt program.
	7) Every input must be provided with a value for proper FB operation.
	8) When this FB is used in two or more places, a duplicated coil warning may occur during
	compile operation due to the Y signal being operated by index modification. However
	this is not a problem and the FB will operate without error.
	9) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description	
Timing chart	[When operation completes without error]         FB_EN (Execution command) FB_ENO (Execution status)         Operation mode         i_Write_Offset (User range write command)         CH□ Offset specification         Channel change request (YnB)         User range write request (YnB)         FB_OK (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)	[When an error occurs]         FB_EN (Execution command) FB_ENO (Execution status)         Operation mode         i_Write_Offset (User range write command)         CH□ Offset specification Channel change request (YnB)         User range write request (YnB)         User range write request (YnB)         B_B_OK (Completed without error)         FB_CK (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)
Relevant manuals	<ul> <li>MELSEC-L Analog-Digital Converter Module</li> <li>MELSEC-L CPU Module User's Manual (Hare</li> <li>GX Works2 Version 1 Operating Manual (Core</li> <li>GX Works2 Version 1 Operating Manual (Simetal Context)</li> </ul>	User's Manual dware Design, Maintenance and Inspection) mmon) nple Project, Function Block)

## Error codes

•Error code list

Error code	Description	Action	
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.	
	target channel is not within the range of 1		
	or 2.		



## Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address	Word For de		point range of the CPU.	hexadecimal) where the
			For details, refer to the	L60AD2DA2 is connected. (For
		CPU user's ma		example, enter H10 for X10.)
Target CH	i_CH	Word	1, 2	Specify the channel number.
User range write	i_Write_Offset		ON, OFF	Turn ON for the adjusted offset
command		Bit		value writing to a flash memory.
				Turn OFF after the writing.

#### Output labels

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



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.10. M+L60AD2DA2\_AD\_SetGainVal (A/D conversion gain setting)

#### FB Name

M+L60AD2DA2\_AD\_SetGainVal

Item	Description				
Function overview	Sets the gain of the specified A/D conversion channel (CH1 or CH2).				
Symbol	Execution command - Module start XY address - Target CH - User range write command -	M+L60AD2DA2_AD_SetGainVal B : FB_EN FB_ENO : B = E W : i_Start_IO_No FB_OK : B = C W : i_CH FB_ERROR : B = E B : i_Write_Gain ERROR_ID : W = E		<ul> <li>Execution status</li> <li>Completed without error</li> <li>Error flag</li> <li>Error code</li> </ul>	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Мо	del
	Engineering software	GX Works2 *1 Language Japanese version		Softv Version1.8	ware version
		English version Chinese (Simplified) ve Chinese (Traditional) ve	ersion /ersion	Version1.2 Version1.4 Version1.4	24A or later 19B or later 19B or later
		Korean version *1 For software versions "Relevant Manuals".	s applicat	Version1.4	19B or later odules used, refer to
Programming language	Ladder				
Number of steps	<ul> <li>474 steps (for MELSEC-L series CPU)</li> <li>* The number of steps of the FB in a program depends on the CPU model that is used and input and output definition.</li> </ul>				



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the gain of the specified A/D conversion
	channel (CH1 or CH2) is set.
	2) By turning ON the user range write command while FB_EN (Execution command) is ON,
	the gain value is written.
	3) After FB_EN (Execution command) is turned ON, the execution of this FB continues until
	the setting of the gain value of the specified channel is completed.
	4) When the setting value of the target channel is out of range, the FB_ERROR output turns
	ON and processing is interrupted, and the error code is stored in ERROR_ID (Error
	code).
	Refer to the error code explanation section for details.
Compiling method	Macro type



Item	Description			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do			
	not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) When the following FBs are used, implement an external interlock to prevent them from			
	being executed simultaneously. Do not use two or more of these FBs simultaneously. If			
	two or more of these FBs are executed simultaneously, the offset/gain is set incorrectly.			
	M+L60AD2DA2_AD_SetOffsetVal			
	M+L60AD2DA2_AD_SetGainVal			
	M+L60AD2DA2_DA_SetOffsetVal			
	M+L60AD2DA2_DA_SetGainVal			
	5) This FB cannot configure the offset/gain settings of channel 1 and channel 2			
	simultaneously. To configure the offset/gain settings simultaneously, create a program			
	instead of the use of this FB.			
	6) This FB uses index registers Z7 to Z9. Please do not use these index registers with an			
	interrupt program.			
	7) Every input must be provided with a value for proper FB operation.			
	8) When this FB is used in two or more places, a duplicated coil warning may occur during			
	compile operation due to the Y signal being operated by index modification. However this			
	is not a problem and the FB will operate without error.			
	9) To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Pulsed execution (multiple scan execution type)			
Application example	Refer to "Appendix 1. FB Library Application Examples".			



Item	Description					
Item Timing chart	Description         [When operation completes without error]         FB_EN (Execution command) FB_ENO (Execution status)         Operation mode         i_Write_Gain (User range write command)         CH_Gain specification Channel change request (YnB)	[When an error occurs]         FB_EN (Execution command)         FB_ENO (Execution status)         Operation mode         i_Write_Gain (User range write command)         CHI Gain specification Channel change request (YnB)				
	User range write request (YnA)       FB_OK (Completed without error)       FB_ERROR (Error flag)       ERROR_ID (Error code)       0	User range write request (YnA) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0 Error code 0				
Relevant manuals	<ul> <li>MELSEC-L Analog Input/Output Module User's Manual</li> <li>MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)</li> <li>GX Works2 Version 1 Operating Manual (Common)</li> <li>GX Works2 Version 1 Operating Manual (Simple Project, Function Block)</li> </ul>					

## Error codes

•Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	



#### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Target CH	i_CH	Word	1, 2	Specify the channel number.
User range write	i_Write_Gain		ON, OFF	Turn ON for the adjusted gain
command		Bit		value writing to a flash memory.
				Turn OFF after the writing.

#### Output labels

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

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.11. M+L60AD2DA2\_AD\_ShiftOperation (A/D conversion shift operation)

#### FB Name

M+L60AD2DA2\_AD\_ShiftOperation

Item	Description				
Function overview	Adds the conversion value shift amount to the digital value.				
Symbol	M+L60AD2DA2_AD_ShiftO Execution command — B : FB_EN Digital value — W : i_Digital_Value Shifting amount to conversion value — W : i_Shift_Value o_E			FB_ENO : B FB_OK : B g_Out_Val : W B_ERROR : B RROR_ID : W	<ul> <li>Execution status</li> <li>Completed without error</li> <li>Digital output value</li> <li>Error flag</li> <li>Error code</li> </ul>
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Mode	el
	Engineering software GX Works2 *1				
		Language		Softwa	are version
		Japanese version		Version1.86Q or later	
		English version		Version1.24	A or later
		Chinese (Simplified) ve	ersion	Version1.49	B or later
		Chinese (Traditional) v	/ersion	Version1.49	B or later
		Korean version		Version1.49	B or later
		*1 For software version: "Relevant Manuals".	s applicabl	le to the mo	dules used, refer to
Programming	Ladder				
language					
Number of steps	193 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) By turning ON FB_EN (Execution command), the conversion value shift amount is added				
	to the digital value *1.				
	*1 Input the A/D conversion data that is read by M+L60AD2DA2_AD_ReadADVal or				
	other methods from the L60AD2DA2 to the digital value.				
	2) When the addition result falls below -32,768 (exceeds 32,767), the value is fixed to				
	-32,768 (32,767).				
Compiling method	Macro type				
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery				
precautions	processing separately in accordance with the required system operation.				
	2) The FB cannot be used in an interrupt program.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do				
	not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	4) Every input must be provided with a value for proper FB operation.				
	5) To operate the L60AD2DA2, set the I/O range according to the device and system to be				
	connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Version 1 Operating Manual (Common).				
	6) When FB_OK (Completed without error) is ON, o_Dig_Out_Val (Digital output value) is				
	effective.				
	7) By turning OFF FB_EN, o_Dig_Out_Val (Digital output value) is cleared to 0.				
FB operation type	Real-time execution				
Application example	Refer to "Appendix 1. FB Library Application Examples".				
Timing chart	[When operation completes without error]				
	(Execution command)				
	FB_ENO (Execution status)				
	Shift operation				
	FB_OK (Completed without error)				
	FB ERROR (Error flag)				
	ERROR ID (Error code)				



Item	Description			
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual			
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)			

Error codes				
●Error code list				
Error code	Description	Action		
None	None	None		



#### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		ЫІ		OFF: The FB is not activated.
Digital value	i_Digital_Value	Mord	-32,768 to	Specify the digital value.
		vvolu	32,767	
Shifting amount to	i_Shift_Value	Mord	-32,768 to	Specify the shift amount.
conversion value		vvolu	32,767	

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
		DIL		OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the A/D
error		Bit OFF o		conversion shift operation is being
				executed.
Digital output value	o_Dig_Out_Val	Word	0	The digital value to which the conversion
		vvoru	0	value shift amount is added is stored.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



## 2.1.12. M+L60AD2DA2\_AD\_DiffOperation (A/D difference conversion)

#### FB Name

M+L60AD2DA2\_AD\_DiffOperation

Item	Description			
Function overview	Outputs the remaining value after subtraction of the reference value from the digital value.			
Symbol	M+L60AD2DA2_AD_DiffOperation         Execution command       B : FB_EN         B : FB_EN       FB_ENO : B         Digital value       W : i_Digital_Value         W : i_Digital_Value       FB_OK : B         Completed without error         o_Dig_Out_Val : W         Digital output value         o_Standard_Val : W         Difference conversion reference value         FB_ERROR : B         ERROR_ID : W			
Applicable hardware	Analog I/O module L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	Model	
	Engineering software	ngineering software GX Works2 *1		
		Language		Software version
		Japanese version		Version1.86Q or later
		English version Version1.24A of		Version1.24A or later
		Chinese (Simplified) ve	ersion	Version1.49B or later
		Chinese (Traditional) v	version	Version1.49B or later
	Korean version Version1.49B or later		Version1.49B or later	
		*1 For software versions applicable to the modules used, refer to "Relevant Manuals".		
Programming	Ladder			
language				
Number of steps	200 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) By turning ON FB_EN (Execution command), the differential conversion is executed.		
	2) The remaining value after subtraction of o_Standard_Val (Difference conversion		
	reference value) from i_Digital_Value (Digital value) is output while FB_EN (Execution		
	command) is ON. o_Standard_Val (Difference conversion reference value) is		
	i_Digital_Value (Digital value)*1 of when FB_EN (Execution command) is turned ON.		
	*1 Input the A/D conversion data that is read by M+L60AD2DA2_AD_ReadADVal or		
	other methods from the L60AD2DA2 to the digital value.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.		
	Do not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop because it is impossible to turn OFF.		
	4) Every input must be provided with a value for proper FB operation.		
	To operate the L60AD2DA2, set the I/O range according to the device and system to be		
	connected. Configure the setting in Switch Setting of GX Works2 according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Version 1 Operating Manual (Common).		
	When FB_OK (Completed without error) is ON, o_Dig_Out_Val (Digital output value)		
	and o_Standard_Val (Difference conversion reference value) are effective.		
	7) By turning OFF FB_EN, o_Dig_Out_Val (Digital output value) and o_Standard_Val		
	(Difference conversion reference value) are cleared to 0.		
FB operation type	Real-time execution		
Application example	Refer to "Appendix 1. FB Library Application Examples".		
Timing chart	[When operation completes without error]		
	FB_EN (Execution command)		
	FB_ENO (Execution status)		
	Difference conversion status Not converted During difference conversion Not converted		
	Difference conversion 0 Difference conversion 0		
	FB_OK (Completed without error)		
	FB_ERROR (Error flag)		
	ERROR_ID (Error code) 0		



Item	Description	
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual	
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)	
	GX Works2 Version 1 Operating Manual (Common)	
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)	

Error codes				
Error code list				
Error code	Description	Action		
None	None	None		



●Input labels					
Name (Comment)	Label name	Data type	Setting range	Description	
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.	
		DIL		OFF: The FB is not activated.	
Digital value	i_Digital_Value	Mord	-32,768 to	Specify the digital value for the	
		vvora	32,767	difference conversion.	

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO		ON: Execution command is ON.	
				OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the difference
error		Bit OFF c		conversion is being executed.
Digital output value	o_Dig_Out_Val			The input digital value to which the
		Word	0	difference conversion has been executed
				is stored.
Difference	o_Standard_Val			The difference conversion reference value
conversion		Word	0	(the digital value of when FB_EN is turned
reference value				ON) is stored.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.13. M+L60AD2DA2\_AD\_ClipOperation (A/D conversion digital clipping)

#### **FB** Name

M+L60AD2DA2\_AD\_ClipOperation

Item	Description				
Function overview	Limits the digital value w	vith the upper and lower I	imit value	es of the digital clipping.	
Symbol	M+L60AD2DA2_AD_ClipC         Execution command —         B : FB_EN         Digital value —         W : i_Digital_Value         Digital clipping upper limit value —         W : i_Clip_U_Lim         Digital clipping lower limit value —		AD_ClipOpe o_Diç FE E	FB_ENO : B — Execution status FB_OK : B — Completed without error g_Out_Val : W — Digital output value B_ERROR : B — Error flag RROR_ID : W — Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module           Series           MELSEC-L Series         LCPL		LCPU	Model PU	
	Engineering software GX Works2 *1				
		LanguageJapanese versionVe		Software version	
				Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) v	ersion	Version1.49B or later	
		Chinese (Traditional)	version	Version1.49B or later	
	Korean version Version1.49B or later		Version1.49B or later		
		*1 For software versions applicable to the modules used, refer to "Relevant Manuals".			
Programming language	Ladder				
Number of steps	198 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) By turning ON FB_EN (Execution command), the digital clipping is executed.			
	) While FB_EN (Execution command) is ON, i_Digital_Value (Digital value)*1 is fixed to			
	the upper limit value or lower limit value if i_Digital_Value (Digital value) exceeds			
	i_Clip_U_Lim (Digital clipping upper limit value) or falls below i_Clip_L_Lim (Digital			
	clipping lower limit value).			
	*1 Input the A/D conversion data that is read by M+L60AD2DA2_AD_ReadADVal or			
	other methods from the L60AD2DA2 to the digital value.			
	3) When the setting value of i_Clip_U_Lim (Digital clipping upper limit value) is equal to or			
	smaller than the value of i_Clip_L_Lim (Digital clipping lower limit value), FB_ERROR is			
	turned ON and the processing is interrupted. An error code is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.			
	Do not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) Every input must be provided with a value for proper FB operation.			
	5) To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
	6) When FB_OK (Completed without error) is ON, o_Dig_Out_Val (Digital output value) is			
	effective.			
	7) By turning OFF FB_EN, o_Dig_Out_Val (Digital output value) is cleared to 0.			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1. FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN (Every tion command)			
	(Execution command) FB_ENO			
	(Execution status)			
	Digital clipping         Processing         During processing         Digital clipping           FB_OK         FD_OK         FD_OK         FD_OK			
	(Completed without error)			
	FB_ERROR (Error flag)			



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

Item	Description	
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual	
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)	
	GX Works2 Version 1 Operating Manual (Common)	
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)	

## Error codes

## •Error code list

Error code	Description	Action
11 (Decimal)	The digital clipping upper limit value is equal to or smaller than the digital clipping lower limit value.	Please try again after confirming the setting.

# Labels

## Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Digital value	i_Digital_Value	Word	-32,768 to	Specify the target digital value for
		vvora	32,767	the digital clipping.
Digital clipping upper	i_Clip_U_Lim	Word	-32,768 to	Specify the digital clipping upper
limit value		vvora	32,767	limit value.
Digital clipping lower	i_Clip_L_Lim	Mord	-32,768 to	Specify the digital clipping lower limit
limit value		vvoiu	32,767	value.

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL		OFF: Execution command is OFF.
Completed without	FB_OK	Bit	OFF	When ON, it indicates that the digital
error		DIL		clipping is being executed.
Digital output value	o_Dig_Out_Val	Mord	Vord 0	The input digital value to which the digital
		vvolu		clipping has been executed is stored.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL		occurred.
Error code	ERROR_ID	Word	0	FB error code output.



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.1.14. M+L60AD2DA2\_AD\_SetLoggingPARAM (Logging function parameter setting)

#### FB Name

M+L60AD2DA2\_AD\_SetLoggingPARAM

Item	Description				
Function overview	Sets the logging function of the specified A/D conversion channel (CH1 or CH2).				
Symbol					
		M+L60AD2DA2_AD_SetLoggingPARAM			
	Execution command	B : FB_EN	I	B_ENO : B	-Execution status
	Module start XY address	s—W:i_Start_IO_No		FB_OK : B	— Completed without error
	Target C⊦	<b>і</b> —W∶і_СН	FB_	ERROR : B	—Error flag
	Logging enable/disable setting	g— B:i_Log_Enable	ER	ROR_ID : W	Error code
	Logging data setting	g—W:i_Log_Data			
	Logging cycle setting value	e—W:i_Log_Cycle_Val			
	Logging cycle unit setting	g—W:i_Log_Cycle_Unit			
	Logging points after trigge	r—W:i_Log_Points			
	Level trigger condition setting	g—W:i_Log_Trig_Cond			
	Trigger data—W:i_Log_Trig_Data				
	Trigger setting value—W:i_Log_Trig_Value				
					]
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Μ	odel
		MELSEC-L Series	LCPU		
		01/11/11/01/14			
	Engineering software	GX WORKS2 "1			
		Language		So	ftware version
		Japanese version		Version1	.86Q or later
		English version		Version1	.24A or later
		Chinese (Simplified) version		Version1	.49B or later
		Chinese (Traditional) version		Version1	.49B or later
		Korean version Version1.49B or		.49B or later	
		*1 For software versions	s applica	ble to the	modules used, refer to
		"Relevant Manuals".			



Item	Description			
Programming	Ladder			
language				
Number of steps	404 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) By turning ON FB_EN (Execution command), the logging function of the specified A/D			
	conversion channel (CH1 or CH2) is set.			
	2) FB operation is one-shot only, triggered by the FB_EN signal.			
	3) The setting value is validated when the Operating condition setting request signal (Yn9)			
	is turned OFF $ ightarrow$ ON $ ightarrow$ OFF or the Operating condition setting request FB			
	(M+L60AD2DA2_RequestSetting) is executed.			
	4) When the function selection of this FB is set for logging function, this FB is available.			
	5) When the function selection is not set for the logging function or the setting value of the			
	target channel is out of range, FB_ERROR is turned ON and the processing is			
	interrupted.			
	The error code 10 (Decimal) or 60 (Decimal) is stored in ERROR_ID (Error code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.			
	Do not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition			
	of the target channel.			
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an			
	interrupt program.			
	6) Every input must be provided with a value for proper FB operation.			
	7) If the parameter is set using the configuration function of GX Works2, this FB is			
	unnecessary.			
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Pulsed execution (1 scan execution type)			



Item	Description	
Application example	Refer to "Appendix 1. FB Library Application E	xamples".
Timing chart	[When operation completes without error]         FB_EN (Execution command)         FB_ENO (Execution status)         Setting writing processing         FB_OK (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)         0	FB_EN (Execution command)         FB_ENO (Execution status)         Logging function parameter setting writing processing         FB_OK (Completed without error)         FB_ERROR (Error flag)         ERROR_ID (Error code)
Relevant manuals	<ul> <li>MELSEC-L Analog Input/Output Module Use</li> <li>MELSEC-L CPU Module User's Manual (Har</li> <li>GX Works2 Version 1 Operating Manual (Context</li> <li>GX Works2 Version 1 Operating Manual (Simple Context</li> </ul>	r's Manual dware Design, Maintenance and Inspection) mmon) nple Project, Function Block)

# Error codes Error code list Error code Description Action

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 1	
	or 2.	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the
	intelligent function module switch setting	intelligent function module switch setting of
	of the target module is set to other than	the target module to the logging function,
	the logging function.	and execute the FB again.



## Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution command	FB_EN	Rit	ON, OFF	ON: The FB is activated.
		Dit		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
		vvoiu	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	1, 2	Specify the channel number.
Logging	i_Log_Enable	Bit	ON, OFF	ON: Logging function enabled
enable/disable setting		Dit		OFF: Logging function disabled
Logging data setting	i_Log_Data		0, 1	Set the logging target data.
		Word		0: Digital output value
				1: Scaling value
Logging cycle setting	i_Log_Cycle_Val		1) Logging cycle unit	Set the cycle for storing data.
value			setting = 0	
			80 to 32,767	
			2) Logging cycle unit	
		Word	setting = 1	
			1 to 32,767	
			3) Logging cycle unit	
			setting = 2	
			1 to 3,600	
Logging cycle unit	i_Log_Cycle_Unit		0: µs	Set the cycle unit for storing
setting		Word	1: ms	data.
			2: s	
Logging points after	i_Log_Points		1 to 10,000	Set the data points to be
trigger		Word		collected after the hold trigger is
				detected.
Level trigger condition	i_Log_Trig_Cond		0: Disable	Set whether to use the level
setting		Mord	1: Above	trigger or not and the condition
			2: Below	for the level trigger when using
			3: Pass through	the level trigger.



Name (Comment)	Label name	Data	Setting range	Description
		type		
Trigger data	i_Log_Trig_Data		0 to 4,999	Set the buffer memory address
		Word		to be monitored by the level
				trigger.
Trigger setting value	i_Log_Trig_Value	Word	-32,768 to 32,767	Set a level at which a level
		word		trigger is generated.

#### 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	FB_OK	Bit OFF		When ON, it indicates that the logging
error				function parameter setting is completed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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


# 2.1.15. M+L60AD2DA2\_AD\_SaveLogging (Logging data save)

## FB Name

M+L60AD2DA2\_AD\_SaveLogging

Item	Description					
Function overview	Saves the logging data of the specified A/D conversion channel (CH1 or CH2) to a file.					
Symbol	Saves the logging data of the specified A/D conversion channel (CH1 of CH2) to a file.         M+L60AD2DA2_AD_SaveLogging         Execution command       B : FB_EN         FB_ENO : B       Execution status         Module start XY address       W : i_Start_IO_No         Target CH       W : i_CH         Maximum No. of save files       W : i_Max_Number         Overwrite save command       B : i_Over_Write         FB_ERROR : B       Error flag         Logging forced save command       B : i_Save_Order					
Applicable	Analog I/O module	L60AD2DA2				
hardware and	CPU module					
software		Series		Model		
		MELSEC-L Series LCPU *				
		* Only the model having	an SD r	memory card slot is applicable.		
	Engineering software	GX Works2 *1				
		Language		Software version		
		Japanese version		Version1.86Q or later		
		English version		Version1.24A or later		
		Chinese (Simplified) ve	ersion	Version1.49B or later		
		Chinese (Traditional) v	ersion	Version1.49B or later		
		Korean version		Version1.49B or later		
		*1 For software versions	s applica	ble to the modules used, refer to		
		"Relevant Manuals".				
Programming	Ladder					
language						
Number of steps	* The number of stops of	-L series CPU)	anda an	the CDU medal that is used and		
	input and output definiti	on	enus on	The GPU model that is used and		
Function description	1) By turning ON FB_EN (Execution command) and the logging hold flag, the logging data					



Item	Description				
	is sorted chronologically from the head pointer. Then, the logging data and the trigger				
	detection information are saved in CSV format in the SD memory card mounted on the				
	CPU.				
	2) When FB_EN (Execution command) is ON, the FB starts the save processing of the				
	logging data each time the logging hold flag is turned ON.				
	3) If an input signal error is detected or the external power supply is turned OFF during the logging, the logging stops.				
	In this case, the logging data is saved by turning on FB_EN (Execution command) after				
	i_Save_Order (Logging forced save command) is turned ON.				
	When the logging enable/disable setting is disabled, the logging data is not saved even				
	if FB_EN (Execution command) is turned ON after i_Save_Order (Logging forced save				
	command) is turned ON. FB_ERROR is turned ON and the processing is interrupted.				
	The error code 70 (Decimal) is stored in ERROR_ID.				
	Refer to the error code explanation section for details.				
	4) It requires multiple scans to complete the save processing of the logging data. To check				
	whether it is completed, check FB_OK (Completed without error).				
	5) The format for the file name that the FB saves in an SD memory card is "AD" + "second				
	and third digits of the module start XY address that is expressed in 4 digits" + "Target				
	channel" + "serial number" + ".CSV". The maximum serial number depends on				
	i_Max_Number (Maximum No. of save files). If FB_EN (Execution command) is turned				
	OFF, the serial number is reset and the serial number starts from 1 again.				
	[File name example]				
	The file name is "AD452006.CSV" in the following case. The module start XY address is				
	H0450, the target channel is 2, i_Max_Number (Maximum No. of save files) is 30, and				
	the number of files this FB created is 6.				
	6) When a file with the same name exists in the SD memory card, the existing file is				
	replaced with a new CSV file created by this FB.				
	7) When FB_EN (Execution command) is turned ON after i_Over_Write (Overwrite save				
	command) is turned ON and the number of files that this FB stored in the SD memory				
	card exceeds i_Max_Number (Maximum No. of save files), the serial number returns to				
	1 and the save processing of the logging data continues.				
	8) When FB_EN (Execution command) is turned ON after i_Over_Write (Overwrite save				
	command) is turned OFF and the number of files that this FB stored in the SD memory				
	card exceeds i_Max_Number (Maximum No. of save files), the save processing of the				
	logging data stops.				
	9) If the number of files that the FB stored in the SD memory card has reached				
	i_Max_Number (Maximum No. of save files), o_Exceed_Number (Maximum No.				



Item	Description				
	exceeded flag) is turned ON regardless of whether i_Over_Write (Overwrite save				
	command) is ON or OFF.				
	10) Only when the target module is processing the logging and the logging status monitor				
	value (Un\G1146, Un\G1147) is not "F: Stop (disabled)", this FB can be used.				
	11) When FB_EN (Execution command) is turned ON while the target module is not				
	processing the logging and the logging status monitor value (Un\G1146, Un\G1147) is				
	"F: Stop (disabled)", FB_ERROR is turned ON and the processing of the FB is				
	interrupted. Additionally, when the setting of the target channel or the setting value of				
	the maximum No. of save files is out of range, FB_ERROR is turned ON and the				
	processing of the FB is interrupted.				
	The error code 10 (Decimal), 11 (Decimal), or 60 (Decimal) is stored in ERROR_ID.				
	Refer to the error code explanation section for details.				
	12) When the SD memory card mounted on the CPU 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. When the CPU is set to stop at the error occurrence, FB_ERROR and				
	ERROR_ID are not updated.				
	When the CPU is set to continue running at the error occurrence, FB_ERROR is turned				
	ON and an error code is stored in ERROR_ID.				
	13) For the format of the CSV file that this FB creates, refer to "Appendix 2. CSV File				
	Format for Logging data save FB".				
	*1 For information on the size of SD memory card and the number of files that can be save				
	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				
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery				
precautions	processing separately in accordance with the required system operation.				
	2) The FB cannot be used in an interrupt program.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.				
	Do not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	4) This FB uses index registers Z6 to Z9. Please do not use these index registers in an				
	interrupt program.				
	5) In this FB, the logging data can be saved only in the SD memory card.				
	6) This FB uses the SP.FWRITE command. Thus, when an execution error of the				
	SP.FWRITE command occurs, a CPU error occurs.				



Item	Description			
	7) Do not use this FB when the CPU module that does not have a SD memory slot is used			
	Even if used with such a CPU module, this FB does not operate.			
	8) When two or more of these FBs are used, implement an interlock to prevent them from			
	being executed simultaneously.			
	[Interlock example]			
	When the target channels are set to channels 1 and 2 and their logging data are saved			
	confirm that FB_OK (Completed without error) for channel 1 is turned ON before turning			
	ON FB_EN (Execution command) for channel 2.			
	9) When this FB is executed while the protect switch of the SD memory card ON, the			
	logging data cannot be saved. FB_ERROR is turned ON and the processing is			
	interrupted.			
	The error code 31 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	10) When this FB is executed without an SD memory card on the CPU module, FB_ERROP			
	is turned ON and the processing is interrupted.			
	The error code 33 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	11) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) OFF,			
	which can be set by sliding the SD memory card disabling switch upward, FB_ERROR			
	is turned ON and the processing is interrupted.			
	The error code 35 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	12) When SM606 (SD memory card forced disable instruction) is turned ON while the			
	logging data is being saved, SP.FWRITE is not processed and the logging data cannot			
	be saved. FB_ERROR is turned ON and the processing is interrupted.			
	The error code 36 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	13) When this FB is executed with the SD memory card accessed by, for example, the data			
	logging function of LCPU, the time for completing this FB may extend or a timeout erro			
	(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			
	MELSEC-L CPU Module User's Manual (Data Logging Function).			
	Refer to the error code explanation section for details.			
	14) Every input must be provided with a value for proper FB operation.			
	15) Pay attention to the size of the SD memory card and the number of files that can be			
	saved when determining i_Max_Number (Maximum No. of save files). If the size of the			
	SD memory card or the number of files that can be saved is exceeded when this FB is			



Item	Description				
	<ul> <li>executed, a CPU error occurs. For information on the size of 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).</li> <li>16) To operate the L60AD2DA2, set the I/O range according to the device and system to be connected. Configure the setting in Switch Setting of GX Works2 according to the application.</li> <li>For details on how to use the intelligent function module switch setting, refer to GX Works2 Version 1 Operating Manual (Common).</li> </ul>				
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]         FB_EN (Execution command)       FB_ENO (Execution status)       FB_ENO (Execution status)         Logging hold flag (Logging forced save command)       FB_ENO (Execution status)       FB_ENO (Execution status)         o_Making_File (Creating file)       O_Making_File (Creating file)       O_Making_File (Creating file)         FB_ENC (Completed without error)       O_Exceed_Number (Maximum No. exceeded flag)       O_Exceed_Number (Maximum No. exceeded flag)         FB_ERROR (Error flag)       0       FB_ERROR (Error flag)       FB_ERROR (Error flag)				
Relevant manuals	<ul> <li>MELSEC-L Analog Input/Output Module User's Manual</li> <li>MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)</li> <li>MELSEC-L CPU Module User's Manual (Data Logging Function)</li> <li>GX Works2 Version 1 Operating Manual (Common)</li> <li>GX Works2 Version 1 Operating Manual (Simple Project, Function Block)</li> </ul>				

Error codes		
•Error code list		
Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The target	Please try again after confirming the
	channel is not within the range of 1 or 2.	setting.
11 (Decimal)	The maximum number of save files is not	Please try again after confirming the
	valid. The maximum number of save files is	setting.
	not within the range of 1 to 999.	



Error code	Description	Action		
20 (Decimal)	The processing is interrupted because the	Please try again after confirming the		
	logging hold flag or i_Save_Order (Logging	setting so that the logging hold flag or		
	forced save command) is turned OFF while	i_Save_Order (Logging forced save		
	the logging data is being saved.	command) is not turned OFF while the		
	An incomplete CSV file is saved in the SD	logging data is being saved.		
	memory card.			
31 (Decimal)	No data can be written to the SD memory card	Execute the FB again after turning OFF		
	because SM601 (Memory card protect flag) is	the protect switch of the SD memory		
	ON (Write prohibited).	card and confirming that SM601 is OFF		
		(Write permitted).		
33 (Decimal)	This FB is executed with no SD memory card	Execute this FB again after mounting the		
	on the CPU module.	SD memory card to which the target CSV		
		file is saved on the CPU module.		
35 (Decimal)	The SD memory card cannot be accessed	Execute the FB again after turning ON		
	because SM605 (Memory card remove/insert	SM605 (Memory card remove/insert		
	prohibit flag) is turned OFF.	prohibit flag) by sliding the SD memory		
		card disabling switch downward.		
36 (Decimal)	SM606 (SD memory card forced disable	Execute the FB again after disabling the		
	instruction) is ON, and access to the SD	SD memory card forced disable		
	memory card is unavailable.	instruction by turning OFF SM606 and		
	If SM606 (SD memory card forced disable	confirming that SM607 (SD memory card		
	instruction) is turned ON while the logging	use force stop condition flag) is OFF.		
	data is being saved, an incomplete CSV file is			
	saved in the SD memory card.			
40 (Decimal)	The logging data saving processing timeout	Reduce the frequency of the access		
	occurred because accesses to the SD	processing to the SD memory card.		
	memory card are frequently made in addition			
	to this FB.			



Error code	Description	Action
60 (Decimal)	When the target module was not processing	After enabling the logging enable/disable
	the logging and the logging status monitor	setting (Un\G1000, Un\G1001), turn OFF
	value (Un\G1146, Un\G1147) was "F: Stop	$\rightarrow$ ON $\rightarrow$ OFF the Operating condition
	(disabled)", FB_EN (Execution command) was	setting request signal (Yn9) or execute
	turned ON.	the Operating condition setting request
		FB (M+L60AD2DA2_RequestSetting) to
		execute the logging.
		Execute the FB again after confirming
		that the logging status monitor value
		(Un\G1146, Un\G1147) is other than "F:
		Stop (disabled)".
		To save data while the logging is
		stopped, turn ON FB_EN (Execution
		command) after turning ON
		i_Save_Order (Logging forced save
		instruction).
70 (Decimal)	When the logging enable/disable setting was	After enabling the logging enable/disable
	disabled, FB_EN (Execution command) was	setting (Un\G1000, Un\G1001), turn OFF
	turned ON after i_Save_Order (Logging forced	$\rightarrow$ ON $\rightarrow$ OFF the Operating condition
	save instruction) was turned ON to start	setting request signal (Yn9) or execute
	saving the logging data.	the Operating condition setting request
		FB (M+L60AD2DA2_RequestSetting) to
		execute the logging.
		After the logging, execute the FB again.
Error codes other than	The error code of the CPU module	For details on the caused error code,
above		refer to Appendix 1 Error Code Lists of
		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	i_Start_IO_No	Word	Depends on the I/O	Specify the start XY address
address			point range of the CPU.	(in hexadecimal) where the
			For details, refer to the	L60AD2DA2 is connected.
			CPU user's manual.	(For example, enter H10 for
				X10.)
Target CH	i_CH	Word	1, 2	Specify the channel number.
Maximum No. of	i_Max_Number	Word	1 to 999	Specify the maximum
save files				number of CSV files the FB
				saves.
Overwrite save	i_Over_Write	Bit	ON, OFF	Set whether to overwrite a
command				CSV file with the youngest
				serial number when the
				number of CSV files saved
				by this FB exceeds the
				maximum number of save
				files. (When OFF, the save
				processing of logging data
				stops.)
Logging forced save	i_Save_Order	Bit	ON, OFF	Turn ON to save the logging
command				data while the logging is
				stopped (disabled).
				Turn OFF after the saving.



#### 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	FB_OK	Bit	OFF	When ON, it indicates that the file save is	
error				completed.	
				Turned OFF when the logging resumes.	
Creating file	o_Making_File	Bit	OFF	When ON, it indicates that a file is being	
				created.	
Maximum No.	o_Exceed_Number	Bit	OFF	When ON, it indicates that the number of	
exceeded flag				CSV files saved by this FB has reached	
				the maximum number of save files.	
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has	
				occurred.	
Error code	ERROR_ID	Word	0	FB error code output.	

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.2. D/A conversion FB

#### 2.2.1. M+L60AD2DA2\_DA\_WriteDAVal (Write D/A conversion data)

# FB Name

#### M+L60AD2DA2\_DA\_WriteDAVal

Item	Description					
Function overview	Writes the D/A conversion data of the specified D/A conversion channel (CH3 or CH4).					
Symbol	Execution command — Module start XY address — Target CH — Digital value —	M+L60AD2DA2_DA_WriteDAVal - B : FB_EN FB_ENO : B - W : i_Start_IO_No FB_OK : B - W : i_CH FB_ERROR : B - W : i_DA_Value ERROR_ID : W		<ul> <li>Execution status</li> <li>Completed without error</li> <li>Error flag</li> <li>Error code</li> </ul>		
Applicable hardware	Analog I/O module	L60AD2DA2				
and software	CPU module	Series     Model       MELSEC-L Series     LCPU			odel	
	Engineering software	GX Works2 *1				
		Language		So	ftware version	
		Japanese version		Version1	.86Q or later	
		English version		Version1	.24A or later	
		Chinese (Simplified) ve	ersion	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	Ladder					
Number of steps	254 stops (for MELSEC L spring CDLI)					
ramber of steps	* The number of steps of	the FB in a program der	ends on t	the CPU r	nodel that is used and	
	input and output definition.					



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the digital input value of the specified D/A
	conversion channel (CH3 or CH4) is written.
	2) The digital value to be written depends on the output range setting.
	When the scaling function (D/A conversion) of the L60AD2DA2 is enabled, the digital
	value is scaled before the D/A conversion.
	3) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
	4) When the digital value is set in the auto refresh setting of the intelligent function
	module, this FB is unnecessary.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description					
Timing chart	[When operation completes without error]         FB_EN (Execution command)         FB_ENO (Execution status)         i_DA_Value_CH□ (CH□ Digital input value)         FB_OK (Completed without error)         FB_EROR (Error flag)         FBPOR_ID (Error code)	FB_EN (Execution command)         FB_ENO (Execution status)         i_DA_Value_CH□ (CH□ Digital input value)         FB_OK (Completed without error)         FB_ERROR (Error flag)         ERROR ID (Error code)				
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual					
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)					
	• GX Works2 Version 1 Operating Manual (Co	ommon)				
	• GX Works2 Version 1 Operating Manual (Sin	mple Project, Function Block)				

# Error codes

# •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 3	
	or 4.	

## Labels

●Input labels				
Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the	Specify the start XY address (in
address			I/O point range of	hexadecimal) where the L60AD2DA2 is
		\A/ord	the CPU.	connected. (For example, enter H10 for
		vvora	For details, refer to	X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	3, 4	Specify the channel number.
Digital value	i_DA_Value		-32,000 to 32,000	Specify the digital input value.
				The available setting range differs
		Word		depending on the output range setting
				and whether the scaling function (D/A
				conversion) is used or not.



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

## Output labels

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

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



# 2.2.2. M+L60AD2DA2\_DA\_WriteAllDAVal (Write D/A conversion data (all CHs))

## FB Name

M+L60AD2DA2\_DA\_WriteAllDAVal

Item	Description			
Function overview	Writes the D/A conversion data of the D/A conversion channels (CH3 and CH4).			
Symbol	M+L60AD2DA2_DA_WriteAllDAVal			AVal
	Execution command -	B : FB_EN	F	B_ENO : B Execution status
	Module start XY address -	W : i_Start_IO_No		FB_OK : B Completed without error
	CH3 Digital value –	W:i_DA_Value_CH3	FB_	ERROR : B Error flag
	CH4 Digital value –	W : i_DA_Value_CH4	ER	ROR_ID : W—Error code
Applicable hardware	Analog I/O module	L60AD2DA2		
and software	CPU module			
		Series		Model
		MELSEC-L Series	LCPU	
		OV/W/ani-a0.*4		
	Engineering software	GX WORKS2 T		
		Language		Software version
		Japanese version		Version1.86Q or later
		English version		Version1.24A or later
		Chinese (Simplified) ve	ersion	Version1.49B or later
		Chinese (Traditional) v	ersion	Version1.49B or later
		Korean version		Version1.49B or later
		*1 For software versions	s applica	ble to the modules used, refer to
		"Relevant Manuals".		
Programming language	Ladder			
Number of steps	228 steps (for MELSEC-L series CPU)			
	* The number of steps of	* The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definition.			



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the digital input values of the D/A
	conversion channels (CH3 and CH4) are written.
	2) The digital input value to be written depends on the output range setting.
	When the scaling function (D/A conversion) of the L60AD2DA2 is enabled, the digital
	input value is scaled before the D/A conversion.
	3) When the digital input value is set in the auto refresh setting of the intelligent function
	module, this FB is unnecessary.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an
	interrupt program.
	5) Every input must be provided with a value for proper FB operation
	6) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error]
	FB_ENO
	(CH□ Digital input value) During update Stopped
	FB_OK (Completed without error)
	FB_ERROR (Error flag)
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)



## •Error code list

Error code	Description	Action
None	None	None

## Labels

●Input labels				
Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the L60AD2DA2
		Word	CPU.	is connected. (For example, enter H10
		vvolu	For details, refer to	for X10.)
			the CPU user's	
			manual.	
CH3 Digital value	i_DA_Value_C		-32,000 to 32,000	Specify the digital input value of
	H3			channel 3.
		Word		The available setting range differs
		vvolu		depending on the scaling function
				(D/A conversion) and output range
				setting.
CH4 Digital value	i_DA_Value_C		-32,000 to 32,000	Specify the digital input value of
	H4			channel 4.
		Mord		The available setting range differs
		vvolu		depending on the scaling function
				(D/A conversion) and output range
				setting.

# Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		ЫІ	OFF	OFF: Execution command is OFF.
Completed without error	FB_OK	Dit	OFF	When ON, it indicates that the digital input
		DIL		value is being written.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



# 2.2.3. M+L60AD2DA2\_DA\_SetDAConversion (D/A conversion enable/disable setting)

## FB Name

M+L60AD2DA2\_DA\_SetDAConversion

Item	Description				
Function overview	Enables or disables the D/A conversion for the D/A conversion specified channel (CH3 or				
	CH4) or all the D/A conversion channels (CH3 and CH4).				
Symbol	Execution com Module start XY ad Targ D/A conversion enable/disable s	M+L60AD2DA2_E mand — B : FB_EN ldress — W : i_Start_IO_No et CH — W : i_CH setting — B : i_DA_Enable	DA_SetDAC	onversion FB_ENO : B — Execution status FB_OK : B — Completed without error FB_ERROR : B — Error flag ERROR_ID : W — Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Model	
		MELSEC-L Series	LCPU		
	Engineering software GX Works2 *1				
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	version	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	308 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) By turning ON FB_EN (Execution command), the D/A conversion for the specified D/A
	conversion channel (CH3 or CH4) or all the D/A conversion channels (CH3 and CH4) is
	enabled or disabled.
	2) FB operation is one-shot only, triggered by the FB_EN signal.
	3) The setting value is validated when the Operating condition setting request signal (Yn9)
	is turned OFF $ ightarrow$ ON $ ightarrow$ OFF or the Operating condition setting request FB
	(M+L60AD2DA2_RequestSetting) is executed.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation.
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN (Execution command)       FB_ENO (Execution status)         D/A conversion enable/disable setting writing processing       No processing         FB_OK (Completed without error)       No processing         FB_ERROR (Error flag)       0         ERROR_ID (Error code)       0			
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual			
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)			

# Error codes

# •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 3,	
	4, or 15.	

# Labels

●Input labels				
Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the L60AD2DA2
		Word	CPU.	is connected. (For example, enter H10
			For details, refer to	for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	3, 4, 15	3 or 4: Specify the channel number.
		vvolu		15: Specify channel 3 and channel 4.
D/A conversion	i_DA_Enable		ON, OFF	ON: D/A conversion enabled
enable/disable		Bit		OFF: D/A conversion disabled
setting				



## Output labels

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

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



# 2.2.4. M+L60AD2DA2\_DA\_SetDAOutput (D/A output enable/disable setting)

## FB Name

M+L60AD2DA2\_DA\_SetDAOutput

Item	Description					
Function overview	Enables or disables the D/A output of the specified D/A conversion channel (CH3 or CH4) or					
	all the D/A conversion cl	hann	els (CH3 and CH4).			
Symbol	Execution command — Module start XY address — Target CH — D/A output enable/disable setting —		M+L60AD2DA2_ B : FB_EN W : i_Start_IO_No W : i_CH B : i_DA_Out_Enable	2_DA_SetDAOutput FB_ENO : B — Execution status FB_OK : B — Completed without e FB_ERROR : B — Error flag ERROR_ID : W — Error code		<ul> <li>Execution status</li> <li>Completed without error</li> <li>Error flag</li> <li>Error code</li> </ul>
Applicable hardware	Analog I/O module	L60	)AD2DA2			
and software	CPU module					
			Series		Мо	del
		М	ELSEC-L Series	LCPU		
	Engineering software	GX	. Works2 *1			·
			Language		Soft	ware version
		Ja	apanese version		Version1.8	36Q or later
		Er	nglish version		Version1.2	24A or later
		C	Chinese (Simplified) version		Version1.4	19B or later
		C	Chinese (Traditional) version		Version1.4	19B or later
		K	orean version		Version1.4	19B or later
		*11	For software version	s applica	ble to the m	odules used, refer to
Programming	Laddar		Relevant Manuals .			
Programming						
Number of stope						
Number of steps	279 Steps (IVI MELSEC-L series CPU)					
	ine number of steps of the FB in a program depends on the CPU model that is used and					



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the D/A output of the specified D/A
	conversion channel (CH3 or CH4) or all the D/A conversion channels (CH3 and CH4) is
	enabled or disabled.
	2) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z8 and Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation.
	7) When this FB is used in two or more places, a duplicated coil warning may occur during
	compile operation due to the Y signal being operated by index modification. However
	this is not a problem and the FB will operate without error.
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description		
Timing chart	[When operation completes without error] (for CH3) FB_EN (Execution command) FB_ENO (Execution status)	[When an error occurs] (for CH3) FB_EN (Execution command) FB_ENO (Execution status)	
	i DA_Out_Enable (D/A output enable/ disable setting) Output enable/disable flag (Yn3) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0	(Execution status) i_DA_Out_Enable (D/A output enable/ disable setting) Output enable/disable flag (Yn3) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0 Error code 0	
Relevant manuals	MELSEC-L Analog Input/Output Module Us	er's Manual	
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)		
	• GA Worksz version 1 Operating Manual (C	ommon)	
	<ul> <li>GX Works2 Version 1 Operating Manual (Si</li> </ul>	mple Project, Function Block)	

Error codes		
Error code list		
Error code	Description	Action
10 (Decimal)	The specified channel is not valid.	Please try again after confirming the setting.
	Set 3, 4, or 15 to the target channel.	



# Labels

# Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
		vvora	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH		3, 4, 15	3 or 4: Specify the channel number.
		Word		15: Specify channel 3 and channel
				4.
D/A output	i_DA_Out_Enable		ON, OFF	ON: D/A output enabled
enable/disable		Bit		OFF: D/A output disabled
setting				

## Output labels

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



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



# 2.2.5. M+L60AD2DA2\_DA\_SetScaling (D/A conversion scaling setting)

## FB Name

M+L60AD2DA2\_DA\_SetScaling

Item	Description				
Function overview	Sets the scaling of the specified D/A conversion channel (CH3 or CH4).				
Symbol	Execution c Module start XY T D/A conversion scaling enabl D/A conversion scaling upper li D/A conversion scaling lower li	M+L60A command — B : FB_EN Y address — W : i_Start_IO_No Farget CH — W : i_CH le/disable — B : i_Scaling_Ena imit value — W : i_Scl_U_Lim imit value — W : i_Scl_L_Lim	D2DA2_DA_Si	etScaling FB_ENO:B FB_OK:B FB_ERROR:B ERROR_ID:W	<ul> <li>Execution status</li> <li>Completed without error</li> <li>Error flag</li> <li>Error code</li> </ul>
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Mode	el
	Engineering software	GX Works2 *1			
		Language	•	Softw	are version
		Japanese version		Version1.86	Q or later
		English version		Version1.24	IA or later
		Chinese (Simplified	) version	Version1.49	B or later
		Chinese (Traditiona	l) version	Version1.49	B or later
		Korean version		Version1.49	B or later
		*1 For software versi "Relevant Manuals	ons applica s".	able to the mo	dules used, refer to
Programming language	Ladder				
Number of steps	305 steps (for MELSEC-L series CPU)				
	* The number of steps of	of the FB in a program	depends o	n the CPU mo	odel that is used and
	input and output defini	ition.			



Item	Description			
Function description	1) By turning ON FB_EN (Execution command), the scaling of the specified D/A			
	conversion channel (CH3 or CH4) is set.			
	2) FB operation is one-shot only, triggered by the FB_EN signal.			
	3) The setting value is validated when the Operating condition setting request signal (Yn9)			
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB			
	(M+L60AD2DA2_RequestSetting) is executed.			
	4) When the setting value of the target channel is out of range, the FB_ERROR output			
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID			
	(Error code).			
	Refer to the error code explanation section for details.			
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separately in accordance with the required system operation.			
	2) The FB cannot be used in an interrupt program.			
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.			
	Do not use this FB in programs that are only executed once such as a subroutine,			
	FOR-NEXT loop because it is impossible to turn OFF.			
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition			
	of the target channel.			
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an			
	interrupt program.			
	6) Every input must be provided with a value for proper FB operation			
	To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Pulsed execution (1 scan execution type)			
Application example	Refer to "Appendix 1. FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN (Execution command)			
	FB_ENO			
	(Execution status) Scaling function setting No processing Write No processing No processing No processing			
	FB_OK			
	(Completed without error) FB_ERROR (Error flag) FB_ERROR (Error flag)			
	ERROR_ID (Error code) 0 Error code 0			



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)

# Error codes

Error code list		
Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The target	Please try again after confirming the setting.
	channel is not within the range of 3 or 4.	

# Labels

## Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	FB_EN		ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the	Specify the start XY address (in
address			I/O point range of	hexadecimal) where the
		Word	the CPU.	L60AD2DA2 is connected. (For
		vvoru	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	Word	3, 4	Specify the channel number.
D/A conversion	i_Scaling_Enable		ON, OFF	ON: Enabled
scaling		Bit		OFF: Disabled
enable/disable				
D/A conversion	i_Scl_U_Lim		-32,000 to 32,000	Specify the D/A conversion scaling
scaling upper limit		Word		upper limit value.
value				
D/A conversion	i_Scl_L_Lim		-32,000 to 32,000	Specify the D/A conversion scaling
scaling lower limit		Word		lower limit value.
value				



## Output labels

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

## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



# 2.2.6. M+L60AD2DA2\_DA\_SetAlarm (D/A conversion alert output setting)

## FB Name

M+L60AD2DA2\_DA\_SetAlarm

Item	Description				
Function overview	Sets the alert output of the specified D/A conversion channel (CH3 or CH4).				
Symbol	Execution command Module start XY address Target CH Alert output enabled/disabled Alert output upper limit value Alert output lower limit value	M+L60AD2DA2_I B : FB_EN W : i_Start_IO_No W : i_CH B : i_Alarm_Enable W : i_Alm_U_Lim W : i_Alm_L_Lim	DA_SetAlar F FB_ ER	m FB_ENO : B — Execution status FB_OK : B — Completed without error ERROR : B — Error flag ROR_ID : W — Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Model	
	Engineering software	GX Works2 *1			
		Language Japanese version English version Chinese (Simplified) version Chinese (Traditional) version Korean version *1 For software versions "Relevant Manuals".	ersion version s applica	Software versionVersion1.86Q or laterVersion1.24A or laterVersion1.49B or laterVersion1.49B or laterVersion1.49B or laterble to the modules used, refer to	
Programming	Ladder				
language					
Number of steps	288 steps (for MELSEC-L * The number of steps of input and output definition	. series CPU) the FB in a program depe on.	ends on t	the CPU model that is used and	



Item	Description		
Function description	1) By turning ON FB_EN (Execution command), the alert output of the specified D/A		
	conversion channel (CH3 or CH4) is set.		
	2) FB operation is one-shot only, triggered by the FB_EN signal.		
	3) The setting value is validated when the Operating condition setting request signal (Yn9)		
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB		
	(M+L60AD2DA2_RequestSetting) is executed.		
	4) When the setting value of the target channel is out of range, the FB_ERROR output turns		
	ON and processing is interrupted, and the error code is stored in ERROR_ID (Error		
	code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery		
precautions	processing separately in accordance with the required system operation.		
	2) The FB cannot be used in an interrupt program.		
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do		
	not use this FB in programs that are only executed once such as a subroutine,		
	FOR-NEXT loop because it is impossible to turn OFF.		
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an		
	interrupt program.		
	6) Every input must be provided with a value for proper FB operation.		
	7) To operate the L60AD2DA2, set the output range according to the device and system to		
	be connected. Configure the setting in Switch Setting of GX Works2 according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Version 1 Operating Manual (Common).		
FB operation type	Pulsed execution (1 scan execution type)		
Application example	Refer to "Appendix 1. FB Library Application Examples".		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN (Execution command)     FB_EN (Execution command)		
	FB_ENO (Execution status)		
	Alert output function setting writing processing Write Noprocessing Alert output function setting writing processing No processing No processing		
	FB_OK		
	FB_ERROR (Error flag)		
	ERROR_ID (Error code) 0 Error code 0		



Item	Description			
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual			
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)			

# Error codes

Error code	Description	Action			
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.			
	target channel is not within the range of 3				
	or 4.				



# Labels

# Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Mord	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Target CH	i_CH	Word	3, 4	Specify the channel number.
Alert output	i_Alarm_Enable	Dit	ON, OFF	ON: Enabled
enabled/disabled		ы		OFF: Disabled
Alert output upper	i_Alm_U_Lim	Mord	-32,768 to 32,767	Specify the alert output upper
limit value		vvoru		limit value.
Alert output lower	i_Alm_L_Lim	Word	-32,768 to 32,767	Specify the alert output lower
limit value		vvolu		limit value.

## Output labels

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



## FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



# 2.2.7. M+L60AD2DA2\_DA\_SetOffsetVal (D/A conversion offset setting)

## FB Name

M+L60AD2DA2\_DA\_SetOffsetVal

Item	Description				
Function overview	Sets the offset of the sp	ecified D/A conversion ch	nannel (C	H3 or CH4).	
Symbol	Execution comman Module start XY addres Target C Offset/gain adjustment amoun Set value change comman User range write comman	specified D/A conversion channel (C		FB_ENO : B Execution status FB_OK : B Completed without error B_ERROR : B Frror flag RROR_ID : W Frror code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	Series MELSEC-L Series	LCPU	Model	
	Engineering software	GX Works2 *1			
		Language Japanese version English version Chinese (Simplified) version Chinese (Traditional) version Korean version		Software version	
				Version 1.86Q or later	
				Version1.49B or later	
				Version1.49B or later	
				Version1.49B or later	
		*1 For software versions applicable to the modules used, refer "Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	482 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 defini	tion.			


Item	Description
Function description	1) By turning ON FB_EN (Execution command), the offset of the specified D/A conversion channel (CH3 or CH4) is set.
	2) To adjust the D/A output, set i_Adjust_Amount (Offset/gain adjustment amount) and tur
	ON from OFF i_Value_Change (Set value change command) while the FB_EN
	(Execution command) is ON.
	3) By turning ON the user range write command while FB_EN (Execution command) is
	ON, the offset value is written.
	4) When the setting value of the target channel is out of range, the FB_ERROR output
	turns ON and processing is interrupted, and the error code is stored in ERROR_ID
	(Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When the following FBs are used, implement an external interlock to prevent them fror
	being executed simultaneously. Do not use two or more of these FBs simultaneously. I
	two or more of these FBs are executed simultaneously, the offset/gain is set incorrectly
	M+L60AD2DA2_AD_SetOffsetVal
	M+L60AD2DA2_AD_SetGainVal
	M+L60AD2DA2_DA_SetOffsetVal
	M+L60AD2DA2_DA_SetGainVal
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation.
	7) When this FB is used in two or more places, a duplicated coil warning may occur durin
	compile operation due to the Y signal being operated by index modification. However
	this is not a problem and the FB will operate without error.
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to b
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)



Item	Description
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error]
	FB_EN (Execution command) FB_ENO (Execution status) Operation mode CHID Offset specification Channel change request (YnB) i_Value_Change (Set value change command) Set value change request (YnB) i_Write_Offset (User range write request (YnA) FB_CK (Completed without error) FB_ERROR (Error flag)
	ERROR_ID (Error code) 0
	[When an error occurs]
	FB_EN (Execution command)
	CHI_ Offset specification
	Channel change request
	i_Value_Change (Set value change command)
	Set value change request (Yn6)
	i_Write_Offset (User range write command)
	User range write request (YnA)
	FB_OK (Completed without error)
	FB_ERROR (Error flag)
	ERROR_ID (Error code) 0 Error code 0
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)



## Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 3	
	or 4.	

## Labels

|--|

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		word	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Target CH	i_CH	Word	3, 4	Specify the channel number.
Offset/gain	i_Adjust_Amount	Word	-3,000 to 3,000	Specify the adjustment amount
adjustment amount		word		for the D/A output adjustment.
Set value change	i_Value_Change		ON, OFF	Turn ON for D/A output change.
command		Bit		Turn OFF after the D/A output
				change.
User range write	i_Write_Offset		ON, OFF	Turn ON for the adjusted offset
command		Bit		value writing to a flash memory.
				Turn OFF after the writing.

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



Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



## 2.2.8. M+L60AD2DA2\_DA\_SetGainVal (D/A conversion gain setting)

#### FB Name

M+L60AD2DA2\_DA\_SetGainVal

Item	Description			
Function overview	Sets the gain of the speci	fied D/A conversion char	nnel (CH3	3 or CH4).
Symbol	Execution command Module start XY address Target CH Offset/gain adjustment amount Set value change command User range write command	M+L60AD2DA2_C B : FB_EN W : i_Start_IO_No W : i_CH W : i_Adjust_Amount B : i_Value_Change B : i_Write_Gain	DA_SetGair FB_ ER	TVal FB_ENO : B — Execution status FB_OK : B — Completed without error _ERROR : B — Error flag RROR_ID : W — Error code
Applicable hardware	Analog I/O module	L60AD2DA2		
and software	CPU module	Series MELSEC-L Series	LCPU	Model
	Engineering software	GX Works2 *1		
		Language Japanese version English version Chinese (Simplified) version Chinese (Traditional) version Korean version *1 For software versions "Relevant Manuals".	ersion /ersion s applica	Software versionVersion1.86Q or laterVersion1.24A or laterVersion1.49B or laterVersion1.49B or laterVersion1.49B or laterble to the modules used, refer to
Programming	Ladder			
language				
Number of steps	450 steps (for MELSEC-L * The number of steps of input and output definition	. series CPU) the FB in a program depo on.	ends on t	the CPU model that is used and



Item	Description	
Function description	1) By turning ON FB_EN (Execution command), the gain of the specified D/A conversion	
	channel (CH3 or CH4) is set.	
	2) To adjust the D/A output, set i_Adjust_Amount (Offset/gain adjustment amount) and tu	rn
	ON from OFF i_Value_Change (Set value change command) while the FB_EN	
	(Execution command) is ON.	
	3) By turning ON the user range write command while FB_EN (Execution command) is O	N,
	the gain value is written.	
	4) When the setting value of the target channel is out of range, the FB_ERROR output tur	ns
	ON and processing is interrupted, and the error code is stored in ERROR_ID (Error	
	code).	
	Refer to the error code explanation section for details.	
Compiling method	Macro type	
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery	
precautions	processing separately in accordance with the required system operation.	
	2) The FB cannot be used in an interrupt program.	
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.	Οо
	not use this FB in programs that are only executed once such as a subroutine,	
	FOR-NEXT loop because it is impossible to turn OFF.	
	4) When the following FBs are used, implement an external interlock to prevent them fror	n
	being executed simultaneously. Do not use two or more of these FBs simultaneously. I	f
	two or more of these FBs are executed simultaneously, the offset/gain is set incorrectly	y.
	M+L60AD2DA2_AD_SetOffsetVal	
	M+L60AD2DA2_AD_SetGainVal	
	M+L60AD2DA2_DA_SetOffsetVal	
	M+L60AD2DA2_DA_SetGainVal	
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an	
	interrupt program.	
	6) Every input must be provided with a value for proper FB operation.	
	7) If the gain is set using the configuration function of GX Works2, this FB is unnecessary	<i>\</i> .
	8) When this FB is used in two or more places, a duplicated coil warning may occur durin	ıg
	compile operation due to the Y signal being operated by index modification. However the	nis
	is not a problem and the FB will operate without error.	
	9) To operate the L60AD2DA2, set the I/O range according to the device and system to b	e
	connected. Configure the setting in Switch Setting of GX Works2 according to the	
	application.	
	For details on how to use the intelligent function module switch setting, refer to GX	
	Works2 Version 1 Operating Manual (Common).	







Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)



## Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid. The	Please try again after confirming the setting.
	target channel is not within the range of 3	
	or 4.	

## Labels

|--|

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		word	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Target CH	i_CH	Word	3, 4	Specify the channel number.
Offset/gain	i_Adjust_Amount	Word	-3,000 to 3,000	Specify the adjustment amount
adjustment amount		word		for the D/A output adjustment.
Set value change	i_Value_Change		ON, OFF	Turn ON for D/A output change.
command		Bit		Turn OFF after the D/A output
				change.
User range write	i_Write_Gain		ON, OFF	Turn ON for the adjusted gain
command		Bit		value writing to a flash memory.
				Turn OFF after the writing.

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



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#### Note

This chapter includes information related to the function block.

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



## 2.2.9. M+L60AD2DA2\_DA\_ShiftOperation (D/A conversion shift operation)

#### FB Name

M+L60AD2DA2\_DA\_ShiftOperation

Item	Description			Description			
Function overview	Adds the input value shift amount to the digital value.						
Symbol	Execution command — Digital value — Input value shift amount —	M+L60AD2DA2_DA_; B:FB_EN W:i_Digital_Value W:i_Shift_Value	ShiftOpera Ff o_Dig_C FB_E ERR	tion B_ENO : B — Execution status FB_OK : B — Completed without error Dut_Val : W — Digital output value ERROR : B — Error flag COR_ID : W — Error code			
Applicable hardware	Analog I/O module	L60AD2DA2					
and software	CPU module						
		Series		Model			
		MELSEC-L Series	LCPU				
	Engineering software	GX Works2 *1		Software version			
		Japanese version		Version1.86Q or later			
		English version		Version1.24A or later			
		Chinese (Simplified) v	ersion	Version1.49B or later			
		Chinese (Traditional)	ersion/	Version1.49B or later			
		Korean version		Version1.49B or later			
		*1 For software version: "Relevant Manuals".	s applica	ble to the modules used, refer to			
Programming	Ladder						
language							
Number of steps	192 steps (for MELSEC-L series CPU)						
	* The number of steps of	f the FB in a program dep	ends on	the CPU model that is used and			
	input and output definit	ion.					



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the input value shift amount is added to the
	digital value *1.
	*1 Input a digital value that is to be written by M+L60AD2DA2_DA_WriteDAVal or other
	methods to the L60AD2DA2 as the digital value.
	2) When the addition result falls below -32,768 (exceeds 32,767), the value is fixed to
	-32,768 (32,767).
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) Every input must be provided with a value for proper FB operation.
	5) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
	6) When FB_OK (Completed without error) is ON, o_Dig_Out_Val (Digital output value) is
	effective.
	7) By turning OFF FB_EN, o_Dig_Out_Val (Digital output value) is cleared to 0.
FB operation type	Real-time execution
Application example	Refer to "Appendix 1. FB Library Application Examples".
Timing chart	[When operation completes without error]
	(Execution command)
	FB_ENO (Execution status)
	Shift operation During shift processing During shift processing
	FB_OK
	EB_ERROR (Error flag)
	ERROR_ID (Error code)
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	<ul> <li>GX Works2 Version 1 Operating Manual (Simple Project, Function Block)</li> </ul>



Error	cod	es
	000	00

#### •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	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Digital value	i_Digital_Value	Word	-32,768 to 32,767	Specify the digital value.
Input value shift	i_Shift_Value	Mord	-32,768 to 32,767	Specify the shift amount.
amount		vvolu		

Name (Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Rit.	OFF	ON: Execution command is ON.
		ы		OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the D/A
error		Bit	OFF	conversion shift operation is being
				executed.
Digital output value	o_Dig_Out_Val	Word 0		The digital value to which the input value
				shift amount is added is stored.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0



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#### Note

This chapter includes information related to the function block.

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



## 2.2.10. M+L60AD2DA2\_DA\_WaveDataStoreCsv (Read wave data (CSV file))

#### FB Name

M+L60AD2DA2\_DA\_WaveDataStoreCsv

Item	Description				
Function overview	Reads data from the CSV file where parameters and wave data (wave data and wave data				
	points) of the wave output function are stored, then writes them to the buffer memory of the				
	L60AD2DA2.				
Symbol			Dete Ote		
	Execution command—	M+L60AD2DA2_DA_Wa	aveDataSto	B ENO : B Execution status	
	Modulo start XX addross —	W : i Start IO No			
	CSV file name	S:I_FlieiName	FB_E		
			ERR	CR_ID : W—Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Model	
		MELSEC-L Series	LCPU *		
		* Only the model having	an SD n	nemory card slot is applicable.	
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	rersion	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applicat	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	1029 steps (for MELSE	C-L series CPU)			
	* The number of steps o	f the FB in a program dep	pends on	the CPU model that is used and	
	input and output defini	tion.			







Item	Description
	order for the number of specified points, and stores them into the start address
	(Un\G5000) or later of the wave data registration area of the buffer memory.
	The CSV file of the wave output function can be created easily with the "Create wave
	output data" tool of GX Works2.
	4) When the CSV file specified by i_FileName (CSV file name) does not exist in the SD
	memory card inserted to the CPU module, a CPU error (Error code: 2410) occurs.
	* When the CPU is set to stop at the CPU error occurrence, FB_ERROR and
	ERROR_ID are not updated. The operation status of the CPU module (RUN/STOP)
	for when the CPU error occurs can be set in [PLC RAS] *1.
	*1: [Parameter]<>[PLC Parameter]<>[PLC RAS]<>"File Access Error " in "When There is an Error"
	5) When FB_EN (Execution command) is turned OFF before the execution of this FB is
	completed, the processing is interrupted. At that time, the data stored in the buffer
	memory is not cleared.
	When the FB is executed again, the reading processing is started from the beginning.
	6) Only when the function selection is set to the wave output function, this FB can be used.
	7) When the function selection is set to other than the wave output function, FB_ERROR is
	turned ON and the processing of the FB is interrupted.
	The error code 60 (Decimal) is stored in ERROR_ID.
	Refer to the error code explanation section for details.
	8) Do not remove the SD memory card during the execution of this FB. For the insertion of
	removal method of the SD memory card, refer to MELSEC-L CPU Module User's
	Manual (Hardware Design, Maintenance and Inspection).
Compiling method	Macro type
Restrictions and	1) This FB requires many scans and takes long time to complete the processing.
precautions	Therefore, this FB should be executed during the warm up of the L60AD2DA2.
	2) The FB does not include error recovery processing. Program the error recovery
	processing separately in accordance with the required system operation.
	3) The FB cannot be used in an interrupt program.
	4) Please ensure that the FB_EN signal is capable of being turned OFF by the program.
	Do not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) This FB uses the SP.FREAD command. Thus, when an execution error of the
	SP.FREAD command occurs, a CPU error occurs.
	7) Do not use this FB when the CPU module that does not have a SD memory slot is used



Item	Description
	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
	is turned ON and the processing is interrupted.
	The error code 33 (Decimal) is stored in ERROR_ID.
	Refer to the error code explanation section for details.
	9) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) OFF,
	which can be set by sliding the SD memory card disabling switch upward, FB_ERROR
	is turned ON and the processing is interrupted.
	The error code 35 (Decimal) is stored in ERROR_ID.
	Refer to the error code explanation section for details.
	10) When this FB is executed with SM606 (SD memory card forced disable instruction) ON,
	SP.FREAD is not processed and the wave data cannot be read. FB_ERROR is turned
	ON and the processing is interrupted.
	The error code 36 (Decimal) is stored in ERROR_ID.
	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 LCPU, the time for completing this FB may extend or a timeout error
	(Error 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 MELSEC-L CPU
	Module 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) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (multiple scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description
Timing chart	[When operation completes without error]
	FB_EN (Execution command)
	FB_ENO (Execution status)
	Reading a CSV file in the During SP.FREAD execution No processing
	Buffer memory updating Update stopped During update Update stopped
	FB_OK (Completed without error)
	FB_ERROR (Error flag)
	ERROR_ID (Error code)
	[When an error occurs]
	FB_EN (Execution command)
	FB_ENO (Execution status)
	Reading a CSV file in the SD memory card     No processing
	Buffer memory updating Update Stopped
	FB_OK (Completed without error)
	FB_ERROR (Error flag)
	ERROR_ID (Error code) 0 Error code 0
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	MELSEC-L CPU Module User's Manual (Data Logging Function)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)



## Error code list

Error code	Description	Action
33 (Decimal)	This FB is executed with no SD memory	Execute this FB again after mounting the SD
	card on the CPU module.	memory card to which the target CSV file is
		saved on the CPU module. Or execute this FB
		again after inserting the available SD memory
		card and saving the target CSV file to the SD
		memory card using "Write PLC User Data" of
		GX Works2.
35 (Decimal)	The SD memory card cannot be accessed	Execute the FB again after turning ON SM605
	because SM605 (Memory card	(Memory card remove/insert prohibit flag) by
	remove/insert prohibit flag) is turned OFF.	sliding the SD memory card disabling switch
		downward.
36 (Decimal)	SM606 (SD memory card forced disable	Execute the FB again after disabling the SD
	instruction) is ON, and access to the SD	memory card forced disable instruction by
	memory card is unavailable.	turning OFF SM606 and confirming that
		SM607 (SD memory card use force stop
		condition flag) is OFF.
40 (Decimal)	The wave data reading processing	Reduce the frequency of the access
	timeout occurred because accesses to the	processing to the SD memory card.
	SD memory card were frequently made in	
	addition to this FB.	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the
	intelligent function module switch setting	intelligent function module switch setting of
	of the target module is set to other than	the target module to the wave output function,
	the wave output function.	and execute the FB again.
Error codes other	The error code of the CPU module	For details on the caused error code, refer to
than above		Appendix 1 Error Code Lists of 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	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O point	Specify the start XY address (in
address		Word	range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
CSV file name	i_FileName		12 characters or less	Specify the name of the CSV file
		Character		in which the parameters and the
				wave data of the wave output
				function are stored. (Only CSV is
		character		valid for a file attribute.)
		string		For details of the CSV file format,
				refer to "Appendix 4. CSV File
				Format for Wave Data Reading
				FB (CSV File)".

Name (Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Bit OFF		ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that writing the
error		Bit		parameters and wave data of the wave
		Ы	OFF	output function in the CSV file to the buffer
				memory of the L60AD2DA2 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.



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#### Note

This chapter includes information related to the function block.

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



## 2.2.11. M+L60AD2DA2\_DA\_WaveDataStoreDev (Read wave data (device))

#### FB Name

M+L60AD2DA2\_DA\_WaveDataStoreDev

Item	Description				
Function overview	Reads data from the file register (ZR) where parameters and wave data (wave data and wave				
	data points) of the wave	output function are stored	l, then wi	rites them to the buffer memory of	
	the L60AD2DA2.				
Symbol					
	Execution command —	B : FB EN	FE	B ENO : B Execution status	
	Module start XX address	W i Start IO No	-	EB OK : B Completed without error	
	Read start address -		FD_C		
			ERR	OR_ID : W Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Model	
		MELSEC-L Series	LCPU		
	Engineering soltware	GA WOIKSZ I		2.4	
		Language		Software version	
				Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	/ersion	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	614 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				
	"Create wave output data" tool of GX Works2.				
	* m: File register (ZR) read start address. Specifying the points to be used in [PC File]*1				
	and the device points of the file register (ZR) in [Device]*2 can reserve the points of the				
	file register and arrange the data in the desired address.				
	*1 [Parameter]⊏>[PLC Parameter]⊏>[PLC File]⊏>"File Register"				
	*2 [Parameter]⊏>[PLC Parameter]⊏>[Device]⊏>"File Register Extension Setting"				
	4) Reserve "Number of wave data" +100 points or more for the file register (ZR) to be used.				
	When this FB is executed with the points specified in i_ReadDataAddr (Read start				
	address) less than "Number of wave data" +100 of ZR(m+98,99), the available range of				
	the file register (ZR) is exceeded and a CPU error (Error code: 4101) occurs.				
	5) Only when the function selection is set to the wave output function, this FB can be used.				
	6) When the function selection is set to other than the wave output function, FB_ERROR is				
	turned ON and the processing of the FB is interrupted.				
	The error code 60 (Decimal) is stored in ERROR_ID.				
	Refer to the error code explanation section for details.				
	7) When FB_EN (Execution command) is turned OFF before the execution of this FB is				
	completed, the processing is interrupted. At that time, the data stored in the buffer				
	memory is not cleared.				
	When the FB is executed again, the reading processing is started from the beginning.				
Compiling method	Macro type				
Restrictions and	1) This FB requires many scans and takes long time to complete the processing.				
precautions	Therefore, this FB should be executed during the warm up of the L60AD2DA2.				
	2) The FB does not include error recovery processing. Program the error recovery				
	processing separately in accordance with the required system operation.				
	3) The FB cannot be used in an interrupt program.				
	4) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do				
	not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an				
	interrupt program.				
	6) When two or more of these FBs are used, they cannot be used simultaneously.				
	7) Every input must be provided with a value for proper FB operation.				
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to be				
	connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Version 1 Operating 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]         FB_EN (Execution command)       FB_ENO (Execution status)       Image: Complete Status (Completed without error)         Buffer memory updating processing       Image: Complete Status (Completed without error)       Image: Complete Status (Completed without error)         FB_CK (Completed without error)       Image: Complete Status (Completed without error)       Image: Complete Status (Completed without error)         FB_ERROR (Error flag)       FB_ERROR (Error flag)       FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code 0				
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual				
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)				
	<ul> <li>GX Works2 Version 1 Operating Manual (Common)</li> </ul>				
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)				

## •Error code list

Error code	Description	Action	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the	
	intelligent function module switch setting	intelligent function module switch setting of the	
	of the target module is set to other than	target module to the wave output function, and	
	the wave output function.	execute the FB again.	



## Labels

## Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN		ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
			For details, refer to the	example, enter H10 for X10.)
			CPU user's manual.	
Read start address	i_ReadDataAddr		Effective device range	Specify the start address of the file
		Doublo		register (ZR) in which the
		Double		parameters and the wave data of
		word		the wave output function are
				stored.

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that writing the
error				parameters and the wave data of the wave
		DIL		output function in the file register (ZR) to the
				buffer memory of the module is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0



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#### Note

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



## 2.2.12. M+L60AD2DA2\_DA\_WaveOutputSetting (Wave output setting)

#### FB Name

M+L60AD2DA2\_DA\_WaveOutputSetting

Item	Description				
Function overview	Sets the wave output of the specified D/A conversion channel (CH3 or CH4) or all the D/A				
	conversion channels (CH3 and CH4).				
Symbol					
	Execution	command —	B : FB_EN		FB_ENO : B Execution status
	Module start X	r address —	W:i_Start_IO_No		FB_OK : B Completed without error
	т	arget CH-	W : i_CH		FB_ERROR : B — Error flag
	Output setting during wave ou	utput stop —	W : i_OutputSelect		ERROR_ID : W—Error code
	Output value during wave ou	utput stop —	W:i_OutputValue		
	Wave pattern start addres	ss setting—	D : i_StartingAddr		
	Wave pattern data poin	nts setting —	D : i_PointsSetting		
	Wave pattern output repetition	on setting —	W:i_Frequency		
	Constant for wave output convers	sion cycle —	W:i_ConvSpeed		
Applicable hardware	Analog I/O module	L60AD	2DA2		
and software	CPU module				
			Series		Model
		MELS	EC-L Series	LCPU	
	Engineering software	GX Wo	orks2 *1		
			Language		Software version
		Japan	lese version		Version1.86Q or later
		Englis	sh version		Version1.24A or later
		Chine	se (Simplified) ve	ersion	Version1.49B or later
		Chinese (Traditional) version Version1.49B or later			
		Korea	in version		Version1.49B or later
		*1 For software versions applicable to the modules used, refer to			
		"Rel	evant Manuals".		
Programming	Ladder				
language					



Item	Description
Number of steps	403 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) By turning ON FB_EN (Execution command), the wave output for the specified D/A
	conversion channel (CH3 or CH4) or all the D/A conversion channels (CH3 and CH4) is
	set.
	2) The setting value is validated when the Operating condition setting request signal (Yn9)
	is turned OFF $\rightarrow$ ON $\rightarrow$ OFF or the Operating condition setting request FB
	(M+L60AD2DA2_RequestSetting) is executed.
	3) Only when the function selection is set to the wave output function, this FB can be used.
	Set the wave output data for the analog output in advance.
	4) When the function selection is not set for the wave output function or the setting value of
	the target channel is out of range, FB_ERROR is turned ON and the processing is
	interrupted.
	The error code 10 (Decimal) or 60 (Decimal) is stored in ERROR_ID (Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition
	of the target channel.
	5) This FB uses index registers Z6 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation.
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Pulsed execution (1 scan execution type)
Application example	Refer to "Appendix 1. FB Library Application Examples".



Item	Description				
Timing chart	[When operation completes without error]       [When an error occurs]         FB_EN (Execution command)       FB_ENO (Execution status)         Fach setting value writing processing FB_OK (Wave output setting complete)       FB_ENO (Execution status)         FB_ENO (Execution status)       Each setting value writing processing FB_OK (Wave output setting complete)         FB_ERROR (Error flag)       0         ERROR_ID (Error code)       0				
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual				
	MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)				
	GX Works2 Version 1 Operating Manual (Common)				
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)				

#### •Error code list

Error code	Description	Action	
10 (Decimal)	The specified channel is not valid.	Please try again after confirming the setting.	
	Set 3, 4, or 15 to the target channel.		
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the	
	intelligent function module switch setting	intelligent function module switch setting of	
	of the target module is set to other than	the target module to the wave output function,	
	the wave output function.	and execute the FB again.	

### Labels

●Input labels				
Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN		ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the L60AD2DA2
		Word	CPU.	is connected. (For example, enter H10
			For details, refer to	for X10.)
			the CPU user's	
			manual.	
Target CH	i_CH	\A/ord	3, 4, 15	3 or 4: Specify the channel number.
		vvoid		15: Specify channel 3 and channel 4.



Name (Comment)	Label name	Data type	Setting range	Description
Output setting during	i_OutputSelect		0: 0V/0mA	Specify the output value during the
wave output stop			1: Offset value	wave output stop.
		Word	2: Output value	
			during wave output	
			stop	
Output value during	i_OutputValue		• 0 to 12,287	Set the value to be output when "2:
wave output stop			(For range of 0 to	Output value during wave output stop"
			5V, 1 to 5V, 0 to	is selected in "Output setting during
		\A/ord	20mA, and 4 to	wave output stop".
		vvolu	20mA)	The available setting range differs
			• -16,384 to 16,383	depending on the output range
			(For range of -10	setting.
			to 10V)	
Wave pattern start	i_StartingAddr	Double	5,000 to 54,999	Set the start address of the wave
address setting		Word		pattern to be output.
Wave pattern data	i_PointsSetting	Double	1 to 50,000 (points)	Set the data points of the wave pattern
points setting		Word		to be output.
Wave pattern output	i_Frequency		-1:	Set the output times of the wave
repetition setting			Unlimited repetition	pattern.
		Word	1 to 32,767:	
			Specified number of	
			times	
Constant for wave	i_ConvSpeed		1 to 5,000	Set the constant to determine the
output conversion		Word		conversion cycle of the wave output.
cycle				

Name (Comment)	Label name	Data	Initial	Description
		type	value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		ЫІ	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the wave output
error		ЫІ	UFF	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.



Version	Date	Description
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#### Note

This chapter includes information related to the function block.

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



## 2.2.13. M+L60AD2DA2\_DA\_WaveOutReqSetting (Wave output start/stop request)

#### FB Name

M+L60AD2DA2\_DA\_WaveOutReqSetting

Item	Description				
Function overview	Sets the starting, stopping, or pausing of the wave output of the specified D/A conversion				
	channel (CH3 or CH4) or all the D/A conversion channels (CH3 and CH4).				
Symbol	Execution command — Module start XY address — Target CH — Wave output start/stop request —	M+L60AD2DA2_DA_WaveOutReqSetting         B : FB_EN       FB_ENO : B         W : i_Start_IO_No       FB_OK : B         W : i_CH       o_WaveStatus_CH3 : W         W : i_Start_Stop_Req       o_WaveStatus_CH4 : W			
	FB_ERROR : B — Error flag ERROR_ID : W — Error code				
Applicable	Analog I/O module	L60AD2DA2			
hardware and	CPU module				
software		Series		Model	
		MELSEC-L Series LCPU			
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	ersion	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming language	Ladder				
Number of steps	353 steps (for MELSEC-L	series CPU)			
	* The number of steps of	the FB in a program depe	ends on t	the CPU model that is used and	
	input and output definition	on.			



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the starting, stopping, or pausing of the
	wave output of the specified D/A conversion channel (CH3 or CH4) or all the D/A
	conversion channels (CH3 and CH4) is set.
	2) By turning ON FB_EN (Execution command), the value of the wave output status
	monitor (Un\G3102, Un\G3103) is output.
	When a channel is specified in the input label, only the wave output status monitor value
	of the specified channel is updated. For other channels, "0" is output.
	When all channels are set in the input label, the wave output status monitor values of all
	the channels are output.
	3) After FB_EN (Execution command) is turned ON, the FB is always executed.
	4) To restart the wave output, after the wave output is finished, set i_Start_Stop_Req (Wave
	output start/stop request) to "1 (Wave output start request)", "0 (Wave output stop
	request)", then "1 (Wave output start request)".
	5) Only when the function selection is set to the wave output function, this FB can be used.
	6) When the function selection is not set for the wave output function or the setting value of
	the target channel is out of range, FB_ERROR is turned ON and the processing is
	interrupted.
	The error code 10 (Decimal) or 60 (Decimal) is stored in ERROR_ID (Error code).
	Refer to the error code explanation section for details.
Compiling method	Macro type
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery
precautions	processing separately in accordance with the required system operation.
	2) The FB cannot be used in an interrupt program.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of
	the target channel.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) Every input must be provided with a value for proper FB operation.
	7) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
FB operation type	Real-time execution



Item	Description				
Application example	Refer to "Appendix 1. FB Library Application Examples".				
Timing chart	[When operation completes without error] [When an error occurs]				
	FB_EN (Execution command)				
	FB_ENO (Execution status)				
	Wave output start/stop request 0 Write 0 Wave output start/stop request	0			
	o WaveStatusCH3 to 4 (CH3 and CH4 Wave output status monitor)	0			
	FB_OK (Completed without error)				
	FB_ERROR (Error flag) FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 E	rror code 0			
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 Version 1 Operating Manual (Common)				
	• GX Works2 Version 1 Operating Manual (Simple Project, Function Block)				

### •Error code list

Error code	Description	Action
10 (Decimal)	The specified channel is not valid.	Please try again after confirming the setting.
	Set 3, 4, or 15 to the target channel.	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the
	intelligent function module switch setting of	intelligent function module switch setting of
	the target module is set to other than the	the target module to the wave output
	wave output function.	function, and execute the FB again.


# Input labels

Name	Label name	Data	Setting range	Description
(Comment)		type		
Execution	FB_EN	Rit	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start	i_Start_IO_No		Depends on the I/O point	Specify the start XY address (in
XY address		Word	range of the CPU.	hexadecimal) where the L60AD2DA2
		word	For details, refer to the CPU	is connected. (For example, enter
			user's manual.	H10 for X10.)
Target CH	i_CH	\\/ord	3, 4, 15	3 or 4: Specify the channel number.
		word		15: Specify channel 3 and channel 4.
Wave output	i_Start_Stop_Req		0: Wave output stop request	Specify the request for the wave
start/stop		Word	1: Wave output start request	output start or stop.
request			2: Wave output pause request	

## Output labels

Name (Comment)	Label name	Data	Initial value	Description
		type		
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK	Rit	OFF	When ON, it indicates that the FB is
error		Dit	OFF	being executed properly.
CH3 Wave output	o_WaveStatus_CH3			Outputs the wave output status value
status monitor				(stop, during output, pause).
		Word	0	0: Wave output stop
				1: Wave output
				2: Wave output pause
CH4 Wave output	o WaveStatus CH4			3: Wave output step action *1
status monitor	0_114/00/44/00_0111			
				*1: The wave output step action function
				is unavailable with the FB. To execute,
		Word	0	refer to Section 8.18 Wave Output
				Function of MELSEC-L Analog
				Input/Output Module User's Manual and
				use the device test function of GX
				Works2.



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

Name (Comment)	omment) Label name Data Initial value		Description	
		type		
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.

Version	Date	Description
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Note

This chapter includes information related to the function block.

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



## 2.3. Common FB

2.3.1. M+L60AD2DA2\_ReadADVal\_WriteDAVal (Read A/D conversion data and write D/A conversion data)

#### FB Name

M+L60AD2DA2\_ReadADVal\_WriteDAVal

Item	Description				
Function overview	Reads the A/D conversion data of the A/D conversion channels (CH1 and CH2) and writes the				
	D/A conversion data of the D/A conversion channels (CH3 and CH4).				
Symbol		M+I 60AD2DA2 ReadADVa	l WriteDA	Val	
	Execution command B : FB_EN FB_ENO : B Execution status				
	Module start XY address — W : i_Start_IO_No FB_			_OK : B Completed without error	
	CH3 Digital value — W	: i_DA_Value_CH3 o_A	D_Value_0	CH1 : W—CH1 A/D conversion data	
	CH4 Digital value — W	: i_DA_Value_CH4 o_A	D_Value_0	CH2 : W CH2 A/D conversion data	
			FB_ERR	ROR : B Error flag	
			ERROR	LID : W Error code	
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module	nodule			
		Series		Model	
		MELSEC-L Series	LCPU		
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	rersion	Version1.49B or later	
		Korean version Version1.49B or later			
		*1 For software versions applicable to the modules used, refer to			
		"Relevant Manuals".			
Programming	Ladder				
language					



Item	Description				
Number of steps	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.				
Function description	1) By turning ON FB_EN (Execution command), the A/D conversion data of the A/D				
	conversion channels (CH1 and CH2) is read and the digital input values of the D/A				
	conversion channels (CH3 and CH4) are written.				
	2) The read A/D conversion data depends on the settings of the input range and the				
	averaging processing function.				
	3) When the A/D conversion completed flag (XnE) is OFF, the A/D conversion data of				
	channel 1 and channel 2 is not read.				
	4) The digital input value to be written depends on the output range setting.				
	When the scaling function (D/A conversion) of the L60AD2DA2 is enabled, the digital				
	input value is scaled before the D/A conversion.				
	5) When the digital output value and digital input value are set in the auto refresh setting of				
	the intelligent function module, this FB is unnecessary.				
Compiling method	Macro type				
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery				
precautions	processing separately in accordance with the required system operation.				
	2) The FB cannot be used in an interrupt program.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do				
	not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an				
	interrupt program.				
	5) Every input must be provided with a value for proper FB operation.				
	6) To operate the L60AD2DA2, set the input range according to the device and system to be				
	connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Version 1 Operating Manual (Common).				
FB operation type	Real-time execution				
Application example	Refer to "Appendix 1. FB Library Application Examples".				



Item	Description				
Timing chart	[When operation completes without error]         FB_EN (Execution command)         FB_ENO (Execution status)         o_AD_Value_CH□ (CH□ A/D conversion data)         I_DA_Value_CH□ (CH□ Digital input value)         FB_CK (Completed without error)         FB_EROR (Error flag)         ERROR_ID (Error code)				
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual     MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)				
	• MELOEC-E CI O Module Oser s Manual (Partware Design, Manuenance and Inspection)				
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)				

# Error codes Error code list Error code Description Action

Error code	Description	Action
None	None	None



# Input labels

Name	Label name	Data	Setting range	Description
(Comment)		type		
Execution	FB_EN	Rit.	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the	Specify the start XY address (in
address			I/O point range	hexadecimal) where the L60AD2DA2 is
		Word	of the CPU.	connected. (For example, enter H10 for
		word	For details, refer	X10.)
			to the CPU	
			user's manual.	
CH3 Digital	i_DA_Value_CH3		-32,000 to	Specify the digital input value of channel 3.
value		Word	32,000	The available setting range differs
		word		depending on the scaling function (D/A
				conversion) and output range setting.
CH4 Digital	i_DA_Value_CH4		-32,000 to	Specify the digital input value of channel 4.
value		\A/ord	32,000	The available setting range differs
		word		depending on the scaling function (D/A
				conversion) and output range setting.

## Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that the A/D
error		Bit	OFF	conversion value is being read or the
				digital input value is being written.
CH1 A/D conversion	o_AD_Value_CH1	Word	0	The A/D conversion value of channel 1
data		vvoru	0	is stored.
CH2 A/D conversion	o_AD_Value_CH2	Word	0	The A/D conversion value of channel 2
data		vvoru	0	is stored.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		DIL	OFF	occurred.
Error code	ERROR_ID	Word	0	FB error code output.



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## Note

This chapter includes information related to the function block.

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



# 2.3.2. M+L60AD2DA2\_RequestSetting (Operating condition setting request)

#### **FB** Name

M+L60AD2DA2\_RequestSetting

Item	Description					
Function overview	Validates each setting.					
Symbol	Execution command — I Module start XY address — \	M+L60AD2DA2_RequestSetting B : FB_EN FB_ENO : B — Execution status V : i_Start_IO_No FB_OK : B — Completed without		ENO : B — Execution status		
			FB_ERROR : B — Error flag ERROR_ID : W — Error code			
Applicable hardware	Analog I/O module	L60AD2DA2				
and software	CPU module	Series MELSEC-L Series	Model LCPU			
	Engineering software	GX Works2 *1				
		Language		Software version		
		Japanese version V		Version1.86Q or later		
		English version		Version1.24A or later		
		Chinese (Simplified) version Version		Version1.49B or later		
		Chinese (Traditional) version		Version1.49B or later		
		Korean version Version1.49B or later		Version1.49B or later		
		*1 For software version: "Relevant Manuals".	s applicab	ble to the modules used, refer to		
Programming	Ladder					
language						
Number of steps	294 steps (for MELSEC-L series CPU)					
	I he number of steps of input and output definiti	the FB in a program dep on.	ends on th	he CPU model that is used and		
language Number of steps	294 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) By turning ON FB_EN (Execution command), the setting contents of all the channels				
	(CH1 to CH4) are validated. For the applicable setting, refer to MELSEC-L Analog				
	Input/Output Module User's Manual.				
	2) After FB_EN (Execution command) is turned ON, the execution of this FB continues until				
	each function setting is completed.				
Compiling method	Macro type				
Restrictions and	1) When this FB is executed while the L60AD2DA2 is being operated, A/D conversion and				
precautions	D/A conversion are stopped. The D/A output before the stop is held.				
	The conversion restarts after FB_OK turns ON.				
	2) The FB does not include error recovery processing. Program the error recovery				
	processing separately in accordance with the required system operation.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do				
	not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	4) The FB cannot be used in an interrupt program.				
	5) This FB uses index register Z9. Please do not use the index register in an interrupt				
	program.				
	6) Every input must be provided with a value for proper FB operation.				
	7) When this FB is used in two or more places, a duplicated coil warning may occur during				
	compile operation due to the Y signal being operated by index modification. However				
	this is not a problem and the FB will operate without error.				
	8) To operate the L60AD2DA2, set the input range according to the device and system to				
	be connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Version 1 Operating Manual (Common).				
FB operation type	Pulsed execution (multiple scan execution type)				
Application example	Refer to "Appendix 1. FB Library Application Examples".				
Timing chart	[When operation completes without error]				
	FB_EN (Execution command)				
	FB_ENO (Execution status)				
	Operating condition setting				
	Operating condition setting				
	FB_OK (Completed without error)				
	FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0				



Item	Description			
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual			
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)			
	GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)			



Error codes		
Error code list		
Error code	Description	Action
None	None	None

●Input labels					
Name (Comment)	Label name	Data type	Setting range	Description	
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.	
		DIL		OFF: The FB is not activated.	
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in	
address		Word	point range of the CPU.	hexadecimal) where the	
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For	
			CPU user's manual.	example, enter H10 for X10.)	

#### Output labels

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

# FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

## Note

This chapter includes information related to the function block.

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



# 2.3.3. M+L60AD2DA2\_ErrorOperation (Error operation)

#### FB Name

M+L60AD2DA2\_ErrorOperation

Item	Description				
Function overview	Monitors error codes and	resets errors.			
Symbol	Г	M+I 60AD2DA2 Error	Operation		
	Execution command – B	: FB_EN	FB_	ENO : B Execution status	
	Module start XY address — W	/:i_Start_IO_No	FE	3_OK : B—Completed without error	
	Error reset request – B	: i_Error_Reset o	_UNIT_ER	ROR : B Module error flag	
	o UNIT ERR CODE : W—Module error code				
			FB_ER	ROR : B Error flag	
			ERRO	R_ID : W Error code	
	L				
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		Model	
		MELSEC-L Series			
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version		Version1.86Q or later	
		English version		Version1.24A or later	
		Chinese (Simplified) ve	ersion	Version1.49B or later	
		Chinese (Traditional) v	version	Version1.49B or later	
		Korean version		Version1.49B or later	
		*1 For software versions	s applica	ble to the modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	307 steps (for MELSEC-L	series CPU)			
	* The number of steps of t	the FB in a program depe	nds on tl	he CPU model that is used and	
	input and output definition	on.			



Item	Description				
Function description	1) When FB_EN (Execution command) is turned ON, an error of the target module is				
	monitored.				
	After FB_EN (Execution command) is turned ON, an error is reset when i_Error_Reset				
	(Error reset command) is turned ON during error occurrence.				
Compiling method	Macro type				
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery				
precautions	processing separately in accordance with the required system operation.				
	The FB cannot be used in an interrupt program.				
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program.				
	Do not use this FB in programs that are only executed once such as a subroutine,				
	FOR-NEXT loop because it is impossible to turn OFF.				
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an				
	interrupt program.				
	5) Every input must be provided with a value for proper FB operation.				
	6) When this FB is used in two or more places, a duplicated coil warning may occur during				
	compile operation due to the Y signal being operated by index modification. However				
	this is not a problem and the FB will operate without error.				
	7) To operate the L60AD2DA2, the setting must be appropriate to the device and system				
	to be connected. Configure the setting in Switch Setting of GX Works2 according to the				
	For details on now to use the intelligent function module switch setting, refer to GX				
	Works2 version 1 Operating Manual (Common).				
FB operation type					
Application example	Refer to "Appendix 1. FB Library Application Examples".				
Timing chart	[vvnen operation completes without error]				
	FB_EN (Execution command)				
	FB_ENO (Execution status)				
	i_Error_Reset				
	Error clear request (YnF)				
	Error flag (XnF)				
	o_UNIT_ERROR (Module error flag)				
	o_UNIT_ERR_CODE (Module error code) 0 Module error code 0				
	FB_OK (Completed without error)				
	FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0				



Item	Description
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)
	GX Works2 Version 1 Operating Manual (Common)
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)



Error codes					
●Error code list					
Error code	Description	Action			
None	None	None			

●Input labels					
Name (Comment)	Label name	Data type	Setting range	Description	
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.	
		DIL		OFF: The FB is not activated.	
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in	
address		Mord	point range of the CPU.	hexadecimal) where the	
		vvolu	For details, refer to the	L60AD2DA2 is connected. (For	
			CPU user's manual.	example, enter H10 for X10.)	
Error reset request	i_Error_Reset	Dit	ON, OFF	Turn ON for the error reset.	
		DIL		Turn OFF after the error reset.	

# Output labels

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



Version	Date	Description
1.00A	2013/08/30	First edition

### Note

This chapter includes information related to the function block.

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



# 2.3.4. M+L60AD2DA2\_OGBackup (Offset/gain value save)

#### **FB** Name

M+L60AD2DA2\_OGBackup

Item	Description			
Function overview	Reads the offset/gain setting value of the user range setting and stores it to a file.			
Symbol	M+L60AD2DA2_C Execution command — B : FB_EN Module start XY address — W : i_Start_IO_No Pass data classification — W : i_Dat_Type		_OGBackup FB_ENO : B — Execution status FB_OK : B — Completed without error FB_ERROR : B — Error flag ERROR_ID : W — Error code	
Applicable	Analog I/O module	L60AD2DA2		
hardware and	CPU module			
software		Series		Model
		MELSEC-L Series	LCPU	*
		* Only the model having	ı an SD ı	memory card slot is applicable.
	Engineering software	GX Works2 *1		
		Language		Software version
		Japanese version		Version1.86Q or later
		English version		Version1.24A or later
		Chinese (Simplified) ve	ersion	Version1.49B or later
		Chinese (Traditional) v	resion	Version1.49B or later
		Korean version		Version1.49B or later
		*1 For software versions	s applica	ble to the modules used, refer to
		"Relevant Manuals".		
Programming	Ladder			
language				
Number of steps	570 steps (for MELSEC-L series CPU)			
	* The number of steps of	f the FB in a program dep	ends on	the CPU model that is used and
	input and output definit	ion.		



Item	Des	cription
Function description	1)	By turning ON FB_EN (Execution command), the offset/gain value of the user range
		setting is read and saved to an SD memory card inserted into the CPU module.
	2)	FB operation is one-shot only, triggered by the FB_EN signal.
	3)	The name of the file which this FB creates is "LADA" + "Module start XY address" +
		".BIN".
		[File name example]
		When the module start XY address is H0120, the file name is "LADA0120.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 SD memory card mounted on the CPU 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 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	Mac	ro type
Restrictions and	1)	The FB does not include error recovery processing. Program the error recovery
precautions		processing separately in accordance with the required system operation.
	2)	The FB cannot be used in an interrupt program.
	3)	Please ensure that the FB_EN signal is capable of being turned OFF by the program.
		Do not use this FB in programs that are only executed once such as a subroutine,
		FOR-NEXT loop because it is impossible to turn OFF.
	4)	This FB uses index register Z9. Please do not use the index register in an interrupt
		program.
	5)	Every input must be provided with a value for proper FB operation.
	6)	Do not use this FB when the CPU module that does not have a SD memory slot is used.
		Even if used with such a CPU module, this FB does not operate.
	7)	When this FB is executed while the protect switch of the SD memory card ON, the
		offset/gain value cannot be saved. FB_ERROR is turned ON and the processing is
		interrupted.
		The error code 31 (Decimal) is stored in ERROR_ID.
		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
		is turned ON and the processing is interrupted.
		The error code 33 (Decimal) is stored in ERROR_ID.



Item	Description		
	Refer to the error code explanation section for details.		
	9) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) OFF,		
	which can be set by sliding the SD memory card disabling switch upward, FB_ERROR		
	is turned ON and the processing is interrupted.		
	The error code 35 (Decimal) is stored in ERROR_ID.		
	Refer to the error code explanation section for details.		
	10) When this FB is executed with SM606 (SD memory card forced disable instruction) ON,		
	SP.FWRITE is not processed and the offset/gain value cannot be read. FB_ERROR is		
	turned ON and the processing is interrupted.		
	The error code 36 (Decimal) is stored in ERROR_ID.		
	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 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		
	MELSEC-L CPU Module User's Manual (Data Logging Function).		
	12) To operate the L60AD2DA2, set the I/O range according to the device and system to be		
	connected. Configure the setting in Switch Setting of GX Works2 according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Version 1 Operating Manual (Common).		
FB operation type	Pulsed execution (multiple scan execution type)		
Application example	Refer to "Appendix 1. FB Library Application Examples".		
Timing chart	[When operation completes without error] [When an error occurs]		
	FB_EN (Execution command)		
	FB_ENO (Execution status)     User range setting file saving processing     No processing     User range setting file saving processing       No processing     No processing     No processing     No processing		
	FB_OK (Completed without error)		
	FB_ERROR (Error flag) ERROR ID (Error code) 0 ERROR ID (Error code) 0 Error code		
Delevent menuele			
Relevant manuals	• MELSEC L CPU Module User's Manual (Hardware Design Maintenance and Inspection)		
	• MELSEC L CPU Module User's Manual (Data Logging Function)		
	GX Works2 Version 1 Operating Manual (Common)		
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)		



# Error codes

# ●Error code list

Error code	Description	Action
31 (Decimal)	No data can be written to the SD memory	Execute the FB again after turning OFF the
	card because SM601 (Memory card	protect switch of the SD memory card and
	protect flag) is ON (Write prohibited).	confirming that SM601 is OFF (Write
		permitted).
33 (Decimal)	This FB is executed with no SD memory	Execute this FB again after mounting the SD
	card on the CPU module.	memory card to which the target file is saved
		on the CPU module.
35 (Decimal)	The SD memory card cannot be	Execute the FB again after turning ON
	accessed because SM605 (Memory card	SM605 (Memory card remove/insert prohibit
	remove/insert prohibit flag) is turned OFF.	flag) by sliding the SD memory card disabling
		switch downward.
36 (Decimal)	SM606 (SD memory card forced disable	Execute the FB again after disabling the SD
	instruction) is ON, and access to the SD	memory card forced disable instruction by
	memory card is unavailable.	turning OFF SM606 and confirming that
		SM607 (SD memory card use force stop
		condition flag) is OFF.
40 (Decimal)	The offset/gain value saving processing	Reduce the frequency of the access
	timeout occurred because accesses to	processing to the SD memory card.
	the SD memory card were frequently	
	made in addition to this FB.	



# Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON, OFF	ON: The FB is activated.
		Dit		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
		word	For details, refer to	example, enter H10 for X10.)
			the CPU user's	
			manual.	
Pass data	i_Dat_Type		0 to FH	Specify the type of the data to be
classification				stored for each channel.
		Word		0: Voltage, 1: Current
				b15         b4         b3         b2         b1         b0           0         to         0         CH4         CH3         CH2         CH1

## Output labels

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



Version	Date	Description
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### Note

This chapter includes information related to the function block.

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



# 2.3.5. M+L60AD2DA2\_OGRestore (Offset/gain value restore)

#### **FB** Name

M+L60AD2DA2\_OGRestore

Item	Description				
Function overview	Restores the offset/gain	setting values of the user	range se	tting that	are saved in a file to the
	module.				
Symbol			CBaatara		
	Execution command —	B : FB EN	FB	ENO : B	- Execution status
	Module start XV address —	W i Start IO No	F		-Completed without error
		W . 1_0tan_10_10			
			FB_EF	KOK : B	- Error flag
			ERRC	OR_ID:W	-Error code
Applicable hardware	Analog I/O module	L60AD2DA2			
and software	CPU module				
		Series		М	odel
		MELSEC-L Series	LCPU *		
		* Only the model having	ı an SD m	nemory ca	rd slot is applicable.
	Engineering software	GX Works2 *1			
		Language		So	ftware version
		Japanese version		Version1	.86Q or later
		English version		Version1	.24A or later
		Chinese (Simplified) ve	ersion	Version1	.49B or later
		Chinese (Traditional) v	ersion	Version1	.49B or later
		Korean version		Version1	.49B or later
		*1 For software versions	s applicab	le to the	modules used, refer to
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	593 steps (for MELSEC-L series CPU)				
	* The number of steps o	f the FB in a program dep	ends on t	he CPU r	nodel that is used and
	input and output definit	tion.			



Item	Description
Function description	1) By turning ON FB_EN (Execution command), the offset/gain value in the SD memory
	card inserted in the CPU module is read and restored to the module.
	2) FB operation is one-shot only, triggered by the FB_EN signal.
	3) This FB operates only when the A/D conversion and D/A conversion are set to "disabled
	for all channels.
	4) Execute this FB after executing M+L60AD2DA2_OGBackup.
	When reading a file created other than by M+L60AD2DA2_OGBackup, a Module error
	(Error code: 163) occurs.
	5) The name of the file which this FB reads from the memory card is "LADA" + "Module
	start XY address" + ".BIN".
	[File name example]
	When the module start XY address is H0120, the read file name is "LADA0120.BIN".
	6) When no target file containing the user range setting exist 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
Restrictions and	1) Set the A/D conversion and D/A conversion to "disabled" for all channels before
precautions	executing this FB.
	2) The FB does not include error recovery processing. Program the error recovery
	processing separately in accordance with the required system operation.
	3) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	4) The FB cannot be used in an interrupt program.
	5) This FB uses index register Z9. Please do not use the index register in an interrupt
	program.
	6) This FB cannot restore the user range setting from a file created other than by
	M+L60AD2DA2_OGBackup.
	7) Every input must be provided with a value for proper FB operation.
	8) Do not use this FB when the CPU module that does not have a 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_ERROF
	is turned ON and the processing is interrupted.
	The error code 33 (Decimal) is stored in ERROR_ID.
	Refer to the error code explanation section for details.
	10) When this FB is executed with SM605 (Memory card remove/insert prohibit flag) OFF,



Item	Description			
	which can be set by sliding the SD memory card disabling switch upward, FB_ERROR is			
	turned ON and the processing is interrupted.			
	The error code 35 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	11) When this FB is executed with SM606 (SD memory card forced disable instruction) ON,			
	SP.FREAD is not processed and the offset/gain value cannot be restored. FB_ERROR			
	is turned ON and the processing is interrupted.			
	The error code 36 (Decimal) is stored in ERROR_ID.			
	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 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 MELSEC-L CPU			
	Module User's Manual (Data Logging Function).			
	13) To operate the L60AD2DA2, set the I/O range according to the device and system to be			
	connected. Configure the setting in Switch Setting of GX Works2 according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Manual (Common).			
FB operation type	Pulsed execution (multiple scan execution type)			
Application example	Refer to "Appendix 1. FB Library Application Examples".			
Timing chart	[When operation completes without error] [When an error occurs]			
	FB_EN (Execution command)			
	FB_ENO (Execution status)     User range setting file reading processing       User range setting file reading processing     No processing			
	FB_OK (Completed without error)			
	FB_ERROR (Error flag) FB_ERROR (Error flag) FB_ERROR [Error code) FB_ERROR [D (Error code) FFD_ERROR [Error code) FFD_ERROR [Error code] FFD_ERROR [Error FFD_ERROR			
Delevent menuele				
Relevant manuals	MELSEC-L Analog input/Output Module User's Manual     MELSEC-L CPLI Module User's Manual (Hardware Design, Maintenance and Inspection)			
	• MELSEC-L CPU Module User's Manual (Data Logging Function)			
	• GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project Function Block)			



# Error codes

# ●Error code list

Error code	Description	Action
33 (Decimal)	This FB is executed with no SD memory	Execute this FB again after mounting the SD
	card on the CPU module.	memory card to which the target file is saved
		on the CPU module.
35 (Decimal)	The SD memory card cannot be	Execute the FB again after turning ON
	accessed because SM605 (Memory card	SM605 (Memory card remove/insert prohibit
	remove/insert prohibit flag) is turned OFF.	flag) by sliding the SD memory card disabling
		switch downward.
36 (Decimal)	SM606 (SD memory card forced disable	Execute the FB again after disabling the SD
	instruction) is ON, and access to the SD	memory card forced disable instruction by
	memory card is unavailable.	turning OFF SM606 and confirming that
		SM607 (SD memory card use force stop
		condition flag) is OFF.
40 (Decimal)	The offset/gain value reading processing	Reduce the frequency of the access
	timeout occurred because accesses to	processing to the SD memory card.
	the SD memory card were frequently	
	made in addition to this FB.	
90 (Decimal)	A channel whose A/D conversion is set to	Please try again after confirming the setting.
	"enabled" exists.	



#### Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Dit	ON, OFF	ON: The FB is activated.
		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)

#### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK	Dit	OFF	When ON, it indicates that the file save is
error		DIL		completed.
Error flag	FB_ERROR	Dit	OFF	When ON, it indicates that an error has
		ы		occurred.
Error code	ERROR_ID	Word	0	FB error code output.

# FB Version Upgrade History

Version	Date	Description
1.00A	2013/08/30	First edition

#### Note

This chapter includes information related to the function block.

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



# 2.3.6. M+L60AD2DA2\_FreeCalDataStoreDev (Read calculation expression data)

## FB Name

M+L60AD2DA2\_FreeCalDataStoreDev

# **Function Overview**

Item	Description					
Function overview	Reads calculation expression data of the free calculation function from the file register (ZR),					
	and then writes them to the buffer memory of the L60AD2DA2.					
Symbol						
	Execution command — B :	FB_EN	FB_ENO : B Execution status			
	Module start XY address — W :	i Start IO No	FB QK : B Completed without error			
	Pood stort address - D :	i_PoadDataAddr				
	Nedu Statt audress — D .					
			ERROR_ID : W — Error code			
Applicable hardware	Analog I/O module	L60AD2DA2				
and software		* Applicable to analog I/O m	odules whose first five digits of the			
		product information are "17	7012" or later			
	CPU module					
		Series	Model			
		MELSEC-L Series LCPU				
	Engineering software		O officients sectors			
		Language	Software version			
		Japanese version	Version1.86Q or later			
			Version1.24A or later			
		Chinese (Simplified) versio	n Version1.49B or later			
		Chinese (Traditional) version	on Version1.49B or later			
		Korean version	Version1.49B or later			
		*1 For software versions app	blicable to the modules used, refer to			
		"Relevant Manuals".				
Programming	Ladder					
language	· · · · · · · · · · · · · · · · · · ·					
Number of steps	485 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.					



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B

Item	Description					
Function description	1) By turning ON FB_EN (Execution command), the calculation expression data of the free					
	calculation function is read from the serial number access format file register (ZR) and					
	stored in the buffer memory of the analog I/O module.					
	File register Buffer memory					
	Calculation 282 words					
	ZB(m + 281)					
	Un\G50000 Calculation					
	M+L60AD2DA2_FreeCalDataStoreDev					
	For the free calculation function, refer to MELSEC-L Analog Input/Output Module					
	User's Manual.					
	2) The read calculation expression data of the free calculation function is validated when					
	the Operating condition setting request signal (Yn9) is turned OFF $ ightarrow$ ON $ ightarrow$ OFF or					
	the Operating condition setting request FB (M+L60AD2DA2_RequestSetting) is					
	executed.					
	3) This FB reads the calculation expression data of the free calculation function from ZR					
	(m+0) specified by i_ReadDataAddr (Read start address) and stores them in the buffer					
	memory (Un\G50000 to Un\G50281). To create the calculation expression data to be					
	stored in the file register (ZR), use the "Free calculation function setting" tool of GX					
	Works2.					
	*m: File register (ZR) read start address. Specifying the points to be used in [PC File]*1					
	and the device points of the file register (ZR) in [Device]*2 can reserve the points of the					
	file register and arrange the data in the desired address.					
	<sup>^</sup> 2 [Parameter] <sup>_</sup> [PLC Parameter] <sup>_</sup> [Device] <sup>_</sup> <sup>-</sup> File Register Extension Setting					
	4) Reserve 282 file registers (ZR) or more to be used. When this FB is executed with the					
	points specified in <u>ReadDataAdd</u> (Read start address) less than 262 points, the					
	5) Only when the function selection is set to the "free calculation function" or the "free					
	conversion characteristics function + free calculation function" this EB can be used					
	6) When the function selection is set to other than the "free calculation function" or the "free					
	conversion characteristics function + free calculation function" FB_ERROR is turned ON					
	and the processing of the FB is interrupted.					
	The error code 60 (Decimal) is stored in ERROR ID.					
	Refer to the error code explanation section for details.					



Item	Description
	7) When FB_EN (Execution command) is turned OFF before the execution of this FB is
	completed, the processing is interrupted. At that time, the data stored in the buffer
	memory is not cleared.
	When the FB is executed again, the reading processing is started from the beginning.
Compiling method	Macro type
Restrictions and	1) This FB requires many scans and takes long time to complete the processing.
precautions	Therefore, this FB should be executed during the warm up of the L60AD2DA2.
	2) The FB does not include error recovery processing. Program the error recovery
	processing separately in accordance with the required system operation.
	3) The FB cannot be used in an interrupt program.
	4) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do
	not use this FB in programs that are only executed once such as a subroutine,
	FOR-NEXT loop because it is impossible to turn OFF.
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an
	interrupt program.
	6) When two or more of these FBs are used, they cannot be used simultaneously.
	7) Every input must be provided with a value for proper FB operation.
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to be
	connected. Configure the setting in Switch Setting of GX Works2 according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Version 1 Operating Manual (Common).
	However, set the I/O range in the free conversion characteristics range setting
	(Un\G4101) for channels for which the "free calculation function" or the "free conversion
	characteristics function + free calculation function" is used. Please read the MELSEC-L
	Analog Input/Output Module User's Manual for the free conversion characteristics range
	setting (Un\G4101)".
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]         FB_EN (Execution command) FB_ENO (Execution status)       FB_EN (Execution status)         Buffer memory updating processing       Update stopped         FB_OK (Completed without error)       Update stopped         FB_EROR (Error flag)       0         ERROR ID (Error code)       0					
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual					
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)					
	GX Works2 Version 1 Operating Manual (Common)					
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)					



# Error codes

# ●Error code list

Error code	Description	Action	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the	
	intelligent function module switch setting	intelligent function module switch setting of the	
	of the target module is set to other than	target module to the "free calculation function"	
	the "free calculation function" or the "free	or the "free conversion characteristics function +	
	conversion characteristics function + free	free calculation function", and execute the FB	
	calculation function".	again.	

## Labels

# Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Read start address	i_ReadDataAddr		Effective device range	Specify the start address of the file
		Double		register (ZR) in which the
		Word		calculation expression data of the
				free calculation function is stored.

# Output labels

Name (Comment)	Label name	Data type	Initial	Description
			value	
Execution status	FB_ENO	Dit	OFF	ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that writing the calculation
error		Bit OFF		expression data of the free calculation function in
		DIL	UFF	the file register (ZR) to the buffer memory of the
				module is completed.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0



Version	Date	Description
1.00A	2015/04/03	First edition

#### Note

This chapter includes information related to the function block.

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



# 2.3.7. M+L60AD2DA2\_FreeConvDataStoreCsv (Read conversion characteristics data (CSV file))

### **FB** Name

M+L60AD2DA2\_FreeConvDataStoreCsv

## **Function Overview**

Item	Description					
Function overview	Reads the parameters and free conversion characteristics table of the free conversion					
	characteristics function from the CSV file, and then writes them to the buffer memory of					
	the L60AD2DA2.					
Symbol		M+L60AD2DA2_FreeConvDataStoreCsv				
	Execution command —	B : FB_EN	FB_ENO : B	Execution status		
	Module start XY address —	W : i_Start_IO_No	FB_OK : B			
	CSV file name	S : i_FileName FB_ERROR : B Error flag				
			ERROR_ID : W			
Applicable hardware	Analog I/O module	L60AD2DA2				
and software		* Applicable to analog I/O m	odules whose first fiv	e digits of the		
		product information are "17012" or later				
	CPU module					
		Series Model				
		MELSEC-L Series LCPU *				
		* Only the model having an SI	• memory card slot is a	pplicable.		
	Engineering	GX Works2 *1				
	software	Language	Software	version		
		Japanese version	Version1.86Q	or later		
		English version	Version1.24A d	or later		
		Chinese (Simplified) version	n Version1.49B	or later		
		Chinese (Traditional) version	on Version1.49B	or later		
		Korean version	Version1.49B	or later		
		*1 For software versions app	plicable to the modul	es used, refer to		
		"Relevant Manuals".				
Programming language	Ladder					
Number of steps	1028 steps (for MEL	SEC-L series CPU)				
	* The number of step	os of the FB in a program depe	ends on the CPU mo	del that is used		
	and input and output definition.					



MELSEC-L Analog Input/Output Module FB Library Reference Manual FBM-M111-B





Item	Description
	This FB reads all the parameters of the free conversion characteristics function from
	the CSV file and stores them in the buffer memory (Un\G4100 and Un\G4101). Then,
	this FB reads "Free conversion characteristics table" specified in "Number of free
	conversion characteristics table data points" of the line 100 in the CSV file from the
	line 101 in order for the number of specified points, and stores them into the Start
	address (Un\G5000) or later of the free conversion characteristics table registration
	area of the buffer memory.
	The CSV file of the free conversion characteristics function can be created easily
	with the "Create free conversion characteristics table" tool of GX Works2.
	4) When the CSV file specified by i_FileName (CSV file name) does not exist in the SD
	memory card inserted to the CPU module, a CPU error (Error code: 2410) occurs.
	* When the CPU is set to stop at the CPU error occurrence, FB_ERROR and
	ERROR_ID are not updated. The operation status of the CPU module (RUN/STOP)
	for when the CPU error occurs can be set in [PLC RAS] *1.
	*1: [Parameter]⊏>[PLC Parameter]⊏>[PLC RAS]⊂>"File Access Error" in "When
	There is an Error"
	5) When FB_EN (Execution command) is turned OFF before the execution of this FB is
	completed, the processing is interrupted. At that time, the data stored in the buffer
	memory is not cleared.
	When the FB is executed again, the reading processing is started from the
	beginning.
	6) Only when the function selection is set to the "free conversion characteristics
	function" or the "free conversion characteristics function + free calculation function",
	this FB can be used.
	7) When the function selection is set to other than the "free conversion characteristics
	function" or the "free conversion characteristics function + free calculation function",
	FB_ERROR is turned ON and the processing of the FB is interrupted.
	The error code 60 (Decimal) is stored in ERROR_ID.
	Refer to the error code explanation section for details.
	8) Do not remove the SD memory card during the execution of this FB. For the insertion
	or removal method of the 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	1)	This FB requires many scans and takes long time to complete the processing.	
precautions		Therefore, this FB should be executed during the warm up of the L60AD2DA2.	
	2)	The FB does not include error recovery processing. Program the error recovery	
		processing separately in accordance with the required system operation.	
	3)	The FB cannot be used in an interrupt program.	
	4)	Please ensure that the FB_EN signal is capable of being turned OFF by the program.	
		Do not use this FB in programs that are only executed once such as a subroutine,	
		FOR-NEXT loop because it is impossible to turn OFF.	
	5)	This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program.	
	6)	This FB uses the SPEREAD command. Thus, when an execution error of the	
	0)	SP.FREAD command occurs, a CPU error occurs.	
	7)	Do not use this FB when the CPU module that does not have a 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 is turned ON and the processing is interrupted.	
		The error code 33 (Decimal) is stored in ERROR ID.	
		Refer to the error code explanation section for details.	
	9)	When this FB is executed with SM605 (Memory card remove/insert prohibit flag)	
	,	OFF, which can be set by sliding the SD memory card disabling switch upward,	
		FB_ERROR is turned ON and the processing is interrupted.	
		The error code 35 (Decimal) is stored in ERROR_ID.	
		Refer to the error code explanation section for details.	
	10)	When this FB is executed with SM606 (SD memory card forced disable instruction)	
		ON, SP.FREAD is not processed and the conversion characteristics data cannot be	
		read. FB_ERROR is turned ON and the processing is interrupted.	
		The error code 36 (Decimal) is stored in ERROR_ID.	
		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 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	
		MELSEC-L CPU Module 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.	



Item	Description				
	14) To operate the L60AD2DA2, set the I/O range according to the device and system to				
	be connected. Configure the setting in Switch Setting of GX Works2 according to the				
	application.				
	For details on how to use the in	telligent function module switch setting, refer to GX			
	Works2 Version 1 Operating Ma	on 1 Operating Manual (Common).			
	However, set the I/O range in the	e I/O range in the free conversion characteristics range setting			
	(Un\G4101) for channels for wh	ich the "free calculation function" or the "free			
	conversion characteristics func	tion + free calculation function" is used.			
	Please read the MELSEC-LAn	alog Input/Output Module User's Manual for the free			
	conversion characteristics rang	e setting (Un\G4101)".			
FB operation type	Pulsed execution (multiple scan exe	cution type)			
Application example	Refer to "Appendix 1. FB Library Ap	plication Examples".			
Timing chart	[When operation completes without	error]			
	FB_EN (Execution command)				
	FB_ENO	<u>_</u>			
	(Execution status)				
	Reading a CSV file in the SD memory card	No processing Update stopped During update			
	Buffer memory updating Update stopped				
	FB_OK (Completed without error)				
	FB_ERROR (Error flag)				
	ERROR_ID (Error code)	0			
	FB_EN				
	(Execution command)				
	(Execution status)				
	Reading a CSV file in the SD memory card				
	Buffer memory updating Update stopped				
	FB_OK (Completed without error)				
	FB_ERROR (Error flag)				
	ERROR_ID (Error code)	Error code 0			



Item	Description			
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual			
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and			
	Inspection)			
	MELSEC-L CPU Module User's Manual (Data Logging Function)			
	GX Works2 Version 1 Operating Manual (Common)			
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)			



# Error codes

## Error code list

Error code	Description	Action
33 (Decimal)	This FB is executed with no SD memory	Execute this FB again after mounting the SD
	card on the CPU module.	memory card to which the target CSV file is
		saved on the CPU module. Or execute this FB
		again after inserting the available SD memory
		card and saving the target CSV file to the SD
		memory card using "Write PLC User Data" of
		GX Works2.
35 (Decimal)	The SD memory card cannot be accessed	Execute the FB again after turning ON SM605
	because SM605 (Memory card	(Memory card remove/insert prohibit flag) by
	remove/insert prohibit flag) is turned OFF.	sliding the SD memory card disabling switch
		downward.
36 (Decimal)	SM606 (SD memory card forced disable	Execute the FB again after disabling the SD
	instruction) is ON, and access to the SD	memory card forced disable instruction by
	memory card is unavailable.	turning OFF SM606 and confirming that
		SM607 (SD memory card use force stop
		condition flag) is OFF.
40 (Decimal)	The conversion characteristics data reading	Reduce the frequency of the access
	processing timeout occurred because	processing to the SD memory card.
	accesses to the SD memory card were	
	frequently made in addition to this FB.	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the
	intelligent function module switch setting of	intelligent function module switch setting of the
	the target module is set to other than the	target module to the "free conversion
	"free conversion characteristics function" or	characteristics function" or the "free conversion
	the "free conversion characteristics function	characteristics function + free calculation
	+ free calculation function".	function", and execute the FB again.
Error codes other	The error code of the CPU module	For details on the caused error code, refer to
than above		Appendix 1 Error Code Lists of 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	FB_EN	Dit	ON, OFF	ON: The FB is activated.
command		ы		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address			point range of the	hexadecimal) where the
		Word	CPU.	L60AD2DA2 is connected. (For
			For details, refer to the	example, enter H10 for X10.)
			CPU user's manual.	
CSV file name	i_FileName		12 characters or less	Specify the name of the CSV file
				in which the parameters and the
				free conversion characteristics
				table of the free conversion
				characteristics function are stored.
		Character		(Only CSV is valid for a file
		string		attribute.)
				For details of the CSV file format,
				refer to "Appendix 6. CSV File
				Format for Conversion
				Characteristics Data Reading FB
				(CSV File).

## Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed without	FB_OK		OFF	When ON, it indicates that writing the
error				parameters and free conversion
		Bit		characteristics table of the free conversion
				characteristics function in the CSV file to the
				buffer memory of the L60AD2DA2 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	2015/04/03	First edition

### Note

This chapter includes information related to the function block.

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

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



# 2.3.8. M+L60AD2DA2\_FreeConvDataStoreDev (Read conversion characteristics data (device))

### FB Name

M+L60AD2DA2\_FreeConvDataStoreDev

# **Function Overview**

Item	Description				
Function overview	Reads the parameters and free conversion characteristics table of the free conversion				
	characteristics function from the file register (ZR), and then writes them to the buffer memory				
	of the L60AD2DA2.				
Symbol	M+L60AD2DA2_FreeConvDataStoreDev				
	Execution command — B	: FB_EN	FB_ENO : B Execution status		
	Module start XY address — W	: i_Start_IO_No	FB_OK : B Completed without error		
	Read start address — D	: i_ReadDataAddr	FB_ERROR : B Error flag		
			ERROR_ID : W Error code		
Applicable hardware	Analog I/O module	L60AD2DA2			
and software		* Applicable to analog I/O mc	dules whose first five digits of the		
		product information are "17	012" or later		
	CPU module				
		Series	Model		
	MELSEC-L Series LCPU				
	Engineering software	GX Works2 *1	<b>2</b> <i>t</i>		
		Language	Software version		
		Japanese version	Version1.86Q or later		
		English version	Version1.24A or later		
		Chinese (Simplified) version	Version1.49B or later		
		Chinese (Traditional) versio	n Version1.49B or later		
		Korean version	Version1.49B or later		
		*1 For software versions app	licable to the modules used, refer to		
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	622 steps (for MELSEC-I	_ 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			
	Then, this FB reads "Free conversion characteristics table" of specified points specified			
	in "Number of free conversion characteristics table data points" of ZR (m+98, 99) from			
	ZR (m+100) in order, and stores them into the Start address (Un\G5000) or later of the			
	free conversion characteristics table registration area the buffer memory.			
	The file register (ZR) data of the free conversion characteristics function can be created			
	easily with the "Create free conversion characteristics table" tool of GX Works2.			
	*m: File register (ZR) read start address. Specifying the points to be used in [PC File]*1			
	and the device points of the file register (ZR) in [Device]*2 can reserve the points of the			
	file register and arrange the data in the desired address.			
	*1 [Parameter]<>[PLC Parameter]<>[PLC File]<>"File Register"			
	*2 [Parameter] <->[PLC Parameter] <->[Device] <->"File Register Extension Setting"			
	4) Reserve "Number of free conversion characteristics table data points" +100 points or			
	more for the file register (ZR) to be used. When this FB is executed with the points			
	specified in i_ReadDataAddr (Read start address) less than "Number of free conversion			
	characteristics table data points" +100 of ZR (m+98, 99), the available range of the file			
	register (ZR) is exceeded and a CPU error (Error code: 4101) occurs.			
	5) Only when the function selection is set to the "free conversion characteristics function" or			
	the "free conversion characteristics function + free calculation function", this FB can be			
	used.			
	6) When the function selection is set to other than the "free conversion characteristics			
	function" or the "free conversion characteristics function + free calculation function",			
	FB_ERROR is turned ON and the processing of the FB is interrupted.			
	The error code 60 (Decimal) is stored in ERROR_ID.			
	Refer to the error code explanation section for details.			
	7) When FB_EN (Execution command) is turned OFF before the execution of this FB is			
	completed, the processing is interrupted. At that time, the data stored in the buffer			
	memory is not cleared.			
	When the FB is executed again, the reading processing is started from the beginning.			
Compiling method	Macro type			



Item	Description					
Restrictions and	1) This FB requires many scans and takes long time to complete the processing.					
precautions	Therefore, this FB should be executed during the warm up of the L60AD2DA2.					
	The FB does not include error recovery processing. Program the error recovery					
	processing separately in accordance with the required system operation.					
	3) The FB cannot be used in an interrupt program.					
	4) Please ensure that the FB_EN signal is capable of being turned OFF by the program. Do					
	not use this FB in programs that are only executed once such as a subroutine,					
	FOR-NEXT loop because it is impossible to turn OFF.					
	<ol> <li>This FB uses index registers Z7 to Z9. Please do not use these index registers in an interrupt program.</li> </ol>					
	<ul><li>6) When two or more of these FBs are used, they cannot be used simultaneously.</li></ul>					
	7) Every input must be provided with a value for proper FB operation.					
	8) To operate the L60AD2DA2, set the I/O range according to the device and system to be					
	connected. Configure the setting in Switch Setting of GX Works2 according to the					
	application.					
	For details on how to use the intelligent function module switch setting, refer to GX					
	Works2 Version 1 Operating Manual (Common).					
	However, set the I/O range in the free conversion characteristics range setting					
	(Un\G4101) for channels for which the "free calculation function" or the "free conversion					
	characteristics function + free calculation function" is used.					
	Please read the MELSEC-L Analog Input/Output Module User's Manual for the free					
	conversion characteristics range setting (Un\G4101)".					
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]					
	FB_EN (Execution command)       FB_ENO (Execution status)         Buffer memory updating processing       Update stopped         FB_ENO (Execution status)       Update stopped         FB_ENO (Execution status)       Update stopped         FB_ENO (Execution status)       Buffer memory updating processing         FB_OK (Completed without error)       FB_ERROR (Error flag)         FB_ERROR (Error code)       0         ERROR_ID (Error code)       0					
Relevant manuals	MELSEC-L Analog Input/Output Module User's Manual					
	• MELSEC-L CPU Module User's Manual (Hardware Design, Maintenance and Inspection)					
	GX Works2 Version 1 Operating Manual (Common)					
	GX Works2 Version 1 Operating Manual (Simple Project, Function Block)					



# Error codes

## ●Error code list

Error code	Description	Action	
60 (Decimal)	The function selection of Switch 4 of the	Set the function selection of Switch 4 of the	
	intelligent function module switch setting	intelligent function module switch setting of the	
	of the target module is set to other than	target module to the "free conversion	
	the "free conversion characteristics	characteristics function" or the "free conversion	
	function" or the "free conversion	characteristics function + free calculation	
	characteristics function + free calculation	function", and execute the FB again.	
	function".		

# Labels

# Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command		DIL		OFF: The FB is not activated.
Module start XY	i_Start_IO_No		Depends on the I/O	Specify the start XY address (in
address		Word	point range of the CPU.	hexadecimal) where the
		vvoru	For details, refer to the	L60AD2DA2 is connected. (For
			CPU user's manual.	example, enter H10 for X10.)
Read start address	i_ReadDataAddr		Effective device range	Specify the start address of the file
				register (ZR) in which the
		Double		parameters and the conversion
		Word		characteristics data of the free
				conversion characteristics
				function are stored.



### Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO			ON: Execution command is ON.
		DIL	OFF	OFF: Execution command is OFF.
Completed without	FB_OK			When ON, it indicates that writing the
error				parameters and the conversion characteristics
		Bit	OFF	data of the free conversion characteristics
				function in the file register (ZR) to the buffer
				memory of the 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	2015/04/03	First edition

#### Note

This chapter includes information related to the function block.

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

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



# Appendix 1. FB Library Application Examples

L60AD2DA2 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 setting

None

#### 3) Application example settings

#### a) Common setting

Input and output item	Value	Description
Module start XY address	0	Specify the start XY address where the
		L60AD2DA2 is connected.



## Appendix 1.1. Application examples of the A/D conversion FBs

# 1) List of devices

## a) External input (commands)

Device	FB name	Application (ON details)
MO	M+L60AD2DA2_AD_ReadADVal	A/D value reading request
M10	M+L60AD2DA2_AD_ReadAllADVal	A/D value read req. (all CHs)
M20	M+L60AD2DA2_AD_ReadScalingVal	Scaling value reading request
M30	M+L60AD2DA2_AD_ReadAllScalingVal	Scaling val read req. (all CHs)
M40	M+L60AD2DA2_AD_SetADConversion	A/D conv enable/disable set req.
M41		A/D conv enabl:ON/disabl:OFF set
M50	M+L60AD2DA2_AD_SetAverage	Averaging proc setting request
M60	M+L60AD2DA2_AD_SetScaling	A/D conversion scaling set req.
M61		A/D conv scaling enab/disab set
M70	M+L60AD2DA2_AD_SetInputSignalErr	Input signal error setting req.
M80	M+L60AD2DA2_AD_SetOffsetVal	A/D conv offset setting request
M81		A/D conv offset value write req.
M90	M+L60AD2DA2_AD_SetGainVal	A/D conv gain setting request
M91		A/D conv gain value write req.
M100	M+L60AD2DA2_AD_ShiftOperation	A/D conv shift operation req.
D100		Digital value
M110	M+L60AD2DA2_AD_DiffOperation	Difference conversion request
D110		Digital value
M120	M+L60AD2DA2_AD_DigitalClipOperation	Digital clipping request
D120		Digital value
M130	M+L60AD2DA2_AD_SetLoggingPARAM	Logging fnc param setting req.
M131		Log fnc enabl:ON/disabl:OFF set
M140	M+L60AD2DA2_AD_SaveLogging	Logging data save request
M141	]	Log file ovr enable/disable set
M142		Logging forced save command



## b) External output (checks)

Device	FB name	Application (ON details)
M1	M+L60AD2DA2_AD_ReadADVal	A/D value reading FB ready
M2		A/D value reading complete
F0		A/D value reading FB error
D0		A/D conversion data
D1		A/D value reading FB error code
M11	M+L60AD2DA2_AD_ReadAllADVal	A/D value read FB rdy. (all CHs)
M12		A/D value read comp. (all CHs)
D10		CH1 A/D conversion data
D11		CH2 A/D conversion data
M21	M+L60AD2DA2_AD_ReadScalingVal	Scaling value reading FB ready
M22		Scaling value reading complete
F5		Scaling value reading FB error
D20		Scaling value
D21		Scaling value read FB error code
M31	M+L60AD2DA2_AD_ReadAllScalingVal	Scaling val read rdy. (all CHs)
M32		Scaling val read comp. (all CHs)
D30		CH1 Scaling value
D31		CH2 Scaling value
M41	M+L60AD2DA2_AD_SetADConversion	A/D conv enabl:ON/disabl:OFF set
M42		A/D conv enable/disable FB ready
F10		A/D conv enable/disable FB error
D40		A/D enable/disable FB error code
M51	M+L60AD2DA2_AD_SetAverage	Averaging proc setting FB ready
M52		Averaging proc setting complete
F15		Averaging proc setting FB error
D50		Averaging proc set FB error code
M62	M+L60AD2DA2_AD_SetScaling	A/D conv scaling setting FB rdy.
M63		A/D conv scaling req. complete
F20		A/D conv scaling setting FB err
D60		A/D conv scaling set FB err code
M71	M+L60AD2DA2_AD_SetInputSignalErr	Input signal error setting ready
M72		Input signal error setting comp.
F25		Input signal err setting FB err
D70	]	Input signal err set FB err code
M82	M+L60AD2DA2_AD_SetOffsetVal	A/D conv offset setting FB ready



Device	FB name	Application (ON details)
M83		A/D conv offset setting comp.
F30		A/D conv offset setting FB error
D80		A/D conv offset set FB err code
M92	M+L60AD2DA2_AD_SetGainVal	A/D conv gain setting FB ready
M93		A/D conv gain setting complete
F35		A/D conv gain setting FB error
D90		A/D conv gain set FB error code
M101	M+L60AD2DA2_AD_ShiftOperation	A/D conv shift operation FB rdy.
M102		A/D conv shift operation comp.
D101		A/D conv shift conversion value
M111	M+L60AD2DA2_AD_DiffOperation	Difference conversion FB ready
M112		Difference conversion complete
D111		Difference conversion value
D112		Difference conv reference value
M121	M+L60AD2DA2_AD_DigitalClipOperation	Digital clipping FB ready
M122		Digital clipping complete
F40		Digital clipping FB error
D121		Digital output value
D122		Digital clipping FB error code
M132	M+L60AD2DA2_AD_SetLoggingPARAM	Logging func param set FB ready
M133		Logging fnc param set complete
F45		Logging fnc param setting FB err
D130		Log fnc param set FB err code
M143	M+L60AD2DA2_AD_SaveLogging	Logging data save FB ready
M144		Logging data save complete
M145		Logging data saving
M146		Logging file max No. reached
F50		Logging data save FB error
D140		Logging data save FB error code



M+L60AD2DA2	AD	ReadADVal	(Read A/D	conversion	data)
	· ··D	i touu, ib vui	(1100007.00	00111010101011	aaiaj

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K1	Set the target channel to channel 1.

By turning ON M0, the A/D conversion data of channel 1 is read.





### M+L60AD2DA2\_AD\_ReadAllADVal (Read A/D conversion data (all CHs))

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.

By turning ON M10, the A/D conversion data of the A/D conversion channels (CH1 and CH2) is read.

М10	BeadAllADVal		
A/D valu e read r eq. (all CHs)	B:FB_EN Executio n comman d	FB_ENO:B Executio n status	(M11) A/D valu e read F B rdy. ( all CHs)
[но ]	W:i_Start_I0_No Module s tart XY address	FB_OK:B Complete d withou t error	(M12) A/D valu e read c omp. (al ICHs)
	o_AD_V	/alue_CH1:W {D10 } CH1 A/D CH1 A/D conversi conversi on data on data	
	o_AD_V	/alue_CH2:W {D11 } CH2 A/D CH2 A/D conversi conversi on data on data	
	F	B_ERROR:B Error fl ag	
	E	RROR_ID:W	



Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K2	Set the target channel to channel 2.

M+L60AD2DA2\_AD\_ReadScalingVal (Read A/D conversion scaling value)

By turning ON M20, the scaling value of channel 2 is read.





M+L60AD2DA2\_AD\_ReadAllScalingVal (Read A/D conversion scaling value (all CHs))

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.

By turning ON M30, the scaling values of the A/D conversion channels (CH1 and CH2) are read.

M30	BeadAllScalingVa	
Scaling val read req. (a II CHs)	B:FB_EN FB_E Executio Exe n comman n st d	END:B coutio stus rdy. (a II CHs)
[но ]	W:i_Start_IO_No FB, Module s Con tart XY d w address t en	_OK:B(M32 nplete Scaling ithou val read ror comp. ( all CHs)
	o_Scaling_C CH ing e	XH1:W {D30 } 1 Scal CH1 Scal valu ing valu e
	o_Scaling_C CH: ing e	CH2:W [D31 ] 2 Scal CH2 Scal valu ing valu e
	FB_ERF Erro ag	ROR:B
	ERROR Erro de	_ID:W



Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K15	Set the target channel to channel 1 and 2.
i_AD_Enable	ON/OFF	Turn ON to enable the A/D conversion of the target channel.

M+L60AD2DA2\_AD\_SetADConversion (A/D conversion enable/disable setting)

By turning ON M40, the values for the A/D conversion enable/disable setting of the A/D conversion channels (CH1 and CH2) are written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Average_Type	K1	Set the averaging processing type to "Time average".
i_Average_Times	K100	Set the time average to 100.

M+L60AD2DA2\_AD\_SetAverage (A/D conversion averaging process setting)

By turning ON M50, the value for the averaging processing type setting of channel 1 is written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Scaling_Enable	ON/OFF	Turn ON to enable the 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.

M+L60AD2DA2\_AD\_SetScaling (A/D conversion scaling setting)

By turning ON M60, the value for the scaling setting of channel 2 is written to the buffer memory.

M60 A/D conv ersion s caling s et req.	AD_SetScaling B:FB_EN Executio n comman d	FB_ENO:B Executio n status		(M62) A/D conv scaling setting FB rdy.
(HO ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		(M63) A/D conv scaling req. co mplete
[К1 ]	W:i_CH F Target C H	B_ERROR:B Error fl ag		(F20) A/D conv scaling setting FB err
M61 A/D conv scaling enab/di sab set	B:i_Scaling_Enable E A/D conv ersion s caling e nable/di	RROR_ID:W Error co de	{D60 } A/D conv scaling set FB err code	
[К30000 ]	W:i_Scl_U_Lim A/D conv ersion s caling u pper lim			
[K-30000]	W:i_Scl_L_Lim A/D conv ersion s caling I ower lim			



Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Sig_Err_Type	K1	Set the input signal error detection setting of channel 2 to "Upper lower limit
		detection".
i_Sig_Err_Level	K100	Set the value for the input signal error detection setting to 10.0%.

M+L60AD2DA2\_AD\_SetInputSignalErr (A/D conversion input signal error detection setting)

By turning ON M70, the input signal error detection setting value of channel 2 is written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Write_Offset	ON/OFF	Turn ON to write the offset value of channel 1.

#### M+L60AD2DA2\_AD\_SetOffsetVal (A/D conversion offset setting)

By turning ON M80 and then M81, the offset value of channel 1 is written.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K2	Set the target channel to channel 2.
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 2.

M+L60AD2DA2\_AD\_SetGainVal (A/D conversion gain setting)

By turning ON M90 and then M91, the gain value of channel 2 is written.





M+L60AD2DA2	_AD_	_ShiftOperation	(A/D	conversion	shift operation)	
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Label name	Setting value	Description
i_Digital_Value	-	Store the target digital output value to which the shift amount is to be added.
i_Shift_Value	K1000	Set the shift amount to 1,000.

By turning ON M100, the digital value to which the conversion value shift amount is added is output.

M100 A/D conv shift o peration req.	AD_ShiftOpe B:FB_EN Executio n comman d	FB_ENO:B Executio n status	(M101) A/D conv shift o peration FB rdy.
D100 ] Digital value	W:i_Digital_Value Digital value	FB_OK:B Complete d withou t error	(M102) A/D conv shift o peration comp.
[К1000 ]	W:i_Shift_Value Shifting amount to conve rsion va	o_Dig_Out_Val:W Digital output v alue	{D101 } A/D conv shift c onversio n value
		FB_ERROR:B Error fl ag	
		ERROR_ID:W Error co de	



## M+L60AD2DA2\_AD\_DiffOperation (A/D difference conversion)

Label name	Setting value	Description
i_Digital_Value	-	Store the digital value for the difference conversion.

By turning ON M110, the remaining value after subtraction of the reference value from the input digital value is output.

М110	DiffOner	ration		
Differen ce conve rsion re quest	B:FB_EN Executio n comman d	FB_ENO:B Executio n status		(M111) Differen ce conve rsion FB ready
D110 Digital value	} W:i_Digital_Value Digital value	FB_OK:B Complete d withou t error		(M112) Differen ce conve rsion co mplete
		o_Dig_Out_Val:W Digital output v alue	{D111 } Differen ce conve rsion va lue	
		o_Standard_Val:W Differen ce conve rsion re ference	{D112 } Differen ce conv referenc e value	
		FB_ERROR:B Error fl ag		
		ERROR_ID:W Error co de		



		5 11 6/
Label name	Setting value	Description
i_Clip_U_Lim	K12000	Set the upper limit value of digital clipping to 12000.
i_Clip_L_Lim	K0	Set the lower limit value of digital clipping to 0.

M+L60AD2DA2\_AD\_ClipOperation (A/D conversion digital clipping)

By turning ON M120, the value fixed to the upper limit value or lower limit value is output when the input digital value exceeds the upper limit value or falls below the lower limit value of the digital clipping.

M120 Digital clipping request	DigitalClip( - B:FB_EN Executio n comman d	Oper FB_ENO:B - Executio n status		—(M121) Digital clipping FB read y
D120 ] Digital value	W:i_Digital_Value Digital value	FB_OK:B Complete d withou t error		—(M122) Digital clipping complet e
[К12000 ]	W:i_Clip_U_Lim Digital clipping upper I imit val	o_Dig_Out_Val:W Digital output v alue	{D121 } Digital output v alue	
{КО [	W:i_Clip_L_Lim Digital clipping lowerl imit val	FB_ERROR:B Error fl ag		—(F40) Digital clipping FBerro r
		ERROR_ID:W Error co de	{D122 } Digital clipping FB erro r code	



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Log_Enable	ON/OFF	Turn ON to enable the logging.
i_Log_Data	К0	Set the logging data to "Digital output value".
i_Log_Cycle_Val	K320	Set the cycle for storing logging data to 320µs.
i_Log_Cycle_Unit	K0	Set the logging cycle unit to "µs".
i_Log_Points	K1	Set the data points to be recorded before the hold trigger is detected and the
		logging function is paused to 1.
i_Log_Trig_Cond	K1	Set the condition for which a level trigger is generated to "Above".
i_Log_Trig_Data	K12	Set the buffer memory address for activating the level trigger to 12.
i_Log_Trig_Value	K10000	Set a level at which the level trigger is activated to 10,000.

M+L60AD2DA2\_AD\_SetLoggingPARAM (Logging function parameter setting)

By turning ON M130, the value for the logging function parameter setting of channel 2 is written to the buffer memory.



(Continues to the next page)







Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K2	Set the target channel to channel 2.
i_Max_Number	K10	Set the maximum number of CSV files the FB saves to 10.
i_Over_Write	ON/OFF	Set whether to overwrite the file to which the logging data is written.
i_Save_Order	ON/OFF	Turn ON to save the logging data while the logging is stopped (disabled).

M+L60AD2DA2\_AD\_SaveLogging (Logging data save)

By turning ON M140, the logging data from the start pointer of channel 2 for the number of the logging data are sorted chronologically. Then, the logging data and the trigger detection information are saved in CSV format in the SD memory card mounted on the CPU.



М140	Savel out	lina		
Logging data sav e reques t	B:FB_EN Executio n comman d	FB_ENO:B Executio n status		—(M143) Logging data sav e FB rea dy
[но ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		—(M144) Logging data sav e comple te
[К2]	W:i_CH Target C H	o_Making_File:B Creating file		—(M145 ) Logging data sav ing
[К10]	W:i_Max_Number o_ Maximum No. of s ave file s	Exceed_Number:B Maximum No. exce eded fla g		—(M146) Logging file max No. rea ched
M141 Log file ovr ena ble/disa ble set	B:i_Over_Write Overwrit e save c ommand	FB_ERROR:B Error fl ag		—(F50) Logging data sav e FB err or
M142 Logging forced s ave comm and	B:i_Save_Order Logging forceds ave comm and	ERROR_ID:W Error co de	{D140 } Logging data sav e FB err or code	



## Appendix 1.2. Application examples of the D/A conversion FBs

# 1) List of devices

a) External input (commands)

Device	FB name	Application (ON details)
M150	M+L60AD2DA2_DA_WriteDAVal	D/A conversion data write req.
M160	M+L60AD2DA2_DA_WriteAllDAVal	D/A data write req. (all CHs)
M170	M+L60AD2DA2_DA_SetDAConversion	D/A conv enable/disable set req.
M171		D/A conv enabl:ON/disabl:OFF set
M180	M+L60AD2DA2_DA_SetDAOutput	DA output enable/disable set req
M181		DA outpt enabl:ON/disabl:OFF set
M190	M+L60AD2DA2_DA_SetScaling	D/A conversion scaling set req.
M191		DA conv scaling enabl/disabl set
M200	M+L60AD2DA2_DA_SetAlarm	Alert output setting request
M201		Airt outpt enbl:ON/disbl:OFF set
M210	M+L60AD2DA2_DA_SetOffsetVal	D/A conv offset setting request
M211		D/A conv offset value change req
M212		D/A conv offset value write req.
D210		Offset/gain adjustment amount
M220	M+L60AD2DA2_DA_SetGainVal	D/A conv gain setting request
M221		D/A conv gain value change req.
M222		D/A conv gain value write req.
D220		Offset/gain adjustment amount
M230	M+L60AD2DA2_DA_ShiftOperation	D/A conv shift opearation req.
D230		Digital value
M240	M+L60AD2DA2_DA_WaveDataStoreCsv	Wave data read (CSV) request
M250	M+L60AD2DA2_DA_WaveDataStoreDev	Wave data read (device) request
M260	M+L60AD2DA2_DA_WaveOutputSetting	Wave output setting request
M270	M+L60AD2DA2_DA_WaveOutReqSetting	Wave output start/stop request



b) External output (checks)

Device	FB name	Application (ON details)
M151	M+L60AD2DA2_DA_WriteDAVal	D/A conversion data write FB rdy
M152		D/A conversion data write comp.
F55		D/A conv data write FB error
D150		DA conv data write FB error code
M161	M+L60AD2DA2_DA_WriteAllDAVal	D/A data write FB rdy. (all CHs)
M162		D/A data write comp. (all CHs)
M172	M+L60AD2DA2_DA_SetDAConversion	D/A conv enable/disable FB ready
M173		D/A conv enable/disable set comp
F60		D/A conv enable/disable FB error
D170		D/A enable/disable FB error code
M182	M+L60AD2DA2_DA_SetDAOutput	D/A output enable/disable FB rdy
M183		DA outpt enable/disable set comp
F65		D/A outpt enable/disable FB err
D180		DA otpt enable/disable FB er cod
M192	M+L60AD2DA2_DA_SetScaling	D/A conv scaling setting FB rdy.
M193		D/A conv scaling set complete
F70		D/A conv scaling setting FB err
D190		D/A conv scaling set FB err code
M202	M+L60AD2DA2_DA_SetAlarm	Alert output setting FB ready
M203		Alert output setting complete
F75		Alert output setting FB error
D200		Alert output setting FB err code
M213	M+L60AD2DA2_DA_SetOffsetVal	D/A conv offset setting FB ready
M214		D/A conv offset setting comp.
F80		D/A conv offset setting FB error
D211		D/A conv offset set FB err code
M223	M+L60AD2DA2_DA_SetGainVal	D/A conv gain setting FB ready
M224		D/A conv gain setting complete
F85		D/A conv gain setting FB error
D221		D/A conv gain set FB error code
M231	M+L60AD2DA2_DA_ShiftOperation	D/A conv shift operation FB rdy.
M232		D/A conv shift operation comp.
D231		D/A conv shift conversion value



Device	FB name	Application (ON details)
M241	M+L60AD2DA2_DA_WaveDataStoreCsv	Wave data read (CSV) FB ready
M242		Wave data read (CSV) complete
F90		Wave data read (CSV) FB error
D240		Wave data read (CSV) FB err code
M251	M+L60AD2DA2_DA_WaveDataStoreDev	Wave data read (device) FB ready
M252		Wave data read (device) complete
F95		Wave data read (device) FB error
D250		Wave data read (dev) FB err code
M261	M+L60AD2DA2_DA_WaveOutputSetting	Wave output setting FB ready
M262		Wave output setting complete
F100		Wave output setting FB error
D260		Wave output setting FB err code
M271	M+L60AD2DA2_DA_WaveOutReqSetting	Wave output start/stop FB ready
M272		Wave output start/stop complete
D270		CH3 Wave output status monitor
D271		CH4 Wave output status monitor
F105		Wave output start/stop FB error
D272		Wave output start/stop err code


Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
i_DA_Value	K4000	Set the digital value to 4,000.

M+L60AD2DA2\_DA\_WriteDAVal (Write D/A conversion data)

By turning ON M150, the digital value of channel 3 is written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_DA_ValueCH3	K32000	Set the digital value of channel 3 to 32,000.
i_DA_ValueCH4	K-32000	Set the digital value of channel 4 to -32,000.

M+L60AD2DA2\_DA\_WriteAllDAVal (Write D/A conversion data (all CHs))

By turning ON M160, the digital values of channel 3 and 4 are written to the buffer memory.

м160		WriteAllDAVal		
		B:FB_EN	FB_ENO:B	(M161
D/A data		Executio	Executio	D/A data
write r		n comman	n status	Write F
req. (all CHo)		a		all CHs)
Critic)				dirorroy
	{но }	W:i_Start_I0_No	FB_OK:B	(M162
		Module s	Complete	D/A data
		tart XY	d withou	write c
		address	t error	omp. (al
				i chsj
	{K32000 }	W:i_DA_Value_CH3 I	B_ERROR:B	
		CH3 Digi	Error fl	
		tal valu	ag	
		e		
	f K-32000 7	W:i DA Value CH4 E	RROR ID:W	
	L	CH4 Digi	Error co	
		tal valu	de	
		е		
1				



Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
i_DA_Enable	ON/OFF	Turn ON to enable the D/A conversion of the target channel.

M+L60AD2DA2\_DA\_SetDAConversion (D/A conversion enable/disable setting)

By turning ON M170, the value for the D/A conversion enable/disable setting of channel 3 is written to the buffer memory.

M170 D/A conv enable/ disable set req.	SetDAConversion B:FB_EN Executio n comman d	FB_ENO:B Executio n status		-(M172) D/A conv enable/ disable FB ready
[но ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		-(M173) D/A conv enable/ disable set comp
[кз ]	W:i_CH FI Target C H	3_ERROR:B Error fl ag		-(F60) D/A conv enable/ disable FB error
M171 D/A conv enabl:0 N/disabl :0FF set	B:i_DA_Enable EF D/A conv ersion e nable/di sable se	ROR_ID:W Error co de	[D170] D/A enab le/disab le FB er ror code	



Label name	Setting value	Description
i_Start_IO_No	НО	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	К3	Set the target channel to channel 3.
i_DA_Out_Enable	ON/OFF	Turn ON to enable the D/A output of the target channel.

#### M+L60AD2DA2\_DA\_SetDAOutput (D/A output enable/disable setting)

By turning ON M180 and then M181, the D/A output of channel 3 is enabled.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
i_Scaling_Enable	ON/OFF	Turn ON to enable the scaling.
i_Scl_U_Lim	K20000	Set the scaling upper limit value to 20,000.
i_Scl_L_Lim	K-20000	Set the scaling lower limit value to -20,000.

M+L60AD2DA2\_DA\_SetScaling (D/A conversion scaling setting)

By turning ON M190, the value for the scaling setting of channel 3 is written to the buffer memory.

L 14100				
M190 D/A conv ersion s caling s et req.	DA_SetScaling B:FB_EN Executio n comman d	FB_ENO:B Executio n status		-(M192) D/A conv scaling setting FB rdy.
(HO )	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		-(M193) D/A conv scaling set com plete
[КЗ ]	W:i_CH I Target C H	FB_ERROR:B Error fl ag		-(F70) D/A conv scaling setting FB err
M191 DA conv scaling enabl/di sabl set	B:i_Scaling_Enable E D/A conv ersion s caling e nable/di	RROR_ID:W Error co de	{D190 } D/A conv scaling set FB err code	
[K20000 ]	W:i_Scl_U_Lim D/A conv ersion s caling u pper lim			
[ К-20000 ]	W:i_Scl_L_Lim D/A conv ersion s caling I ower lim			



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
i_Alarm_Enable	ON/OFF	Turn ON to enable the alert output.
i_Alm_U_Lim	K30000	Set the alert output upper limit value to 30,000.
i_Alm_L_Lim	K-30000	Set the alert output lower limit value to -30,000.

M+L60AD2DA2\_DA\_SetAlarm (D/A conversion alert output setting)

By turning ON M200, the value for the alert output of channel 3 is written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
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 3.

M+L60AD2DA2\_DA\_SetOffsetVal (D/A conversion offset setting)

By turning ON M210 and then M211, the offset value of channel 3 is changed. Then, by turning ON M212 the offset value of channel 3 is written.

M210		DA Set0	ifsetVal		
D/A conv offset setting request		B:FB_EN Executio n comman d	FB_ENO:B Executio n status		(M213) D/A conv offset setting FB ready
	———[НО ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		(M214) D/A conv offset setting comp.
	——[КЗ ]	W:i_CH Target C H	FB_ERROR:B Error fl ag		(F80) D/A conv offset setting FB error
		W:i_Adjust_Amount Offset/g ain adju stment a mount	ERROR_ID:W Error co de	{D211 } D/A conv offset set FB e rr code	
M211 D/A conv offset value ch ange req		B:i_Value_Change Set valu e change command			
M212 D/A conv offset value wr ite req.		B:i_Write_Offset User ran ge write command			



Label name	Setting value	Description
i_Start_IO_No	H0	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K4	Set the target channel to channel 4.
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 4.

M+L60AD2DA2\_DA\_SetGainVal (D/A conversion gain setting)

By turning ON M220 and then M221, the gain value of channel 4 is changed. Then, by turning ON M232, the gain value of channel 4 is written.

м220	DA Set	:GainVal	
D/A conv gain se tting re quest	B:FB_EN Executio n comman d	FB_ENO:B Executio n status	(M223) D/A conv gain se tting FB ready
[	H0 } W:i_Start_I0_No Module s tart XY address	FB_OK:B Complete d withou t error	(M224) D/A conv gain se tting co mplete
[	(4 ] W:i_CH Target C H	FB_ERROR:B Error fl ag	(F85) D/A conv gain se tting FB error
[ [ ] ] ] ] ] ] ] ] ] ] ] ] ] ] ] ] ] ]	D220 } W:i_Adjust_Amount Dffset/g Offset/g in adju ain adju tment a stment a nount mount	ERROR_ID:W {D221 } Error co de gain se t FB err or code	
M221 D/A conv gain va lue chan ge req.	B:i_Value_Change Set valu e change command		
M222 D/A conv gain va lue writ e req.	B:i_Write_Gain User ran ge write command		



M+L60AD2DA2	_DA	ShiftOperation	(D/A	conversion	shift operation	)
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Label name	Setting value	Description
i_Digital_Value	-	Store the target digital output value to which the shift amount is to be added.
i_Shift_Value	K1000	Set the shift amount to 1,000.

By turning ON M230, the digital value to which the input value shift amount is added is output.

M230 D/A conv shift o pearatio n req.	DA_ShiftOp B:FB_EN Executio n comman d	eratio FB_ENO:B Executio n status		(M231 ) D/A conv shift o peration FB rdy.
D230 ] Digital value	W:i_Digital_Value Digital value	FB_OK:B Complete d withou t error		(M232 ) D/A conv shift o peration comp.
[К1000 ]	W:i_Shift_Value Input va lue shif t amount	o_Dig_Out_Val:W Digital output v alue	{D231 } D/A conv shift c onversio n value	
		FB_ERROR:B Error fl ag		
		ERROR_ID:W Error co de		



M+L60AD2DA2	DA	WaveDataStoreCsv	(Read	wave	data	(CSV	file))
			(			(	

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_FileName	"L60ADA_1.csv"	Set "L60ADA_1.csv" as the name of the CSV file from which the
		parameters and the wave data of the wave output function are read.

By turning ON M240, the parameters and wave data of the wave output function are read from "L60ADA\_1.csv" in the SD memory card and stored in the buffer memory.

M240	WaveDataStoreCsv	,		
Wave dat a read ( CSV) req uest	- B:FB_EN Executio n comman d	FB_ENO:B Executio n status		-(M241) Wave dat a read ( CSV) FB ready
[но	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		–(M242) Wave dat a read ( CSV) com plete
["L60ADA_1.csv" ]	S:i_FileName F CSV file name	B_ERROR:B Error fl ag		-(F90) Wave dat a read ( CSV) FB error
	E	ROR_ID:W Error co de	{D240 } Wave dat a read ( CSV) FB err code	



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_ReadDataAddr	K0	Set ZR0 as the read start address where the parameters and the wave
		data of the wave output function are stored.

M+L60AD2DA2\_DA\_WaveDataStoreDev (Read wave data (device))

By turning ON M250, the parameters and wave data of the wave output function are read from the file register ZR0 or later, and stored in the buffer memory.

M250 Wave dat a read ( device)	WaveDataStoreDe B:FB_EN Executio n comman d	FB_ENO:B Executio n status		-(M251) Wave dat a read ( device)
[H0]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		-(M252) Wave dat a read ( device)
[κο ]	D:i_ReadDataAddr Read sta rt addre ss	FB_ERROR:B Error fl ag		(F95) (F95) Wave dat a read ( device)
	E	:RROR_ID:W Error co de	{D250 } Wave dat a read ( dev) FB err code	гв error



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	К3	Set the target channel to channel 3.
i_OutputSelect	K2	Set "Output setting during wave output stop" to 2 (Output value during
		wave output stop).
i_OutputValue	K4000	Set the output setting value during the wave output stop to 4,000.
i_StartingAddr	K5000	Set the start address of the wave pattern to be output to 5,000.
i_PointsSetting	K10000	Set the data points of the wave pattern to be output to 10,000.
i_Frequency	K2000	Set the wave output times to 2,000.
i_ConvSpeed	K1	Set the constant for wave output conversion cycle to 1.

M+L60AD2DA2	DA	WaveOutpu	utSettina	(Wave	output	settina)
		_vuvoouipt	nooning	(mave	output	ooung)

By turning ON M260, the wave output setting of channel 3 is performed.





(Continues to the next page)



[K10000 ]	D:i_PointsSetting Wave pat tern dat a points setting
{κ2000 }	W:i_Frequency Wave pat tern out put repe tition s
[K1 ]	W:i_ConvSpeed Constant for wav e output convers



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_CH	K3	Set the target channel to channel 3.
i_Start_Stop_Req	K1	Set Wave output start/stop request to 1 (Wave output start request).

M+L60AD2DA2\_DA\_WaveOutReqSetting (Wave output start/stop request)

By turning ON M270, the wave output of channel 3 is started.

М270	WayeOutputReg	]
Wave out put star t/stop r equest	B:FB_EN FB_ENO:B Executio Executio n comman n status d	(M271) Wave out put star t/stop F B ready
(HO ]	W:i_Start_IO_No FB_OK:B Module s Complete tart XY d withou address t error	(M272) Wave out put star t/stop c omplete
[КЗ ]	W:i_CH o_WaveStatus_CH3:W Target C CH3 Wav H output status m onitor	[D270] e CH3 Wave output status m onitor
[K1 ]	W:i_Start_Stop_Req o_WaveStatus_CH4:W Wave out CH4 Wav put star output t/stop r status m equest onitor	[D271 ] e CH4 Wave output status m onitor
	FB_ERROR:E Error fl ag	(F105) Wave out put star t/stop F B error
	ERROR_ID:W Error co de	[D272 ] Wave out put star t/stop e rr code



## Appendix 1.3. Application examples of the common FBs

# 1) List of devices

a) External input (commands)

Device	FB name	Application (ON details)
M280	M+L60AD2DA2_ReadADVal_WriteDAVal	AD value read/DA value write req
M290	M+L60AD2DA2_RequestSetting	Operating condition setting req.
M300	M+L60AD2DA2_ErrorOperation	Error operation request
M301		Error reset request
M310	M+L60AD2DA2_OGBackup	Offset/gain save to file request
M320	M+L60AD2DA2_OGRestore	Offset/gain restore request
M330	M+L60AD2DA2_FreeCalDataStoreDev	Calculate express data read req.
M340	M+L60AD2DA2_FreeConvDataStoreCsv	Conv. chara data read (CSV) req.
M350	M+L60AD2DA2_FreeConvDataStoreDev	Conv. chara data read (dev) req.



b) External output (checks)

Device	FB name	Application (ON details)
M281	M+L60AD2DA2_ReadADVal_WriteDAVal	AD val read/DA val write FB rdy.
M282		AD val read/DA val write comp
M291	M+L60AD2DA2_RequestSetting	OP condition request FB ready
M292		OP condition request complete
M302	M+L60AD2DA2_ErrorOperation	Error operation FB ready
M303		Error operation complete
F110		Module error flag
D300		Module error code
M311	M+L60AD2DA2_OGBackup	Offset/gain save to file FB rdy.
M312		Offset/gain save to file comp.
F115		Offset/gain save file FB error
D310		Offset/gain save file FB err cod
M321	M+L60AD2DA2_OGRestore	Offset/gain restore FB ready
M322		Offset/gain restore complete
F120		Offset/gain restore FB error
D320		Offset/gain restore FB err code
M331	M+L60AD2DA2_FreeCalDataStoreDev	Calclat express data read FB rdy
M332		Calculate express data read comp
F125		Calclat express data read FB err
D330		Clclat exprs dat read FB err cod
M341	M+L60AD2DA2_FreeConvDataStoreCsv	Conv. chara data read(CSV)FB rdy
M342		Conv chara data read(CSV)FB comp
F130		Conv. chara data read(CSV)FB err
D340		Conv chr dat read(CSV)FB err cod
M351	M+L60AD2DA2_FreeConvDataStoreDev	Conv. chara data read(dev)FB rdy
M352		Conv chara data read(dev)FB comp
F135		Conv. chara data read(dev)FB err
D350		Conv chr dat read(dev)FB err cod



Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
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.

M+L60AD2DA2\_ReadADVal\_WriteDAVal (Read A/D conversion data and write D/A conversion data)

By turning ON M280, the A/D conversion data of the A/D conversion channels (CH1 and CH2) is read and the digital values of the D/A conversion channels (CH3 and CH4) are written.

M280	BeadAD	WriteDA		
AD value read/DA value w rite req	B:FB_EN Executio n comman d	FB_ENO:B Executio n status	() A e. al F	w1281) Dvalr ad/DAv Iwrite Brdy.
[КО ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error	() A e. al	M282) Dvalr ad/DAv Iwrite comp
{K16000 }	W:i_DA_Value_CH3 CH3 Digi tal valu e	o_AD_Value_CH1:W CH1 A/D conversi on data	{D280 } CH1 A/D conversi on data	
{K-16000}	W:i_DA_Value_CH4 CH4 Digi tal valu e	o_AD_Value_CH2:W CH2 A/D conversi on data	[D281] CH2 A/D conversi on data	
		FB_ERROR:B Error fl ag		
		ERROR_ID:W Error co de		



#### M+L60AD2DA2\_RequestSetting (Operating condition setting request)

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.

By turning ON M290, the following settings are validated.

- A/D conversion enable/disable setting
- Averaging processing setting
- Input signal error detection setting
- Scaling function (A/D conversion) setting
- Logging function setting
- D/A conversion enable/disable setting
- Alert output function setting
- Scaling function (D/A conversion) setting
- Wave output function setting
- Free conversion calculation function setting
- Free conversion characteristics function setting





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_Error_Reset	ON/OFF	Turn ON for the error reset.

M+L60AD2DA2\_ErrorOperation (Error operation)

By turning ON M300, the error code is output when an error occurs. By turning ON M301 after the error output, the error is reset.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_Dat_Type	H0A	Set the pass data classification to "Voltage" for channel 1 and 3 and
		"Current" for channel 2 and 4.

M+L60AD2DA2\_OGBackup (Offset/gain value save)

By turning ON M310, the offset/gain value of the user range setting is read and saved in the SD memory card inserted in the CPU module in a file format.

M310 Offset/g ain save to file request	OGBackup B:FB_EN Executio n comman d	FB_ENO:B Executio n status		–(M 311) Offset/g ain save to file FB rdy.
[но ]	W:i_Start_IO_No Module s tart XY address	FB_OK:B Complete d withou t error		-(M312) Offset/g ain save to file comp.
[HQA ]	W:i_Dat_Type Pass dat a classi fication	FB_ERROR:B Error fl ag		-(F115) Offset/g ain save file FB error
		ERROR_ID:W Error co de	{D310 } Offset/g ain save file FB err cod	



#### M+L60AD2DA2\_OGRestore (Offset/gain value restore)

Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.

By turning ON M320, the offset/gain setting values of the user range setting that are saved in a file is restored to the module.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_ReadDataAddr	K0	Set ZR0 as the read start address where the calculation expression data of
		the free calculation function are stored.

M+L60AD2DA2\_FreeCalDataStoreDev (Read calculation expression data)

By turning ON M330, calculation expression data of the free calculation function is read from the file register ZR0 or later and written to the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_FileName	"L60ADA_2.csv"	Set "L60ADA_2.csv" as the name of the CSV file from which the
		parameters and conversion characteristics table of the free conversion
		characteristics function are read.

M+L60AD2DA2\_FreeConvDataStoreCsv (Read conversion characteristics data (CSV file))

By turning ON M340, the parameters and conversion characteristics table of the free conversion characteristics function are read from "L60ADA\_2.csv" in the SD memory card and stored in the buffer memory.





Label name	Setting value	Description
i_Start_IO_No	HO	Set the start XY address where the L60AD2DA2 is connected to 0H.
i_ReadDataAddr	K300	Set ZR300 as the read start address where the parameters and conversion
		characteristics table of the free conversion characteristics function are stored.

M+L60AD2DA2\_FreeConvDataStoreDev (Read conversion characteristics data (device))

By turning ON M350, the parameters and conversion characteristics table of the free conversion characteristics function are read from the file register ZR300 or later and stored in the buffer memory.





# Appendix 2. CSV File Format for Logging data save FB

This following shows the specification of the CSV file format that M+L60AD2DA2\_AD\_SaveLogging (Logging data save) outputs.

Item	Description
Delimiter	Comma (,)
Linefeed code	CRLF (0DH, 0AH)
Character code	ASCII
File size	Maximum 80130 bytes *1

\*1 When the number of logging data points is 10000 and all the logging data is negative with 5 digits, the file size is maximum.

#### (1) Output details of the row and column in a file

The following shows an output example of the rows and columns in a CSV file.





## (a) Header row

The head row contains the necessary information for the display in GX LogViewer. Do not change this row. The file size of the header row is fixed to 128 bytes.

## • File information row

The information related to the CSV file is written according to the order listed in the following table.

Column	Item	Output detail	Sizo
number			SIZE
Column 1	File type	[LOGGING]	9 bytes
Column 2	File version	L60AD2DA2_ $\triangle$ *1 (the value indicating the file	11 bytes
		version)	
Column 3	Data-type	2 (the value indicating where the data-type	1 byte
	information row	information row is)	
	number		
Column 4	Date name row	3 (the value indicating where the data name row is)	1 byte
	number		
Column 5	Data start column	4 (the value indicating where the data row is)	1 byte
*2	number		

\*1 Displays the specifications of the file version.

riangle: Version

\*2 At the end of row 5, NULL is output in one byte.

• Data-type information row

The data type of each column is written according to the order listed in the following table. The data type of each column is output in the format of "Data type" + "[Additional information]".

Column	Itom	Output detail of "Data	Output detail of "Additional	Size	
number	nem	type"	information"		
Column 1	Data column	SHORT (signed 16bit	[DEC 0] (desimal specification)	12 bytes	
		integer specification)		12 Dytes	
Column 2	Trigger detection	TRIGGER	[*] ("*" is used to indicate trigger	10 bytes	
	information		detection.)		
	column				



## • Date name row

The title of each column is written according to the order listed in the following table. The data type of each column is output in the format of "Data name" + "[Additional information]". (The information written in the data row is displayed as the title when the logging data is displayed in GX LogViewer.

Column number	Column name	Output detail of "Data name"	Output detail of "Additional information"	Size
Column 1	Data	DATE *1	Hold trigger detection time*2*3	24 bytes
	column	I/O:	Start XY address of the module that acquires	8 bytes
			the logging data *4	
		CH:	Target channel *4	4 bytes
		CYCLE:	Logging cycle *3	9 to 23 bytes
Column 2	Trigger	Trigger	-	7 bytes
	detection	-	- (NULL) *5	1 to 15 bytes
	information			
	column			

\*1 Spaces are output between each output item in the data column.

\*2 The time is output in the format of YYYY/MM/DD hh/mm/ss.

\*3 The values of CH Trigger detection time (Un\G1154 to Un\G1161) and CH Logging cycle monitor value (Un\G1122 to Un\G1127) are output as the hold trigger (logging stop request) detection time and logging cycle.

- \*4 The value that is specified as a parameter of FB (M+L60AD2DA2\_SaveLogging) is output to the XY address number and target channel.
- \*5 To fix the file size of the header row, NULL is output in 1 to 15 bytes at the end of the trigger detection information column.

### (b) Data row

The data is written to the data row according the order listed in the following table. (The information is displayed in GX LogViewer)

Column name	Output detail	Size
Data column	Logging data stored in the buffer memory of the L60AD2DA2	1 to 6 bytes *1
Trigger detection	* (output only to the logging data row indicated by trigger pointer.)	0 to 1 byte
information		
column		

\*1 When the size of the logging data of the data row indicated by the trigger pointer is smaller than 6 bytes, NULL is output at the end of the logging data to fix the data to 6 bytes.



# Appendix 3. Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory

The following table lists the relation between the storage source "Wave output function parameter and data" and the storage location buffer memory handled by M+L60AD2DA2\_DA\_WaveDataStoreCsv (Read wave data (CSV file)) and M+L60AD2DA2\_DA\_WaveDataStoreCsv (Read wave data (CSV file)).

						Storag	ge source	Storage location
					CSV file in the SD		Serial number access	Analog I/O
					memory card		format file register	module buffer
No.	Parameter/data of the wave output		Setting range	СН			(ZR)	memory
	function		(decimal)				()	(a. Mashala at ant
							(m: Read start	(n: Module start
					Row	Column	address)	
_	Linused	_		_	1.000	Column	$ZR(m \pm 0)$	upper) -
	onused						21((11110)	
-	Unused	-		-	-	-	ZR (m + 1)	-
1)	Output setting during wave output	0: 0V/	/0mA	3	1	3	ZR (m + 2)	Un\G3010
	Select the output during the wave	2: Ou	tout value during wave output stop	4	1	4	ZR (m+3)	Un\G3011
	output stop for each channel.		+					
2)	Output value during wave output	(*1)	0 to 12,287	3	2	3	ZR (m + 10)	Un\G3018
	stop		(practical range: 0 to 12,000)					
	Set the value to be output for each							
	channel when "2: Output value	(*2)	-16 384 to 16 383	4	2	4	7R (m + 11)	Un\G3019
	selected in "Output setting during	( -)	(practical range: -16.000 to	-	2	-		01100010
	wave output stop"		16,000)					
2)				-				
3)	Wave pattern start address setting	5,000	to 54,999	3	3	3	ZR (m + 20 and 21)	Un\G3028 and
	Set the start address of the wave							3029
	channel			4	3	4	ZR (m + 22 and 23)	Un\G3030 and
	channel.							3031
4)	Wave pattern data points setting	1 to 5	0.000 (points)	3	4	3	ZR (m + 36 and 37)	Un\G3044 and
,	Set the data points of the wave						· · · · · · · · · · · · · · · · · · ·	3045
	pattern to be output for each			4	4	4	7R (m + 38 and 39)	Un\G3046 and
	channel.			•	•	•		3047
5)	Wave pattern output repetition	1 · 1 / r	limited repetition	2	5	2	ZP (m + 50)	
5)	setting	1 to 3	2 767: Specified number of times	3	5	3	ZR (III + 50)	011/03038
	Set the output times of the wave	1 10 0		4	5	4	ZR (m + 51)	Un\G3059
	pattern for each channel.							
6)	Constant for wave output conversion	1 to 5	,000	3	6	3	ZR (m + 58)	Un\G3066
	cycle							
	Set the constant to determine the			4	6	4	ZR (m + 59)	Un\G3067
	conversion cycle (multiple of the							
	channel							
7)	Number of wave data points	0 to 5	0.000 (points)	7	100	1	ZR (m + 98 and 99)	
• /	Set the total points of the wave	0.00	e;eee (peine)			•		
	data.							-
		(+ ()		Ζ,				
8)	Wave data	(*1)	0 to 12,287		101	1	ZR (m + 100)	Un\G5000
		(*0)	(practical range: 0 to 12,000)		10 50 400		TD (m + E0000)	
		( 2)	-10,304 10 10,303		50,100		ZIZ (III + 20088)	011/004999
			16.000)	/				
			-,,	v			1	

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

\*1: When the output range setting is (CH3, CH4) is 0 to 5V, 1 to 5V, and 0 to 20mA, 4 to 20mA

\*2: When the output range setting is (CH3, CH4) is -10 to 10V

\* The number 1) to 8) in the table corresponds to the number in the row and column example of a CSV file in Appendix 4.



# Appendix 4. CSV File Format for Wave Data Reading FB (CSV File)

This section shows the CSV file format that M+L60AD2DA2\_DA\_WaveDataStoreCsv (Read wave data (CSV file)) handles. (A CSV file has an extension ".csv" and can be opened in general applications such as Microsoft Excel and Notepad.)

The following table lists the CSV format specification.

Item	Description
Delimiter	Comma (,)
Linefeed code	CRLF (0x0D, 0x0A)
Character code	ASCII or Shift JIS
File size	Maximum 400275 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 number of characters for the CSV file name must be within 12 including the extension ".csv". (Two-byte characters can be used. One two-byte character equals to two one-byte characters.) (Example) L60ADA\_1.csv, wd000001.csv, WaveData.csv

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



\*1 Values set in 1) to 6) of row 1 and 2 are ignored.

\*2 The number 1) to 8) corresponds to each item of "Table 1 Storage Source "Wave Output Function Parameter and Data" and Storage Location Buffer Memory" in Appendix 3. For details on the items, refer to the table.



Appendix 5. Storage Source "Parameters and Conversion Characteristics Table of the Free Conversion Characteristics Function" and Storage Location Buffer Memory
The following table lists the relation between the storage source "parameters and conversion characteristics table of the free conversion characteristics function" and the storage location buffer memory handled by
M+L60AD2DA2\_FreeConvDataStoreCsv (Read conversion characteristics data (CSV file)) and
M+L60AD2DA2\_FreeConvDataStoreDev (Read conversion characteristics data (device)).

Table 2 Storage Source "Parameters and Conversion Characteristics Table of the Free Conversion Characteristics
Function" and Storage Location Buffer Memory

				Storage location	
No.	Parameters and conversion characteristics table of the free conversion characteristics function	Setting range (decimal)	CSV file in the SD	Serial number access format file register (ZR)	Analog I/O module buffer memory
			Row	(m: Read start address)	XY address upper)
1)	Selection of free conversion	0: Analog input	1	ZR (m + 0)	Un\G4100
	characteristics table	1: Analog output			
	Select the conversion	2: Analog input/output			
2)	characteristics table to be used.				
2)	Free conversion characteristics	(*1) 0H: 4 to 20mA	2	ZR (m + 1)	Un\G4101
	Relact the range of the channel	1H: 0 to 20mA			
	in which the free conversion	2H. 1 10 5V			
	characteristics function is used	4H: -10 to 10V			
	The set range is shared by all	5H: 0 to 10V			
	the channels in which the free	AH: 4 to 20mA (Extended mode)			
	conversion characteristics	BH: 1 to 5V (Extended mode)			
	function is used.	(*2) 0H: 4 to 20mA			
		<sup>(2)</sup> 1H: 0 to 20mA			
		2H: 1 to 5V			
		3H: 0 to 5V			
		4H: -10 to 10V			
3)	Number of conversion	(*3) 12001 (points)	100	ZR (m + 98 and 99)	
	characteristics table data points	(*4) 16501 (points)			-
	Set the total points of the	(*5) 16001 (points)			
	conversion characteristics data.*	(*6) 32001 (points)			
4)	Conversion characteristics table	(*3) 0 to 12000	101 to	ZR (m + 100) to	Un\G5000 to
		(*4) -3,000 to 13,500	32,101	ZR (m + 32100)	Un\G37000
		(*5) 0 to 16,000			
		(*6) -16,000 to 16,000			

\*1: When the selection of free conversion characteristics table is the analog input

\*2: When the selection of free conversion characteristics table is the analog output or analog input/output

- \*3: When the free conversion characteristics range setting is 4 to 20mA, 0 to 20mA, 1 to 5V, or 0 to 5V
- \*4: When the free conversion characteristics range setting is 4 to 20mA (Extended mode) or 1 to 5V (Extended mode)
- \*5: When the free conversion characteristics range setting is 0 to 10V
- \*6: When the free conversion characteristics range setting is -10 to 10V
- \* This parameter is used by the system. Always set a value within the setting range. If a value outside the setting range, the proper operation cannot be guaranteed.



Appendix 6. CSV File Format for Conversion Characteristics Data Reading FB (CSV File) This section shows the CSV file format that

M+L60AD2DA2\_FreeConvDataStoreCsv(M+L60AD2DA2\_FreeConvDataStoreCsv (Read conversion characteristics data (CSV file))) handles. (A CSV file has an extension ".csv" and can be opened in general applications such as Microsoft Excel and Notepad.)

The following table lists the CSV format specification.

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

\*1 When the number of conversion characteristics table data points is 32001 and all the data in the conversion characteristics table is negative with 5 digits, the file size is maximum.

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

(Example) L60ADA\_1.csv, fd000001.csv, ConversionData.csv

The following figure shows a row and column example of a CSV file. In this example, the number of conversion characteristics table data points is 32001 (points) (maximum).



\*1 The number 1) to 4) corresponds to each item of "Table 2 Storage Source "Parameters and Conversion Characteristics Table of the Free Conversion Characteristics Function" and Storage Location Buffer Memory" in Appendix 5. For details on the items, refer to the table.

