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

Applicable module:

Q68ADV, Q68ADI

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	Overview



Reference Manual Revision History

Reference Manual Number	Date	Description	
FBM-M038-A	2010/11/15	First edition	
FBM-M038-B	2012/06/29	1) Added the following FB library.	
		•M+Q68AD_ScalingOperation	
		•M+Q68AD_ScalingAllOperation	
		•M+Q68AD_ScalingAllMaxMinOpe	
		•M+Q68AD_ShiftOperation	
FBM-M038-C	2015/03/27	1) Added applicable GX Works2 Version.	
		•This FB is able to install on GX Works2 of all language versions.	
		2) Added the following "FB Version Upgrade History".	
		•M+Q68AD_SetOffsetVal	
		•M+Q68AD_SetGainVal	
		•M+Q68AD_ScalingOperation	



1. Overview

1.1 Overview of the FB Library

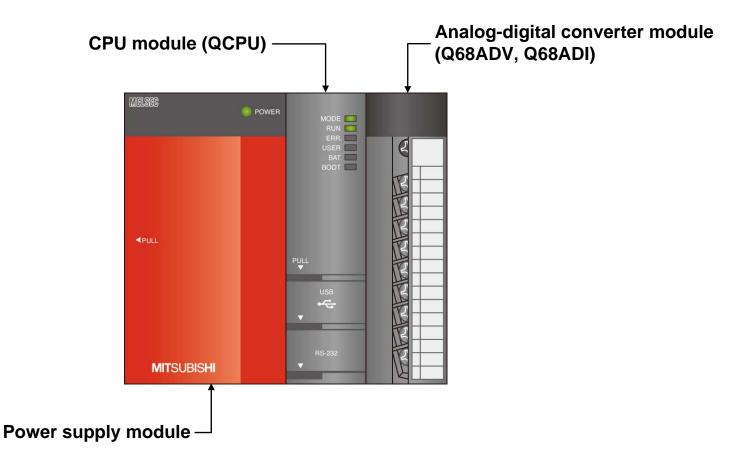
This FB library is for using the MELSEC-Q Q68AD analog-digital converter module.

1.2 Function of the FB Library

Item	Description	
M+Q68AD_ReadADVal	Reads A/D conversion data of a specified channel.	
M+Q68AD_ReadAllADVal	Reads A/D conversion data of all channels.	
M+Q68AD_SetADConversion	Sets the A/D conversion enable/disable setting of a specified	
	channel or all channels.	
M+Q68AD_SetAverage	Sets averaging process of a specified channel.	
M+Q68AD_RequestSetting	Enables settings of each function.	
M+Q68AD_SetOffsetVal	Performs offset setting of a specified channel.	
M+Q68AD_SetGainVal	Performs gain setting of a specified channel.	
M+Q68AD_ErrorOperation	Monitors error codes and performs error reset.	
M+Q68AD_ScalingOperation	Converts a digital value (A/D conversion value) of a specified	
	channel to the ratio value in a set width.	
M+Q68AD_ScalingAllOperation	Converts digital values (A/D conversion values) of all channels to	
	the ratio values in set widths.	
M+Q68AD_ScalingAllMaxMinOpe	Outputs the scaling maximum/minimum values by using the Scaling	
	process FB (M+Q68AD_ScalingOperation) or the Scaling process	
	(All CHs) FB (M+Q68AD_ScalingAllOperation).	
M+Q68AD_ShiftOperation	Adds the shift amount to the digital value (A/D conversion value) that	
	was read.	



1.3 System Configuration Example



- 1.4 Relevant Manuals
- •MELSEC-Q Analog-Digital Converter Module User's Manual
- •QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- •GX Works2 Version1 Operating Manual (Common)
- •GX Works2 Version1 Operating Manual (Simple Project, Function Block)

1.5 Note

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



2. Details of the FB Library

2.1 M+Q68AD_ReadADVal (A/D conversion data read)

FB Name

M+Q68AD_ReadADVal

Item	Description			
Function overview	Reads A/D conversion data of a specified channel.			
Symbol		M+Q68AD_ReadADV	/al	7
	Execution command —	B : FB_EN	FB_ENO : E	B — Execution status
	Module start XY address —	W:i_Start_IO_No	FB_OK : E	Completed without error
	Channel No. —	W:i_CH I	FB_ERROR : E	B — Error flag
			ERROR_ID : V	/ — Error code
		c	p_AD_Value: V	AD conversion value
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			
		Series		Model
		MELSEC-Q Series *1	Basic mode	el
			High perfor	mance model
			Universal n	nodel
		*1 Not applicable to QCPU	(A mode)	
	Engineering software	GX Works2 *1		
		Language	S	oftware version
		Japanese version	Versio	n1.86Q or later
		English version	Versio	n1.24A or later
		Chinese (Simplified) version	on Versio	n1.49B or later
		Chinese (Traditional) versi	on Versio	n1.49B or later
		Korean version	Versio	n1.49B or later
		*1 For software versions ap	plicable to th	e modules used, refer to
		"Relevant Manuals".		
Programming	Ladder			
language				
Number of steps	198 steps (for MELSEC	-Q series universal model CP	U)	
	* The number of steps of	of the FB in a program depend	ts on the CP	J model that is used and
	input and output defir	nition.		



Item	Description				
Function description	1) By turning ON FB_EN (Execution command), A/D conversion data of the specified channel is read.				
	2) The read A/D conversion data depends on the resolution mode of the input range setting.				
	3) When the target channel setting value is invalid, the FB_ERROR output turns ON,				
	processing is interrupted, and the error code is stored in ERROR_ID (Error code).				
	Refer to the error code explanation section for details.				
	4) If the A/D converter module buffer memory is set to auto refresh the digital operation				
	value, it is unnecessary to use this FB.				
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, etc. because it is impossible to turn OFF.				
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of				
	the target channel.				
	5) This FB uses index registers Z7 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) The input range, temperature drift compensation, resolution mode, and operation mode				
	must be configured to match devices and systems connected to the Q68AD module.				
	Configure these settings by making the GX Works2 switch setting according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Operating Manual (Common).				
FB operation type	Real-time execution				
Application example	Refer to "Appendix 1 - FB Library Application Examples".				
Timing chart	[When operation completes without error] [When an error occurs]				
	FB_EN (Execution command)				
	FB_ENO (Execution status)				
	o_AD_Value Refreshing Pafreshing o_AD_Value Refreshing				
	(AD conversion value) stop FB_OK FB_OK				
	(Completed without error) (Completed without error) FB_ERROR (Error flag) FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code 0				



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

Error Codes

•Error code list

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

Labels				
●Input labels				
Name	Label name	Data type	Setting range	Description
(Comment)				
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to the	address (in hexadecimal)
			CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
Channel No.	i_CH	Word	1~8	Specify the channel number.



Output labels

Name	Label name	Data	Initial	Description
(Comment)		type	value	
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
				OFF: Execution command is OFF.
Completed	FB_OK	Bit	OFF	When ON, it indicates that the A/D conversion value
without error				is being read.
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.
AD conversion	o_AD_Value	Word	0	Store the A/D conversion data of the specified
value				channel.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_ReadADVal function block.

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



2.2 M+Q68AD_ReadAllADVal (A/D conversion data read (All CHs))

FB Name

M+Q68AD_ReadAllADVal

Item	Description		
Function overview	Reads A/D conversion of	data of all channels.	
Symbol		M+Q68AD_ReadAllA	DVal
	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
			FB_ERROR : B — Error flag
			ERROR_ID : W — Error code
		o_A	D_ValueCH1 : W — CH 1 AD conversion value
		o_A	D_ValueCH2 : W — CH 2 AD conversion value
		o_A	D_ValueCH3 : W — CH 3 AD conversion value
		o_A	D_ValueCH4 : W — CH 4 AD conversion value
		o_AD_ValueCH5 : W — CH 5 AD conversion value	
		o_AD_ValueCH6 : W — CH 6 AD conversion value	
		o_AD_ValueCH7 : W — CH 7 AD conversion value	
		o_A	D_ValueCH8 : W—CH 8 AD conversion value
Applicable hardware	Analog-digital	Q68ADV, Q68ADI	
and software	converter module		
	CPU module		
		Series	Model
		MELSEC-Q Series *1	Basic model
		High performance model	
			Universal model
		*1 Not applicable to QCPU (A mode)	



Item	Description			
	Engineering software	oftware GX Works2 *1		
		Language	Software version	
		Japanese version	Version1.86Q or later	
		English version	Version1.24A or later	
		Chinese (Simplified) version	Version1.49B or later	
		Chinese (Traditional) version	Version1.49B or later	
		Korean version	Version1.49B or later	
		*1 For software versions applica	able to the modules used, refer to	
		"Relevant Manuals".		
Programming	Ladder			
language				
Number of steps	230 steps (for MELSEC	-Q series universal model CPU)		
	* The number of steps of	of the FB in a program depends or	n the CPU model that is used and	
	input and output defir	iition.		
Function description	1) By turning ON FB_EI	N (Execution command), A/D conv	version data of all channels is	
	read.			
	2) The read A/D conversion data depends on the resolution mode of input range setting.			
	3) If the A/D converter n	nodule buffer memory is set to aut	to refresh the digital operation	
	value, it is unnecessa	ary to use this FB.		
Compiling method	Macro type			
Restrictions and	1) The FB does not include error recovery processing. Program the error recovery			
precautions	processing separatel	y in accordance with the required	system operation.	
	2) The FB cannot be us	ed in an interrupt program.		
	3) Please ensure that th	e FB_EN signal is capable of beir	ng turned OFF by the program. Do	
		ograms that are only executed onc		
		. because it is impossible to turn C		
	,	egisters Z8 and Z9. Please do not	use these index registers in an	
	interrupt program.			
		provided with a value for proper F	·	
	, , ,	perature drift compensation, resol	•	
	-	o match devices and systems con		
	Configure these setti application.	ngs by making the GX Works2 sw	itch setting according to the	
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating M	anual (Common).		
FB operation type	Real-time execution			



Item	Description
Timing chart	FB_EN (Execution command) FB_ENO (Execution status) AD conversion value (All CHs) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)
Relevant manual	 Analog-Digital Converter Module User's Manual QCPU User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version1 Operating Manual (Common) GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes

Error code	Description	Action
None	None	None

Labels

Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)



Output labels

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	Bit	OFF	When ON, it indicates that A/D conversion data of
error				all channels is being read.
Error flag	FB_ERROR	Bit	OFF	Always OFF
Error code	ERROR_ID	Word	0	Always 0
CH 1 AD	o_AD_ValueCH1	Word	0	Stores the A/D conversion data of channel 1.
conversion value				
CH 2 AD	o_AD_ValueCH2	Word	0	Stores the A/D conversion data of channel 2.
conversion value				
CH 3 AD	o_AD_ValueCH3	Word	0	Stores the A/D conversion data of channel 3.
conversion value				
CH 4 AD	o_AD_ValueCH4	Word	0	Stores the A/D conversion data of channel 4.
conversion value				
CH 5 AD	o_AD_ValueCH5	Word	0	Stores the A/D conversion data of channel 5.
conversion value				
CH 6 AD	o_AD_ValueCH6	Word	0	Stores the A/D conversion data of channel 6.
conversion value				
CH 7 AD	o_AD_ValueCH7	Word	0	Stores the A/D conversion data of channel 7.
conversion value				
CH 8 AD	o_AD_ValueCH8	Word	0	Stores the A/D conversion data of channel 8.
conversion value				

FB Version Upgrade History

Version	Date	Description
1.00A	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_ReadAllADVal function block.

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



2.3 M+Q68AD_SetADConversion (A/D conversion enable/disable setting)

FB Name

M+Q68AD_SetADConversion

Item	Description					
Function overview	Sets the A/D conversion enable/disable setting of a specified channel or all channels.					
Symbol		ddress — nel No. —	W : i_Start_IO_No W : i_CH	FE	ion FB_ENO : B — Execution status FB_OK : B — Completed without error B_ERROR : B — Error flag RROR_ID : W — Error code	
Applicable hardware	Analog-digital	Q68/	ADV, Q68ADI			
and software	converter module					
	CPU module					
			Series		Model	
		ME	_SEC-Q Series *1	Bas	ic model	
				Higł	n performance model	
		Univ			versal model	
		*1 Not applicable to QCPU (A mode)				
	Engineering software	GX Works2 *1				
			Language		Software version	
		Jap	anese version		Version1.86Q or later	
		Eng	lish version		Version1.24A or later	
		Chi	nese (Simplified) version	on	Version1.49B or later	
			nese (Traditional) versi	ion	Version1.49B or later	
			ean version		Version1.49B or later	
		*1 For software versions applicable to the modules used, refer to "Relevant Manuals".				
Programming	Ladder					
language						
Number of steps	241 steps (for MELSEC	-Q seri	es universal model CP	U)		
	* 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), A/D conversion enable/disable setting of						
	the specified channel or all channels is set.						
	2) FB operation is one-shot only, triggered by the FB_EN signal.						
	3) The new setting value will not take effect until the 'operating condition setting request'						
	signal (Yn9) is turned OFF->ON->OFF or the Operating condition setting request FB						
	(M+Q68AD_RequestSetting) is executed.						
	4) When the target channel setting value is invalid, the FB_ERROR output turns ON,						
	processing is interrupted, and the error code is stored in ERROR_ID (Error code).						
	Refer to the error code explanation section for details.						
Compiling method	Macro type						
Restrictions and	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, etc. because it is impossible to turn OFF.						
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of						
	the target channel.						
	5) This FB uses index registers Z7 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) The input range, temperature drift compensation, resolution mode, and operation mode						
	must be configured to match devices and systems connected to the Q68AD module.						
	Configure these settings by making the GX Works2 switch setting according to the						
	application.						
	For details on how to use the intelligent function module switch setting, refer to GX						
	Works2 Operating Manual (Common).						
FB operation type	Pulsed execution (1 scan execution type)						
Application example	Refer to "Appendix 1 - FB Library Application Examples".						
Timing chart	[When operation completes without error] [When an error occurs]						
	FB_EN (Execution command)						
	FB_ENO (Execution status)						
	A/D conversion enable/disable No processing Writing processing A/D conversion enable/disable No processing No processing						
	FB_OK (Completed without error)						
	FB_ERROR (Error flag) FB_ERROR (Error flag)						
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code						



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

Error Codes

Error code list

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

Labels					
●Input labels					
Name (Comment)	Label name	Data	Setting range	Description	
		type			
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.	
command				OFF: The FB is not activated.	
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY	
address			range. For details, refer to	address (in hexadecimal)	
			the CPU user's manual.	where the Q68AD module is	
				mounted. (For example, enter	
				H10 for X10.)	
Channel No.	i_CH	Word	1~8,15	1~8: Specify a channel	
				number.	
				15: Specify all channels.	
A/D conversion	i_AD_Enable	Bit	ON, OFF	ON: Enable output of A/D	
enable/disable				conversion value.	
setting				OFF: Disable output of A/D	
				conversion value.	



Output labels

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	Bit	OFF	When ON, it indicates that A/D conversion
error				enable/disable setting is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_SetADConversion function block.

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



2.4 M+Q68AD_SetAverage (Averaging process setting)

FB Name

M+Q68AD_SetAverage

Item	Description			
Function overview	Sets averaging process of a specified channel.			
Symbol	Module start XY ad Chann Sampling process/averaging pr s Average No. of times/average	M+Q68AD_Set mand — B : FB_EN ddress — W : i_Start_IO_No el No. — W : i_CH rocess _ W : i_Average_Mode e time — W : i_Average_Type s/time — W : i_Average_Times	Average FB_ENO : B — Execution status FB_OK : B — Completed without error FB_ERROR : B — Error flag ERROR_ID : W — Error code	
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			
		Series	Model	
		MELSEC-Q Series *1	Basic model	
			High performance model	
			Universal model	
		*1 Not applicable to QCPU	(A mode)	
	Engineering software	GX Works2 *1		
		Language	Software version	
		Japanese version	Version1.86Q or later	
		English version	Version1.24A or later	
		Chinese (Simplified) version	on Version1.49B or later	
		Chinese (Traditional) versi	ion Version1.49B or later	
		Korean version	Version1.49B or later	
			plicable to the modules used, refer to	
		"Relevant Manuals".		
Programming language	Ladder			
Number of steps	274 steps (for MELSEC-Q series universal model CPU)			
	* The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output defin			



Item	Description				
Function description	1) By turning ON FB_EN (Execution command), averaging process setting of the specified				
	channel is set.				
	2) FB operation is one-shot only, triggered by the FB_EN signal.				
	3) The new setting value will not take effect until the 'operating condition setting request'				
	signal (Yn9) is turned OFF->ON->OFF or the Operating condition setting request FB				
	(M+Q68AD_RequestSetting) is executed.				
	4) When the target channel setting value is invalid, the FB_ERROR output turns ON,				
	processing is interrupted, and the error code is stored in ERROR_ID (Error code).				
	Refer to the error code explanation section for details.				
Compiling method	Macro type				
Restrictions and	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, etc. because it is impossible to turn OFF.				
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of				
	the target channel.				
	5) This FB uses index registers Z7 to Z9. Please do not use these index registers in an				
	interrupt program.				
	6) The input range, temperature drift compensation, resolution mode, and operation mode				
	must be configured to match devices and systems connected to the Q68AD module.				
	Configure these settings by making the GX Works2 switch setting according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Operating Manual (Common).				
FB operation type	Pulsed execution (1 scan execution type)				
Application example	Refer to "Appendix 1 - FB Library Application Examples".				
Timing chart	[When operation completes without error] [When an error occurs]				
	(Execution command)				
	(Execution status)				
	Average time/average No. of times write processing FB_OK Average time/average No. of times write processing FB_OK				
	(Completed without error)				
	FB_ERROR (Error flag) FB_ERROR (Error flag) ERROR_ID (Error code) 0 ERROR_ID (Error code) 0				



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

Error Codes

•Error code list

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

Labels						
Input labels						
Name (Comment)	Label name	Data	Setting range	Description		
		type				
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.		
command				OFF: The FB is not activated.		
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY		
address			range. For details, refer to	address (in hexadecimal)		
			the CPU user's manual.	where the Q68AD module is		
				mounted. (For example, enter		
				H10 for X10.)		
Channel No.	i_CH	Word	1~8	Specify the channel number.		
Sampling	i_Average_Mode	Word	0: Sampling process	Specify the averaging process		
process/averaging			1: Averaging process	type.		
process setting						
Average No. of	i_Average_Type	Word	0: Average No. of times			
times/average			1: Average time			
time						
No. of times/time	i_Average_Time	Word	No. of times: 4~62,500	Set the time average and		
	s		(times)	count average of the specified		
			Time: 2~5,000 (ms)	channel.		



Output labels

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	Bit	OFF	When ON, it indicates that average process setting
error				for the specified channel is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.

FB Version Upgrade History

Version	Date	Description
1.00A	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_SetAverage function block.

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



2.5 M+Q68AD_RequestSetting (Operating condition setting request operation)

FB Name

M+Q68AD_RequestSetting

Item	Description				
Function overview	Enables settings of each function.				
Symbol	M+Q68AD_RequestSetting				
	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	
			FB_ERROR :	B — Error flag	
			ERROR_ID :	W Error code	
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module				
		Series		Model	
		MELSEC-Q Series *1	Basic mod	lel	
			High perfo	h performance model	
			Universal	model	
		*1 Not applicable to QCPU (A mode)			
	Engineering software	GX Works2 *1			
		Language		Software version	
		Japanese version	Versio	on1.86Q or later	
		English version	Versio	on1.24A or later	
		Chinese (Simplified) version	on Versio	on1.49B or later	
		Chinese (Traditional) version	on Versio	on1.49B or later	
		Korean version	Versio	on1.49B or later	
		*1 For software versions app	plicable to th	ne modules used, refer to	
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	164 steps (for MELSEC-Q series universal model CPU)				
	* The number of steps of the FB in a program depends on the CPU model that is used and				
	input and output definition.				



Item	Description		
Function description	 By turning ON FB_EN (Execution command), settings of all channels are enabled. For information on the settings that are enabled, refer to the MELSEC-Q Analog-Digital Converter Module User's Manual. When FB_EN is turned ON, the FB will continue to execute until the settings for each function are completed. 		
Compiling method	Macro type		
Restrictions and precautions	 The FB does not include error recovery processing. Program the error recovery processing separately in accordance with the required system operation. The FB cannot be used in an interrupt program. This FB uses index register Z9. Please do not use this index register in an interrupt program. When this FB is executed, AD conversion processing is stopped. After turning ON FB_OK, the conversion processing resumes. 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. The input range, temperature drift compensation, resolution mode, and operation mode must be configured to match devices and systems connected to the Q68AD module. Configure these settings by making the GX Works2 switch setting according to the application. For details on how to use the intelligent function module switch setting, refer to GX Works2 Operating Manual (Common). 		
FB operation type	Pulsed execution (multiple scan execution type)		
Application example	Refer to "Appendix 1 - FB Library Application Examples".		
Timing chart	FB_EN (Execution command) FB_ENO (Execution status) Operating condition setting request (Y signal) Operating condition setting completion flag (X signal) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)		
Relevant manual	 Analog-Digital Converter Module User's Manual QCPU User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version1 Operating Manual (Common) GX Works2 Version1 Operating Manual (Simple Project, Function Block) 		



Error Codes

Error code list

Error code	Description	Action
None	None	None

Labels

Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)

Output labels

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	Bit	OFF	When ON, it indicates that enabled operation of
error				each setting has been executed.
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	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_RequestSetting function block.

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



2.6 M+Q68AD_SetOffsetVal (Offset setting)

FB Name

M+Q68AD_SetOffsetVal

Item	Description			
Function overview	Performs offset setting of a specified channel.			
Symbol		M+Q68AD_SetOffsetVal		
	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
	Channel No. —	W:i_CH	FB_ERROR : B	-Error flag
	User range write command —	B :i_Write_Offset	ERROR_ID : W	Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		<u> </u>
and software	converter module			
	CPU module		•	
		Series		Model
		MELSEC-Q Series *1	Basic model	
			High perform	ance model
			Universal mo	odel
		*1 Not applicable to QCPU	(A mode)	
	Engineering software	GX Works2 *1		
		Language	Sot	ftware version
		Japanese version	Version1	.86Q or later
		English version	Version1	.24A or later
		Chinese (Simplified) version	on Version1	.49B or later
		Chinese (Traditional) versi	on Version1	.49B or later
		Korean version	Version1	.49B or later
		*1 For software versions ap	plicable to the	modules used, refer to
		"Relevant Manuals".		
Programming	Ladder			
language				
Number of steps	298 steps (for MELSEC-Q series universal model CPU)			
	* The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definit	ition.		



Item	Description		
Function description	1) By turning ON FB_EN (Execution command), the offset value of the specified channel is		
	set.		
	2) By turning ON the user range write command when FB_EN (Execution command) is ON,		
	the offset value is written.		
	3) By turning ON FB_EN (Execution command), this FB continues its operation until the		
	setting of offset value of the specified channel is completed.		
	4) When the target channel setting value is invalid, the FB_ERROR output turns ON,		
	processing is interrupted, and the error code is stored in ERROR_ID (Error code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		
Restrictions and	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) When two or more of these FBs are used, precaution must be taken to avoid repetition of		
	the target channel.		
	4) This FB uses index registers Z7 to Z9. Please do not use these index registers in an		
	interrupt program.		
	5) 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.		
	6) The input range, temperature drift compensation, resolution mode, and operation mode		
	must be configured to match devices and systems connected to the Q68AD module.		
	Configure these settings by making the GX Works2 switch setting according to the		
	application.		
	For details on how to use the intelligent function module switch setting, refer to GX		
	Works2 Operating Manual (Common).		
FB operation type	Pulsed execution (multiple scan execution type)		
Application example	Refer to "Appendix 1 - FB Library Application Examples".		



Item	Description			
Timing chart	[When operation completes without error] 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 (YnA) EB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0	[When an error occurs] FB_EN (Execution command) FB_ENO (Execution status) Operation mode i_Write_Offset (User range write command) CHEI Offset specification Channel change request (YnB) User range write request (YnA) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)		
Relevant manual	 Analog-Digital Converter Module User's Manual QCPU User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version1 Operating Manual (Common) GX Works2 Version1 Operating Manual (Simple Project, Function Block) 			

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



Labels

Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
Channel No.	i_CH	Word	1~8	Specify the channel number.
User range write	i_Write_Offset	Bit	ON, OFF	ON: Perform user range write
command				operation.
				OFF: Do not perform user
				range write operation

Output labels

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	Bit	OFF	When ON, it indicates that the offset setting of the
error				specified channel is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.



FB Version Upgrade History

Version	Date	Description
1.00A	2010/11/15	First edition
1.01B	2015/03/27	Optimized program
		(Not change this FB function)

Note

This chapter includes information related to the M+Q68AD_SetOffsetVal function block.

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



2.7 M+Q68AD_SetGainVal (Gain setting)

FB Name

M+Q68AD_SetGainVal

Item	Description			
Function overview	Performs gain setting of a specified channel.			
Symbol		M+Q68AD_SetGain	/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	
	Channel No. —	W : i_CH	FB_ERROR : B — Error flag	
	User range write command —	B:i_Write_Gain	ERROR_ID : W Error code	
Applicable bardware	Applog digital			
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module	Opring	Mardal	
		Series	Model	
		MELSEC-Q Series *1	Basic model	
			High performance model	
			Universal model	
		*1 Not applicable to QCPU	A mode)	
	Engineering software	GX Works2 *1		
		Language	Software version	
		Japanese version	Version1.86Q or later	
		English version	Version1.24A or later	
		Chinese (Simplified) version	n Version1.49B or later	
		Chinese (Traditional) version	on 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	296 steps (for MELSEC-Q series universal model CPU)			
	* The number of steps of the FB in a program depends on the CPU model that is used and			
	input and output definition.			



Item	Description	
Function description	1) By turning ON FB_EN (Execution command), the gain value of the specified channel is set.	
	2) By turning ON the user range write command when FB_EN (Execution command) is ON,	
	the gain value is written.	
	3) By turning ON FB_EN (Execution command), this FB continues its operation until the	
	setting of gain value of the specified channel is completed.	
	4) When the target channel setting value is invalid, the FB_ERROR output turns ON,	
	processing is interrupted, and the error code is stored in ERROR_ID (Error code).	
	Refer to the error code explanation section for details.	
Compiling method	Macro type	
Restrictions and	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) When two or more of these FBs are used, precaution must be taken to avoid repetition of the target channel.	
	4) This FB uses index registers Z7 to Z9. Please do not use these index registers in an	
	interrupt program.	
	5) 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.	
	6) The input range, temperature drift compensation, resolution mode, and operation mode	
	must be configured to match devices and systems connected to the Q68AD module.	
	Configure these settings by making the GX Works2 switch setting according to the	
	application.	
	For details on how to use the intelligent function module switch setting, refer to GX	
	Works2 Operating Manual (Common).	
FB operation type	Pulsed execution (multiple scan execution type)	
Application example	Refer to "Appendix 1 - FB Library Application Examples".	



Item	Description	
Timing chart	[When operation completes without error] FB_EN (Execution command) FB_ENO (Execution status) Operation mode i_Write_Gain (User range write command) CH□ Gain specification Channel change request (YnB) User range write request (YnB) User range write request (YnA) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0	FB_EN (Execution command) FB_ENO (Execution status) Operation mode i_Write_Gain (User range write command) CH□ Gain specification Channel change request (YnB) User range write request (YnA) FB_CK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)
Relevant manual	 Analog-Digital Converter Module User's Mar QCPU User's Manual (Hardware Design, Ma GX Works2 Version1 Operating Manual (Con GX Works2 Version1 Operating Manual (Sin 	aintenance and Inspection) mmon)

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



Labels

Input labels

Name (Comment)	Label name	Data	Setting range Description	
		type		
Execution	FB_EN	Bit	ON, OFF ON: The FB is activated.	
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
Channel No.	i_CH	Word	1~8	Specify the channel number.
User range write	i_Write_Gain	Bit	ON, OFF	ON: Perform the user range
command				write operation.
				OFF: Do not perform the user
				range write operation.

Output labels

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	Bit	OFF	When ON, it indicates that the gain setting of the
error				specified channel is completed.
Error flag	FB_ERROR	Bit	OFF	When ON, it indicates that an error has occurred.
Error code	ERROR_ID	Word	0	FB error code output.



FB Version Upgrade History

Version	Date	Description	
1.00A	2010/11/15	First edition	
1.01B	2015/03/27	Optimized program	
		(Not change this FB function)	

Note

This chapter includes information related to the M+Q68AD_SetGainVal function block.

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



2.8 M+Q68AD_ErrorOperation (Error operation)

FB Name

M+Q68AD_ErrorOperation

Item	Description				
Function overview	Monitors error codes and performs error reset.				
Symbol		M+Q68AD_ErrorOperation			
	Execution command —	B : FB_EN	FE	B_ENO : B	Execution status
	Module start XY address —	W : i_Start_IO_No	F	FB_OK : В	-Completed without error
	Error reset request —	B : i_ErrorReset	o_UNIT_E	RROR : B	-Module error
		٥_٧	UNIT_ERR_	CODE : W	-Module error code
			FB_E	RROR : B	—Error flag
			ERR	OR_ID:W	Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module				
		Series	Series		Model
		MELSEC-Q Series *1 Basic model			
			High perform		ance model
		Universal model		odel	
		*1 Not applicable to QC	CPU (A m	ode)	
	Engineering software	GX Works2 *1			
		Language		Sot	ftware version
		Japanese version		Version1	.86Q or later
		Chinese (Simplified) version Version1		.24A or later	
				.49B or later	
				.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	191 steps (for MELSEC-Q series universal model CPU)			
	* The number of steps of the FB in a program depends on the CPU model that is used			
	input and output definition.			
Function description	1) By turning ON FB_EN (Execution command), an error in the target module is monitored.			
	2) After turning ON FB_EN (Execution command), by turning ON i_ErrorReset (error reset			
	request) during error occurrence, error reset is performed.			
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) This FB uses index registers Z8 and Z9. Please do not use these index registers in an			
	interrupt program.			
	4) 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.			
	5) The input range, temperature drift compensation, resolution mode, and operation mode			
	must be configured to match devices and systems connected to the Q68AD module.			
	Configure these settings by making the GX Works2 switch setting according to the			
	application.			
	For details on how to use the intelligent function module switch setting, refer to GX			
	Works2 Operating Manual (Common).			
FB operation type	Real-time execution			
Application example	Refer to "Appendix 1 - FB Library Application Examples".			
Timing chart	FB_EN (Execution command)			
	FB_ENO (Execution status)			
	i_ErrorReset (Error clear request)			
	Error reset (Y signal)			
	error (X signal)			
	(Module error flag)			
	(Error code) FB_OK			
	(Completed without error)			
	FB_ERROR (Error flag) ERROR_ID (Error code)			
Relevant manual	Analog-Digital Converter Module User's Manual			
	•QCPU User's Manual (Hardware Design, Maintenance and Inspection)			
	•GX Works2 Version1 Operating Manual (Common)			
	•GX Works2 Version1 Operating Manual (Simple Project, Function Block)			



Error Codes

•Error code list

Error code	Description	Action
None	None	None

Labels

Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON, OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
Error reset request	i_ErrorReset	Bit	ON, OFF	Turn ON to perform the error
				reset. Turn OFF after
				completion of error reset.

Output labels

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	Bit	OFF	When ON, it indicates an error reset is completed.
error				
Module error	o_UNIT_ERROR	Bit	OFF	When ON, it indicates a module error has occurred.
Module error code	o_UNIT_ERR_CODE	Word	0	Stores a code for an error occurring.
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	2010/11/15	First edition

Note

This chapter includes information related to the M+Q68AD_ErrorOperation function block.

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

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



2.9 M+Q68AD_ScalingOperation (Scaling process)

FB Name

M+Q68AD_ScalingOperation

Function Overview

Item	Description			
Function overview	Converts a digital value (A/D conversion value) of a specified channel to the ratio value in a			
	set width.			
Symbol		M+Q68AD_ScalingOpe	ration	
	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
	Channel No. —	W:i_CH o_So	caling_Value:W-	-Scaling value
	Scaling upper limit value —	W:i_Scl_U_Lim o_Sc	alComp_CH:W_	-Scaling completion CH
	Scaling lower limit value	W:i_Scl_L_Lim	FB_ERROR : B	- Error flag
	Scaling completion CH—	W:i_ScalComp_CH	ERROR_ID : W	- Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			
		Series	N	lodel
		MELSEC-Q Series *1	Basic model	
			High performa	ince model
			Universal mod	lel
		*1 Not applicable to QCPU	(A mode)	
	Engineering software	GX Works2 *1		
		Language	Sof	tware version
		Japanese version	Version	1.86Q or later
		English version	Version	1.24A or later
		Chinese (Simplified) version	on Version?	1.49B or later
		Chinese (Traditional) version	on Version?	1.49B or later
		Korean version	Version	1.49B or later
		*1 For software versions ap	plicable to the m	nodules used, refer to
		"Relevant Manuals".		
Programming	Ladder			
language				



Item	Description		
Number of steps	560 steps (for MELSEC-Q series universal model CPU)		
	* The number of steps of the FB in a program depends on the CPU model that is used and		
	input and output definition.		
Function description	1) By turning ON FB_EN (Execution command), the digital value (A/D conversion value) of		
	a specified channel is converted to a ratio of the scaling upper/lower limit values and the		
	result is output as a scaling value.		
	2) If the operation result exceeds the range of -32768 to 32767, it is fixed to -32768 or		
	32767.		
	3) If the A/D conversion completed flag is turned OFF while FB_EN (Execution command)		
	 is turned ON, the scaling operation process stops and o_Scaling_Value (Scaling value) before it stops is hold. When the A/D conversion completed flag is turned ON, the operation process resumes. 4) After a scaling value of a specified channel is calculated, the bit (see figure below) corresponding to the specified channel is turned ON. The bit corresponding to the input i_ScalComp_CH (Scaling completion CH) is updated and the information are output in o_ScalComp_CH (Scaling completion CH). 		
	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0		
	0 0 0 0 0 0 0 0 0 CH. 8 CH. 7 CH. 6 CH. 5 CH. 4 CH. 3 CH. 2 CH. 1		
	 Scaling process is performed. Scaling process is not performed. The information of Scaling completion CHs are combined. Therefore, use the same 		
	device for the input and output. (Refer to "Appendix 1 - FB Library Application		
	Examples".)		
	The scaling maximum/minimum values can be easily obtained by inputting the		
	information of o_ScalComp_CH (Scaling completion CH) and o_Scaling_Value (Scaling		
	value) obtained by this FB in M+Q68AD_ScalingAllMaxMinOpe (Scaling		
	maximum/minimum value process (All CHs)).		
	5) When the input value is invalid, the FB_ERROR output turns ON, processing is		
	interrupted, and the error code is stored in ERROR_ID (Error code).		
	Refer to the error code explanation section for details.		
Compiling method	Macro type		



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, etc. because it is impossible to turn OFF.					
	4) When two or more of these FBs are used, precaution must be taken to avoid repetition of					
	the target channel.					
	5) This FB uses index registers Z7 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) The input range, temperature drift compensation, resolution mode, and operation mode					
	must be configured to match devices and systems connected to the Q68AD module.					
	Configure these settings by making the GX Works2 switch setting according to the					
	application.					
	For details on how to use the intelligent function module switch setting, refer to GX					
	Works2 Operating Manual (Common).					
FB operation type	Real-time execution					
Application example	Refer to "Appendix 1 - FB Library Application Examples".					
Timing chart	[When operation completes without error] [When an error occurs]					
	FB_EN (Execution command)					
	FB_ENO (Execution status)					
	Scaling operation processing in progressing Scaling operation processing No processing					
	FB_OK (Completed without error)					
	FB_ERROR (Error flag)					
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code 0					
Relevant manual	Analog-Digital Converter Module User's Manual					
	•QCPU User's Manual (Hardware Design, Maintenance and Inspection)					
	•GX Works2 Version1 Operating Manual (Common)					
	•GX Works2 Version1 Operating Manual (Simple Project, Function Block)					



Error Codes

Error code list

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

Labels

Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution	FB_EN	Bit	ON,OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
Channel No.	i_CH	Word	1~8	Specify the channel number.
Scaling upper limit	i_Scl_U_Lim	Word	-32,000~32,000	Specify the scaling upper/lower limit values.
value				
Scaling lower limit	i_Scl_L_Lim			
value				
Scaling completion	i_ScalComp_CH	Word	b0: CH1 Scaling complete	A scaling value of the channel
СН			b1: CH2 Scaling complete	specified with i_CH is
			b2: CH3 Scaling complete	calculated, the bit
			b3: CH4 Scaling complete	corresponding to i_CH is
			b4: CH5 Scaling complete	updated, and then the
			b5: CH6 Scaling complete	information is output in
			b6: CH7 Scaling complete	o_ScalComp_CH. (Refer to 4)
			b7: CH8 Scaling complete	in Restrictions and
			b8~15: (Not used)	precautions).
			0: Scaling not complete	
			1: Scaling complete	



Output labels

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	Bit	OFF	When ON, it indicates that the scaling process is
error				being performed.
Scaling value	o_Scaling_Value	Word	0	Stores a value obtained by performing the scaling
				process on the input A/D conversion value.
Scaling completion	o_ScalComp_C	Word	0	A scaling value of the channel specified with i_CH
СН	Н			is calculated, the bit corresponding to i_CH for
				i_ScalComp_CH is updated, and then the
				information is output in this label. (Refer to 4) in
				Restrictions and precautions).
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	2012/06/29	First edition
1.01B	2015/03/27	Optimized program
		(Not change this FB function)

Note

This chapter includes information related to the M+Q68AD_ScalingOperation function block.

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

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



2.10 M+Q68AD_ScalingAllOperation (Scaling process (All CHs))

FB Name

M+Q68AD_ScalingAllOperation

Function Overview

Item	Description			
Function overview	Converts digital values (A	VD conversion values) of a	all channels to the	e ratio values in set
	widths.			
Symbol		M+Q68AD_ScalingA	llOperation	
	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 Scaling upper limit value-	W : i_Scl_U_LimCH1 o_	_Scaling_ValCH1:W	-CH1 Scaling value
	CH1 Scaling lower limit value -	W:i_Scl_L_LimCH1 o_	_Scaling_ValCH2:W	-CH2 Scaling value
	CH2 Scaling upper limit value -	W : i_Scl_U_LimCH2 o_	_Scaling_ValCH3:W	-CH3 Scaling value
	CH2 Scaling lower limit value-	W : i_Scl_L_LimCH2 o_	_Scaling_ValCH4:W	-CH4 Scaling value
	CH3 Scaling upper limit value-	W : i_Scl_U_LimCH3 o_	_Scaling_ValCH5:W	-CH5 Scaling value
	CH3 Scaling lower limit value -	W : i_Scl_L_LimCH3 o_	_Scaling_ValCH6:W	-CH6 Scaling value
	CH4 Scaling upper limit value-	W : i_Scl_U_LimCH4 o_	_Scaling_ValCH7:W	-CH7 Scaling value
	CH4 Scaling lower limit value -	W : i_Scl_L_LimCH4 o_	_Scaling_ValCH8:W	-CH8 Scaling value
	CH5 Scaling upper limit value -	W : i_Scl_U_LimCH5 c	o_ScalComp_CH:W	-Scaling completion CH
	CH5 Scaling lower limit value -	W : i_Scl_L_LimCH5	FB_ERROR : B	-Error flag
	CH6 Scaling upper limit value-	W : i_Scl_U_LimCH6	ERROR_ID : W	Error code
	CH6 Scaling lower limit value -	W : i_Scl_L_LimCH6		
	CH7 Scaling upper limit value -	W : i_Scl_U_LimCH7		
	CH7 Scaling lower limit value -	W : i_Scl_L_LimCH7		
	CH8 Scaling upper limit value-	W : i_Scl_U_LimCH8		
	CH8 Scaling lower limit value-	W : i_Scl_L_LimCH8		
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			
		Series	Γ	Model
		MELSEC-Q Series *1	Basic model	
			High performa	ance model
			Universal mod	del
		*1 Not applicable to QCP	U (A mode)	



Item	Description					
	Engineering software	GX Works2 *1				
			Language	1	Software	version
		Japanese	version		Version1.86Q	or later
		English ve	ersion		Version1.24A	or later
		Chinese (Simplified)	version	Version1.49B	or later
		Chinese (Traditional) versior	Version1.49B	or later
		Korean ve	ersion		Version1.49B	or later
		*1 For soft	ware version	ons appl	cable to the modu	les used, refer to
		"Releva	nt Manuals	s".		
Programming	Ladder					
language						
Number of steps	1516 steps (for MELSE	C-Q series u	niversal m	odel CPI)	
	* The number of steps of the FB in a program depends on the CPU model that is used and					
	input and output defin	nition.				
Function description	1) By turning ON FB_EN (Execution command), the digital values (A/D conversion values)					
	of all channels are co			scaling	upper/lower limit v	alues and the
	results are output as	•				
	2) If the operation result	t exceeds the	e range of	-32768 t	o 32767, it is fixed	to -32768 or
	32767.					
	3) If the A/D conversion		•			
	is turned ON, the sca	•	•	•	•	,
	before it stops is hold. When the A/D conversion completed flag is turned ON, the					
	operation process res		l 46 a bita (and firm		
	4) After scaling values a				<i>,</i> .	•
	channels are turned completion CH).		IIOIIIalioII	are out		J_CH (Scaling
			L0 L7			
		<u>b11 b10 b9</u>	b8 b7	<u>b6 b5</u>	b4 b3 b2 b	
	0 0 0 0	0 0 0	0 CH. 8	CH. 7 CH. 6	CH. 5 CH. 4 CH. 3 CH.	2 CH. 1
	1: Scaling process is	performed				
	0: Scaling process is	-	ed.			
	The scaling maximur	-		be easilv	obtained by input	tting the
	information and the s			-		•
		aximum/minimum value process (All CHs).				
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, etc. because it is impossible to turn OFF.
	4) This FB uses index registers Z8 and Z9. Please do not use these index registers in an
	interrupt program.
	5) Every input must be provided with a value for proper FB operation.
	6) The input range, temperature drift compensation, resolution mode, and operation mode
	must be configured to match devices and systems connected to the Q68AD module.
	Configure these settings by making the GX Works2 switch setting according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application Examples".
Timing chart	FB_EN (Execution command) FB_ENO (Execution status) Scaling operation process FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)
Relevant manual	Analog-Digital Converter Module User's Manual
	 QCPU User's Manual (Hardware Design, Maintenance and Inspection)
	•GX Works2 Version1 Operating Manual (Common)
	•GX Works2 Version1 Operating Manual (Simple Project, Function Block)

Error Codes		
Error code list		
Error code	Description	Action
None	None	None



Labels

Input labels

Name (Comment)	Label name	Data type	Setting range	Description
Execution command	FB_EN	Bit	ON,OFF	ON: The FB is activated. OFF: The FB is not activated.
Module start XY address	i_Start_IO_No	Word	Depends on the I/O point range. For details, refer to the CPU user's manual.	Specify the starting XY address (in hexadecimal) where the Q68AD module is mounted. (For example, enter H10 for X10.)
CH1 Scaling upper limit value CH1 Scaling lower limit value CH2 Scaling upper limit	i_Scl_U_LimCH1 i_Scl_L_LimCH1 i_Scl_U_LimCH2	Word	-32,000~32,000	Specify the scaling upper/lower limit values.
value CH2 Scaling lower limit value CH3 Scaling upper limit value	i_Scl_L_LimCH2 i_Scl_U_LimCH3			
CH3 Scaling lower limit value CH4 Scaling upper limit	i_Scl_L_LimCH3 i_Scl_U_LimCH4	-		
value CH4 Scaling lower limit value	i_Scl_L_LimCH4	_		
CH5 Scaling upper limit value CH5 Scaling lower limit	i_Scl_U_LimCH5 i_Scl_L_LimCH5	_		
value CH6 Scaling upper limit value	i_Scl_U_LimCH6	-		
CH6 Scaling lower limit value	i_Scl_L_LimCH6	1		



Name (Comment)	Label name	Data	Setting range	Description
		type		
CH7 Scaling upper limit	i_Scl_U_LimCH7	Word	-32,000~32,000	Specify the scaling
value				upper/lower limit values.
CH7 Scaling lower limit	i_Scl_L_LimCH7			
value				
CH8 Scaling upper limit	i_Scl_U_LimCH8			
value				
CH8 Scaling lower limit	i_Scl_L_LimCH8]		
value				

Output labels

Name (comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON.
	_			OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the scaling
				process is being performed.
CH1 Scaling value	o_Scaling_ValCH1	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH1.
CH2 Scaling value	o_Scaling_ValCH2	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH2.
CH3 Scaling value	o_Scaling_ValCH3	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH3.
CH4 Scaling value	o_Scaling_ValCH4	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH4.
CH5 Scaling value	o_Scaling_ValCH5	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH5.
CH6 Scaling value	o_Scaling_ValCH6	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH6.
CH7 Scaling value	o_Scaling_ValCH7	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH7.



Name (comment)	Label name	Data	Initial	Description
		type	value	
CH8 Scaling value	o_Scaling_ValCH8	Word	0	Stores a value obtained by performing the
				scaling process on the input A/D conversion
				value of CH8.
Scaling completion CH	o_ScalComp_CH	Word	0	Scaling values are calculated, the bits
				corresponding to the channels are turned
				ON, and the information is output in this
				label. (Refer to 4) in Restrictions and
				precautions).
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	2012/06/29	First edition

Note

This chapter includes information related to the M+Q68AD_ScalingAllOperation function block.

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

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



2.11 M+Q68AD_ScalingAllMaxMinOpe (Scaling maximum/minimum value process (All CHs))

FB Name

M+Q68AD_ScalingAllMaxMinOpe

Function Overview

Item	Description				
Function overview	Outputs the scaling maximum/minimum values by using the Scaling process FB				
	(M+Q68AD_ScalingOperation) or the Scaling process (All CHs) FB				
	(M+Q68AD_ScalingAllC	Operation).			
Symbol		M+Q68AD_Scali	ngAllMaxMinOpe		
	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 Scaling value —	W : i_Scaling_ValCH1	o_Scal_MaxValCH1 : W—CH1 Scaling maximum value		
	CH2 Scaling value	W : i_Scaling_ValCH2	o_Scal_MinValCH1 : W—CH1 Scaling minimum value		
	CH3 Scaling value	W : i_Scaling_ValCH3	o_Scal_MaxValCH2:W—CH2 Scaling maximum value		
	CH4 Scaling value —	W : i_Scaling_ValCH4	o_Scal_MinValCH2:W—CH2 Scaling minimum value		
	CH5 Scaling value —	W : i_Scaling_ValCH5	o_Scal_MaxValCH3 : W—CH3 Scaling maximum value		
	CH6 Scaling value —	W : i_Scaling_ValCH6	o_Scal_MinValCH3:W—CH3 Scaling minimum value		
	CH7 Scaling value	W : i_Scaling_ValCH7	o_Scal_MaxValCH4 : W—CH4 Scaling maximum value		
	CH8 Scaling value —	W : i_Scaling_ValCH8	o_Scal_MinValCH4 : W—CH4 Scaling minimum value		
	Scaling completion CH —	W : i_ScalComp_CH	o_Scal_MaxValCH5 : W—CH5 Scaling maximum value		
			o_Scal_MinValCH5 : W—CH5 Scaling minimum value		
			o_Scal_MaxValCH6 : W—CH6 Scaling maximum value		
			o_Scal_MinValCH6 : W— CH6 Scaling minimum value		
			o_Scal_MaxValCH7 : W—CH7 Scaling maximum value		
			o_Scal_MinValCH7 : W—CH7 Scaling minimum value		
			o_Scal_MaxValCH8 : W—CH8 Scaling maximum value		
			o_Scal_MinValCH8 : W—CH8 Scaling minimum value		
			FB_ERROR : B — Error flag		
			ERROR_ID : W — Error code		
	l				
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				



Item	Description		
	CPU module		
		Series	Model
		MELSEC-Q Series *1	Basic model
			High performance model
			Universal model
		*1 Not applicable to QCPU (A mode)
	Engineering software	GX Works2 *1	
		Language	Software version
		Japanese version	Version1.86Q or later
		English version	Version1.24A or later
		Chinese (Simplified) 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	plicable to the modules used, refer to
		"Relevant Manuals".	
Programming	Ladder		
language			
Number of steps	746 steps (for MELSEC-	-Q series universal model CPU	U)
	* The number of steps o	f the FB in a program depend	s on the CPU model that is used and
	input and output definit	ition.	



Function description	1) By turning ON FB_EN (Execution command), the scaling maximum/minimum values are output in the channels set with i_ScalComp_CH (Scaling completion CH). * i_ScalComp_CH
	i_ScalComp_CH
	b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0
	0 0 0 0 0 0 0 0 0 CH. 8 CH. 7 CH. 6 CH. 5 CH. 4 CH. 3 CH. 2 CH. 1
	1: Enable (Output maximum/minimum values)
	0: Disable (Do not output maximum/minimum values.)
	2) If the following operation is performed while FB_EN (Execution command) is turned ON,
	the scaling maximum/minimum values will be returned to the scaling values.
	a) The operating condition setting request (Yn9) is turned ON, or the Operating condition
	setting request FB (M+Q68AD_RequestSetting) is executed.
	b) The maximum/minimum values reset request (YnD) is turned ON.
	* The scaling maximum/minimum values can be easily obtained by using this FB together with the Scaling process FB (M+Q68AD_ScalingOperation) or the Scaling process (All CHs) FB (M+Q68AD_ScalingAllOperation).
	The same device must be set for the Scaling completion CH (i_ScalComp_CH) of this FB
	and the Scaling completion CH (o_ScalComp_CH) of M+Q68AD_ScalingOperation or
	M+Q68AD_ScalingAllOperation.
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, etc. because it is impossible to turn OFF.
	 This FB uses index register Z9. Please do not use this index register in an interrupt program.
	5) Every input must be provided with a value for proper FB operation.
	6) The input range, temperature drift compensation, resolution mode, and operation mode
	must be configured to match devices and systems connected to the Q68AD module.
	Configure these settings by making the GX Works2 switch setting according to the
	application.
	For details on how to use the intelligent function module switch setting, refer to GX
	Works2 Operating Manual (Common).
FB operation type	Real-time execution
Application example	Refer to "Appendix 1 - FB Library Application Examples".



Item	Description	
Timing chart	FB_EN (Execution command) FB_ENO (Execution status) Scaling maximum/ minimum value process FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code)	
Relevant manual	 Analog-Digital Converter Module User's Manual QCPU User's Manual (Hardware Design, Maintenance and Inspection) GX Works2 Version1 Operating Manual (Common) GX Works2 Version1 Operating Manual (Simple Project, Function Block) 	

Error Codes		
●Error code list		
Error code	Description	Action
None	None	None



Labels

Input labels

Name (Comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON,OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Module start XY	i_Start_IO_No	Word	Depends on the I/O point	Specify the starting XY
address			range. For details, refer to	address (in hexadecimal)
			the CPU user's manual.	where the Q68AD module is
				mounted. (For example, enter
				H10 for X10.)
CH1 Scaling value	i_Scaling_ValCH1	Word	-32768~32767	Specify the scaling values.
CH2 Scaling value	i_Scaling_ValCH2	-		For scaling values of the
CH3 Scaling value	i_Scaling_ValCH3	-		channels not used, specify
CH4 Scaling value	i_Scaling_ValCH4			word values (e.g., K0).
CH5 Scaling value	i_Scaling_ValCH5			
CH6 Scaling value	i_Scaling_ValCH6			
CH7 Scaling value	i_Scaling_ValCH7			
CH8 Scaling value	i_Scaling_ValCH8			
Scaling completion	i_ScalComp_CH	Word	b0: CH1 Scaling complete	Specify the channels to output
СН			b1: CH2 Scaling complete	the scaling
			b2: CH3 Scaling complete	maximum/minimum values.
			b3: CH4 Scaling complete	(Refer to 1) in Restrictions and
			b4: CH5 Scaling complete	precautions).
			b5: CH6 Scaling complete	
			b6: CH7 Scaling complete	
			b7: CH8 Scaling complete	
			b8~15: (Not used)	
			0: Disable (Do not perform	
			the maximum/minimum	
			value process because	
			the scaling process is not	
			completed.)	
			1: Enable (Perform the	
			maximum/minimum value	
			process because the	
			scaling process is	
			completed.)	



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Output labels

Name (Comment)	Label name	Data type	Initial value	Description
Execution status	FB_ENO	Bit	OFF	ON: Execution command is ON. OFF: Execution command is OFF.
Completed without error	FB_OK	Bit	OFF	When ON, it indicates that the scaling process is being performed.
CH1 Scaling maximum value	o_Scal_MaxValCH1	Word	0	Stores the maximum value of the CH1 scaling value (i_Scaling_ValCH1).
CH1 Scaling minimum value	o_Scal_MinValCH1	Word	0	Stores the minimum value of the CH1 scaling value (i_Scaling_ValCH1).
CH2 Scaling maximum value	o_Scal_MaxValCH2	Word	0	Stores the maximum value of the CH2 scaling value (i_Scaling_ValCH2).
CH2 Scaling minimum value	o_Scal_MinValCH2	Word	0	Stores the minimum value of the CH2 scaling value (i_Scaling_ValCH2).
CH3 Scaling maximum value	o_Scal_MaxValCH3	Word	0	Stores the maximum value of the CH3 scaling value (i_Scaling_ValCH3).
CH3 Scaling minimum value	o_Scal_MinValCH3	Word	0	Stores the minimum value of the CH3 scaling value (i_Scaling_ValCH3).
CH4 Scaling maximum value	o_Scal_MaxValCH4	Word	0	Stores the maximum value of the CH4 scaling value (i_Scaling_ValCH4).
CH4 Scaling minimum value	o_Scal_MinValCH4	Word	0	Stores the minimum value of the CH4 scaling value (i_Scaling_ValCH4).
CH5 Scaling maximum value	o_Scal_MaxValCH5	Word	0	Stores the maximum value of the CH5 scaling value (i_Scaling_ValCH5).
CH5 Scaling minimum value	o_Scal_MinValCH5	Word	0	Stores the minimum value of the CH5 scaling value (i_Scaling_ValCH5).
CH6 Scaling maximum value	o_Scal_MaxValCH6	Word	0	Stores the maximum value of the CH6 scaling value (i_Scaling_ValCH6).
CH6 Scaling minimum value	o_Scal_MinValCH6	Word	0	Stores the minimum value of the CH6 scaling value (i_Scaling_ValCH6).
CH7 Scaling maximum value	o_Scal_MaxValCH7	Word	0	Stores the maximum value of the CH7 scaling value (i_Scaling_ValCH7).
CH7 Scaling minimum value	o_Scal_MinValCH7	Word	0	Stores the minimum value of the CH7 scaling value (i_Scaling_ValCH7).



Name (Comment)	Label name	Data	Initial	Description
		type	value	
CH8 Scaling	o_Scal_MaxValCH8	Word	0	Stores the maximum value of the CH8 scaling
maximum value				value (i_Scaling_ValCH8).
CH8 Scaling	o_Scal_MinValCH8	Word	0	Stores the minimum value of the CH8 scaling
minimum value				value (i_Scaling_ValCH8).
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	2012/06/29	First edition

Note

This chapter includes information related to the M+Q68AD_ScalingAllMaxMinOpe function block.

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

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



2.12 M+Q68AD_ShiftOperation (Shift process)

FB Name

M+Q68AD_ShiftOperation

Function Overview

Item	Description		
Function overview	Adds the shift amount to the digital value (A/D conversion value) that was read.		
Symbol	Γ	M+Q68AD_ShiftOperati	
	Execution command —		FB_ENO : B Execution status
	Digital value — V	V : i_Digital_value	FB_OK : B Completed without error
	Shift amount — \	W : i_Shift_Value o_Di	ig_Out_Val : WDigital output value
		F	B_ERROR : B Error flag
		E	ERROR_ID : W Error code
	L		
Applicable hardware	Analog-digital	Q68ADV, Q68ADI	
and software	converter module		
	CPU module		
		Series	Model
		MELSEC-Q Series *1	Basic model
			High performance model
			Universal model
		*1 Not applicable to QCPU	(A mode)
	Engineering software	GX Works2 *1	
		Language	Software version
		Japanese version	Version1.86Q or later
		English version	Version1.24A or later
		Chinese (Simplified) version	on Version1.49B or later
		Chinese (Traditional) vers	ion Version1.49B or later
		Korean version	Version1.49B or later
		*1 For software versions ap	oplicable to the modules used, refer to
		"Relevant Manuals".	
Programming	Ladder		
language			
Number of steps	162 steps (for MELSEC	C-Q series universal model CF	PU)
	* The number of steps	of the FB in a program depend	ds on the CPU model that is used and
	input and output defi	nition.	



Item	Description				
Function description	1) By turning ON FB_EN (Execution command), the shift amount is added to the following				
	value.				
	a) Digital value (A/D conversion value)				
	b) Scaling value calculated by M+Q68AD_ScalingOperation (Scaling process)				
	2) If the sum exceeds the range of -32768 to 32767, it is fixed to -32768 or 32767.				
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, etc. because it is impossible to turn OFF.				
	4) Every input must be provided with a value for proper FB operation.				
	5) The input range, temperature drift compensation, resolution mode, and operation mode				
	must be configured to match devices and systems connected to the Q68AD module.				
	Configure these settings by making the GX Works2 switch setting according to the				
	application.				
	For details on how to use the intelligent function module switch setting, refer to GX				
	Works2 Operating Manual (Common).				
	6) o_Dig_Out_Val (Digital output value) is valid when FB_OK (Completed without error) is				
	turned ON.				
	7) o_Dig_Out_Val (Digital output value) is cleared to 0 by turning OFF FB_EN.				
FB operation type	Real-time execution				
Application example	Refer to "Appendix 1 - FB Library Application Examples".				
Timing chart	FB_EN				
	(Execution command)				
	(Execution status)				
	Shift process processing				
	(Completed without error)				
	FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0				
Relevant manual	Analog-Digital Converter Module User's Manual				
	 QCPU User's Manual (Hardware Design, Maintenance and Inspection) 				
	•GX Works2 Version1 Operating Manual (Common)				
	•GX Works2 Version1 Operating Manual (Simple Project, Function Block)				



Error Codes

•Error code list

Error code	Description	Action
None	None	None

Labels

Input labels

Name (comment)	Label name	Data	Setting range	Description
		type		
Execution	FB_EN	Bit	ON,OFF	ON: The FB is activated.
command				OFF: The FB is not activated.
Digital value	i_Digital_value	Word	-32,768~32,767	Specify the A/D conversion
				value that was read or specify
				the scaling value.
Shift amount	i_Shift_Value	Word	-32,768~32,767	Specify the amount to shift.

Output labels

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	Bit	OFF	When ON, it indicates that the shift process is being
error				performed.
Digital output	o_Dig_Out_Va	Word	0	Stores a sum obtained by adding the input digital
value	T			value to the shift amount.
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	2012/06/29	First edition

Note

This chapter includes information related to the M+Q68AD_ShiftOperation function block.

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

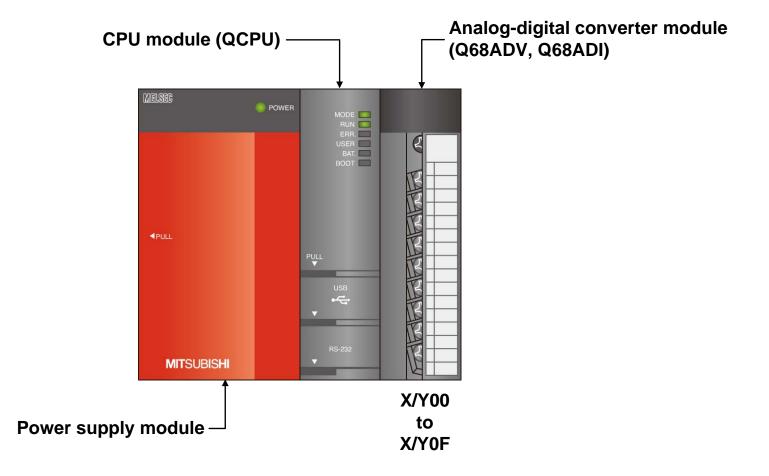
Before using any Mitsubishi products, please read all relevant manuals.



Appendix 1. FB Library Application Examples

Q68AD FB application examples are as follows.

1) System configuration



Reminder

•Every input must be provided with a value for proper FB operation.

If not set, the values will be unspecified.

•Abbreviations may be used in the label comments due to the limitation on the number of the characters to display in GX Works2.



2) List of devices

a) External input (commands)

Device	FB name	Application (ON details)		
M0	M+Q68AD_ReadADVal	Execution command		
M10	M+Q68AD_ReadAllADVal	Execution command		
M20	M+Q68AD_SetADConversion	Execution command		
M21		A/D conversion enable/disable setting		
M30	M+Q68AD_SetAverage	Execution command		
M40	M+Q68AD_RequestSetting	Execution command		
M50	M+Q68AD_SetOffsetVal	Execution command		
M51		Offset value write request		
M60	M+Q68AD_SetGainVal	Execution command		
M61		Gain value write request		
M70	M+Q68AD_ErrorOperation	Execution command		
M71		Error reset request		
M80	M+Q68AD_ScalingOperation	Execution command		
D81		Scaling completion CH		
M90	M+Q68AD_ScalingAllOperation	Execution command		
M100	M+Q68AD_ScalingAllMaxMinOpe	Execution command		
		CH1 Scaling value		
D90		(CH1 Scaling output value (o_Scaling_ValCH1) of		
		M+Q68AD_ScalingAllOperation)		
		CH2 Scaling value		
D91		(CH2 Scaling output value (o_Scaling_ValCH2) of		
		M+Q68AD_ScalingAllOperation)		
		CH3 Scaling value		
D92		(CH3 Scaling output value (o_Scaling_ValCH3) of		
		M+Q68AD_ScalingAllOperation)		
		CH4 Scaling value		
D93		(CH4 Scaling output value (o_Scaling_ValCH4) of		
		M+Q68AD_ScalingAllOperation)		
		CH5 Scaling value		
D94		(CH5 Scaling output value (o_Scaling_ValCH5) of		
		M+Q68AD_ScalingAllOperation)		



Device	FB name	Application (ON details)
		CH6 Scaling value
D95		(CH6 Scaling output value (o_Scaling_ValCH6) of
		M+Q68AD_ScalingAllOperation)
		CH7 Scaling value
D96		(CH7 Scaling output value (o_Scaling_ValCH7) of
		M+Q68AD_ScalingAllOperation)
		CH8 Scaling value
D97		(CH8 Scaling output value (o_Scaling_ValCH8) of
		M+Q68AD_ScalingAllOperation)
D98		Scaling completion CH
M120	M+Q68AD_ShiftOperation	Execution command
D120		Digital value

b) External output (checks)

Device	FB name	Application (ON details)
M1	M+Q68AD_ReadADVal	A/D conversion data read FB ready
M2		A/D conversion data read complete
F0		A/D conversion data read FB error
D0		A/D conversion data read FB error code
D1		A/D conversion data
M11	M+Q68AD_ReadAllADVal	All channels batch read FB ready
M12		All channels batch read complete
D10		CH1 A/D conversion data
D11		CH2 A/D conversion data
D12		CH3 A/D conversion data
D13		CH4 A/D conversion data
D14		CH5 A/D conversion data
D15		CH6 A/D conversion data
D16		CH7 A/D conversion data
D17		CH8 A/D conversion data
M22	M+Q68AD_SetADConversion	A/D conversion enable/disable setting FB ready
M23		A/D conversion enable/disable setting complete
F5		A/D conversion enable/disable setting FB error
D20		A/D conversion enable/disable setting error code
M31	M+Q68AD_SetAverage	Averaging process setting FB ready
M32		Averaging process setting complete
F10		Averaging process setting FB error



Device	FB name	Application (ON details)		
D30		Averaging process setting FB error code		
M41	M+Q68AD_RequestSetting	Operating condition setting request operation FB ready		
M42		Operating condition setting request operation FB setting		
10142		complete		
M52	M+Q68AD_SetOffsetVal	Offset value setting FB ready		
M53		Offset value setting complete		
F15		Offset value setting FB error		
D50		Offset setting FB error code		
M62	M+Q68AD_SetGainVal	Gain value setting FB ready		
M63		Gain value setting complete		
F20		Gain value setting FB error		
D60		Gain setting FB error code		
M72	M+Q68AD_ErrorOperation	Error operation ready		
M73		Error operation complete		
M74		Module error flag		
D70		Module error code		
M81	M+Q68AD_ScalingOperation	Scaling process FB ready		
M82		Scaling process complete		
D80		Scaling value		
D81		Scaling completion CH		
F25		Scaling process FB error		
D82		Scaling process FB error code		
M91	M+Q68AD_ScalingAllOperation	Scaling process (All CHs) FB ready		
M92		Scaling process (All CHs) complete		
D90		CH1 Scaling value		
D91		CH2 Scaling value		
D92		CH3 Scaling value		
D93		CH4 Scaling value		
D94		CH5 Scaling value		
D95		CH6 Scaling value		
D96		CH7 Scaling value		
D97		CH8 Scaling value		
D98		Scaling completion CH		
M101	M+Q68AD_ScalingAllMaxMinOpe	Scaling maximum/minimum value process FB ready		
M102		Scaling maximum/minimum value process complete		
D100		CH1 Scaling maximum value		
D101		CH1 Scaling minimum value		



Device	FB name	Application (ON details)
D102		CH2 Scaling maximum value
D103		CH2 Scaling minimum value
D104		CH3 Scaling maximum value
D105		CH3 Scaling minimum value
D106		CH4 Scaling maximum value
D107		CH4 Scaling minimum value
D108		CH5 Scaling maximum value
D109		CH5 Scaling minimum value
D110		CH6 Scaling maximum value
D111		CH6 Scaling minimum value
D112		CH7 Scaling maximum value
D113		CH7 Scaling minimum value
D114		CH8 Scaling maximum value
D115		CH8 Scaling minimum value
M121	M+Q68AD_ShiftOperation	Shift process FB ready
M122		Shift process complete
D121		Digital output value

3) Global label settings

None

4) Application example settings

a) Common settings

I/O item	Value	Description
Module start XY address	0	Specify the starting XY address where the
		Q68AD module is mounted.

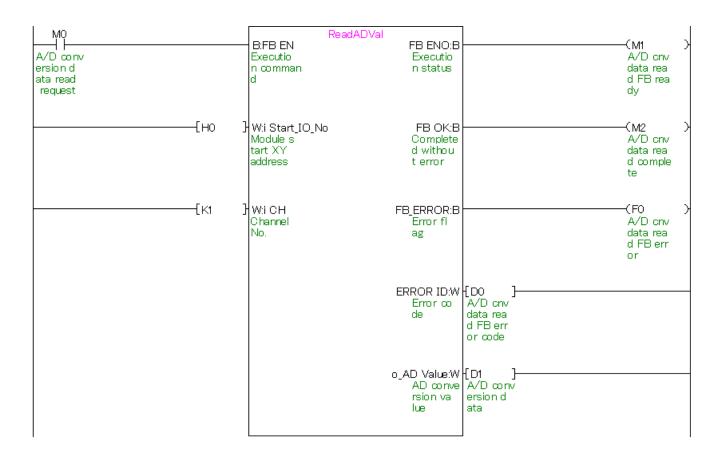


5) Programs

M+Q68AD_ReadADVal (A/D conversion data read)

Label name Setting value		Description		
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted 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.

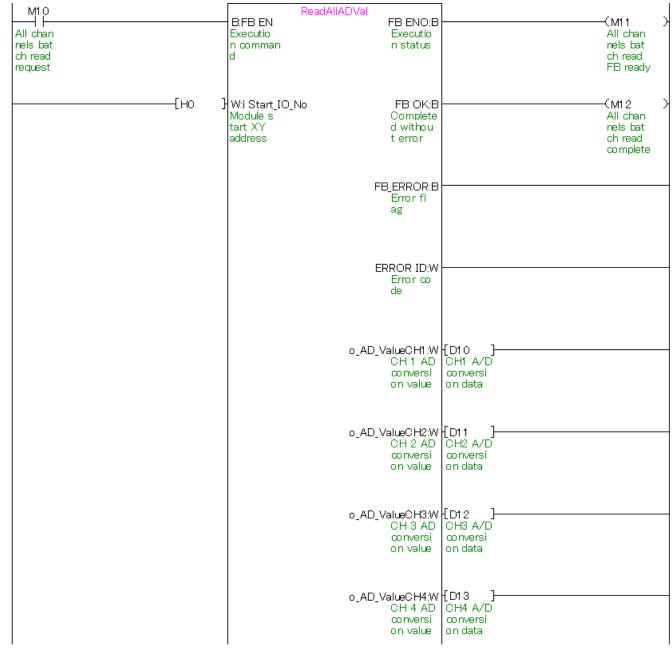




M+Q68AD_ReadAllADVal (A/D conversion data read (All CHs))

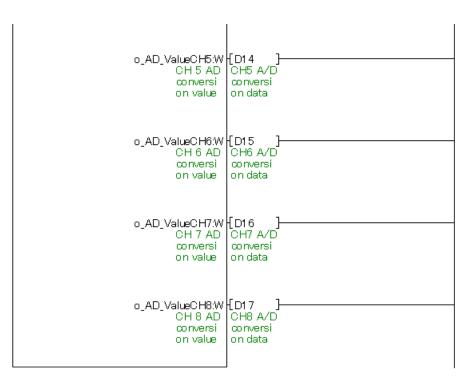
Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.

By turning ON M10, the A/D conversion data of all channels are read.



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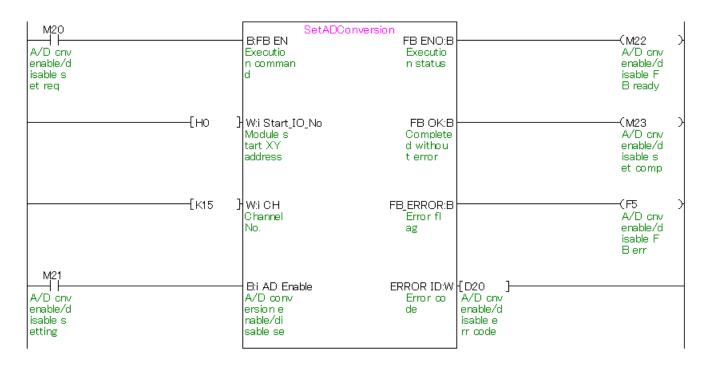




	•		
Label name Setting		Description	
	value		
i_Start_IO_No	HO	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_CH	K15	Set the target channel to all channels.	
i_AD_Enable	ON/OFF	Turn ON to enable the A/D conversion of the target channels.	

M+Q68AD_SetADConversion (A/D conversion enable/disable setting)

By turning ON M20, the A/D conversion enable/disable setting values of all channels are written to the buffer memory.

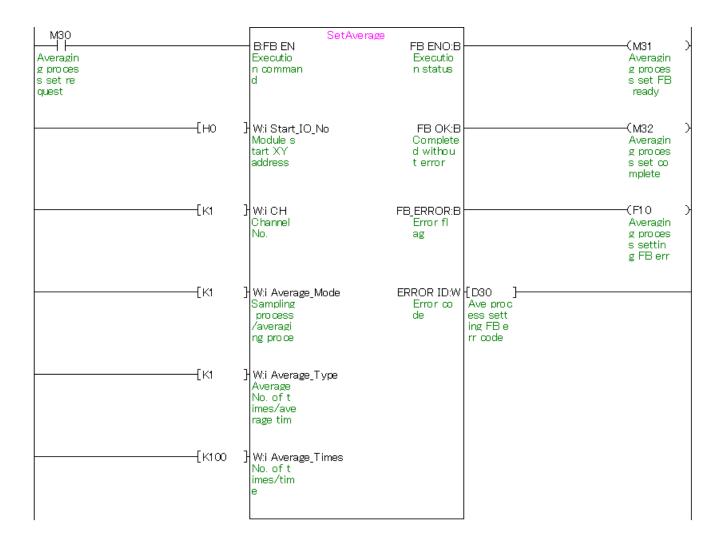




Label name	Setting	Description	
	value		
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_CH	K1	Set the target channel to channel 1.	
i_Average_Mode	K1	Set the sampling process/averaging process setting to Averaging process.	
i_Average_Type	K1	Set the average process type to Average time.	
i_Average_Times	K100	Set the average time to 100.	

M+Q68AD_SetAverage (Averaging process setting)

By turning ON M30, the averaging process setting value of channel 1 is written to the buffer memory.





M+Q68AD_RequestSetting (Operating condition setting request operation)

Label name	Setting value	Description
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.

By turning ON M40, the A/D conversion enable/disable settings and averaging process settings are enabled.

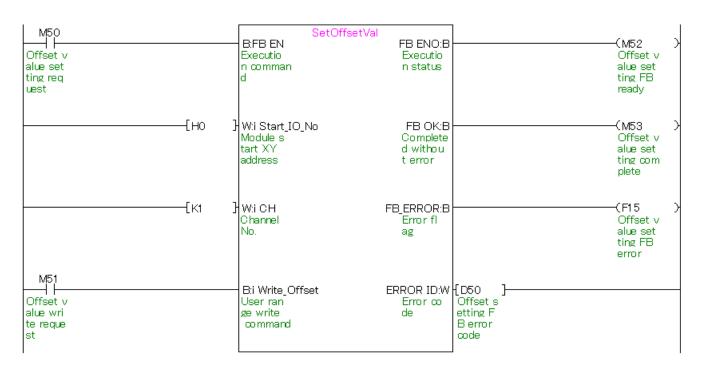
M40 Operatin g condit ion set request		RequestSetting B:FB EN Executio n comman d	FB ENO:B Executio n status	(M41 OP co tion s req F ready	et FB
	-{H0 }	Wi Start_IO_No Module s tart XY address	FB OK:B Complete d withou t error	(M42 OP ac tion s reque FB a	ondi æt est
		F	B_ERROR:B Error fl ag		
		E	RROR ID:W Error co de		



M+Q68AD_SetOffsetVal (Offset setting)

Label name	Setting value	Description	
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_CH	K1	Set the target channel to channel 1.	
i_Write_Offset	ON/OFF	Turn ON to perform user range write operation for channel 1.	

After turning ON M50, by turning ON M51, the offset value of channel 1 is written.

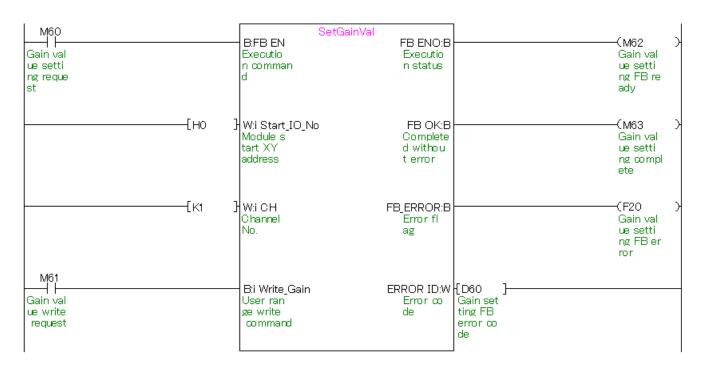




M+Q68AD_SetGainVal (Gain setting)

Label name	Setting	Description
	value	
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.
i_Write_Gain	ON/OFF	Turn ON to perform user range write operation for channel 1.

After turning ON M60, by turning ON M61, the gain value of channel 1 is written.

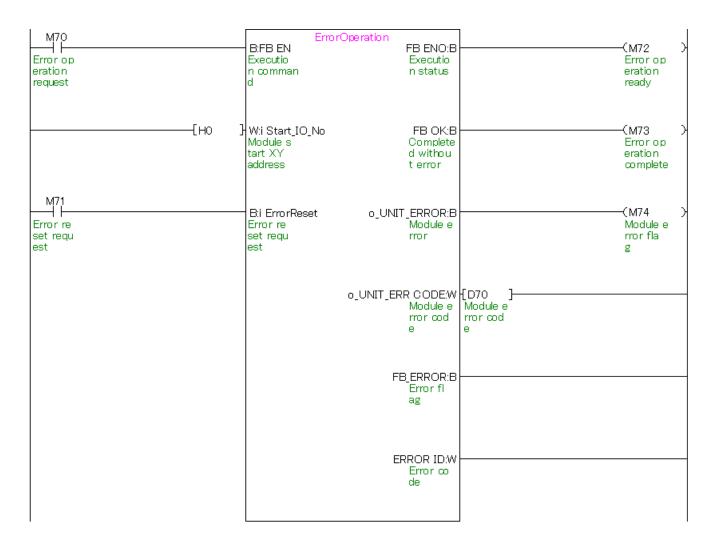




M+Q68AD_ErrorOperation (Error operation)

Label name	Setting	Description	
	value		
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_ErrorReset	ON/OFF	Turn ON to perform error reset.	

By turning ON M70, an error code is output when an error occurs. After an error output, by turning ON M71, the error is reset.





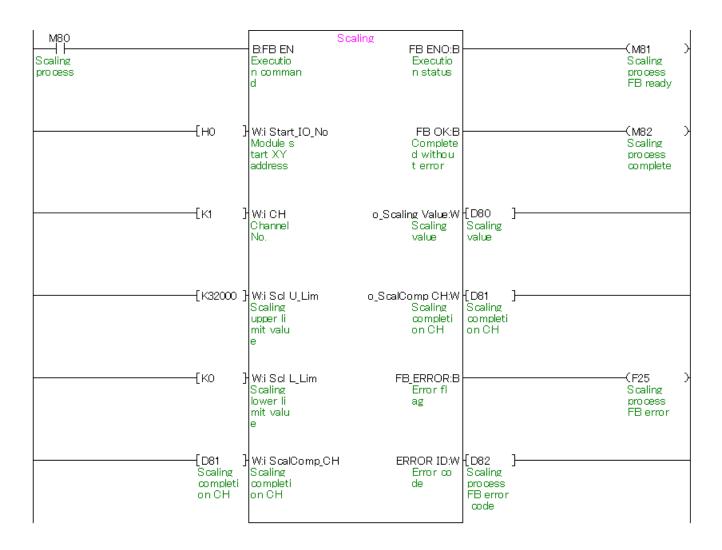
M+Q68AD_ScalingOperation (Scaling process)

Label name	Setting	Description	
	value		
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_CH	K1	Set the target channel to all channels.	
i_Scl_U_Lim	K32000	Set the scaling upper limit value to 32,000.	
i_Scl_L_Lim	K0	Set the scaling lower limit value to 0.	
i_ScalComp_CH	D81	Set information of the Scaling completion CH. *	

* The same device must be set for i_ScalComp_CH (Scaling completion CH) and o_ScalComp_CH (Scaling completion CH).

When two or more of these FBs are used for channels, set the same device for the Scaling completion CHs of all FBs.

By turning ON M80, this FB performs conversion to the ratio value in a set width and outputs the conversion result to D80.





Label name	Setting	Description
	value	
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.
i_Scl_U_LimCH1 to	K32000	Set the scaling upper limit values of CH1 to CH8 to 32,000.
i_Scl_U_LimCH8		
i_Scl_L_LimCH1 to	K0	Set the scaling lower limit values of CH1 to CH8 to 0.
i_Scl_L_LimCH8		

M+Q68AD_ScalingAllOperation (Scaling process (All CHs))

By turning ON M90, this FB performs conversion to the ratio values in set widths and outputs the conversion results to D90 to D97.



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	W:iSclU_LimCH4 CH4Scal inguppe rlimit value	o_Scaling_ValCH7:W CH7 Scal ing valu e	[D96] CH7 Scal ing valu e
	WiiScl L_LimCH4 CH4 Scal ing lowe r limit value	o_Scaling_ValCH8:W CH8 Scal ing valu e	[D97] CH8 Scal ing valu e
	W:iScIU_LimCH5 CH5Scal ing uppe rlimit value	o_ScalComp CH:W Scaling completi on CH	{D98 } Scaling completi on CH
	W:iScIL_LimCH5 CH5Scal ing lowe r limit value	FB_ERROR:B Error fl ag	
	W:iSclU_LimCH6 CH6Scal ing uppe rlimit value	ERROR ID:W Error co de	
	W:iScIL_LimCH6 CH6Scal ing lowe r limit value		
	W:iScIU_LimCH7 CH7Scal ing uppe rlimit value		
	W:iScIL_LimCH7 CH7 Scal ing lowe r limit value		
	W:i Scl U_LimCH8 CH8 Scal ing uppe r limit value		
	W:i Scl L_LimCH8 CH8 Scal ing lowe r limit value		



Label name	Setting	Description	
	value		
i_Start_IO_No	H0	Set the starting XY address where the Q68AD module is mounted to 0H.	
i_Scaling_ValCH1 to	D90 to	Set the scaling values for CH1 to CH8.	
i_Scaling_ValCH8	D97		
i_ScalComp_CH	D98	Set the channels to perform the scaling maximum/minimum value process.	

M+Q68AD_ScalingAllMaxMinOpe (Scaling maximum/minimum value process (All CHs))

By turning ON M100, the scaling maximum/minimum values of CH1 to CH8 are output to D100 to D115.

* The scaling maximum/minimum values can be easily obtained by inputting the information of Scaling completion CH and scaling values, which were obtained by M+Q68AD_ScalingOperation (Scaling process) or M+Q68AD_ScalingAIIMaxMinOpe (Scaling maximum/minimum value process (All CHs)), in this FB.

M1 00 Scaling max/min value pr o œss	ScalAllMaxMin B:FB EN Executio n comman d	FB ENO:B Executio n status		(M101 : Scaling max/min val pro FB ready	2
[но]	W:i Start_IO_No Module s tart XY address	FB OK:B Complete d withou t error			>
CH1 Scal	W:i Scaling_ValCH1 o_Scal_Max CH1 Scal ing valu e	CH1 Scal ing maxi	{D100 } CH1 Scal ing maxi mum valu e		
CH2 Scal	W:i Scaling_ValCH2 o_Scal_Mir CH2 Scal ing valu e	CH1 Scal ing mini	[D101] CH1 Scal ing mini mum valu e		
CH3 Scal	W:iScaling_ValCH3 o_Scal_Max CH3 Scal ing valu e	CH2 Scal ing maxi	[D1 02] CH2 Scal ing maxi mum valu e		
CH4 Scal	W:i Scaling_ValCH4 o_Scal_Mir CH4 Scal ing valu e	CH2 Scal ing mini	[D1 03] CH2 Scal ing mini mum valu e		

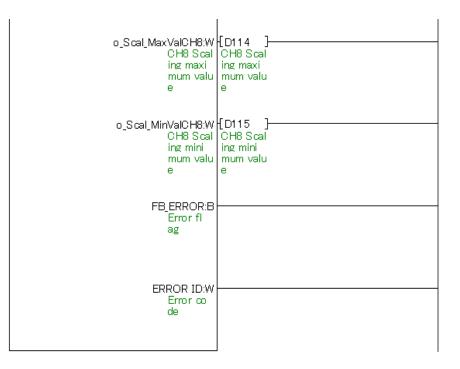
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1	1		I
D94 CH5 S ing va e	cal CH5 Scal	ing maxi	{D104 } CH3 Scal ing maxi mum valu e
ED95 CH6 S ing va e	cal CH6 Scal	ing mini	[D105] CH3 Scal ing mini mum valu e
D96 CH7 S ing va e	cal CH7 Scal	ing maxi	[D106] CH4 Scal ing maxi mum valu e
D97 CH8 S ing va e	cal CH8 Scal	ing mini	[D107] CH4 Scal ing mini mum valu e
[D98 Scalin compl on CH	ti completi		CH5 Scal ing maxi
		o_Scal_MinValCH5:W CH5 Scal ing mini mum valu e	[D109] CH5 Scal ing mini mum valu e
		o_Scal_MaxValCH6:W CH6 Scal ing maxi mum valu e	{D110 } CH6 Scal ing maxi mum valu e
		o_Scal_MinValCH6:W CH6 Scal ing mini mum valu e	CH6 Scal ing mini
		o_Scal_MinValCH7:W CH7 Scal ing mini mum valu e	{D113 } CH7 Scal ing mini mum valu e
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M+Q68AD_ShiftOperation (Shift process)

Label name	Setting	Description
	value	
i_Digital_Value	-	Set A/D conversion data.
i_Shift_Value	K300	Add 300 to the digital value.

By turning ON M120, 300 is added to D120 (Digital value) and the sum is output to D121.

M1 20 Shift pr oœss FB	S B:FB EN Executio n comman d	hift FB ENO:B Executio n status		–(M121) Shift pr oœss FB ready
[D120] Digital value	W:i Digital_value Digital value	FB OK:B Complete d withou t error		-(M122) Shift pr oœss co mplete
[K300]	W:i Shift_Value Shift am ount	o_Dig_Out Val:W Digital output v alue	{D121 } Digital output v alue	
		FB_ERROR:B Error fl ag		
		ERROR ID:W Error co de		

