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

Applicable module:
Q68ADV, Q68ADI

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Reference Manual Revision History

Reference Manual Number	Date	Description	
FBM-M038-A	2010/11/15	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	

1. Overview

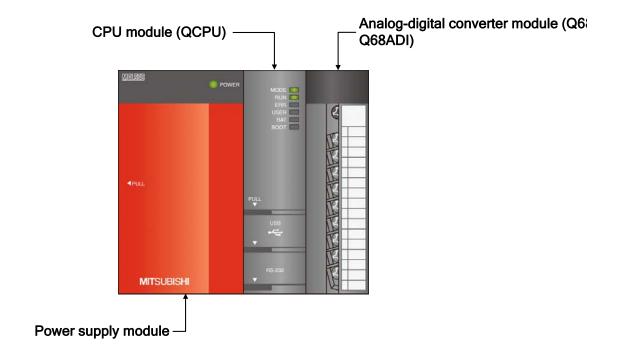
1.1 Overview of the FB Library

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_ReadADVal		7	
	Execution command —	B : FB_EN		FB_ENO : I	B —Execution status
	Module start XY address —	W: i_Start_IO_No		FB_OK : I	B —Completed without error
	Channel No. —	W:i_CH	F	B_ERROR : I	B —Error flag
				ERROR_ID : \	W—Error code
			c	_AD_Value: \	W—AD conversion value
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module				
		Series			Model
		MELSEC-Q Series	s *1	Basic mode	el
				High perfor	rmance model
				Universal r	nodel
		*1 Not applicable to	QCPU ((A mode)	
	Engineering software	GX Works2 *1			
		Language		Softwar	re version
		English version	Version	1.24A or late	er
		Chinese version	Version	1.49B or late	er
		*1 For software ver	sions ap _l	olicable to th	e modules used, refer to
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	201 steps (for MELSEC	C-Q series high performance model CPU)			
	* The number of steps o	of the FB in a program depends on the CPU model that is used and			
	input and output defin	ition.			

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 Z9, Z8 and Z7. 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_EN (Execution command)				
	FB_ENO (Execution status) FB_ENO (Execution status)				
	o_AD_Value (AD conversion value) Refreshing Refreshing				
	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				

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 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 data of all channels.			
Symbol		M+Q68AD_ReadAllADVal		
	Execution command—	B : FB_EN		FB_ENO : B —Execution status
	Module start XY address —	W:i_Start_IO_No	W: i_Start_IO_No FB_OK: B —Completed without error	
			FB_ERROR: B —Error flag	
			ERROR_ID : W—Error code	
			o_AD	_ValueCH1: W—CH1AD conversion value
			o_AD	CH 2 AD conversion value
			o_AD	_ValueCH3: W—CH3AD conversion value
			o_AD	CH 4 AD conversion value
			o_AD	ValueCH5:W—_CH 5 AD conversion value
			o_AD	CH 6 AD conversion value
			o_AD	ValueCH7:W—_CH 7 AD conversion value
		o_AD_ValueCH8: W—CH8AD conversion va		CH 8 AD conversion value
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			
		Series		Model
		MELSEC-Q Series	s *1	Basic model
				High performance model
				Universal model
		*1 Not applicable to	QCPU ((A mode)
	Engineering software	GX Works2 *1	,	
		Language		Software version
English version Version		Version1.24A or later		
Chinese version Version1.49B or		n1.49B or later		
		*1 For software versions applicable to the modules used		plicable to the modules used, refer to
		"Relevant Manuals".		
Programming	Ladder			
language				

Item	Description					
Number of steps	232 steps (for MELSEC-Q series high performance 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), A/D conversion 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 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) This FB uses index registers Z9 and Z8. 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)					
	AD conversion value (All CHs) Refreshing Refreshing stop					
	FB_OK (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 code list

Error code	Description	Action
None	None	None

Labels

Input 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	Execution com Module start XY ac Chanr A/D conversion enable/disable s	mmand— B: FB_EN ddress— W: i_Start_IO_No nel No.— W: i_CH setting— B: i_AD_Enable		BAD_SetAD(
Applicable hardware and software	Analog-digital converter module	Q68A	ADV, Q68ADI				
and software	CPU module Engineering software	Chinese version \		Version Versions app	Model Basic model High performance model Universal model (A mode) Software version 1.24A or later 1.49B or later plicable to the modules used, refer to		
Programming language	Ladder	1					
Number of steps	244 steps (for MELSEC-Q series high performance 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), 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 Z9, Z8 and Z7. 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_EN (Execution command)						
	FB_ENO (Execution status) FB_ENO (Execution status)						
	A/D conversion enable/disable setting write process No processing Writing Processing Setting write process No processing Setting Writing Setting Writin						
	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 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	Execution command— B: FB_EN Module start XY address— Channel No.— W: i_Start_IO_No W: i_CH Sampling process/averaging process_ setting Average No. of times/average time— No. of times/time— W: i_Average_Type W: i_Average_Times		de oe	verage FB_ENO : B — Execution FB_OK : B — Complete FB_ERROR : B — Error flag ERROR_ID : W — Error coo	ed without error	
Applicable hardware and software	Analog-digital converter module CPU module	Q68ADV, Q68ADI				
		Series MELSEC-Q Series *1 Not applicable to		Model Basic model High performance mode Universal model A mode)	5	
	Engineering software	Chinese version *1 For software version "Relevant Manual	Version sions app	Software version 1.24A or later 1.49B or later blicable to the modules us	sed, refer to	
Programming language	Ladder					
Number of steps	277 steps (for MELSEC-Q series high performance 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), 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 Z9, Z8 and Z7. 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 command)					
	FB_ENO (Execution status) Average time (average No. of					
	Average time/average No. of times write processing No processing Writing No processing No processing No processing No processing No processing No processing					
	FB_OK (Completed without error) FB_OK (Completed without error)					
	FB_ERROR (Error flag) ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 ERROR_ID (Error code) 0					
	Entrol Code U Effor code U					

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 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
rvanic (Comment)	Labername	Data	ITIICICI	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	Execution command—	M+Q68AD_F B : FB_EN	RequestSet	•	Execution status
	Module start XY address —	W:i_Start_IO_No		FB_OK : B	Completed without error
			Ī	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	s *1	Basic model	
				High perform	nance model
				Universal mo	odel
		*1 Not applicable to	QCPU ((A mode)	
	Engineering software	GX Works2 *1			
		Language		Software	version
		English version	Version	1.24A or later	
		Chinese version	Version	1.49B or later	,
		*1 For software ver	sions app	olicable to the	modules used, refer to
		"Relevant Manua	als".		
Programming	Ladder				
language					
Number of steps	165 steps (for MELSEC-	٠,		,	
	* The number of steps o		n depend	s on the CPU	model that is used and
	input and output defin				
Function description	1) 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.				
	2) When FB_EN is turned ON, the FB will continue to execute until the settings for each				
	function are complete	ed.			

Item	Description				
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 				
ED apparation type	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) 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 code list

Error code	Description	Action
None	None	None

Labels

Input labels

• Impat 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 F		FB_ENO : B	Execution status
	Module start XY address —	W:i_Start_IO_No F		FB_OK: B	—Completed without error
	Channel No. —	W:i_CH		FB_ERROR : B	—Error flag
	User range write command—	B : i_W rite_Offset		ERROR_ID: W	Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module				
		Series			Model
		MELSEC-Q Series	s *1	Basic model	
				High perform	nance model
				Universal mo	odel
		*1 Not applicable to	QCPU	(A mode)	
	Engineering software	GX Works2 *1			
		Language		Software	version
		English version	Version	1.24A or later	
		Chinese version	Version	1.49B or later	
		*1 For software ver	sions ap	plicable to the	modules used, refer to
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	296 steps (for MELSEC-	296 steps (for MELSEC-Q series high performance model CPU)			
	* The number of steps of	e number of steps of the FB in a program depends on the CPU model that is used and			
	input and output defin	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 Z9, Z8 and Z7. 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".				
Timing chart	[When operation completes without error] [When an error occurs]				
	FB_EN (Execution command)				
	FB_ENO (Execution status)				
	Operation mode Normal Offset/gain setting Normal Operation mode Normal mode Normal mode Normal mode				
	i_Write_Offset (User range write command)				
	CH Offset specification Channel change request Channel change request				
	(YnB) User range write request User range write request				
	(YnA) FB_OK (Completed without error)				
	(Completed without error) FB_ERROR (Error flag) (Completed without error) FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0 Error code				
	MELSEC O Analog Digital Convertor Module ED Library Deference Manual				

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 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

- Catpat labolo				
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

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_SetGainVal			
	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 hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module			T	
		Series			Model
		MELSEC-Q Series	s *1	Basic model	
				High perform	nance model
				Universal mo	odel
		*1 Not applicable to	QCPU ((A mode)	
	Engineering software	GX Works2 *1			
		Language		Software	version
		English version	Version	1.24A or later	
		Chinese version	Version	1.49B or later	
		*1 For software vers	sions ap _l	plicable to the	modules used, refer to
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	294 steps (for MELSEC-Q series high performance 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	ition.			

Item	Description				
Function description	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	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 Z9, Z8 and Z7. 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".				
Timing chart	[When operation completes without error] [When an error occurs]				
	FB_EN (Execution command) FB_EN (Execution command)				
	FB_ENO (Execution status) FB_ENO (Execution status)				
	Operation mode Normal Mode Nor				
	(User range write command) (User range write command)				
	CH□ Gain specification Channel change request Channel change request				
	(YnB) User range write request (YnA) User range write request (YnA) (YnB) User range write request (YnA)				
	(YnA) FB_OK (Completed without error) (YnA) FB_OK (Completed without error)				
	FB_ERROR (Error flag) FB_ERROR (Error flag)				
	ERROR_ID (Error code) 0 ERROR_ID (Error code) 0				
	MELSEC O Analog Digital Convertor Madula ED Library Deforance Manua				

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 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

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

Function Overview

Item	Description				
Function overview	Monitors error codes and performs error reset.				
Symbol		M+Q68AD_	ErrorOpera	ation	
	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
	Error reset request —	B:i_ErrorReset	1U_0	NIT_ERROR : B	—Module error
			o_UNIT_	ERR_CODE : W	Module error code
				FB_ERROR : B	—Error flag
				ERROR_ID: W	Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI			
and software	converter module				
	CPU module			T	
		Series			Model
		MELSEC-Q Series	s *1	Basic model	
				High perform	nance model
				Universal mo	odel
		*1 Not applicable to	QCPU ((A mode)	
	Engineering software	GX Works2 *1			
		Language		Software	version
		English version	Version	1.24A or later	
		Chinese version	Version	1.49B or later	
		*1 For software vers	sions app	plicable to the	modules used, refer to
		"Relevant Manua	als".		
Programming	Ladder				
language					
Number of steps	193 steps (for MELSEC-	-Q series high perform	mance m	nodel CPU)	
	* The number of steps o	f the FB in a program	n depend	ls on the CPU	model that is used and
	input and output defin				
Function description	1) By turning ON FB_EN	l (Execution commar	nd), an e	rror in the targ	et module is monitored.
	2) After turning ON FB_EN (Execution command), by turning ON i_ErrorReset (error rese				ErrorReset (error reset
	request) during error	occurrence, error res	et is perf	formed.	

Item	Description				
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 registers Z9 and Z8. Please do not use these index registers in an interrupt program. 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	Real-time execution				
Application example	Refer to "Appendix 1 - FB Library Application Examples".				
Timing chart	FB_ENO (Execution command) FB_ENO (Execution status) i_ErrorReset (Error clear request) Error (X signal) o_UNIT_ERROR (Module error flag) o_UNIT_ERR_CODE (Error code) FB_OK (Completed without error) FB_ERROR (Error flag) ERROR_ID (Error code) 0 Module error code 0 Module error code 0 Module error code 0 Module error code 0 Module 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

• Input labels	I		I	
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_ScalingOperation				
	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_S	caling_Value: W	—Scaling value
	Scaling upper limit value —	W:i_Scl_U_Lim	o_Sc	calComp_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			Model
		MELSEC-Q Series	s *1	Basic model	
				High perform	ance model
				Universal mo	del
		*1 Not applicable to	QCPU	(A mode)	
	Engineering software	GX Works2 *1			
		Language		Software	version
		English version	Version	1.24A or later	
		Chinese version	Version	1.49B or later	
		*1 For software ver	sions ap	plicable to the	modules used, refer to
		"Relevant Manuals".			
Programming	Ladder				
language					
Number of steps	563 steps (for MELSEC-	-Q series high perfor	mance m	nodel CPU)	
	* The number of steps of	f the FB in a program	n depend	s on the CPU	model that is used and
	input and output defin	ition.			

Item	Description					
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).					
	1: Scaling process is performed. 0: 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 Z9, Z8 and Z7. 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_EN (Execution command)					
	FB_ENO (Execution status) FB_ENO (Execution status)					
	Scaling operation process No Operation No processing in progress processing Scaling operation process No processing in progress No processing					
	FB_OK (Completed without error) FB_OK (Completed without error)					
	FB_ERROR (Error flag) FB_ERROR (Error flag)					
	ERROR_ID (Error code) 0 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
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.
Scaling upper limit	i_Scl_U_Lim	Word	-32,000~32,000	Specify the scaling upper/lower limit values.
value				upper/lower liftlit values.
Scaling lower limit	i_Scl_L_Lim			
value				
Scaling completion	i_ScalComp_CH	Word	b0: CH1 Scaling complete	A scaling value of the channel
CH			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		

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/D conversion values) of all channels to the ratio values in set					
	widths.					
Symbol		M+Q68AD_ScalingAllC	Operation			
	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_S	caling_ValCH1:W—CH1 Scaling value			
	CH1 Scaling lower limit value -	W: i_Scl_L_LimCH1 o_S	caling_ValCH2:W—CH2 Scaling value			
	CH2 Scaling upper limit value –	W: i_Scl_U_LimCH2 o_S	caling_ValCH3:W—CH3 Scaling value			
	CH2 Scaling lower limit value -	W: i_Scl_L_LimCH2 o_S	caling_ValCH4: W — CH4 Scaling value			
	CH3 Scaling upper limit value –	W: i_Scl_U_LimCH3 o_S	caling_ValCH5:W—CH5 Scaling value			
	CH3 Scaling lower limit value -	W: i_Scl_L_LimCH3 o_S	caling_ValCH6:W—CH6 Scaling value			
	CH4 Scaling upper limit value –	W: i_Scl_U_LimCH4 o_S	caling_ValCH7:W—CH7 Scaling value			
	CH4 Scaling lower limit value -	W: i_Scl_L_LimCH4 o_S	caling_ValCH8: W — CH8 Scaling value			
	CH5 Scaling upper limit value -	W: i_Scl_U_LimCH5 o_s	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 limi		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 Model				
		MELSEC-Q Series *1 Basic model				
		High performance model				
		Universal model				
		*1 Not applicable to QCPU	(A mode)			

Item	Description					
	Engineering software	GX Works2 *1				
		Language	Software version			
		English version	Version1.24A or later			
		Chinese version	Version1.49B or later			
		*1 For software ver	sions applicable to the modules used, refer to			
		"Relevant Manua	als".			
Programming	Ladder					
language						
Number of steps	1518 steps (for MELSE)	C-Q series high perfo	ormance model CPU)			
	* The number of steps o	f the FB in a program	n depends on the CPU model that is used and			
	input and output defin	ition.				
Function description	1) By turning ON FB_EN	N (Execution commar	nd), the digital values (A/D conversion values)			
	of all channels are co	nverted to ratios of the	ne scaling upper/lower limit values and the			
	results are output as	scaling values.				
		exceeds the range of	of -32768 to 32767, it is fixed to -32768 or			
	32767.					
	1	on completed flag is turned OFF while FB_EN (Execution command)				
			ss stops and o_Scaling_Value (Scaling value)			
			rersion completed flag is turned ON, the			
	operation process res					
	1		s (see figure below) corresponding to the			
		JN and the information	on are output in o_ScalComp_CH (Scaling			
	completion CH).					
	b15 b14 b13 b12 b	<u>b11 b10 b9 b8 b7</u>	7 b6 b5 b4 b3 b2 b1 b0			
	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	•				
		-	n be easily obtained by inputting the			
			268AD_ScalingAllMaxMinOpe (Scaling			
	maximum/minimum v					
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 Z9 and Z8. 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 processing in progress processing					
	FB_OK (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 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	Specify the starting XY
			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 upper limit	i_Scl_U_LimCH1	Word	-32,000~32,000	Specify the scaling
value				upper/lower limit values.
CH1 Scaling lower limit	i_Scl_L_LimCH1			
value				
CH2 Scaling upper limit	i_Scl_U_LimCH2			
value				
CH2 Scaling lower limit	i_Scl_L_LimCH2			
value				
CH3 Scaling upper limit	i_Scl_U_LimCH3			
value				
CH3 Scaling lower limit	i_Scl_L_LimCH3			
value				
CH4 Scaling upper limit	i_Scl_U_LimCH4			
value				
CH4 Scaling lower limit	i_Scl_L_LimCH4			
value				
CH5 Scaling upper limit	i_Scl_U_LimCH5			
value				
CH5 Scaling lower limit	i_Scl_L_LimCH5			
value				
CH6 Scaling upper limit	i_Scl_U_LimCH6			
value				
CH6 Scaling lower limit	i_Scl_L_LimCH6			
value				

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	Initial	Description
		type	value	
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 ma	ximum/minimum valu	ues by using the Sca	ling process FB				
	(M+Q68AD_ScalingOperation) or the Scaling process (All CHs) FB							
	(M+Q68AD_ScalingAllOperation).							
Symbol		M+Q68AD_ScalingAllMaxMinOpe						
	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				
			Error flag					
		ERROR_ID: W—Error code						
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	
		English version	Version	n1.24A or later	
		Chinese version	Version	n1.49B or later	
		*1 For software ver	sions ap _l	plicable to the modules used, refer to	
		"Relevant Manua	als".		
Programming	Ladder				
language					
Number of steps	747 steps (for MELSEC-	-Q series high perfor	mance m	nodel CPU)	
	* The number of steps of	f the FB in a program	n depend	Is on the CPU model that is used and	
	input and output defin	ition.			
Function description	' '	•	•	scaling maximum/minimum values are	
	output in the channels			scaling completion CH). *	
		i_ScalC	omp_CF	1	
	0 0 0 0	2 b11 b10 b9 b8 0 0 0 0 0	b7 b6 CH. 8 CH.	7 CH. 6 CH. 5 CH. 4 CH. 3 CH. 2 CH. 1	
	1: Enable (Output	maximum/minimum	values)		
	, ,	t output maximum/m	,	values.)	
		-		N (Execution command) is turned ON,	
	the scaling maximum	/minimum values will	be retur	ned to the scaling values.	
	a) The operating cond	dition setting request	(Yn9) is	turned ON, or the Operating condition	
	setting request FB	(M+Q68AD_Reques	tSetting)	is executed.	
	b) The maximum/mini	imum values reset re	quest (Y	nD) is turned ON.	
	* The scaling maximum/minimum values can be easily obtained by using this FB together				
				peration) or the Scaling process (All	
	CHs) FB (M+Q68AD_				
	The same device must be set for the Scaling completion CH (i_ScalComp_CH) of this FB				
		ne Scaling completion CH (o_ScalComp_CH) of M+Q68AD_ScalingOperation or			
0	M+Q68AD_ScalingAllOperation.				
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 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".					
Timing chart	FB_ENO (Execution status) Scaling maximum/ minimum value process FB_OK (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 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.)
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.)	

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
error				is being performed.
CH1 Scaling	o_Scal_MaxValCH1	Word	0	Stores the maximum value of the CH1 scaling
maximum value				value (i_Scaling_ValCH1).
CH1 Scaling	o_Scal_MinValCH1	Word	0	Stores the minimum value of the CH1 scaling
minimum value				value (i_Scaling_ValCH1).
CH2 Scaling	o_Scal_MaxValCH2	Word	0	Stores the maximum value of the CH2 scaling
maximum value				value (i_Scaling_ValCH2).
CH2 Scaling	o_Scal_MinValCH2	Word	0	Stores the minimum value of the CH2 scaling
minimum value				value (i_Scaling_ValCH2).
CH3 Scaling	o_Scal_MaxValCH3	Word	0	Stores the maximum value of the CH3 scaling
maximum value				value (i_Scaling_ValCH3).
CH3 Scaling	o_Scal_MinValCH3	Word	0	Stores the minimum value of the CH3 scaling
minimum value				value (i_Scaling_ValCH3).
CH4 Scaling	o_Scal_MaxValCH4	Word	0	Stores the maximum value of the CH4 scaling
maximum value				value (i_Scaling_ValCH4).
CH4 Scaling	o_Scal_MinValCH4	Word	0	Stores the minimum value of the CH4 scaling
minimum value				value (i_Scaling_ValCH4).
CH5 Scaling	o_Scal_MaxValCH5	Word	0	Stores the maximum value of the CH5 scaling
maximum value				value (i_Scaling_ValCH5).
CH5 Scaling	o_Scal_MinValCH5	Word	0	Stores the minimum value of the CH5 scaling
minimum value				value (i_Scaling_ValCH5).
CH6 Scaling	o_Scal_MaxValCH6	Word	0	Stores the maximum value of the CH6 scaling
maximum value				value (i_Scaling_ValCH6).
CH6 Scaling	o_Scal_MinValCH6	Word	0	Stores the minimum value of the CH6 scaling
minimum value				value (i_Scaling_ValCH6).
CH7 Scaling	o_Scal_MaxValCH7	Word	0	Stores the maximum value of the CH7 scaling
maximum value				value (i_Scaling_ValCH7).
CH7 Scaling	o_Scal_MinValCH7	Word	0	Stores the minimum value of the CH7 scaling
minimum value				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	M+Q68AD_ShiftOperation			on
	Execution command — B : FB_EN		FB_ENO : B — Execution status	
	Digital value — V	V: i_Digital_value		FB_OK : B — Completed without error
	Shift amount — V	V: i_Shift_Value	o_Di	g_Out_Val: W — Digital output value
			FI	B_ERROR : B — Error flag
			E	RROR_ID : W — Error code
Applicable hardware	Analog-digital	Q68ADV, Q68ADI		
and software	converter module			
	CPU module			_
		Series		Model
		MELSEC-Q Series	s *1	Basic model
				High performance model
				Universal model
		*1 Not applicable to QCPU (A mode)		
	Engineering software	GX Works2 *1		_
		Language		Software version
		English version	Version	n1.24A or later
		Chinese version	Version	n1.49B or later
		*1 For software ver	sions ap	plicable to the modules used, refer to
		"Relevant Manua	als".	
Programming	Ladder			
language				
Number of steps	162 steps (for MELSEC-Q series high performance model CPU)			nodel CPU)
	* The number of steps of	of the FB in a program	n depend	ds on the CPU model that is used and
	input and output defir	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) FB ENO				
	(Execution status)				
	Shift process processing in progress processing				
	FB_OK (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	1			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.

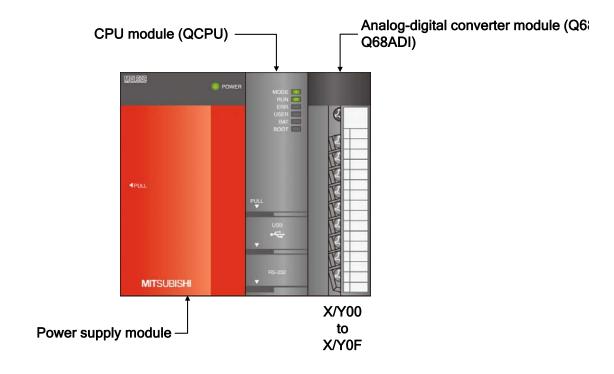
It does not include information on restrictions of use such as combination with intelligent function modules or programmable controller CPUs.

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)
MO	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)
		CH6 Scaling value
D95		(CH6 Scaling output value (o_Scaling_ValCH6) of
		M+Q68AD_ScalingAllOperation)

Device	FB name	Application (ON details)
		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
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 complete

Device	FB name	Application (ON details)
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
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

Device	FB name	Application (ON details)
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

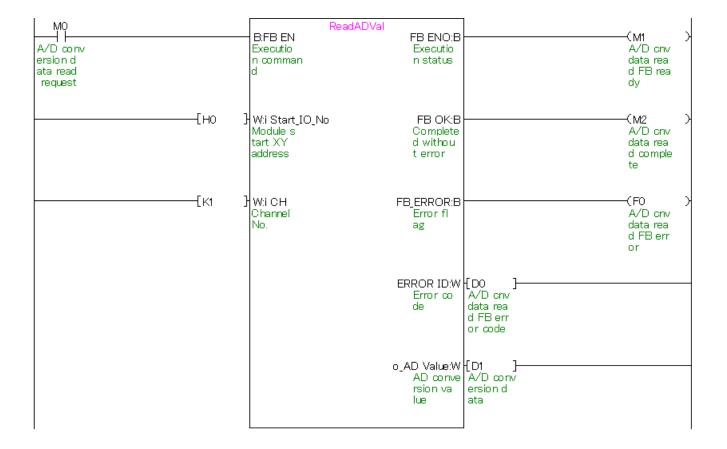
I/O item	Value	Description
Module start XY address	0	Specify the starting XY address where the
		Q68AD module is mounted.

5) Programs

M+Q68AD_ReadADVal (A/D conversion data read)

Label name	Setting value	Description
i_Start_IO_No	НО	Set the starting XY address where the Q68AD module is mounted to 0H.
i_CH	K1	Set the target channel to channel 1.

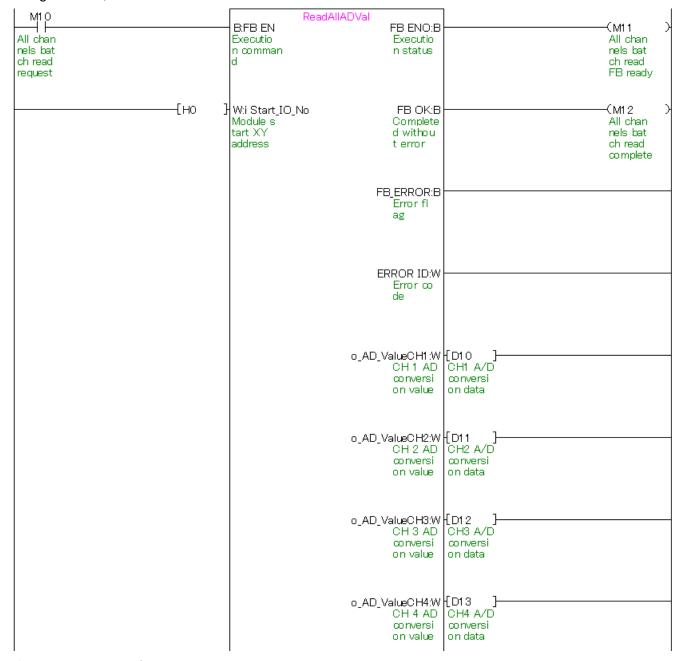
By turning ON M0, the A/D conversion data of channel 1 is read.



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.

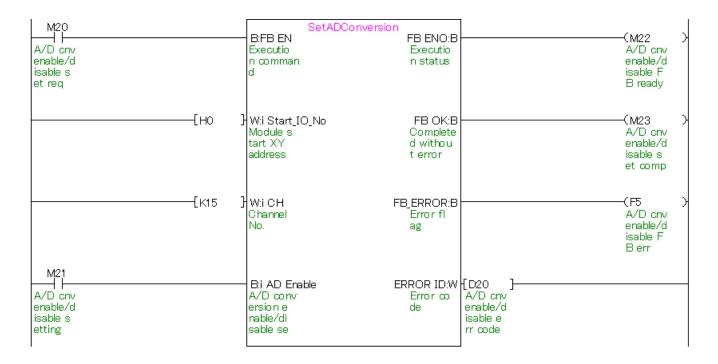


o_AD_ValueCH5:W CH 5 AD conversi on value	CH5 A/D conversi
o_AD_ValueCH6:W CH 6 AD conversi on value	CH6 A/D conversi
o_AD_ValueCH7:W CH 7 AD conversi on value	CH7 A/D conversi
	[D17] CH8 A/D conversi on data

M+Q68AD_SetADConversion (A/D conversion enable/disable 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	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.

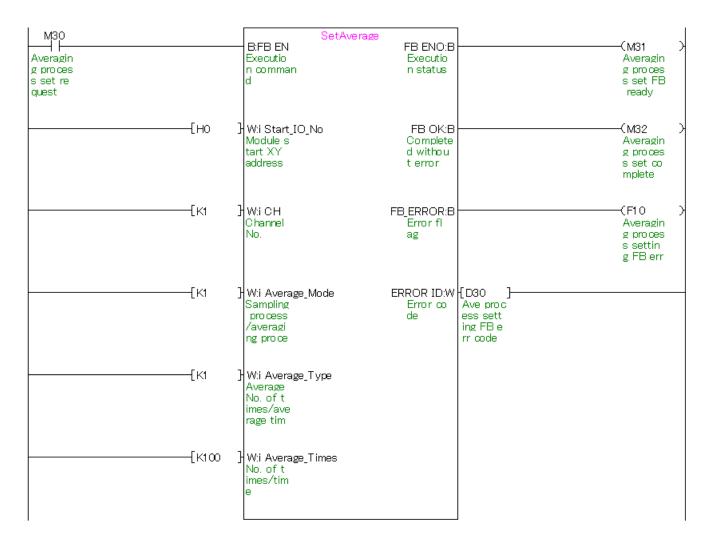
By turning ON M20, the A/D conversion enable/disable setting values of all channels are written to the buffer memory.



M+Q68AD_SetAverage (Averaging process 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_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.

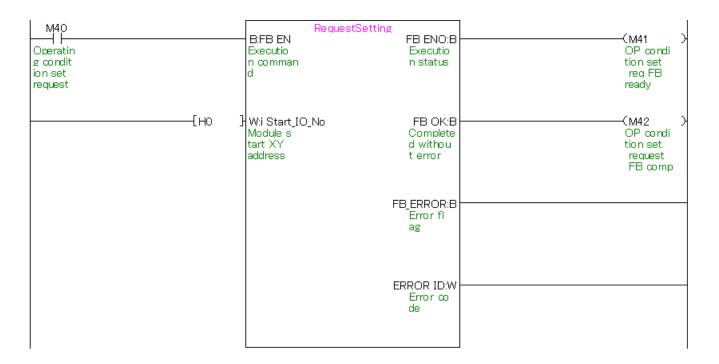
By turning ON M30, the averaging process setting value of channel 1 is written to the buffer memory.



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.

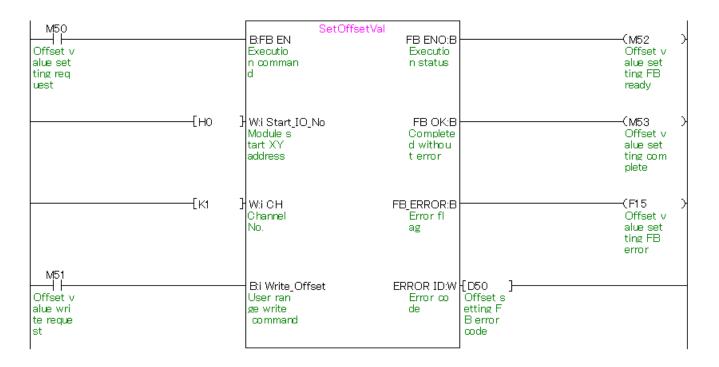
By turning ON M40, the A/D conversion enable/disable settings and averaging process settings are enabled.



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.

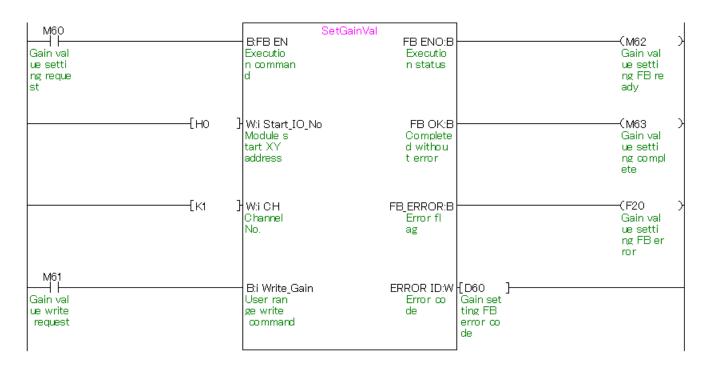
After turning ON M50, by turning ON M51, the offset value of channel 1 is written.



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.

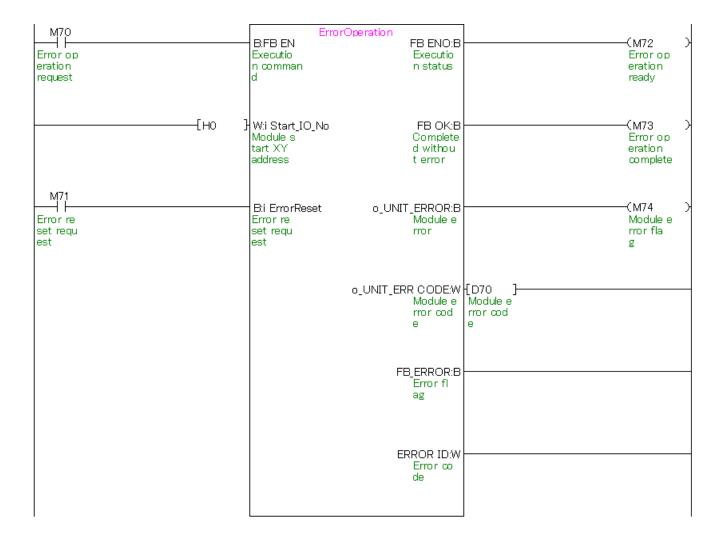
After turning ON M60, by turning ON M61, the gain value of channel 1 is written.



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.



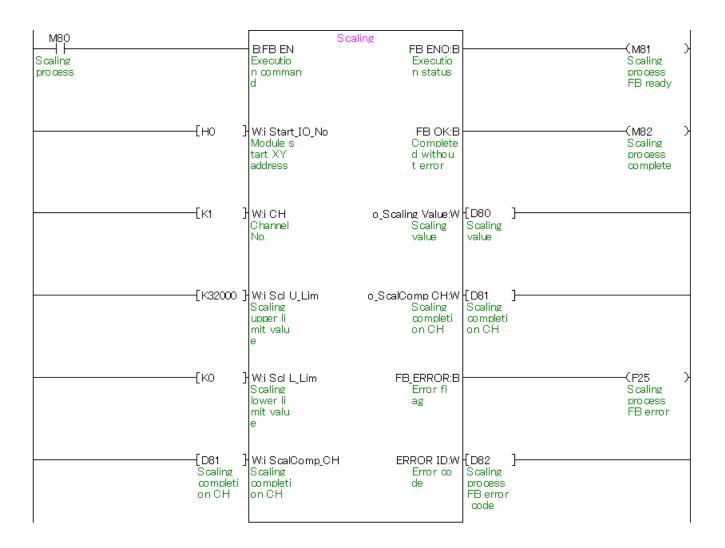
M+Q68AD_ScalingOperation (Scaling process)

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.

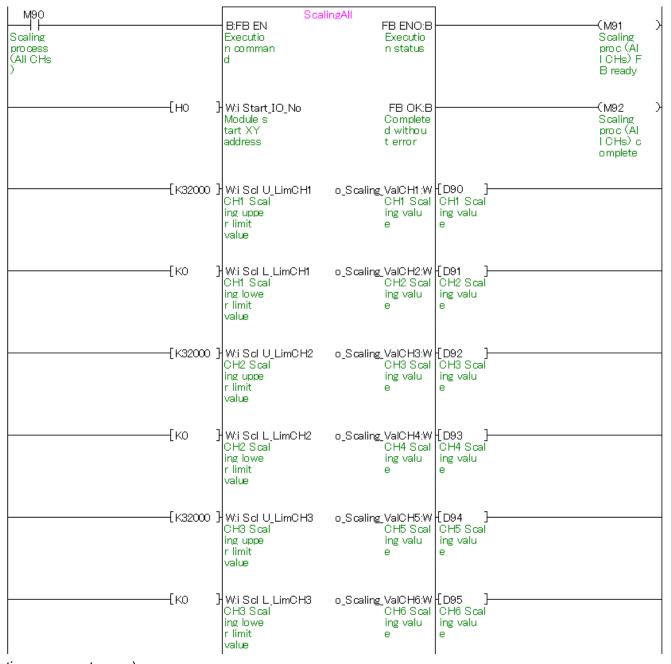
By turning ON M80, this FB performs conversion to the ratio value in a set width and outputs the conversion result to D80.



M+Q68AD_ScalingAllOperation (Scaling process (All CHs))

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		

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



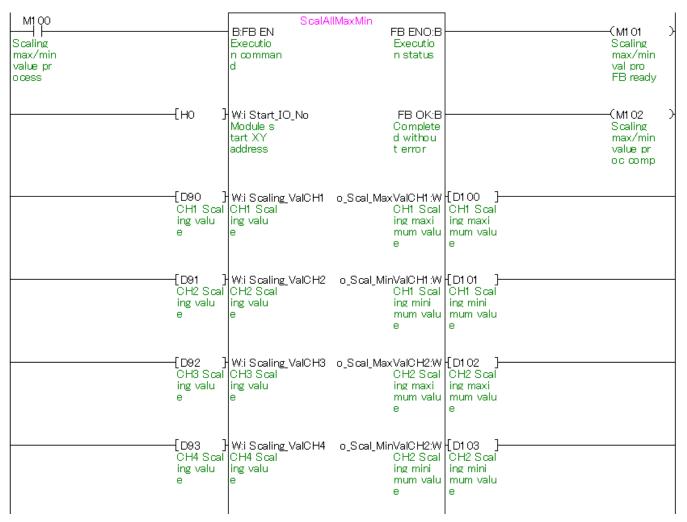
1		I	1	
[1	K32000 }	W:i Scl U_LimCH4 CH4 Scal ing uppe r limit value	o_Scaling_ValCH7:W CH7 Scal ing valu e	{D96 } CH7 Scal ing valu e
	KO }	W:i ScI L_LimCH4 CH4 Scal ing lowe r limit value	o_Scaling_ValCH8:W CH8 Scal ing valu e	{D97 } CH8 Scal ing valu e
[1	K32000 }	W:i Scl U_LimCH5 CH5 Scal ing uppe r limit value	o_ScalComp CH:W Scaling completi on CH	[D98] Scaling completi on CH
[1	ко }	W:i ScI L_LimCH5 CH5 Scal ing lowe r limit value	FB_ERROR:B Error fl ag	
[1	K32000 }	W:i Scl U_LimCH6 CH6 Scal ing uppe r limit value	ERROR ID:W Error co de	
[1	KO }	W:i ScI L_LimCH6 CH6 Scal ing lowe r limit value		
[1	K32000 }	W:i ScI U_LimCH7 CH7 Scal Ing uppe r limit value		
[1	KO }	W:i ScI L_LimCH7 CH7 Scal ing lowe r limit value		
	K32000 }	W:i Scl U_LimCH8 CH8 Scal ing uppe r limit value		
	KO }	W.i Scl L_LimCH8 CH8 Scal ing lowe r limit value		

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

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.

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_ScalingAllMaxMinOpe (Scaling maximum/minimum value process (All CHs)), in this FB.



5	CH5 Scal CH5 Scal ng valu ing valu	o_Scal_MaxValCH3:W CH3 Scal ing maxi mum valu e	{D104 } CH3 Scal ing maxi mum valu e
5	CH6 Scal CH6 Scal ng valu ing valu	o_Scal_MinValCH3:W CH3 Scal ing mini mum valu e	{D105 } CH3 Scal ing mini mum valu e
5	CH7 Scal CH7 Scal ng valu ing valu	o_Scal_MaxValCH4:W CH4 Scal ing maxi mum valu e	CH4 Scal ing maxi
j j	CH8 Scal CH8 Scal ng valu ing valu	o_Scal_MinValCH4:W CH4 Scal ing mini mum valu e	CH4 Scal ing mini
S	D98 } W:i ScalComp_CH Scaling Scaling Scaling Scaling Scaling Scaling Scaling Scaling	o_Scal_MaxValCH5:W CH5 Scal ing maxi mum valu e	[D108] CH5 Scal ing maxi mum valu e
		o_Scal_MinValCH5:W CH5 Scal ing mini mum valu e	CH5 Scal ing mini
		o_Scal_MaxValCH6:W CH6 Scal ing maxi mum valu e	CH6 Scal ing maxi
		o_Scal_MinValCH6:W CH6 Scal ing mini mum valu e	{D111 } CH6 Scal ing mini mum valu e
		o_Scal_MinValCH7:W CH7 Scal ing mini mum valu e	{D113 } CH7 Scal ing mini mum valu e

o_Scal_MaxValCH8:W CH8 Scal ing maxi mum valu e	CH8 Scal
o_Scal_MinValCH8:W CH8 Scal ing mini mum valu e	CH8 Scal
FB_ERROR:B Error fl ag	
ERROR ID:W Error co de	

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.

