

**Programmable Controller** 



Channel Isolated Analog-Digital Converter Module/ Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual

-Q68AD-G -Q66AD-DG -GX Configurator-AD (SW2D5C-QADU-E)



### **SAFETY PRECAUTIONS**

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

In this manual, the safety precautions are classified into two levels: "/N WARNING" and "/N CAUTION".

WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "ACAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety. Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

### [Design Precaution]

### 

Do not write any data to the "system area" or "write-protect area" of the buffer memory areas in the intelligent function module. Also, do not use any "prohibited to use" signals as an output signal to an intelligent function module from the programmable controller CPU. Doing so may cause malfunction of the programmable controller system.

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Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.

They should be installed 100mm or more from each other.

Not doing so could result in noise that may cause malfunction.

### [Security Precautions]

### WARNING

To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

### [Installation Precautions]

Use the programmable controller in an environment that meets the general specifications contained in the user's manual of the CPU module to use. Using this programmable controller in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
<ul> <li>While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point.</li> <li>For the Q66AD-DG, secure the module with fixing brackets after installation to the base unit.</li> <li>When using the Q68AD-G in an environment where they are frequent vibrations, screw the module to the base unit after installation.</li> </ul>
<ul> <li>Tighten the screws within the range of specified torque.</li> <li>If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.</li> <li>If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.</li> </ul>
<ul> <li>Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.</li> <li>Not doing so may cause damage to the module.</li> <li>In the system where a CPU module supporting the online module change is used and on the MELSECNET/H remote I/O stations, modules can be replaced online (during energizing).</li> <li>However, there are some restrictions on replaceable modules and the replacement procedures are predetermined for each module.</li> <li>For details, refer to the chapter of the online module change in this manual.</li> </ul>
Do not directly touch the conductive area or electronic components of the module. Doing so may cause malfunction or failure in the module.

### [Wiring Precautions]

Individually ground the FG terminal of the programmable controller with a ground resistance of			
100 $\Omega$ or less.			
Not doing so can cause an electric shock or malfunction.			
When turning on the power and operating the module after wiring is completed, always attach the			
terminal cover that comes with the product.			
There is a risk of electric shock if the terminal cover is not attached.			
Tighten the terminal screws within the range of specified torque.			
If the terminal screws are loose, it may result in short circuits or malfunction.			
If the terminal screws are tightened too much, it may cause damage to the screw and/or the			
module, resulting in short circuits or malfunction.			
Be careful not to let foreign matter such as sawdust or wire chips get inside the module.			
They may cause fires, failure or malfunction.			
The top surface of the module is covered with protective film to prevent foreign objects such as			
cable offcuts from entering the module when wiring.			
Do not remove this film until the wiring is complete.			
Before operating the system, be sure to remove the film to provide adequate ventilation.			

### [Starting and Maintenance Precautions]



### [Disposal Precautions]

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• When disposing of this product, treat it as industrial waste.

## **CONDITIONS OF USE FOR THE PRODUCT**

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries. MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT. ("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

\* The manual number is given on the bottom left of the back cover.

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		4.4.2, Section 4.6.1, Section 4.6.2, Section 5.2.1, Section 5.2.2, Section 5.3.2,	
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		3.4.4, 3.4.7, 3.4.9, 3.4.11, 3.4.12, 3.4.13, 3.4.22, Section 4.3, 4.5, Section 5.1,	
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1		Addition	
		CONDITIONS OF USE FOR THE PRODUCT	
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		SAFETY PRECAUTIONS, COMPLIANCE WITH THE EMC AND LOW VOLT-	
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4		3.2.6, 3.3.2, 3.4.1, 3.4.2, 3.4.4, 3.4.5, 3.4.7, 3.4.10, 3.4.15 to 3.4.17, 3.4.19,	
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		VOLTAGE, AND MACHINERY DIRECTIVES, GENERIC TERMS AND ABBRE-	
		VIATIONS, Section 2.1, 3.1, 3.1.1, 3.2, 3.3.2, 3.4.2, 3.4.4, 4.4.2, 4.6.2, 5.2.1,	
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·		Section 4.4.2	
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		tion 3.1.1	
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#### INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC-Q series programmable controllers. Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controller you have purchased, so as to ensure correct use.

Please forward a copy of this manual to the end user.

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#### MANUALS

#### The manuals related to this product are listed below.

#### **Relevant Manuals**

Manual name	Manual number	
GX Developer Version 8 Operating Manual	SH 080373E	
Operating methods of GX Developer, such as programming, printing, monitoring, and debugging	ST-000373E	
GX Developer Version 8 Operating Manual (Function Block)	SH-080376E	
Operating methods of GX Developer, such as creating and printing function blocks		
GX Works2 Version1 Operating Manual (Common)		
System configuration, parameter settings, and online operations (common to Simple project and Structured	SH-080779ENG	
project) of GX Works2		
GX Works2 Version1 Operating Manual (Intelligent Function Module)		
Operating methods of the intelligent function module of GX Works2, such as parameter settings, monitoring,	SH-080921ENG	
and predefined protocol support function		

#### COMPLIANCE WITH THE EMC, LOW VOLTAGE, AND MACHINERY DIRECTIVES

#### (1) Method of ensuring compliance

To ensure that Mitsubishi Electric programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- Safety Guidelines (This manual is included with the CPU module or head module.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

#### (2) Additional measures

No additional measures are necessary for the compliance of this product with EMC and Low Voltage Directives.

#### **GENERIC TERMS AND ABBREVIATIONS**

Unless otherwise specified, this manual uses the following general terms and abbreviations.

Generic term/abbreviation	Description				
A/D converter module	A generic term for the Q68AD-G and Q66AD-DG				
DOS/V personal computer	An IBM PC/AT <sup>®</sup> or compatible computer with DOS/V				
GX Developer	The product name of the software package for the MELSEC programmable controllers				
GX Works2	The product name of the software package for the MELSEC programmable controllers				
GX Configurator-AD	An abbreviation for the analog-digital converter module setting and monitor tool GX Configurator-AD (SW2D5C-QADU-E)				
QCPU (Q mode)	A generic term for the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PHCPU, Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q10UDHCPU, Q13UDHCPU, Q20UDHCPU, Q26UDHCPU, Q03UDVCPU, Q04UDVCPU, Q06UDVCPU, Q06UDVCPU, Q26UDVCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q10UDEHCPU, Q13UDEHCPU, Q20UDEHCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU.				
Process CPU	A generic term for the Q02PHCPU, Q06PHCPU, Q12PHCPU and Q25PHCPU				
Redundant CPU	A generic term for Q12PRHCPU and Q25PRHCPU.				
Personal computer	A generic term for DOS/V personal computers				
Industrial shipment setting	A generic term for analog input ranges 0 to 10V, 0 to 5V, 1 to 5V, -10 to 10V, 0 to 20mA, and 4 to 20mA				
FB	An abbreviation for function block				

#### PACKING LIST

# The following items are included in the package of the A/D converter module. (GX Configurator-AD is sold separately.)

Model	Product name	Quantity
Q68AD-G	Type Q68AD-G channel isolated analog-digital converter module	1
Q66AD-DG	Type Q66AD-DG channel isolated analog-digital converter module (with signal con- ditioning function)	1
	FG terminal L-shaped metal fitting	1

#### The following items are included in the package of GX Configurator-AD.

Model	Model Product name			
SW2D5C-QADU-E	GX Configurator-AD version 2 (1-license product)(CD-ROM)	1		
SW2D5C-QADU-EA	GX Configurator-AD version 2 (Multiple-license product)(CD-ROM)	1		

### **1 OVERVIEW**

This User's Manual describes the specifications, handling and programming methods for the type Q68AD-G channel isolated analog-digital converter module (hereinafter referred to as the Q68AD-G) and type Q66AD-DG channel isolated analog-digital converter module (with signal conditioning function) (hereinafter referred to as the Q66AD-DG), which are used with the MELSEC-Q series CPU modules. The Q66AD-DG is exclusively used for current input. In this manual, the Q68AD-G and Q66AD-DG are collectively referred to as the A/D converter modules.

#### 1.1 Features

#### (1) Channel isolated

The channels are isolated. The Q66AD-DG is also isolated between the external power supply and channels.

#### (2) Multi-channel analog input is available.

- (a) By using a single Q68AD-G, analog voltage or current inputs of 8 channels are available.
- (b) A single Q66AD-DG allows connection of 2-wire transmitters of 6 channels. It has an input range for analog current, in addition to connections to 2-wire transmitters.

#### (3) Power supply to 2-wire transmitter (Q66AD-DG only)

Supplying power to the 2-wire transmitter, the Q66AD-DG does not require the power supply for the 2-wire transmitter.

Supply power can be switched ON/OFF channel-by-channel by the A/D conversion enable/disable setting.

# (4) Module protection provided by short-circuit protection circuit (Q66AD-DG only)

If an excessive current flows into the module due to a short circuit of the wiring, the short-circuit protection circuit limits the current to within 25 to 35mA, protecting the module.

#### (5) Analog input check by check terminals (Q66AD-DG only)

Measurement of a voltage at the check terminals allows the mA of the 2-wire transmitter output to be checked without the wiring being disconnected.

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PROGRAMMING

#### (6) High accuracy

The reference accuracy  $^{*1}$  is as high as ±0.1% and the temperature coefficient  $^{*2}$  is as high as ±71.4ppm/°C.

- \*1 Accuracy of offset/gain setting at ambient temperature
- \*2 Accuracy per temperature change of 1°C
  - Example) Accuracy when the temperature varies from 25 to 30°C

0.1% (reference accuracy) + 0.00714 %/°C (temperature coefficient) × 5°C (temperature variation difference) = 0.1357%

#### (7) Changing the input range

The input range<sup>\*3</sup> can easily be set from the GX Developer.

\*3 Input range refers to the type of offset/gain settings. The most frequently used range is set as the default but the user can also set the offset/gain.

#### (8) A/D conversion system<sup>\*1</sup>

There are the following five A/D conversion systems.

(a) Sampling processing

Analog input values are converted into digital values one by one on a channel basis and the digital output value is output at every conversion.

- (b) Averaging processing
  - 1) Time averaging

A/D conversion is averaged in terms of time on a channel basis and a digital average value is output.

2) Count averaging

A/D conversion is averaged in terms of count on a channel basis and a digital average value is output.

3) Move averaging

The specified number of digital output values measured per sampling time are averaged.

(c) Primary delay filter

A digital output value is smoothed according to the preset time constant. \*1 Refer to Section 3.2.1 for the details of the A/D conversion system.

#### (9) Input signal error detection function

The voltage/current outside the setting range is detected.

#### (10)Warning output<sup>\*1</sup>

There are the following two warning outputs.

(a) Process alarm

A warning is output if a digital output value falls outside the setting range.

(b) Rate alarm

A warning is output if the varying rate of a digital output value falls outside the preset varying rate range.

\*1 Refer to Section 3.2.4 for details on warning output.

#### (11) Scaling function

A/D conversion values can be converted to percentage values (%) in the preset range and be loaded into the buffer memory. This function can reduce the time required for programming. (Refer to Section 3.2.6.)

#### (12)Online module change

Furthermore, the following operations can be processed by using sequence programs. (Note that these operations are possible for the modules of the same model only.) (Refer to Chapter7.)

- Transferring the offset/gain set values to the replacement A/D converter module
- Transferring the offset/and gain set values to another A/D converter module mounted on the other slot

#### (13)Offset/gain setting

GX Configurator-AD, dedicated instruction (G(P).OFFGAN) or mode switching setting allows a shift to the offset/gain setting mode easily.

#### (14) Easy settings using GX Configurator-AD

Using GX Configurator-AD which is sold separately, sequence programs can be reduced since settings of the A/D converter module can be made on the window. Also, the set status or operating status of the module can be checked easily.

A FB<sup>\*1</sup> can be created automatically from the set intelligent function module parameter, and can be used in sequence programs.

\*1 FB is the function for making a circuit block used in a sequence program repeatedly a part (FB) to use it in the sequence program.

This function can improve the efficiency of program development and minimize program bugs to improve program qualities.

For the details of FB, refer to "GX Developer Version 8 Operating Manual (Function Block)."

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### 2 SYSTEM CONFIGURATION

This chapter explains the system configuration of the A/D converter module.

#### 2.1 Applicable Systems

This section describes the applicable systems.

#### (1) Applicable modules and base units, and No. of modules

(a) When mounted with a CPU module

For the CPU modules, the number of modules, and base units applicable to the A/D converter module, refer to the following.

User's Manual (Hardware Design, Maintenance and Inspection) for the CPU module used

To use the A/D converter module with a C Controller module, refer to the user's manual for the C Controller module.

- (b) Mounting to a MELSECNET/H remote I/O station For the number of modules and base units applicable to the A/D converter module, refer to the following.
  - Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network)

#### (2) Support of the multiple CPU system

When using the A/D converter in a multiple CPU system, refer to the following manual first.

- QCPU User's Manual (Multiple CPU System)
- (a) Applicable A/D converter module The A/D converter module is of the function version C from the first product, and applicable to a multiple CPU system.
- (b) Intelligent function module parameters Write intelligent function module parameters to only the control CPU of the A/D converter module.

#### (3) Compatibility with online module change

The A/D converter module is of the function version C from the first product, and online module change is possible.

For the procedure of online module change, refer to Chapter7.

Relation between the system containing the Q68AD-G and software package is shown in the following table.

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GX Developer or GX Works2 is required to use the A/D converter module.

		Software Version					
		GX Developer	GX Configurator-AD	GX Works2			
	Single CPU system	Version 7 or later					
	Multiple CPU system	Version 8 or later	Version 8 or later				
Q02/Q02H/Q06H/	Single CPU system	Version 4 or later					
Q12H/Q25HCPU	Multiple CPU system	Version 6 or later					
	Single CPU system	Version 8 68W or later					
	Multiple CPU system						
	Single CPU system	Version 7 10L or later					
	Multiple CPU system			Refer to the GX Works2 Version1 Operating Manual (Common)			
Q12PRH/	Redundant CPU system	Version 8.45X or later					
Q25PRHCPU	Reduindant of 0 system						
Q00UJ/Q00U/	Single CPU system	Version 8 76E or later					
Q01UCPU	Multiple CPU system		Version 2 09K or later				
Q02U/Q03UD/	Single CPU system						
Q04UDH/	Multiple CPLL system	Version 8.48A or later					
Q06UDHCPU							
Q10UDH/	Single CPU system	Version 8 76E or later					
Q20UDHCPU	Multiple CPU system						
Q13UDH/	Single CPU system	Version 8.620 or later					
Q26UDHCPU	Multiple CPU system						
Q03UDE/Q04UDEH/	Single CPU system						
Q06UDEH/Q13UDEH/	Multiple CPLL system	Version 8.68W or later					
Q26UDEHCPU							
Q10UDEH/ Single CPU system		Version 8 76E or later					
Q20UDEHCPU Multiple CPU system							
CPU modules other than	n the above	Unsupported	Unsupported				
If installed in a MELSEC	NET/H remote I/O station	Version 6 or later	Version 2.09K or later				

### ⊠ Point

- Depending on the version of GX Configurator-AD, applicable system, CPU module and functions of A/D converter module vary. Refer to Appendix 2 for details.
- (2) When using GX Works2, refer to the following.
  - GX Works2 Version1 Operating Manual (Common)
  - GX Works2 Version1 Operating Manual (Intelligent Function Module)

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#### **Precautions on System Configuration** 2.2

#### (1) When using the A/D converter module with Redundant CPU

- (a) Dedicated instruction The dedicated instruction cannot be used.
- (b) GX Configurator-AD connection

GX Configurator-AD cannot be used when accessing Redundant CPU via an intelligent function module on an extension base unit from GX Developer. Connect a personal computer with a communication path indicated below.





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Connection through an intelligent function module on the main base unit (Through Ethernet module, MELSECNET/H module, or CC-Link module)

# 2.3 How to Check the Function Version, Serial No., and Software Version

(1) Checking the function version and serial No.

The serial No. and function version of the A/D converter module can be checked on the rating plate, front of the module, and system monitor of GX developer.

(a) On the rating plate

The rating plate is put on the side of the A/D converter module.



(b) On the front of the module

The function version and serial No. on the rating plate is also indicated on the front of the module (lower part)



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(c) On the system monitor (product information list)

To display the system monitor, select [Diagnostics]  $\rightarrow$  [System moni-

tor]  $\rightarrow$  Product Inf. List of GX Developer.

Serial Function Product No. version No.											on Product on No.	
Product Information List												×
	Sort  Order by Installation  Order by Type Name  Base Slot Type Series Model Name					Point	I/O Address	Master	Serial No.	Ver	Production Number	•
	0	CPU	CPU	0	Q06UDHCPU	-	-	-	130220000000000	В	091013092955015-B	
	0	0	Intelli.	Q	Q68AD-G	16Point	0000	-	100620000000000	С	-	
	0	1	-	-	Empty	-	-	-	-	-	-	
	0	2	-	-	Empty	-	-	-	-	-	-	
	0	3	-	-	Empty	-	-	-	-	-	-	

#### 1) Production number

Production number indication is not available for the A/D converter module; "-" is shown.

### ⊠Point -

The serial No. on the rating plate and the front of the module may be different from the serial No. displayed on the product information list in GX Developer.

- The serial No. on the rating plate and the front of the module indicates the management information of the product.
- The serial No. displayed on the product information list in GX Developer indicates the function information of the product. The function information of the product is updated when a new function is added.

#### (2) Checking the software version of GX Configurator-AD

The software version of GX Configurator-AD can be checked on GX Developer by clicking [Help]  $\rightarrow$  [Product information].



(In the case of GX Developer Version 8)

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### **3 SPECIFICATIONS**

The description of this chapter and later is based on the Q68AD-G.

### 3.1 Performance Specifications

#### 3.1.1 Performance specifications list

Table 3.1 shows the performance specifications of the A/D converter modules.

lte	em	Specifications									
Number of and channels	alog input	8 channels									
Analog input Voltage			-10 to 10VE	C (Input impeda	nce 1 MΩ or mo	ore)					
	Current		0 to 20	mADC (Input res	istance 250Ω)						
Digital output		16-bit si	16-bit signed binary (normal resolution mode: -4096 to 4095, high resolution mode: -12288 to 12287, -16384 to 16383)								
Using scalin	g function		16-bit s	igned binary (-32	2768 to 32767)						
				Normal reso	lution mode	High resolu	ition mode				
		Input	Analog input range	Digital output value	Maximum resolution	Digital output value	Maximum resolution				
			0 to 10V		2.5 mV	0 to 16000	0.625 mV				
			0 to 5V	0 to 4000	1.25 mV	0 to 12000	0.416 mV				
		ľ	1 to 5V		1.0 mV		0.333 mV				
		Voltage	1 to 5V (Extended mode)	-1000 to 4500	1.0 mV	-3000 to 13500	0.333 mV				
I/O characteristics,			-10 to 10V	-4000 to 4000	2.5 mV	-16000 to 16000	0.625 mV				
			Users range setting	-4000 10 4000	0.375 m V <sup>*8</sup>	-12000 to 12000	0.333 mV <sup>*8</sup>				
		Current	0 to 20mA		5 µ A	0 to 12000	1.66 <i>µ</i> A				
			4 to 20mA	0104000	4 µ A	01012000	1.33 <i>µ</i> A				
			4 to 20mA (Extended mode)	-1000 to 4500	4 µ A	-3000 to 13500	1.33 µ A				
			Users range setting	-4000 to 4000	1.37 <i>μ</i> Α <sup>*8</sup>	-12000 to 12000	1.33 µ A <sup>*8</sup>				
			±0.1%								
Accuracy	Reference		Norm	nal resolution mod	de : ±4digit <sup>*2</sup>						
(Accuracy	accuracy *1	High resolution mode (0 to 10V, -10 to 10V) : ±16digit <sup>*2</sup>									
relative to	,										
	Temperature				<u> </u>						
valuej	coefficient *3		±7	1.4ppm/°C (0.00	714%/°C)						
Common mod	le	Common mode voltage, Input-Common ground (input voltage 0V): 500VAC									
characteristic		Common mode voltage rejection ratio (VCM < 500V): 60Hz 107dB, 50Hz 106dB									
Sampling cycle <sup>*4</sup>				10ms/ chanr	nel						
Response time	e <sup>*5</sup>			20ms							
Absolute maxi	imum input	Voltage: ± 15V Current: ± 30mA <sup>*6</sup>									

#### Table3.1 Performance Specifications of Q68AD-G

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Item	Specifications				
	Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance	
Isolation	Between input terminal and programmable controller power supply	Transformer isolation	500VAC rms, 1min.	500VDC, 10MΩ or	
	Between analog input channels		1000VAC rms, 1min.	more	
Maximum number of writes					
to flash memory	Up to 50,000 times				
Number of I/O occupied					
points	to points (i/O assignment: intelligent to points)				
External wiring connection	10 nin connector				
system	40-pin connector				
Annlinghle wing size	0.3mm <sup>2</sup> (AWG22) or less (for A6CON1, A6CON4)				
Applicable wire size	0.088mm <sup>2</sup> to 0.24mm <sup>2</sup> (AWG28 to 24) (for A6CON2)				
External device connection connector	A6CON1, A6CON2, A6CON4 (sold separately)				
Internal current consumption (5VDC)	0.46A				
Weight	0.16kg				

Table3.1 Performance Specifications of Q68AD-G

\*1 Accuracy of offset/gain setting at ambient temperature

\*2 "digit" indicates a digital value.

\*3 Accuracy per temperature change of 1°C

Example) Accuracy when temperature changes from 25 to 30°C

0.1% (reference accuracy) + 0.00714 %/°C (temperature coefficient)  $\times$  5°C (temperature change difference) = 0.1357%

\*4 The cycle in which A/D conversion values are updated.

- \*5 The time required for an input signal to reach the A/D converter inside the Q68AD-G.
- \*6 Current value indicates value of instant input current that does not break module inner electrical resistance.

\*7 For details on I/O conversion characteristics, refer to Section3.1.2 (1).

\*8 The maximum resolution for the user range setting

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#### Table3.2 Performance Specifications of Q66AD-DG

ltem		Specifications							
Number of analog input channels (2-wire		6 channels							
transmitters)									
With 2-wire		4 to 20mADC (Input resistance 250の)							
Input	transmitter				,				
specification Without 2-wire			0 to 20mADC±1	(Input resistand	ce 250Ω)				
transmitter									
	Supply voltage	26±2VDC							
Power supply	part	24mADC							
for 2-wire trans	smit- Short-circuit	Available							
ter protection		Limit current: 25 to 35mA							
Check terminals		Available							
Divital		16-bit signed binary	/ (normal resoluti	on mode: -96 to	o 4095, high reso	lution mode:			
Digital output			-28	38 to 12287)					
Using	scaling function		16-bit signed b	inary (-32768 to	32767)				
			Normal reso	lution mode	High resolu	ution mode			
		Analog input range	Digital out-	Maximum	Digital out-	Maximum			
			put value	resolution	put value	resolution			
		0 to 20mA		5 µ A		1.66 <i>µ</i> A			
I/O characteris	stics, maximum resolution <sup>*8</sup>	4 to 20mA	0 to 4000	4 µ A	0 to 12000	1.33 <i>µ</i> A			
		4 to 20mA			-3000 to				
		(Extended mode)	-1000 to 4500	4 µ A	13500	1.33 <i>µ</i> A			
		Users range setting <sup>*4</sup>	0 to 4000	1.37 μ Α <sup>*9</sup>	0 to 12000	1.33 µ A <sup>*9</sup>			
Accuracy		±0.1%							
(Accuracy	Reference accuracy *1		(Normal reso	lution mode: +4	diait <sup>*2</sup>				
relative to			High resoluti	ion mode: +12di	ait <sup>*2</sup> )				
digital	*0	High resolution mode: ±12aigit =)							
output value)	Temperature coefficient <sup>3</sup>	±71.4ppm/°C (0.00714 %/°C)							
Sampling cycle	e <sup>*5</sup>	10ms/ channel							
Response time	e <sup>*6</sup>	20ms							
Absolute maxi	mum output	±30mA <sup>*7</sup>							
		Specific isolated area Isolation method Dielectric withstand Insulation							
		Between I/O terminal a	nd		voltage	resistance			
		programmable control	er	5001/	AC rms 1min				
Isolation		programmable control		0001		500VDC			
		Between analog inpu	t Transfor	mer		10MO or			
		channels	isolatio	on 1000∖	/AC rms, 1min.	more			
		Between external pow	er	5001					
		supply and analog inp	ut	5000	AC rms, 1min.				
Maximum number of writes to flash									
memory		Up to 50,000 times							
Number of I/O occupied points		16 points (I/O assignment: Intelligent 16 points)							
External wiring connection system		40-pin connector							
Applicable wire size		0.3mm <sup>2</sup> (AWG22) or less (for A6CON1, A6CON4)							
		0.088mm <sup>2</sup> to 0.24mm <sup>2</sup> (AWG28 to 24) (for A6CON2)							
External device connection connector		A6CON1, A6CON2, A6CON4 (sold separately)							
External power supply <sup>*10</sup>		24VDC +20%, -15%							
		Ripple, spike within 500mV <sub>P-P</sub>							
		Inrush current: 5.0A, within 550µs							
		0.36A							

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Item	Specifications	
Internal current consumption (5VDC)	0.42A	
Weight	0.22kg	IEW
*1 Accuracy Q66AD-D specificat *2 "digit" ind *3 Accuracy	of offset/gain setting at ambient temperature G needs to be powered on 30 minutes prior to operation for compliance to the ion (accuracy). icates a digital value. per temperature change of 1°C	OVERV
Example)	Accuracy when temperature changes from 25 to 30 °C 0.1% (reference accuracy) + 0.00714 %/°C (temperature coefficient) × 5°C (temperature change difference) = 0.1357%	STEM NFIGURATIO
*4 User rang *5 The cycle *6 The time *7 Current v resistance *8 For detail *9 The maxi	<ul> <li>je setting is 2 to 24mA</li> <li>in which A/D conversion values are updated.</li> <li>required for an input signal to reach the A/D converter inside the Q66AD-DG.</li> <li>alue indicates value of instant input current that does not break module inner electrical</li> <li>s on I/O conversion characteristics, refer to Section3.1.2 (2).</li> <li>mum resolution for the user range setting</li> </ul>	
*10 The exte When all Note that Appendix	ernal power supply is for a 2-wire transmitter. the channels used are for current input, wiring for 24VDC is not required. to use the Q66AD-DG with a product number (first five digits) of 15031 or earlier, refer to 2.	SRATION <b>D</b> SPECIF
Remark ••••• See the u of the A/E	user's manual for the CPU module being used for general specifications O converter modules.	SETUP AND PROCEDURES BEFORE OPEF

#### Table3.2 Performance Specifications of Q66AD-DG

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#### 3.1.2 I/O conversion characteristic

The I/O conversion characteristic represents the angle formed by a straight line connecting the "offset value" and "gain value" when the analog signals (voltage or current input) from outside the programmable controller are converted to digital values.

#### Offset value

The offset value denotes the analog input value (voltage or current) that makes the digital output value 0.

#### Gain value

The gain value denotes the analog input value (voltage or current) that makes the digital output value:

4000 (in normal resolution mode) 16000/12000 (in high resolution mode)



- (a) Voltage input characteristic
  - Fig. 3.1 shows a graph of the voltage input characteristic.





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Fig.3.1 Voltage input characteristic of Q68AD-G (2/2)

### ⊠ Point

- (1) Set within the analog input range and digital output range for each input range. If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid use shown by the dotted lines in Fig.3.1.)
- (2) Do not input an analog input voltage of -15V or less and 15V or more The input elements may be damaged.
- (3) Set the offset/gain values for the User range setting marked within a range which satisfies the following conditions.
  - (a) Offset value, gain value setting range: 10 to 10V
  - (b) Use one of the following formulas according to the resolution mode to be set.
    - 1) Normal resolution mode
    - { (Gain value) (Offset value) } > 1.5V
    - 2) High resolution mode
    - { (Gain value) (Offset value) }  $\geq$  4.0V
- (4) When an analog value that exceeds the range for the digital output value is entered, the digital output value will be fixed at the maximum or minimum value.

Analog input	Normal resolution mode		High resolution mode		
range setting	Minimum	Maximum	Minimum	Maximum	
1 to 5V	-96		-288	12287	
0 to 5V	-90	1005	-200	12207	
-10 to 10V	-4096	4095	-16384	16383	
0 to 10V	-96		-384	10303	
1 to 5V	-1096	1505	-3288	13787	
(Extended mode)	-1090	4393	-5200	15/07	
User range setting	-4096	4095	-12288	12287	



#### Fig.3.2 Current input characteristic of Q68AD-G

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### Point

(1) Set within the analog input range and digital output range for each input range.

If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid use shown by the dotted lines in Fig.3.2.)

- (2) Do not input an analog input current of -30mA or less and 30mA or more. The input elements may be damaged.
- (3) Set the offset/gain values for the User range setting marked within a range in which satisfies the following conditions.
  - (a) Gain value  $\leq 20$ mA, offset value  $\geq 0$ mA
  - (b) Use one of the following formulas according to the resolution mode to be set.
    - 1) Normal resolution mode
    - { (Gain value) (Offset value) } > 5.5mA
    - 2) High resolution mode
    - { (Gain value) (Offset value) }  $\geq$  16.0mA
- (4) When an analog value that exceeds the range of the digital output value is entered, the digital output value will be fixed at the maximum or minimum value.

Analog input range setting	Digital output value (Normal resolution mode)		Digital output value (High resolution mode)	
	Minimum	Maximum	Minimum	Maximum
4 to 20mA	-96	4095	-288	12287
0 to 20mA	-30			
4 to 20mA (Extended mode)	-1096	4595	-3288	13787
User range setting	-4096	4095	-12288	12287



Fig.3.3 Input characteristic of Q66AD-DG

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### ⊠Point

(1) Set within the analog input range and digital output range for each input range.

If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid use shown by the dotted lines in Fig.3.3.)

- (2) Do not input an analog input current of -30mA or less and 30mA or more. The input elements may be damaged.
- (3) Set the offset/gain values for the User range setting marked within a range which satisfies the following conditions.
  - (a) Gain value  $\leq 24$ mA, offset value  $\geq 0$ mA
  - (b) Use one of the following formulas according to the resolution mode to be set.
    - 1) Normal resolution mode
    - { (Gain value) (Offset value) } > 5.5mA
    - 2) High resolution mode
    - { (Gain value) (Offset value) }  $\geq$  16.0mA
- (4) When an analog value that exceeds the range of the digital output value is entered, the digital output value will be fixed at the maximum or minimum value.

Analog input range setting	Digital output value (Normal resolution mode)		Digital output value (High resolution mode)	
	Minimum	Maximum	Minimum	Maximum
0 to 20mA	-96	4095	-288	12287
4 to 20mA	-30			
4 to 20mA (Extended mode)	-1096	4595	-3288	13787
User range setting	-96	4095	-288	12287
# 3.1.3 Accuracy

The reference accuracy is the accuracy at the ambient temperature for offset/gain setting. The temperature coefficient is the accuracy per temperature variation of 1°C. The reference accuracy is the accuracy relative to the maximum digital output value. Even if you change the offset/gain setting or input range to change the input characteristic, the reference accuracy and temperature coefficient do not change and are kept within the ranges given in the performance specifications.

[Example] Accuracy when the temperature changed from 25°C to 30°C 0.1% (reference accuracy) + 0.00714%/°C (temperature coefficient) 5°C (temperature variation difference) = 0.1357%

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# 3.2 Function List

	able 3.3 lists the functions of the A/D converter module	es.
--	--	-----

Table3.3	Function	list
Tables.s	Function	list

Item		Reference section		
	(1)	Specifies whether to enable or disable the A/D conversion for each channel.		
A/D conversion enable/	(2)	Since the conversion time is 10ms per channel, disabling A/D conversion of	Section 3.4.2	
disable setting		unused channels can reduce the entire conversion time.		
	(1)	Sampling processing		
		The A/D conversion for analog input values is performed successively for each		
		channel, and the digital output value is output upon each conversion.		
	(2)	Averaging processing		
		(a) Time averaging		
		A/D conversion is averaged in terms of time on a channel basis and a digital		
		average value is output.		
A/D conversion method		(b) Count averaging	Section 3.2.1	
		A/D conversion is averaged in terms of count on a channel basis and a		
		digital average value is output.		
		(c) Move averaging		
		The specified number of digital output values measured per sampling time		
		are averaged.		
	(3)	Primary delay filter		
		A digital output value is smoothed according to the preset time constant.		
Maximum and minimum	(1)	The maximum and minimum values of the digital output values are retained in the	Section 3.2.2	
values hold function		module.		
Input signal error	(1) A voltage or current input that is equal to or more than the input signal error			
detection function		detection upper limit value, or equal to or less than the input signal error detec-	Section 3.2.3	
		tion lower limit value is detected.		
	(1)	Process alarm		
		A warning is output when a digital output value is equal to or more than the pro-		
		cess alarm upper upper limit value, or equal to or less than the process alarm		
Warning output function			Section 3.2.4	
	(2)	Rate alarm		
		A warning is output when the digital output value changes in a rate by which the		
		digital output value reaches the rate alarm upper limit value or more, or the rate		
Conversion starting time				
setting function	(1)	Setting the A/D conversion starting time allows A/D conversion to be started at	Section 3.2.5	
the point when the output of the 2-wire transmitter stabilizes.		the point when the output of the 2-wire transmitter stabilizes.	0001011 0.2.0	
(QOUAD-DO Only)	(1)	The supply power to the 2-wire transmitter can be switched ON/OFF channel by		
	(.,	channel		
Supply power ON/OFF	(2)	Power is supplied to channels that have input range settings of "4 to 20mA		
function	(_)	(2-wire transmitter input): 0H" "4 to 20mA (Extended mode) (2-wire transmitter	Section 3.4.2	
(Q66AD-DG only)		input): AH" or "User range setting (2-wire transmitter input): FH", and that are set		
		to "Enabled" in A/D conversion enable/disable setting (Un\G0).		
	(1)	Conversion of A/D conversion values to preset percentage values and loading	<u> </u>	
Scaling function	È	into the buffer memory is available.	Section 3.2.6	
		Programming steps for the scaling can be eliminated.		
Online module change	(1)	The module can be changed without the system being stopped. <sup>*1</sup>	Chapter 7	

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- \*1 If the module is changed online to a module that has no extended mode for analog input range under the following input range settings, an intelligent function module switch error will occur. Q68AD-G: 4 to 20mA (extended mode): A<sub>H</sub>

1 to 5V (extended mode): B<sub>H</sub>

Q66AD-DG: 4 to 20mA (extended mode) (2-wire transmitter input):  $A_H$ 4 to 20mA (extended mode) (current input):  $C_H$ 

### 3.2.1 A/D conversion methods

### (1) Sampling processing

A/D conversion is performed successively for analog input values, and the converted digital output values are stored in the buffer memory. The sampling processing time varies depending on the number of channels used (number of channels set as A/D conversion enable).

Sampling processing time = No. of channels used  $\times$  10 (ms)

Example) When setting 6 for the number of channels used

 $6 \times 10 = 60 \text{ (ms)}$ 

### (2) Averaging processing

(a) Time averaging

A/D conversion is made for the preset period of time, the sum of values other than the maximum and minimum values is averaged, and the result is stored into the buffer memory.

The processing count within the set time varies depending on the number of channels used (number of channels set as A/D conversion enable).

Processing count = Set time/(No. of channels used × 10) (times)

Example) When setting 6 for the number of channels used, and 500ms for the set time

 $500/(6 \times 10) = 8.333$  (times)... Drop the fractional part.

(b) Count averaging

A/D conversion is made the preset number of times, the sum of values other than the maximum and minimum values is averaged, and the result is stored into the buffer memory.

The time required for the count-based average value to be stored into the buffer memory varies depending on the number of channels used (number of channels set as A/D conversion enable).

Processing time = Set count  $\times$  (No. of channels used  $\times$  10) (ms)

Example) When setting 5 (times) for the average processing count

 $5 \times 6 \times 10 = 50 \text{ (ms)}$ 

(c) Moving average

The specified count of digital output values imported per sampling time are averaged to find a value, which is then stored into the buffer memory.

Since average processing is performed with data shifted per sampling, the most recent digital output value is obtainable.

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### (3) Primary delay filter

A digital value whose transient noise has been smoothed is output according to the preset time constant.

The degree of smoothing varies with the time constant setting.

The relational expression of the time constant and digital output value is indicated below.

$$[If n = 1 ]$$
  

$$Yn = 0$$
  

$$[If n = 2]$$
  

$$Yn = yn-1 + \frac{\Delta t}{\Delta t + TA} (yn - yn-1)$$
  

$$[If n \ge 3]$$
  

$$Yn = Yn-1 + \frac{\Delta t}{\Delta t + TA} (yn - Yn-1)$$
  

$$Yn : Current digital output value yn
$$Yn-1 : Immediately \text{ preceding digital output Yn-1} value$$
  

$$n : Sampling \text{ count} \qquad \Delta t$$$$

- : Pre-smoothing digital output value
- : Immediately preceding pre-smoothing digital output value
- A/D conversion time (0.01 × number of conversion enabled channels)(s)

TA : Time constant (s)

\*1 The A/D conversion completed flag turns ON when n  $\geqq$  2.

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[Example 1] Digital output value when the analog input value varied from 0 to 1V When the high resolution mode and the input range of 0 to 10V is specified for the Q68AD-G

The variation of the digital output value at the time constant setting of 1000ms (1s) is as shown below.

1000ms (1s) after the analog input value has reached 1V, the digital output value reaches 63.2% of the value attained when the sampling processing is selected.



[Example 2] Digital output value when the variation of the analog input value has a ringing waveform

When the high resolution mode and the input range of 0 to 10V is specified for the Q68AD-G

The variations of the digital output values at the time constant setting of 2000ms (2s), at the time constant setting of 1000ms (1s), and at the moving average processing of 16 times are as shown below.



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# 3.2.2 Maximum and minimum values hold function

- (1) The maximum and minimum values are held in the buffer memory channel by channel.
- (2) The maximum and minimum values are cleared to 0 when the maximum value/ minimum value reset request (YD) or operating condition setting request (Y9) is turned ON, and new maximum and minimum values are stored when conversion is started.
- (3) Since the area for storing the maximum and minimum values can be rewritten with the sequence program, the maximum and minimum values within a specific period of time can be checked.
- When the scaling function is enabled, values after scaling conversion are stored as the maximum and minimum values.
   For the scaling function, refer to Section 3.2.6.

### 3.2.3 Input signal error detection function

- If the input voltage/current rose to or above the input signal error detection upper limit value or fell to or below the lower limit value, the input signal error detection flag (Un\G49) and input signal error detection signal (XC) turn ON and the ALM LED flickers to indicate the error.
- (2) When the input signal error detection flag (Un\G49) turns ON for a channel, a digital output value immediately before the error detection is held for the channel, and the A/D conversion completed flag (Un\G10) of the corresponding channel turns OFF.
- (3) By bringing the analog input value within the setting range and then turning ON the error clear request (YF), the input signal error detection flag (Un\G49) and input signal error detection signal (XC) turn OFF.

(4) When the analog input value returns to within the setting range, A/D conversion is resumed independently of whether the input signal error detection flag (Un\G49) and input signal error detection signal (XC) are reset or not, the A/D conversion completed flag (Un\G10) of the corresponding channel turns ON again after the first updating. (The ALM LED remains flickering.)

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- (5) This function is executed at every sampling processing.
- (6) Perform the following procedure to use this function.
  - 1) Set the input signal error detection setting value for the corresponding channel.
  - 2) Enable the A/D conversion of the corresponding channel.
  - 3) Enable the input signal error detection of the corresponding channel.
  - 4) Turn ON the operating condition setting request (Y9).

(7) How to set an input signal error detection upper/lower limit values
 Set input signal error detection upper/lower limit values based on the input signal error detection setting value (input signal error detection upper/lower limit setting values).
 (Set the values in the unit of 1 (0.1%)).

The input signal error detection setting value is reflected to both the input signal error detection upper and lower limit values by default.

To detect input signal errors using only an upper limit value or lower limit value, or to individually set an upper limit value and a lower limit value, refer to (9) in this section.

(a) Input signal error detection upper limit value

This value is calculated as follows:

Gain value + {Full input range (Gain value - Offset value) × Input signal error detection setting value (Input signal error detection upper limit setting value)} A value equal to or greater than the gain value can be set.

A setting value (%) can be calculated by the following formula.

Input signal error detection setting value (Input signal error detection upper limit setting value)	_	Input signal error detection upper limit value	-	Gain value of each range		4000
	=	Gain value of each range	-	Offset value of each range	×	1000

(b) Input signal error detection lower limit value

This value is calculated as follows:

Lower limit value of the input range - {Full input range (Gain value - Offset value) × Input signal error detection setting value (Input signal error detection lower limit setting value)}

A value equal to or smaller than the lower limit value of the input range can be set. A setting value (%) can be calculated by the following formula.

Input signal error detection setting value (Input signal error detection lower limit setting value) Lower limit value of each \_ Input signal error detection lower limit value \_ \_ \_ \_ 1000 Gain value of each range - Offset value of each range × 1000 OVERVIEW

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The following table lists the lower limit value, offset value, and gain value for each input range

able3.4 The lower limit value	, offset value	, and gain value	e for each inpu	t range (Q68AD-G)
-------------------------------	----------------	------------------	-----------------	-------------------

Input	Analog input range	Lower limit value	Offset value	Gain value
	0 to 10V	0V		10V
	0 to 5V	0V		5V
	1 to 5V	1V		5V
Volt-	1 to 5V (extended mode)	1V		5V
age	-10 to 10V	-10V	0V	10V
	User range setting	Analog value when the digital value is: • -4000 (normal resolution mode) • -12000 (high resolution mode)	Analog value set as an offset value by the user	Analog value set as a gain value by the user
	0 to 20mA	0mA	0mA	20mA
	4 to 20mA	4mA	4mA	20mA
Cur-	4 to 20mA (extended mode)	4mA	4mA	20mA
rent	User range setting	Analog value when the digital value is: • -4000 (normal resolution mode) • -12000 (high resolution mode)	Analog value set as an offset value by the user	Analog value set as a gain value by the user

Table3.5 The lower limit value, offset value, and gain value for each input range (Q66AD-DG)

Input	Analog input range	Lower limit value	Offset value		
0 to 20mA	0mA	20mA			
4 to 20mA	4mA	20mA			
4 to 20mA (extended mode)	4mA		20mA		
User range setting	Analog value set as an offset v	alue by the user	Analog value set as a gain value by the user		

(8)Setting example of input signal error detection

Example) To detect an input signal error when the analog input value falls below 2.4mA in the channel where the input range of 4 to 20mA (extended mode) and the normal resolution mode is set

Apply the following values to the calculation formula for an input signal error detection lower limit value.

- Input signal error detection lower limit value: 2.4mA
- Lower limit value of the input range (offset value): 4.0mA
- Gain value: 20.0mA

Input signal error detection setting value = Lower limit value of each Gain value of each range - Input signal error detection upper limit value Offset value of each range × 1000

> Therefore, Set 100 (10.0%) as an input signal error detection setting value. The input signal error detection values act as follows in this case. (Because of the setting value of 100 (10%), an error is detected not only at 2.4mA but also at 21.6mA.)



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#### (9)Specifying a condition to detect input signal errors

By setting the following buffer memory areas, input signal errors can be detected only at an upper limit value or lower limit value, or at different upper/lower limit values.

- Input signal error detection extended/input signal error detection setting (Un\G47)
- CH□ input signal error detection setting value/CH□ input signal error detection lower limit setting value (Un\G142 to Un\G149)
- CH□ input signal error detection upper limit setting value (Un\G150 to Un\G157) The following is a setting example.
- Example) Channel where the input range of 4 to 20mA (extended mode) and the normal resolution mode is set
  - 1) To detect input signal errors at a lower limit value only
    - Input signal error detection extended setting: 1 (different upper/lower limit values)
    - Input signal error detection upper limit setting value: 251 (input signal error detection disabled)
    - Input signal error detection lower limit setting value: 100 (10.0%)







- Input signal error detection extended setting: 1 (different upper/lower limit values)
- Input signal error detection upper limit setting value: 100 (10.0%)
- Input signal error detection lower limit setting value: 251 (input signal error detection disabled)



# 3.2.4 Warning output function

### (1) Process alarm

(a) If the detected digital output value rose to or above the process alarm upper upper limit value or fell to or below the process alarm lower lower limit value and entered the warning output range zone, the warning output flag (process alarm)(Un\G50) and warning output signal (X8) turn ON and the ALM LED is lit to indicate the warning.

A warning will be output according to the following digital output values.

Item		Digital value causing warning output
Value set in scaling enable/	0: Disable	CH⊡ digital output value (Un\G11 to Un\G18)
disable setting (Un\G53)	1: Enable	CH⊡ scaling value (Un\G54 to Un\G61)

(b) After a warning was output, when the digital output value reaches a value less than the process alarm upper lower limit value, or a value more than the process alarm lower upper limit value, "0" is stored in the corresponding bit of the warning output flag (Un\G50) for the channel.

The warning output signal (X8) turns OFF, and the ALM LED turns OFF when the digital output values in all channels get out of the warning output range.



- (c) When time or count averaging is specified, this function is executed at intervals of the preset averaging time or averaging count.
   When any other A/D conversion system (sampling processing, moving average, primary delay filter) is specified, this function is executed at intervals of the sampling time.
- (d) To use the scaling function, be sure to consider scale conversion before setting the CH□ process alarm upper/lower limit value.

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### (2) Rate alarm

- (a) If the range of change in the digital output value sampled at intervals of the rate alarm warning detection period is equal to or greater than the rate alarm upper limit value or is equal to or less than the rate alarm lower limit value, the warning output flag (rate alarm) (Un\G51) and warning output signal (X8) turn ON and the ALM LED is lit to indicate the warning of the rate alarm.
- (b) If, after the output of the warning, the rate fell below the rate alarm upper limit value or rose above the rate alarm lower limit value and returned to within the setting range, "0" is stored into the bit position corresponding to the channel number of the warning output flag (rate alarm) (Un\G51).



The warning output signal (X8) turns OFF only when all channels return to within the setting range.



- (c) Set the rate alarm upper limit value/lower limit value in 0.1%/s increments relative to the maximum value (16000/12000/4000) of the digital output value.
   The setting range is -32768 to 32767 (-3276.8% to 3276.7%).
- (d) The setting range of the rate alarm warning detection period is 10 to 5000ms.
   When the period is set to 5000ms, the digital values are compared at intervals of 5 seconds to detect the varying rate.
- (e) The rate alarm is judged by converting the rate alarm upper/lower limit value into the digit value per rate alarm warning detection period.
   The expression for the value used to make judgment per rate alarm warning detection period is as follows.

Value used to make judgment per rate alarm warning detection period [digit] =rate alarm upper limit value or lower limit value  $\times$  0.001  $\times$  maximum value of the digital output value  $\times$  rate alarm warning detection period  $\div$  1000

#### - Example

- In channel 1, when the following:
- Upper limit value of change rate: 30%/s (300 is stored in buffer memory)
- Maximum digital output value: 16000
- Rate alarm warning detection period: 10ms

are set, a value [digit] used at every rate alarm warning detection period can be calculated as follows:

 $300 \times 0.001 \times 16000 \times 10 \div 1000=48$ (digit)

Therefore, the current value is compared with the previous value every 10ms in channel 1, and whether a difference of 48 (digit) or more is identified between them or not is determined.

- (f) The rate alarm is useful to watch the varying rate of the digital output value in a limited range.
  - Example of setting the rate alarm upper limit value/lower limit value when it is desired to watch that the digital output value increases within the specified range



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 Example of setting the rate alarm upper limit value/lower limit value when it is desired to watch that the digital output value decreases within the specified range



 Example of setting the rate alarm upper limit value/lower limit value when it is desired to watch that the digital output value increases/decreases within the specified range



### 3.2.5 Conversion starting time setting function (Q66AD-DG only)

- As the A/D conversion starting time, set the "time necessary from when the used 2-wire transmitter powers on until its output stabilizes". This setting allows A/D conversion processing to be started as soon as the output of the 2-wire transmitter stabilizes.
- (2) Set the time to the CH□ Conversion starting time setting (for 2-wire transmitter) (Un\G78 to Un\G83).
- (3) The following indicates the time until the A/D conversion completed flag (Un\G10) turns ON when the A/D conversion starting time has been set.

(Conversion starting time) + (A/D conversion pre-processing: Approx. 150 to 165ms) + (A/D conversion processing: number of conversion enabled channels × 10ms)

# **Point**

Set the A/D conversion starting time in consideration of the time necessary from when the 2-wire transmitter powers on until its output stabilizes and the warm-up time of the 2-wire transmitter.



[Example] When the time necessary from when the 2-wire transmitter powers on until its output stabilizes is 500ms

# 3.2.6 Scaling Function

- (1) With this function, A/D conversion values are converted to rate values and loaded into the buffer memory.
- (2) A digital value stored in CH□ digital output value (Un\G11 to Un\G18) is converted to a value in the range set by CH□ scaling upper/lower limit value (Un\G62 to Un\G77). The converted value is stored in CH□ scaling value storage area (Un\G54 to Un\G61).
- (3) The scaling function is used for processed values when using the averaging processing or primary delay filter.
- (4) The setting of CH□ scaling upper/lower limit value (Un\G62 to Un\G77) varies depending on whether to use the factory default range setting or the user range setting for the input range.
  - (a) When using the factory default setting for the input range Set a value that should correspond to the upper limit of digital output as the scaling upper limit value, and a value that should correspond to the lower limit as the scaling lower limit value.

Example 2) Input range setting: -10 to 10V

(Q68AD-G)

Example 1) Input range setting: 0 to 20mA, or 4 to 20mA (Q68AD-G, Q66AD-DG)



(b) When using the user range setting for the input range Set a value corresponding to the gain or offset value to the scaling upper or lower limit value respectively.



# Example 2) Gain value: 0V, Offset value: 10V (Q68AD-G)



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Analog input

voltage (V)

10

- (5) How to calculate a scaling value is explained below.
  - (a) When using the factory default setting for the input range

1) Input range: 0 to10V, 0 to 5V, 1 to 5V, 0 to 20mA, 4 to 20mA, 1 to 5V (Extended mode), or 4 to 20mA (Extended mode) Scaling value =  $\frac{Dx \times (SH-SL)}{DMAX} + SL$ 2) Input range: -10 to 10V Scaling value =  $\frac{Dx \times (SH-SL)}{DMAX - DMIN} + \frac{SH+SL}{2}$ 

Dx	:	Digital output value
Dмах	:	The maximum digital output value in the input range being used
Dміn	:	The minimum digital output value in the input range being used
Sн	:	Scaling upper limit value
SL	:	Scaling lower limit value
	<b>``</b>	() where () () () () () where the explicit transition is the second stress in the second stress in the second stress is the second stress in the second stress in the second stress is the second stress in the second stress is the second stress is the second stress in the second stress is the second stre

Example) On the Q68AD-G, using the scaling function in High resolution mode and in the input range of -10 to 10V If the setting is Scaling upper limit value, SH: 14000 Scaling lower limit value, SL : 2000 and the digital output value Dx is 7500,

Scaling value = 
$$\frac{7500 \times (14000 - 2000)}{16000 - (-16000)} + \frac{(14000 + 2000)}{2}$$
  
= 10812.5...  
= 10812  
It omits digits below the decimal point.



#### (b) When using the user range setting for the input range

Scaling	value = $\frac{DX \times (SH-SL)}{DMAX} + SL$	
Dx : Dmax : Sh : Sl :	Digital output value The maximum digital output value in the input range being used (A/D conversion value corresponding to the gain value) Scaling upper limit value Scaling lower limit value	
Example)	On the Q68AD-G, using the scaling function in High resolution mode and in the user range setting If the setting is Scaling upper limit value, SH: 10000 Scaling lower limit value, SL : 2000 and the digital output value 4250 is input,	DNP
Scaling va	lue = $\frac{4250 \times (10000 - 2000)}{12000} + 2000$ = 4833.33 = 4833 It omits digits below the decimal point.	TY PACKAGE SETUP A

# ⊠Point

The setting range allowed for the scaling upper and lower values is -32000 to 32000. Note that the resolution will not change even if a scaling upper/lower limit value is set to change more than the resolution.

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# 3.3 I/O Signals for the Programmable Controller CPU

### 3.3.1 List of I/O signals

Table 3.4 lists the I/O signals of the Q68AD-G.

Table 3.5 lists the I/O signals of the Q66AD-DG.

Note that I/O numbers (X/Y) shown in this chapter and thereafter are the values when the start I/O number for the A/D converter module is set to 0.

Signal dire	ection CPU Module ← Q68AD-G	Signal dire	ection CPU Module → Q68AD-G
Device No. (Input)	Signal name	Device No. (Output)	Signal name
X0	Module ready	Y0	
X1		Y1	
X2		Y2	
X3	1	Y3	
X4	Use prohibited	Y4	Use prohibited <sup>*1</sup>
X5		Y5	
X6		Y6	
X7	High resolution mode status flag	Y7	
X8	Warning output signal	Y8	
X9	Operating condition setting completed flag	Y9	Operating condition setting request
ХА	Offset/gain setting mode flag	YA	User range writing request
XB	Channel change completed flag	YB	Channel change request
XC	Input signal error detection signal	YC	Use prohibited <sup>*1</sup>
ХD	Maximum value/minimum value reset	VD	Maximum value/minimum value reset
	completed flag	10	request
XE	A/D conversion completed flag	YE	Use prohibited <sup>*1</sup>
XF	Error flag	YF	Error clear request

Table3.6 List of I/O signal (Q68AD-G)

# ⊠Point

\*1 These signals cannot be used by the user since they are for system use only.

If these are turned ON/OFF by the sequence program, the performance of the A/D converter module cannot be guaranteed.

Signal dire	ction CPU Module ← Q66AD-DG	Signal dire	ction CPU Module  → Q66AD-DG	
Device No. (Input)	Signal name	Device No. (Output)	Signal name	
X0	Module ready	Y0		
X1		Y1		
X2		Y2		
X3		Y3		
X4	Use prohibited	Y4	Use prohibited <sup>*1</sup>	
X5		Y5		
X6		Y6		
X7	High resolution mode status flag	Y7		
X8	Warning output signal	Y8		
X9	Operating condition setting completed flag	Y9	Operating condition setting request	
XA	Offset/gain setting mode flag	YA	User range writing request	
XB	Channel change completed flag	YB	Channel change request	
YC	Input signal error detection signal	VC	Offset/gain change request	
70	Offset/gain change completed flag		Onset/gain change request	
ΥD	Maximum value/minimum value reset	VD	Maximum value/minimum value reset	
AD .	completed flag		request	
XE	A/D conversion completed flag	YE	Use prohibited <sup>*1</sup>	
XF	Error flag	YF	Error clear request	

### Table3.7 List of I/O signal (Q66AD-DG)

⊠Point

\*1 These signals cannot be used by the user since they are for system use only.

If these are turned ON/OFF by the sequence program, the performance of the A/D converter module cannot be guaranteed.

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# 3.3.2 Details of I/O signals

I/O signals for the A/D converter modules are explained in detail below.

### (1) Input signals

Device No.	Signal Name	Description					
		(1) When the programmable controller CPU is powered on or reset, this signal turns on once the					
		preparation for A/D conversion has been completed, and A/D conversion processing is then per					
		formed.					
X0	Module ready	2) In either of the following states, the Module ready (X0) turns OFF.					
		<ul> <li>During offset/gain setting mode (A/D conversion processing is performed.)</li> </ul>					
		<ul> <li>When the A/D converter module has a watchdog timer error<sup>*1</sup></li> </ul>					
		(A/D conversion processing is not performed.)					
X7	High resolution mode status flag	) This turns ON when in high resolution mode.					
		) The Warning output signal (X8) turns ON at detection of a process alarm or rate alarm.					
		(a) Process alarm					
		1) This signal turns ON when the digital output value falls outside the setting range set to					
		the process alarm upper/lower limit values (Un\G86 to Un\G117) on any of the					
		channels enabled for A/D conversion after the process alarm function has been made					
	Warning output signal	valid.					
		2) As soon as the digital output values return to within the setting ranges on all channels					
		enabled for A/D conversion, this signal turns OFF automatically and the ALM LED is					
		also extinguished.					
		(b) Rate alarm					
		1) This signal turns ON when the varying rate of the digital output value falls outside the					
		varying rate range set to the rate alarm upper/lower limit values (Un\G122 to Un\G137)					
X8		on any of the channels enabled for A/D conversion after the rate alarm function has been made valid.					
		2) As soon as the varving rates of the digital output values return to within the preset					
		varying ranges on all channels enabled for A/D conversion, this signal turns OFF					
		automatically and the ALM LED is also extinguished.					
		→ Performed by the A/D converter module					
		→ Performed by the sequence program					
		Warning output flag					
		(Un\G50, Un\G51)					
Warning output signal (X8)							

\*1 A watchdog timer error occurs when the program calculations are not completed within the scheduled time due to malfunctions of A/D converter module hardware.

When a watchdog timer error occurs, the RUN LED for the A/D converter module turns off.

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Device No.	Signal Name	Description	
		<ol> <li>This signal is used as an interlock condition to turn ON/OFF the Operating condition setting request (Y9) when any of the following settings has been changed.</li> <li>A/D conversion enable/disable setting (Un\G0)</li> </ol>	DVERVIEW
		<ul> <li>CH Average time/Average number of times/Moving average/Time constant settings (Un\G1 to Un\G8)</li> <li>Averaging process specification (Un\G24, Un\G25)</li> </ul>	2
		Input signal error detection extended/input signal error detection setting (Un\G47)	
		Warning output settings (Un\G48)	NO
		Scaling enable/disable setting(Un\G53)	RAT
		CH□ scaling upper/lower limit value (Un\G62 to Un\G77)	
		<ul> <li>CH□ conversion starting time setting (for 2-wire transmitter) *1 (Un\G78 to Un\G83)</li> </ul>	NO NN
		• CH□ process alarm upper/lower limit value (Un\G86 to Un\G117)	2
		CH rate alarm warning detection period (Un\G118 to Un\G125)	J
		CH□ rate alarm upper/lower limit value (Un\G126 to Un\G141)	SN
		value (Un\G142 to Un\G149)	ATIO
	Onenatives	<ul> <li>CH□ input signal error detection upper limit setting value (Un\G150 to Un\G157)</li> </ul>	) FIC
X9	condition setting completed flag	2) When the operating condition setting completed flag (X9) is OFF, A/D conversion processing is not performed. Under the following conditions, the operating condition setting completed flag (X9) turns OFF.	A SPEC
		When operating condition setting request (Y9) is ON	Z
		→ Performed by the A/D converter module	) P∆TIC
		Performed by the sequence program	JRE C
		Module ready (X0)	PROCEDU
		Operating condition setting completed flag (X9)	-Sor-
		Operating condition setting request (Y9)	ONFIGURAI
		A/D conversion	(GX C( 0 )
		3) Digital outputs are cleared immediately after this Operating condition setting request (Y9) turns ON. Therefore, turn ON the A/D conversion completed flag before reading digital outputs.	

1: For the Q66AD-DG only

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Device No.	Signal Name	Description
		[In offset/gain setting mode]
		(1) This signal is used as an interlock condition to turn ON/OFF the User range writing request (YA)
		when the value at completion of offset/gain setting adjustment is registered.
		(2) Refer to Section 4.6 regarding the offset/gain settings.
		→ Performed by the A/D converter module
		───► Performed by the sequence program
		Module ready (X0) OFF
		Offset/gain setting mode flag (XA)
×۸	Offset/gain	User range writing request (YA)
A	setting mode flag	[In normal mode]
		(1) This signal is used as an interlock condition to turn ON/OFF the User range writing request (YA)
		when the user range is restored.
		(2) Refer to Chapter 7 for the user range restoration.
		→ Performed by the A/D converter module
		→ Performed by the sequence program
		Module ready (X0) ON
		Offset/gain setting mode flag (XA)
		User range writing request (YA)
		(1) This signal is used as an interlock condition for setting the channel change request (YB) to ON/
		OFF when changing the channel for which the offset/gain settings are to be performed.
		(2) Refer to Section 4.6 regarding the offset/gain settings.
		Performed by the A/D converter module     Performed by the sequence program
ХВ	Channel change completed flag	Offset/gain setting mode Offset/gain specifications (Un\G22, Un\G23)
		Channel change completed flag (XB)
		Channel change request (YB)

Device No	Signal Name	1	Description				
Device No.	Signal Name	(1)	This signal turns ON when the analog input value falls outside the setting range set to the Input				
		(1)	signal error detection setting value value/input signal error detection lower limit setting value				
			(Un)C142 to Un)C140. Input signal error detection upper limit setting value (Un)C150 to				
			Un/G157) on any of the channels enabled for A/D conversion after the Input signal error dates				
			tion is made valid				
		(2)	When the Input signal error detection signal turns ON				
		(2)	1 The A/D conversion completed flag (LIn)C10) of the corresponding channel turns OEE				
			<ol> <li>The digital output value is hold as at the time of error detection.</li> </ol>				
			2) The digital output value is field as at the time of error detection.				
		(3)	5) The ALM LED models. By bringing the appleg input value within the softing range and then turning ON the Error clear				
		(3)	request (VE) the lineut signal error detection signal (VC) turns OEE and the ALM LED is				
			extinguished				
		(1)	When the analog input value returns to within the setting range. A/D conversion is resumed				
		(4)	independently of whether the input signal error detection signal (VC) is reset or not and after				
	Input signal error		the first updating the $\Lambda/D$ conversion completed flag (LIn)G10) of the corresponding channel				
	detection signal		tures ON again				
			The processing such as averaging processing or primary delay filter, starts from the first time				
			after resumption of A/D conversion				
			arter resumption of A/D conversion.				
XC			<ul> <li>Performed by the sequence program</li> </ul>				
7.0			Input signal error detection flag				
			(Un)G49) 0 Input signal error 0				
			Input signal error detection signal				
			Error clear request (YF)				
		(1)	This signal is used as an interlock condition to turn ON/OFF the offset/gain change request (YC)				
			when the offset/gain value is changed.				
		(2)	Refer to Section 4.6 for the offset/gain setting.				
	Offset/gain		→ Performed by the A/D converter module				
	change		Performed by the sequence program				
	completed fleg <sup>*1</sup>						
	completed hag		Offset/gain change completed flag				
			Offset/gain change request (YC)				
		(1)	This signal turns ON when the maximum value/minimum value stored at any of the buffer				
			memory addresses 30 to 45 (Un\G30 to Un\G45) is reset by turning ON the Maximum value/				
			minimum value reset request (YD).				
			► Performed by the A/D converter module				
			Performed by the sequence program				
	Maximum value/		Maximum and minimum values				
VD	minimum value		storage area				
XD.	reset completed		(UN\G3U to UN\G45)				
	flag						
			Maximum value/minimum value				
			reset request (YD)				
			Maximum value/minimum value				
			reset completed flag (XD)				

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ONLINE MODULE CHANGE

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TROUBLESHOOTING



Device No.	Signal Name	Description					
		[For th	ne Q68AD-G]				
		(1) 1	This signal turns ON when all	conversion-enabled channels ha	ve completed the initial A/D con-		
		version.					
		(∠) I   r	ead out the digital output value	ion completed liag (Un\G10) Is u le	seu as an interiock condition to		
		[For th	ne Q66AD-DG1 <sup>*1</sup>				
		(1)	This signal turns ON when all	conversion-enabled channels ha	ve completed the initial A/D con-		
		N N	versions.				
		(2) 1	The following table lists the sig	gnal status when the external pov	wer supply is turned OFF.		
			Selected range	When the external power supply is turned OFF	When the external power supply is turned ON again		
		Anale withc	og current input range only out 2-wire transmitter	Signal remains ON because t	he A/D conversion continues.		
		2-wire transmitter range only		<ul> <li>Signal turns OFF because the A/D conversion stops.</li> <li>Previous digital output values are held.</li> </ul>	<ul> <li>A/D conversion resumes.</li> <li>Signal turns ON again when all conversion-enabled channels have completed the initial A/D conversion.<sup>*3</sup></li> </ul>		
			Analog current input range without 2-wire transmitter	• A/D conversion continues.*2	L		
	A/D conversion completed flag	Mix	2-wire transmitter range	<ul> <li>A/D conversion stops.<sup>*2</sup></li> <li>Previous digital output values are held.</li> </ul>	<ul> <li>A/D conversion resumes.</li> <li>Signal turns ON again when all conversion-enabled channels have completed</li> </ul>		
					the initial A/D conversion. <sup>*3</sup>		
XE		*1 T	*1 The specifications are or the Q66AD-DG whose product number (first five digits) is "15032" or later				
		F	For the specifications of the Q66AD-DG whose product number (first five digits) is "15031" or				
		e	earlier, refer to Appendix 2.				
		*2 1	The signal turns OFF because	the channels for the 2-wire trans	smitter range stop the A/D con-		
		*3 1	The processing such as avera	ging processing and primary del	ay filter starts from the initial sta-		
		t	us after the A/D conversion re	esumes.			
		(3) The following table lists the signal status when the A/D conversion is enabled in the					
			or the external power supply.				
			Selected range	A/D conversion d	isable $\rightarrow$ enable		
		Analo	og current input range only	• A/D conversion starts.			
		withc	out 2-wire transmitter	Signal turns ON when all conversion-enabled channels have     completed the initial A/D conversion			
		2-wir	e transmitter range only	A/D conversion does not start.*4     Signal remains OFF.			
		Mix	Analog current input range without 2-wire transmitter	• A/D conversion starts. <sup>*5</sup>			
			2-wire transmitter range	<ul> <li>A/D conversion does not start</li> </ul>	*4, *5		
		*4 1 v *5 1 (4) 1	The A/D conversion starts if the when all conversion-enabled of the signal remains OFF becau been completed. This signal or A/D conversion of	e external power supply is turned channels have completed the initi use the A/D conversion for the 2- completed flag (Un\G10) is used	d on. Then, the signal turns ON al A/D conversion. wire transmitter range has not as an interlock condition to read		
		0	out the digital output value.				

Device No.	Signal Name	Description		
		(1) This signal turns ON when a write error occurs.		
		(2) To clear the error code, set the error clear request (YF) to ON.		
		→ Performed by the A/D converter module		
		→ Performed by the sequence program		
		Error code(Un\G19)		
XF	Error flag			
		Error flag (XF)		
		Error clear request (YF)		

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SYSTEM CONFIGURATION

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### (2) Output signals

Device No.	Signal Name	Description		
		(1) Turn this signal ON when making any of the following settings valid.		
		<ul> <li>A/D conversion enable/disable setting (Un\G0)</li> </ul>		
		<ul> <li>CH</li></ul>		
		<ul> <li>Averaging process specification (Un\G24, Un\G25)</li> </ul>		
		<ul> <li>Input signal error detection extended/input signal error detection setting (Un\G47)</li> </ul>		
		Warning output settings (Un\G48)		
	Operating	Scaling enable/disable setting(Un\G53)		
Y9	condition setting	- CH□ scaling upper/lower limit value(Un\G62 to Un\G72)		
	request	CH     conversion starting time setting (for 2-wire transmitter) (Un\G78 to Un\G83)		
		CH□ process alarm upper/lower limit value (Un\G86 to Un\G117)		
		• CH $\square$ rate alarm warning detection period (Un)G118 to Un)G125)		
		$- CH\Box$ rate alarm upper/lower limit value (Up)G126 to Up)G141)		
		CHI input signal arrest datastion softing value/CH input signal arrest datastion lawor limit softing		
		value (Lin)G142 to Lin)G149)		
		$\sim$ CH $\square$ input signal error detection upper limit setting value (Un)C150 to Un)C157)		
		(2) Refer to the X9 column for ON/OFF timing		
		(2) Note to the Xe column of Chief a ning.		
	User range writing request	(1) This turns ON when the value for the adjusted offset/gain settings are registered in the A/D		
		converter module.		
		(2) Refer to the XA column for ON/OFF timing.		
YA		Refer to Section 4.6 for offset/gain settings.		
		[In normal mode]		
		(1) This signal turns ON when the user range is restored.		
		(2) Refer to the field of XA for the ON/OFF timing.		
		Refer to Chapter 7 for user range restoration.		
	Channel change	(1) This turns ON when changing the channel for which offset/gain settings are to be performed.		
YB	request	(2) Refer to the XB column for ON/OFF timing.		
	loquoor	Refer to Section 4.6 for offset/gain settings.		
	Offset/gain	(1) Turn this signal ON when changing the offset/gain value.		
YC	change request <sup>*1</sup>	(2) Refer to the field of XC for the ON/OFF timing.		
		Refer to Section 4.6 for the offset/gain setting.		
	Maximum value/	(1) Turning ON the Maximum value/minimum value reset request (YD) clears the maximum value/		
YD	minimum value	minimum value stored at any of the buffer memory addresses 30 to 45 (Un\G30 to Un\G45).		
	Free close	<ul> <li>(2) Relet to the XD column for ON/OFF timing.</li> <li>(1) Ture this signal ON when electing a write error or input signal error.</li> </ul>		
YF		<ul> <li>(1) Furth this signal ON when clearing a write error or input signal error.</li> <li>(2) Befor to the field of XE or XC for the ON/OEE timing.</li> </ul>		
	request	(2) הפופו נט גוופ וופומ טו אר טו אל וטו גוופ טוא/טרר גווזווחg.		

\*1: Q66AD-DG only

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# ⊠Point

When the User range writing request (YA) is turned ON in the normal mode with A/D conversion enabled, the A/D converter module restores the user range.



# 3.4 Buffer Memory

# 3.4.1 Buffer memory assignment

This section describes the buffer memory assignments of the A/D converter modules.

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SYSTEM CONFIGURATION

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**SPECIFICATIONS** 

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### (1) Buffer memory assignment of Q68AD-G

# ⊠Point

Do not write data from system area or sequence program to the buffer memory area where writing is disabled.

Doing so may cause malfunction.

Address		Description		D/44/*1	Poforonco	
Hexadecimal	Decimal	Description	Delault	R/W	Kelerence	
0н	0	A/D conversion enable/disable setting	0000н	R/W <sup>*2</sup>	Section 3.4.2	
1 1		CH1 Average time/Average number of times/	0	0 0 0 0 0 0 1 2		
In		Moving average/Time constant settings	0	K/VV -		
2		CH2 Average time/Average number of times/	0	0 0/4/*2	1	
2	2	Moving average/Time constant settings	Ū	r///		
34	3	CH3 Average time/Average number of times/	0	D/\/*2		
Un	Ŭ	Moving average/Time constant settings	Ŭ			
4н	4	CH4 Average time/Average number of times/	0	R///*2		
-111	+	Moving average/Time constant settings	Ŭ		Section 3.4.3	
5H	5	CH5 Average time/Average number of times/	0	R///*2	0001011 0.4.0	
Un	Ŭ	Moving average/Time constant settings	Ŭ			
64	6	CH6 Average time/Average number of times/	0	D/\/*2		
Un	U	Moving average/Time constant settings	Ŭ			
7	7	CH7 Average time/Average number of times/	0	R/W <sup>*2</sup>		
1 11	1	Moving average/Time constant settings				
8	8	CH8 Average time/Average number of times/	0	R/W <sup>*2</sup>	1	
Un	0	Moving average/Time constant settings				
9н	9	System area	—	_	—	
Ан	10	A/D conversion completed flag	0	R	Section 3.4.4	
Вн	11	CH1 Digital output value	0	R		
Сн	12	CH2 Digital output value	0	R		
Dн	13	CH3 Digital output value	0	R		
Ен	14	CH4 Digital output value	0	R	Section 3.4.5	
Fн	15	CH5 Digital output value	0	R	0001011 0.4.0	
10н	16	CH6 Digital output value	0	R		
11н	17	CH7 Digital output value	0	R		
12н	18	CH8 Digital output value	0	R		
13н	19	Error code	0	R	Section 3.4.6	
14н	20	Setting range(CH1 to CH4)	0	R	Section 3.4.7	
15н	21	Setting range(CH5 to CH8)	0	R		
16н	22	Offset/gain setting mode offset specification	0	R/W	Section 3 4 8	
17н	23	Offset/gain setting mode gain specification	0	R/W	5668611 0.4.0	
18н	24	Averaging process specification (CH1 to CH4)	0	R/W <sup>*2</sup>	Section 3.4.9	
19н	25	Averaging process specification (CH5 to CH8)	0	R/W*2	000001 0.4.0	

#### Table3.8 Buffer memory assignment of Q68AD-G (1/6)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition



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Addres Hexadecimal 1Ан to 1Dн 1Eн 1Fн 20н 21н 22н 23н 24н 25н 26н 27н 28н 29н 2Ан 2Вн 2Сн 2Dн 2Ен 2Fн 30н 31н 32н 33н 34н 35н 36н

37н

38н

39н

ЗАн

3Вн

3Сн

3Dн

3Ен

3Fн

40н

41н

42н

43н

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66

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Table3.8 Buffer memory assignment of Q68AD-G (2/6)								
s Decimal	Description	Default	R/W <sup>*1</sup>	Reference				
26								
to	Svstem area	_		_				
29	,							
30	CH1 Maximum value	0	R/W					
31	CH1 Minimum value	0	R/W					
32	CH2 Maximum value	0	R/W					
33	CH2 Minimum value	0	R/W					
34	CH3 Maximum value	0	R/W					
35	CH3 Minimum value	0	R/W					
36	CH4 Maximum value	0	R/W					
37	CH4 Minimum value	0	R/W	Castien 2.4.40				
38	CH5 Maximum value	0	R/W	Section 3.4.10				
39	CH5 Minimum value	0	R/W					
40	CH6 Maximum value	0	R/W					
41	CH6 Minimum value	0	R/W					
42	CH7 Maximum value	0	R/W					
43	CH7 Minimum value	0	R/W					
44	CH8 Maximum value	0	R/W					
45	CH8 Minimum value	0	R/W					
46	System area	—	—	—				
47	Input signal error detection extended/input signal error detection setting	00FFн	R/W <sup>*2</sup>	Section 3.4.11				
48	Warning output setting	FFFFH	R/W <sup>*2</sup>	Section 3.4.12				
49	Input signal error detection flag	0	R	Section 3.4.13				
50	Warning output flag (Process alarm)	0	R	0 11 0 1 1 1				
51	Warning output flag (Rate alarm)	0	R	Section 3.4.14				
52	System area	—	_	—				
53	Scaling enable/disable setting	00FFн	R/W <sup>*2</sup>	Section 3.4.15				
54	CH1 Scaling value	0	R					

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\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

CH2 Scaling value

CH3 Scaling value

CH4 Scaling value

CH5 Scaling value

CH6 Scaling value

CH7 Scaling value

CH8 Scaling value

CH1 Scaling lower limit value

CH1 Scaling upper limit value

CH2 Scaling lower limit value

CH2 Scaling upper limit value

CH3 Scaling lower limit value

CH3 Scaling upper limit value

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

0

0

0

0

0

0

0

0

0

0

0

0

0

R

R

R

R

R

R

R

R/W\*2

R/W<sup>\*2</sup> R/W<sup>\*2</sup>

R/W\*2

R/W\*2

R/W\*2

Section 3.4.16

Section 3.4.17

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Writing Operating Operating condition condition condition setting setting request completed flag\_\_\_\_\_

Address		Description	Default	D 44/*1	Boforonoo
Hexadecimal	Decimal	Description	Delault	R/W	Reference
44 <sub>H</sub>	68	CH4 Scaling lower limit value	0	R/W <sup>*2</sup>	
45н	69	CH4 Scaling upper limit value	0	R/W*2	
46н	70	CH5 Scaling lower limit value	0	R/W*2	
47н	71	CH5 Scaling upper limit value	0	R/W*2	
48 <sub>H</sub>	72	CH6 Scaling lower limit value	0	R/W <sup>*2</sup>	Section 3 4 17
49н	73	CH6 Scaling upper limit value	0	R/W <sup>*2</sup>	
4Ан	74	CH7 Scaling lower limit value	0	R/W <sup>*2</sup>	
4Bн	75	CH7 Scaling upper limit value	0	R/W*2	
4Сн	76	CH8 Scaling lower limit value	0	R/W <sup>*2</sup>	
4Dн	77	CH8 Scaling upper limit value	0	R/W <sup>*2</sup>	
4Eн	78				
to	to	System area	—	—	—
55н	85				
56н	86	CH1 Process alarm lower lower limit value	0	R/W <sup>*2</sup>	
57н	87	CH1 Process alarm lower upper limit value	0	R/W*2	
58н	88	CH1 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	
59н	89	CH1 Process alarm upper upper limit value	0	R/W <sup>*2</sup>	
5Ан	90	CH2 Process alarm lower lower limit value	0	R/W*2	
5Вн	91	CH2 Process alarm lower upper limit value	0	R/W*2	
5Сн	92	CH2 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	l
5Dн	93	CH2 Process alarm upper upper limit value	0	R/W*2	
5Eн	94	CH3 Process alarm lower lower limit value	0	R/W*2	
5Fн	95	CH3 Process alarm lower upper limit value	0	R/W*2	
60н	96	CH3 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	
61н	97	CH3 Process alarm upper upper limit value	0	R/W <sup>*2</sup>	
62н	98	CH4 Process alarm lower lower limit value	0	R/W*2	
63н	99	CH4 Process alarm lower upper limit value	0	R/W <sup>*2</sup>	Section 3 / 10
64н	100	CH4 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	Section 5.4.19
65н	101	CH4 Process alarm upper upper limit value	0	R/W*2	
66н	102	CH5 Process alarm lower lower limit value	0	R/W*2	
67н	103	CH5 Process alarm lower upper limit value	0	R/W <sup>*2</sup>	
68н	104	CH5 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	
69н	105	CH5 Process alarm upper upper limit value	0	R/W*2	
6Ан	106	CH6 Process alarm lower lower limit value	0	R/W*2	
6Вн 107		CH6 Process alarm lower upper limit value	0	R/W <sup>*2</sup>	
6Сн 108		CH6 Process alarm upper lower limit value	0	R/W*2	
6Dн 109		CH6 Process alarm upper upper limit value	0	R/W*2	
6Ен	110	CH7 Process alarm lower lower limit value	0	R/W*2	
6Fн	111	CH7 Process alarm lower upper limit value	0	R/W <sup>*2</sup>	
70н	112	CH7 Process alarm upper lower limit value	0	R/W <sup>*2</sup>	
71н	113	CH7 Process alarm upper upper limit value	0	R/W*2	

#### Table3.8 Buffer memory assignment of Q68AD-G (3/6)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition

	iony writing con			
i Y9	X9			
	11	[ MON	مادماه	مادماد
			ጥጥ	ጥጥ
Writing   Operating	Operating			
request condition	condition			
setting	settina			
request	completed			
roquoor	flag			
<u> </u>				

SETUP AND PROCEDURES BEFORE OPERATION A SPECIFICATIONS & CONFIGURATION A OVERVIEW

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UTILITY PACKAGE SETI (GX CONFIGURATOR- PRO AD) D1 BEFI

3.4 Buffer Memory 3.4.1 Buffer memory assignment **3** - 46

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Address Hexadecimal Decimal		Description		*1	Defense	
		Description	Default	R/W '	Reference	
72н	114	CH8 Process alarm lower lower limit value	0	R/W <sup>*2</sup>		
73н	115	CH8 Process alarm lower upper limit value	0	R/W <sup>*2</sup>	Castian 2.4.40	
74н	116	CH8 Process alarm upper lower limit value	0	R/W*2	Section 3.4.19	
75н	117	CH8 Process alarm upper upper limit value	0	R/W <sup>*2</sup>		
76н	118	CH1 Rate alarm warning detection period	0	R/W <sup>*2</sup>		
77н	119	CH2 Rate alarm warning detection period	0	R/W*2		
78н	120	CH3 Rate alarm warning detection period	0	R/W <sup>*2</sup>		
79н	121	CH4 Rate alarm warning detection period	0	R/W*2	Section 2 4 20	
7Ан	122	CH5 Rate alarm warning detection period	0	R/W <sup>*2</sup>	Section 5.4.20	
7Вн	123	CH6 Rate alarm warning detection period	0	R/W*2		
7Сн	124	CH7 Rate alarm warning detection period	0	R/W <sup>*2</sup>		
7Dн	125	CH8 Rate alarm warning detection period	0	R/W*2		
7Ен	126	CH1 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
7Fн	127	CH1 Rate alarm lower limit value	0	R/W*2		
80н	128	CH2 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
<b>81</b> н	129	CH2 Rate alarm lower limit value	0	R/W*2		
82н	130	CH3 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
83н	131	CH3 Rate alarm lower limit value	0	R/W*2		
84 <sub>H</sub>	132	CH4 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
85н	133	CH4 Rate alarm lower limit value	0	R/W*2	Section 3.4.21	
86н	134	CH5 Rate alarm upper limit value	0	R/W <sup>*2</sup>	0001011 0.4.21	
87н	135	CH5 Rate alarm lower limit value	0	R/W <sup>*2</sup>		
88H	136	CH6 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
89н	137	CH6 Rate alarm lower limit value	0	R/W <sup>*2</sup>		
8Ан	138	CH7 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
8Вн	139	CH7 Rate alarm lower limit value	0	R/W <sup>*2</sup>		
8Cн	140	CH8 Rate alarm upper limit value	0	R/W <sup>*2</sup>		
8Dн	141	CH8 Rate alarm lower limit value	0	R/W <sup>*2</sup>		
8Eu	142	CH1 Input signal error detection setting value/CH1 Input	50	P/\//*2		
OEII	172	signal error detection lower limit setting value	00	1.7,4.4		
8FH	143	CH2 Input signal error detection setting value/CH2 Input	50	R/W <sup>*2</sup>		
		signal error detection lower limit setting value		10,00		
90н	144	CH3 Input signal error detection setting value/CH3 Input	50	R/W <sup>*2</sup>		
		signal error detection lower limit setting value			Section 3.4.22	
91н	145	CH4 Input signal error detection setting value/CH4 Input	50	R/W <sup>*2</sup>		
-	-	signal error detection lower limit setting value				
92н	146	CH5 Input signal error detection setting value/CH5 Input	50	R/W <sup>*2</sup>		
		signal error detection lower limit setting value	-			
93н	147	CH6 Input signal error detection setting value/CH6 Input	50	R/W <sup>*2</sup>		
		signal error detection lower limit setting value			1	

#### Table3.8 Buffer memory assignment of Q68AD-G (4/6)

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\*1 Indicates whether reading from and writing to a sequence program are enabled.

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.



\*3 Areas used to restore the User range settings offset/gain values when the module is replaced online. Refer to Chapter 7 for details of online module change.

R : Read enabled
Melsec Q	series
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Address		Description	Default	D/M/*1	Reference
Hexadecimal	Decimal	Description	Delaun	<b>R/ W</b>	Reference
94 <sub>H</sub>	148	CH7 Input signal error detection setting value/CH7 Input	50	R/W <sup>*2</sup>	
		signal error detection lower limit setting value		1011	
95н	149	CH8 Input signal error detection setting value/CH8 Input	50	R/W <sup>*2</sup>	
06	150	Signal error detection lower limit setting value	50	D/M*2	
90H	150		50	R/W <sup>2</sup>	
97н	151	CH2 Input signal error detection upper limit setting value	50	R/W <sup>2</sup>	Section 3.4.22
98н	152	CH3 Input signal error detection upper limit setting value	50	R/W <sup>2</sup>	Section 5.4.22
99н	153	CH4 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Ан	154	CH5 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Вн	155	CH6 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Сн	156	CH7 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Dн	157	CH8 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Ен	158	Mode switching setting	0		Section 3 4 23
9Fн	159	inde switching setting	0	17/24	Section 5.4.25
А0н	160				
to	to	System area	—	—	—
С7н	199				
С8н	200	Save data classification setting* <sup>3</sup>	0	R/W	Section 3.4.24
С9н	201	System area	_	_	
САн	202	CH1 Factory default offset value <sup>3</sup>	0	R/W	
СВн	203	CH1 Factory default gain value <sup>3</sup>	0	R/W	
ССн	204	CH2 Factory default offset value <sup>*3</sup>	0	R/W	
CDн	205	CH2 Factory default gain value <sup>*3</sup>	0	R/W	
СЕн	206	CH3 Factory default offset value <sup>*3</sup>	0	R/W	
СГн	207	CH3 Factory default gain value <sup>*3</sup>	0	R/W	
D0н	208	CH4 Factory default offset value <sup>*3</sup>	0	R/W	
D1н	209	CH4 Factory default gain value <sup>*3</sup>	0	R/W	0
D2н	210	CH5 Factory default offset value <sup>*3</sup>	0	R/W	Section 3.4.25
D3н	211	CH5 Factory default gain value <sup>*3</sup>	0	R/W	
D4н	212	CH6 Factory default offset value <sup>*3</sup>	0	R/W	
D5н	213	CH6 Factory default gain value <sup>*3</sup>	0	R/W	
D6н	214	CH7 Factory default offset value <sup>*3</sup>	0	R/W	
D7н	215	CH7 Factory default gain value <sup>*3</sup>	0	R/W	
D8H	216	CH8 Factory default offset value <sup>*3</sup>	0	R/W	
D9н	217	CH8 Factory default gain value* <sup>3</sup>	0	R/W	ł
_ •	- • •		, , , , , , , , , , , , , , , , , , ,		

#### Table3.8 Buffer memory assignment of Q68AD-G (5/6)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition



\*3 Areas used to restore the User range settings offset/gain values when the module is replaced online.

Refer to Chapter 7 for details of online module change.

ONLINE MODULE CHANGE

**TROUBLESHOOTING** 

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Address		Description	Dofault	D/M/*1	Poforonco
Hexadecimal	Decimal	Description	Delault	R/W	Reference
DAH	218	CH1 User range settings offset value <sup>*3</sup>	0	R/W	
DBн	219	CH1 User range settings gain value <sup>*3</sup>	0	R/W	
DСн	220	CH2 User range settings offset value <sup>*3</sup>	0	R/W	
DDн	221	CH2 User range settings gain value <sup>*3</sup>	0	R/W	
DEH	222	CH3 User range settings offset value <sup>*3</sup>	0	R/W	
DFH	223	CH3 User range settings gain value <sup>*3</sup>	0	R/W	
E0H	224	CH4 User range settings offset value <sup>*3</sup>	0	R/W	
Е1н	225	CH4 User range settings gain value <sup>*3</sup>	0	R/W	Section 3.4.25
Е2н	226	CH5 User range settings offset value <sup>*3</sup>	0	R/W	0001011 0.4.20
ЕЗн 227 (		CH5 User range settings gain value <sup>*3</sup>	0	R/W	
E4H	228	CH6 User range settings offset value <sup>*3</sup>	0	R/W	
Е5н	229	CH6 User range settings gain value <sup>*3</sup>	0	R/W	
Е6н	230	CH7 User range settings offset value <sup>*3</sup>	0	R/W	
Е7н	231	CH7 User range settings gain value <sup>*3</sup>	0	R/W	
E8H	232	CH8 User range settings offset value <sup>*3</sup>	0	R/W	
Е9н	233	CH8 User range settings gain value <sup>*3</sup>	0	R/W	

### Table3.8 Buffer memory assignment of Q68AD-G (6/6)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition

ī	i	Y9	X9					1
┝		_//			—Гмоу	**	**	Ч
	Writing	Operating	Operating	i	Luiot			-   -
	roquost	condition	condition					
	request	settina	settina					
		request	completed					
	i		flag	1				

\*3 Areas used to restore the User range settings offset/gain values when the module is replaced online. Refer to Chapter 7 for details of online module change.

### (2) Buffer memory assignment of Q66AD-DG

## ⊠Point

Do not write data from system area or sequence program to the buffer memory area where writing is disabled.

Doing so may cause malfunction.

Address		Description	Default	D/M/*1	Reference			
Hexadecimal	Decimal	Description	Denaun		Reference			
0н	0	A/D conversion enable/disable setting	003Fн	R/W <sup>*2</sup>	Section 3.4.2			
1	1	CH1 Average time/Average number of times/	0	D/\/*2				
IH	1	Moving average/Time constant settings	0	R/W -				
2	2	CH2 Average time/Average number of times/	0	אאמ				
ZΠ	2	Moving average/Time constant settings	0	K/W -				
3,,	3	CH3 Average time/Average number of times/	0	×14/10				
0H	0	Moving average/Time constant settings	0	r////	Section 3.4.3			
4н 4		CH4 Average time/Average number of times/	0	D/\\/*2	0001011 0.4.0			
		Moving average/Time constant settings	Ũ	N/ W				
54	5	CH5 Average time/Average number of times/	0	D/\\/*2				
on	Ŭ	Moving average/Time constant settings	Ũ	N/ W				
64	6	CH6 Average time/Average number of times/	0	0	0	0	P/\//*2	
UII	Ŭ	Moving average/Time constant settings	Ũ	11/00				
7н	7							
to	to	System area	—	—	—			
9н	9							
Ан	10	A/D conversion completed flag	0	R	Section 3.4.4			
Вн	11	CH1 Digital output value	0	R				
Сн	12	CH2 Digital output value	0	R				
Dн	13	CH3 Digital output value	0	R	Section 3 4 5			
Ен	14	CH4 Digital output value	0	R				
Fн	15	CH5 Digital output value	0	R				
10н	16	CH6 Digital output value	0	R				
11н	17	System area			_			
12н	18							
13н	19	Error code	0	R	Section 3.4.6			
14н	20	Setting range(CH1 to CH4)	0	R	Section 3.4.7			
15н	21	Setting range(CH5,CH6)	0	R				
<b>16</b> н	22	Offset/gain setting mode offset specification	0	R/W	Section 3.4.8			
17н	23	Offset/gain setting mode gain specification	0	R/W				
<b>1</b> 8н	24	Averaging process specification (CH1 to CH4)	0	R/W <sup>*2</sup>	Section 3.4.9			
19н	25	Averaging process specification (CH5 to CH6)	0	R/W*2	0000010.4.0			

### Table3.9 Buffer memory assignment of Q66AD-DG (1/5)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition

Y9 X9		
	LINOV	~~~
		ጥጥ
Writing Operating Operating		
condition condition		
request setting setting		
Setting Setting		
request completed		
flag		

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Address		Description	Dofault	D/M/*1	Poforonco	
Hexadecimal	Decimal	Description	Delauli	R/W '	Reference	
1Ан	26					
to	to	System area	—	_	—	
1Dн	29					
1Ен	30	CH1 Maximum value	0	R/W		
1Fн	31	CH1 Minimum value	0	R/W		
20н	32	CH2 Maximum value	0	R/W		
21н	33	CH2 Minimum value	0	R/W		
22н	34	CH3 Maximum value	0	R/W		
23н	35	CH3 Minimum value	0	R/W	Section 3.4.10	
24н	36	CH4 Maximum value	0	R/W	00000110.4.10	
25н	37	CH4 Minimum value	0	R/W		
26н	38	CH5 Maximum value	0	R/W		
27н	39	CH5 Minimum value	0	R/W		
28н	40	CH6 Maximum value	0	R/W		
29н	41	CH6 Minimum value	0	R/W		
2Ан	42					
to	to	System area	—	—	—	
2Ен	46					
2F⊔	47	Input signal error detection extended/input signal error	003Eu	P/\//*2	Section 3.4.11	
2	41	detection setting			50000110.4.11	
30н	48	Warning output setting	3F3Fн	R/W*2	Section 3.4.12	
31н	49	Input signal error detection flag	0	R	Section 3.4.13	
32н	50	Warning output flag (Process alarm)	0	R	Section 3.4.14	
33н	51	Warning output flag (Rate alarm)	0	R	0601011 0.4.14	
34н	52	System area	—		_	
35н	53	Scaling enable/disable setting	003Fн	R/W <sup>*2</sup>	Section 3.4.15	
36н	54	CH1 Scaling value	0	R		
37н	55	CH2 Scaling value	0	R		
38н	56	CH3 Scaling value	0	R	Section 2.4.40	
39н	57	CH4 Scaling value	0	R	Section 3.4.10	
ЗАн	58	CH5 Scaling value	0	R		
3Вн	59	CH6 Scaling value	0	R		
3Сн	60	System area				
3Dн	61		_	_	—	
3Ен	62	CH1 Scaling lower limit value	0	R/W <sup>*2</sup>		
3Fн	63	CH1 Scaling upper limit value	0	R/W <sup>*2</sup>		
40н	64	CH2 Scaling lower limit value	0	R/W*2		
41н	65	CH2 Scaling upper limit value	0	R/W <sup>*2</sup>		
42н	66	CH3 Scaling lower limit value	0	R/W <sup>*2</sup>	Section 3.4.17	
43н	67	CH3 Scaling upper limit value	0	R/W <sup>*2</sup>		
44 <sub>H</sub>	68	CH4 Scaling lower limit value	0	R/W*2		
45н	69	CH4 Scaling upper limit value	0	R/W <sup>*2</sup>		

### Table3.9 Buffer memory assignment of Q66AD-DG (2/5)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

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Address		Description	Default	<b>—</b> //*1	Boforonco	~
Hexadecimal	Decimal	Description	Delault	R/W '	Reference	/IEV
46н	70	CH5 Scaling lower limit value	0	R/W*2		ERV
47н	71	CH5 Scaling upper limit value	0	R/W <sup>*2</sup>	Section 3 / 17	8
48 <sub>H</sub>	72	CH6 Scaling lower limit value	0	R/W*2	Section 5.4.17	2
<b>49</b> H	73	CH6 Scaling upper limit value	0	R/W*2		
4Ан	74					N
to	to	System area	—	—	—	ATIC
4Dн	77					BUR
4Eн	78	CH1 Conversion starting time setting (for 2-wire transmitter)	30	R/W*2		NFIG
<b>4</b> Fн	79	CH2 Conversion starting time setting (for 2-wire transmitter)	30	R/W <sup>*2</sup>		S X
50н	80	CH3 Conversion starting time setting (for 2-wire transmitter)	30	R/W <sup>*2</sup>	Section 3 / 18	- 3
51н	81	CH4 Conversion starting time setting (for 2-wire transmitter)	30	R/W <sup>*2</sup>	Section 5.4.10	
52н	82	CH5 Conversion starting time setting (for 2-wire transmitter)	30	R/W*2		S
53н	83	CH6 Conversion starting time setting (for 2-wire transmitter)	30	R/W <sup>*2</sup>		lon
54н	84	System erec				CAT
55н	85	System area	_	_		CIF
56н	86	CH1 Process alarm lower lower limit value	0	R/W <sup>*2</sup>		SPE
57н	87	CH1 Process alarm lower upper limit value	0	R/W <sup>*2</sup>		
58н	88	CH1 Process alarm upper lower limit value	0	R/W <sup>*2</sup>		
59н	89	CH1 Process alarm upper upper limit value	0	R/W <sup>*2</sup>		TION
5Ан	90	CH2 Process alarm lower lower limit value	0	R/W <sup>*2</sup>		ERA.
5Вн	91	CH2 Process alarm lower upper limit value	0	R/W <sup>*2</sup>		UN BIO
5Сн	92	CH2 Process alarm upper lower limit value	0	R/W <sup>*2</sup>		D A A
5Dн	93	CH2 Process alarm upper upper limit value	0	R/W <sup>*2</sup>		ROCET L
5Ен	94	CH3 Process alarm lower lower limit value	0	R/W <sup>*2</sup>		이ᇿᇤ
5 <b>F</b> н	95	CH3 Process alarm lower upper limit value	0	R/W*2		Ð
60н	96	CH3 Process alarm upper lower limit value	0	R/W*2		OR-
61н	97	CH3 Process alarm upper upper limit value	0	R/W*2		AGE
62н	98	CH4 Process alarm lower lower limit value	0	R/W*2	Section 3.4.19	ACK
63н	99	CH4 Process alarm lower upper limit value	0	R/W*2		I Y P
64н	100	CH4 Process alarm upper lower limit value	0	R/W <sup>*2</sup>		
65н	101	CH4 Process alarm upper upper limit value	0	R/W <sup>*2</sup>		
66н	102	CH5 Process alarm lower lower limit value	0	R/W <sup>*2</sup>		6
67н	103	CH5 Process alarm lower upper limit value	0	R/W <sup>*2</sup>		
68н	104	CH5 Process alarm upper lower limit value	0	R/W*2		g
69н	105	CH5 Process alarm upper upper limit value	0	R/W*2		MM
6Ан	106	CH6 Process alarm lower lower limit value	0	R/W*2		ŝRAI
6Вн	107	CH6 Process alarm lower upper limit value	0	R/W <sup>*2</sup>		So So
6Сн	108	CH6 Process alarm upper lower limit value	0	R/W*2		ā
6Dн	109	CH6 Process alarm upper upper limit value	0	R/W*2		
6Ен	110					
to	to	System area	—	—	—	ULE
75н	117					IODI
		*1 Indicates whether reading from and writing to a sequence r	program ar	e enabled	l	Σ

### Table3.9 Buffer memory assignment of Q66AD-DG (3/5)

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.

Buffer memory writing condition

Y9 X9 Э ⊢ ⊢ Writing -[моv  $\mathbb{H}$ ┥┟ Operating condition setting request Operating condition setting completed flag request

ONLINE MODULE CHANGE

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TROUBLESHOOTING

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Addres	Address Description		Default	D/M/*1	Reference
Hexadecimal	Decimal	Description	Delaun	R/W	Kelefence
76н	118	CH1 Rate alarm warning detection period	0	R/W*2	
77н	119	CH2 Rate alarm warning detection period	0	R/W <sup>*2</sup>	
78н	120	CH3 Rate alarm warning detection period	0	R/W <sup>*2</sup>	Section 3 4 20
79н	121	CH4 Rate alarm warning detection period	0	R/W*2	Section 5.4.20
7Ан	122	CH5 Rate alarm warning detection period	0	R/W <sup>*2</sup>	
7Вн	123	CH6 Rate alarm warning detection period	0	R/W <sup>*2</sup>	
7Сн	124	System area	_		_
7Dн	125				
7Eн	126	CH1 Rate alarm upper limit value	0	R/W <sup>*2</sup>	
7 <b>F</b> н	127	CH1 Rate alarm lower limit value	0	R/W*2	
80н	128	CH2 Rate alarm upper limit value	0	R/W <sup>*2</sup>	
81н	129	CH2 Rate alarm lower limit value	0	R/W <sup>*2</sup>	
82н	130	CH3 Rate alarm upper limit value	0	R/W <sup>*2</sup>	
83н	131	CH3 Rate alarm lower limit value	0	R/W <sup>*2</sup>	Section 2 4 21
84н	132	CH4 Rate alarm upper limit value	0	R/W <sup>*2</sup>	Section 3.4.21
85н 133 86н 134		CH4 Rate alarm lower limit value	0	R/W <sup>*2</sup>	
		CH5 Rate alarm upper limit value	0	R/W <sup>*2</sup>	
87н 1	135	CH5 Rate alarm lower limit value	0	R/W <sup>*2</sup>	
88 <sub>H</sub> 136		CH6 Rate alarm upper limit value	0	R/W <sup>*2</sup>	
89н	137	CH6 Rate alarm lower limit value	0	R/W*2	
8Ан	138				
to	to	System area	—	—	—
8Dн	141				
8Eн	142	CH1 Input signal error detection setting value/CH1 Input signal error detection lower limit setting value	50	R/W*2	
05	140	CH2 Input signal error detection setting value/CH2 Input	50	<b>-</b> 4*2	
огн	143	signal error detection lower limit setting value	50	R/W <sup>2</sup>	
90н	144	CH3 Input signal error detection setting value/CH3 Input	50	R/W <sup>*2</sup>	
		signal error detection lower limit setting value		10,00	Section 3.4.22
91н	145	CH4 Input signal error detection setting value/CH4 Input	50	R/W*2	
		CH5 Input signal error detection setting value/CH5 Input			
92н	146	signal error detection lower limit setting value	50	R/W <sup>*2</sup>	
		CH6 Input signal error detection setting value/CH6 Input		*0	
93н	14 <i>1</i>	signal error detection lower limit setting value	50	R/W <sup>2</sup>	
94н	148	System area	_		
95н	149				
96н	150	CH1 Input signal error detection upper limit setting value	50	R/W*2	
97н	151	CH2 Input signal error detection upper limit setting value	50	R/W*2	Section 3.4.22
98н	152	CH3 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	

### Table3.9 Buffer memory assignment of Q66AD-DG (4/5)

MELSEG Q series

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals

Buffer memory writing condition



Address		Description	Dofault	D/M/*1	Poforonco
Hexadecimal	Decimal	Description	Delault	R/W	Reference
99н	153	CH4 Input signal error detection upper limit setting value	50	R/W <sup>*2</sup>	
9Ан	154	CH5 Input signal error detection upper limit setting value	50	R/W*2	Section 3.4.22
9Вн	155	CH6 Input signal error detection upper limit setting value	50	R/W*2	
9Сн	156	System area			
9Dн	157				
9Eн	158	Mode switching setting	0	R/W	Section 3.4.23
<u>9Fн</u>	159				
AUH to	160	Suptom area			
	201	System area	_	_	—
Сэн	201	Old Frateria defende #3	0	D/M/	
САн	202	CH1 Factory default offset value *	0	R/W	
СВн	203	CH1 Factory default gain value <sup>3</sup>	0	R/W	
ССн	204	CH2 Factory default offset value <sup>*3</sup>	0	R/W	
CDн	205	CH2 Factory default gain value <sup>*3</sup>	0	R/W	
СЕн	206	CH3 Factory default offset value <sup>*3</sup>	0	R/W	
СГн	207	CH3 Factory default gain value <sup>*3</sup>	0	R/W	Section 3 4 25
<b>D</b> 0н	208	CH4 Factory default offset value <sup>*3</sup>	0	R/W	3601011 3.4.23
D1н	209	CH4 Factory default gain value <sup>*3</sup>	0	R/W	
D2н	210	CH5 Factory default offset value <sup>*3</sup>	0	R/W	
D3н	211	CH5 Factory default gain value <sup>*3</sup>	0	R/W	
D4 <sub>H</sub>	212	CH6 Factory default offset value <sup>*3</sup>	0	R/W	
D5н	213	CH6 Factory default gain value <sup>*3</sup>	0	R/W	
<b>D</b> 6н	214				
to	to	System area	—	—	—
D9н	217				
DAH	218	CH1 User range settings offset value <sup>*3</sup>	0	R/W	
DBн	219	CH1 User range settings gain value <sup>*3</sup>	0	R/W	
DCн	220	CH2 User range settings offset value <sup>*3</sup>	0	R/W	
DDн	221	CH2 User range settings gain value <sup>*3</sup>	0	R/W	
DEH	222	CH3 User range settings offset value <sup>*3</sup>	0	R/W	
DFн	223	CH3 User range settings gain value <sup>*3</sup>	0	R/W	Section 3 4 25
E0H	224	CH4 User range settings offset value <sup>*3</sup>	0	R/W	3601011 3.4.25
Е1н	225	CH4 User range settings gain value <sup>*3</sup>	0	R/W	
Е2н	226	CH5 User range settings offset value <sup>*3</sup>	0	R/W	
ЕЗн	227	CH5 User range settings gain value <sup>*3</sup>	0	R/W	
E4 <sub>H</sub>	228	CH6 User range settings offset value <sup>*3</sup>	0	R/W	
Е5н	229	CH6 User range settings gain value <sup>*3</sup>	0	R/W	

#### Table3.9 Buffer memory assignment of Q66AD-DG (5/5)

\*1 Indicates whether reading from and writing to a sequence program are enabled.

R : Read enabled

W : Write enabled

\*2 When writing data to the buffer memory, always use the interlock condition (buffer memory write condition) of the following I/O signals.



\*3 Areas used to restore the User range settings offset/gain values when the module is replaced online.

Refer to Chapter 7 for details of online module change.

MELSEC Q series

OVERVIEW

SYSTEM CONFIGURATION

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SPECIFICATIONS

SETUP AND PROCEDURES BEFORE OPERATION

UTILITY PACKAGE (GX CONFIGURATOR-AD)

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PROGRAMMING

### 3.4.2 A/D conversion enable/disable setting (Un\G0)

- (1) Set whether to enable or disable A/D conversion for each channel. For the Q66AD-DG, the A/D conversion enable/disable setting also acts as the ON/ OFF setting of the supply power to the 2-wire transmitter. Note that power is supplied to only the 2-wire transmitters whose channels use input ranges of "4 to 20mA (2-wire transmitter input): 0H", "4 to 20mA (Extended mode) (2-wire transmitter input): AH" or "User range setting (2-wire transmitter input): FH". No power is supplied when any other input range is used.
- (2) It is necessary to set the operating condition setting request (Y9) to ON/OFF in order to validate the A/D conversion enable/disable setting. (Refer to Section 3.3.2.)
- (3) The Q68AD-G is preset to enable A/D conversion on all channels. The Q66AD-DG is preset to disable A/D conversion on all channels.



### 3.4.3 CH □ average time/average number of times/moving average/ time constant settings (Un\G1 to Un\G8)

- (1) Set the average time, average count, moving average count or primary delay filter time constant for each channel for which averaging processing is specified.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) 0 is set as the default.
- (4) The setting ranges are as follows.

Processing method	Setting value
Time averaging	40 to 5000 (ms) <sup>*1</sup>
Count averaging	4 to 500 (times)
Moving average	2 to 60 (times)
Primary delay filter	10 to 5000 (ms) <sup>*2</sup>

## ⊠Point

- (1) For the time averaging marked<sup>\*1</sup>, set a value equal to or greater than (4 times x 10ms x number of channels used). If any insufficient value is set, an error occurs and 0 is stored as a digital output value.
- (2) For the primary delay filter marked<sup>\*2</sup>, set a value equal to or greater than (10ms x number of channels used). If any insufficient value is set, an error occurs and 0 is stored as a digital output value.
- (3) Writing a value outside the range to a channel will cause an error, storing an error code in Error code (Un\G19) and turning ON the Error flag (XF). If this occurs, A/D conversion is performed based on the setting before the error detection.
- (4) Since the default setting is 0, change it for the selected processing method.
- (5) If a value is set to a sampling-processing channel, the value is ignored.

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### 3.4.4 A/D conversion completed flag (Un\G10)

 When the A/D conversion-enabled channel has completed the initial A/D conversion, A/D conversion completed flag is set to 1.

A/D conversion completed flag (XE) turns ON when all A/D conversion-enabled channels have completed the initial A/D conversion.

[For the Q66AD-DG]<sup>\*1</sup>

- When the A/D conversion is enabled in the off condition of the external power supply and the initial A/D conversion is completed, the channels for the analog current input range without a 2-wire transmitter are set to 1. Also, the channels for the 2-wire transmitter range remain 0. If the external power supply is turned on and the initial A/D conversion is completed, the channels are set to 1.
- When the external power supply is turned off, the channels for the 2-wire transmitter range only are set to 0. The channels for the analog current input range without a 2-wire transmitter remain 1.

\*1 The specifications are for product number 15032 or later of the Q66AD-DG. For the specifications for product number 15031 or earlier, refer to Appendix 2.

(2) When operating condition setting request (Y9) is set to ON, A/D conversion completed flag on all channels returns to the default setting of 0.
 If operating condition setting request (Y9) is set to OFF and the initial A/D conversion is completed, the flag is set to 1.





[Setting example of Q66AD-DG]

When all A/D conversions of conversion-enabled channels 3 and 4 are completed, 000CH is stored into the buffer memory address 10 (Un\G10).



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(3) Use this area or the A/D conversion competed flag (XE) as an interlock to read out the digital output value.

### 3.4.5 CH digital output value (Un\G11 to Un\G18)

- (1) Digital values converted from analog values are stored for respective channels.
- (2) Digital values are stored in 16-bit signed binary format.



- (3) While the operating condition setting request (Y9) is ON, 0 is stored in this area.
- (4) Use the A/D conversion competed flag (XE) or the A/D conversion completed flag (Un\G10) as an interlock to read out the digital output value.

### 3.4.6 Write data error code (Un\G19)

- (1) An error code generated by the A/D converter module is stored here.
- (2) Refer to Section 8.1 for details of the error codes.

### 3.4.7 Setting range (Un\G20, Un\G21)

 These areas are used to confirm the input ranges of respective channels. A value set in the input range setting is stored in the corresponding channel area as shown below.

	b15	to	b12 b11	to	b8 l	b7 to	b4 b3	3 to	b0
Un\G20 (Setting range CH1 to CH4)		CH4		CH3		CH2		CH1	
Un\G21(Setting range CH5 to CH8)		CH8		CH7		CH6		CH5	

For Q66AD-DG, information of b8 to b15 is fixed at 0.

### Setting ranges of Q68AD-G

Input range	Setting value
4 to 20 mA	Он
0 to 20 mA	1н
1 to 5 V	2н
0 to 5 V	3н
-10 to 10V	4н
0 to 10 V	5н
4 to 20 mA (Extended mode)	Ан
1 to 5 V (Extended mode)	Вн
User range setting	Fн

### Setting ranges of Q66AD-DG

Input range	Setting value
4 to 20 mA	
(For 2-wire transmitter input)	UH
4 to 20 mA (For current input)	6н
0 to 20 mA (For current input)	7н
4 to 20 mA (Expanded mode)	Διι
(For 2-wire transmitter input)	Ап
4 to 20 mA (Expanded mode)	Cu
(For current input)	Сп
User range setting	Eu
(For current input)	
User range setting	Fн
(For 2-wire transmitter input)	П

## **Point**

The input range setting cannot be changed in this area.

Change the input range setting in the intelligent function module switch setting. (Refer to Section 4.5.)

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## 3.4.8 Offset/gain setting mode offset/gain specification (Un\G22, Un\G23)

- (1) Specify the channel to be adjusted for the offset/gain settings.
- (2) Specify the channel to be adjusted with an offset value in Un\G22 and the channel to be adjusted with a gain value in Un\G23.
- (3) Set the offset and gain separately (Set either Un\G22 or Un\G23 to 0). If both are set at the same time, an offset/gain setting mode error (error code 500) occurs.
- (4) Refer to Section 4.6 for the details of the offset/gain settings.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G22 (Offset specification)	0	0	0	0	0	0	0	0	CH8	CH7	CH6	CH5	CH4	СНЗ	CH2	CH1
Un\G23 (Gain specification)	0	0	0	0	0	0	0	0	CH8	CH7	CH6	CH5	CH4	СНЗ	CH2	CH1

For Q68AD-G, information of b8 to b15 is fixed at 0. For Q66AD-DG, information of b6 to b15 is fixed at 0. 1 : Channel set 0 : Invalid

### 3.4.9 Averaging process specification (Un\G24, Un\G25))

- (1) Specify whether to perform sampling processing or averaging processing (time averaging, count averaging, moving average, or primary delay filter) for each channel.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) By default, sampling processing( $0_H$ ) is set for all channels.

	b15	to	b12 b11	to	b8 b7	to	b4 b3	to	b0
Un\G24 (Setting range CH1 to CH4)	(	CH4		CH3		CH2		CH1	
Un\G25 (Setting range CH5 to CH8)	(	CH8		CH7		CH6		CH5	

For Q66AD-DG, information of b8 to b15 is fixed at 0.

Processing method	Setting value
Sampling processing	Он
Time averaging	1н
Count averaging	2н
Moving average	3н
Primary delay filter	4н

### [Setting example of Q68AD-G]

When setting channel 1 to count averaging, channel 2 to time averaging, channel 3 to primary delay filter, and channel 4 to sampling processing, store 412H into Un\G24.



### [Setting example of Q66AD-DG]

When setting channel 1 to time averaging, channel 2 to count averaging, channel 3 to moving average, and channel 4 to primary delay filter, store 4321H into Un\G24.



### **Point**

When a value outside the above setting range has been written to a channel, sampling processing is applied to the channel.

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## 3.4.10 CH □ maximum value/minimum value storage area (Un\G30 to Un\G45)

- (1) For each channel, the maximum and minimum values of the converted digital values are stored in this area every sampling time in 16-bit signed binary.
- (2) The stored values for all channels will be cleared to 0 when the operating condition setting request (Y9) is set to ON and the setting is changed or when the maximum value/minimum value reset request (YD) is set to ON.
- (3) For the channel where averaging processing is specified also, the maximum and minimum values of the digital values from sampling processing are stored in this area.
- (4) When the scaling function is enabled, maximum/minimum values after scaling conversion are stored.

### 3.4.11 Input signal error detection extended/input signal error detection setting (Un\G47)

- (1) This area is used to set whether the input signal error detection, process alarm, or rate alarm will be enabled or disabled for each channel. If the warning of input signal error detection is enabled, the input signal error detection can be performed by setting the same value of upper and lower limit or different value of upper and lower limit.
- (2) To validate the input signal error detection extended/input signal error detection setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) All channels for the input signal error detection and all channels for the input signal error detection extended setting are set to the same value of upper limit and lower limit as the default setting.



For Q66AD-DG, information of b6, b7, b14, b15 is fixed at 0.

### [Setting example of Q68AD-G]

If the following setting is performed, store 01EAH into Un\G47.

- The channel 1, 3 and 5 specified for input signal error detection are set to 0 (enabled).
- The channel 1 specified for input signal error detection extended setting is set to 1 (different value of lower and upper limit).

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	0	01EAн
CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	-
\			/	\			/	\			/	\			/	
	(	)			1				E	Ξ				4		

[Setting example of Q66AD-DG]

If the following setting is performed, store 0215H into Un\G47.

- The channel 2, 4 and 6 specified for input signal error detection are set to 0 (enabled).
- The channel 2 specified for input signal error detection extended setting is set to 1 (different value of lower and upper limit).



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### 3.4.12 Warning output settings (Un\G48)

- (1) This area is used to set whether the process alarm/rate alarm warning is to be output or stopped on a channel basis.
- (2) To validate the warning output setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) By default, all channels are set to disable.





For Q66AD-DG, information of b6, b7, b14, b15 is fixed at 0.

### [Setting example of Q68AD-G]

When process alarm warning output is enabled for channel 1 and rate alarm warning output is enabled for channel 3, FBFEH is stored into Un\G48.

1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	FBFE
CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH8	CH7	CH6	CH5	CH4	CH3	CH2	CH1	
\			/	\			/	\			/	\			/	
	F	=			В				I	=			F	=		

### [Setting example of Q66AD-DG]

When process alarm warning output is enabled for channel 2 and rate alarm warning output is enabled for channel 4, 373DH is stored into Un\G48.



### 3.4.13 Input signal error detection flag (Un\G49)

- (1) If the analog input value detected falls outside the setting range sets to the CH□ input signal error detection setting value/CH□ Input signal error detection lower limit setting value (Un\G142 to Un\G149), or CH□ input signal error detection upper limit setting value (Un\G150 to Un\G157), the Input signal error detection flag for the corresponding channel turns to 1.
- (2) By bringing the analog input value within the setting range and turning ON the Error clear request (YF), the Input signal error detection flag turns OFF.
- (3) If an error is detected on any one of the channels for which input signal error detection is enabled, the Input signal error detection signal (XC) also turns ON.
- (4) When the operating condition setting request (Y9) is turned ON, the Input signal error detection flag is cleared.



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#### Warning output flag (Un\G50,Un\51) 3.4.14

- (1) If the digital output value or its varying rate falls outside the setting range set to the CH□ process alarm upper/lower limit value (Un\G86 to Un\G117) or CH□ rate alarm upper/lower limit value (Un\G126 to Un\G141), the warning output flag for the corresponding channel turns to 1.
- (2) For both the process alarm and rate alarm, whether the warning is for the upper or lower limit value can be checked on a channel basis.
- (3) When the digital output value or its varying rate returns to within the setting range, the warning output flag is automatically reset.
- (4) If a warning is detected on any one of the channels for which A/D conversion and process alarm or rate alarm warning output are enabled, the Warning output signal (X8) also turns ON.
- (5) When the operating condition setting request (Y9) is turned ON, the warning output flag is cleared.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
	CH8	CH8	CH7	CH7	CH6	CH6	CH5	CH5	CH4	CH4	CH3	CH3	CH2	CH2	CH1	CH1	7
Un\G50(Process alarm)	Upper limit value	Lower limit value	Lower limit value	Upper limit value	ES ERATIOI												
	For Q	66AD	-DG, ir	nforma	ation o	f b12	to b15	is fixe	ed at 0					0: N 1: A	Norma Alarm	ıl, ON	SETUP AND PROCEDUR BEFORE OF
	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	5
	CH8	CH8	CH7	CH7	CH6	CH6	CH5	CH5	CH4	CH4	CH3	CH3	CH2	CH2	CH1	CH1	o'r
Un\G51(Rate alarm)	Upper limit value	Lower limit value	Lower limit value	Upper limit value	SKAGE SURATOF												
	For Q	66AD	-DG, ir	/ nforma	ation o	f b12	to b15	is fixe	ed at 0	I.				0: N 1: A	Norma Alarm	il, ON	UTILITY PAC (GX CONFIG AD)

#### 3.4.15 Scaling enable/disable setting (Un\G53)

- (1) Whether to enable or disable the scaling function for each channel is set in this area.
- (2) To validate the scaling function, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) All channels are defaulted to "Disable".

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G53	0	0	0	0	0	0	0	0	CH8	CH7	CH6	CH5	CH4	СНЗ	CH2	CH1
For Q68AD-G, information of b8 to b15 is fixed at 0.												0: Ac 1: Ina	tive active			

### **Point**

When the Scaling enable/disable setting (Un\G53) is set to "Disable", 0s are stored in the CH $\square$  scaling value storage area (Un\G54 to Un\G61).

## 3.4.16 CH □ scaling value storage area (Un\G54 to Un\G61)

- (1) Digital output values after scaling are stored for respective channels.
- (2) Scaling values are stored as 16-bit signed binaries.



## 3.4.17 CH scaling upper / lower limit value (Un\G62 to Un\G77)

- (1) For each channel, set a scaling range.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) The setting range is -32000 to 32000.
- (4) Refer to Section 3.2.6 for details of the scaling function.

## ⊠ Point

- Setting a value outside the above setting range or a value that does not meet the inequality "Upper limit > Lower limit" will cause an error. If this occurs, an error code is stored in Error code (Un\G19) followed by ON of the Error flag (XF), and the module will operate under the setting before the error.
- (2) Since the default setting is 0, change the setting.
- (3) When the Scaling enable/disable setting (Un\G53) is set to "Disable", scaling upper/lower limit values are ignored.

## 3.4.18 CH □ conversion starting time setting (for 2-wire transmitter) (Un\G78 to Un\G83) (Q66AD-DG only)

- (1) This area is used to set the "time necessary from when the used 2-wire transmitter powers on until its output stabilizes" on a channel basis. This setting is valid only for the channels that use input ranges of "4 to 20mA (2-wire transmitter):  $0_H$ " or "User range setting (2-wire transmitter):  $F_H$ ", and that are set as conversion-enabled in the A/D conversion enable/disable setting (Un\G0). It is ignored in the case of any other setting.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)

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(3) The setting range is 0 to 3276.7 seconds (0 to 54 minutes and 36.7 seconds) [0 to 32767].

Set the time in 100ms increments.

- Example) When setting the A/D conversion starting time to 5 seconds, store 50 into the buffer memory.
- (4) The default is set to 3 seconds [30].
- (5) Refer to Section 3.2.5 for details of the conversion starting time setting function.

## **Point**

If a value outside the above setting range is written to a channel, an error occurs, and an error code is stored into the Error code (Un\G19). In this case, the operation is performed based on the setting before the error detection.

## 3.4.19 CH □ process alarm upper/lower limit value (Un\G86 to Un\G117)

- (1) For each channel, set a range of digital output values.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) The setting range is -32768 to 32767.
- (4) Make four kinds of settings: process alarm upper upper limit value, upper lower limit value, lower upper limit value and lower lower limit value.
- (5) Refer to Section 3.2.4 for details of the process alarm.

### ⊠Point

- (1) If a value outside the above setting range is set or if a value that does not satisfy the condition of "lower lower limit value ≤ lower upper limit value ≤ upper lower limit value ≤ upper upper limit value" is set, it results in an error. An error code is stored into the Error code (Un\G19), the Error flag (XF) turns ON, and operation is performed based on the setting before the error detection.
- (2) Since the default setting is 0, change the setting.
- (3) When "Enable" is set in the Scaling enable/disable setting (Un\G53), always take into account the scaling conversion before setting values.



## 3.4.20 CH □ rate alarm warning detection period (Un\G118 to Un\G125)

- (1) Set a period, with which the varying rate of the digital output value will be checked, on a channel basis.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) The setting range is 10 to 5000ms. The value can be set in 1ms increments, but the first digit is rounded down and the value is processed in 10ms increments.
- (4) When time averaging or count averaging has been specified for averaging process specification, set the rate alarm warning detection period as a multiple of the time averaging or count averaging conversion period.
  - Example) When the number of channels is 5, and if the count value set for the count averaging is 10, the conversion cycle for count averaging is: 10 (times)  $\times$  5 (CH)  $\times$  10 (ms) = 500 (ms) Therefore, set a multiple of 500, such as 1500 or 3000, to the rate alarm warning detection period.
- (5) The default setting is 0ms.
- (6) Refer to Section 3.2.4 for details of the rate alarm.

## ⊠ Point

- (1) If a value outside the above setting range is written to a channel, an error occurs, and an error code is stored into the Error code (Un\G19). The Error flag (XF) turns ON, and the time or count averaging or rate alarm processing is performed based on the setting before the error detection.
- (2) Since the default setting is 0, change the setting.
- (3) If the upper limit value and lower limit value settings of the rate alarm are small, the warning output may turn ON due to overreaction to disturbance or like. This overreaction can be avoided by increasing the setting of the rate alarm warning detection period.

### 3.4.21 CH rate alarm upper/lower limit value (Un\G126 to Un\G141)

- (1) For each channel, set the range of change rate of digital output values.
- (2) To validate the setting, the operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) The setting range is -32768 to 32767 (-3276.8 to 3276.7%). Set the value in 0.1%/s increments.
  - Example) When setting the rate alarm upper limit value to 30%/s, store 300 into the buffer memory.
- (4) Refer to Section 3.2.4 for details of the rate alarm.

# 3.4.22 CH □ Input signal error detection setting value/CH □ Input signal error detection lower limit setting value (Un\G142 to Un\G149)

CH  $\square$  Input signal error detection upper limit setting value (Un\G150 to Un\G157)

- Set the value (upper limit setting value and lower limit setting value), by which an error of the input analog value will be detected, on a channel basis. The setting value (upper limit value and lower limit value) depends on the input signal error detection extended setting.
  - (a) When Same upper limit value/lower limit value is selected.
    - Set the value of the input signal error detection setting for CH□ input signal error detection setting (Un\G142 to Un\G149).
  - (b) When Different upper limit value/lower limit value is selected.
    - Set the value of the input signal error detection lower limit for CH□ Input signal error detection lower limit setting value (Un\G142 to Un\G149).
    - Set the value of the input signal error detection upper limit for CH□ Input signal error detection upper limit setting value (Un\G150 to Un\G157).
- (2) To validate the setting, the Operating condition setting request (Y9) must be turned ON/OFF. (Refer to Section 3.3.2.)
- (3) The setting range is 0 to 250 (0 to 25.0%). Set the value in 0.1% increments. Example) When setting the input signal error detection setting value to 15%, store 150 into the buffer memory.

If 251 is entered in the CH□ Input signal error detection upper limit setting value and CH□ Input signal error detection lower limit setting value boxes after Different upper limit value/lower limit value is selected for the input signal error detection extended setting, the detection function for the upper and lower limits can be disabled.

(4) Based on an input signal error detection setting value (input signal error upper and lower limit setting values), an input signal upper and lower limit values are calculated as shown below.

The calculated values vary depending on the input range.\*1

- (a) Input signal error detection upper limit value
  - = gain value of corresponding range + (gain value of corresponding range offset value of corresponding range) × {input signal error detection setting value (Input signal error detection upper limit setting value) /1000}
- (b) Input signal error detection lower limit value
  - = lower limit value of corresponding range + (gain value of corresponding range - offset value of corresponding range) × {input signal error detection setting value (Input signal error detection lower limit setting value) /1000}
  - \*1 For the lower limit value, offset value, and gain value for each input range, refer to Point (3) in this section.

[Example When same upper limit value/lower limit value is selected for the input signal error detection extended setting, setting 15% (150) to the input signal error detection setting value in the Q68AD-G]

Resolution mode : High resolution mode

Used range : User range setting (Offset value: 5mA, Gain value: 18mA) In this setting, because the lower limit value is an analog value at the time the digital value is -12000, it is -8mA.

Therefore, the input signal error detection upper and lower limit values are as follows:

Input signal error detection upper limit value =  $18 + (18-5) \times 150/1000 = 19.95$ mA Input signal error detection lower limit value =  $-8 - (18-5) \times 150/1000 = -9.95$ mA

(5) Refer to Section 3.2.3 for details of the input signal error detection function.

## **Point**

- (1) Set the input signal error detection upper limit value to less than 25mA. If the setting is 25mA or more, the error may not be detected.
- (2) If a value outside the setting range is set, an error occurs and an error code is stored in the Error code (Un\G19). In this case, the operation is performed based on the setting before the error detection.
- (3) The following table lists the lower limit value, offset value, and gain value for each input range.

Input	Analog input range	Lower limit value	Offset value	Gain value
	0 to 10V	0V	10V	
	0 to 5V	0V	5V	
	1 to 5V	1V		5V
Volt-	1 to 5V (extended mode)	1V		5V
age	-10 to 10V	-10V	0V	10V
	User range setting	Analog value when the digital value is: • -4000 (normal resolution mode) • -12000 (high resolution mode)	Analog value set as an offset value by the user	Analog value set as a gain value by the user
	0 to 20mA	0mA	0mA	20mA
	4 to 20mA	4mA	4mA	20mA
Cur-	4 to 20mA (extended mode)	4mA	4mA	20mA
rent	User range setting	Analog value when the digital value is: • -4000 (normal resolution mode) • -12000 (high resolution mode)	Analog value set as an offset value by the user	Analog value set as a gain value by the user

### Table3.10 The lower limit value, offset value, and gain value for each input range (Q68AD-G)

### Table3.11 The lower limit value, offset value, and gain value for each input range (Q66AD-DG)

Input	Analog input range	Lower limit value	Offset value				
0 to 20mA	0mA	0mA					
4 to 20mA	4mA		20mA				
4 to 20mA (extended mode)	4mA	20mA					
User range setting	Analog value set as an offset	Analog value set as an offset value by the user					

- (1) Set values for the mode desired to be switched to.
- (2) After setting the values, turning the operating condition setting request (Y9) from OFF to ON switches to that mode.
- (3) When mode switching is performed, this area is cleared to zero and the operating condition setting completed flag (X9) turns OFF.
- (4) After confirming that the operating condition setting completed flag (X9) has turned OFF, turn OFF the operating condition setting request (Y9).

Mode to be switched to	Set value							
Mode to be switched to	Buffer memory address 158	Buffer memory address 159						
Normal mode	0964н	4144н						
Offset/gain setting mode	4144н	0964н						

## ⊠Point

If any value other than the above is written, mode switching is not performed and only the operating condition is changed.

### 3.4.24 Save data classification setting (Un\G200) (Q68AD-G only)

 This area is used to restore the User range settings offset/gain values when the module is replaced online.

Refer to Chapter 7 for details of online module change.

(2) Specify whether the offset/gain values to be saved/restored are voltages or currents when saving/restoring the offset/gain values of the user range setting.



## ⊠Point

Refer to Section 4.6 for the offset/gain value setting method.

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## 3.4.25 Factory default and User range settings offset/gain value (Un\G202 to Un\G233)

- The areas are used to restore the User range settings offset/gain values when the module is replaced online.
   Refer to Chapter 7 for details of online module change.
- (2) When the offset/gain values of the user range setting are restored, the used data are stored.

The data are stored (saved) when:

- Initial setting is written by the utility;
- The operating condition is set (Y9 turns from OFF to ON \* 1); or
- The offset/gain values are written in the offset/gain setting mode (YA turns from OFF to ON).

- (3) When restoring the offset/gain values of the user range setting, set the data saved here into the corresponding area of the module where the data will be restored.
- (4) Buffer memory saving recording procedure for online module change
  - 1) Set the save data classification setting<sup>\*1</sup> (Un\G200).
  - 2) Turn the operating condition setting request (Y9) from OFF to ON.
  - Compare the offset/gain values of the Factory default and User range settings (Un\G202 to Un\G233) with the range reference values. Refer to Section 7.4 for the range reference values.
  - 4) If the values are proper, record the values of the save data classification

setting<sup>\*1</sup>, Factory default and User range settings offset/gain value.

\*1: The Q66AD-DG does not require the setting and recording of the save data classification setting.

## ⊠Point

Refer to Section 4.6 for the offset/gain value setting method.

<sup>\*1:</sup> The data are not saved when values have been written to the mode switching setting area (Un\G158, Un\G159).

## 4 SETUP AND PROCEDURES BEFORE OPERATION

## 4.1 Handling Precautions

- (1) Do not drop the module or subject it to heavy impact.
- (2) Do not remove the PCB of the module from its case. Doing so may cause the module to fail.
- (3) Be careful not to let foreign particles such as swarf or wire chips enter the module. They may cause a fire, mechanical failure or malfunction.
- (4) The top surface of the module is covered with a protective film to prevent foreign objects such as wire burrs from entering the module during wiring.
   Do not remove this film until the wiring is complete.
   Before operating the system, be sure to remove the film to provide adequate ventilation.
- (5) Tighten the screws such as module fixing screws within the following ranges. Loose screws may cause short circuits, failures, or malfunctions.

Screw location	Tightening torque range
Module fixing screw (M3 screw)	0.36 to 0.48 N m
Connector screw (M2.6 screw)	0.20 to 0.29 N <sup>.</sup> m
FG terminal screw (M3 screw)	0.42 to 0.58 N <sup>.</sup> m

(6) To mount the module, while pressing the module mounting lever located in the lower part of the module, fully insert the module fixing projection into the hole in the base unit and press the module until it snaps into place.

Improper installation may result in a module malfunction, or may cause the module to fall off.

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### 4.1.1 Attaching a module fixing bracket (Q66AD-DG only)

After mounting the Q66AD-DG on the base unit, fix the module with a module fixing bracket.

### **Point**

Make sure that the module fixing bracket is hooked on the 3rd slit viewed from the front of Q66AD-DG.

And tighten the module fixing screw at the specified torque.



## 4.2 Setup and Procedures before Operation



#### **Part Names** 4.3

The name of each part of the A/D converter module is shown below.

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3) 1) 2) ľ External device Terminal number Terminal number F 0 A1 B1 A20 B20 ſ 0 A 5) (2) Q66AD-DG Module fixing bracket Module fixing screw 1) ,3) External device 2) connector Terminal Terminal number number 0 A1 B1 A20 B20 0 --5)

4)

## SETUP AND PROCEDURES BEFORE OPERATION

Name and appearance

Description Displays the operating status of the A/D converter module. : Normal operation

1)	RUN LED <sup>*2</sup>	On : Normal operation	
		Flashing : During offset/gain setting mode	
		Off : 5V power supply interrupted, watchdog timer error occurred, or	
		online module change enabled.	
		Displays the error status of the A/D converter module.	
2)	ERR. LED	On ː Error <sup>*1</sup>	
		Flashing : Error in switch settings. Switch No. 5 of the intelligent function	
		module has been set to a value other than zero.	
		Off : Normal operation	
		Displays the alarm status of the A/D converter module.	
3)	ALM LED	On : An alarm (process alarm, rate alarm) occurred.	
		Flashing : An input signal error occurred.	
		Off : Normal operation	
	FG terminal L-Shaped	Metal fitting to wire for FG of the Q66AD-DG.	
4)	metal fitting (Q66AD-DG		
	only)		
5)	Serial No. display	Displays the serial No. of the A/D converter module.	_
			_

\* 1 Check the error code for details.

\* 2 When the module is mounted on a MELSECNET/H remote I/O station, the RUN LED stays off until a data link starts normally, even after the power is turned on. The RUN LED turns on once a data link starts.

## **Point**

Number

When two or more errors have occurred, the latest error found by the A/D converter module is indicated with the LED.

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(1) Q68AD-G			
Terminal number	Signal name	Terminal number	Signal name
A1	CH1 V +	B1	CH1 V -/I -
A2	CH1 I +	B2	-
A3	-	B3	CH2 V +
A4	CH2 V -/I -	B4	CH2 I +
A5	-	B5	-
A6	CH3 V +	B6	CH3 V -/I -
A7	CH3 I +	B7	-
A8	-	B8	CH4 V +
A9	CH4 V -/I -	B9	CH4 I +
A10	-	B10	-
A11	CH5 V +	B11	CH5 V -/I -
A12	CH5 I +	B12	-
A13	-	B13	CH6 V +
A14	CH6 V -/I -	B14	CH6 I +
A15	-	B15	-
A16	CH7 V +	B16	CH7 V -/I -
A17	CH7 I +	B17	-
A18	-	B18	CH8 V +
A19	CH8V -/I -	B19	CH8 I +
A20	-	B20	-

(2) Q66AD-DG			
Terminal number	Signal name	Terminal number	Signal name
A1	CH1 P	B1	CH1 I +/CHK +
A2	-	B2	CH1 I -/CHK -
A3	-	B3	-
A4	CH2 P	B4	CH2 I +/CHK +
A5	-	B5	CH2 I -/CHK -
A6	-	B6	-
A7	CH3 P	B7	CH3 I +/CHK +
A8	-	B8	CH3 I -/CHK -
A9	-	B9	-
A10	CH4 P	B10	CH4 I +/CHK +
A11	-	B11	CH4 I -/CHK -
A12	-	B12	-
A13	CH5 P	B13	CH5 I +/CHK +
A14	-	B14	CH5 I -/CHK -
A15	-	B15	-
A16	CH6 P	B16	CH6 I +/CHK +
A17	-	B17	CH6 I -/CHK -
A18	-	B18	-
A19	24VDC	B19	24VDC
A20	24GDC	B20	24GDC
P : Power supply for 2-wire transmitter			

I+/CHK+ : 2-wire transmitter current input, Current(+) input / check (+) terminal

I-/CHK-: Current(-) input / check (-) terminal

### (3) Connector for external wiring

The connectors for use with the A/D converter module should be purchased separately by the user.

The following tables show the connector types and the crimp-contact tool.

### (a) Connector types<sup>\*1</sup>

Туре	Model name	Applicable wire size
Soldering type (straight out)	A6CON1	0.3mm <sup>2</sup> (AWG22) (stranded)
Crimp-contact type (straight out)	A6CON2	0.088mm <sup>2</sup> to 0.24mm <sup>2</sup> (AWG28 to 24) (stranded)
Soldering type (straight out/diagonal out)	A6CON4	0.3mm <sup>2</sup> (AWG22) (stranded)

\*1: The A6CON3 (pressure-displacement type, straight out) connector cannot be used for the A/D converter module.

### (b) Crimp-contact tool

Туре	Model name	Applicable wire size	Contact
Crimp-contact tool	N363TT005H	0.088mm <sup>2</sup> to 0.24mm <sup>2</sup> (AWG28 to 24)	OTAX Corporation

A1 A2 A3 A4 A5

A6

Α7

A8

A9 A10

A11 A12 0 0 0 0

A13 0 0

A14

A15 0 0

A16 0 0

A17

A18 0 0

A19

A20 0 0

0 0

0 0 B2 B3 0 0

0 0

0 0 B7

0 0 B8

0 0 B9 B10

0 0

0 0

0 0

0 0

Seen from the front of the module

Β1

B4

B5 0 0

B6 0 0

> B11 B12

B13

B14

B15

B16

B17

B18

B19

B20

## 4.4 Wiring

The wiring precautions and examples of module connection are provided below.

### 4.4.1 Wiring precautions

In order to optimize the functions of the A/D converter module and ensure system reliability, external wiring that is protected from noise is required. Please observe the following precautions for external wiring:

- (1) Use separate cables for the AC control circuit and the external input signals of the Q68AD-G to prevent influences of AC surge or induction.
- (2) Use separate cables for the AC control circuit, the external input signals and external power supply of the Q66AD-DG to avoid influences of AC side surge or induction.
- (3) Keep a distance among the main circuit line, a high-voltage cable and a load cable from other than the programmable controller.
   Failure to do so may increase the effects of noise, surges and induction.
- (4) The shield wire or the shield of the shielded cable must be grounded at one end.
- (5) When wiring to the module placed on the right side of the Q66AD-DG is difficult, remove the Q66AD-DG before wiring.

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### 4.4.2 External wiring

### (1) Q68AD-G

(a) For voltage input

Signal source 0 to ±10V



(b) For current input



- \*1: Use a 2-core twisted shielded wire for the power wire.
- \*2: Shows input resistance.
- \*3: For current input, be sure to connect (V+) and (I+) terminals.
- \*4: Connect (V+) terminal to (I+) terminal in the external device connection connector to reduce resistance of the connection conductor.
- \*5: Always ground the shield of the wire of each channel.



If the external wiring is disconnected during use of voltage input on the Q68AD-G, depending on the internal circuit characteristics, a certain time is required until the digital output reaches a value equivalent to 0V.

To avoid the phenomenon, connect a resistor (approximately 1M  $_\Omega$  ) across (V+) and (V-) terminals.

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### (2) Q66AD-DG





(b) For current input



- \*1 Use a 2-core twisted shielded wire for the power wire.
- \*2 Shows input resistance.
- \*3 To connect with the 2-wire transmitter, be sure to connect to P and I+/CHK+.
- \*4 Always ground the shield of the wire of each channel.
- \*5 The check terminals (CHK+, CHK-) are used to check the amount of input in mA in relation to the 2-wire transmitter output.

This can be checked since analog inputs of 4 to 20mA are converted to analog outputs of 1 to 5V. The relationship of this conversion can be expressed by the following formula:

Analog output(V) = 
$$\frac{\text{Analog input(mA)}}{1000} \times 250 \,\Omega$$

\*6 When all the channels used are for current input, wiring for 24VDC is not required. Note that to use the Q66AD-DG with a product number (first five digits) of 15031 or earlier, refer to Appendix 2.

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. . . . . .



ance to the specification (accuracy). Therefore, power on 30 minutes prior to offset/gain setting or after online module

change.

. . . .

## 4.4.3 Connector/terminal block converter module

For the following products, please consult your local Mitsubishi Electric sales office or representative.

### (1) Q68AD-G

Product	Model	Manufacturer
Dedicated cable	FA-CBL□□Q68ADGN <sup>*1</sup>	Mitsubishi Electric Engineering Co
Connector/terminal block con-	FA1-TBS40ADGN	I td
verter module	FA-LTB40ADGN	

### (2) Q66AD-DG

Product	Model	Manufacturer
Dedicated cable	FA-CBL□□Q66ADDG <sup>*1</sup>	Mitsubishi Electric Engineering
Connector/terminal block con-	FA1-TBS40ADDG	Co., Ltd.
verter module	FA-LTB40ADDG	],

## ⊠Point

The offset/gain setting is adjusted in each module (Q68AD-G and Q66AD-DG) at the factory default setting of the modules.

Therefore an error may occur for the conversion characteristic because of the influence such as the conductor resistance when a dedicated cable or connector/ terminal block converter module is used.

If a problem occurs by the influence, perform the offset/gain setting by using the user range setting. (Refer to Section 4.6.)

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## 4.5 Intelligent Function Module Switch Setting

The intelligent function module switches are set using the I/O assignment settings of GX Developer.

### (1) Setting item

The intelligent function module switches consist of switches 1 to 5 and are set using 16-bit data. When the intelligent function module switches are not set, the default value for switches 1 to 5 is 0.

Switch No.		Setting item	
		Q68AD-G	
		Analog input range	Input range setting value
		4 to 20mA	0н
	Input range setting	0 to 20mA	1н
Switch 1		1 to 5V	2н
	ЦЦЦЦН	0 to 5V	Зн
	CH4 CH3 CH2 CH1	-10 to 10V	4н
		0 to 10V	5н
		4 to 20mA (Extended mode)	Ан
		1 to 5V (Extended mode)	Вн
		User range setting	Fн
		-	<u></u>
		Q66AD-DG	
		Analog input range	Input range setting value
		4 to 20mA (For 2-wire transmitter	0H
		input)	011
	Input range setting	4 to 20mA (For current input)	6H
		0 to 20mA (For current input)	7H
Switch 2		4 to 20mA (Extended mode)	Δц
	Eived at 00u	(For 2-wire transmitter input)	7.11
	for Q66AD-DG	4 to 20mA (Extended mode) (For current input)	Сн
		User range setting (For current input)	Ен
		User range setting (For 2-wire transmitter input)	Fн
		<b></b>	·
Switch 3		Empty	
Switch 4		н: Fixed Normal resolution mode to Fн (value other than 0н)*1: High resolutior Normal mode (A/D conversion processing)	i mode
Switch E	IH		
Switch 5		UH : Fixed	

Table4.1 Switch setting item

\*1 Setting any value within the setting range will provide the same operation. When the setting range is 1H to FH, set 1H for example.

### (2) Operating procedure

Start the settings with GX Developer I/O assignment setting window.

LC n	ame	PL	C system	P	LC file	PLC R	AS(1)	PLC RA	S(2)	0	)evic	e Program	
oot f	ie				SFC			1/0 a	ssig	nment			
1/0 /	Assign	ment(*)											
	S	lot	Type		Mo	del nam	е	Points		Start≽	<u>۲</u>	•	
0	PLC		PLC	•					-			Switch setti	'nq
1	0(*-0)		Intelli.	Ŧ	Q68AD-G			16points	-		_		
2	1(*-1)			Ŧ					Ŧ		_	Detailed sett	ng
3	2[*-2]			•					-				
4	3(*-3)			-					-		_		
5	4(*-4)			Ŧ					۳		_		
6	5(*-5)			•					•		_		
				-									
/ A:	ssignin	g the l	/O address is	no	t necessar	y as the	CPU d	l bes it autom	▼ atica	ally.		<u> </u>	
A: Le Base	ssignin saving sattin	g the l this se g(*)	/O address is tting blank w	il n	I ot necessar ot cause a	y as the n error t	o occur	l oes it autom	atica	ally.		2 	
A: Le Base	ssignin saving saving	g the l this se g(*) Base	/O address is tting blank w model name	no il n	i ot necessar, iot cause a ower mode	y as the n error t I name	CPU di o occur Exten	bes it autom	atica	ally. ilots	-	Base mode • Auto	
A: Le Base	b(*+b) ssignin eaving e settin ain	g the l this se g(*) Base	/O address is tting blank w model name	no il n	ot necessar ot cause a ower mode	y as the n error t I name	CPU di o occur Exten	sion cable	atica	ally. ilots	-	Base mode • Auto • Detail	
A: Le Base M Ext.B	ssignin saving e settin ain Jase1	g the I this se g(*) Base	/O address is tting blank w model name	P	necessar ot cause a ower mode	y as the n error t I name	CPU de o occur Exten	l bes it autom	atica	ilots	-	Base mode Auto Detail	
A: Le Base M Ext.B	ain Base1 Base2	g the I this se g(*) Base	/O address is tting blank w model name	P	ot cause a ot cause a ower mode	y as the n error t	Exten	l oes it autom sion cable	• atica	ilots	-	Base mode Auto Detail	]
A: Le Base M Ext.B Ext.B	ain ase2 ase3	g the l this se g(*) Base	/O address is itting blank w model name	P	necessar ot cause a ower mode	y as the n error t	CPU di o occur Exten	l bes it autom sion cable	• atica	ilots	-	Base mode (* Auto C Detail 8 Slot Defaul	
A: Le Base M Ext.B Ext.B Ext.B Ext.B	ain ase2 ase4 ase4 ase4	g the l this se g(*) Base	/O address is itting blank w model name	P	necessar ot cause a ower mode	y as the n error t	CPU di o occur Exten	l pes it autom	etics	ilots	-	Base mode • Auto C Detail 8 Slot Defaul 13 Slot Defaul	
A: Le Base M Ext.B Ext.B Ext.B Ext.B	ain ase1 ase2 ase4 ase5	g the I this se g(*) Base	/O address is tting blank w model name	P	ot necessat ot cause a ower mode	y as the n error t	ECPU de o occur Exten	sion cable	stica S	ilots	-	Base mode Auto Detail 8 Slot Defaul 12 Slot Defaul	

wi	tch settin	g for I/O a	nd intelligent funct	ion mod	ule					×
					Input	format	HEX.	-		
							,	_		
	Slot	Туре	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5		
5	PLC	PLC								
1	0(*-0)	Intelli.	Q68AD-G	0000	0000		0000	0000		
	1(*-1)									
	2(*-2)									
1	3(*-3)									
	4(*-4)									
6	5(*-5)									
7	6(*-6)									
3	7(*.7)									
5	8(1-8)									
1	10(*-9)	-								
1	11(8:11)									
2	12(*12)									
2	13(513)	-								
13	100 100								-	
3	141~141									

(a) I/O assignment setting window Set the following for the slot in which the A/D converter module is mounted.

The type setting is required; set other items as needed.

Type		Select "intelli "
Type	•	Oelect Intell.
Model name	:	Enter the module model name.
Points	:	Select 16 points.
Start	:	Enter the start I/O number for
		the A/D converter module.
Detailed	:	Specify the control PLC for the
setting		A/D converter module.
		It is unnecessary to set the
		"Error time output mode" or "H/

W error time PLC operation mode" since these settings are invalid for the A/D converter module.

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(b) Switch setting for intelligent function module window

> Click on [Switch setting] on the I/O assignment setting window to display the window shown at left, then set switches 1 to 5.

> The switches can easily be set if values are entered in hexadecimal. Change the entry format to hexadecimal and then enter the values.



## 4.6 Offset/Gain Settings

When using the user range setting, make the offset/gain setting according to the operation indicated in Section 4.6.1 or Section 4.6.2.

When the Factory default is used, offset/gain setting is not necessary.

If the utility package is installed, perform the offset/gain settings according to the procedure described in Section 5.6.2.

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## 4.6.1 Offset/gain settings (Q68AD-G)



- \*1 The mode switching (normal mode to offset/gain setting mode to normal mode) method is given below.
  - Dedicated instruction (G(P).OFFGAN) .....Refer to Section 4.6.1 (2) (a)
  - Setting made to mode switching setting (buffer memory addresses 158, 159: Un\G158, Un\G159) and turning the operation condition setting request (Y9) from OFF to ON
     .....Refer to Section 4.6.1 (2) (b)
  - Intelligent function module switch setting ...... Refer to Section 4.5, Section 4.6.1 (2) (c) (After intelligent function module switch setting, reset the programmable controller CPU or switch power OFF, then
  - ON.)
- \*2 Do not perform the operations below during the steps indicated with \*2. If they are performed, the data inside a flash memory will have a problem, and the Q68AD-G may not operate normally.
  - Powering off the programmable controller CPU
  - Resetting the programmable controller CPU



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**⊈**TION

## ⊠ Point

(1) Perform the offset/gain settings in the range that satisfies the conditions specified in POINT of Section 3.1.2 (2).

When the setting exceeds this range, the maximum resolution or total accuracy may not be within the range indicated in the performance specification.

(2) Though the offset/gain settings can be performed on multiple channels at the same time, set the offset and gain separately (0 at either of the buffer memory addresses 22, 23).

If channels are set at Un\G22 and Un\G23 at the same time, an error will occur and the ERR. LED will be lit.

- (3) After the offset/gain settings are completed, verify that the offset and gain values have been set correctly under actual usage conditions.
- (4) The offset and gain values are stored into the Flash memory and are not erased at power-off.
- (5) At the time of offset/gain setting, turn ON the user range write request (YA) to write the values to the flash memory.

Data can be written to the flash memory the maximum of 50 thousand times. To prevent accidental writing to the flash memory, an error (error code: 162) will occur if data is written 26 times consecutively.

(6) If an error (error code: 40 □<sup>\*1</sup>) occurs during offset/gain setting, re-set the correct offset/gain value.

The offset/gain value of the channel where the error has occurred is not written to the module.(\*1:  $\Box$  indicates the corresponding channel number.)

- (7) Module ready (X0) turns from OFF to ON when the offset/gain setting mode switches to the normal mode by the dedicated instruction (G(P).OFFGAN) or the setting of the mode switching setting (Un\G158, Un\G159). Note that initial setting processing will be executed if there is a sequence program that makes initial setting when module ready (X0) turns ON.
- (8) Un\G200, Un\G202 to Un\G233 are the areas used to restore the User-set offset/gain values when online module change is made. Refer to Chapter 7 for details of online module change.

### (2) Program examples

The program in the dotted area of (a) is common to (a), (b) and (c). Is this example, the I/O signals for the Q68AD-G are X/Y0 to X/YF

- Offset/gain setting value write command to the module . . . . . . M4
  - Mode switching ..... M5
- Dedicated instruction (G(P).OFFGAN) setting storage device . . D1

(a) When switching the mode using the dedicated instruction (G(P).OFFGAN) The following program switches to the offset/gain setting mode with the dedicated instruction (G(P).OFFGAN), changes the channel where offset/gain setting will be made, writes the offset/gain values to the Q68AD-G, and then switches to the normal mode.

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Switches to offset/gain setting mode			
	<b>K</b> 1	D1	Stores setting of dedicated instruction (G.OFFGAN) into D1.
G. OFFGAN	UO	D1	Dedicated instruction (G.OFFGAN)
Specifies channel where offset/gain setting will be made			
	H1	DO	B Stores channel where offset/ gain setting will be made into D0.
Specifies channel where offset setting will be made	DO	U0\ G22	] Specifies offset setting channel.
L MOM	KO	U0\ G23	Sets 0 to buffer memory address 23.
Specifies channel where gain setting will be made		UO/	
	DØ	G23	Specifies gain setting channel.
[MOA	KO	U0\ G22	Sets 0 to buffer memory address 22.
Changes channel where offset/gain setting will be made			
	[Set	YOB	Turns ON channel change request (YB).
ХОВ ——	[RST	YOB	Turns OFF channel change request (YB).
Registers offset/gain setting results to module	[Set	YOA	Turns ON user range writing request (YA).
XOA H	[rst	YOA	Turns OFF user range writing request (YA).
Switches to normal mode			
M5 [MOVP	KO	D1	Stores setting of dedicated instruction (G.OFFGAN) into D1.
[G. OFFGAN	UO	D1	Bedicated instruction (G.OFFGAN)
X0A Proces	ssing in norr	mal mode	Э
		END	3

\*1: The program in the dotted area is a common program.

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(b) When switching the mode using the setting of the mode switching setting (Un\G158, Un\G159) and operation condition setting request (Y9)

(c) When switching the mode by making intelligent function module switch setting Only the common program is necessary.

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## 4.6.2 Offset/gain settings (Q66AD-DG)

### (1) Offset/gain setting procedure



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- \*1 The mode switching (normal mode to offset/gain setting mode to normal mode) method is given below.
  - Dedicated instruction (G(P).OFFGAN) ..... Refer to Section 4.6.2 (2) (a)
  - Setting made to mode switching setting (Un\G158, Un\G159) and turning the operation condition setting request (Y9) from OFF to ON ...... Refer to Section 4.6.2 (2) (b)

  - ON.)
- \*2 Turning ON the channel change request (YB) starts to supply power from the corresponding channel to the 2-wire transmitter. After fully checking the wiring, settings, etc., turn ON the channel change request (YB).
- \*3 Do not perform the following during the operation (\*3 in the above flow chart). Doing so may cause malfunction of the Q66AD-DG because of a data error in the flash memory.
  - Power-off of the system
  - Reset of the programmable controller CPU

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## ⊠Point

- Perform the offset/gain settings in the range that satisfies the conditions specified in POINT of Section 3.1.2 (2).
   When the setting exceeds this range, the maximum resolution or total accuracy may not be within the range indicated in the performance specification.
- (2) Though the offset/gain settings can be performed on multiple channels at the same time, set the offset and gain separately (0 at either of the buffer memory addresses 22, 23).
  If channels are set at Up)C22 and Up)C22 at the same time, an error will

If channels are set at Un\G22 and Un\G23 at the same time, an error will occur and the ERR. LED will be lit.

- (3) After the offset/gain settings are completed, verify that the offset and gain values have been set correctly under actual usage conditions.
- (4) The offset and gain values are stored into the Flash memory and are not erased at power-off.
- (5) At the time of offset/gain setting, turn ON the user range write request (YA) to write the values to the Flash memory.
   Data can be written to the Flash memory up to 100 thousand times.
   To prevent accidental write to the Flash memory, an error will occur and the error code (Un\G19) will be stored if write is performed 26 consecutive times.
- (6) If an error (error code: 40□<sup>\*1</sup>) occurs during offset/gain setting, re-set the correct offset/gain value.

The offset/gain value of the channel where the error has occurred is not written to the A/D converter module. (\*1:  $\Box$  indicates the corresponding channel number.)

- (7) When the offset/gain setting mode is switched to the normal mode, the module ready (X0) turns from OFF to ON. Note that the initial setting processing will be executed at this time if there is a sequence program that performs initial settings when the module ready (X0) turns ON.
- (8) When one mode is switched to the other (the normal mode is switched to the offset/gain setting mode or the offset/gain setting mode is switched to the normal mode), A/D conversion is suspended and the power supply to the 2-wire transmitter is turned OFF.

To resume A/D conversion and supply power to the 2-wire transmitter, turn ON the operating condition setting request (Y9) after the mode is switched to the normal mode.

(9) Un\G202 to Un\G225 are the areas used to restore the User-set offset/gain values when online module change is made. Refer to Chapter 7 for details of online module change. ONLINE MODULE CHANGE PROGRAMMING

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#### (2) Program examples

The program in the dotted area of (a) is common to (a), (b) and (c). In this example, the I/O signals for the Q66AD-DG are X/Y0 to X/YF.

Channel selection	M0
Offset setting	M1
• Gain setting	M2
Channel change command	M3
Offset/gain setting value write command to the module	M4
Mode switching	M5
Offset/gain change command	M6
Normal mode checking signal	M50
Module ready check flag	M100
Channel designation storage device	D0
• Dedicated instruction (G(P).OFFGAN) setting storage device	D1

(a) When switching the mode using the dedicated instruction (G(P).OFFGAN) The following program switches to the offset/gain setting mode with the dedicated instruction (G(P).OFFGAN), changes the channel where offset/gain setting will be made, writes the offset/gain values to the Q66AD-DG, and then switches to the normal mode.

Switches to	offset/gain setting mode					
M5			—[₩O¥P	<b>K</b> 1	D1 ]	Stores setting of dedicated instruction (G.OFFGAN) into D1.
		G. OFFGA	Ŵ	UO	D1 ]	Dedicated instruction (G.OFFGAN)
1 Specifies ch     ↓	annel where offset/gain setting will I	e made	[NO¥P	H1	D0 ]	Stores channel where offset/ gain setting will be made into D0.
Specifies ch	M2 X0A	ade	[MOVP	DO	U0\ G22 ]	Specifies offset setting channel.
			[W0A	KO	UO\ G23 ]	Sets 0 to buffer memory address 23.
Specifies ch	annel where gain setting will be ma M1 X0A	le	[MO¥P	DO	UO\ G23 ]	Specifies gain setting channel.
			—[WOA	KO	U0\ G22 ]	Sets 0 to buffer memory address 22.
Changes ch	annel where offset/gain setting will I X0B //	e made		-[Set	YOB ]	Turns ON channel change request (YB).
				-[RST	YOB ]	Turns OFF channel change request (YB).
Changes of	fset/gain values X0C H			[SET	YOC ]	Turns ON offset/gain change request (YC).
				-[RST	YOC ]	Turns OFF offset/gain change request (YC).
	ffset/gain setting results to module X0A 	-		[Set	YOA	Turns ON user range change request (YA).
XOA				-[RST	YOA	Turns OFF user range change request (YA).
Switches to	normal mode		[MO¥P	ко	D1 ]	Stores setting of dedicated instruction (G.OFFGAN) into D1.
		G. OFFGA	Ŵ	UO	D1 ]	Dedicated instruction (G.OFFGAN)
XOA			-[ Proces	ssing in no	rmal mode ]	
					-[END ]	

\*1 The program in the dotted area is a common program.

-						SET	M100	Turns ON Module ready check flag.
-	M100	M50	M51	1 <sup>29</sup>	 [MOVP	нзс	U0\ G0	A/D conversion enable/disable
	то — <b>М</b> —				*2 Adding initial setting	items		7
						Fana		Turns ON operation condition
						SET	19	setting request (Y9).
						RST	M100	check flag.
	M50				 	RST	¥9	Setting request (Y9)
tches to o	offset/gai ≝	n setting r	node XOA		 [MOV	H4144	U0\ G158	Sets 4144⊦ to buffer memory address 158.
					 Mov	H964	U0\ G159	J Sets 964⊢ to buffer memory address 159.
						SET	Υ9	<sup>3</sup> Turns ON operation condition setting request (Y9).
						SET	M50	3
-	<sup>M5</sup> →	M50	¥9			RST	¥9	Turns OFF operation condition setting request (Y9)
					Common program			_
vitches to	normal	mode X0A	×0		[MOV	H964	UO\ G158	Sets 964H to buffer memory address 158.
					 MOV	H4144	U0\ G159	J Sets 4144⊢ to buffer memory address 159.
						SET	Y9	Turns ON operation condition setting request (Y9).
						SET	M51	3
						RST	M50	3
-	M5	M51	-1			RST	¥9	Turns OFF operation conditior setting request (Y9)
$\vdash$							-(T0 KI0	> 1-second timer
	тO	M51				RST	M51	
F	$\neg$					L .		-

(b) When switching the mode using the setting of the mode switching setting (Un\G158, Un\G159) and operation condition setting request (Y9)

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## **Point**

When running this program together with the normal-mode A/D conversion program (shown in Section 6.4.3), use \*1 of this program as the initial setting program.

To use each function of the Q66AD-DG for A/D conversion in the normal mode, add appropriate initial setting items to the part marked \*2 depending on the function to be used. (Refer to an example below.)

*2 Example of adding initial setting items (Averaging processing specifications of	s Сн	1 and C	H2)			
() wordging proceeding opcontourone of	011		)			CI11 Average times / Average
	-[	MOV	K50	U0\ G1	}_	number of times/Move average/ Time constant settings
	-{	MOV	K100	U0\ G2	]—	CH2 Average time/Average number of times/Move average/ Time constant settings
	-{	MOV	H42	U0\ G24	$\vdash$	Averaging process specification

Note) When adding this program to the normal-mode A/D conversion program (shown in Section 6.4.3), replace the existing initial setting program with the program marked \*1. Before using this program, check the device numbers.

(c) When switching the mode by making intelligent function module switch setting Only the common program is necessary.

## 4.6.3 A/D conversion value storage during offset/gain setting

If during the offset/gain setting, the A/D conversion values are stored into Un\G11 to Un\G18 as in the normal mode.

### (1) Q68AD-G

The A/D conversion values of all channels are stored into the buffer memory.

#### (2) Q66AD-DG

The A/D conversion values of the channels specified in the offset/gain setting mode (Un\G22, Un\G23) are stored into the buffer memory.

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# 5 UTILITY PACKAGE (GX Configurator-AD)

## 5.1 Utility Package Functions

Table 5.1 shows an overview of the utility package functions	•
Tables 1 Utility package (GX Configurator-AD) function list	

Item	Description	Reference section
	(1) Sets the following items that require initial setting.	
	A/D conversion enable/disable setting	
	Averaging process specification	
	Average time/Average number of times/Move average/	
	Time constant settings	
	Conversion starting time setting (For 2-wire transmitter) (0664D-DG)	
	Warning output settings (Process alarm setting)	
	- Presess clerm upper upper limit value/upper limit value/	
	Process alarm upper upper innit value/upper lower limit value/     lower upper limit value/lower lower limit value/	
	. Werning output estings (Date clarm setting)	
	Warning output settings (Rate alarm setting)	
Initial sotting <sup>*1</sup>	Rate alarm upper limit value/lower limit value	Section 5.4
miliai selling	Rate alarm warning detection period	Section 5.4
	<ul> <li>Input signal error detection extended/Input signal error detection set- ting</li> </ul>	
	Input signal error detection setting value/Input signal error detection	
	lower limit setting value	
	Input signal error detection upper limit setting value	
	Scaling enable/disable setting	
	Scaling upper limit value/lower limit value	
	(2) The data for which initial setting has been completed is registered in the	
	parameters for the programmable controller CPU, and automatically writ-	
	ten to the A/D converter module when the programmable controller CPU	
	changes to the RUN status.	
	(1) Sets auto refresh for the A/D converter module buffer memory.	
Auto refresh	(2) The buffer memory that was set for auto refresh is automatically read and	Section 5 5
setting <sup>*1</sup>	written to the specified device when the END command for the program-	Section 5.5
	mable controller CPU is executed.	
	(1) Monitor/Test	
	The buffer memory and I/O signals for the A/D converter modules are	
	monitored and tested.	
	(2) Operating condition setting	
	Changes the initial setting during operation.	
Monitor/Test	(3) Offset/gain setting	Section 5.6
	when setting the onset/gain to a value selected by the user (when the	
	be easily set while viewing the window	
	(4) Pass data	
	The pass data (industrial shipment settings offset/gain values user range	
	settings offset/gain values) can be monitored and set.	
	0 11	
FB conversion	(initial setting/auto refresh setting).	Section 5.7

## 5.2 Installing and Uninstalling the Utility Package

For how to install or uninstall the utility package, refer to "Method of installing the MEL-SOFT Series" included in the utility package.

## 5.2.1 Handling precautions

The following explains the precautions on using the GX Configurator-AD.

### (1) For safety

Since GX Configurator-AD is add-in software for GX Developer, read "Safety Precautions" and the basic operating procedures in the GX Developer Operating Manual.

### (2) About installation

GX Configurator-AD is add-in software for GX Developer Version 4 or later. Therefore, GX Configurator-AD must be installed on the personal computer that has already GX Developer Version 4 or later installed.

### (3) Window error of Intelligent function module utility

Insufficient system resource may cause the window to be displayed inappropriately while using the Intelligent function module utility. If this occurs, close the Intelligent function module utility, GX Developer (program, comments, etc.), and other applications, and then start GX Developer and Intelligent function module utility again.

### (4) To start the Intelligent function module utility

- (a) In GX Developer, select "QCPU (Q mode)" for PLC series and specify a project. If any PLC series other than "QCPU (Q mode)" is selected, or if no project is specified, the Intelligent function module utility will not start.
- (b) Multiple Intelligent function module utilities can be started. However, [Open parameters] and [Save parameters] operations under [Intelligent function module parameter] are allowed for one Intelligent function module utility only. Only the [Monitor/test] operation is allowed for the other utilities.

#### (5) Switching between two or more Intelligent function module utilities

When two or more Intelligent function module utility windows cannot be displayed side by side, select a window to be displayed on the top of others using the task bar.

🛃 Start 🔰 🏘 MELSOFT series GX D... 🛛 🌌 Intelligent function m... 🛛 🌌 Intelligent function m...

## (6) Number of parameters that can be set in GX Configurator-AD

When multiple intelligent function modules are mounted, the number of parameter settings must not exceed the following limit.

When intelligent function modules are installed to:	Maximum number of parameter settings			
when intelligent function modules are installed to.	Initial setting	Auto refresh setting		
Q00J/Q00/Q01CPU	512	256		
Q02/Q02H/Q06H/Q12H/Q25HCPU	512	256		
Q02PH/Q06PH/Q12PH/Q25PHCPU	512	256		
Q12PRH/Q25PRHCPU	512	256		
Q00UJ/Q00U/Q01UCPU	512	256		
Q02UCPU	2048	1024		
Q03UD/Q04UDH/Q06UDH/Q10UDH/Q13UDH/				
Q20UDH/Q26UDH/Q03UDE/Q04UDEH/Q06UDEH/	4096	2048		
Q10UDEH/Q13UDEH/Q20UDEH/Q26UDEHCPU				
CPU modules other than the above	Not available	Not available		
MELSECNET/H remote I/O station	512	256		

For example, if multiple intelligent function modules are installed to the MELSECNET/ H remote I/O station, configure the settings in GX Configurator so that the number of parameter settings for all the intelligent function modules does not exceed the limit of the MELSECNET/H remote I/O station.

Calculate the total number of parameter settings separately for the initial setting and for the auto refresh setting.

The number of parameters that can be set for one module in GX Configurator-AD is as shown below.

Target module	Initial setting	Auto refresh setting
Q68AD-G	6 (Fixed)	36 (Max.)
Q66AD-DG	10 (Fixed)	28 (Max.)

Example) Counting the number of parameter settings in Auto refresh setting

1	Auto refresh setting							<b>1</b>
	Module information Module type: A/D Conversion Module Module model name: Q68AD-G	\$	itart I/O No.:	0000				
	Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side Device	<b>^</b>	
н	CH1 Digital output value	1	1		->	D1		
	CH2 Digital output value	1	1		•>	D2		
ľ	CH3 Digital output value	1	1		·>	D3	]•	This one row is counted as one setting.
Ľ	спя рідкагочри, уамо				i ~		ŤÍ.	Blank rows are not counted
н	CH5 Digital output value	1	1		->			Diank rows are not counted.
н	CH6 Digital output value	1	1		->		-	Count up all the setting items on this
L	CH7 Digital output value	1	1		->			window, and add the total to the
L	CH8 Digital output value	1	1		->			number of settings for other intelligent
L	CH1 Maximum value	1	1		->		- -	
	Make text file	End setu	•			Cancel		function modules to get a grand total.

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## 5.2.2 Operating environment

This section explains the operating environment of the personal computer that runs GX Configurator-AD.

Item		Description		
Installation (Add-in) target <sup>*1</sup>		Add-in to GX Developer Version 4 (English version) or later*2		
Computer		A personal computer with any of the operating systems below		
CPU Required memory		Refer to the next page "Operating system and performance required for personal computer".		
Hard disk	For installation	65 MB or more		
space <sup>*3</sup>	For operation	20 MB or more		
Display		800×600 dots or more resolution <sup>*4</sup>		
		${\sf Microsoft}^{^{\odot}}$ Windows $^{^{\odot}}$ 95 Operating System (English version)		
		Microsoft <sup>®</sup> Windows <sup>®</sup> 98 Operating System (English version)		
		Microsoft <sup>®</sup> Windows <sup>®</sup> Millennium Edition Operating System (English version)		
		Microsoft $^{\odot}$ Windows NT $^{\odot}$ Workstation Operating System Version 4.0 (English version)		
		${\sf Microsoft}^{^{\odot}}$ Windows $^{^{\odot}}$ 2000 Professional Operating System (English version)		
		${\sf Microsoft}^{^{\odot}}\;{\sf Windows}^{^{\odot}}\;{\sf XP}\;{\sf Professional}\;{\sf Operating}\;{\sf System}\;{\sf (English\;version)}\;{\sf SP1}\;{\sf or}\;{\sf later}$		
		${\sf Microsoft}^{^{\odot}}$ ${\sf Windows}^{^{\odot}}$ XP Home Edition Operating System (English version) SP1 or later		
		${\sf Microsoft}^{^{\odot}}$ Windows Vista $^{^{\odot}}$ Home Basic Operating System (English version)		
Operating syst	em	${\sf Microsoft}^{^{\odot}}$ Windows Vista $^{^{\odot}}$ Home Premium Operating System (English version)		
		${\sf Microsoft}^{^{\odot}}$ Windows Vista $^{^{\odot}}$ Business Operating System (English version)		
		${\sf Microsoft}^{^{\odot}}$ Windows Vista $^{^{\odot}}$ Ultimate Operating System (English version)		
		${\sf Microsoft}^{^{\odot}}$ Windows Vista $^{^{\odot}}$ Enterprise Operating System (English version)		
		${ m Microsoft}^{\odot}$ ${ m Windows}^{\odot}$ 7 Starter Operating System (English version) <sup>*4</sup>		
		${ m Microsoft}^{\odot}~{ m Windows}^{\odot}~{ m 7}~{ m Home}~{ m Premium}~{ m Operating}~{ m System}~{ m (English~version)}^{ m *4}$		
		${ m Microsoft}^{\odot}~{ m Windows}^{\odot}~7~{ m Professional Operating System (English version)}^{\star4}$		
		${ m Microsoft}^{\odot}~{ m Windows}^{\odot}~{ m 7}~{ m Ultimate}~{ m Operating}~{ m System}~{ m (English~version)}^{ m *4}$		
		Microsoft <sup>®</sup> Windows <sup>®</sup> 7 Enterprise Operating System (English version) <sup>*4</sup>		

\*1: Install the GX Configurator-AD in GX Developer Version 4 or higher in the same language. GX Developer (English version) and GX Configurator-AD (Japanese version) cannot be used in combination, and GX Developer (Japanese version) and GX Configurator-AD (English version) cannot be used in combination.

\*2: GX Configurator-AD cannot be used as an add-in with GX Developer Version 3 or earlier versions.

In addition, GX Developer Version 8 or later is necessary to use the FB conversion function.

- \*3: When Windows Vista<sup>®</sup> or Windows<sup>®</sup>7 is used, resolution of 1024×768 dots or more is recommended.
- \*4: When 32-bit Windows<sup>®</sup>7 is used, add GX Configurator-AD Version 2.11M or later in GX Developer Version 8.91V or later.

When 64-bit Windows<sup>®</sup>7 is used, add GX Configurator-AD Version 2.11M or later in GX Developer Version 8.98C or later.

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Operating system an	d performance req	uired for personal	computer
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Operating system	Performance required for personal computer			
Operating system	CPU	Memory		
Windows <sup>®</sup> 95	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows <sup>®</sup> 98	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows <sup>®</sup> Me	Pentium <sup>®</sup> 150MHz or more	32MB or more		
Windows NT <sup>®</sup> Workstation 4.0	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows <sup>®</sup> 2000 Professional	Pentium <sup>®</sup> 133MHz or more	64MB or more		
Windows <sup>®</sup> XP	Pentium <sup>®</sup> 300MHz or more	128MB or more		
Windows Vista <sup>®</sup>	Pentium <sup>®</sup> 1GHz or more	1GB or more		
Windows <sup>®</sup> 7	Pentium <sup>®</sup> 1GHz or more	1GB or more (32-bit) 2GB or more (64-bit)		

⊠Point

(1) The functions shown below are not available for Windows  $^{\odot}~$  XP, Windows  $^{Vista^{\odot}}$  , and Windows  $^{\odot}~$  7.

If any of the following functions is attempted, this product may not operate normally.

- Start of application in Windows® compatible mode
- · Fast user switching
- Remote desktop
- Large fonts (Details setting of Display Properties)
- DPI setting other than 100%

Also, GX Configurator-AD is not supported by 64-bit Windows  $^{\odot}~$  XP and 64-bit Windows Vista  $^{\odot}~$  .

- (2) A user with USER authority or higher can access GX Configurator-AD for Windows Vista<sup>®</sup> and Windows<sup>®</sup> 7.
- (3) When Windows $^{\circ}$  7 is used, the following functions are not available.
  - Windows XP Mode
  - Windows Touch

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## 5.3 Utility Package Operation

## 5.3.1 Common utility package operations

### (1) Control keys

Special keys that can be used for operation of the utility package and their applications are shown in the table below.

Key	Application
Esc	Cancels the current entry in a cell.
	Closes the window.
Tab	Moves between controls in the window.
Ctrl	Used in combination with the mouse operation to select multiple
	cells for test execution.
Delete	Deletes the character where the cursor is positioned.
Delete	When a cell is selected, clears all of the setting contents in the cell.
Back Space	Deletes the character where the cursor is positioned.
$\uparrow \qquad \leftarrow  \rightarrow$	Moves the cursor.
Page Up	Moves the cursor one page up.
Page Down	Moves the cursor one page down.
Enter	Completes the entry in the cell.

#### (2) Data created with the utility package

The following data or files that are created with the utility package can be also handled in GX Developer. Figure 5.1 shows respective data or files are handled in which operation.

#### (a) Intelligent function module parameter

This represents the data created in Auto refresh setting, and they are stored in an intelligent function module parameter file in a project created by GX Developer.



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(b) Text files

A text file can be created by clicking the Make text file button on the initial setting, Auto refresh setting, or Monitor/Test window. The text files can be utilized to create user documents.



Fig5.1 Correlation chart for data created with the utility package Steps 1) to 3) shown in Fig5.1 are performed as follows:

1) From GX Developer, select:

 $[Project] \rightarrow [Open \ project] \ / \ [Save]/ \ [Save as]$ 

- 2) On the intelligent function module selection window of the utility, select: [Intelligent function module parameter] → [Open parameters] / [Save parameters]
- 3) From GX Developer, select:

[Online]  $\rightarrow$  [Read from PLC] / [Write to PLC] "Intelligent function module parameters"

Alternatively, from the intelligent function module selection window of the utility, select:

[Online]  $\rightarrow$  [Read from PLC] / [Write to PLC]

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Refer to Section 5.4.

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1)	
[Online] – [Monitor/Test]	< <fb parameter="" support="">&gt; tab - FB conversion window</fb>
◆ Selecting monitor/test module window	+ FB conversion window
Select monitor/test module	7 FB conversion
Select monitor/test module     Start I/O No.     Module type     Module model name     QBSAD-G	FB program is generated from the following contents.
Module mpetereration hauts     Statt I/D No     Module model name     00000 (SBAD-G	
	Refer to Section 5.7.
Select a module to be mon Monitor/Test window	itored/tested.
Monitor/Test	
<ul> <li>Module information</li> <li>Module type: A/D Conversion Module</li> <li>Start I/O No.: 0000</li> <li>Module model name: Q88AD-G</li> </ul>	
Setting item         Current value         Setting value           Exer code         0           Varing output flig (secsor alam)         0000000000000           Varing output flig (secsor alam)         0000000000000           Setting unput flig (secsor alam)         0000000000000           Varing output flig (secsor alam)         0000           V/ monto/ket         0000           V/ monto/ket         Mit value/min value information           Name value/min value information         Mit value/min value information           Dif 0 previse condition setting         CH10 (besend condition setting           Dif 0 previse condition setting         CH20 (besend condition setting)           Dif 0 previse condition setting         CH20 (besend condition setting)	
Flash Rold setting module         Details         More display           Pread from module         Lood file         Make text file	doring
Start monitor Stop monitor Execute jest Clo	

Refer to Section 5.6.

#### [Operating procedure]

Intelligent function module utility is started from GX Developer.

 $[Tools] \rightarrow [Intelligent function utility] \rightarrow [Start]$ 

[Setting window]

🚰 Intelligent fun	iction module	utility	D:\ME	LSEC\GPPW	/VAD	
Intelligent function m	odule <u>p</u> arameter	<u>O</u> nline	<u>T</u> ools	Help		
Select a target inte	elligent function m	odule. —				
Start I/O No.	Mod	lule type				
00	)00 A/	/D Conve	ersion M	odule	•	·
	Mod	lule mode	l name			
	Qf	68AD-G				•
Parameter setting r	module					
Intelligent function	module paramete	FB Su	upport P	arameter		
Start I/O No.	Module mo	del name		Initial setting	Auto refresh	
Start I/O No. 0000	Module mo Q68AD-G	del name	•	Initial setting Available	Auto refresh Available	
Start I/O No. 0000	Module mo Q68AD-G	del name	•	Initial setting Available	Auto refresh Available	
Start I/O No. 0000	Module mo Q68AD-G	del name	3	Initial setting Available	Auto refresh Available	
Start I/O No. 00000	Module mo Q68AD-G	del name	3	Initial setting Available	Auto refresh Available	
Start I/O No. 0000]	Module mo Q68AD-G	del name	3	Initial setting Available	Auto refresh Available	
Start I/O No. 00000	Module mo Q68AD-G	del name		Initial setting Available	Auto refresh Available	
Start I/O No. 00000	Module mo Q68AD-G	del name	3 	Initial setting Available	Auto refresh Available	
Start I/O No. 00000 FB parameter>>	Module mo Q68AD-G	del name		Initial setting Available	Auto refresh Available	

[Explanation of items]

### (1) Activation of other windows

Following windows can be displayed from the intelligent function module utility window.

Common operations to the <<Intelligent function module parameter>> tab and <<FB support parameter>> tab

(a) Initial setting window

"Start I/O No. <sup>*1</sup> " $\rightarrow$	"Module type" $\rightarrow$	"Module model name"	$\rightarrow$	Initial setting	

(b) Auto refresh setting window

"Start I/O No.<sup>\*1</sup>"  $\rightarrow$  "Module type"  $\rightarrow$  "Module model name"  $\rightarrow$  Auto refresh

- (c) Select monitor/test module window [Online] → [Monitor/Test]
  - \*1 Enter the start I/O No. in hexadecimal.

On the <<FB support parameter>> tab

- (a) Start-up of the FB conversion window
  - <<FB support parameter>> tab → FB conversion

For details, refer to Section 5.7.

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The <<FB support parameter>> tab is displayed when the project which is being edited is a label project.

### (2) Command buttons

Common operations to the <<Intelligent function module parameter>> tab and <<FB support parameter>> tab

Delete
--------

Deletes the initial setting and auto refresh setting of the selected module.

However, if "initial setting" and "auto refresh setting" have been prepared and the cell of initial setting or auto refresh setting is selected and executed, only the setting of the selected cell is deleted.

EXIT	

Close this window.

When the <<FB support parameter>> tab is selected

<<Parameter

Moves the setting of the selected line to the <<Intelligent function module parameter>> tab.

When the <<Intelligent Function Module Parameter>> tab is selected

FB Parameter>>

Moves the setting of the selected line to the <<FB support parameter>> tab.

### (3) Menu bar

(a) File menu

Intelligent function module parameters of the project opened by GX Developer are handled.

[Open parameters]	: Reads a parameter file.
[Close parameters]	: Closes the parameter file. If any data are modi-
	fied, a dialog asking for file saving will appear.
[Save parameters]	: Saves the parameter file.
[Delete parameters]	: Deletes the parameter file.
[Open FB support parameters]	: Opens the FB support parameter file.
[Save as FB support parame-	: Saves the FB support parameter file.
ters]	
[Exit]	: Close this window.
Online menu	
[Monitor/Test] : Activate	es the Select monitor/test module window.

- : Reads intelligent function module parameters from the CPU module.
- : Writes intelligent function module parameters to the CPU module.



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(b)

[Read from PLC]

[Write to PLC]

## ⊠Point

- (1) Saving intelligent function module parameters in a file Since intelligent function module parameters cannot be saved in a file by the project saving operation of GX Developer, save them on the shown module selection window.
- (2) Reading/writing intelligent function module parameters from/to a programmable controller CPU using GX Developer
  - (a) Intelligent function module parameters can be read from and written into a programmable controller after having been saved in a file.
  - (b) Set a target programmable controller CPU in GX Developer:
     [Online] → [Transfer setup].
- (3) Checking the required utility
  While the start I/O is displayed on the Intelligent function module utility setting window, " \* " may be displayed for the model name.
  This means that the required utility has not been installed or the utility cannot be started from GX Developer.
  Check the required utility, selecting [Tools] [Intelligent function utility] [Utility list...] in GX Developer.

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## 5.4 Initial Setting

#### [Purpose]

The following A/D initial setting parameters are set:

- A/D conversion enable/disable setting
- Averaging process specification
- Average time/Average number of times/Move average/Time constant settings
- A/D conversion starting time setting (Q66AD-DG)
- Warning output settings (Process alarm setting)
- Process alarm upper upper limit value/upper lower limit value/lower upper limit value/lower lower limit value
- Warning output settings (Rate alarm setting)
- Rate alarm upper limit value/lower limit value
- Rate alarm warning detection period
- Input signal error detection extended/input signal error detection setting
- Input signal error detection setting value/Input signal error detection lower limit setting value
- Input signal error detection upper limit setting value
- Scaling enable/disable setting
- Scaling upper limit value/lower limit value

Setting parameters in the Initial setting window can omit parameter settings in sequence programs.

#### [Operating procedure]

"Start I/O No. *	<sup>1</sup> " $\rightarrow$ "Module type" $\rightarrow$	"Module model name" $\rightarrow$	Initial setting	$  \rightarrow$
------------------	--	-----------------------------------	-----------------	-----------------

#### CH□ Initial setting

\*1 Enter the start I/O No. in hexadecimal.

#### [Setting window]

Module information			
Module type: A/D Conversion Modu	ıle	Start I/O No.: 00	000
Module model name: Q68AD-G			
Setting item		Setting va	alue
CH1 A/D conversion enable/disable set	iting	Enable	•
CH1 Averaging process specification		Sampling	-
CH1 Average time/Average number of ti Move average/Time constant settings Average time(40-5000ms)/Average num times(4-500times) Move average(2-60times)/Linear delay f	imes/ ber of ilter(10-5000ms)		0
CH1 Warning output setting (Process ala	arm setting)	Disable	-
	Details Select inpu Enable Disable	t ange	

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[Explanation of items]

#### (1) Setting contents

Set A/D conversion enable/disable, averaging process specification and others for each channel.

### (2) Command buttons

Make text file	Creates a file containing the window data in text file for- mat.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

## **Point**

- (1) Change the RUN/STOP switch of the CPU module: STOP  $\rightarrow$  RUN  $\rightarrow$  STOP  $\rightarrow$  RUN.
- (2) After setting the RUN/STOP switch to RUN, power the programmable controller OFF → ON or reset the CPU module.

When using a sequence program to write initial setting data, the data will be written when the CPU module is switched from STOP to RUN. Create a program so that initial setting is re-executed in the sequence program.

## 5.5 Auto Refresh Setting

#### [Purpose]

Configure the A/D converter module's buffer memory for auto refresh. [Operating procedure]

"Start I/O No. \* " → "Module type" → "Module model name" → Auto refresh \* Enter the start I/O No. in hexadecimal.

#### [Setting window]

Module information						
Module type: A/D Conversion Module	9	itart I/O No.:	0000			
Module model name: Q68AD-G						
	Module side	Module side			PLC side	
Setting item	Buffer size	Transfer word count		Transfer direction	Device	
CH1 Digital output value	1	1		->	D1	-
CH2 Digital output value	1	1		->	D2	
CH3 Digital output value	1	1		->	D3	1
CH4 Digital output value	1	1		->	Í	]
CH5 Digital output value	1	1		->		2
CH6 Digital output value	1	1		->		1
CH7 Digital output value	1	1		->		1
CH8 Digital output value	1	1		->		-
CH1 Maximum value	1	1		->		•
Make text file	End setu	n			Cancel	

[Explanation of items]

#### (1) Items

Module side Buffer size	:	Displays the size of the buffer memory for the setting item that can be transferred (fixed at one word).
Module side Transfer word count	:	Displays the number of words to transfer the CPU device from the head device (fixed at one word).
Transfer direction	:	"←" indicates that data is written from the device to the buffer memory. "→" indicates that data is read from the buffer memory to the device.
PLC side Device	:	Enter a CPU module side device that is to be automatically refreshed. Applicable devices are X, Y, M, L, B, T, C, ST, D, W, R, and ZR. When using bit devices X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16, etc.) Also, buffer memory data are stored in a 16-point area, starting from the specified device number. For example, if X10 is entered, data are stored in X10 to X1F.

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### (2) Command buttons

Make text file	Creates a file containing the window data in text file for- mat.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

## ⊠Point

Auto refresh setting data are stored in intelligent function module parameters. After being written to the CPU module, the auto refresh setting data are made effective by operating either (1) or (2).

- (1) Change the RUN/STOP switch of the CPU module: STOP  $\rightarrow$  RUN  $\rightarrow$  STOP  $\rightarrow$  RUN.
- (2) After setting the RUN/STOP switch to RUN, power the programmable controller OFF  $\rightarrow$  ON or reset the CPU module.

The auto refresh settings cannot be changed from sequence programs.

However, processing equivalent to auto refresh can be added using the FROM/ TO instruction in the sequence program.

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## 5.6 Monitoring/Test

### 5.6.1 Monitor/test window

#### [Purpose]

Buffer memory monitoring/testing, I/O signal monitoring/testing, operating condition setting, offset/gain settings (Refer to Section 5.6.2) and pass data (Refer to Section 5.6.3, 5.6.4) are started from this window.

#### [Operating procedure]

"Select monitor/test module" window ightarrow "Start I/O No. \* <sup>1</sup>" ightarrow "Module type" ightarrow

"Module model name" → | Monitor/test

\* 1 Enter the start I/O No. in hexadecimal.

The window can also be started from System monitor of GX Developer Version 6 or later.

Refer to the GX Developer Operating Manual for details.

[Setting window]

lonitor/Test		
Module information Module type: A/D Conversion Module Module model name: Q684D-G	Start I/O No.: 0000	
Setting item	Current value	Setting value
Error code	0	
warning output flag (process alarm)	000000000000000000000000000000000000000	
Warning output flag (rate alarm)	000000000000000000000000000000000000000	
nput signal error detection flag	000000000000000000000000000000000000000	
Setting range (CH1 to CH4)	0000	
Setting range (CH5 to CH8)	0000	
/ monitor/test</td <td></td> <td>X/Y monitor/test</td>		X/Y monitor/test
faximum value/minimum value information		Max value/min value info.
CH1 Operating condition setting		CH1 Operating condition setting
CH2 Operating condition setting		CH2 Operating condition setting
CH3 Operating condition setting		CH3 Operating condition setting
Flash ROM setting	Details	
Wite to module         Save Ho         Current value display           Read from Load life         Make text He	Cannot execute test	Monitoring
Start monitor Stop monitor Ex	vecute test	Close

	X/Y mo	nitor/test			Max val	lue/min value info.
X/Y monitor/test				Maximum value/minimum value information		
Module information Module type: A/D Conversion Module Module model name: Q68AD-G	Start I/O No.: 0000			Module information Module type: A/D Convertion Module Module model name: Q68AD-6	Start I/O No.: 0000	
Setting item 2000 Module ready 2007 High resolution mode status flag 2008 Warming output signal 2008 Generating-conditional setting completed flag 2008 Gharmel Ghange completed flag 2008 Gharmel Ghask-Triminum value reset completed 2000 Masimum value/Triminum value reset completed	Current value ON-Ready OFF-Normal resolution mode OFF-Normang ON-No request OFF-Normal mode OFF-Normal mode OFF-Normat Signal Error OFF-Reales	Setting value		Setting Ixen           CH4 Maximum value           CH5 Maximum value           CH5 Maximum value           CH6 Minism value           CH6 Minism value           CH6 Minism value           CH6 Minism value           CH7 Minism value           CH7 Minism value           CH7 Minism value	Lurrent value	Setting value
X0E:A/D conversion completed flag	ON:Completed			CH8 Maximum value CH8 Minimum value	-96	
X0F:Error flag	OFF:No error		-	Maximum value/minimum value reset request	Release	Release 🗸 🗸
Path ROM setting         Current value display           With to module         Save file         Current value display           Read from module         Lead file         Make text file	Details Cannot execute test	Mon	itoring	Flash ROM setting         Current value           Viriatiz         Save file         Current value           Pread from module         Load file         Make ted file	- Details Cannot execute test	Monitoling
Start monitor Stop monitor E	xepute Jest	Ci	ose	Start monitor Stop monitor Exe	coute jest	Close

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[Explanation of items]

#### (1) Items

Setting item	:	Displays I/O signals and buffer memory names.
Current value	:	Monitors the I/O signal states and present buffer memory values.
Setting value	:	Select or enter the data to be written during test operation.

### (2) Command buttons

Current value display	Displays the current value of the item selected. (This is used to check the text that cannot be dis- played in the current value field. However, in this utility package, all items can be displayed in the dis- play fields).
Make text file	Creates a file containing the window data in text file format.
Start monitor /	Selects whether or not to monitor current values.
Execute test	Performs a test on the selected items. To select more than one item, select them while holding down the Ctrl key.
Close	Closes the window that is currently open and returns to the previous window.

### (3) Example of using "Execute test"

The following is an example to change sampling processing of CH1 to count averaging processing in 10 times.

- (a) Click the Operating setting button in the "Monitor/Test" window.
- (b) Set CH1 Averaging process specification to "Count".
- (c) Click the setting field of CH1 Average time/Average number of times/Move average/Time constant settings.
- (d) Input "10" as the number of averaging, then click the Enter key. At this point, CH1 is still set to sampling processing.
- (e) Select the setting areas (b) to (d), holding the Ctrl key. Multiple items can be selected by dragging the mouse over them also.
- (f) Click the Execute test button to write the data. After the writing is completed, the written values are displayed in the "Current value" field.
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# 5.6.2 Offset/gain setting operation

Perform the offset/gain setting operation in the following sequence.

#### (1) Switch to the offset/gain setting window

Perform the operation in Section 5.6.1 to display the offset/gain setting window. At this point, a dialog box to confirm the transition of module's operation mode (normal

mode -> offset/gain setting mode) is displayed. Click the Yes button to transit to the offset/gain setting mode.

Offset/Gain setting						
Offset/gain settin	gs is performed.					
Current modu	le	Q68AD-G:0000H		Error code	Error clear	
Channel No.	Channel	Setting	g state		Offset setting	
Channel No.	selection	Offset setting	Gain se	etting	Gain setting	
CH1					dantooking	
CH2					Registration	
CH3						
CH4					Conversion	
CH5					Characteristic	
CH6						
CH7						
CH8						
					Close	

#### (2) Specify channels

Place check marks in "Channel selection" column to specify the channels for each of which the offset or gain setting is to be made.

#### (3) Apply current/voltage

Apply current or voltage to the module. Note that "Current" only is allowed for the Q66AD-DG.

#### (4) Execute offset/gain setting

For each of the channels specified in (2), click the Offset setting or Gain setting button to execute respective setting.

#### (5) Write settings into module

Write the content set up by operations (2) to (4) into module by clicking the

Registration button.

#### (a) Precaution

While the set data of the steps (2) to (4) are written to the module after clicking the

Registration button, do not perform the operations below.

If they are performed, the data inside E2PROM will have a problem, and the A/D converter module may not operate normally.

- Powering off the programmable controller CPU
- Resetting the programmable controller CPU

#### (6) Switch to the normal mode

When the offset/gain setting window is closed by clicking the Close button after the setting operation has finished, module's operation mode transits to the normal mode.

# Point

If an error code is displayed while performing the setting operation, the details and measure of the error can be confirmed by clicking the <u>...</u> button to the right of the error code display area. In addition, the error code can be cleared by clicking the <u>Error clear</u> button.

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# 5.6.3 Confirmation of conversion characteristic

#### [Purpose]

The converted value of digital-analog conversion can be confirmed according to the tilt of the graph, based on the offset/gain setting.

#### [Operating procedure]



[Setting window]



[Explanation of items]

#### (1) Items displayed on the window

I/O characteristic diagram: Displays the I/O conversion characteristic to the prepared offset/gain setting.

#### (2) Setting details

Analog/Range setting

Analog	: Select the type of the analog signal input (voltage or current). When the target module is the Q66AD-DG, "Current" only can be selected.
Range setting	: Make selection from "Normal resolution" or "High resolution"
Offset/Gain set	ting
Offset value	: Enter an offset value to display the I/O characteristic diagram.
Gain value	: Enter a gain value to display the I/O characteristic diagram.
Analog/Digital	<ul> <li>conversion : Select a conversion type shown below for confirming the correspondence between an analog value and a digital value caused by the conversion characteristic.</li> <li>Digital → Analog</li> <li>Analog → Digital</li> </ul>

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Analog value	: <when a="" converted="" digital="" to="" value=""></when>
	Enter an analog value to be converted to a digital value
	<when an="" analog="" converted="" to="" value=""></when>
	The analog value converted from a digital value is displayed.
Digital value	: <when a="" converted="" digital="" to="" value=""></when>
	The digital value corresponding to an entered analog value is displayed.
	<when an="" analog="" converted="" to="" value=""></when>
	Enter a digital value to be converted to an analog value.
⊠Point –	
(1) The f	ollowing explains an offset value and a gain value.
(a) Ar	ו offset value is an analog input value (voltage or current) that is con- verted to 0 in digital output value.
(b) /	A gain value is an analog input value (voltage or current) that is con- verted to the following digital output value.
4	400 (Normal resolution mode)
	16000/12000 (High resolution mode)
(2) Satist	fy the conditions below when setting an offset value and a gain value
(_) Vote	that they are different from the I/O characteristics of the A/D converter
modu	ile (In case of the Q66AD-DG the option for the analog/range setting is
"Curr	ent" only"
(a) \	When "Voltage" is selected for the analog/range setting
• 9	Setting range of offset/gain values: -10 to 10V
• [	)epending on the range setting, adjust the offset/gain values as follows
1	) Normal resolution mode
{	(Gain value) - (Offset value)} > $1.5V$
2	(High resolution mode
<u>-</u> {	(Gain value) - (Offset value) $\geq 4.0V$
(h) \	When "Current" is selected for the analog/range setting
	$2 \cos x \cos $
• (	balli value $\ge 20$ mA, Ulisel value $\le 0$ mA
• L	A Normal resolution mode
1	$(Coin value) = (Offect value) > 5.5 m^{4}$
{	(Gain value) - (Offset value)} > 5.5mA
2	.) High resolution mode

{ (Gain value) - (Offset value)} > 16.0mA

#### (3) Explanation of window command buttons

Range setting

The entered offset/gain value is determined, and the I/O characteristic diagram is updated.

Conversion

Conversion for the entered value is performed.

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# 5.6.4 Pass data (Q68AD-G)

Perform operation in the following sequence to save/restore the user range.

#### (1) Switch to the pass data window

Perform the operation in Section 5.6.1 to display the Pass data window.

#### (2) User range saving

(a) Set "Voltage specified" or "Current specified" in the Setting value field of Pass

data classification setting, and click the  $\[$  Execute test  $\]$  button. When the setting is completed, the set data is displayed in the Current value field of CH  $\[$  Pass data classification setting.

(b) Change the Setting value field of Pass data read request to "Request", and click

the Execute test button. When read is completed, the values are displayed in the Current value fields of CH □ Industrial shipment settings offset/gain values/CH □ User range settings offset/gain values.

(c) Compare the values with those in the range reference table, and record them if they are correct.

Refer to Section 7.4 for the range reference table.

#### (3) User range restoration

- (a) Set "Voltage specified" or "Current specified" in the Setting value field of Pass data classification setting, and click the Execute test button.
   When the setting is completed, the set data is displayed in the Current value field of CH □ Pass data classification setting.
- (b) Set the recorded values in the Setting value fields of CH □ Industrial shipment settings offset/gain values/user range settings offset/gain values.
- (c) Select all the Setting value fields of CH □ Industrial shipment settings offset/gain

values/user range settings offset/gain values, and click the <u>Execute test</u> button.

When write is completed, the set values are displayed in the Current value fields of CH  $\square$  Industrial shipment settings offset/gain values/CH  $\square$  User range settings offset/gain values.

(d) Change the Setting value field of Pass data write request to "Request", and click the Execute test button.

Make sure that the indication in the Current value field of Pass data write request changes from "Request" to "OFF" on completion of write.

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LITY PACKAGE CONFIGURATOR-

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# 5.6.5 Pass data (Q66AD-DG)

Perform operation in the following sequence to save/restore the user range.

#### (1) Switch to the Pass data window

Perform the operation in Section 5.6.1 to display the pass data window.

Module information		
Module type: A/D Conversion Module	Start I/O No.: 0000	
Module model name: Q66AD-DG		
Setting item	Current value	Setting value
CH1 Industrial shipment settings offset value	0	000 0000
CH1 Industrial shipment settings gain value	0	000 0000
CH2 Industrial shipment settings offset value	0	000 0000
CH2 Industrial shipment settings gain value	0	000 0000
CH3 Industrial shipment settings offset value	0	000 0000
CH3 Industrial shipment settings gain value	0	000 0000
CH4 Industrial shipment settings offset value	0	000 0000
CH4 Industrial shipment settings gain value	0	000 0000
CH5 Industrial shipment settings offset value	0	000 0000
CH5 Industrial shipment settings gain value	0	000 0000
CH6 Industrial shipment settings offset value	0	000 0000
Flash ROM setting	Details	
Write to Current value		Monitorin
module Save he display		
Paul free	Hexadecimal input	
module Load file Make text file	Setting range	
	0000 - FFFF	
	1	

#### (2) User range saving

(a) Change the Setting value field of pass data read request to "Request", and click the Execute test | button.

When read is completed, the values are displayed in the Current value fields of CH □ industrial shipment settings offset/gain values/CH □ user range settings offset/gain values.

 (b) Compare the values with those in the range reference table, and record them if they are correct.

Refer to Section 7.4 for the range reference table.

#### (3) User range restoration

- (a) Set the recorded values in the Setting value fields of CH □ industrial shipment settings offset/gain values/user range settings offset/gain values.
- (b) Select all the Setting value fields of CH  $\hfill\square$  industrial shipment settings offset/gain

values/user range settings offset/gain values, and click the Execute test button. When write is completed, the set values are displayed in the Current value fields

of CH ☐ industrial shipment settings offset/gain values/ CH ☐ user range settings offset/gain values.

(c) Change the Setting value field of pass data write request to "Request", and click the Execute test button.

Make sure that the indication in the Current value field of pass data write request changes from "Request" to "OFF" on completion of write.

# 5.7 FB Conversion of Initial Setting/Auto Refresh Setting

#### [Purpose]

FB is generated automatically from the intelligent function module parameter (initial setting/auto refresh setting).

#### [Operating procedure]

Intelligent Function Module Parameter Setting Module Selection Window  $\rightarrow$ 

<<FB Support Parameter>>  $\rightarrow$  FB conversion

#### [Setting window]

🛿 FB conversion						
FB program	n is generated from	n the following	g contents.			Conversion Close
Start I/O No.	Module model name	Initial setting	Auto refresh	FB program name	Title	
0000H	Q68AD-G					

#### [Explanation of items]

#### (1) Items displayed on the window

Start I/O No.	: The start I/O No. of the information which is set up on the currently open intelligent function module parameter is displayed.
Module model name	: The module model name of the information which is set up on the currently open intelligent function module parameter is displayed.
Initial setting	: Set up whether to apply FB conversion to the parameter or not. Check if you apply FB conversion to the parameter.
Auto refresh	: Set up whether to apply FB conversion to the parameter or not. Check if you apply FB conversion to the parameter.
FB program name	<ul> <li>Set up the name of the converted FB program.</li> <li>Up to six single-byte characters can be set up as an FB program name.</li> <li>However, the characters and terms shown below cannot be set up as FB program name.</li> <li>Character: /, :, ;, *, ?, ", &lt;, &gt;,  , ,</li> <li>Term :COM1 to COM9, LPT1 to LPT9, AUX, PRN, CON, NUL, CLOCK\$</li> <li>In addition, I- is added for initial setting and A- is added for auto refresh setting respectively to the top of the FB name setting to be registered in GX Developer after FB conversion is performed.</li> <li>Ex.:If the FB program name is "ABCDE, " the initial setting is "I-ABCDE" and the auto refresh setting is "A-ABCDE".</li> </ul>
Title	: Set up a title on a converted FB program. Up to 32 single-byte characters can be set up as a title.

#### (2) Explanation of window command buttons

Conversion

FB conversion is performed for the checked columns of initial setting and auto refresh setting.

# 5.8 Usage of FB

This section describes the procedure for using FB with GX Developer. For details, refer to "GX Developer Version 8 Operating Manual (Function Block)."

## 5.8.1 Outline

The procedure for creating FB is shown below.

- (1) Set up the intelligent function module parameter (initial setting/auto refresh setting).
- (2) Convert the intelligent function module parameter into FB.
- (3) Paste the FB to a sequence program.
- (4) Convert (compile) the sequence program.

Next, a flowchart of procedures 1) to 4) is shown below.



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# ⊠ Point

The initial setting/auto refresh setting of the intelligent function module can be performed by each of the following methods.

- (1) Set intelligent function parameters (Initial setting/Auto refresh setting) and write them to the programmable controller CPU.
- (2)Create an FB of the intelligent function module parameter (initial setting/auto refresh setting) and paste it to the sequence program.
- In accordance with the specification of the system, perform the initial setting/auto refresh setting of the intelligent function module by one of the methods above.\*1
  - \* 1: The following explains the case in which both of (1) and (2) are performed.
    - (a) Initial settingFB setting given in (2) is valid.
    - (b) Auto refresh setting
      - Both (1) and (2) are valid.
      - At the time of FB execution and in the END processing of the sequence program, auto refresh is performed.

## 5.8.2 Paste an FB to a sequence program

#### [Purpose of operation]

Paste an FB in order to use it with a sequence program.

[Operation procedure]

Switch the <<Project>> tab into the <<FB>> tab on GX Developer, and drag & drop the FB to be used onto the sequence program.

	-					
MillSOFT series GX Developer (U     Broject Edit Bind(Replace Convert	nset project) - [LD(Edit mode) Yew Online Diagnostics Tools ?	MAIN 124 Step] Window Help				_ <b>0</b> X _ 8 ×
			94949			
Kurtisen Block     Header     ArAD-F8     ArAD-F8     Header     Body					END-	3
Project FB Structure	<u> </u>	02054	Not station		Oursette	AL 84
After pasting			,			
Project Edit Bind/Replace Convert	nset project) - [LD(Edit mode) New Online Diagnostics Tools !	MAIN 124 Step] Mindow Help				_ 8 ×
Global variables						
	<u>*************************************</u>	<u>よ為市路</u> ③ 11111 回				
	글 붉 등 등 용 등 급		I AD-FB (FB1	6.A.		~
Unset project)     Elimeter for the sector of the sec			B: I_START	O_END:B		
Header Body Elia A-AD-F6	89				END	3
Even FB     E	89				[end	3
Soft State State     Soft State	89				[end	3
E 19 Interder Interder E 19 Adv76 E 19	89				[END	3
E 22 (Mote 1 landor E 20 corr E 20 corr	89				[END	3
E C C C C C C C C C C C C C C C C C C C	89				дия]	3
E C C C C C C C C C C C C C C C C C C C	89				{END	3
G 20 Long to the second of the	19 				{IND	3
<ul> <li>Body Hotel Handler Handle</li></ul>	69				{BR0	3

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# 5.8.3 Convert (compile) a sequence program

#### [Purpose of operation]

Convert (compile) the sequence program to which an FB was pasted so that it can be executed.

🏶 MELSOFT series GX Developer (U	inset project) - [LD(Edit	mode) MAIN 128 Step]			
Project Edit Bind/Replace Convert	Yew Online Diagnostics	Iools Window Help			- 8 :
	0.0.0.22	<u>ss</u>			
Global variables	• Bts 71	ă <u>11</u>			
<u>,</u>	ある おおお				
	14 BIQ 2 I		3		
	티 비 비 비 비 티 티 티 티 티 티 티 티 티 티 티 티 티 티 티	1333338	방왕뫶왕글글;;;;	5 <b>5</b> 5	
X			I-AD-FI	(FB1)	2
(Unset project)     Direction Block	89		B:I_START	O_BND:B	
8 1 1-AD-FB					
Body	93				[BND ]
A-AD-FB					
Body					
Drojart en Dructura					
Panda			02004 Host station		Comuto 1100
even of			New		NOR NOR

[Operation procedure]

Click the [Convert] menu  $\rightarrow$  [Convert/Compile] menu of GX Developer.

# 6 **PROGRAMMING**

This chapter describes the programs of the A/D converter modules. When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problems will occur in the system control.

# 6.1 Programming Procedure

In the following procedure, create a program that will execute the analog/digital conversion of the A/D converter module.



# 6.2 For Use in Normal System Configuration (Q68AD-G)

### (1) System configuration



#### (2) Conditions for the intelligent function module switch setting

	Input range setting	Normal resolution mode/ High resolution mode
CH1		
CH2	4 to 20mA	High resolution mode
CH3		
CH4		
to	not used	-
CH8		

#### (3) Program conditions

- (a) The following averaging processing specification is used for each channel.
  - CH1: Sampling processing
  - CH2: Time averaging (50 times)
  - CH3: Primary delay filtering (100ms)
- (b) CH1 uses the input signal error detection function (Refer to Section 3.2.3.)Input signal error detection: 10%
- (c) CH2 uses the warning output setting (process alarm) (Refer to Section 3.4.1 (1).)
  - Process alarm lower lower limit value: 1000
  - Process alarm lower upper limit value: 1500
  - Process alarm upper lower limit value: 6000
  - Process alarm upper upper limit value: 7000
- (d) CH3 uses the warning output setting (rate alarm) (Refer to Section 3.2.4 (2).)
  - Rate alarm warning detection period : 50ms
  - Rate alarm upper limit value: 0.3%
  - Rate alarm upper limit value: 0.1%
- (e) In the event of a write error, an error code shall be displayed in BCD format. The error code shall be reset after removal of the cause.

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## 6.2.1 Before creating a program

Perform the following steps before creating a program.

#### (1) Wiring of external devices

- Mount the Q68AD-G on the base unit and connect the external devices.
  - For all of CH1 to CH3, run the cables for current input.



#### (2) Intelligent function module switch setting

Based on the setting conditions given in Section 6.2 (2), make the intelligent function module switch settings.

(a) Each switch setting





2) Switch3: Empty (No setting required)

#### 3) Switch4: Mode setting



#### 4) Switch5: Use prohibited (0н:fixed<sup>\*1</sup>)



\*1:If any other than 0H is set to Switch 5, an error occurs.

(b) Write the settings in (a) to the Q68AD-G.

On GX Developer's "Parameter setting" window, select the "I/O assignment" tab, click "Switch setting", and make settings of Switch 1 to 5 on the window shown below.

Switch setting for I/O and intelligent function module											
					Input	format	HEX.	<b>-</b>			
[		Slot	Туре	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5		
	0	PLC	PLC								
	1	0(*-0)	Intelli.	Q68AD-G	0000	0000		0F00	0000		
	2	1(*-1)									

TROUBLESHOOTING

## 6.2.2 Programming example using the utility package

#### (1) List of devices

Device	Function						
D1, D11	CH1 Digital output value						
D2, D12	CH2 Digital output value	CH2 Digital output value					
D3, D13	CH3 Digital output value						
D6,D7 <sup>*1</sup>	Warning output flag						
D8 <sup>*1</sup>	Input signal error detection flag						
D9 <sup>*1</sup>	Error code						
M0 to M2	A/D conversion completed flag						
M12,M13	CH2 Warning output flag (Process alarm)						
M34,M35	CH3 Warning output flag (Rate alarm)						
M50	CH1 Input signal error detection flag						
X0	Module ready						
XC	Input signal error detection signal						
XE	A/D conversion completed flag						
XF	Error flag						
Y9	Operating condition setting request						
YF	Error clear request						
X10	Digital output value read command input						
X10	signal	OX10 (X10 to X1E)					
X11	Input signal error detection reset signal						
X12	Error reset signal						
Y20 to Y2B	Error code display (BCD 3 digits)	QY10 (Y20 to Y2F)					

\*1:Devices used for the auto refresh function of GX Configurator-AD.

#### (2) Operating the utility package

(a) Initial setting (Refer to Section 5.4) Set the initial settings of CH1 to CH3. Refer to Section 6.2 for the settings.

CH1 Initial setting				
Module information Module type: A/D Conversion Module Module model name: Q68AD-G		Start I/O No.:	0000	
Setting item		Settir	ng value	
CH1 A/D conversion enable/disable setting		Enable		-
CH1 Averaging process specification		Sampling		, T
CH1 Average time/Average number of times/ Move average/Time constant settings Average time(40-5000ms)/Average number of times(4-500times) Move average(2-60times)/Linear delay filter(10	0-5000ms)			ō
CH1 Warning output setting (Process alarm se	etting)	Disable	•	Ā.
	-Details Select input Setting r Enable Disable	t ange		
Make text file	End se	etup	Cancel	

(b) Auto refresh setting (Refer to Section 5.5)

Set the digital output values, warning output flags, input signal error detection flags, and error codes of CH1 to CH3.

Module type: A/D Conversion Module	S	itart I/O No.:	0000		
Module moder hand, gouword					
Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side Device
CH1 Digital output value	1	1		->	D1
CH2 Digital output value	1	1		->	D2
CH3 Digital output value	1	1		->	D3
CH4 Digital output value	1	1		->	
CH5 Digital output value	1	1		->	
CH6 Digital output value	1	1		->	
CH7 Digital output value	1	1		->	
CH8 Digital output value	1	1		->	
CH1 Maximum value	1	1		->	

(c) Writing the intelligent function module parameters (Refer to Section 5.3.3)
 Write the intelligent function module parameters to the CPU module.
 This operation is performed using the parameter setting module selection window.

#### (3) Programming example



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# 6.2.3 Programming example without using the utility package

#### (1) List of devices

Device	Function	
D1	CH1 Digital output value	
D2	CH2 Digital output value	
D3	CH3 Digital output value	
M0 to M2	A/D conversion completed flag	
M100	Module ready check flag	
M12,M13	CH2 Warning output flag (Process alarm)	
M34,M35	CH3 Warning output flag (Rate alarm)	
M50	CH1 Input signal error detection flag	
X0	Module ready	
Х9	Operating condition setting completed flag	
XC	Input signal error detection signal	
XE	A/D conversion completed flag	Q68AD-G (X/Y0 to X/YF)
XF	Error flag	
Y9	Operating condition setting request	
YF	Error clear request	
¥10	Digital output value read command input	
XIU	signal	OX10 (X10 to X1E)
X11	Input signal error detection reset signal	
X12	Error reset signal	
Y20 to Y2B	Error code display (BCD 3 digits)	QY10 (Y20 to Y2F)



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(2) Programming example

# 6 PROGRAMMING

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<ul> <li>Read the input signal error detection flag.</li> <li>Processing at CH1 input</li> </ul>
Signal error detection
2 Output the error code in BCD.
Turn ON the error clear request (YF).
Turn OFF the error clear request (YF).
3



# 6.3 For Use in Remote I/O Network (Q68AD-G)

#### (1) System configuration

Remote master station (Network No. 1) Remote I/O station (Station No. 1)



(2) Conditions for the intelligent function module switch setting

	Input range setting	Normal resolution mode/ High resolution mode
CH1		
CH2	4 to 20mA	High resolution mode
CH3		
CH4		
to	not used	-
CH8		

Based on the setting conditions given in the above, make the intelligent function module switch settings.

Select the "I/O assignment" tab on the "Intelligent function module switch settings" window, and click "Switch setting" to set the following values.

Switch No		Setting value		
Switch 1	0000н	(CH1 to CH3: 4 to 20mA		
Switch 2	0000н	CH4 to CH8: Default)		
Switch 3	-			
Switch 4	0F00н (High resolution mode)			
Switch 5	0000н (0н: Fixed)			

#### (3) Program conditions

(a) The following averaging processing specification is used for each channel.

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SETUP AND PROCEDURES BEFORE OPERATION

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- CH1: Sampling processing
- CH2: Time averaging (50 times)
- CH3: Primary delay filtering (100ms)
- (b) CH1 uses the input signal error detection function (Refer to Section 3.2.3.)Input signal error detection: 10%
- (c) CH2 uses the warning output setting (process alarm) (Refer to Section 3.2.4 (1).)
  - Process alarm lower lower limit value: 1000
  - Process alarm lower upper limit value: 1500
  - Process alarm upper lower limit value: 6000
  - Process alarm upper upper limit value: 7000
- (d) CH3 uses the warning output setting (rate alarm) (Refer to Section 3.2.4 (2).)
  - Rate alarm warning detection period : 50ms
  - Rate alarm upper limit value: 0.3%
  - Rate alarm upper limit value: 0.1%
- (e) In case of a write error, an error code is indicated in BCD format. The error code is reset after the error cause is resolved.

#### (4) List of devices

Device	Function						
D1(W1)	CH1 Digital output value						
	CH2 Digital output value						
D2(W2)							
D3(VV3)							
D6,D7(W6,W7) <sup>*1</sup>	Warning output flag						
D8(W8) <sup>*1</sup>	Input signal error detection flag						
D9(W9) <sup>*1</sup>	Error code						
D10	A/D conversion completed flag						
M12,M13	CH2 Warning output flag (Process alarm)						
M34,M35	CH3 Warning output flag (Rate alarm)						
M50	CH1 Input signal error detection flag						
X20	Initialization request signal						
X21	Digital output value read command input signal	OX10 (X20 to X2E)					
X22	Input signal error detection reset signal						
X23	Error reset signal						
Y30 to Y3B	Error code display (BCD 3 digits)	QY10 (Y30 to Y3F)					
X120	Module ready						
X129	Operating condition setting completed flag						
X12C	Input signal error detection signal						
X12E	A/D conversion completed flag	(X/V120 to X/V12E)					
X12F	Error flag	(/// 1/20 10 // 1/2F)					
Y129	Operating condition setting request						
Y12F	Error clear request						

\*1:Devices used for the auto refresh function of GX Configurator-AD.

# **Point**

For details on the MELSECNET/H remote I/O network, refer to the Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O Network). 6.3.1

# Programming example using the utility package

#### (1) Operating GX Developer

- (a) CPU parameter setting
  - Network type
    - : MNET/H (Remote master)
  - Starting I/O No. Network No.
- : 0000н : 1

: Online

- Total stations
- : 1

:

- Mode
- Network range assignment :

		M station -> R station					M station <- R station						
StationNo.		Y			Y			X			Х		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0100	01FF	256	0000	OOFF	256	0100	01FF	256	0000	OOFF	]-[
	M station -> R station		ation	M station <- R station			M station -> R station			M station <- R station			-
StationNo.		В			В			W			W		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1							160	0100	019F	160	0000	009F	•

#### Refresh parameters

				Link side			PLC side					
	Dev. r	name	Points	Start	End		Dev.	name	Points	Start	End	-
Transfer SB	SB		512	0000	01FF	+	SB		512	0000	01FF	
Transfer SW	SW		512	0000	01FF	₩.	S₩		512	0000	01FF	
Random cyclic	LB					+		-				
Random cyclic	LW					+		-				[ .
Transfer1	LB	•	8192	0000	1FFF	. ↔	В	-	8192	0000	1FFF	-
Transfer2	LW	-	8192	0000	1FFF	₩.	W	-	8192	0000	1FFF	1
Transfer3	LX	-	512	0000	01FF	+	Х	-	512	0000	01FF	
Transfer4	LY	+	512	0000	01FF	+	Y	-	512	0000	01FF	<u> </u>
Transfer5		-				+		-				
Transfer6		+						-				



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#### (2) Operating the utility package

Operate the utility package on the remote I/O station side.

Set the following in the Intelligent function module parameter setting module select area.

- Start I/O No. : 20
- Module type : A/D Conversion Module
- Module model name: Q68AD-G
- (a) Initial setting (Refer to Section 5.4)
   Set the initial settings of CH1 to CH3.
   Refer to Section 6.3 for the settings.

CH1 Initial setting	
Module information Module type: A/D Conversion Module Module model name: Q68AD-G	Start I/O No.: 0020
Setting item	Setting value
CH1 A/D conversion enable/disable setting	Enable 👻
CH1 Averaging process specification	Sampling 🗸 🗸
CHT Average time/Average number of times/ Move average/Time constant settings Average time(40-5000ms)/Average number of times(4-500times) Move average(2-60times)/Linear delay filter(10-5000ms)	0
CH1 Warning output setting (Process alarm setting)	Disable 🗸 🗸
Details Select inpu Setting Enable Disable	t range
Make text file End s	Cancel

(b) Auto refresh setting (Refer to Section 5.5)

Set the digital output values, warning output flags, input signal error detection flags, and error codes of CH1 to CH3.

Module type: A/D Conversion Module Module model name: Q68AD-G	9	itart I/O No.:	0020		
Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side _ Device
CH1 Digital output value	1	1		->	W1
CH2 Digital output value	1	1		->	W2
CH3 Digital output value	1	1		->	W3
CH4 Digital output value	1	1		->	
CH5 Digital output value	1	1		->	
CH6 Digital output value	1	1		->	
CH7 Digital output value	1	1		->	
CH8 Digital output value	1	1		->	
CH1 Maximum value	1	1		->	

(c) Writing the intelligent function module parameters (Refer to Section 5.3.3)
 The intelligent function module parameters are written to the remote I/O station.
 This operation is performed using the intelligent function module parameter
 setting module select window.

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(3) Programming example



**Point** 

To write the intelligent function module parameters, set the target remote I/O station from [Online] - [Transfer setup] on GX Developer.

They can be written by:

- Directly connecting GX Developer to the remote I/O station.
- Connecting GX Developer to another device such as a CPU module and passing through the network.

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## 6.3.2 Programming example without using the utility package

# Point

The dedicated instructions used for reading/writing the buffer memory of the intelligent function module on a remote I/O station (REMTO and REMFR) are the execution type for which several scans are needed. Therefore, transmissions of the execution results are not synchronized with the I/O signal operations. When reading a digital output value on an A/D converter module after changing the operating condition during operation, be sure to read the A/D conversion completed flag (buffer memory address 10) at the same time. Also, for the case of changing the operating condition, insert an interlock to prevent the execution of the REMFR instruction.

#### (1) Operating GX Developer (CPU parameter setting)

Network type	: MNET/H (Remote master)
<ul> <li>Starting I/O No.</li> </ul>	: 0000H
	4

2

- Network No. : 1
   Total stations : 1
- Mode : Online
- Network range assignment :

				M station	-> R statio	on		M station <- R station						
Stati	StationNo.	Y			Y			×			×			
		Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1		256	0100	01FF	256	0000	OOFF	256	0100	01FF	256	0000	OOFF	]•
		M stati	on -> R sta	ation	M station <- R station			M station -> R station			M station <- R station			
Statio	onNo.		В		В			W			W			
		Pointo	Chark	End	Pointo Start End			Points Start End			Pointo	Charle	End	

160 0100 019F 160 0000 009F -

Refresh parameters

1

				Link side					PLC side		
	Dev.	name	Points	Start	End		Dev. nam	e Points	Start	End	_
Transfer SB	SB		512	0000	01FF	+	SB	512	0000	01FF	
Transfer SW	SW		512	0000	01FF	₩.	SW	512	0000	01FF	
Random cyclic	LB					++		r			
Random cyclic	LW					₩.		r			
Transfer1	LB	-	8192	0000	1FFF	₩.	В 💌	· 8192	0000	1FFF	
Transfer2	LW	-	8192	0000	1FFF	₩.	W 🔹	· 8192	0000	1FFF	
Transfer3	LX	-	512	0000	01FF	₩.	×	r 512	0000	01FF	
Transfer4	LY	-	512	0000	01FF	₩.	Y 🔹	· 512	0000	01FF	
Transfer5		-				₩.		,			
Transfer6		-				↔		·			Ŧ

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#### (2) Programming example



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M102							—[моv	H0F8	D1000	]	A/D conversion enable/disable setting
							—[моv	K50	D1002	]	CH2 Average time/Average number of times/ Move average/Time constant settings
							—[моv	K100	D1003	]	CH3 Average time/Average number of times/ Move average/Time constant settings
							—[моv	H420	D1024	]	Averaging process specification
							—Емоу	HOFE	D1047	]	Input signal error detection settings
							—[моv	H0FBFD	D1048	]	Warning output settings
							—[моv	K1000	D1090	]	CH2 process alarm lower lower limit value
							—[моv	K1500	D1091	]	CH2 process alarm lower upper limit value
							—[моv	K6000	D1092	]	CH2 process alarm upper lower limit value
							—[моv	K7000	D1093	]	CH2 process alarm upper upper limit value
							—[моv	K50	D1120	]	CH3 rate alarm warning detection period
							—[моv	КЗ	D1130	]	CH3 rate alarm upper limit value
							—[моv	K1	D1131	]	CH3 rate alarm lower limit value
							—[моv	K100	D1142	]	CH1 input signal error detection setting value
M102	X129 Y129								—К0	$\rightarrow$	
-ко →	[ZP.REMTO	"j1"	K1	K1	H2	K0	D1000	K4	M200	]	
M200	M201 [ZP.REMTO	"j1"	K1	K1	H2	K24	D1024	K1	M210	]	
M210	M211 ZP.REMTO	"j1"	K1	K1	H2	K47	D1047	K2	M220	]	
M220	M221	"j1"	K1	K1	H2	K90	D1090	K4	M230	]	Write to buffer memory
M230	M231	"j1"	K1	K1	H2	K120	D1120	K1	M240	]	
M240	M241	, "j1"	K1	K1	H2	K130	D1130	K2	M250	-	
M250	M251	'i1"	K1	K1	H2	K142	D1142	K1	M260	-	
X129	Y129 M260 M261	,. 						-[SET	Y129	]	J Turn ON operation condition setting request (Y9).

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		[R:	ST Y129	I urn OFF operation condition setting request (Y9)	
* Digital ou	tout value read processing	[R	ST M102	3	'IEW
* Digital output va X21 * Warning (process SM4( M32) * Input signal error SM4( M32)	X21 X120 X12E Y129		——ко —	Concurrently read the A/D conversion completed flag and CH1 to CH3 digital output values.	OVERV
	M300 M301 D10.0	[MOV D1	1 D1	Read the CH1 digital output value.	2
	D10.1	[MOV D1:	2 D2	Read the CH2 digital output value.	7
	D10.2	[MOV D1:	B D3	Read the CH3 digital output value.	RATION
* Warning	-K0	D10 K4	M300	3	TEM
	Z.REMFR"j1" K4 K1 H2 K50	D6 K2	M320	Read the warning output flag.	SYS COI
	M320 M321 D6.2	- Processing at	warning occurrence	Processing at CH2 process alarm upper limit value warning occurrence	3
	D6.3	- Processing at	warning occurrence	Processing at CH2 process alarm lower limit value warning occurrence	S
		- Processing at	warning occurrence	Processing at CH3 rate alarm upper limit value warning occurrence	ATION
* Input sigr	D7.5	- Processing at	warning occurrence	Processing at CH3 rate alarm lower limit value warning occurrence	CIFIC,
	SM400 [Z.REMFR"j1" K5 K1 H2 K49	D8 K1	M330	Read the input signal error detection flag.	SPE
	M330 M331 D8.0	- Processing	at error detection	Processing at CH1 input signal error detection	4
* Error cod	X22 X12C 11 I e display and reset processing	[SI	ET Y12F	] Turn ON the error clear request (YF).	ATION
	X12F [ZP.REMFR "j1" K6 K1 H2 K19	D9 K1	M340	] Read the error code.	ND URES OPER
	M340 M341	-EBCD D9	K3Y30	] Output the error code in BCD.	TUP A OCED FORE
	X23 X12F	[SI	ET Y12F	] Turn ON the error clear request (YF).	R P S E
	Y12F X12C X12F	[R	ST Y12F	] Turn OFF the error clear request (YF).	5 ~
Į		——Ем	CR N0	3	AGE RATOF
			END		UTILITY PACK/ (GX CONFIGUF AD)

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# 6.4 For Use in Normal System Configuration (Q66AD-DG)

#### (1) System configuration



#### (2) Conditions for the intelligent function module switch setting

	Input range setting	Normal resolution mode/ High resolution mode
CH1	4 to 20mA	
CH2	(For 2-wire transmitter	High resolution mode
CH3	input)	
CH4		
to	not used	-
CH6		

#### (3) Program conditions

- (a) The following averaging processing specification is used for each channel.
  - CH1: Sampling processing
  - CH2: Time averaging (50 times)
  - CH3: Primary delay filtering (100ms)
- (b) CH1 uses the input signal error detection function (Refer to Section 3.2.3.)
  - Input signal error detection: 10%
- (c) CH2 uses the warning output setting (process alarm) (Refer to Section 3.2.4 (1).)
  - Process alarm lower lower limit value: 1000
  - Process alarm lower upper limit value: 1500
  - Process alarm upper lower limit value: 6000
  - Process alarm upper upper limit value: 7000
- (d) CH3 uses the warning output setting (rate alarm) (Refer to Section 3.2.4 (2).)
  - Rate alarm warning detection period : 50ms
  - Rate alarm upper limit value: 0.3%
  - Rate alarm upper limit value: 0.1%
- (e) In the event of a write error, an error code shall be displayed in BCD format. The error code shall be reset after removal of the cause.

MELSEG **Q** series

## 6.4.1 Before creating a program

Perform the following steps before creating a program.

#### (1) Wiring of external devices

Mount the Q68AD-G on the base unit and connect the external devices.

• For all of CH1 to CH3, run the cables for current input.

For details, refer to "4.4.2 (2) (a) For 2-wire transmitter input".



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#### (2) Intelligent function module switch setting

Based on the setting conditions given in Section 6.2 (2), make the intelligent function module switch settings.

- (a) Each switch setting
  - 1) Switch1, Switch2: Input range setting

<switch 2=""></switch>	<switch 1=""></switch>	
0000 н	0000	н
Fixed at 0, CH6 CH5	CH4 CH3 CH2 CH1	
		— CH1 to CH3: 0H(4 to 20mA input)
		— CH4 to CH6: 0H(default)

- 2) Switch3: Empty (No setting required)
- 3) Switch4: Mode setting

	<	Swit	ch 4	>	
(	כ	F	0 Fix	0 ed a	H at 0

Setting of normal resolution mode/high resolution mode All channels: Fн (High resolution mode) Setting of normal mode/Offset/gain setting mode All channels: 0н (normal mode)

4) Switch5: Use prohibited (0:fixed)



\*1:If any other than  $0{\mbox{\tiny H}}$  is set to Switch 5, an error occurs.

#### (b) Write the settings in (a) to the Q66AD-DG

On GX Developer's "Parameter setting" window, select the "I/O assignment" tab, click "Switch setting", and make settings of Switch 1 to 5 on the window shown below.

S١	Switch setting for I/O and intelligent function module											
Input format												
[		Slot	Туре	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	*		
	0	PLC	PLC									
	1	0(*-0)	Intelli.	Q66AD-DG	0000	0000		0F00	0000			
	2	1(*-1)										
### 6.4.2 Programming example using the utility package

### (1) List of devices

Device	Function	
D1, D11	CH1 Digital output value	
D2, D12	CH2 Digital output value	
D3, D13	CH3 Digital output value	
D6,D7 <sup>*1</sup>	Warning output flag	
D8 <sup>*1</sup>	Input signal error detection flag	
D9 <sup>*1</sup>	Error code	
M0 to M2	A/D conversion completed flag	
M12,M13	CH2 Warning output flag (Process alarm)	
M34,M35	CH3 Warning output flag (Rate alarm)	
M50	CH1 Input signal error detection flag	
X0	Module ready	
XC	Input signal error detection signal	
XE	A/D conversion completed flag	
XF	Error flag	
Y9	Operating condition setting request	
YF	Error clear request	
X10	Digital output value read command input signal	
X11	Input signal error detection reset signal	QX10 (X10 to X1F)
X12	Error reset signal	
Y20 to Y2B	Error code display (BCD 3 digits)	QY10 (Y20 to Y2F)

\*1:Devices used for the auto refresh function of GX Configurator-AD.

### (2) Operating the utility package

(a) Initial setting (Refer to Section 5.4)Set the initial settings of CH1 to CH3.Refer to Section 6.4 for the settings.

CH1 Initial setting	
Module information Module type: A/D Conversion Module Module model name: Q66AD-DG	Start I/O No.: 0000
Setting item	Setting value
CH1 A/D conversion enable/disable setting	Enable 👻
CH1 Averaging process specification	Sampling 🗸 🗸
CH1 Average time/Average number of times/ Move average/Time constant settings Average time[40-5000ms]/Average number of times[4-500times] Move average[2-60times]/Linear delay filter[10-5000ms]	0
CH1 A/D conversion starting time setting(2-wire transmitter)	30
CH1 Warning output setting (Process alarm setting)	Disable 🗸 🗸
Details Select inpu Setting r Enable Disable	t ange
Make text file End se	Cancel

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Set the digital output values, warning output flags, input signal error detection flags, and error codes of CH1 to CH3.

Setting item	Module side Buffer size	Module side Transfer word count	Transfer direction	PLC side Device
CH1 Digital output value	1	1	->	D1
CH2 Digital output value	1	1	->	D2
CH3 Digital output value	1	1	 ->	D3
CH4 Digital output value	1	1	 ->	
CH5 Digital output value	1	1	->	
CH6 Digital output value	1	1	->	
CH1 Maximum value	1	1	->	
CH1 Minimum value	1	1	->	
CH2 Maximum value	1	1	->	

(c) Writing the intelligent function module parameters (Refer to Section 5.3.3)
 Write the intelligent function module parameters to the CPU module.
 This operation is performed using the parameter setting module selection window.



### **Point**

To perform only current input by means of the Q66AD-DG with a product number (first five digits) of 15031 or earlier, refer to Appendix 2.

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### 6.4.3 Programming example without using the utility package

### (1) List of devices

Device	Function	
D1	CH1 Digital output value	
D2	CH2 Digital output value	
D3	CH3 Digital output value	
M0 to M2	A/D conversion completed flag	
M100	Module ready check flag	
M12,M13	CH2 Warning output flag (Process alarm)	
M34,M35	CH3 Warning output flag (Rate alarm)	
M50	CH1 Input signal error detection flag	
X0	Module ready	
X9	Operating condition setting completed flag	
XC	Input signal error detection signal	
XE	A/D conversion completed flag	Q66AD-DG (X/Y0 to X/YF)
XF	Error flag	
Y9	Operating condition setting request	
YF	Error clear request	
X10	Digital output value read command input signal	
X11	Input signal error detection reset signal	QX10 (X10 to X1F)
X12	Error reset signal	
Y20 to Y2B	Error code display (BCD 3 digits)	QY10 (Y20 to Y2F)

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(2) Programming example

Initial settings					
			-[SET	M100	Turns ON Module ready check flag.
		MOV	H38	U0\ G0	A/D conversion enable/disable setting
		MOV	к50	UO\ G2	CH2 Average time/ Average number of times/Move average/ Time constant settings
		MOV	K100	U0\ G3	CH3 Average time/ Average number of times/Move average/ Time constant settings
-		MOV	H420	00\ G24	Averaging process specification
		MOV	H3E	U0\ G47	Input signal error detection settings
_		MOV	H3B3D	U0\ G48	Warning output settings
		MOV	K1000	UO\ G90	CH2 process alarm lower lower limit value
		MOV	K1500	UO\ G91	CH2 process alarm lower upper limit value
_		MOV	K6000	U0\ G92	CH2 process alarm upper lower limit value
		MOV	K7000	UO\ G93	CH2 process alarm upper upper limit value
		MOV	K50	U0\ G120	CH3 rate alarm warning detection period
-		MOV	КЗ	U0\ G130	CH3 rate alarm upper limit value
		MOV	K1	UO\ G131	CH3 rate alarm lower limit value
-		MOV	K100	U0\ G142	CH1 input signal error detection setting value
-			-[SET	¥9	Turns ON operation condition setting request (Y9).
			RST	M100	Turns OFF Module ready check flag.
Read digital output values			RST	¥ 9	Turns OFF operation condition setting request (Y9)
	¥9 ¥	MOV	U0\ G10	K2M0	Read the A/D conversion completed flag.
		MOV	U0\ G11	Dl	Read the CH1 digital output value.
		MOV	U0\ G12	D2	Read the CH2 digital output value.
Warning (process alarm, rate alarm)	M2		U0\ G13	D3	Read the CH3 digital output value.
		[MOV	U0\ G50	K4M10	Read the warning output flag. (Process alarm)
		MOV	U0\ G51	K4M30	Read the warning output flag. (Rate alarm)
M12		Process	ing at warni	ng occurrence	Processing at CH2 process alarm upper limit value warning occurrence
		Process	ing at warni	ng occurrence	Processing at CH2 process alarm lower limit value warning occurrence
M34		Process	ing at warni	ng occurrence	Processing at CH3 rate alarm upper limit value warning occurrence
M35		Process	sing at warni	ng occurrence	Processing at CH3 rate alarm lower limit value warning occurrence





### 6.5 For Use in Remote I/O Network (Q66AD-DG)

### (1) System configuration

Remote master station (Network No. 1) Remote I/O station (Station No. 1)



### (2) Conditions for the intelligent function module switch setting

	-	-
	Input range setting	Normal resolution mode/ High resolution mode
CH1	4 to 20mA	
CH2	(For 2-wire transmitter	High resolution mode
CH3	input)	
CH4		
to	not used	-
CH6		

Based on the setting conditions given in the above, make the intelligent function module switch settings.

Select the "I/O assignment" tab on the "Intelligent function module switch settings" window, and click "Switch setting" to set the following values.

Switch No.		Setting value
Switch 1	0000н	(CH1 to CH3: 4 to 20mA(For 2-wire transmitter input),
Switch 2	0000н	CH4 to CH6: Default)
Switch 3	-	
Switch 4	0F00н (High resol	lution mode)
Switch 5	0000н (0н: Fixed)	

### (3) Program conditions

- (a) The following averaging processing specification is used for each channel.
  - CH1: Sampling processing
  - CH2: Time averaging (50 times)
  - CH3: Primary delay filtering (100ms)
- (b) CH1 uses the input signal error detection function (Refer to Section 3.2.3.)
  - Input signal error detection: 10%

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- (c) CH2 uses the warning output setting (process alarm) (Refer to Section 3.2.4 (1).)
  - Process alarm lower lower limit value: 1000
  - Process alarm lower upper limit value: 1500
  - Process alarm upper lower limit value: 6000
  - Process alarm upper upper limit value: 7000
- (d) CH3 uses the warning output setting (rate alarm) (Refer to Section 3.2.4 (2).)
  - Rate alarm warning detection period : 50ms
  - Rate alarm upper limit value: 0.3%
  - Rate alarm upper limit value: 0.1%
- (e) In case of a write error, an error code is indicated in BCD format. The error code is reset after the error cause is resolved.

Device	Function	
D1(W1)	CH1 Digital output value	
D2(W2)	CH2 Digital output value	
D3(W3)	CH3 Digital output value	
D6,D7(W6,W7) <sup>*1</sup>	Warning output flag	
D8(W8) <sup>*1</sup>	Input signal error detection flag	
D9(W9) <sup>*1</sup>	Error code	
D10	A/D conversion completed flag	
M12,M13	CH2 Warning output flag (Process alarm)	
M34,M35	CH3 Warning output flag (Rate alarm)	
M50	CH1 Input signal error detection flag	
X20	Initialization request signal	
X21	Digital output value read command input signal	OX10 (X20 to X2E)
X22	Input signal error detection reset signal	QX10 (X20 10 X21 )
X23	Error reset signal	
Y30 to Y3B	Error code display (BCD 3 digits)	QY10 (Y30 to Y3F)
X120	Module ready	
X129	Operating condition setting completed flag	
X12C	Input signal error detection signal	
X12E	A/D conversion completed flag	(V/V120 to V/V12E)
X12F	Error flag	(//1/20/10//1/26)
Y129	Operating condition setting request	
Y12F	Error clear request	

#### (4) List of devices

\*1:Devices used for the auto refresh function of GX Configurator-AD.

### ⊠Point

For details on the MELSECNET/H remote I/O network, refer to the Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O Network).

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#### Programming example using the utility package 6.5.1

### (1) Operating GX Developer

- (a) CPU parameter setting
  - Network type

Mode

- : MNET/H (Remote master)
- Starting I/O No.
- : 0000н : 1
- Network No. Total stations
- : 1
- : Online

:

Network range assignment :

			M station	-> R statio	n				M station	<- R statio	n		
StationNo.		Y			Y			Х			Х		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0100	01FF	256	0000	00FF	256	0100	01FF	256	0000	OOFF	-
	M stat	ion -> R st	ation	M stat	ion <- Rist	ation	M stati	ion -> R st	ation	M stati	ion <- Rist	ation	
StationNo.		В			В			W			W		
	Defeate	Chark	End	Points	Start	End	Points	Start	End	Points	Start	End	
	Foints	Start	Enu	TOILIS	Julian	L LIIU	1 On its	ordire	L Ella	1 On to	oraire		

#### Refresh parameters

				Link side					PLC side	
	Dev. i	name	Points	Start	End		Dev. nan	ne Points	Start	End
Transfer SB	SB		512	0000	01FF	+	SB	512	0000	01FF
Transfer SW	SW		512	0000	01FF	₩.	SW	512	0000	01FF
Random cyclic	LB					₩.		-		
Random cyclic	LW					₩.		-		
Transfer1	LB	4	8192	0000	1FFF	. ↔	В	8192	0000	1FFF
Transfer2	LW	4	8192	0000	1FFF	+ +	W ·	<ul> <li>8192</li> </ul>	0000	1FFF
Transfer3	LX	•	512	0000	01FF	₩.	×	<ul> <li>512</li> </ul>	0000	01FF
Transfer4	LY		512	0000	01FF	₩.	Y ·	<ul> <li>512</li> </ul>	0000	01FF
Transfer5		+						-		
Transfer6		4				₩.		-		•



### (2) Operating the utility package

Operate the utility package on the remote I/O station side.

Set the following in the Intelligent function module parameter setting module select area.

- Start I/O No. : 20
- Module type : A/D Conversion Module
- Module model name : Q66AD-DG
- (a) Initial setting (Refer to Section 5.4)Set the initial settings of CH1 to CH3.Refer to Section 6.5 for the settings.

CH1 Initial setting	
Module information Module type: A/D Conversion Module Module model name: Q66AD-DG	Start I/O No.: 0020
Setting item	Setting value
CH1 A/D conversion enable/disable setting	Enable
CH1 Averaging process specification	Sampling 🚽 🗕
CH1 Average time/Average number of times/ Move average/Time constant settings Average time(40-5000ms)/Average number of times(4-500times) Move average(2-60times)/Linear delay filter(10-5000ms Clil 4.47 exercises to the setting of wire to set	
CHTA/D conversion starting time setting[2-wire transmi	iter) 30
CH1 Warning output setting (Process alarm setting)	Disable
Details Select i Enat Disal	nput ng range e le
Make text file	d setup Cancel

(b) Auto refresh setting (Refer to Section 5.5)

Set the digital output values, warning output flags, input signal error detection flags, and error codes of CH1 to CH3.

Module information Module type: A/D Conversion Module	s	itart I/O No.:	0020			
Module model name: Q58AD-G						
Setting item	Module side Buffer size	Module side Transfer word count		Transfer direction	PLC side Device	
CH1 Digital output value	1	1		->	W1	-
CH2 Digital output value	1	1		->	W2	
CH3 Digital output value	1	1		->	W3	-
CH4 Digital output value	1	1		->		1
CH5 Digital output value	1	1		->		=
CH6 Digital output value	1	1		->		1
CH7 Digital output value	1	1		->		-
CH8 Digital output value	1	1		->		1
CH1 Maximum value	1	1		->		-

 (c) Writing the intelligent function module parameters (Refer to Section 5.3.3) The intelligent function module parameters are written to the remote I/O station. This operation is performed using the intelligent function module parameter setting module select window.

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* Read d	igital output value	S						
					—[мол	W1	D1	Read the CH1 digital output value.
					—[мол	W2	D2	Read the CH2 digital output value.
					[MOV	W3	D3	] Read the CH3 digital output value.
<ul> <li>Warnin</li> </ul>	g (process alarm,	rate alarm) occu	rrence status and p	processing at warning oc	currence	9		
	SM400				—[моv	W6	K4M10	Read the warning output flag. (Process alarm)
					—Емол	W7	K4M30	Read the warning output flag. (Rate alarm)
	M12				- Processi	ing at warning	occurrence	Processing at CH2 process alarm upper limit value warning occurrence
	M13  ↑				-[Processi	ing at warning	occurrence	Processing at CH2 process alarm lower limit value warning occurrence
	M34  ↑				- Processi	ing at warning	occurrence	Processing at CH3 rate alarm upper limit value warning occurrence
	M35  ↑				- Processi	ing at warning	occurrence	<ul> <li>Processing at CH3 rate</li> <li>Jalarm lower limit value</li> <li>warning occurrence</li> </ul>
* Input si	gnal error detection	on status and pro	cessing at error de	tection				5
	KM400				[mov	W8	K2M50	Read the input signal error detection flag.
	M50  ↑				[Process	sing at error	detection	Processing at CH1 input signal error detection
						-[SET	Y12F	] Turn ON the error clear request (Y12F).
* Error co	de display and re	eset processing						
	X23 X12F	g			-EBCD	W9	K3Y30	] Output the error code in BCD.
						[SET	Y12F	] Turn ON the error clear request (Y12F).
	¥105 ¥100	N10E						
		x12F				-[RST	Y12F	] Turn OFF the error clear request (Y12F).
							-[END	3

### (3) **Programming example**

### ⊠Point

- (1) To write the intelligent function module parameters, set the target remote I/O station from [Online] - [Transfer setup] on GX Developer. They can be written by:
  - Directly connecting GX Developer to the remote I/O station.
  - Connecting GX Developer to another device such as a CPU module and passing through the network.
- (2) To perform only current input by means of the Q66AD-DG with a product number (first five digits) of 15031 or earlier, refer to Appendix 2.

### 6.5.2 Programming example without using the utility package

### ⊠ Point

The dedicated instructions used for reading/writing the buffer memory of the intelligent function module on a remote I/O station (REMTO and REMFR) are the execution type for which several scans are needed. Therefore, transmissions of the execution results are not synchronized with the I/O signal operations. When reading a digital output value on an A/D converter module after changing the operating condition during operation, be sure to read the A/D conversion completed flag (buffer memory address 10) at the same time. Also, for the case of changing the operating condition, insert an interlock to prevent the execution of the REMFR instruction.

### (1) Operating GX Developer (CPU parameter setting)

- Network type
- : MNET/H (Remote master)

: 0000H

- Starting I/O No.
- Network No. : 1
- Total stations : 1
- Mode : Online
- Network range assignment :

			M station	n -> R statio	on				M station	<- R statio	n		٠
StationNo.		Y			Y			Х			Х		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	256	0100	01FF	256	0000	OOFF	256	0100	01FF	256	0000	OOFF	-
	M stati	on -> R sta	ation	M stati	on <- Rista	ation	M stati	on -> R sta	ation	M stati	ion <- Rista	ation	
StationNo.		В			В			W			W		
	Dointo	Chevel	End	Dojato	Chevel	End	Dojato	Charle	End	Dojeto	Chark	End	-

160 0100 019F 160 0000 009F V

Refresh parameters

				Link side						PLC side		
	Dev.	name	Points	Start	End		Dev.	. name	Points	Start	End	-
Transfer SB	SB		512	0000	01FF	+	SB		512	0000	01FF	
Transfer SW	SW		512	0000	01FF		SW		512	0000	01FF	
Random cyclic	LB					<b>↔</b>		•				
Random cyclic	LW							•				
Transfer1	LB	•	8192	0000	1FFF		В	-	8192	0000	1FFF	
Transfer2	LW	-	8192	0000	1FFF		W	-	8192	0000	1FFF	
Transfer3	LX	-	512	0000	01FF	. ↔	Х	•	512	0000	01FF	
Transfer4	LY	-	512	0000	01FF		Y	•	512	0000	01FF	
Transfer5		-				↔		-				
Transfer6		-				↔		-				Ŧ

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### (2) Programming example



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M102										
							[MOV	H38	D1000	A/D conversion enable/disable setting
							—[моv	K50	D1002	CH2 Average time/Average number of times/ Move average/Time constant settings
							—[моv	K100	D1003	3 CH3 Average time/Average number of times/ Move average/Time constant settings
							—[моv	H420	D1024	Averaging process specification
							—[моv	H3E	D1047	7 ] Input signal error detection settings
							—[моv	H3B3D	D1048	3 ] Warning output settings
							—[моv	K1000	D1090	CH2 process alarm lower lower limit value
							—[моv	K1500	D1091	1 ] CH2 process alarm lower upper limit value
							—[моv	K6000	D1092	2 ] CH2 process alarm upper lower limit value
							—[моv	K7000	D1093	3 ] CH2 process alarm upper upper limit value
							—[моv	K50	D1120	CH3 rate alarm warning detection period
							—[моv	K3	D1130	CH3 rate alarm upper limit value
							—[моv	K1	D1131	1 ] CH3 rate alarm lower limit value
							—[моv	K100	D1142	2 ] CH1 input signal error detection setting value
M102	X129 Y129								—К0	$\rightarrow$
-ко →	[ZP.REMTO	"j1"	K1	K1	H2	K0	D1000	K4	M200	E
M200	M201	"j1"	K1	K1	H2	K24	D1024	K1	M210	Э
M210	M211 M211 ZP.REMTO	"j1"	K1	K1	H2	K47	D1047	K2	M220	E
M220	M221	"j1"	K1	K1	H2	K90	D1090	K4	M230	- Write to buffer memory
M230	M231	"j1"	K1	K1	H2	K120	D1120	K1	M240	Э
M240	M241 ZP.REMTO	"j1"	K1	K1	H2	K130	D1130	K2	M250	E E E E E E E E E E E E E E E E E E E
M250	M251 ZP.REMTO	"j1"	K1	K1	H2	K142	D1142	K1	M260	J J
X129	Y129 M260 I	W261						[SET	Y129	Turn ON operation condition setting request (Y9).

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	M102	Y129	X129								-[RST	Y129	Turn OFF operation condition setting request (Y9)
* Digital au	toutual	rood pro-	opping								-[RST	M102	3
Digital ou				¥129								—ко -	Concurrently read the A/D conversion completed flag and CH1 to CH3 digital output values.
				L	мзоо —   —	M301				—[моv	D11	D1	Read the CH1 digital output value.
							D10.1			—[моv	D12	D2	Read the CH2 digital output value.
							D10.2			—[моv	D13	D3	Read the CH3 digital output value.
* Warning	-K0 -> (process a	alarm, rate	alarm) oo	-[Z.REMFR courrence str	."j1" atus and	K2 processin	K1 g at warn	H2 ing occu	K10 rrence	D10	K4	M300	
	SM400			-[Z.REMFR	."j1"	K4	K1	H2	K50	D6	K2	M320	Read the warning output flag.
	M320	M321								[ Proces	sing at warnin	g occurrence	Processing at CH2 process alarm upper limit value warning occurrence
			6.3							[ Proces	sing at warnin	g occurrence	Processing at CH2 process alarm lower limit value warning occurrence
											sing at warnin	g occurrence	Processing at CH3 rate alarm upper limit value warning occurrence
* Input sign	al error d	etection st	D7.5								sing at warnin	g occurrence	Processing at CH3 rate alarm lower limit value warning occurrence
input sign	SM400			-[Z.REMFR	:"j1"	K5	K1	H2	K49	D8	K1	M330	Read the input signal error detection flag.
	M330	M331								[ Proc	essing at erro	r detection	Processing at CH1 input signal error detection
* Error cod	X22	X12C	processin	g							[SET	Y12F	] Turn ON the error clear request (YF).
			-[ZP.REM	/FR "	j1"	K6	K1	H2	K19	D9	K1	M340	Read the error code.
		M340	M341							—[вср	D9	K3Y30	] Output the error code in BCD.
	X23  ¶	X12F									-[SET	Y12F	Turn ON the error clear request (YF).
	Y12F ──│	X12C	X12F								-[RST	Y12F	Turn OFF the error clear request (YF).
l											-[MCR	N0	з 
												-[END	PACKAG
													ADI CONTILITU ADI CON ADI CON

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### 7 ONLINE MODULE CHANGE

To perform online module change, read the following manual.

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- (1) Perform an online module change by operating GX Developer.
- (2) To ensure ease of offset/gain re-setting, there is a user range save/restoration function that is performed by executing the dedicated instruction or read/write from/to buffer memory.

### ⊠Point

- (1) Perform an online module change after making sure that the system outside the programmable controller will not malfunction.
- (2) To prevent an electric shock and malfunction of operating modules, provide means such as switches for powering off each of the external power supply and external devices connected to the module to be replaced online.
- (3) After the module has failed, data may not be saved properly. Referring to Section 3.4.23, therefore, prerecord the data to be saved (offset/gain values of the industrial shipment settings and user range settings in the buffer memory).
- (4) It is recommended to perform an online module change in the actual system in advance to ensure that it would not affect the other modules by checking the following:
  - Means of cutting off the connection to external devices and its configuration are correct.
  - Switching ON/OFF does not bring any undesirable effect.
- (5) Do not install/remove the module to/from the base unit more than 50 times after the first use of the product. (IEC 61131-2 compliant) Failure to do so may cause malfunction.

#### (Note)

The dedicated instruction cannot be executed during an online module change. When using the dedicated instruction to execute save/restoration, therefore, execute

save/restoration in the other system<sup>\*1</sup>.

If the other system is unavailable, execute restoration by performing write to the buffer memory.

\*1: If the module is mounted on the remote I/O station, execute save/restoration in the other system mounted on the main base unit. (Save/restoration cannot be executed in the other system mounted on the remote I/O station.)

### 7.1 Online Module Change Conditions

The CPU, MELSECNET/H remote I/O module, A/D converter module, GX Developer and base unit given below are needed to perform an online module change.

### (1) CPU

The Process CPU or Redundant CPU are required. For precautions on multiple CPU system configuration, refer to the QCPU User's Manual (Multiple CPU System). For precautions on redundant system configuration, refer to the QnPRHCPU User's Manual (Redundant System).

#### (2) MELSECNET/H remote I/O module

The module of function version D or later is necessary.

### (3) A/D converter module

The module of function version C or later is necessary.

### (4) GX Developer

GX Developer of Version 7.10L or later is necessary. GX Developer of Version 8.18U or later is required to perform an online module change on the remote I/O station.

#### (5) Base unit

- 1) When the slim type main base unit (Q3□SB) is used, an online module change cannot be performed.
- When the power supply module unnecessary type extension base unit (Q5□B) is used, online module change cannot be performed for the modules on all the base units connected.

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### 7.2 Online Module Change Operations

CI	PU operatio	on 🔘: Exe	cuted ⊠:	Not execut	ed		
	FROM/	Dedi-		GX Con	figurator		
X/Y refresh	TO instruc- tion <sup>*</sup> 1	cated instruc- tion	Device test	Initial setting parame- ter	Monitor/ test	(User operation)	(Intelligent function module operation)
0	0	0	0	×	0	<ul> <li>(1) Conversion disable         <ul> <li>Turn OFF all Y signals that were turned ON by a sequence program.</li> <li>(2) Dismounting of module</li></ul></li></ul>	Module is operating as usual. Module stops operating. -RUN LED turns off. -Conversion disabled.
×	×	×	×	×	×	Click the [Execution] button of GX Developer to make the module dismountable. Dismount the corresponding module. (3) Mounting of new module Mount a new module <sup>*3</sup>	X/Y refresh resumes and the module starts.
0	×	×	×	0	×	After mounting the module, click the [Execution] button of GX Developer. Operation check before control start (4) Operation check Click the [Cancel] button of GX Developer to leave the online mode.	•RUN LED turns off. •Default operation (X0 remains OFF) (When there are initial setting) parameters, operation is performed according to the initial setting parameters at this point.
0	×	×	0	×	0	Conduct an operation test on the new module using "Device test" of GX Developer or "Monitor/test" of GX Configurator. Perform user range restoration processing by write to buffer memory at this point. Operation check completed (5) Resumption of control Operate GX Developer to resume the online module change mode, and click the [Execution] button to resume	X0 (Module ready) turns ON. Start is made when X0 turns from OFF to ON. Operation is performed according to the initial setting
0	0	0	0	×	0	control.	sequence.*2

The following gives the operations performed for an online module change.

\*1: Access to the intelligent function module device (U  $\square$ \G  $\square$ ) is included.

\*2: In the absence of the operation marked <sup>\*</sup>2, the operation of the intelligent function module is the operation performed prior to that.

\*3: If the module is changed online to a module that has no extended mode for analog input range under the following input range settings, an intelligent function module switch error will occur. Also, the analog input range extended mode cannot be used in that case. Q68AD-G: 4 to 20mA (extended mode): A<sub>H</sub>

1 to 5V (extended mode): B<sub>H</sub>

Q66AD-DG: 4 to 20mA (extended mode) (2-wire transmitter input): A<sub>H</sub>

4 to 20mA (extended mode) (current input): C<sub>H</sub>

### 7.3 Online Module Change Procedure

There are the following online module change procedures depending on whether the user range setting has been made or not, whether the initial setting of GX Configurator-AD has been made or not, and whether the other system exists or not.

Range setting	Initial setting	Other system	<b>Reference section</b>
Industrial shipment setting	GX Configurator-AD	-	Section 7.3.1
Industrial shipment setting	Sequence program	-	Section 7.3.2
User range setting	GX Configurator-AD	Present	Section 7.3.3
User range setting	GX Configurator-AD	Absent	Section 7.3.4
User range setting	Sequence program	Present	Section 7.3.5
User range setting	Sequence program	Absent	Section 7.3.6

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## 7.3.1 When industrial shipment setting is used and initial setting was made with GX Configurator-AD

#### (1) Conversion disable

(a) Set the A/D conversion enable/disable setting (Un\G0) for all channel conversion disable and turn operating condition setting request (Y9) from OFF to ON to stop conversion.

After confirming that conversion has stopped with the A/D conversion completion flag (Un\G10), turn off Operation Condition Setting Request (Y9).

Dovice test	
Bit device	
Device	Close
Y9	
FORCE ON FORCE OFF Toggle force	Hide history
- Word device/buffer memory-	
C Device	-
Ruffer memory Markels should D0000 [1 (Use)	
(Hex)	
Address 0 V DEC	-
Setting uplug	
Program	
Label reference program MAIN	•
- Execution history	
V9 Force ON	Find
Module start:0 Address:0(D) FF(H)	Find next
Y9 Force OFF	Becetting
	rierseuing
	Clear

(The window shows the setting example of the Q68AD-G.)

### (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.

tem A	Moni	tor																	
stalled	d statu	us											_	Base					
			0	1	2	3	4							Base	Modu	le			
		MasterPLC->															Mai	in base	
			0.004	l												C	Ехр	ansion bas	
۲ ۱	rsu		0-6 D-G	unti	unti	unti	unti									C			
F	pply	025PHCPU	16pt	ng	ng	ng	ng									C			
		920111010														C			
																C			
																C	Evp		
			<u> </u>	ľ				_											
										_						C	Ехр	ansion bas	
aramet	eter sta	atus	1											Mode		C	Exp	ansion bas	
aramet	eter sta	atus 1/0 Address	0	10	20	30	40							Mode	s Systen	C n mor	Exp	pansion bas	
aramet	eter sta	atus 1/0 Address	0	10	20	30	40							Mode	Systen Online	C n mor mode	Exp iitor ule ch	hansion bas	
aramet	eter sta	atus 1/0 Address	0 0 Intelli	10 1 None	20 2 None	30 3 None	40 4 None							Mode	s Systen Online	n mor mode Dia	itor ule ch	hansion bas	
aramet P F	<sup>p</sup> owe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt							Mode ©	Systen Online Module	n mor mode Dia	Exp nitor ule ch gnost	hange tics	e 7
aramet P F	<sup>D</sup> owe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt							Mode ©	Systen Online Module	n mor mode Dia Sase	Exp iitor ule ch gnost tailed	hange tics d Informatio nation	e 7
aramet P F	Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt							Mode	System Online Module	C n mor mode Dia Dia Sase Produ	Exp nitor ule ch tailed Inform uct Inf	hange tics d Informatio nation f. List	» 7
aramet P r F atus	eter sta Powe r su pply	atus 1/0 Address Q25PHCPU system error	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	Modu	ning		Ste	art monito			System Online Module E	n mor mode Dia Base Produ	itor itor gnost tailed Inform of pc	nange tics I Informatio nation f. List ower suppl	9 7 1

7.3 Online Module Change Procedure

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(b) Click the "Execution" button to enable a module change.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module selection completed
Status/Guidance Please turn off Y signal of the ch intelligent function module.	anged module when you change the
[Execution]	Cancel

If the following error window appears, click the [OK] button, dismount the module as-is, and mount a new module.

MELSOF	T series GX Developer 🛛 🗙
(į)	The target module didn't respond. The task is advanced to the installation confirmation.
	(OK]

(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

### ⊠ Point

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

#### (3) Mounting of new module

- (a) Mount a new module to the same slot and install the connector.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change	
Operation	Target module
Module change execution Installation confirmation	I/O address 000H Module name Q68AD-G
Module control restart	Status Changing module
Status/Guidance The module can be exchanged. Please press the Execute button	after installing a new module.
Execution	Cancel

#### (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	
_ Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance The controls such as I/O, FROM and automatic refresh for the inst Please confirm the parameter set	I/TO instruction executions, :alled module are restarted, ting and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.



Sy	stem N	loni	tor									×
Г	nstalled	statu	IS								Base	
				0	1	2	3	4			Base Module	
			MasterPLC->			•					Main base	
	P	owe			Unmo	Unmo	Unmo	Unmo			C Expansion base 1	
	T	su		1Cet	unti	unti	unti	unti			C Expansion base 2	
	٢	,più	Q25PHCPU	төрс	ng	ng	ng	ng			C Expansion base 3	
											C Expansion base 4	
											C Expansion base 5	
											C Expansion base 6	
L											C Expansion base 7	
гI	Parameti	er sta	itus								Mode	
I			I/O Address	0	10	20	30	40			C System monitor	
				0	1	2	3	4			Online module change	
	Po	owe su	Q25PHCPU	Intelli gent	None	None	None	None			Diagnostics	
	P	ply		16pt	16pt	16pt	16pt	16pt			Module's Detailed Information	
L											Base Information	
	Status										Product Inf. List	
	Mc	odule	system error	•	/odule	error			Module warning	Start monitor	Detailed inf. of power supply	1
	Mo	odule	change							Stop monitor	Close	1

(c) Click the [Close] button to close the System monitor window.

(d) Monitor CH ☐ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.

Monitor/Test		
Module type: A/D Conversion Module Module model name: Q68AD-G	Start I/O No.: 0000	
Setting item	Current value	Setting value
A/D conversion completed flag	000000011111111	
CH1 Digital output value	-96	
CH2 Digital output value	-96	
CH3 Digital output value	-96	
CH4 Digital output value	-96	
CH5 Digital output value	-96	
CH6 Digital output value	-96	
CH7 Digital output value	-96	
CH8 Digital output value	-96	
CH1 scaling value	0	
CH2 scaling value	0	
Flash ROM setting	_ Details	
Write to Save file Current value display	Cannot execute test	Monitoring
Head from Load file Make text file		
Start-monitor Stop monitor Ex	ecute jest	Close

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### (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.



(b) The "Online module change completed" window appears.



## 7.3.2 When industrial shipment setting is used and initial setting was made with sequence program

#### (1) Conversion disable

(a) Set the A/D conversion enable/disable setting (Un\G0) for all channel conversion disable and turn operating condition setting request (Y9) from OFF to ON to stop conversion.

After confirming that conversion has stopped with the A/D conversion completion flag (Un\G10), turn off Operation Condition Setting Request (Y9).

Device test		
Bit device		I
Device		Close
Y9	•	
FORCE ON FORCE O	FF Toggle force	Hide history
-Word device/buffer memory-		
C Device		-
Buffer memory Module star	rt I/0 0000 💌 (Hex)	_
Address		<b>•</b>
Setting value		
FF HE	X 💌 16 bit integer	▼ Set
Program Label reference program	MAIN	•
Execution history		
Device	Setting condition	Find
Y9	Force ON	Find payt
Module start: U Address: U(U)	FF(H) Force OFF	rinu riext
1.0	10,00 011	Re-setting
		Clear
	2	

(The window shows the setting example of the Q68AD-G.)

### (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.

istal	lled statu	as													Base					
_			L Ó	1	2	3	4							1	Base	Mod	ule			
		MasterPLC->			•		•							1			6	в м	ain bas	е
				İ										1			10	) e	xpansio	n base '
	Powe r su		10-68A	Unmo unti	Unmo unti	Unmo unti	Unmo										10	) e		
	pply		16pt	ng	ng	ng	ng										1 0	) E		
		925111010															1 0	1 6		
																	1 0			
																		7 8 7 6		
			<u> </u>	ļ			_				-									
arar	meter sta	atus													Mode	,				
iran	meter sta	atus 1/0 Address	0	10	20	30	40								Mode (•	e Syste	m mo	nito		
iran	meter sta	atus 1/0 Address	0	10	20	30	40								Mode ©	e Syste Online	m mo	nito dule	change	
irar	neter sta	atus 1/0 Address	0 0 Intelli	10 1 None	20 2 None	30 3 None	40 4 None	_							Mode ©	e Syste Onlini	m mo e moc Dij	nito Jule	change	
irar	Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	_							Mode	e Syste Online	m mo e moc Dia	nito dule agno	change ostics	
irar	Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mode ©	e Syste Online Modul	m mo e moc Dia e's D	nitoi dule agno etail	change ostics ed Infor	mation
irar	Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mode ©	s Syste Online Modul	m mo e moc Dia e's D Base	nitoi dule agno etail	change ostics ed Infor ormation	mation
atu	Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mode C	s Syste Onlini Modul	m mo e moc Di. e's D Base Prod	nito dule etail Info	ostics ed Infor ormation Inf. List.	mation
atu	Powe r su pply	atus 1/0 Address Q25PHCPU system error	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	Modu	le wan	ning		Start	monitor		Mode C	e Syste Onlin Modul Detai	m mo e moc Di, Base Prod	nito dule etail luct f. of	ostics ed Infor ormation Inf. List. power s	mation 

(b) Click the "Execution" button to enable a module change.

Online module change	$\mathbf{X}$
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module selection completed
Status/Guidance Please turn off Y signal of the ch intelligent function module.	anged module when you change the
(Execution)	Cancel

If the following error window appears, click the [OK] button, dismount the module as-is, and mount a new module.

MELSOF	T series GX Developer 🛛 🔀
(į)	The target module didn't respond. The task is advanced to the installation confirmation.
	OK

(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

### ⊠Point

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Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

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#### (3) Mounting of new module

- (a) Mount a new module to the same slot and install the connector.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change		×
Operation	Target module	
Module change execution	I/O address 000H	
Installation confirmation	Module name Q68AD-G	
Module control restart	Status	
module control restart	Changing module	
Status/Guidance		
The module can be exchanged.		
Please press the Execute button	after installing a new module.	
Execution	Cancel	

#### (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	
Operation	Target module
Module change execution	I/O address 000H Module name Q68AD-G Status
Status/Guidance	Change module installation completion
and automatic refresh for the inst Please confirm the parameter set	talled module are restarted. ting and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.



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alleu stai	us												_	Base	_				
				2	2		_	_	_	_	_	_		Base	Mod	ule			
_	MasterPl Co			2	3	4	-+	-		-	-		- 1			٦.	а м	ain haca	
-	Indaten EC-2			-		-	-	-	-	-	-	-					е ни е -		
Powe	2		Unmo	Unmo	Unmo	Unmo											U EX		
r su		16ot	unti	unti	unti	unti											O Ex	pansion	base
PPG	Q25PHCPU	rope	ng	ng	ng l	"g											O Ex	pansion	base
																	O Ex	pansion	base
																	O Ex	pansion	base
						_											O Ex	pansion	base
																1	n e.		
ameter sl	atus													Mode	,				
rameter sl	atus		10	20	30	40								Mode	Suste	200 001	onitor		
rameter sl	atus 1/0 Address		10	20	30	40								Mode	e Syste	em me	onitor	hange	
rameter si	atus 1/0 Address	0	10	20	30	40								Mode	e Syste Onlin	e mo	onitor dule d	change	
ameter st	atus 1/O Address	0 0 Intelli	10 1 None	20 2 None	30 3 None	40 4 None		-						Mod	e Syste Onlin	e mo	onitor dule d	change	
Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mod	e Syste Onlin	e mo D	onitor dule d iagno	change stics	- 11-12
Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mod	e Syste Onlin Modu	em mo e mo D le's D	onitor dule d iagno	change stics ed Inform	ation.
Powe rsu pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mode	s Syste Onlin Viodu	e mo D le's D Basi	onitor dule d iagno ) etaile e Info	change istics ed Inform rmation	ation.
Powe rsu pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Mode ©	s Syste Onlin Modu	em mi e mo D le's I Basi Proi	onitor dule d iagno ) etaile e Info duct I	stics ed Inform mation nf. List	ation.
Powe r su pply atus Modul	alus 1/0 Address Q25PHCPU system error	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	Modul	e warnin	ng		Start	monitor		Mod	e Syste Onlin Modu	em mi e mo D le's D Bass Proi	onitor dule ( iagno ) etaile e Info duct I	change istics ed Inform mation nf. List power su	ation.

(c) Click the [Close] button to close the System monitor window.

- (d) Enable the conversion of the channel to be used in A/D conversion enable/disable setting (Un\G0). Monitor CH □ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.
- (e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.

Before performing initialization, check whether the contents of the initialization program are correct or not.

#### 1) Normal system configuration

The sequence program should perform initialization on the leading edge of Module READY (X9) of the A/D converter module.

When control resumption is executed, Module READY (X0) turns ON and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

#### 2) When used on remote I/O network

Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn ON the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

### (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.

Online module change	
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance The controls such as I/O, FROM and automatic refresh for the ins Please confirm the parameter se	1/TO instruction executions, talled module are restarted. tting and wiring, etc. and execute.
Execution	Cancel

(b) The "Online module change completed" window appears.



## 7.3.3 When user range setting is used and initial setting was made with GX Configurator-AD (other system is available)

#### (1) Conversion disable

(a) Set the A/D conversion enable/disable setting (Un\G0) for all channel conversion disable and turn operating condition setting request (Y9) from OFF to ON to stop conversion.

After confirming that conversion has stopped with the A/D conversion completion flag (Un\G10), turn off Operation Condition Setting Request (Y9).

Device test	
- Bit device	
Device	Close
Y9	
	101.111
FORCE ON FORCE OFF Toggle force	Hide history
-Word device/buffer memoru	
word device/barrer memory	
C Device	~
Burrer memory Module start I/U UUUU      (Hex)	
Address 0 💌 DEC	•
Setting value	
FF HEX I 16 bit integer	✓ Set
Program	
Label reference program MAIN	-
	_
Execution history	
Device Setting condition	Find
Y9 Force ON	First seat
Module start:U Address:U(D) FF(H) Y9 Force DEF	rina next
100corr	Re-setting
	Clear

(The window shows the setting example of the Q68AD-G.)

### (2) Dismounting of module

 (a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.

tem	ı Mon	itor																	
nstalle	ed stat	us													Bas	e			
			0	1	2	3	4								Base	e Modu	ıle		
		MasterPLC->				•	-										6	🖲 Main	n base
																		) Expa	ansion base
	Powe rsu		1068A	l Unmo l unti	Unmo unti	Unmo	Unmo unti										ic	) Exna	
	pply	OOFFICE	16pt	ng	ng	ng	ng										1	T Evos	
		Q25PHCPU																- Cope	
																	1 9		
																		) Ехра	ansion base
			Ļ	ļ													6	) Expa	ansion base
			-								_						] (	) Expa	ansion base
aram	neter st	atus													Mod	le	] (	) Expa	insion base
aram	neter st	atus 1/0 Address	0	10	20	30	40								Moo	le Syster	] ( m ma	D Expa	ansion base
aram	neter st	atus 1/0 Address	0	10	20	30	40 4								Moo	le Syster Online	] ( m ma	D Expa initor dule cha	ansion base
aram	neter st	atus 1/0 Address	0 0 Intelli	10 1 None	20 2 None	30 3 None	40 4 None								Moo	je Syster Online	n ma • mod	D Expa	ansion base
aram	Powe r su	atus 1/0 Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None	20 2 None	30 3 None	40 4 None								Moc	le Syster Online	n ma e moa	) Expa nitor dule cha agnosti	ansion base ange cs
aram	Powe rsu pply	atus 1/0 Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt									le Syster Online Module	n ma e mod Di e's D	) Ехра nitor dule chi agnosti etailed	ansion base ange cs Information.
aram	Powe rsu pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								Moo	de Syster Online Module	m ma e moo Di Base	) Expa nitor dule cha agnosti etailed	ansion base ange cs Information
aram	Powe rsu pply	atus 1/O Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt									je Syster Online Module	) ( m ma e moo Di Base Prod	nitor dule chr agnosti etailed Inform luct Inf.	ange cs Information List
aram	Powe rsu pply Module	atus 1/0 Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	Modu	le wan	ning		Sta	art mon	itor		Je Syster Online Module	) ( m mo m mo bi Di Base Prod ed in	о Ехра nitor dule cha etailed etailed luct Inf. f. of po	ansion base ange cs Information tist wer supply

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- MELSEG **Q** series
- (b) Click the "Execution" button to enable a module change.

Online module change	×
Operation	Target module
Module change execution	I/O address 000H Module name 068AD-6
Installation confirmation	
Module control restart	Change module selection completed
Status/Guidance Please turn off Y signal of the ch intelligent function module.	anged module when you change the
Execution	Cancel

If the following error window appears, the user range cannot be saved. Click the [OK] button, dismount the module as-is, and perform the operation in Section 7.3.4 (2) (c) and later.



(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

### ⊠ Point

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

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#### (3) Mounting of new module

- (a) Mount the dismounted module and new module to the other system.
- (b) Using the G(P).OGLOAD instruction, save the user set values to the CPU device. Refer to Appendix 1.2 for the G(P).OGLOAD instruction.
- (c) Using the G(P).OGSTOR instruction, restore the user set values to the module. Refer to Appendix 1.3 for the G(P).OGSTOR instruction.
- (d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the connector.
- (e) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change	$\mathbf{X}$
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Changing module
Status/Guidance	
The module can be exchanged.	
Please press the Execute buttor	ı after installing a new module.
[Execution]	Cancel

### (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to leave the "Online module change" mode.



(c) Click the [Close] button to close the System monitor window.

	d statu	15									 				se -				
			0	1	2	3	4							Ва	:e M 7		3		
		MasterPLC->	•		•	•	· .	_							J		۲	Main	base
Р	owe			Unmo	Unmo	Unmol	Unmo								]		0	Expa	nsion base
Ľ	rsu		10.1	unti	unti	unti	unti								]		С	Expa	nsion base
l f	ppiy	Q25PHCPU	търс	ng	ng	ng	ng								]		C	Expa	nsion base
															]		C	Expa	nsion base
																	C	Expa	nsion base
															1		C	Expa	nsion base
															i		C		
ramel	ter sta	itus													J de-				
rame	ter sta	itus 1/0 Address		10	20	30	40								ide Sj	ustem	mon	itor	
rame	ter sta	itus 1/0 Address	0	10	20	30	40								de Sig	ustem	mon	itor ile cha	nge
amel	ter sta	atus 1/0 Address	0 0	10 1	20 2 None	30 3	40 4								de Sj	ustem hline r	mon	itor Ile cha	inge
amel	ter sta	atus 1/0 Address Q25PHCPU	0 0 Intelli gent	10 1 None	20 2 None	30 3 None	40 4 None								de- S Sj	ustem hline r	mon nodu Diaj	itor Ile cha	nge
amel	ter sta Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								de T Sy T O	vstem hline r	mon nodu Diaj	itor Ile cha gnostic	nge :s
amel P	ter sta Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								de 1 Sj 1 O	vstem nline r odule's Bi	mon modu Dia; s De	itor Ile cha gnostic tailed I	nge :s nformation ition
amel	ter sta Powe r su pply	atus 1/0 Address Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								de S) O	vstem nline r odule's Bi	mon nodu Dia; s De ase I	itor Ile cha gnostic tailed I nforma	nge :s nformation ition
P I	ter sta	atus I/O Address Q25PHCPU system error	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt	Modu	le war	ning	St	art mor	itor		ide S Si Mic	ustem nline r odule's B P etailed	mon modu bias s De ase I frodu	itor ile cha gnostic tailed I nforma ct Inf. of pov	nge :s nformatior ation List ver supply

MELSEG Q series

(d) Monitor CH □ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.

Montor/Test		
Module type: A/D Conversion Module Module model name: Q68AD-G	Start I/O No.: 0000	
Setting item	Current value	Setting value
A/D conversion completed flag	000000011111111	
CH1 Digital output value	-96	
CH2 Digital output value	-96	
CH3 Digital output value	-96	
CH4 Digital output value	-96	
CH5 Digital output value	-96	
CH6 Digital output value	-96	
CH7 Digital output value	-96	
CH8 Digital output value	-96	
CH2 sealing value	0	
	<u>ч</u>	
Flash ROM setting     Current value       Write to module     Save file     Current value       Bead from module     Load file     Make text file	Details Cannot execute test	Monitoring
Start monitor Stop monitor Ex	ecute test	Close

### (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.

Online module change	
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance	/TD instruction executions
and automatic refresh for the inst Please confirm the parameter set	alled module are restarted. ting and wiring, etc. and execute.
[ Execution ]	Cancel

(b) The "Online module change completed" window appears.



## 7.3.4 When user range setting is used and initial setting was made with GX Configurator-AD (other system is unavailable)

#### (1) Conversion disable

(a) On the Operating condition setting window of GX Configurator-AD, set "Disable" in the Setting value field of CH □ A/D conversion enable/disable setting, and click the [Execute test] button.

- Module information		
Module type: A/D Conversion Module	Start I/O No.: 000	10
Module model name: Q68AD-G		
Setting item	Current value	Setting value
CH1 A/D conversion enable/disable setting	Disable	Disable
:H1 Averaging process specification	Sampling	Sampling
Voving average/Time constant settings Sampling: 0, Time averaging: 40 to 5000ms Jount averaging: 4 to 500, Moving average: 2 to 60 Primary delay filter: 10 to 5000ms)		
CH1 Warning output setting (Process alarm setting)	Disable	Disable
CH1 Warning output flag process alarm ower limit value	Normal	
	Normal	
.H1 Warning output flag process alarm		
CH1 Warning output flag process alarm Proof limit unlive Flash ROM setting	Details	
H1 Waning output Itag process alarm Flash ROM setting Wrife to Save file Current value display	Details Select inpu	, Monitorii at
CH1 Vening output itig process alarm reaction of the second seco	Details Select inpu Setting re Enable Disable	Monitori ut ange

(b) After making sure that the indication in the Current value field of CH A/D conversion enable/disable setting is "Disable", change the Setting value field of Operating condition setting request to "Setting request", and click the [Execute test] button to stop conversion.

Monitor the A/D conversion completion flag (Un\G10) and confirm that conversion has stopped.

CH1 Operating condition setting		
Module information		
Module type: A/D Conversion Module	Start I/O No.: 0000	
Module model name: Q68AD-G		
Setting item	Current value	Setting value
CH1 Warning output flag rate alarm upper limit value	Normal	
CH1 Rate alarm lower limit value	0	0
CH1 Rate alarm upper limit value	0	0
CH1 Rate alarm warning detection period	0	0
CH1 Input signal error detection flag	Normal	
CH1 Input signal error detection setting	Disable	Disable
CH1 Input signal error detection setting value	50	50
CH1 Scaling enable/disable setting	Disable	Disable
CH1 Scaling lower limit value	0	0
CH1 Scaling upper limit value	0	0
Operating condition setting request	No request	Setting request
Elash BOM setting	- Details	
Write to Current value		Monitoring
module Save hie display		
	Select input	
medule Load file Make text file	Setting range	
	No request	
	Setting request	
	1	
Start monitor Stop monitor Ex	vecute <u>t</u> est	Close

SETUP AND

- (c) If the saved buffer memory contents are not yet prerecorded, record them in the following procedure.
  - 1) Display the pass data window of GX Configurator-AD.
  - 2) Set the pass data classification setting<sup>\*1</sup> and make a pass data read request. (Refer to Section 5.6.3, 5.6.4)
  - Compare the current values of the industrial shipment settings and user range settings offset/gain values with those of the range reference table. Refer to Section 7.4 for the range reference table.
  - 4) If the values are proper, record the offset/gain values of the pass data classification setting, industrial shipment settings and user range settings.

\*1:The Q66AD-DG does not require the setting and recording of the pass data classification setting.

### ⊠Point

If the buffer memory values compared with the reference table are not proper, save and restoration of the user range cannot be executed.

Before executing module control resumption, make offset/gain setting in the GX Configurator-AD. (Refer to Section 5.6.2.)

Note that if module control is resumed without offset/gain setting being made, operation will be performed with the default values.

### (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.


- MELSEG **Q** series
- (b) Click the "Execution" button to enable a module change.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module selection completed
Status/Guidance	
Please turn off Y signal of the ch intelligent function module.	anged module when you change the
Execution	Cancel

If the following error window appears, the user range cannot be saved. Click the [OK] button, dismount the module as-is, and perform the operation in Section (2) (c) and later.

MELSOF	T series GX Developer 🛛 🗙
(į)	The target module didn't respond. The task is advanced to the installation confirmation.

(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

## **⊠**Point

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

#### (3) Mounting of new module

- (a) Mount a new module to the same slot and install the connector.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change	
- Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Changing module
- Status/Guidance	
The module can be exchanged. Please press the Execute buttor	n after installing a new module.
Execution	Cancel

## (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance The controls such as I/O, FROM and automatic refresh for the ins Please confirm the parameter se	1/TO instruction executions, talled module are restarted. tting and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.



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ODULE

System	Moni	itor																				X
- Install	ed stati	us —													Bas	e						٦
			0	1	2	3	4								Basi	зМ	odule					
		MasterPLC->		<u> </u>	•		•											۲	Main	base		
	Powe			llinmo	Unmo	Unmo	Unmo											C	Expa		ise 1	
	rsu		10.1	unti	unti	unti	unti											C	Expa		ise 2	
	pply	Q25PHCPU	търт	ng	ng	ng	ng											C	Expa		nse 3	
																		C	Ехра		ise 4	
																		C	Ехра		ise 5	
																		C	Ехра	nsion ba	ise 6	
				[														0				
- Paran	neter st	atus													. – Mor	le-						
		L/O Address	0	10	20	30	40	_		_	_	-	-		0	Su	istem	moni	tor			
		I/O Address		1	20	30	4		<u> </u>	<del>                                      </del>	+	+	+	+		0	oline n	odu	le cha	nae		
	_			<u> </u>	-	-					-	-				01		1000		inge		
	Powe r su	Q25PHCPU	Intelli aent	None	None	None	None												inostic	s		1
	pply		16pt	16pt	16pt	16pt	16pt								F	Мо	dule's	Det	ailed I	nformati	on	1
															-		Ba	nse li	nforma	ation		1
																-		odu	st fist	Link		1
Status			_				_							itor 1	_	-	F	odu	actrific.	шюц.,		4
	Module	e system error	- N	/lodule	error			Modu	ule war	ning		- 20	arcmon	101		De	etailed	l inf.	of pov	ver supp	oly	
	Module	e change										St	op mon	itor					Close			

(c) Click the [Close] button to close the System monitor window.

- (d) On the pass data window of GX Configurator-AD, set the prerecorded values and make a pass data write request. (Refer to Section 5.6.3, 5.6.4.)
- (e) Monitor CH □ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.

Monitor/Test		
- Module information Module type: A/D Conversion Module Module model name: Q68AD-G	Start I/O No.: 0000	
Setting item	Current value	Setting value
A/D conversion completed flag	000000011111111	
CH1 Digital output value	-96	
CH2 Digital output value	-96	
CH3 Digital output value	-96	
CH4 Digital output value	-96	
CH5 Digital output value	-96	
CH6 Digital output value	-96	
CH7 Digital output value	-96	
CH8 Digital output value	-96	
CH1 scaling value	0	
CH2 scaling value	0	<b>•</b>
Flash ROM setting         Current value           Wrife to module         Save file         Current value           Flead from module         Load file         Make text file	Cannot execute test	Monitoring
Start monitor Stop monitor Ex	ecute <u>t</u> est	Close

## (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.

Target module
I/O address 000H
Module name Q68AD-G
Status Change module installation completion
1/TO instruction executions, talled module are restarted. titing and wiring, etc. and execute.
Cancel

(b) The "Online module change completed" window appears.

MELSOF	T series GX Developer 🛛 🔀
(i)	Online module change completed.
	OK

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# 7.3.5 When user range setting is used and initial setting was made with sequence program (other system is available)

## (1) Conversion disable

(a) Set the A/D conversion enable/disable setting (Un\G0) for all channel conversion disable and turn operating condition setting request (Y9) from OFF to ON to stop conversion.

After confirming that conversion has stopped with the A/D conversion completion flag (Un\G10), turn off Operation Condition Setting Request (Y9).

Device test	×
Bit device	
Device	Close
Y9	
,	101.111
FORCE ON FORCE OFF Toggle force	Hide history
-)) (and device (buffer memory	
word device/burrer memory	
C Device	-
Buffer memory Module start I/O 0000	
Address 0 T	-
Setting value	
FF HEX  HEX  HEX	▼ Set
Program	-
Label reference program MAIN	·
- Execution history	
Device Setting condition	Find
Module start: 0 Address: 0(D) FE(H)	Find next
Y9 Force OFF =	D
_	He-setting
	Clear

(The window shows the setting example of the Q68AD-G.)

## (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.

em Mon	itor																	
talled sta	tus												Bas	e –				
		0	1	2	3	4							Base	e Mo	odule			
	MasterPLC->		•			•										۲	Main b	ase
		0.004												- 1		$^{\circ}$	Expans	ion base
rsu		D-G	unti	unti	unti	unti								i		$^{\circ}$	Expans	ion base
pply	Q25PHCPU	16pt	ng	ng	ng	ng								i		Ċ	Expans	ion base
																C	Expans	ion base
														I		С	Expans	ion base
														1		С	Expans	ion base
			[															
	-													1-		0		ion base
rameter s	tatus	0	10	20	30	40							Moi	je Sys	tem n	nonit	Expans	sion base
rameter s	tatus 1/0 Address	0	10	20	30	40							Mor	je Sys	stem n	nonit	Expans or	ion base
Powe	tatus 1/0 Address Q25PHCPU	0 0 Intelli gent	10 1 None	20 2 None	30 3 None	40 4 None							Moi	ie Sy: On	stem n line m	monit odul Diag	or e chan	ion base
Power su pply	I/O Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								je Sys Oni Mod	stem n line m [ dule's	nonit odul Diag Deta	cor e chan nostics ailed Inf	ge  'ormation.
Powe r su pply	tatus 1/0 Address 0 025PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								de Sy: On Moo	item n line m [ dule's Ba:	nonit odul Diag Deta se In	or e chan nostics ailed Ini	ge  orn
Powe r su pply	I/O Address I/O Address Q25PHCPU	0 0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt	30 3 None 16pt	40 4 None 16pt								de Sys On Moo	stem n line m (dule's Ba: Pro	nonit odul Diag Deta se In	or e chan nostics ailed Inf aformati	ge  formation. on st
Powe r su pply atus Modul	tatus 1/0 Address 0 Q25PHCPU	0 Intelli gent 16pt	10 1 None 16pt	20 2 None 16pt error	30 3 None 16pt	40 4 None 16pt	Modu	Le war	ning	9	tart mor	itor	Moi	de Sys On Moo	stem n line m [ dule's Ba: Pro tailed	monit odul Diag Deta se In oduc	cor e chan nostics ailed Inf formati et Inf. Li	ge  formation. on st r supply

(b) Click the "Execution" button to enable a module change.

Online module change	$\mathbf{X}$
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module selection completed
Status/Guidance Please turn off Y signal of the ch intelligent function module.	anged module when you change the
Execution	Cancel

If the following error window appears, the user range cannot be saved. Click the [OK] button, dismount the module as-is, and perform the operation in Section 7.3.6 (2) (c) and later.



(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

## ⊠Point

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

## (3) Mounting of new module

- (a) (Mount the dismounted module and new module to the other system.
- (b) Using the G(P).OGLOAD instruction, save the user set values to the CPU device. Refer to Appendix 1.2 for the G(P).OGLOAD instruction.
- (c) Using the G(P).OGSTOR instruction, restore the user set values to the module. Refer to Appendix 1.3 for the G(P).OGSTOR instruction.
- (d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the connector.

(e) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Changing module
Status/Guidance	
The module can be exchanged.	
Please press the Execute buttor	n after installing a new module.
(Execution)	Cancel

## (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance	
The controls such as I/D, FROM and automatic refresh for the inst Please confirm the parameter set	I/TO instruction executions, talled module are restarted. titing and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.



System Monitor		$\mathbf{X}$
Installed status		Base
0 1 2 3	4	Base Module
MasterPLC->		Main base
Powe Upmo Upmo Upmo		C Expansion base 1
r su unti unti unti	unti	C Expansion base 2
Q25PHCPU Topt ng ng ng	ng	C Expansion base 3
		C Expansion base 4
		C Expansion base 5
		C Expansion base 6
		C Expansion base 7
Parameter status		Mode
I/0 Address 0 10 20 30	0 40	C System monitor
0 1 2 3	4	Online module change
Powe Intelli None None Nor	ne None	
r su Q25PHCPU gent polu 16pt 16pt 16pt 16pt	t 16ot	Diagnostics
		Module's Detailed Information
		Base Information
Status		Product Inf. List
Module system error Module error	Module warning Start monitor	Detailed inf. of power supply
Module change	Stop monitor	Close

(c) Click the [Close] button to close the System monitor window.

- (d) Enable the conversion of the channel to be used in A/D conversion enable/disable setting (Un\G0). Monitor CH □ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.
- (e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
   Before performing initialization, check whether the contents of the initialization program are correct or not.
  - 1) Normal system configuration

The sequence program should perform initialization on the leading edge of Module READY (X9) of the A/D converter module.

When control resumption is executed, Module READY (X0) turns ON and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

2) When used on remote I/O network

Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn ON the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

## (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.

Online module change	$\mathbf{X}$
Operation	Target module
Module change execution Installation confirmation Module control restart Status/Guidance The controls such as I/D, FROM and automatic refresh for the inst Please confirm the parameter set	I/D address 000H Module name D68AD-G Status Change module installation completion I/TO instruction executions, tailed module are restarted. ting and wiring, etc. and execute.
Execution	Cancel

(b) The "Online module change completed" window appears.

MELSOF	T series GX Developer	×
(j)	Online module change comple	eted.
	ОК	

# 7.3.6 When user range setting is used and initial setting was made with sequence program (other system is unavailable)

## (1) Conversion disable

(a) Set the A/D conversion enable/disable setting (Un\G0) for all channel conversion disable and turn operating condition setting request (Y9) from OFF to ON to stop conversion.

After confirming that conversion has stopped with the A/D conversion completion flag (Un\G10), turn off Operation Condition Setting Request (Y9).

Device test	×
Bit device	
Device	Close
Y9 💌	
FORCE ON FORCE OFF Toggle force	Hide history
Word device/buffer memory	
C Device	-
Buffer memory Module start I/0 0000      (Hex)	
Address 0 💌 DEC	•
Setting value	
FF HEX I 16 bit integer	▼ Set
Program Label reference program MAIN	-
Execution history	
Device Setting condition	Find
Y9 Force ON T Module start: 0 Address: 0(D) EE(H)	Find next
Y9 Force OFF	D
	Hersetting
	Clear

(The window shows the setting example of the Q68AD-G.)

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- (b) If the saved buffer memory contents are not yet prerecorded, record them in the following procedure.
  - 1) Make the pass data classification setting<sup>\*1</sup> (Un\G200).
  - 2) Turn operating condition setting request (Y9) from OFF to ON.
  - Compare the offset/gain values of the industrial shipment settings and user range settings (Un\G202 to Un\G233) with the range reference table. Refer to Section 7.4 for the range reference table.
  - 4) If the values are proper, record the offset/gain values of the pass data classification setting<sup>\*1</sup>, industrial shipment settings and user range settings.

\*1:The Q66AD-DG does not require the setting and recording of the pass data classification setting.

## ⊠Point

If the buffer memory values compared with the reference table are not proper, save and restoration of the user range cannot be executed. Before resuming module control, follow the flowchart in Section 4.6.1 for the Q68AD-G, or follow the flowchart in Section 4.6.2 for the Q66AD-DG, and make offset/gain setting in the device test of GX Developer.

Perform mode switching by making the setting of the mode switching setting (Un\G158, Un\G159) and turning operating condition setting request (Y9) from OFF to ON.

Note that if module control is resumed without offset/gain setting being made, operation will be performed with the default values.

## (2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" window.



(b) Click the "Execution" button to enable a module change.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status
-Status/Guidance Please turn off Y signal of the ch intelligent function module.	anged module when you change the
Execution	Cancel

If the following error window appears, the user range cannot be saved. Click the [OK] button, dismount the module as-is, and perform the operation in Section (2) (c) and later.

MELSOF	T series GX Developer 🛛 🛛 🗙
<b>(</b>	The target module didn't respond. The task is advanced to the installation confirmation.
	CK III

(c) After confirming that the "RUN" LED of the module has turned off, remove the connector and dismount the module.

## **Point**

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

#### (3) Mounting of new module

- (a) Mount a new module to the same slot and install the connector.
- (b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains OFF.

Online module change	X
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Changing module
Status/Guidance	
The module can be exchanged.	
Please press the Execute button	after installing a new module.
Execution	Cancel

## (4) Operation check

(a) To make an operation check, click the [Cancel] button to cancel control resumption.

Online module change	$\mathbf{X}$
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance The controls such as I/D, FROM and automatic refresh for the inst Please confirm the parameter set	I/TO instruction executions, tailed module are restarted, ting and wiring, etc. and execute.
Execution	Cancel

(b) Click the [OK] button to leave the "Online module change" mode.



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arameter si	atus 1/0 Address	0	10	20	30	40								- Mod C	le Sys Onli	tem n ne m	nonit odul	or e char	nge	
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(c) Click the [Close] button to close the System monitor window.

- (d) Choose [Online] [Debug] [Device test] on GX Developer and set the prerecorded values to the buffer memory.
- (e) Turn the user range writing request (YA) from OFF to ON to restore the user set values to the module.
   After confirming that the offset/gain setting mode status flag (XA) is ON, turn OFF the user range write request (YA).
- (f) Enable the conversion of the channel to be used in A/D conversion enable/disable setting (Un\G0). Monitor CH □ digital output values (Un\G11 to Un\G18) to check if the conversion is processed normally.
- (g) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.Before performing initialization, check whether the contents of the initialization program are correct or not.

#### 1) Normal system configuration

The sequence program should perform initialization on the leading edge of Module READY (X9) of the A/D converter module. When control resumption is executed, Module READY (X0) turns ON and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

#### 2) When used on remote I/O network

Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn ON the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

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## (5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to redisplay the "Online module change" window, click the [Execution] button to resume control. Module ready (X0) turns on.

Online module change	
Operation	Target module
Module change execution	I/O address 000H
Installation confirmation	Module name Q68AD-G
Module control restart	Status Change module installation completion
Status/Guidance The controls such as I/O, FROM and automatic refresh for the ins Please confirm the parameter se	I/TD instruction executions, talled module are restarted. tting and wiring, etc. and execute.
Execution	Cancel

(b) The "Online module change completed" window appears.

MELSOF	T series GX Developer 🛛 🔀
<b>(</b>	Online module change completed.
	OK

## 7.4 Range Reference Table

The range reference tables are given below.

# (1) Reference table for offset/gain values of industrial shipment settings (Un\G202 to Un\G217)

(a) For Q68AD-G

The reference values change depending on the setting of the pass data classification setting (Un\G200).

Address (Decimal)					nal)			Description	Pass data classification	Reference value
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	Description	setting (Un\G200)	(Hexadecimal)
202	204	206	208	210	212	214	216	Industrial shipment settings off-	Voltage specified (0V)	Approx. 0н
202	204	200	200	210	212	214	210	set value	Current specified (0mA)	Approx. 0н
203	205	207	209	211	213	215	217	Industrial shipment settings gain	Voltage specified (10V)	Арргох. 6666н
200	200	201	203	211	210	215	217	value	Current specified (20mA)	Арргох. 3333н

	(b)	For Q66AD-DG
--	-----	--------------

Address (Decimal)						Description	Reference value
CH1	CH2	CH3	CH4	CH5	CH6	Description	(Hexadecimal)
202	204	206	208	210	212	Industrial shinment settings offset value	Approx. 0н
202	204	200	200	210	212		Approx. 0н
203	205	207	209	211	213	Industrial shinment settings gain value	Арргох. 6666н
200	200	201	200	211	210		Арргох. 3333н

# (2) Reference table for user range settings offset/gain values (Un\G218 to 233)

(a) For Q68	AD-G
-------------	------

Offset/g	ain value	Reference value (Hexadecimal)		
	0V	Арргох. Он		
Voltago	1V	Approx. 0А3Dн		
vollage	5V	Арргох. 3333н		
	10V	Арргох. 6666н		
	0mA	Арргох. Он		
Current	4mA	Approx. 0А3Dн		
	20mA	Арргох. 3333н		

## (b) For Q66AD-DG

Offset/gain value	Reference value (Hexadecimal)
0mA	Арргох. Он
4mA	Арргох. 10Е5н
20mA	Арргох. 547Вн

#### Example)

When the offset value of the Q68AD-G channel 1 is 1V and its gain value is 5V, the reference value of the CH1 user range settings offset value (Un\G218) is approximately  $0A3D_{H}$ , and the reference value of the CH1 user range settings gain value (Un\G220) is approximately  $3333_{H}$ .

## 7.5 Precautions for Online Module Change

The following are the precautions for online module change.

- (1) Always perform an online module change in the correct procedure. A failure to do so can cause a malfunction or failure.
- (2) If an online module change is made with the user range setting, the accuracy after that will fall to about less than three times of the accuracy before that. Re-set the offset/gain values as necessary.
- (3) During an online module change, do not perform the operations below. If they are performed, the A/D converter module may not operate normally.
  - Powering off the programmable controller CPU
  - · Resetting the programmable controller CPU

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# 8 **TROUBLESHOOTING**

The following section explains the types of errors that may occur when the A/D converter module is used, and how to troubleshoot such errors.

## 8.1 Error Code List

If an error occurs in the A/D converter module while writing to or reading data from the programmable controller CPU, an error code is written to buffer memory address 19 (Un\G19).

Error code (decimal)	Error description	Action
10□	The input range is set with an illegal value in the intelligent function module switch setting in GX Developer. □ indicates the channel number set incorrectly.	Set a correct parameter value in the parameter setting of GX Developer. (Refer to Section 4.5.)
111	Hardware error of the module.	Turn the power OFF and ON again. If the error occurs again, the module may be malfunctioning. Please consult your local Mitsubishi representative.
112	The setting of the intelligent function module switch 5 is other than 0.	Set a correct parameter value in the parameter setting of GX Developer. (Refer to Section 4.5.)
120* <sup>1</sup>	An invalid value is set in the offset/gain setting. The number of the error channel is not identified	Perform the offset/gain setting again for all of the chan- nels that use the user range settings. If the error occurs again, the module may be malfunction- ing. Please consult your local Mitsubishi representative.
12□* <sup>1</sup>	An invalid value is set in the offset/gain setting. □ indicates the channel number set incorrectly.	Perform the offset/gain setting again for the error chan- nel. If the error occurs again, the module may be malfunctioning. Please consult your local Mitsubishi rep- resentative.
161* <sup>2</sup>	The G(P).OGSTOR instruction was executed in the offset/ gain setting mode.	Do not execute the G(P).OGSTOR instruction in the off- set/gain setting mode.
162	<ul> <li>The G(P).OGSTOR instruction was executed consecutively.</li> <li>At the time of offset/gain setting, a set value was written to the E<sup>2</sup>PROM 26 or more times.</li> </ul>	<ul> <li>Execute the G(P).OGSTOR instruction only once for one module.</li> <li>At the time of offset/gain setting, write a set value only once at one time.</li> </ul>
163	The G(P).OGSTOR instruction was executed for the model that differs from the model for which the G(P).OGLOAD instruction had been executed.	Execute the G(P).OGLOAD and G(P).OGSTOR instruc- tions for the same model.

#### Table8.1 Error code list (1/3)

Error code (decimal)	Error description	Processing
20□ <sup>*3</sup>	The averaging time set in Un∖G1 to Un∖G8 is outside the range of 40 to 5000ms. □ indicates the channel number set incorrectly.	Reset the averaging time setting to within 40 to 5000ms. Also, the set value must be "4 x 10 x No. of channels used" or greater.
30□ <sup>*3</sup>	The averaging count set in Un\G1 to Un\G8 is outside the range of 4 to 500 times. □ indicates the channel number set incorrectly.	Reset the averaging count setting to within 4 to 500 times.
31⊡ <sup>*3</sup>	The moving average count set in Un\G1 to Un\G8 is outside the range of 2 to 60 times. □ indicates the channel number set incorrectly.	Reset the moving average count setting to within 2 to 60 times.
32□ <sup>*3</sup>	The time constant for the primary delay filter set in Un\G1 to Un\G8 is outside the range of 10 to 5000.	Reset the time constant setting to within 10 to 5000. Also, the set value must be "10 x No. of channels used" or greater.
34⊡ <sup>*3</sup>	In the CH□ rate alarm upper/lower limit value (Un\G126 to Un\G141) setting, Lower limit ≧ Upper limit. □ indicates the channel number set incorrectly.	Reset the CH□ rate alarm upper/lower limit value (Un\G126 to Un\G141) so that the lower limit value is smaller than the upper limit value.
35⊟ <sup>*3</sup> (Q66AD-DG only)	The conversion starting time setting (for 2-wire transmitter) (Un\G78 to Un\G83) is outside the range of 0 to 32767. □ indicates the channel number set incorrectly.	Reset the conversion starting time setting (for 2- wire transmitter) to within 0 to 32767.
40 <u></u> * <sup>1</sup>	The offset value is equal to or greater than the gain value at the time of user range setting or user range restoration. □ indicates the error causing channel number.	Reset so that the offset value becomes smaller than the gain value.
500* <sup>1</sup>	The offset/gain channels were set at the same time during offset and gain value settings, or both were set to 0.	Reset the contents of buffer memory addresses 22 and 23 (Un\G22 and Un\G23).

#### Table 8.1 Error code list (2/3)

MELSEG **Q** series

Error code (decimal)	Error description	Processing
6∧□ <sup>*3</sup>	The process alarm upper/lower limit value (Un\G86 to Un\G117) are set contradictorily. □indicates the channel number set incorrectly.	Reset the contents of the process alarm upper/
	2: Lower lower limit value > lower upper limit value 3: Lower upper limit value > upper lower limit value 4: Upper lower limit value > upper upper limit value	lower limit values (Un\G86 to Un\G117).
70□ <sup>*3</sup>	The rate alarm warning detection period (Un\G118 to Un\G125) is outside the range of 10 to 5000ms.	Reset the rate alarm warning detection period (Un\G118 to Un\G125) to within 10 to 5000ms.
71□ <sup>*3</sup>	<ul> <li>The rate alarm warning detection period (Un\G118 to Un\G125) is not:</li> <li>A multiple of the sampling cycle or</li> <li>A multiple of the time or count averaging conversion cycle.</li> <li>indicates the channel number set incorrectly.</li> </ul>	<ul> <li>Change the value of the rate alarm warning detection period as follows:</li> <li>For sampling processing: A multiple of conversion cycle (10ms x No. of conversion-enabled channels)</li> <li>For averaging processing: A multiple of time or count averaging conversion cycle</li> </ul>
72□ <sup>*3</sup>	changed, the rate alarm warning detection period is not a multiple of the corresponding new time or count averaging conversion period.	Reset the time averaging or count averaging set- ting so that the corresponding rate alarm warning detection period is a multiple of the time or count averaging conversion period.
	<ul> <li>When the "Same upper limit value/lower limit value" is selected for the input signal error detection extended setting,</li> <li>CH<sub>□</sub> input signal error detection setting value (Un\G142 to Un\G149) is outside the range of 0 to 250.</li> <li>□ indicates the channel number set incorrectly.</li> </ul>	Reset the input signal error detection setting value to within 0 to 250.
80 <sup>1*3</sup>	<ul> <li>When the "Different upper limit value/lower limit value" is selected for the input signal error detection extended setting,</li> <li>Input signal error detection lower limit setting value (Un\G142 to Un\G149) is outside the range of 0 to 251.</li> <li>Input signal error detection upper limit setting value (Un\G150 to Un\G157) is outside the range of 0 to 251.</li> <li>indicates the channel number set incorrectly.</li> </ul>	Reset the input signal error detection lower limit setting value and input signal error detection upper limit setting value within 0 to 251.
90□ <sup>*3</sup>	The scaling upper/lower limit value (Un\G62 to Un\G77) is set out- side the range of –32000 to 32000. □ indicates the channel number set incorrectly.	Correct the scaling upper/lower limit value within the range of –32000 to 32000.
91⊡ <sup>*3</sup>	In the scaling upper/lower limit value setting (Un\G62 to Un\G77), Lower limit ≧ Upper limit. □ indicates the channel number set incorrectly.	Set them again so that he scaling upper limit value is greater than the scaling lower limit value.

#### Table 8.1 Error code list (3/3)

## ⊠Point

- (1) When two or more errors have occurred, the latest error found by the A/D converter module is stored.
- (2) The error codes marked with \*1 can be cleared by turning ON the error clear request (YF).
- (3) Error code 161 marked with \*2 is not stored in the Error code (Un\G19) area. It is written to the Completion status area, (S) + 1, of the G(P).OGSTOR instruction.
- (4) The error codes marked with \*3 can be cleared by one of the following operations.
  - (a) Turning on the error clear request (YF)
  - (b) Turning on the operating condition setting request (Y9) after correcting the set value to the one in the setting range

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## 8.2 Troubleshooting

## 8.2.1 When the "RUN" LED is flashing or turned off

## (1) When flashing

Check item	Corrective action
Is the mode set to the effect/gain setting mode?	Reset switch 4 of the intelligent function module switch setting for
is the mode set to the onsergant setting mode?	GX Developer to the normal mode (Refer to Section 4.5).

## (2) When off

Check item	Corrective action
In the newer being supplied?	Confirm that the supply voltage for the power supply module is
	within the rated range.
	Calculate the current consumption of the CPU module, I/O module
Is the capacity of the power supply module adequate?	and intelligent function module mounted on the base unit to see if
	the power supply capacity is adequate.
	Reset the programmable controller CPU and verify that it is lit. If
Hop a watchdag timor array appured?	the RUN LED does not light even after doing this, the module may
Has a watchuog timer error occurred?	be malfunctioning. Please consult your local Mitsubishi represen-
	tative.
Is the module correctly mounted on the base unit?	Check the mounting condition of the module.
Is a module change enabled during an online module change?	Refer to Chapter 7 and take corrective action.

## 8.2.2 When the "ERR." LED is on or flashing

## (1) When on

Check item	Corrective action
In an arran being generated?	Confirm the error code and take corrective action described in
is all ellor beilig generated :	Section 8.1.

## (2) When flashing

Check item	Corrective action			
la intelligent function module potting quitch E pot to "other than 0"2	Using GX Developer parameter setting, set intelligent function			
is intelligent function module setting switch 5 set to other than 0 ?	module setting switch 5 to "0" (Refer to Section 4.5).			

## 8.2.3 When the "ALM" LED is on or flashing

## (1) When on

Check item	Corrective action
Is a warning output being generated?	Check the warning output flag (Un\G50, Un\G51).

## (2) When flashing

Check item	Corrective action
Is an input signal error being generated?	Check the input signal error detection flag (Un\G49).

## 8.2.4 When the digital output values cannot be read

Check item	Corrective action				
	Check that the external power supply terminals (between terminals				
Is 24VDC external power supply being supplied? (Q66AD-DG	No. A19 and A20 or B19 and B20) are supplied with a 24VDC				
only)	voltage.				
Is there any fault with the analog signal lines such as disconnec-					
tion (for the Q66AD-DG, disconnection of the signal line with the 2-	Check for faulty condition of the signal lines by a visual check and				
wire transmitter) or wire break?	a continuity check.				
Is the CPU module in the STOP status?	Set the CPU module to the RUN status.				
	Verify that the offset/gain settings are correct				
	(Refer to Section 4.6 and 5.6.2).				
Are the offset/gain settings correct?	If the user range is being used, switch to a different default input				
	range and check if A/D conversion is correctly performed. If so				
	redo the offset/gain settings.				
	Check the Un\G20, Un\G21 in the monitor of GX Developer.				
le the input renge esting correct?	If the input range setting is incorrect, redo the GX Developer				
is the input range setting correct?	intelligent function module switch setting				
	(Refer to Section 4.5).				
	Check the ON/OFF status with Un\G0 in GX Developer monitor				
Is the A/D conversion enable/disable setting for the channel to be	and review the initial setting of the sequence program or utility				
used set to A/D conversion disabled?	package.				
	(Refer to Section 3.4).				
Is a large value set to the A/D conversion starting time setting (for the 2-wire transmitter) (O66AD DG only)?	Check the Un\G78 to Un\G83 in the monitor of GX Developer.				
	From GX Developer turn the operating condition setting request				
	(Y9) from ON to OFE to check that the digital output values are				
Has the operating condition setting request (Y9) been executed?	stored into the Un/G11 to Un/G18				
	If so, review the initial setting of the sequence program or utility				
	package (Refer to Section 3.3)				
	• For the time averaging, set a value of "4 (times) x 10 (ms) x No. of				
	channels" or greater.				
	• For the primary delay filter, set a value of "10 (ms) x No, of chan-				
Is the value set for the averaging processing specification correct?	nels" or greater.				
	If the above requirements are not met, 0 is stored as a digital				
	output value.				
In the case of current input are terminals (V+) and ( +) connected ?	In the case of current input, connect terminals (V+) and ( +)				
(For the Q68AD-G only)	referring to Section 4.4.2.				

## ⊠Point

The module may be faulty if the digital output values cannot be read after proper corrective actions have been taken according to the above check items. Please consult your local Mitsubishi representative.

# 8.2.5 When A/D conversion completed flag does not turn ON during use in normal mode

Check item	Corrective action
Is 24VDC external power supply being supplied? (Q66AD-DG	Check that the external power supply terminals (between terminals
	No. A19 and A20 or B19 and B20) are supplied with a 24VDC
ony)	voltage.
Is an input signal error being generated?	Check the input signal error detection flag (Un\G49).

# 8.2.6 Checking the A/D converter module status using GX Developer system monitor

When the A/D converter module detail information is selected in GX Developer system monitor, error code, LED ON status and status of the intelligent function module switch setting can be checked.

## (1) Operating GX Developer

 $[Diagnostics] \rightarrow [System monitor] \rightarrow Select the A/D conversion module checking the$ 

status.  $\rightarrow$  Module Detailed Information

## (2) Module Detail Information

- (a) Checking the function version and product information The function version and product information of the A/D converter module are displayed in the product information field.
- (b) Checking the error code

The error code stored in buffer memory address 19 (Un\G19) of the A/D converter module is displayed in the Present Error field.

(When the Error History button is pressed, the contents displayed in the Present Error field are displayed in the No. 1 field.)

Module's Detailed I	Information	
Module Module Name I/O Address	Q68AD-G 0	Product information 070310000000000 - C
Implementation Posit	tion Main Base USlot	
Module Information Module access Status of External Po Fuse Status Status of I/O Addres	Possible ower Supply  is Verify Agree	I/OClear / Hold Settings Noise Filter Setting Input Type Remote password setting status
Error Display	Present Error No Ei	ror Display format ror HEX C DEC note of the error history is from the oldest error. displayed in the line as under.
Contents:		
Disposal:		<ul> <li>N</li> </ul>
H/W Information	Start monito	Stop monitor Close

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## (3) H/W information

(a) H/W LED information

The LED ON status is displayed.

No.	LED name	Status
1)	RUN LED	0000н : Indicates that LED is unlit.
2)	ERR. LED	0001н : Indicates that LED is lit.
3)	ALM LED	Alternate display of 0000H and 0001H: Indicates that LED is flash- ing.

## (b) H/W SW information

The status of the intelligent function module switch setting is displayed.

No.	Switch setting for intelligent function module
RANGE	Switch 1
1	
RANGE	Switch 2
2	Owiton 2
-	Switch 3
RANGE	Switch 4
3	Gwitch 4
-	Switch 5

H/W Informat	ion							X	
Module						Display f	Display format		
				HAW SW Information					
Then	Talua	Then	172102		There		There	TTe luce	
RUN	0001	ALM	0000		псеш	Varue	RANGE1	0000	
ERR	0000						RANGE2	0000	
							-	0000	
							MODE	0000	
							-	0000	
				L					
				LH					
				۱H					
	_			LH					
				۱H					
					Start monitor	Stop mor	nitor	Close	

For GX Developer Version 8

# **APPENDIX**

# Appendix 1 Dedicated Instruction List and Available Devices

## (1) Dedicated instruction list

The following table lists the dedicated instructions that can be used with the A/D converter modules.

Instruction	Description	Reference sec- tion	
	Switches to the offset/gain setting mode.	Appendix 1.1	
G(P).OFFGAN	Switches to the normal mode.		
	Reads the offset/gain values of the user range setting to the	Appendix 1.2	
G(F).OGLOAD	CPU.		
	Restores the offset/gain values of the user range setting stored	Appondix 1.3	
G(F).00310K	in the CPU to the A/D converter module.	Appendix 1.5	

## ⊠ Point

When the module is mounted to a MELSECNET/H remote station, the dedicated instructions cannot be used.

## (2) Available devices

The following devices are available for the dedicated instructions:

Internal	devices	Filo register	Constant	
Bit <sup>*1</sup>	Word	File register		
X, Y, M, L, F, V, B	T, ST, C, D, W	R, ZR	-	

\*1 Word device bit designation can be used as bit data.

Word device bit designation is done by designating Word device . Bit No. . (Designation of bit numbers is done in hexadecimal.)

For example, bit 10 of D0 is designated as D0.A .

However, there can be no bit designation for timers (T), retentive timers (ST) and counters (C).

## Appendix 1.1 G(P).OFFGAN

Switches the mode of the A/D converter module. (Normal mode to offset/gain setting mode, offset/gain setting mode to normal mode)

	Usable devices									
Set data	Internal device			Link direct device		Intelligent function	Constant			
	(System, user)		File	J□/□			Index rea-	oonstant		
	Bit	Word	register	Bit	Word	module device U⊡\G⊡	ister Z⊡	К, Н	\$	Other
(S)	_	(	C					_		



### Set data

Set data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
	Mode switching		
	0: Switching to normal mode		
(S)	1: Switching to offset/gain setting mode	0 ,1	Binary 16 bits
	The setting of any other value results in "switching to offset/gain setting		
	mode".		

## (1) Function

Switches the mode of the A/D converter module.

- Normal mode to offset/gain setting mode (the offset/gain setting mode flag (XA) turns ON)
- Offset/gain setting mode to normal mode (the offset/gain setting mode flag (XA) turns OFF)

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## Point

- (1) When the offset/gain setting mode is switched to the normal mode, Module ready (X0) turns from OFF to ON.Note that initial setting processing will be executed if there is a sequence
  - program that makes initial setting when Module ready (X0) turns ON.
- (2) When one mode is switched to the other (the normal mode is switched to the offset/gain setting mode or the offset/gain setting mode is switched to the normal mode), the A/D converter module suspends A/D conversion and switches OFF the power supply to the 2-wire transmitter.

To resume A/D conversion and power supply to the 2-wire transmitter, turn ON the operating condition setting request (Y9) after the mode is switched to the normal mode.

## (2) Operation error

No errors.

## (3) Program example

The following program is designed to switch the A/D converter module mounted in the position of I/O number X/Y0 to X/YF to the offset/gain setting mode when M10 is turned ON, and to return it to the normal mode when M10 is turned OFF.



# Appendix 1.2 G(P).OGLOAD

Reads the offset/gain values of the user range setting of the A/D converter module to the CPU.

Set data	Usable devices									
	Internal device			Link direct device Intelligent		Con	stant			
	(System	ı, user)	File	J□		function	Index rea-	Constant		
	Bit	Word	File register	Bit	Word	module device U⊡\G⊡	ister Z⊡	К, Н	\$	Other
(S)	_	(	0		_				—	—
(D)	0		—		—	—	—			



#### Set data

Set data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
(S)	Start number of the device in which control data is stored.	Within the range of the specified device	Device name
(D)	Device that is turned ON 1 scan on completion of dedicated instruction processing. (D) + 1 also turns ON at an abnormal completion.	Within the range of the speci- fied device	Bit

## Control data<sup>\*1</sup> of Q68AD-G

Device	Item	Set data	Setting range	Set by
(S)	System area	—	—	—
		Stores the status when the instruction is		
$(\mathbf{C}) + 1$	Completion status	complete.		Custom
(5) + 1	Completion status	0 : Normal completion		System
		Other than 0: Abnormal completion		
		Specify the voltage/current of the offset/gain		
		values to be read.		
		0: Voltage specified		
(S) + 2	Pass data classification setting	1: Current specified	0000н to 00FF н	User
( )				
		b15 b8 b7 b6 b5 b4 b3 b2 b1 b0		
		0 ~ 0 CH8 CH7 CH6 CH5 CH4 CH3 CH2 CH1		
(S) + 3	System area			
(0) + 3 (S) + 4	CH1 Industrial shinment settings offset value			System
(0) + 4 (S) + 5	CH1 Industrial shipment settings gain value			System
(0) + 0 (S) + 6	CH2 Industrial shipment settings offset value			System
(S) + 7	CH2 Industrial shipment settings gain value			System
(S) + 8	CH3 Industrial shipment settings offset value			System
(S) + 9	CH3 Industrial shipment settings gain value			System
(S) + 10	CH4 Industrial shipment settings offset value			System
(S) + 10	CH4 Industrial shipment settings gain value			System
(S) + 12	CH5 Industrial shipment settings offset value			System
(S) + 12	CH5 Industrial shipment settings gain value		_	System
(S) + 14	CH6 Industrial shipment settings offset value		_	System
(S) + 15	CH6 Industrial shipment settings gain value			System
(S) + 16	CH7 Industrial shipment settings offset value			System
(S) + 17	CH7 Industrial shipment settings gain value			System
(S) + 18	CH8 Industrial shipment settings offset value			System
(S) + 19	CH8 Industrial shipment settings gain value			System
(S) + 20	CH1 user range settings offset value			System
(S) + 21	CH1 user range settings gain value			System
(S) + 22	CH2 user range settings offset value	_		System
(S) + 23	CH2 user range settings gain value	_	—	System
(S) + 24	CH3 user range settings offset value	_	_	System
(S) + 25	CH3 user range settings gain value	_	_	System
(S) + 26	CH4 user range settings offset value	_	_	System
(S) + 27	CH4 user range settings gain value	_	_	System
(S) + 28	CH5 user range settings offset value	_	_	System
(S) + 29	CH5 user range settings gain value	_	_	System
(S) + 30	CH6 user range settings offset value	—	—	System
(S) + 31	CH6 user range settings gain value	—	—	System
(S) + 32	CH7 user range settings offset value	—	—	System
(S) + 33	CH7 user range settings gain value	—	—	System
(S) + 34	CH8 user range settings offset value	—	—	System
(S) + 35	CH8 user range settings gain value	—	_	System

\*1 Set only the pass data classification setting (S)+2. If data is written to the area set by the system, the offset/gain values will not be read properly.

MELSEG	Q series
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Device	ltem	Set data	Setting range	Set by
(S)	System area	—	—	<u> </u>
(S) + 1	Completion status	Stores the status when the instruction is complete. 0 : Normal completion Other than 0: Abnormal completion	_	System
(S) + 2 (S) + 3	System area	_	_	_
(S) + 4	CH1 Industrial shipment settings offset value		_	System
(S) + 5	CH1 Industrial shipment settings gain value	_		System
(S) + 6	CH2 Industrial shipment settings offset value	_		System
(S) + 7	CH2 Industrial shipment settings gain value	_	—	System
(S) + 8	CH3 Industrial shipment settings offset value	_	_	System
(S) + 9	CH3 Industrial shipment settings gain value	_	_	System
(S) + 10	CH4 Industrial shipment settings offset value	_	_	System
(S) + 11	CH4 Industrial shipment settings gain value	_	_	System
(S) + 12	CH5 Industrial shipment settings offset value	—	_	System
(S) + 13	CH5 Industrial shipment settings gain value	—	_	System
(S) + 14	CH6 Industrial shipment settings offset value	—	_	System
(S) + 15	CH6 Industrial shipment settings gain value	—	_	System
(S) + 16 to (S) + 19	System area	_	_	_
(S) + 20	CH1 user range settings offset value	_	_	System
(S) + 21	CH1 user range settings gain value	_	—	System
(S) + 22	CH2 user range settings offset value	_	_	System
(S) + 23	CH2 user range settings gain value	—	_	System
(S) + 24	CH3 user range settings offset value	—	_	System
(S) + 25	CH3 user range settings gain value	—	_	System
(S) + 26	CH4 user range settings offset value	—	_	System
(S) + 27	CH4 user range settings gain value	—	_	System
(S) + 28	CH5 user range settings offset value	—		System
(S) + 29	CH5 user range settings gain value	—		System
(S) + 30	CH6 user range settings offset value	_	—	System
(S) + 31	CH6 user range settings gain value	_	—	System
(S) + 32 to (S) + 35	System area	_	_	_

## Control data<sup>\*2</sup> of Q66AD-DG

\*2 Setting is not necessary. If setting is made, the offset/gain values will not be read properly.

## (1) Functions

- (a) Reads the offset/gain values of the user range setting of the A/D converter module to the CPU.
- (b) There are two types of interlock signals for the G(P).OGLOAD instruction: the completion device (D) and the status display device at completion (D) + 1.

#### 1) Completion device

Turns ON in the END processing of the scan where the G(P).OGLOAD instruction is completed, and turns OFF in the next END processing.

#### 2) Status display device at completion

Turns ON and OFF depending on the completion status of the G(P).OGLOAD instruction.

Normal completion : Stays OFF and does not change.

Abnormal completion: Turns ON in the END processing of the scan where the G(P).OGLOAD instruction is completed, and turns OFF in the next END processing.

Sequence program	END processing	END processing	END pi	rocessing	END processing
	о П	Execution completion of the G.OGLOAD instruction	1		
G.OGLOAD instruction	OFF				     
Completion device (D)	OFF			ON Abno	ormal
Status display device	OFF			Normal com	bletion
at completion (D)+1				_ 1 scan	

#### (2) Operation error

No errors.

#### (3) Program example

The following program is designed to read the offset/gain values of the A/D converter module mounted in the position of I/O number X/Y0 to X/YF when M11 is turned ON.

Control dat	ta settin	g						*4
			 	[MOV	КО	D102	] \$	Specifies voltage
					ESET	M12	3	
Offset/gain	n value r	estoration						
		101	[GP.OGLOAD	UO	D100	M20	] [	Dedicated instruction
		MZI 			RST	M12	٦Ì	,
		<b>A</b> 1			L		-	
	M20	M21	Performs proce	essing at ab	normal con	npletion	]	
			 			[END	]	

\*1 For the Q66AD-DG, the program in the dotted area is not necessary.

## Appendix 1.3 G(P).OGSTOR

Restores the offset/gain values of the user range setting stored in the CPU to the A/D converter module.

Usable devices									
Internal device			Link dire	ct device	Intelligent		Con	stant	
(System, user)		File	J□/□		function	Index	Constant		
Bit	Word	register	Bit	Word	module device U⊡\G⊡	register Z⊡	К, Н	\$	Other
—	C	0		—		—	—	—	
	0						_	—	
	Internal (System Bit	Internal device (System, user) Bit Word — (	Internal device (System, user) File Bit Word Cegister	Internal device (System, user) Bit Word 	Usable       Internal device (System, user)     Link direct device       Bit     Word       —     O	Usable devices         Internal device (System, user)       Link direct device J□\□       Intelligent function module         Bit       Word       Bit       Word       device U□\G□         —       O       —       —	Usable devices       Internal device (System, user)     Link direct device J_\_     Intelligent function Bit     Index wodule       Bit     Word     File register     Bit     Word     U_\_       —     O     —     —	Usable devices         Internal device (System, user)       Link direct device J□\□       Intelligent function device       Index register       Construction         Bit       Word       Bit       Word       U□\G□       K, H	Usable devices         Internal device (System, user)       Link direct device J_\       Intelligent function device       Index register         Bit       Word       Bit       Word       Intelligent function device       Index register         —       O       —       —       —       —       —       —         O       —       —       —       —       —       —       —



#### Set data

Set data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
(S) <sup>*1</sup>	Start number of the device in which control data is stored.	Within the range of the specified device	Device name
(D)	Device that is turned ON 1 scan on completion of dedicated instruction processing. (D) + 1 also turns ON at an abnormal completion.	Within the range of the specified device	Bit

\*1 When executing the G(P).OGLOAD instruction, specify the device designated in (S).

Do not change the data read with the  $G(\mathsf{P}).\mathsf{OGLOAD}$  instruction.

If it is changed, normal operation cannot be guaranteed.

## Control data of Q68AD-G

Device	Item	Set data	Setting range	Set by
(S)	System area	—	—	—
(S) + 1	Completion status	Stores the status when the instruction is complete. 0 : Normal completion Other than 0: Abnormal completion	_	System
(S) + 2	Pass data classification setting	bit       b	0000н to 00FF н	System
(S) + 3	System area			
(S) + 4	CH1 Industrial shipment settings offset value			System
(5) + 5	CH1 Industrial shipment settings gain value			System
(5) + 6	CH2 Industrial shipment settings onset value			System
(3) + 7	CH2 Industrial shipment settings affect value	—		System
(3) + 0	CH3 Industrial shipment settings onset value			System
(3) + 9 (8) + 10	CH4 Industrial shipment settings offset value			System
(3) + 10 (S) + 11	CH4 Industrial shipment settings onset value			System
(3) + 11 (8) + 12	CHE Industrial chipment settings gain value			System
(3) + 12	CH5 Industrial shipment settings onset value			System
(3) + 13	CHS industrial shipment settings gain value			System
(3) + 14 (8) + 15	CH6 Industrial shipment settings onset value			System
(3) + 13 (8) + 16	CH7 Industrial shipment settings gain value			System
(3) + 10 (8) + 17	CH7 Industrial shipment settings onset value			System
(5) + 17	CH7 Industrial shipment settings gain value	—		System
(S) + 18	CH8 industrial shipment settings offset value			System
(5) + 19				System
(S) + 20	CHT user range settings onset value			System
(5) + 21	CH i user range settings gain value			System
(S) + 22	CH2 user range settings offset value	—		System
(S) + 23	CH2 user range settings gain value	_	—	System
(S) + 24	CH3 user range settings offset value	—	_	System
(S) + 25	CH3 user range settings gain value	_	—	System
(S) + 26	CH4 user range settings offset value	_		System
(S) + 27	CH4 user range settings gain value	—		System
(S) + 28	CH5 user range settings offset value	—		System
(S) + 29	CH5 user range settings gain value	—	_	System
(S) + 30	CH6 user range settings offset value		_	System
(S) + 31	CH6 user range settings gain value		_	System
(S) + 32	CH7 user range settings offset value	—	—	System
(S) + 33	CH7 user range settings gain value	_	_	System
(S) + 34	CH8 user range settings offset value			System
(S) + 35	CH8 user range settings gain value	—	_	System

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Device	Item	Set data	Setting range	Set by
(S)	System area	—	—	—
(S) + 1	Completion status	Stores the status when the instruction is complete. 0 : Normal completion Other than 0: Abnormal completion	_	System
(S) + 2 (S) + 3	System area	—	_	_
(S) + 4	CH1 Industrial shipment settings offset value	_	_	System
(S) + 5	CH1 Industrial shipment settings gain value	_	_	System
(S) + 6	CH2 Industrial shipment settings offset value	_	_	System
(S) + 7	CH2 Industrial shipment settings gain value	_	_	System
(S) + 8	CH3 Industrial shipment settings offset value	—		System
(S) + 9	CH3 Industrial shipment settings gain value	_	_	System
(S) + 10	CH4 Industrial shipment settings offset value	—	_	System
(S) + 11	CH4 Industrial shipment settings gain value	—	_	System
(S) + 12	CH5 Industrial shipment settings offset value	—	_	System
(S) + 13	CH5 Industrial shipment settings gain value	—	_	System
(S) + 14	CH6 Industrial shipment settings offset value	—	_	System
(S) + 15	CH6 Industrial shipment settings gain value	—	_	System
(S) + 16 to (S) + 19	System area	_	_	_
(S) + 20	CH1 user range settings offset value	—	_	System
(S) + 21	CH1 user range settings gain value	—	_	System
(S) + 22	CH2 user range settings offset value	—	_	System
(S) + 23	CH2 user range settings gain value	—	_	System
(S) + 24	CH3 user range settings offset value	—	_	System
(S) + 25	CH3 user range settings gain value	—	_	System
(S) + 26	CH4 user range settings offset value	—	_	System
(S) + 27	CH4 user range settings gain value	—	_	System
(S) + 28	CH5 user range settings offset value	—	_	System
(S) + 29	CH5 user range settings gain value	—	_	System
(S) + 30	CH6 user range settings offset value	—	—	System
(S) + 31	CH6 user range settings gain value	—	—	System
(S) + 32 to	System area	_		_
(S) + 35				

## Control data<sup>\*2</sup> of Q66AD-DG

\*2 Setting is not necessary. If setting is made, the offset/gain values will not be read properly.

## (1) Functions

- (a) Restores the offset/gain values of the user range setting stored in the CPU to the A/D converter module.
- (b) There are two types of interlock signals for the G(P).OGSTOR instruction: the completion device (D) and the status display device at completion (D) + 1.

#### 1) Completion device

Turns ON in the END processing of the scan where the G(P).OGSTOR instruction is completed, and turns OFF in the next END processing.

#### 2) Status display device at completion

Turns ON and OFF depending on the completion status of the G(P).OGSTOR instruction.

Normal completion : Stays OFF and does not change.

Abnormal completion: Turns ON in the END processing of the scan where the G(P).OGSTOR instruction is completed, and turns OFF in the next END processing.



- \*1 When the G(P).OGSTOR instruction is executed, A/D conversion is not performed. After the completion device (D) turns ON, A/D conversion starts, the A/D conversion value is stored into the buffer memory, and the A/D conversion completed flag (XE) then turns ON.
- (c) When the offset/gain values are restored, the reference accuracy falls to about less than three times of the accuracy before that.

## (2) Operation error

In any of the following cases, an error occurs and the corresponding error code is stored into the completion status area (S)+1.

Error code	Case resulting in operation error
161	The G(P).OGSTOR instruction was executed in the offset/gain setting
	mode.
162	The G(P).OGSTOR instruction was executed consecutively.
163	The G(P).OGSTOR instruction was executed for the model that differs
	from the model for which the G(P).OGLOAD instruction had been exe-
	cuted.
#### (3) Program example

Program that restores the offset/gain setting to the A/D converter module mounted in the position of I/O No. X/Y10 to X/Y1F when M11 is turned OFF.

Control data setting			ESET	M13	3
Offset/gain value restoration	GP.OGSTOR	U1	D100	M30	Dedicated instruction
M30 M31 	Performs proce	essing at a	[RST bnormal con	M13 npletion	
				[END	]

## Appendix 2 Functions Added or Changed Due to Version Upgrade

The A/D converter has been upgraded with new functions and specifications.

The functions available for use of the A/D converter module vary with the first five digits of product number.

Also, use the GX Configurator-AD whose version number is compatible one or later.

App.1 Q68AD-G				
		Applic		
Added or changed function	Description	First 5 digits of product number	GX Configurator- AD	Reference section
Analog input range extended mode	<ul> <li>When the following input ranges are selected in the intelligent function module switch setting, the analog input ranges can be extended.</li> <li>4 to 20mA (Extended mode)</li> <li>1 to 5V (Extended mode)</li> <li>The input ranges supported by the analog input range extended mode cannot be used for products of incompatible version.</li> </ul>	10062 or later	2.09K or later	Section3.1.1 Section4.5
Input signal error detec- tion extended setting	When the warning of input signal error detection is enabled, the input signal error detection can be per- formed by setting the same value of upper and lower limit or different value of upper and lower limit. The input signal error detection cannot be performed by setting the different value of upper and lower limit, but can be performed by setting the same value of upper and lower limit. Set the buffer memories as follows. • Un\G47.b15 to b8 ··· Fixed at 0 • Un\G150 to Un\G157 ··· Reserved (system area)	10062 or later	2.09K or later	Section3.2.3 Section3.4.11 Section3.4.22

#### (1) Q68AD-G

APPENDIX

MELSEG **Q** series

#### (2) Q66AD-DG

App.2 Q66AD-DG				
		Applica	able version	
Added or changed function	Description	First 5 digits of product number	GX Configurator- AD	Reference section
Analog input range extended mode	<ul> <li>When the following input ranges are selected in the intelligent function module switch setting, the analog input ranges can be extended.</li> <li>4 to 20mA (Extended mode) (For 2-wire transmitter input)</li> <li>4 to 20mA (Extended mode) (For current input)</li> <li>The input ranges supported by the analog input range extended mode cannot be used for products of incompatible version.</li> </ul>	10102 or later	2.09K or later	Section3.1.1 Section4.5
Input signal error detec- tion extended setting	When the warning of input signal error detection is enabled, the input signal error detection can be per- formed by setting the same value of upper and lower limit or different value of upper and lower limit. The input signal error detection cannot be performed by setting the different value of upper and lower limit, but can be performed by setting the same value of upper and lower limit. Set the buffer memories as follows. • Un\G47.b15 to b6 … Fixed at 0 • Un\G150 to Un\G155 … Reserved (system area)	10102 or later	2.09K or later	Section3.2.3 Section3.4.11 Section3.4.22

APPENDIX

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#### (a) When using the product with product number 15031 or earlier

#### 1) How the A/D conversion completed flag status changes

Signal name	Description
	<ol> <li>This signal turns ON when all conversion-enabled channels have completed the initial A/D conversion.</li> <li>When the external power supply is turned off, the A/D conversion stops and this signal turns OFF. At this time, the previous digital output values are held. The A/D conversion resumes when the external power supply is turned on again. Then, when all conversion-enabled channels have completed the initial A/D conversion, this signal turns ON. The processing such as averaging processing and primary delay filter starts from the initial status after the A/D conversion resumes.</li> <li>The following table lists the signal status when the A/D conversion is enabled in the off condition of the external power supply.</li> </ol>
A/D conversion com- pleted flag (XE)	Selected range       A/D conversion disable → enable         Analog current input range only without 2-wire transmitter       • When the A/D conversion resumes and all conversion-enabled channels have completed the initial A/D conversion, the signal turns ON.
	2-wire transmitter range only       • A/D conversion resumes and the signal turns ON.*1         • Digital output value become the minimum value (normal resolution: - 96, high resolution: -288).
	Analog current input range • A/D conversion resumes and the signal turns ON. <sup>*1</sup>
	Mix without 2-wire transmitter • Digital output value of the channel of the 2-wire transmitter become
	2-wire transmitter range the minimum value (normal resolution: -96, high resolution: -288).
	*1 When the external power supply is turned ON, this signal turns OFF temporarily and the A/D conversion resumes. Then, when all conversion-enabled channels have completed the initial A/D conversion, the sig- nal turns ON again.
	(1) When A/D conversion in the off condition of the external power supply is enabled, A/D conversion com-
	pleted flag (Un\G10) in the channels of a 2-wire transmitter is set to 1.
A/D conversion com-	Also, for the channels of the analog current input range without a 2-wire transmitter, A/D conversion com-
pieted flag (Un/GTU)	<ul> <li>(2) When the external power supply is turned off, A/D conversion completed flag (Un\G10) of all channels is set to 0.</li> </ul>
	2) When channels being used are all for current input and in addition the external
	power supply (24VDC) is not supplied.
	To start the A/D conversion of analog current input range by using the utility

package, Operating condition setting request (Yn9) is required. Add the following programs to the programming examples of Section 6.4.2 (3) and Section 6.5.1 (3).

• When a normal system configuration is employed



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• When the remote I/O network is employed

# **Appendix 3 External Dimensions**



(Unit: mm)

#### (2) Q66AD-DG



#### (1) Q68AD-G

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2-wire transmitter
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# WARRANTY

Please confirm the following product warranty details before using this product.

#### 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

#### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
  - 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
  - 2. Failure caused by unapproved modifications, etc., to the product by the user.
  - 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
  - 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
  - 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
  - 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
  - 7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

#### 2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

#### 3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

#### 4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

#### 5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

# **INFORMATION AND SERVICES**

For further information and services, please contact your local Mitsubishi Electric sales office or representative. Visit our website to find our locations worldwide.

MITSUBISHI ELECTRIC Factory Automation Global Website

Locations Worldwide www.MitsubishiElectric.com/fa/about-us/overseas/

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 SH(NA)-080647ENG-M(2407)MEE

 MODEL:
 Q-A/D-(D)G-U-SY-E

 MODEL CODE:
 13JR96

# MITSUBISHI ELECTRIC CORPORATION

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