

MITSUBISHI

Q62AD-DGH Channel Isolated High Resolution Analog-Digital Converter Module (with Signal Conditioning Function)

Thank you for buying the Mitsubishi programmable controller MELSEC Q Series.

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

User's Manual (Hardware)

MODEL	Q-A/D-DGH-U-HW
MODEL Code	13JT83

IB-0800224-E (0810) MEE

MELSEC-Q
Mitsubishi Programmable Controller

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SAFETY PRECAUTIONS

(Read these precautions before using.)

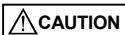
When using Mitsubishi equipment, thoroughly read this manual and the related manuals introduced in the manual. Also pay careful attention to safety and handle the module correctly.

These precautions apply only to this product. Refer to the user's manual of the CPU module to use for the programmable controller system safety precautions.

These SAFETY PRECAUTIONS classify the safety precautions into two categories: "DANGER" and "CAUTION".



Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out correctly.



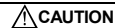
Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out correctly.

Depending on circumstances, procedures indicated by CAUTION may also cause to serious accidents.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place and read it whenever necessary. Always forward it to the end user.

DESIGN PRECAUTIONS



- 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 100 mm (3.94 inch) or more from each other. Otherwise, noise may occur and result in malfunction.

INSTALLATION PRECAUTIONS



- Use the programmable controller in an environment that meets the general specifications given in the User's Manual of the CPU module being used. 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.
- 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. Incorrect installation may result in malfunction or breakdown, or cause the module to loosen and drop. Securely fix the module with screws if it is subject to vibration during use.
- Tighten the screws within the range of specified torque. If the screws are loose, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module. Not doing so may cause damage to the module.
- Do not directly touch the conductive area or electronic components of the module. Otherwise, the module may malfunction or go down.

WIRING PRECAUTIONS



- Always ground the FG terminal for the programmable controller. There is a risk of electric shock or malfunction.
- When turning on the power and operating the module after wiring is completed, always attach the terminal cover included with the product. There is a risk of electric shock if the terminal cover is not attached.
- Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in the failure.
- 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 matters such as sawdust or wire chips get inside the module. These may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable cutoffs 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 heat ventilation.

ABOUT MANUAL

The following manual is also related to this product. If necessary, order it by quoting the details in the table below.

Related Manual	Manual name	Manual No. (Model code)
Channel Isolated High Resolution Analog-Digital Converter Module/Channel Isolated High Resolution Analog-Digital Converter Module (with Signal Conditioning Function) User's Manual		SH-080277 (13JR51)

Compliance with the EMC and Low Voltage Directives

- For programmable controller system
 - To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection). The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.
- For the product
 - No additional measures are necessary for the compliance of this product with the EMC and Low Voltage Directives.

1. Overview

This manual describes the specifications and part names for the Q62AD-DGH type channel isolated high resolution analog-digital converter module (with signal conditioning function) (hereinafter referred to as the Q62AD-DGH), which are used with the MELSEC-Q series CPU modules.

2. Specifications

The specifications for the Q62AD-DGH are shown in the following table. For general specifications for the Q62AD-DGH, refer to the operation manual for the CPU module being used.

Item	Model name	Q62AD-DGH	
Connecting section with 2-wire transmitter	Input specification	Number of analog input points: 2 points (2 channels) Analog input: 4 to 20 mA DC (Input resistance 250 Ω) Supply voltage: 26±2VDC Maximum supply current: 24mA DC Short-circuit protection: Available Limit current: 25 to 35mA Check terminals: Available	
	Digital output	16-bit signed binary (-768 to 32767) 32-bit signed binary (-1538 to 65535)	
	I/O characteristics, Maximum resolution	Analog input range	Maximum resolution: 32-bit, 16-bit Digital output value (32-bit): 0 to 64000 Digital output value (16-bit): 0 to 32000
		4 to 20mA	250.0nA, 500.0nA
		4 to 20mA (Expanded mode)	250.0nA, -16000 to 72000
Users range setting		151.6nA, 303.2nA, 0 to 64000, 0 to 32000	
Accuracy (Accuracy relative to digital output value)	Reference accuracy: ±0.05% Temperature coefficient: ±71.4ppm/°C (0.00714 %/°C)	Digital output value (32-bit): ±0.05% Digital output value (16-bit): ±1digit ³	
Conversion speed	10ms/2 channels		
Isolation specifications	Specific isolated area	Isolation method: Photocoupler isolation Dielectric withstand voltage: 1780VAC rms (3 cycles (elevation 2000mm)) Insulation resistance: 500VDC 10MΩ or more	
	Between I/O terminal and programmable controller power supply	Transformer isolation	
	Between analog input channels	Transformer isolation	
	Between external supply power and analog input	Transformer isolation	
Maximum number of writes for E ² PROM		100,000	
Number of I/O occupied points		16 points	
Connected terminal		18 points terminal block	
Applicable wire size		0.3 to 0.75mm ²	
Applicable solderless terminals		RT.25 - 3 (Solderless terminals with sleeves are not applicable)	
External supply power		24VDC +20%, -15%	
		Ripple, spike within 500mVp-p	
		Inrush current: 5.5A, within 200μs	
Internal current consumption (5 VDC)		0.19A	
		0.33A	
Weight		0.19kg	

- User range setting is 2 to 24mA.
- Accuracy of offset/gain setting at ambient temperature: Q62AD-DGH needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
*3: "digit" indicates a digital output value.
- Accuracy per temperature change of 1 °C: Example: Accuracy when temperature changes from 25 to 30 °C
0.05% (reference accuracy) + 0.00714 %/°C (temperature coefficient) × 5 °C (temperature change difference) = 0.0857%

3. Part Identification Nomenclature

This section explains the part names for the Q62AD-DGH.

Terminal number	Signal name *
1	P
2	I/CHK+
3	CHK-
4	Empty
5	Empty
6	Empty
7	Empty
8	Empty
9	CH2 P
10	I/CHK+
11	CHK-
12	Empty
13	Empty
14	Empty
15	Empty
16	24V
17	24G
18	FG

*P: Power supply for 2-wire transmitter
I/CHK+: 2-wire transmitter current input/check (+) terminal
CHK-: Check (-) terminal

Number	Name	Description
1)	RUN LED	Displays the operating status of the Q62AD-DGH. On: Normal operation Fllickering: During offset/gain setting mode Off: 5V power supply interrupted, watch dog timer error or module exchangeable status during online module change bled
2)	ERR. LED	Displays the error status of the Q62AD-DGH. On: Error (A/D conversion continues.) Fllickering: Error (A/D conversion stops.) Off: Normal operation
3)	ALM LED	Displays the warning status of the Q62AD-DGH. On: An alarm (process alarm, rate alarm) is being generated. Fllickering: An input signal error is being generated. Off: Normal operation
4)	Check terminals	Terminal used to check the analog input current value. (See Section 5.2)
5)	External supply power terminal	Terminal to connect 24VDC external supply power.

4. Precautions For Use

- Do not drop the module or subject it to heavy impact.
- Do not remove the PCB of the module from its case. Doing so may cause the module to fall.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire cutoffs, from entering the module during wiring. Do not peel this label during wiring. Before starting system operation, be sure to peel this label because of heat dissipation.
- Tighten the terminal screws using torque within the following ranges. Loose screws may cause short circuits, mechanical failures or malfunctions.

Screw location	Tightening torque range
Module fixing screw (M3 screw) ¹⁾	0.36 to 0.48 N · m
Terminal block terminal screw (M3 screw)	0.42 to 0.58 N · m
Terminal block mounting screw (M3.5 screw)	0.66 to 0.89 N · m

*1: The module can be easily fixed onto the base unit using the hook at the top of the module.

However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

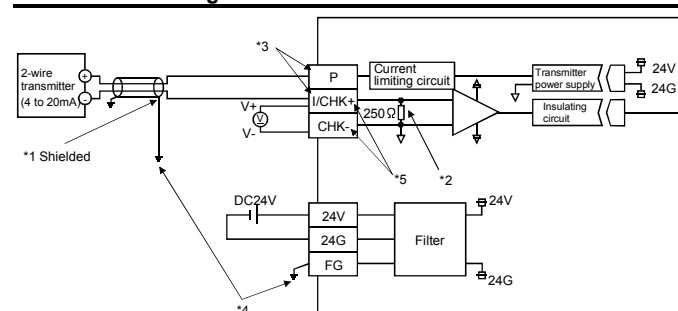
- To mount the module on the base unit, fully insert the module fixing latch into the fixing hole in the base unit and press the module using the hole as a fulcrum. Improper installation may result in a module malfunction, or may cause the module to fall off.

5. Wiring

5.1 Wiring precautions

- Use separate cables for the AC control circuit and the external input signals and external supply power of the Q62AD-DGH to avoid the influence of the AC sidesurges and inductions.
- Do not mount the cables close to or bundle them with main circuit line, a high-voltage cable or load cable from other than the programmable controller. This may increase the effects of noise, surges and induction.
- Perform an one-point grounding for shielded lines and the shields of sealed cables.
- A solderless terminal with insulation sleeve cannot be used for the terminal block. Covering the cable-connection portion of the solderless terminal with a marked tube or an insulation tube is recommended.

5.2 External wiring



- Use a 2-core twisted shielded wire for the power wire.
- Shows input resistance.
- To connect with the 2-wire transmitter, be sure to connect to P and I/CHK+.
- Always use a ground. In addition, ground the FG of the power supply module.
- The check terminals (I/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:

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

IMPORTANT
Q62AD-DGH needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy). Therefore, power on 30 minutes prior to offset/gain setting or after online module change.

5.3 Switch setting for intelligent functional module

The settings for the intelligent function module are performed using the I/O assignment settings for the GX Developer. It can be easy to set by inputting in hexadecimal-4digits.

Switch	Setting
Switch 1	Input range setting: 00H Fixed, CH2 CH1 Analog input range: 4 to 20 mA, 4 to 20mA (Expanded mode), User range setting Input range setting value: 0H, AH, FH
Switch 2	Empty
Switch 3	Empty
Switch 4	Input range setting: 00H Fixed Analog input range: 0H to FH, 1H to FH (numeric value other than 0H) ¹⁾ , Offset/gain setting mode
Switch 5	0H: Fixed

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

6. External Dimensions



Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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Specifications subject to change without notice.
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