MITSUBISHI

Q64AD-GH Channel Isolated High Resolution Analog-Digital Converter Module

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

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

MELSEC-Q
Mitsubishi Programmable Logic Controller

User's Manual (Hardware)

MODEL	Q-A/D-GH-U-HW
MODEL Code	13JT82

IB-0800223-B (0302) MEE

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

⚠DANGER	**Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out correctly.**
⚠CAUTION	**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 serious accidents.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠CAUTION

- 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]

⚠CAUTION

- Use the PLC in an environment that meets the general specifications given in the User's Manual of the CPU module being used.
  Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- When installing the module, securely insert the module fixing tabs into the mounting holes of the base unit while pressing the installation lever located at the bottom of the module downward.
  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 the module to fallout, short circuits, or malfunction.
  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.
- Switch all phases of the external power supply off when mounting or removing the module.
  Otherwise, the module may be damaged.
- Do not directly touch the conductive area or electronic components of the module.
  Otherwise, the module may malfunction or go down.

[WIRING PRECAUTIONS]

⚠CAUTION

- 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.
- 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 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 heat ventilation.

Manual

The following manual is also related to this product. Order them if necessary.

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)

Conformation to the EMC Directive and Low Voltage Instruction
When complying with EMC Directives and Low-Voltage Directives by assembling a Mitsubishi PLC compatible with EMC Directive and Low-Voltage Directives into the user product, refer to Chapter 3 "EMC Directives and Low-Voltage Directives" in the User's Manual (Hardware Section) for the CPU module being used. The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

1. Overview

This manual explains the specifications and part names for the type Q64AD-GH Channel Isolated High Resolution Analog-Digital Converter Module (hereinafter Q64AD-GH) to be used in combination with the MELSEC-Q Series CPU module.

2. Specifications

The specifications for the Q64AD-GH are shown in the following table. For general specifications for the Q64AD-GH, refer to the operation manual for the CPU module being used.

Item \ Model name		Q64AD-GH
Number of analog input points		4 points (4 channels)
Analog input	Voltage	-10 to 10VDC (Input resistance 1 MΩ)
	Current	0 to 20mADC (Input resistance 250 Ω)
Digital output		16-bit signed binary (-32768 to 32767) 32-bit signed binary (-65536 to 65535)
I/O characteristics, maximum resolution		See the table below
Accuracy (Accuracy relative to full-scale)	Reference accuracy *1	±0.05% Digital output value (32-bit) : ±32digit *2 Digital output value (16-bit) : ±16digit *2
	Temperature coefficient *3	±71.4ppm/°C (0.00714%/°C)
Common mode characteristic		Common mode voltage Input-Common ground (input voltage 0V): 1780VAC Common mode voltage rejection ratio (VCM < 1780V): 60Hz 105dB, 50Hz 107dB
Conversion speed		10ms/4 channels
Absolute maximum input		Voltage: ± 15V Current: ± 30mA
Isolation specifications		See the table below
E²PROM write count		Maximum 100,000
Number of I/O occupied points		16 points
Connected terminal		18 points terminal block
Applicable wire size		0.3 to 0.75mm²
Applicable solderless terminals		R1.25 - 3 (A solderless terminals with sleeves cannot be used)
Internal current consumption (5VDC)		0.89A
Weight		0.20kg

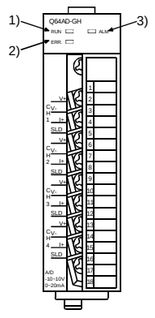
Input	Analog input range	Maximum resolution 32-bit	Maximum resolution 16-bit	Digital output value (32-bit)	Digital output value (16-bit)
Voltage	0 to 10V	156.3μV	312.6μV	0 to 64000	0 to 32000
	0 to 5V	78.2μV	156.4μV		
	1 to 5V	62.5μV	125.0μV		
	Users input range (Uni-polar)	47.4μV	94.8μV		
	-10 to 10V	156.3μV	312.6μV	-64000 to 64000	-32000 to 32000
	Users input range (Bi-polar)	47.4μV	94.8μV		
Current	0 to 20mA	312.5nA	625.0μV	0 to 64000	0 to 32000
	4 to 20mA	250.0nA	500.0μV		
	Users input range (Uni-polar)	151.6nA	303.2μV		

Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance
Between I/O terminal and PLC power supply	Photocoupler insulation	1780VAC rms/3 cycles (elevation 2000m)	500VDC 10MΩ or more
Between analog input channels	Transformer isolation		

*1: Accuracy of offset/gain setting at ambient temperature
*2: "digit" indicates a digital output value.
*3: 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) x 5 °C (temperature change difference) = 0.0857%

3. Part Names

This section explains the Part names for the Q64AD-GH.



Terminal number	Signal name	
1	Empty	
2	Empty	
3	CH1	V+
4		V–
5		I+
6		SLD
7	CH2	V+
8		V–
9		I+
10		SLD
11	CH3	V+
12		V–
13		I+
14		SLD
15	CH4	V+
16		V–
17		I+
18		SLD

Number	Name	Description
1)	RUN LED	Displays the operating status of the Q64AD-GH. On : Normal operation Flickering : During offset/gain setting mode Off : 5V power supply interrupted, watch dog timer error or module exchangeable status during online module replacement
2)	ERR. LED	Displays the error status of the Q64AD-GH. On : Error (A/D conversion continues.) Flickering : Error (A/D conversion stops.) Off : Normal operation
3)	ALM LED	Displays the alarm status of the Q64AD-GH. On : An alarm (process alarm, rate alarm) is being generated. Flickering : An input signal error is being generated. Off : Normal operation

4. Precautions For Use

(1) Do not drop the module or subject it to strong impact.
(2) Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.
Failure to do so may cause a failure or malfunctions of the module.
(3) Tighten the terminal screws for the module to the specified torque shown below.
Insufficient tightening torque could result in shorts, failures or malfunction.

Screw location	Tightening torque range
Module mounting screw (M3 screw)	36 to 48 N · cm
Terminal block terminal screw (M3 screw)	42 to 58 N · cm
Terminal block mounting screw (M3.5 screw)	66 to 89 N · cm

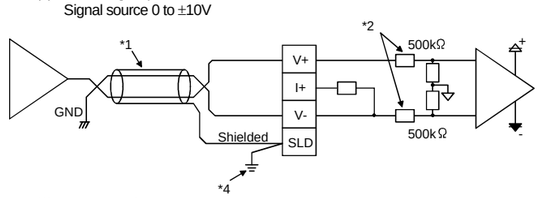
5. Wiring

5.1 Wiring precautions

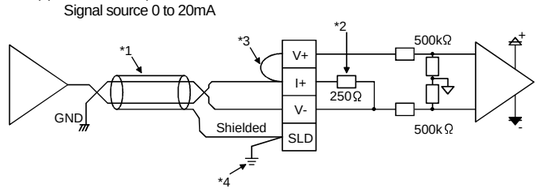
(1) Wire the external AC control circuit and the external input signal for Q64AD-GH with the separate cables to prevent the influence of surge or induction from AC side.
(2) Ground one point of the shield for shielded wires or shielded cables.

5.2 External wiring

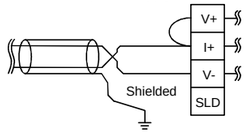
(1) For voltage input
Signal source 0 to ±10V



(2) For current input
Signal source 0 to 20mA



*1 Use a 2-core twisted shielded wire for the power wire.
*2 Shows input resistance.
*3 For current input, be sure to connect to (V+) and (I+) terminals.
*4 Be sure to ground the shield wire of each channel.
The SLD terminal can be used when grounding, however it has not been wired inside the board. Ground it as shown in the diagram shown above or below.
In addition, ground the FG of the power supply module.

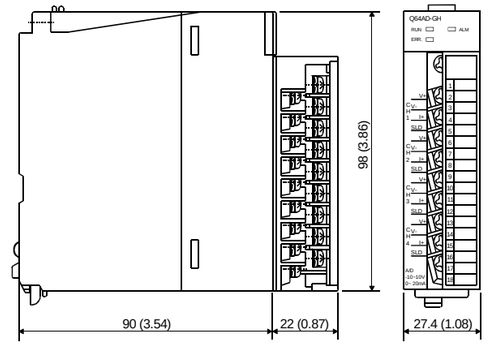


5.3 Switch setting for intelligent functional module

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

	Data item	
Switch 1	Input range setting □□□□ H CH4 CH3 CH2 CH1	Analog input range / Input range setting value 4 to 20mA / 0H 0 to 20mA / 1H 1 to 5V / 2H 0 to 5V / 3H – 10 to 10V / 4H 0 to 10V / 5H User range setting (Uni-polar) / EH User range setting (Bi-polar) / FH
Switch 2	Empty	
Switch 3	Empty	
Switch 4	□□□□ H 000H Fixed 0H : Normal mode (A/D conversion processing) 1 to FH (numeric value other than 0H) : Offset/gain setting mode	
Switch 5	0 : Fixed	

6. External Dimensions



unit (mm (in.))

Warranty

Mitsubishi Electric shall not be liable for any loss caused by reasons for which Mitsubishi is not held accountable, lost business opportunities or unrealized gain on the customer's side resulting from failure of the product, or any other damage, secondary disaster, accident, damage to equipment other than the product or disruption of other business operations arising out of special circumstances which may or may not have been predicted at Mitsubishi.

⚠ **For safe use of the product**

- This product is manufactured as a general-purpose product intended for general industrial use only. It is not designed nor manufactured for use in an equipment or system affecting human lives.
- If you are considering to use this product in equipment or systems for nuclear power generation, power generation, aerospace, medical or passenger transport applications, consult our sales representatives.
- This product is manufactured under our strict quality control system. However, if the product is used in the intended facility in such a way that a failure of the product may lead to serious accident or loss, incorporate backup or fail-safe functions into the system design.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061 Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. AV. Paulista 1471, Conj. 308, Sao Paulo City, Sao Paulo State, Brazil Tel : +55-11-283-2423
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Herts., AL10 8XB,UK Tel : +44-1707-276100
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, 20041 Agrate B., Milano, Italy Tel : +39-039-6053344
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80 08190 - Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131
France	Mitsubishi Electric Europe B.V. French Branch 25 Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568
South Africa	Circuit Breaker Industries LTD. Tripswitch Drive, Elandsfontein Gauteng, South Africa Tel : +27-11-928-2000

Country/Region	Sales office/Tel
Hong Kong	Ryoden Automation Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, HongKong Tel : +852-2887-8870
China	Ryoden Automation Shanghai Ltd. 3F Block5 Building Automation Instrumentation Plaza 103 Cao Bao Rd. Shanghai 200233 China Tel : +86-21-6475-3228
Taiwan	Setsuyo Enterprise Co., Ltd. 6F., No.105 Wu-Kung 3rd.RD, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Korea	HAN NEUNG TECHNO CO.,LTD. 1F Dong Seo Game Channel Bldg., 660-11, Deungchon-dong Kangsec-ku, Seoul, Korea Tel : +82-2-3660-9552
Singapore	Mitsubishi Electric Asia Pte, Ltd. 307 ALEXANDRA ROAD #05-01/02, MITSUBISHI ELECTRIC BUILDING SINGAPORE 159943 Tel : +65-6473-2308
Thailand	F. A. Tech Co.,Ltd. 898/28,29,30 S.V.City Building,Office Tower 2,Floor 17-18 Rama 3 Road, Bangkpongpang, Yannawa, Bangkok 10120 Tel : +66-2-682-6522
Indonesia	P.T. Autoteknindo SUMBER MAKMUR Jl. Muara Karang Selatan Block A Utara No.1 Kav. No.11 Kawasan Industri/ Pergudangan Jakarta - Utara 14440 Tel : +62-21-663-0833
India	Messung Systems Put,Ltd. Electronic Sadan NO:111 Unit No15, M.I.D.C BHOSARI,PUNE-411026 Tel : +91-20-712-2807
Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, PostalBag, No 2, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI5, HIGASHI-KU, NAGOYA, JAPAN

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