# MITSUBISHI Channel Isolated Pulse Input Module

## User's Manual (Hardware)

## QD60P8-G

Thank you for buying the Mitsubishi general-purpose programmable controller MELSEC-Q Series

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



Mitsubishi Programmable Logic Controller

MODEL	QD60P8-G-U-H-JE			
MODEL	12 ITO/			
CODE	133194			
IB(NA)-0800229-C(0709)MEE				

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## SAFETY PRECAUTIONS •

(Read these precautions before using.)

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

These precautions apply only to Mitsubishi equipment. Refer to CPU module User's Manual for a description of the programmable controller system safety precautions.

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



Depending on circumstances, procedures indicated by **CAUTION** may also be linked to serious results.

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.

## [INSTALLATION PRECAUTION]

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- Use the programmable controller in an environment that meets the general specifications contained in CPU module User's Manual 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.
- 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. Improper installation may result in malfunction, breakdown or the module coming loose and dropping.

Securely fix the module with screws if it is subject to vibration or shock 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. Not doing so may cause damage to the module.
- Do not install/remove the module to/from the base unit, or the terminal block to/from the module more than 50 times after the first use of the product. (IEC 61131-2compliant) Failure to do so may cause malfunction.
- Do not directly touch the conductive area or electronic components of the module. Doing so may cause malfunction or failure in the module.

#### [WIRING PRECAUTION]

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- Switch all phases of the external power supply off when installing or placing wiring. Not doing so may cause electric shock or damage to the product.
- Be careful not to let foreign matter 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 ventilation.
- The cables connected to the module should be placed in a duct or fixed. Not doing so can cause the module or cables to be damaged when the cables swing, more or are pulled carefully, for example or to malfunction due to poor cable connection.

## 

- Check the layout of the terminals and then properly route the wires to the module. Fire or failure may result if incorrect voltage is input or incorrect wiring is performed.
- When removing the cable from the module, do not pull the cable. When disconnecting a cable without a terminal block, unscrew on the part that is connected to the module. Pulling the cable that is still connected to the module may cause malfunction or damage to the module or cable.

 Control wires and pulse input wires should not be routed near or bundled with the main circuit cable, power cable and/or other such load-carrying cables other than those for the programmable controller. These cables should be separated by at least 150 mm (5.9 in.). They can cause electrical interference, surges and inductance that can lead to mis-operation.

 Always ground the shielded cable for the programmable controller. There is a risk of electric shock or malfunction.

#### Revisions

\* The manual number is given on the bottom right of the top cover.

Print Date	*Manual Number	Revision
Apr., 2002	IB(NA)-0800229-A	First edition
Sep., 2006	IB(NA)-0800229-B	Partial Correction
		Section 5.2
Sep., 2007	IB(NA)-0800229-C	Partial Correction
		SAFETY PRECAUTIONS, Chapter 2,
		Section 3.1, Section 5.1, Section 5.2

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#### About Manuals

The following manuals are related to this product. Referring to this list, please request the necessary manuals.

Detailed Manual

Manual name	Manual No. (Model code)
Channel Isolated Pulse Input Module User's Manual	SH-080313E (13JR54)

Conformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi programmable controller conform to the EMC directive and low voltage instruction when installing it in your product, please refer to Chapter 3, "EMC Directive and Low Voltage Instruction" of the using programmable controller CPU module User's Manual(Hardware).

The CE logo is printed on the rating plate on the main body of the

programmable controller that conforms to the EMC directive and low voltage instruction.

To make this product conform to the EMC directive and low voltage instruction, please refer to Chapter 5 "Wiring".

## 1. Overview

This manual explains how to handle the Channel Isolated Pulse Input Module (QD60P8-G).

## 2. Performance Specifications

#### The following describes the performance specifications of the QD60P8-G.

Item	Model name				QD60	)P8-G			
Counting switch se	speed ettings	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
Number occupied	of I/O points	32 points (I/O assignment: 32 points for intelligent function module)							
Number	of channels				8 cha	nnels			
Count	Phase				1-phas	e input			
input signal	Signal level				5VDC/12	to 24VDC			
Input der	ating			Refer to t	he deratin	g chart (N	ext page)		
	Counting speed (Max)*	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
Countor	Counting range	Sampling Accumula Input puls	Sampling pulse number: 16-bit binary (0 to 32767)Accumulating count value: 32-bit binary (0 to 99999999)Input pulse value: 32-bit binary (0 to 2147483647)						
Counter	Count type		Lir	near count	er method	l, Ring cou	inter metho	od	
	Minimum count pulse width (Duty ratio 50%)	33.4 µ s	100 µs 50 50 µs µs	1ms 0.5 0.5 ms ms	10ms	20ms	100ms 50 50 ms ms	1s 0.5 0.5 s s	
Dielectric withstand voltage		For 1 min at 1500 VAC between AC external connecting terminals and general grounding For 1 min at 500 VAC between DC external connecting terminals and general grounding For 1 min at 1780 VAC between channels					general general		
Insulation	n resistance	5 M $\Omega$ or more at 500 VDC between AC external connecting terminals and general grounding							
Connecte	ed terminal	18 points terminal block							
Applicab	e wire size				0.3 to 0	.75mm <sup>2</sup>			
Applicable solderless terminals		R1.25-3 (A solderless terminals with sleeves cannot be used)							
Internal c	current otion (5VDC)	0.58A							
Weight	· · · · · · · · · · · · · · · · · · ·				0.1	7kg			
External	dimensions		27.4 (1	.08) (W)×	98 (3.86) (	H)×90 (3.	54) (D) [m	m (in.)]	

\* Counting speed is affected by pulse rise and fall time. Possible counting speeds are shown in the following chart. Note that if a pulse that has a large rise and/or fall time is counted, a miscount may occur.

Diso/fall time	Counting speed switch settings							
	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
t = 8.4 $\mu$ s or less	30kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
t = $25 \mu s$ or less	10kpps	10kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
t = 250 $\mu$ s or less	-	1kpps	1kpps	100pps	50pps	10pps	1pps	0.1pps
t = 2.5ms or less	-	-	100pps	100pps	50pps	10pps	1pps	0.1pps
t = 5ms or less	-	-	-	50pps	50pps	10pps	1pps	0.1pps
t = 25ms or less	-	-	-	-	10pps	10pps	1pps	0.1pps
t = 250ms or less	-	-	-	-	-	1pps	1pps	0.1pps
t = 2.5s or less	-	-	-	-	-	-	0.1pps	0.1pps
t = 5s	-	-	-	-	-	-	-	0.05pps



<Derating Chart>



\* "ON" indicates the status where voltage is applied to pulse input terminals.

For the general specifications of the QD60P8-G, see User's Manual for the CPU module used.

## 3. Handling

#### **3.1 Handling Precautions**

- (1) Since the module case is made of resin, do not drop it or subject it to strong impact.
- (2) The module can easily be secured to the base unit using the hooks located at the top of the module. However, if the module is to be placed in an area that is subject to strong vibration or impact, we recommend that it is secured with module fixing screws (to be provided by the user). In this case, tighten the module fixing screws within the following torque range. If the screw is too loose, it may cause a drop, short circuit, or malfunction. Excessive tightening may damage the screw and/or the module, resulting in a drop, short circuit or malfunction.

Tightening torque range
0.36 to 0.48N•m
0.42 to 0.58N•m
0.66 to 0.89N•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 or shock.

## 4. Part Identification Nomenclature

#### (1) Part identification nomenclature



Number	Name	Description
1)	RUN LED	Indicates the operating status of the QD60P8-G. On : Operating normally Off : 5V power is off, watch dog timer error occurred, in the module changeable status during online module change
2)	ERR.LED	Indicates the error status of the QD60P8-G. On : Error is occurring. Off : Operating normally
3)	CH1 to CH8 LED	Displays the voltage application status of the input terminals. On : Voltage is being applied to the CH1 to CH8 pulse input terminal. Off : No voltage applied to pulse input terminals of CH1 to CH8.

## 5. Wiring

## 

- Switch all phases of the external power supply off when installing or placing wiring. Not doing so may cause electric shock or damage to the product.
- Check the layout of the terminals and then properly route the wires to the module. Fire or failure may result if incorrect voltage is input or incorrect wiring is performed.
- Do not apply the voltage exceeding the value set on the "Intelligent function module switch setting" dialog box to the terminals.
  Failure to observe this may equal fire or failure

Failure to observe this may cause fire or failure.

#### 5.1 Wiring Precautions

- (1) Use separate cables with the AC control circuit and QD60P8-G's external input signals to avoid the influence of AC side surges and induction.
- (2) Do not run the cable close to , or bundle them with, the main circuit and high-voltage cables and the load cables from other than the programmable controller.

Failure to do so will make the cables susceptible to noise, surges and induction.

- (3) If there may be the effect of noise when a cable to be connected to the QD60P8-G and the power line are installed close to each other, use a general shielded twisted pair cable as a countermeasure against noise. The shield must be grounded on the QD60P8-G side.
- (4) The shielded twisted pair cable for connecting QD60P8-G can be secured in place.

If the shielded cable is not secured, unevenness or movement of the shielded twisted pair cable or careless pulling on it could result in damage to the QD60P8-G or shielded cable or defective cable connections could cause mis-operation of the QD60P8-G.

(5) No solderless terminals with insulation sleeves can be used on the terminal block.

It is recommended to cover the electric wire connecting section of each solderless terminal with a marking tube or insulating tube.

- (6) The cables connected to the QD60P8-G should be placed in a duct or fixed, Not doing so can cause the QD60P8-G or cables to be damaged when the cables swing, move or are pulled carelessly, for example, or to malfunction due to poor cable connection.
- (7) To comply with the EMC Directive and Low-Voltage Directive, always ground the QD60P8-G to the control box using shielded twisted pair cables twisted pair cables and AD75CK cable clamping (Mitsubishi Electric make).



#### 5.2 External Wiring

- (1) Wiring example with a source logic type encoder (24VDC)
  - (a) For transistor output



#### (b) For contact output



(2) Wiring example with a sink logic type encoder (24VDC)(a) For transistor output



#### (b) For contact output



#### **5.3 External Interface**

Shows summary image of the internal circuit of the interface for connection to external devices of the QD60P8-G.

Input/ output class	Internal circuit	Terminal No.	Signal name	Operation		Input voltage (guaranteed value)	Operating current (guaranteed value)
Input		1,3,5, 7,9,11, 13,15	CH1 to 8 V+	When ON	5VDC*	3.5 to 5.5V	4mA or more
					12 to 24VDC*	10.2 to 30V	4mA or more
		2,4,6 8,10,12 14,16	CH1 to 8 V-	When OFF	5VDC*	1.0V or less	0.5mA or less
					12 to 24VDC*	2.0V or less	0.5mA or less
-	-	17,18	FG		-	-	-

\* The input voltage range is selected from "5VDC" or "12 to 24VDC" by using intelligent function module switch.

Term	inal number	Signal name
СЦ1	1	CH1 V+
CITI	2	CH1 V-
CHO	3	CH2 V+
GHZ	4	CH2 V-
СПЗ	5	CH3 V+
CHS	6	CH3 V-
<u>с</u> ци	7	CH4 V+
	8	CH4 V-
CH5	9	CH5 V+
	10	CH5 V-
CHE	11	CH6 V+
	12	CH6 V-
<u>СЦ7</u>	13	CH7 V+
	14	CH7 V-
СП8	15	CH8 V+
	16	CH8 V-

## 6. Setting from GX Developer

Settings for QD60P8-G input voltage selection, pulse edge selection, linear counter or ring counter selection, and input filter setting can be made by the GX Developer intelligent function module switch setting.

Use the GX Developer's I/O assignment setting to make the intelligent function module switch setting.

- The intelligent function module switch has switches 1 to 5, and is set at 16 bit data.
- If the intelligent function module switch setting is not operated, the default setting for switches 1 to 5 is 0.

Switch No.	Setting items	Setting details /bit assignment	Default value
Switch 1	Input voltage selection	b15 b12 b8 b4 b0     Not used   Setting items   Meaning     CH1 Input voltage   CH2 Input voltage   0:12 to 24     CH3 Input voltage   0:12 to 24   VDC     CH5 Input voltage   1:5VDC   CH7 Input voltage     CH8 Input voltage   CH8 Input voltage   1:5VDC	0000н
Switch 2	Pulse edge selection	b15 b12   b8   b4   b0     Image: Setting items   Meaning     Image: Setting items   Image: Setting items     Image: Setting items   Image: Seting items     Image: Setting items </td <td>0000н</td>	0000н
Switch 2	Linear counter or Ring counter selection	Setting items   Meaning     CH1 Linear/Ring counter   CH2 Linear/Ring counter     CH3 Linear/Ring counter   0:Linear     CH4 Linear/Ring counter   0:Linear     CH5 Linear/Ring counter   1:Ring     CH6 Linear/Ring counter   1:Ring     CH7 Linear/Ring counter   1:Ring     CH7 Linear/Ring counter   Cunter	

Switch No.	Setting items	Setting details /bit assignment	Default value
Switch 3	Input filter setting (CH1 to CH4)	H Setting items Meaning CH1 Input filter CH2 Input filter CH3 Input filter CH4	0000н
Switch 4	Input filter setting (CH5 to CH8)	H Setting items CH5 Input filter CH6 Input filter CH6 Input filter CH7 Input filter CH8 Input fi	0000н
Switch 5		Vacant	

## 7. External Dimensions



Unit: mm (in.)

#### 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.

Country/Region	Sales office/Tel	Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel : +1-847-478-2100	Hong Kong	Mitsubishi Electric Automation (Hong Kong) Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, Hong Kong
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil	China	Mitsubishi Electric Automation (Shanghai) Ltd. 4/F Zhi Fu Plazz, No.80 Xin Chang Road, Shanghai 200003, China
Germany	Tel : +55-11-5908-8331 Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen,	Taiwan	Setsuyo Enterprise Co., Ltd. 6F No.105 Wu-Kung 3rd.Rd, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
	GERMANY Tel : +49-2102-486-0	Korea	Mitsubishi Electric Automation Korea Co., Ltd.
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB, U.K. Tel : +44-1707-276100	Singapore	Tel : +82-2-3660-9552 Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02,
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2	Theiland	Mitsubishi Electric Building, Singapore 159943 Tel : +65-6470-2460
Spain	Via Paracelso 12, I-20041 Agrate Brianza., Milano, Italy Tel : +39-039-60531 Mitsubishi Electric Europe B.V. Spanish Prope	malianu	Co., Ltd. Bang-Chan Industrial Estate No.111 Moo 4, Serithai Rd, T.Kannayao, A.Kannayao, Bangkok 10230 Thailand Tol : +66 2 517 1326
France	Carretera de Rubi 76-80, E-08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131 Mitsubishi Electric Europe B.V. French	Indonesia	P.T. Autoteknindo Sumber Makmur Muara Karang Selatan, Block A/Utara No.1 Kav. No.11 Kawasan Industri Pergudangan Jakarta - Utara 14440, P.O.Box 5045 Jakarta, 11050 Indonesia
Tance	Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568	India	Tel : +62-21-6630833 Messung Systems Pvt, Ltd. Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari, Pune-411026, India
South Africa	Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa Tel : +27-11-928-2000	Australia	Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

#### MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

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