# MITSUBISHI QD72P3C3 Type Positioning Module with Built-in Counter Function

User's Manual (Hardware)

# QD72P3C3

Thank you for purchasing the Mitsubishi programmable controller MELSEC-Q series.

Prior to use, please read this and relevant manuals thorougly to fully understand the product.

MELSEG-Q Mitsubishi Programmable Controller

MODEL	QD72P3C3-U-HW						
MODEL	13 IV35						
CODE	150155						
IB(NA)- 0800388 -A(0704)MEE							

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# SAFETY PRECAUTIONS

(Read these precautions before use.)

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

The precautions given in this manual are concerned with this product. For the safety precautions of the programmable controller system, please read the User's Manual for the CPU module.

In this section, the safety precautions are ranked as "DANGER" and "CAUTION".



Note that the **A CAUTION** level may lead to a serious consequence according to the circumstances.

Always follow the precautions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

### [INSTALLATION PRECAUTIONS]

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- Use the programmable controller in the environment conditions given in the general specifications in the User's Manual for the CPU module. Failure to do so may cause an electric shock, fire, malfunction, or damage to or deterioration of the product.
- While pressing the installation lever located at the bottom of the module, fully insert the module fixing projection into the fixing hole in the base unit to mount the module. Incorrect module mounting may cause a malfunction, failure, or drop of the module. In an environment of frequent vibrations or impacts, secure the module with screws. The screws must be tightened within the specified torque range. If the screw is too loose, it may cause a drop or malfunction. Excessive tightening may damage the screw and/or the module, resulting in a drop or malfunction.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module. Failure to do so may cause damage to the product.
- Do not directly touch any conductive part or electronic part of the module. Doing so may cause a malfunction or failure of the module.

### [WIRING PRECAUTIONS]

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 Be sure to shut off all phases of the external power supply used by the system before installation or wiring.

Failure to do so may cause an electric shock or damage to the product.

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- Correctly wire cables to the module after checking the terminal layout.
- Solder an external device connector correctly. Failure to do so may cause a malfunction.
- Be careful to prevent foreign matter such as dust or wire chips from entering the module.

Failure to do may cause a fire, failure or malfunction.

 A protective film is attached to the module top to prevent foreign matter such as wire chips from entering the module during wiring. Do not remove the film during wiring.

Be sure to remove it for heat dissipation before system operation.

- Securely connect an external device connector to the module connector and fully tighten the two screws.
- When disconnecting the external wiring cable connected to the module, do not pull it by holding the cable part. Disconnect the cable with connector with holding the connector plugged into the module. Pulling the cable part with the cable still connected to the module may cause a malfunction or damage to the module and/or cable.
- Do not install cables for connecting external I/O signals of the QD72P3C3 and drive unit together with the main circuit cables, power cables, and/or the load cables for any other than programmable controllers or not bring them close to each other.

Keep a distance of 100 mm (3.94 inch) or more between them. Failure to do so may cause a malfunction due to noise, surge or induction.

### Revisions

Print date	*Manual number	Revision
Apr., 2007	IB(NA)-0800388-A	First edition

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#### <u>Manual</u>

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

Related manual

Manual name	(Model code)
QD72P3C3 Type Positioning Module with Built-in Counter Function User's Manual	SH-080683ENG (13JR99)

### Compliance with the EMC and Low Voltage Directives

When incorporating the Mitsubishi programmable controller into other machinery or system and ensuring compliance with the EMC and Low Voltage Directives, refer to Chapter 3 "EMC and Low Voltage Directive" of the User's Manual (Hardware) for the CPU module. The CE logo is printed on the rating plate of the programmable controller, indicating compliance with the EMC and Low Voltage Directives.

To conform this product to the EMC and Low Voltage Directives, refer to Chapter 5 "WIRING".

### 1. OVERVIEW

This manual describes how to handle the QD72P3C3 type positioning module with built-in counter function (hereinafter abbreviated as QD72P3C3).

After unpacking the QD72P3C3, verify that the following product is included.

Model	Product name	Quantity
QD72P3C3	QD72P3C3 type positioning module with built-in counter function	1

A Connector for external wiring is not included, purchase it if required.

- \* Connector model name
  - A6CON1 (soldering type, straight out)
  - A6CON2 (crimp type, straight out)
  - A6CON4 (soldering type, usable for both straight out and diagonal out)

\* A6CON2 crimp tool

- Model: FCN-363T-T005/H
- Contact: FUJITSU COMPONENT LIMITED

# 2. SPECIFICATIONS

### 2.1 Performance Specifications

	Item	Specification							
	Number of axes	3 axes							
	Interpolation function	None (Artificial lin available.)	ear interpolation by	concurrent start is					
	Control method	PTP (Point To Point) control, speed control							
	Control unit	Pulse							
	Positioning data	1 data/axis (Set it with GX Co	onfigurator-PT or sec	uence program.)					
	Position control method	Incremental syste	m, absolute system						
Position	Position control range	[Incremental fashion] - 1073741824 to 1073741823 p [Absolute fashion] (when using linear counter) - 1073741824 to 107374 pulse							
control	Speed command	1 to 100000 pulse	es/s						
	Acceleration/ deceleration processing	Trapezoidal accel							
	Acceleration/ deceleration time	1 to 5000 ms	1 to 5000 ms						
		Position control	1-axis start	1 ms					
	Start time	speed control	3-axes concurrent start	1 ms					
	Pulse output method	Open collector output							
	Maximum output pulse	100 kpps							
	Maximum connection distance between drive units	2 m							
	Counting speed (max.)	100 kpps							
	Number of channels	3 channels							
Counter function*	Counting range	31-bit signed binary [Linear counter] - 1073741824 to 1073741823 [Ring counter] 0 to 1073741823							
	External connection system	40-pin connector							
	Applicable wire size	0.3 mm <sup>2</sup> (for the A6CON 1 and A6CON4), AWG#24 (for the A6CON2)							
Peripheral/ package	compatible utility	GX Configurator-PT (sold separately)							
Data backı	qu	None							
External de	evice connector	A6CON1, A6CON2, A6CON4 (sold separately)							

Item	Specification				
Internal current consumption (5VDC)	0.57 A				
Number of occupied I/O points	32 points (I/O assignment: Intelligent 32 points)				
Weight	0.16 kg				
Ear electrical specifications of count input signals, refer to Section 2.2					

For electrical specifications of count input signals, refer to Section 2.2 Electrical Specifications of I/O Signals.

### 2.2 Electrical Specifications of I/O Signals

- (1) Input specifications
  - (a) Input specifications of external input device for positioning



(b)	Input specifications	for the	counter	function
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Signal name		Rated input voltage current	Operatir voltage range	ng e	ON voltage/ current	vol cu	)FF tage/ rrent	Input resist- ance	Response time
5 VDC		5 VDC/1 mA	<sup>3</sup> 4.5 to 5.5	δV	2.7 VDC or more/5. 5 mA or more	1.0 VDC or less/0.5 mA or less		Approx. 390Ω	1 <sup>µ</sup> s or less
	24 VDC	24 VDC/2 to 6 mA	2 21.6 to 26.4 V		21.6 VDC or more/2 mA or more	5 VI less mA	DC or /0.1 or less	Approx. 3900 + 390Ω	1 <sup>µ</sup> s or less
		<ul> <li>Input p</li> <li>2 phas</li> <li>Set it i</li> <li>(refer the set of the s</li></ul>	ulse can be es, 4 multip n pulse inpu o Chapter 6	e se iles it m i).	elected from 1 m of 2 phases, an ode of "Intellige	ultiple Id CV nt fun	e of 2 p //CCW. iction m	hases, 2 iodule sw	multiples of itch setting"
		Pulse	nput mode		Addition coun	t	Su	otraction	count
			CW				đ	Δ	
			CCW		ФВ		¢	°⊒	
		1 m.	Itiple of 2 nases		ФА_ <u>Г</u> _Г ФВГ_Г_Г		¢	а_Г-Г-	<u> </u>
Phase A pulse input (CH A_5V/ CH A_24V) Phase B pulse input (CH B_5V/ CH B_24V)		2 mu p	tiples of 2 nases		ФА ФВ <b>Г</b>	ФА ФВſL_ſL		⋪₳_ᠮᡫᠮᡫ ⋪₿ĴĹĨĨĹ	
		4 mu p	4 multiples of 2 phases		ΦΑ_ᠮᡶᠮᡫ ΦΒ_ſᡶᡗᡶ		⋪₳ <u></u> ₽₽₽₽ ⋪₿₽₽₽₽₽		
		The minimum count pulse width is as follows.							
		(Duty ratio 50%) (Minimum phase difference for 2-phase input: 2.5 <sup>µ</sup> s) • The rise/fall time is as follows.							
					Rise/fall time			100 k	
				Rise/idii tillie		·	Both 1 and 2-phase input		
		1	$\Lambda$ /		$t = 1.25 \mu \text{s or le}$	ess		100 kPPS	5 D
					$t = 2.5 \mu s$ or less t = 25 $\mu s$ or less	ss		100 KPP3	5
		-+,+	-++ <sub>t</sub> +-		t = 500 µs			-	
		Input p     2 phas     Set the     setting	ulse can be es, 4 multip pulse in pu "(refer to Cl	e se les ilse nap	ected from 1 m of 2 phases, an input mode of " ter 6).	ultiple d CV Intelli	e of 2 p //CCW. igent fu	hases, 2 nction mo	multiples of odule switch

### (2) Output specifications

(	'a'	Output	specifications	of	external	output	device	for	positionina
1	u,	Jouipui	specifications		CALCITICI	output	acvice	101	positioning

Signal name	Rated load voltage	Operating load voltage range	Max. load current/inrush current	Max. voltage drop at ON	Leak- age current at OFF	Response time	
	5 to 24 VDC	4.75 to 30 VDC	50 mA/point 200 mA 10 ms or less/ point	5 VDC (typ.)	0.1 mA or less	-	
	<ul> <li>Set puls functior</li> <li>The foll "pulse of</li> </ul>	Set pulse output mode and pulse output logic selection with "In unction module switch setting" (refer to Chapter 6). Fhe following table shows the relationship of "pulse output mod pulse output logic selection" with pulse output.					
Pulse output F	Puls	e	Pulse ou	tput logic s	election		
(PULSE F)(CW/ PULSE)	outpu	ut I	Positive logic		Negative logic		
	mod	e Forwar	d run Reverse	run Forw	ard run	Reverse run	
Pulse output R (PULSE R)(CCW/	CW CCV				บบ		
SIGN)	PULS				High		
	The rise/f	all time and	duty ratio are as	the table of	n the nex	t page.*	
Deviation counter clear (CLEAR)	5 to 24 VDC	4.75 to 30 VDC	0.1A/point 0.4 A, 10 ms or less/point	1 VDC (typ.) 2.5 VDC (max.)	0.1 mA or less	2 ms or less (resistance load) Pulse width is from 1 to 20 ms.	

\*: Pulse rise/fall time (unit tr,tf: µs Duty: %)...Ambient air temperature is assumed to be ordinary temperature.

Load voltage (V)		26.4						
Cable length (m)		1			2			
Load current (mA)	Pulse speed (kpps)	tr (Rise)	tf (Fall)	Duty	tr (Rise)	tf (Fall)	Duty	
2	100	2.341	0.156	44.76	2.824	0.162	42.45	
2	10	2.849	0.169	49.1	3.727	0.182	49.08	
F	100	1.101	0.176	49.7	1.487	0.188	48.37	
5	10	1.114	0.174	49.6	1.516	0.190	49.83	
10	100	0.511	0.188	51.4	0.753	0.203	50.89	
10	10	0.522	0.187	50.15	0.745	0.204	50.09	
20	100	0.268	0.218	52.37	0.379	0.233	52.18	
	10	0.262	0.218	50.24	0.376	0.234	50.22	
50	100	0.098	0.344	53.34	0.140	0.359	53.33	
	10	0.097	0.347	50.34	0.135	0.361	50.34	

Load voltage (V)		4.75						
Cable length			1		2			
(n	n)		I		2			
Load current (mA)	Pulse speed (kpps)	tr (Rise)	tf (Fall)	Duty	tr (Rise)	tf (Fall)	Duty	
2	100	0.510	0.107	50.87	0.712	0.113	50.38	
	10	0.492	0.107	50.08	0.680	0.112	50.04	
E	100	0.207	0.117	51.8	0.289	0.120	51.74	
J	10	0.201	0.113	50.19	0.288	0.119	50.18	
10	100	0.097	0.129	52.29	0.138	0.131	52.28	
10	10	0.098	0.128	50.23	0.131	0.130	50.23	
20	100	0.039	0.160	52.75	0.055	0.159	52.80	
	10	0.038	0.159	50.28	0.054	0.158	50.28	
50	100	0.015	0.255	53.41	0.016	0.258	53.47	
	10	0.014	0.254	50.34	0.016	0.259	50.36	

### 3. HANDLING

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- Create a safety circuit outside the programmable controller so that the entire system will function safely even when an external power supply error or programmable controller fault occurs. Failure to do so may cause an accident due to an incorrect output or malfunction.
  - Outside the programmable controller, create an emergency stop circuit or interlock circuit to prevent mechanical damage due to excess of position control upper limit/lower limit.
  - (2) The OPR control is controlled by the OPR direction and OPR speed data and deceleration starts when the near-point dog turns ON. Thus, if the OPR direction is incorrectly set, deceleration may not start and the motor continues rotating. Create an interlock circuit outside the programmable controller to prevent mechanical damage.
  - (3) If the positioning module detects an error, it directs the motor to decelerate and stop. Set the OPR data and positioning data within the parameter setting values.

### **ACAUTION** • Use the programmable controller in the environment conditions given in the general specifications in the User's Manual for the CPU module. Failure to do so may cause an electric shock, fire, malfunction, or damage to or deterioration of the product. While pressing the installation lever located at the bottom of the module, fully insert the module fixing projection into the fixing hole in the base unit to mount the module. Incorrect module mounting may cause a malfunction, failure, or drop of the module. In an environment of frequent vibrations or impacts, secure the module with screws. The screws must be tightened within the specified torque range. If the screw is too loose, it may cause a drop or malfunction. Excessive tightening may damage the screw and/or the module, resulting in a drop or malfunction. • Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module. Failure to do so may cause damage to the product. • Do not directly touch any conductive part or electronic part of the module.

Doing so may cause a malfunction or failure of the module.

### **3.1 Handling Precautions**

- (1) Since the module case is made from resin, do not drop the module or apply a strong impact to it.
- (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 placed in an environment of frequent vibrations or impacts, securing the module with module fixing screws is recommended. In this case, tighten the module fixing screws within the following torque range. Module fixing screw (M3): Tightening torque range is from 0.36 to 0.48 N•m.

# 4. PART NAMES

(1) Part names



No.	Name	Name Description		
1)	RUN LED			
2)	ERR. LED			
3)	AX LED	Refer to the next page.		
4)	$\phi$ A LED			
5)	φBLED			
6)	External device connector	Connector for connecting a drive unit and an encorder mechanical input		

#### (2) LED display contents

QD72P3C3 CH3 CH2 CH1 RUN \_\_\_\_\_ AX

ERR.

1	Display contents	Operation status	Description
	CH3 CH2 CH1 RUN □ □ □ AX □ □ φA ERR. □ □ φB	RUN LED is OFF. (The status of ERR. and AX1 to AX3 are indefinite.)	Hardware fault or module error
	CH3 CH2 CH1 RUN ■ □ □ AX □ □ φA ERR. □ □ □ φB	<ul> <li>RUN LED is ON.</li> <li>ERR. LED is OFF.</li> </ul>	The module is normal.
	CH3 CH2 CH1 RUN ■ □ □ AX □ □ φA ERR. ■ □ □ φB	• ERR. LED is ON.	System error
	CH3 CH2 CH1 RUN ■ □ □ AX □ □ φA ERR. □ □ φB	• AX_CH 1to AX_CH 3 are OFF.	The axis is in stop or standby status.
	CH3 CH2 CH1 RUN ■ □ □ ■ AX □ □ φA ERR. □ □ □ φB	AX_CH1 is ON.(LED corresponding to the CH turns ON.)	The axis is in operation.
	CH3 CH2 CH1 RUN ■	<ul> <li>AX_CH1 is flashing.(LED corresponding to the CH flashes.)</li> <li>LED ERR. is flashing.</li> </ul>	Axis/CH error
	CH3 CH2 CH1 RUN ■ □ □ AX □ □ ■ φA ERR. □ □ □ φB	<ul> <li>φ A_CH1 is ON.(LED corresponding to the CH turns ON.)</li> </ul>	Voltage is being applied to phase A.
	CH3 CH2 CH1 RUN ■ □ □ AX □ □ φA ERR. □ □ ■ φB	• $\phi$ B_CH1is ON.(LED corresponding to the CH turns ON.)	Voltage is being applied to phase B.

Symbols in the Display contents columns indicate the following status:

□: OFF, ■: ON, ♦: Flashing

	CON2 (for axis 3)					CON1 (for axes 1 and 2)			
Pin layout	Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name	
	B20	NC	A20	CH3A_24V	B20	CH2A_24V	A20	CH1A_24V	
	B19	NC	A19	CH3A_5V	B19	CH2A_5V	A19	CH1A_5V	
	B18	NC	A18	CH3A COM <sup>*1</sup>	B18	CH2A COM <sup>*1</sup>	A18	CH1A COM <sup>*1</sup>	
	B17	NC	A17	CH3B_24V	B17	CH2B_24V	A17	CH1B_24V	
	B16	NC	A16	CH3B_5V	B16	CH2B_5V	A16	CH1B_5V	
	B15	NC	A15	CH3B COM <sup>*2</sup>	B15	CH2B COM <sup>*2</sup>	A15	CH1B COM <sup>*2</sup>	
B20 0 0 A20 B19 0 0 A19	B14	NC	A14	PG03	B14	PG02	A14	PG01	
B18 0 0 A18 B17 0 0 A17 B16 0 0 A16 B15 0 0 A15	B13	NC	A13	PG03 COM <sup>*3</sup>	B13	PG02 COM <sup>*3</sup>	A13	PG01 COM <sup>*3</sup>	
B14 0 0 A14 B13 0 0 A13	A14 A13 A12 A11 A10 A9 B11	NC	A12	CLEAR3	B12	CLEAR2	A12	CLEAR1	
B12 0 0 A12 B11 0 0 A11 B10 0 0 A10 R9 0 0 A9		NC	A11	CLEAR3 COM <sup>*4</sup>	B11	CLEAR2 COM <sup>*4</sup>	A11	CLEAR1 COM <sup>*4</sup>	
B8 0 0 A8 B7 0 0 A7	B10	NC	A10	DOG3	B10	DOG2	A10	DOG1	
B6 0 0 A6	B9	NC	A9	COM1-3 <sup>*5</sup>	B9	COM1-3 <sup>*5</sup>	A9	COM1-3 <sup>*5</sup>	
B4 0 0 A4 B3 0 0 A3	B8	NC	A8	FLS3	B8	FLS2	A8	FLS1	
B2 0 0 A2 B1 0 0 A1	B7	NC	A7	COM1-3 <sup>*5</sup>	B7	COM1-3 <sup>*5</sup>	A7	COM1-3 <sup>*5</sup>	
	B6	NC	A6	RLS3	B6	RLS2	A6	RLS1	
	B5	NC	A5	COM1-3 <sup>*5</sup>	B5	COM1-3 <sup>*5</sup>	A5	COM1-3 <sup>*5</sup>	
	B4	NC	A4	PULSE F3	B4	PULSE F2	A4	PULSE F1	
	В3	NC	A3	PULSE COM1-3 <sup>*6</sup>	В3	PULSE COM1-3 <sup>*6</sup>	A3	PULSE COM1-3 <sup>*6</sup>	
	B2	NC	A2	PULSE R3	B2	PULSE R2	A2	PULSE R1	
	B1	NC	A1	PULSE COM1-3 <sup>*6</sup>	B1	PULSE COM1-3 <sup>*6</sup>	A1	PULSE COM1-3 <sup>*6</sup>	

#### (3) Signal assignment of external device connector (axis 1)

\*1: Common for CH A-5V and CH A-24V ( corresponds to any of channels No.1 to 3.)

\*2: Common for CH B-5V and CH B-24V (C corresponds to any of channels No.1 to 3.)

\*3: Common for PG0 ( Corresponds to any of axes No.1 to 3.)

\*4: Common for CLEAR ( ( corresponds to any of axes No.1 to 3.)

\*5: Common for DOG, FLS, and RLS ( corresponds to any of axes No.1 to 3.)

\*6: Common for PULSE F and PULSE R (C corresponds to any of axes No.1 to 3.)

### 5. WIRING

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 Be sure to shut off all phases of the external power supply used by the system before installation or wiring.

Failure to do so may cause an electric shock or damage to the product.

### 5.1 Wiring Precautions

the shortest possible.

(1) If bringing cables to be connected to the QD72P3C3 and power cables are close to each other (less than 100 mm (3.94 inch)), use shielded cables. The shield has to be grounded on the QD72P3C3 side to the control panel.



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#### [Processing example of shielded cables]



- (2) Clamp the shielded cable to be connected to the QD72P3C3. If not, the dangling cables may swing or inadvertently be pulled, resulting in malfunctions due to damage of the QD72P3C3, drive unit and/or shielded cable, or poor connection of the shielded cables.
- (3) To conform the cables to the EMC and Low Voltage Directives, ground them to a control panel with the AD75CK cable clamp (manufactured by Mitsubishi Electric Corporation).



Maximum four shielded cables whose external dimension is around 7 mm (0.28 inch) can be grounded with the AD75CK.

(For details, refer to the AD75CK-type Cable Clamping Instruction Manual <IB-68682>.)

### 5.2 External Interface

The following shows the schematic diagram of the internal circuit of the interface for external device connection of the QD72P3C3.

I/O category	External wiring	Pin No.	Internal circuit	Signal r	ame								
		A14	39 <u>0 9: 1/3</u> W	Zero signal	PG0 1								
										A13	2.2kQ 1/10₩	Zero signal common	PG0 COM 1
(for		A10	6.8kΩ 1/3W 680kQ <b>1</b>	Near-point dog signal	DOG 1								
ing)	<b>⊢</b> ≗	A8		Upper limit signal	FLS 1								
		A6		Lower limit signal	RLS 1								
		A9		Common	COM 1-3								
		A12	,  [₩]≠¥]	Deviation counter clear	CLEAR 1								
Output (for		A11		Deviation counter clear common	CLEAR COM 1								
position-		A4		Pulse output F	PULSE F 1								
ing)			A2		Pulse output R	PULSE R 1							
		A3	^	Pulse output common	PULSE COM 1- 3								
		A20	3.9kΩ 390Ω 1/3W 1/3W	Phase A pulse input 24 V	CH1A_24V								
		A19	2.2kΩ 1/10W <b>Δ ▼≠ ▷</b>	Phase A pulse input 5 V	CH1A_5V								
Input (for		A18		Phase A common	CH1A COM								
counter function)		A17		Phase B pulse input 24V	CH1B_24V								
		A16		Phase B pulse input 5V	CH1B_5V								
		A15	• • • · · ·	Phase B common	CH1B COM								

\*: Common terminal is available to both positive common and negative common (COM).

### 6. SETTING FROM GX Developer

Pulse I/O mode, the logic of external I/O signal, and counter format can be set to the QD72P3C3 with intelligent function module switch setting of GX Developer.

Make the switch setting on the "I/O assignment" tab in QCPU's PLC parameter of GX Developer.

The switch has five switches and is set at 16-bit data.

The settings with the switches are enabled after power-ON or resetting the programmable controller CPU. The settings cannot be changed during operation.

Switch No.	Setting item	Setting contents/bit assignment	Factory default value
Switch 1	Pulse output mode (For details, refer to Section 2.2(2)-(a). Pulse output logic selection Deviation counter clear output logic selection Zero signal input logic	b15       b14       b10       b10       b6       b7       b6       b0       b3       b2       b0         i	0000H

Switch No.	Setting item	Setting contents/bit assignment	Factory default value		
	Near- point dog signal input logic selection	b15 to b11         b10 to b8         b7         b6 to b4         b3         b2 to b0           -         7)         6)         -         5)           S0         Near-point dog signal input logic selection (b2: Axis No.3, b1: Axis No.2, b0: Axis No.1)         0: Negative logic			
Switch 2	Lower limit signal input logic selection	1: Positive logic     Lower limit signal input logic selection (b6: Axis No.3, b5: Axis No.2, b4: Axis No.1)     0: Negative logic     1: Positive logic	0000 <sub>H</sub>		
	Upper limit signal input logic selection	<ol> <li>Upper limit signal input logic selection (b10: Axis No.3, b9: Axis No.2, b8: Axis No.1)</li> <li>0: Negative logic</li> <li>1: Positive logic</li> </ol>			
Switch 3	Pulse input mode (For details, refer to Section 2.2 (1)- (b).	b15 to b11         b10 to b8         b7 b6         b5 to b0           -         9)         -         8)           Pulse input mode (b5 to 4: CH3, b3 to 2: CH2, b1 to 0: CH1)         00: CW/CCW           01: 1 multiple of 2 phases         10: 2 multiples of 2 phases           11: 4 multiples of 2 phases         11: 4 multiples of 2 phases	0000н		
	Counter format	<ol> <li>Counter format (b10: CH3, b9: CH2, b8: CH1)</li> <li>Linear counter</li> <li>Ring counter</li> </ol>			
Switch 4	Empty				
Switch 5	Empty				

## 7. EXTERNAL DIMENSIONS



Unit: mm (inch)

#### 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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