# MITSUBISH 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.


| MODEL | QD72P3C3-U-HW |
| :---: | :---: |
| MODEL <br> CODE | $13 J Y 35$ |
| IB(NA)--0800388-A(0704)MEE |  |

## - 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 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]

## $\triangle$ CAUTION

- 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.


## DANGER

- 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.


## . CAUTION

- 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

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

| Print date | ${ }^{*}$ Manual number | Revision |
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Manual
The following manual is also related to this product.

Order it if necessary.
Related manual

| Manual name | Manual No. <br> (Model code) |
| :--- | :---: |
| QD72P3C3 Type Positioning Module with Built-in Counter Function <br> User's Manual | SH-080683ENG <br> (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 <br> 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 |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Position control | Number of axes | 3 axes |  |  |
|  | Interpolation function | None (Artificial linear interpolation by concurrent start is available.) |  |  |
|  | Control method | PTP (Point To Point) control, speed control |  |  |
|  | Control unit | Pulse |  |  |
|  | Positioning data | 1 data/axis (Set it with GX Configurator-PT or sequence program.) |  |  |
|  | Position control method | Incremental system, absolute system |  |  |
|  | Position control range | [Incremental fashion] - 1073741824 to 1073741823 pulse [Absolute fashion] <br> (when using linear counter) - 1073741824 to 1073741823 pulse <br> (when using ring counter) 0 to 1073741823 pulse |  |  |
|  | Speed command | 1 to 100000 pulses/s |  |  |
|  | Acceleration/ deceleration processing | Trapezoidal acceleration/deceleration |  |  |
|  | Acceleration/ deceleration time | 1 to 5000 ms |  |  |
|  | Start time | Position control, speed control | 1-axis start | 1 ms |
|  |  |  | 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 |  |  |
| Counter function | Counting speed (max.) | 100 kpps |  |  |
|  | Number of channels | 3 channels |  |  |
|  | 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 | $0.3 \mathrm{~mm}^{2}$ (for the A6CON 1 and A6CON4), AWG\#24 (for the A6CON2) |  |  |
| Peripheral/compatible utility package |  | GX Configurator-PT (sold separately) |  |  |
| Data backup |  | None |  |  |
| External device connector |  | A6CON1, A6CON2, A6CON4 (sold separately) |  |  |


| Item | Specification |
| :--- | :--- |
| Internal current consumption <br> (5VDC) | 0.57 A |
| Number of occupied I/O points | 32 points (I/O assignment: Intelligent 32 points) |
| Weight | 0.16 kg |

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

| Signal name | Rated input voltage/ current | Operating voltage range | ON voltage/ current | OFF voltage/ current | Input resistance | Response time |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & 5 \mathrm{VDC} / 18 \\ & \mathrm{~mA} \end{aligned}$ | $\begin{aligned} & 4.5 \text { to } 5.5 \\ & \text { VDC } \end{aligned}$ | 2.7 VDC or more/ 5.5 mA or more | 1.0 VDC or less/ 0.5 mA or less | Approx. $390 \Omega$ | $\begin{array}{\|l} 0.1 \mathrm{~ms} \text { or } \\ \text { less } \end{array}$ |
| Zero signal (PG0) |  |  |  |  |  |  |
| Near-point dog signal (DOG) Upper limit signal (FLS) Lower limit signal (RLS) | $\begin{aligned} & 24 \mathrm{VDC} / 5 \\ & \mathrm{~mA} \end{aligned}$ | $\begin{aligned} & 19.2 \text { to } \\ & \text { 26.4 VDC } \end{aligned}$ | 17.5 VDC or more/3.0 mA or more | 7.0 VDC or less/0.9 mA or less | Approx. $6.8 \mathrm{k} \Omega$ | $\begin{aligned} & 1 \mathrm{~ms} \text { or } \\ & \text { less } \end{aligned}$ |

（b）Input specifications for the counter function

| Signal name | Rated input voltage／ current | Operating voltage range | ON voltage／ current | OFF <br> voltage／ current | Input resist－ ance | Response time |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 5 VDC | $\begin{aligned} & 5 \mathrm{VDC} / 18 \\ & \mathrm{~mA} \end{aligned}$ | 4.5 to 5.5 V | 2．7 VDC or more／5． 5 mA or more | 1.0 VDC or less／0．5 mA or less | Approx． 390』 | $1 \mu \mathrm{~s}$ or less |
| 24 VDC | $\begin{aligned} & 24 \mathrm{VDC} / 2 \\ & \text { to } 6 \mathrm{~mA} \end{aligned}$ | $\begin{aligned} & 21.6 \text { to } \\ & 26.4 \mathrm{~V} \end{aligned}$ | 21．6 VDC or more／2 mA or more | 5 VDC or less／0．1 mA or less | Approx． $3900+$ 390』 | $1 \mu$ s or less |

－Input pulse can be selected from 1 multiple of 2 phases， 2 multiples of 2 phases， 4 multiples of 2 phases，and CW／CCW．
Set it in pulse input mode of＂Intelligent function module switch setting＂ （refer to Chapter 6）．

Phase A pulse input（CH A＿5V／ CH A＿24V）

Phase B pulse input（CH B＿5V／ CH B＿24V）

| Pulse input mode | Addition count | Subtraction count |
| :---: | :---: | :---: |
| $\begin{gathered} \text { CW } \\ \text { CCW } \end{gathered}$ | ФA $\square$ ФВ $\qquad$ | ФА $\qquad$ ФВ f t |
| 1 multiple of 2 phases |  | ФА $\downarrow \downarrow$ Фв 」ூ |
| 2 multiples of 2 phases |  | ФА＿？ <br> Фв」に |
| 4 multiples of 2 phases | $\begin{aligned} & \text { ФА } \uparrow \uparrow \downarrow \\ & \text { ФВ } \downarrow \uparrow \downarrow \end{aligned}$ | ФA＿ทน $\Phi \mathrm{B}$ 凡 $\downarrow$ |

－The minimum count pulse width is as follows．

（Duty ratio 50\％）
（Minimum phase difference for 2－phase input： $2.5 \mu \mathrm{~s}$ ）
－The rise／fall time is as follows．


| Rise／fall time | 100 k |
| :--- | :---: |
|  | Both 1 and 2－phase input |
| $t=1.25 \mu_{\text {s }}$ or less | 100 kPPS |
| $t=2.5 \mu_{\text {s }}$ or less | 100 kPPS |
| $t=25 \mu_{\text {s }}$ or less | 10 kPPS |
| $t=500 \mu_{\mathrm{S}}$ | - |

－Input pulse can be selected from 1 multiple of 2 phases， 2 multiples of 2 phases， 4 multiples of 2 phases，and CW／CCW．
Set the pulse in pulse input mode of＂Intelligent function module switch setting＂（refer to Chapter 6）．
（2）Output specifications
（a）Output specifications of external output device for positioning

| Signal name | Rated <br> load <br> voltage | Operating <br> load <br> voltage <br> range | Max．load <br> current／inrush <br> current | Max． <br> voltage <br> drop at <br> ON | Leak－ <br> age <br> current <br> at OFF | Response <br> time |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 5 to 24 <br> VDC | 4.75 to 30 <br> VDC | $50 \mathrm{~mA} /$ point <br> 200 mA 10 <br> ms or less／ <br> point | 5 VDC <br> （typ．） | 0.1 mA <br> or less | - |
|  | － |  |  |  |  |  |

－Set pulse output mode and pulse output logic selection with＂Intelligent function module switch setting＂（refer to Chapter 6）．
－The following table shows the relationship of＂pulse output mode＂and ＂pulse output logic selection＂with pulse output．

| Pulse output F （PULSE F）（CW／ PULSE） | Pulse output mode | Pulse output logic selection |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Positive logic |  | Negative logic |  |
|  |  | Forward run | Reverse run | Forward run | Reverse run |
| Pulse output R （PULSE R）（CCW／ SIGN） | $\begin{gathered} \text { CW } \\ \text { CCW } \end{gathered}$ | ■にし |  | レー凸ŋ |  |
|  | PULSE SIGN | $\underset{\text { High }}{\square \square \square}$ |  |  |  |

The rise／fall time and duty ratio are as the table on the next page．＊


|  |  |  |  |  | 2 ms or less <br> （resistance |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Deviation counter <br> clear（CLEAR） | 5 to 24 <br> VDC | 4.75 to 30 <br> VDC | $0.1 \mathrm{~A} /$ point <br> $0.4 \mathrm{~A}, 10 \mathrm{~ms}$ <br> or less／point | 1 VDC <br> （typ．） 2.5 <br> VDC <br> （max．） | 0.1 mA <br> or less | Pulse width is <br> from 1 to 20 <br> ms． |

*: Pulse rise/fall time (unit tr,tf: $\mu \mathrm{s}$ Duty: \%)...Ambient air temperature is assumed to be ordinary temperature.

| Load vo | age (V) | 26.4 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Cable length (m) |  | 1 |  |  | 2 |  |  |
| Load current (mA) | Pulse speed (kpps) | $\begin{gathered} \mathrm{tr} \\ \text { (Rise) } \end{gathered}$ | $\begin{gathered} \mathrm{tf} \\ \text { (Fall) } \end{gathered}$ | Duty | $\begin{gathered} \mathrm{tr} \\ \text { (Rise) } \end{gathered}$ | $\begin{gathered} \mathrm{tf} \\ \text { (Fall) } \end{gathered}$ | Duty |
| 2 | 100 | 2.341 | 0.156 | 44.76 | 2.824 | 0.162 | 42.45 |
|  | 10 | 2.849 | 0.169 | 49.1 | 3.727 | 0.182 | 49.08 |
| 5 | 100 | 1.101 | 0.176 | 49.7 | 1.487 | 0.188 | 48.37 |
|  | 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 | 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) Cable length (m) |  | 4.75 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 |  |  | 2 |  |  |
| Load current (mA) | Pulse speed (kpps) | $\begin{gathered} \mathrm{tr} \\ \text { (Rise) } \end{gathered}$ | $\begin{gathered} \text { tf } \\ \text { (Fall) } \end{gathered}$ | Duty | $\begin{gathered} \mathrm{tr} \\ \text { (Rise) } \end{gathered}$ | $\begin{gathered} \mathrm{tf} \\ \text { (Fall) } \end{gathered}$ | 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 |
| 5 | 100 | 0.207 | 0.117 | 51.8 | 0.289 | 0.120 | 51.74 |
|  | 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 | 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

## DANGER

- 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.
(1) 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.


## $\triangle$ CAUTION

- 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 $0.48 \mathrm{~N} \cdot \mathrm{~m}$.

## 4. PART NAMES

## (1) Part names



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

(2) LED display contents

|  | Display contents | Operation status | Description |
| :---: | :---: | :---: | :---: |
| $\quad \square \mathrm{AX}$ |  | - RUN LED is OFF. (The status of ERR. and AX1 to AX3 are indefinite.) | Hardware fault or module error |
|  | $\mathrm{CH}_{3} \mathrm{CH} 2 \mathrm{CH} 1$ <br> RUN <br> $\square$ <br> $\square \square \square A X$ AX $\phi A$ ERR. $\square \square \square \square \phi \mathrm{B}$ | - RUN LED is ON. <br> - ERR. LED is OFF. | The module is normal. |
|  |  | - ERR. LED is ON. | System error |
|  |  | $\begin{aligned} & \text { - AX_CH 1to } \\ & \text { AX_CH } 3 \text { are } \\ & \text { OFF. } \end{aligned}$ | The axis is in stop or standby status. |
|  | CH3 CH 2 CH 1 <br> RUN <br> $\square$ <br> $\square \square A^{\square}$ <br> ERR. $\square \square \square \square \phi \mathrm{B}$ | - AX CH1 is ON.(LED corresponding to the CH turns ON .) | The axis is in operation. |
|  |  | - AX _CH1 is flashing.(LED corresponding to the CH flashes.) <br> - LED ERR. is flashing. | Axis/CH error |
|  | CH3 $\mathrm{CH}_{2} \mathrm{CH} 1$ <br> RUN <br> $\square \square \square A X$ ERR. $\square \square \square \square \phi B$ | - $\phi \mathrm{A} \_\mathrm{CH} 1$ is ON.(LED corresponding to the CH turns ON .) | Voltage is being applied to phase A. |
|  |  | - $\phi$ 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, $\square$ : ON,
Flashing
(3) Signal assignment of external device connector (axis 1)

| Pin layout | CON2 (for axis 3) |  |  |  | CON1 (for axes 1 and 2) |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Pin <br> No. | Signal name | $\begin{aligned} & \hline \text { Pin } \\ & \text { No. } \end{aligned}$ | Signal name | $\begin{aligned} & \text { Pin } \\ & \text { No. } \end{aligned}$ | Signal name | $\begin{aligned} & \text { Pin } \\ & \text { No. } \end{aligned}$ | 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 | $\begin{aligned} & \text { CH3A } \\ & \text { COM }^{\star 1} \end{aligned}$ | B18 | $\begin{aligned} & \text { CH2A } \\ & \mathrm{COM}^{* 1} \end{aligned}$ | A18 | $\begin{aligned} & \text { CH1A } \\ & \text { COM }^{\star 1} \end{aligned}$ |
|  | 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 | $\begin{aligned} & \mathrm{CH} 3 \mathrm{~B} \\ & \mathrm{COM}^{* 2} \end{aligned}$ | B15 | $\begin{aligned} & \mathrm{CH} 2 \mathrm{~B} \\ & \mathrm{COM}^{*} \end{aligned}$ | A15 | $\begin{aligned} & \text { CH1B } \\ & \text { COM }^{*} \end{aligned}$ |
|  | B14 | NC | A14 | PG03 | B14 | PG02 | A14 | PG01 |
|  | B13 | NC | A13 | $\begin{aligned} & \text { PG03 } \\ & \text { COM }^{*} \end{aligned}$ | B13 | $\begin{aligned} & \text { PG02 } \\ & \text { COM }^{* 3} \end{aligned}$ | A13 | $\begin{aligned} & \text { PG01 } \\ & \text { COM }^{* 3} \end{aligned}$ |
|  | B12 | NC | A12 | CLEAR3 | B12 | CLEAR2 | A12 | CLEAR1 |
|  | B11 | NC | A11 | $\begin{aligned} & \text { CLEAR33 } \\ & \text { COM }^{* 4} \end{aligned}$ | B11 | $\begin{aligned} & \text { CLEAR2 } \\ & \text { COM }^{* 4} \end{aligned}$ | A11 | $\begin{aligned} & \hline \text { CLEAR1 } \\ & \text { COM }^{* 4} \end{aligned}$ |
|  | B10 | NC | A10 | DOG3 | B10 | DOG2 | A10 | DOG1 |
|  | B9 | NC | A9 | COM1-3* ${ }^{*}$ | B9 | COM1-3*5 | A9 | COM1-3*5 |
|  | B8 | NC | A8 | FLS3 | B8 | FLS2 | A8 | FLS1 |
|  | B7 | NC | A7 | COM1-3* | B7 | COM1-3* ${ }^{\text {² }}$ | A7 | COM1-3* ${ }^{\text {¢ }}$ |
|  | B6 | NC | A6 | RLS3 | B6 | RLS2 | A6 | RLS1 |
|  | B5 | NC | A5 | COM1-3* | B5 | COM1-3* ${ }^{\text {² }}$ | A5 | COM1-3* ${ }^{\text {² }}$ |
|  | B4 | NC | A4 | PULSE F3 | B4 | PULSE F2 | A4 | PULSE F1 |
|  | B3 | NC | A3 | $\begin{aligned} & \hline \text { PULSE } \\ & \text { COM1-36 } \end{aligned}$ | B3 | $\begin{aligned} & \text { PULSE } \\ & \text { COM1-3*6 } \end{aligned}$ | A3 | $\begin{aligned} & \text { PULSE } \\ & \text { COM1-3*6 } \end{aligned}$ |
|  | B2 | NC | A2 | PULSE R3 | B2 | PULSE R2 | A2 | PULSE R1 |
|  | B1 | NC | A1 | $\begin{aligned} & \hline \text { PULSE } \\ & \text { COM1-3*6 } \end{aligned}$ | B1 | $\begin{aligned} & \text { PULSE } \\ & \text { COM1-3*6 } \end{aligned}$ | A1 | $\begin{aligned} & \text { PULSE } \\ & \text { COM1-3*6 } \end{aligned}$ |

*1: Common for $\mathrm{CH} \square \mathrm{A}-5 \mathrm{~V}$ and $\mathrm{CH} \square \mathrm{A}-24 \mathrm{~V}$ ( $\square$ corresponds to any of channels No. 1 to 3.)
*2: Common for $\mathrm{CH} \square \mathrm{B}-5 \mathrm{~V}$ and $\mathrm{CH} \square \mathrm{B}-24 \mathrm{~V} \square$ ( $\square$ corresponds to any of channels No. 1 to 3.)
*3: Common for PG0 $\square$ ( $\square$ corresponds to any of axes No. 1 to 3.)
*4: Common for CLEAR $\square$ ( $\square$ corresponds to any of axes No. 1 to 3.)
*5: Common for DOG $\square$, FLS $\square$, and RLS $\square$ ( $\square$ corresponds to any of axes No. 1 to 3.)
*6: Common for PULSE F $\square$ and PULSE R $\square$ ( $\square$ corresponds to any of axes No. 1 to 3.)

## 5. WIRING

## (1)DANGER

- 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

(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.


Take off the insulating tube of each shield and electrically connect the shields of the cables with conductive tapes.
Cover the conductive part with insulating tape.


Cover the cables including the conductive tape with heat-shrinkable tube.

(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.

*: 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). | b15 b14 to b12b11- b10 to b8 b7 b6 to b4 b3 b2 to b0 <br> 1) Pulse output mode (b2: Axis No.3, b1: Axis No.2, b0: Axis No.1) <br> 0 : CW/CCW mode <br> 1: PULSE/SIGN mode <br> 2) Pulse output logic selection (b6: Axis No.3, b5: Axis No.2, b4: Axis No.1) <br> 0 : Negative logic <br> 1: Positive logic | $0000_{H}$ |
|  | Pulse output logic selection |  |  |
|  | Deviation counter clear output logic selection | 3) Deviation counter clear output logic selection (b10: <br> Axis No.3, b9: Axis No.2, b8: Axis No.1) <br> 0 : Negative logic <br> 1: Positive logic <br> 4) Zero signal input logic selection (b14: Axis No.3, b13: <br> Axis No.2, b12: Axis No.1) <br> 0 : Negative logic <br> 1: Positive logic |  |
|  | Zero signal input logic selection |  |  |



## 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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[^0]:    When exported from Japan, this manual does not require application to the Ministry

