*INSTRUCTION MANUAL*

# CC-Link I/O MODULE
**(NPN/PNP discrete input, NPN transistor output, 16 points each, tension clamp terminal)**

MODEL **R7K4GC-DAC32C**

## BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

### ■ PACKAGE INCLUDES:

Discrete I/O module .....(1)

### ■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

### ■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

### ■ CSP+ file

CSP+ file is downloadable at our web site or CC-Link Partner Association's web site (https://www.cc-link.org).

## POINTS OF CAUTION

### ■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside the instrument panel of a metal enclosure.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures* to ensure the CE conformity.
  * For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.

### ■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  24V DC rating: 24V ±10%, ≤ 55 mA

### ■ GENERAL PRECAUTIONS

- Before you remove the unit or mount it, turn off the power supply and I/O signal for safety.
- Before wiring the terminal blocks, turn off the power supply and I/O signal for safety.
- DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

### ■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

### ■ AND ....

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.


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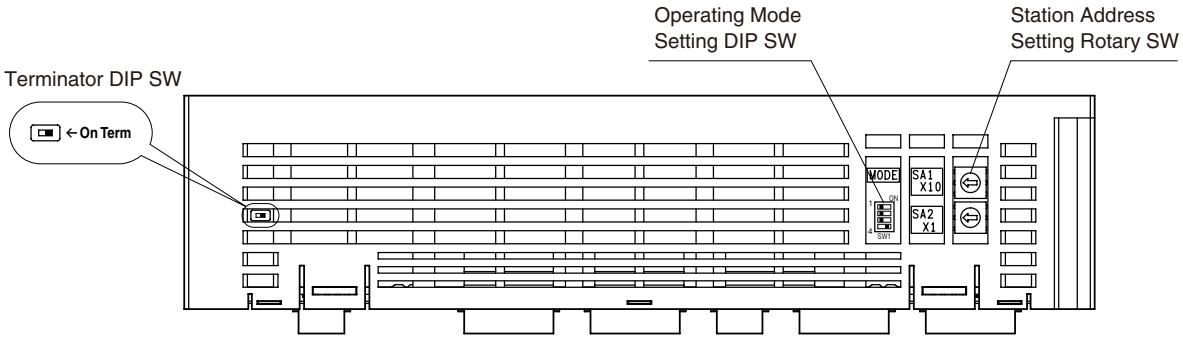
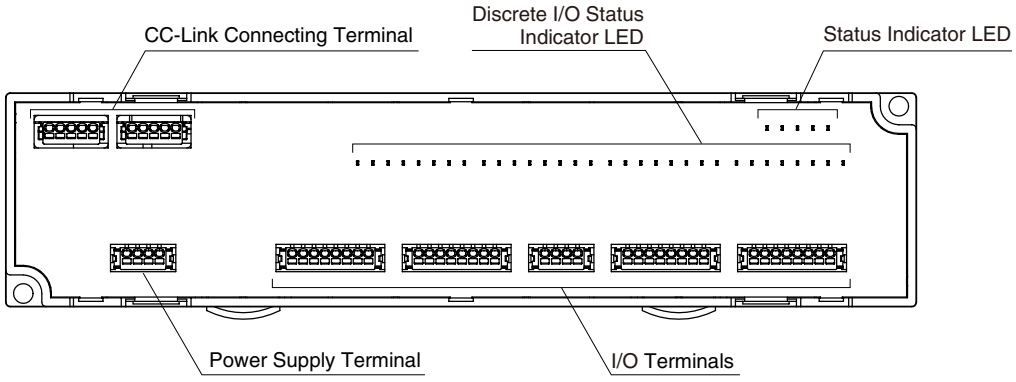
# COMPONENT IDENTIFICATION

■ **TOP VIEW**




■ **FRONT VIEW**




## ■ STATUS INDICATOR LED

| ID | STATUS | COLOR | FUNCTION |
|---|---|---|---|
| PWR | ON | Green | Normal internal power supply |
| | OFF | — | No power supply |
| RUN | ON | Green | Normal communication* |
| | OFF | — | No communication |
| ERR | ON | Green | Communication error |
| | OFF | — | Normal |
| SD | ON | Green | The module is transmitting. |
| | OFF | — | |
| RD | ON | Green | The module is receiving. |
| | OFF | — | |

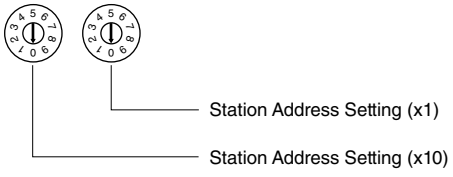
* When the request command from the master device is interrupted, the RUN indicator LED goes out.

## ■ DISCRETE I/O STATUS INDICATOR LED

Green LED shows the I/O status.
ON : LED ON
OFF : LED OFF

## ■ STATION ADDRESS

The left switch determines the tenth place digit, while the right one does the ones place digit of the station address (1 - 64).
(Factory setting: 00)




## ■ OPERATING MODE

(*) Factory setting

**• Baud Rate (SW1-1, 1-2, 1-3)**

Baud Rate is selected with the DIP switch.

| BAUD RATE | SW1-1 | SW1-2 | SW1-3 |
|---|---|---|---|
| 156 kbps (*) | OFF | OFF | OFF |
| 625 kbps | ON | OFF | OFF |
| 2.5 Mbps | OFF | ON | OFF |
| 5 Mbps | ON | ON | OFF |
| 10 Mbps | OFF | OFF | ON |
| Setting error | ON | OFF | ON |
| Setting error | OFF | ON | ON |
| Setting error | ON | ON | ON |

**• OUTPUT AT THE LOSS OF COMMUNICATION (SW1-4)**

| OUTPUT AT THE LOSS OF COMMUNICATION | SW1-4 |
|---|---|
| Output clear (output OFF) | OFF |
| Hold the output (*)<br>(maintains the last data received normally) | ON |

## ■ TERMINATING RESISTOR

To use the terminating resistor, turn the switch ON, and OFF to invalidate. (Factory setting OFF)

## ■ STATUS INDICATOR LED

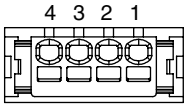
| PWR | RUN | ERR | SD *1 | RD | STATUS *2 |
|---|---|---|---|---|---|
| ON | ON | BL | BL | ON | Communicates normally with occasional CRC errors due to noise interference. |
| ON | ON | BL | BL | ON | Communicates normally but the Baud Rate and/or Station Address switches failed. ERR LED blinks approximately in 0.5 seconds intervals. |
| ON | ON | BL | BL | OFF | ---- |
| ON | ON | BL | OFF | ON | CRC error detected in the received data. Unable to respond. |
| ON | ON | BL | OFF | OFF | ---- |
| ON | ON | OFF | BL | ON | Normal communication |
| ON | ON | OFF | BL | OFF | ---- |
| ON | ON | OFF | OFF | ON | Unable to receive data addressed to the station. |
| ON | ON | OFF | OFF | OFF | ---- |
| ON | OFF | BL | BL | ON | Polling response is made but CRC error is detected in received refresh data. |
| ON | OFF | BL | BL | OFF | ---- |
| ON | OFF | BL | OFF | ON | CRC error detected in the data addressed to the station. |
| ON | OFF | BL | OFF | OFF | ---- |
| ON | OFF | OFF | BL | ON | Link is not started. |
| ON | OFF | OFF | BL | OFF | ---- |
| ON | OFF | OFF | OFF | ON | No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master) |
| ON | OFF | OFF | OFF | OFF | Unable to receive data due to wire breakdown |
| ON | OFF | ON | OFF | ON/OFF | Faulty Baud Rate and/or Station Address setting |
| OFF | OFF | OFF | OFF | OFF | Power input removed or power supply failure. |

OFF = OFF, ON = ON, BL = Blinking
*1. SD LED which is blinking may appear to be ON with high baud rate especially when fewer modules are connected.
*2. LED combinations indicated with "----" do not occur in normal operation unless LED failure or the like occurs.

## ■ TERMINAL ASSIGNMENTS

### • Power Supply Terminal Assignment

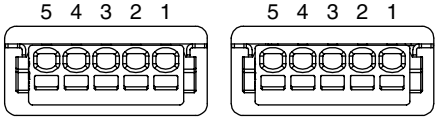
**Unit side connector:** PTSM0,5/4-2,5-V SMD R44 (Phoenix Contact)
**Applicable wire size:** 0.25 - 0.34 mm²
**Stripped length:** 6 mm
**Recommended solderless terminal**
AI0,25-6BU 0.25 mm² (Phoenix Contact)
AI0,25-6YE 0.25 mm² (Phoenix Contact)
AI0,34-6TQ 0.34 mm² (Phoenix Contact)




| NO. | ID | FUNCTION |
|---|---|---|
| 1 | FE1 | Grounding |
| 2 | – | No connection |
| 3 | 24V | Power supply (+) |
| 4 | 0V | Power supply (-) |

### • CC-Link Terminal Assignment

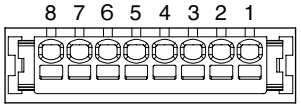
**Unit side connector:** PTSM0,5/5-2,5-H SMD (Phoenix Contact)
**Applicable wire size:** 0.25 - 0.34 mm²
**Stripped length:** 6 mm
**Recommended solderless terminal**
AI0,25-6BU 0.25 mm² (Phoenix Contact)
AI0,25-6YE 0.25 mm² (Phoenix Contact)
AI0,34-6TQ 0.34 mm² (Phoenix Contact)



| NO. | ID | FUNCTION |
|---|---|---|
| 1 | DA | DA |
| 2 | DG | DG |
| 3 | DB | DB |
| 4 | SLD | Shield |
| 5 | FE | Function earth |

**• I/O Terminal Assignment**

**Unit side connector:** PTSM0,5/8-2,5-V SMD R44 (Phoenix Contact)
**Applicable wire size:** 0.25 - 0.34mm²
**Stripped length:** 6mm
**Recommended solderless terminal**
AI0,25-6BU 0.25mm² (Phoenix Contact)
AI0,25-6YE 0.25mm² (Phoenix Contact)
AI0,34-6TQ 0.34mm² (Phoenix Contact)




| NO. | ID | FUNCTION |
|---|---|---|
| 1 | X7 | Input 7 |
| 2 | X6 | Input 6 |
| 3 | X5 | Input 5 |
| 4 | X4 | Input 4 |
| 5 | X3 | Input 3 |
| 6 | X2 | Input 2 |
| 7 | X1 | Input 1 |
| 8 | X0 | Input 0 |

| NO. | ID | FUNCTION |
|---|---|---|
| 1 | X15 | Input 15 |
| 2 | X14 | Input 14 |
| 3 | X13 | Input 13 |
| 4 | X12 | Input 12 |
| 5 | X11 | Input 11 |
| 6 | X10 | Input 10 |
| 7 | X9 | Input 9 |
| 8 | X8 | Input 8 |

| NO. | ID | FUNCTION |
|---|---|---|
| 1 | Y7 | Output 7 |
| 2 | Y6 | Output 6 |
| 3 | Y5 | Output 5 |
| 4 | Y4 | Output 4 |
| 5 | Y3 | Output 3 |
| 6 | Y2 | Output 2 |
| 7 | Y1 | Output 1 |
| 8 | Y0 | Output 0 |

| NO. | ID | FUNCTION |
|---|---|---|
| 1 | Y15 | Output 15 |
| 2 | Y14 | Output 14 |
| 3 | Y13 | Output 13 |
| 4 | Y12 | Output 12 |
| 5 | Y11 | Output 11 |
| 6 | Y10 | Output 10 |
| 7 | Y9 | Output 9 |
| 8 | Y8 | Output 8 |

**Unit side connector:** PTSM0,5/4-2,5-V SMD R44 (Phoenix Contact)
**Applicable wire size:** 0.25 - 0.34 mm²
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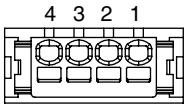



| NO. | ID | FUNCTION |
|---|---|---|
| 1 | V+ | Exc. supply (+) |
| 2 | V– | Exc. supply (-) |
| 3 | COM | Common |
| 4 | COM | Common |

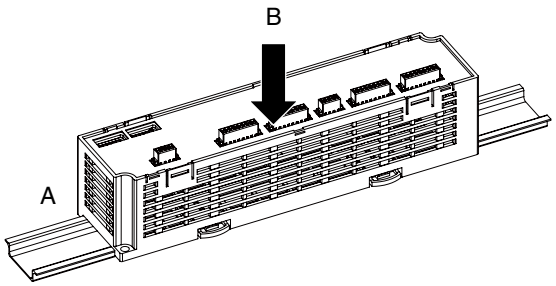
# MOUNTING INSTRUCTIONS

### ■ DIN RAIL MOUNTING

**• Mounting**

A) Set the upper hook at the rear side of the unit on the DIN rail.

B) Push in the lower.

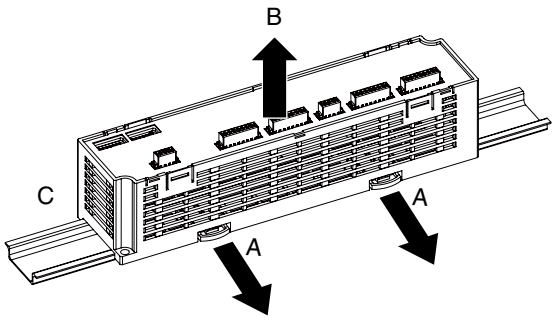



**• Dismounting**

A) Push down the DIN rail mounter slider with tip of a minus screwdriver.

B) Pull the lower of the unit.

C) Remove the upper hook of the unit from the DIN rail.



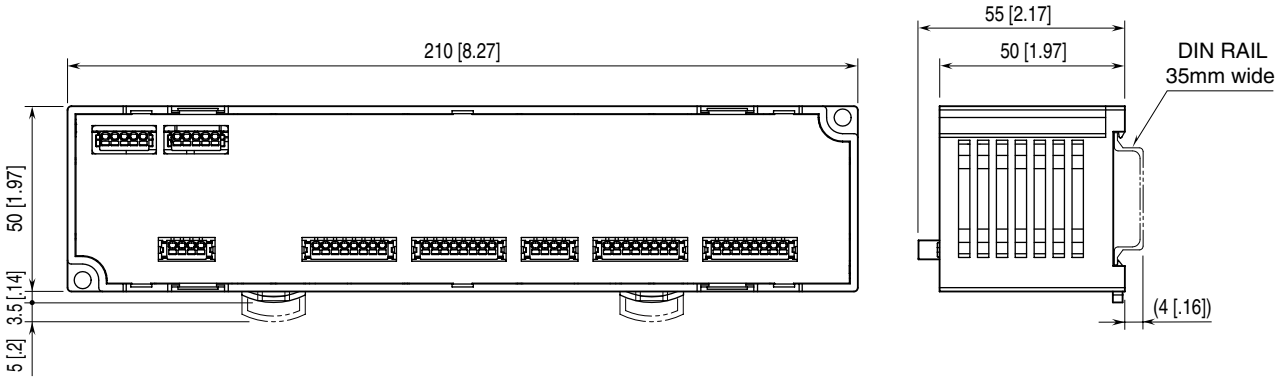

### ■ SURFACE MOUNTING (unit: mm [inch])

**Torque**: 1.4 N·m


# TERMINAL CONNECTIONS

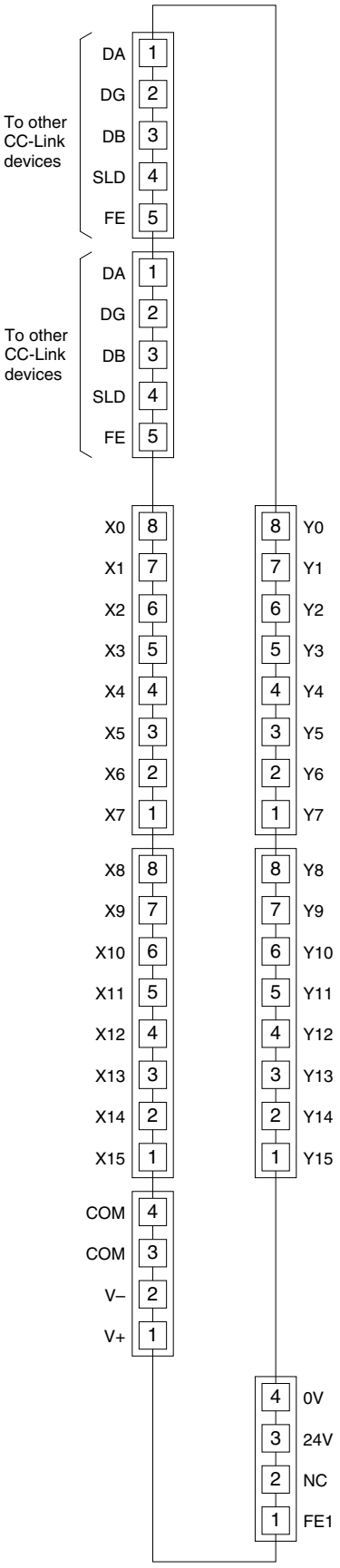
Connect the unit as in the diagram below.

### ■ EXTERNAL DIMENSIONS unit: mm [inch]

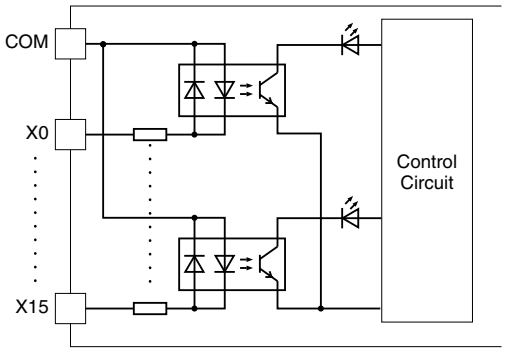


## ■ CONNECTION DIAGRAM

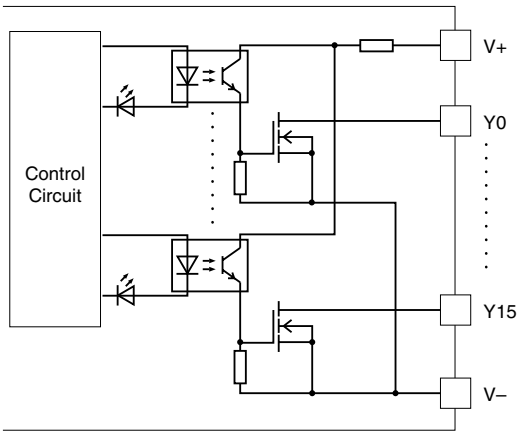
Note: In order to improve EMC performance, bond the FE1 terminal to ground.
Caution: FE1 terminal is NOT a protective conductor terminal.



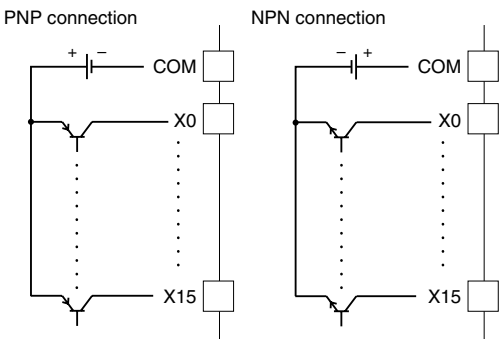

■ Input Circuit



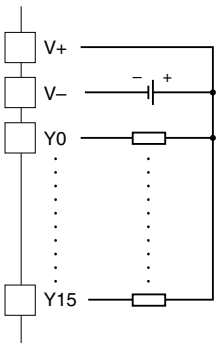

■ Output Circuit




■ Input Connection Examples

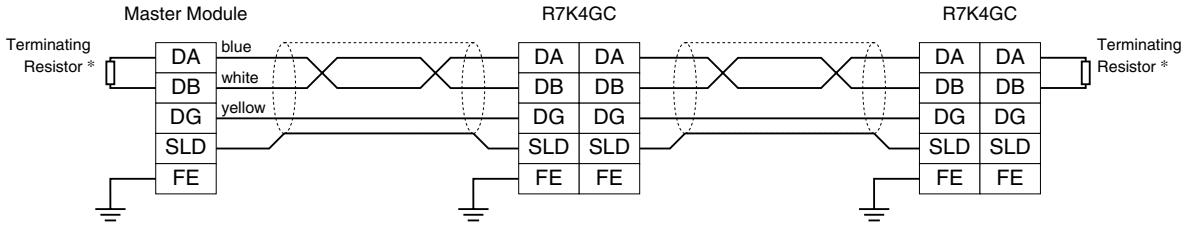



■ Output Connection Examples



# COMMUNICATION CABLE WIRING

■ **MASTER CONNECTION**

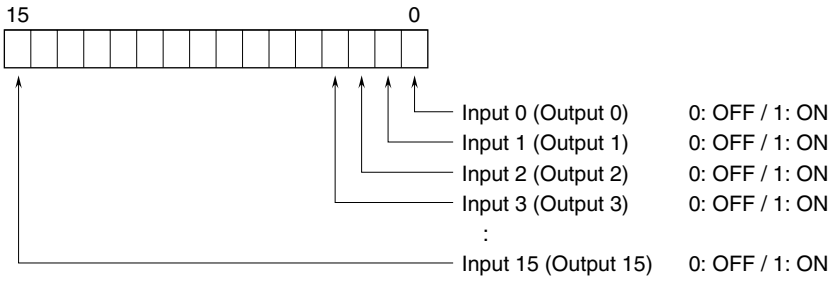



* Turn on the terminator DIP switch to activate the internal terminating resistor.

# DATA ALLOCATION


# I/O DATA DESCRIPTIONS

■ **DISCRETE I/O**



# CONFORMITY WITH CE MARKING

## ■ CE MARKING

CE marking requires to integrate safety regulations existed in each country in EU territory and to secure smooth distribution of products of which safety is guaranteed. It is mandatory by law that products distributed and sold in EU territory to have CE mark which shows that the product conforms with the requirements of EU Directive. Each EU Directive describes the scope of apparatuses to which that EU Directive is applied. The module must conform with EMC Directive.
Each Directive states only basic requirements. In order to mark the CE on an assembled machinery equipment, its manufacturer needs to check the overall conformity with Directives applicable to it.

## ■ WARNINGS AND CAUTIONS WHEN INSTALLING THE MODULE

The module needs to be installed in a control panel. This is effective not only to ensure general safety but also to contain noise emissions by the module inside the control panel. We conduct a series of testing to see that the product conforms to EMC Directive while it is installed in the control panel.
Warning and cautions when installing the module are stated below.

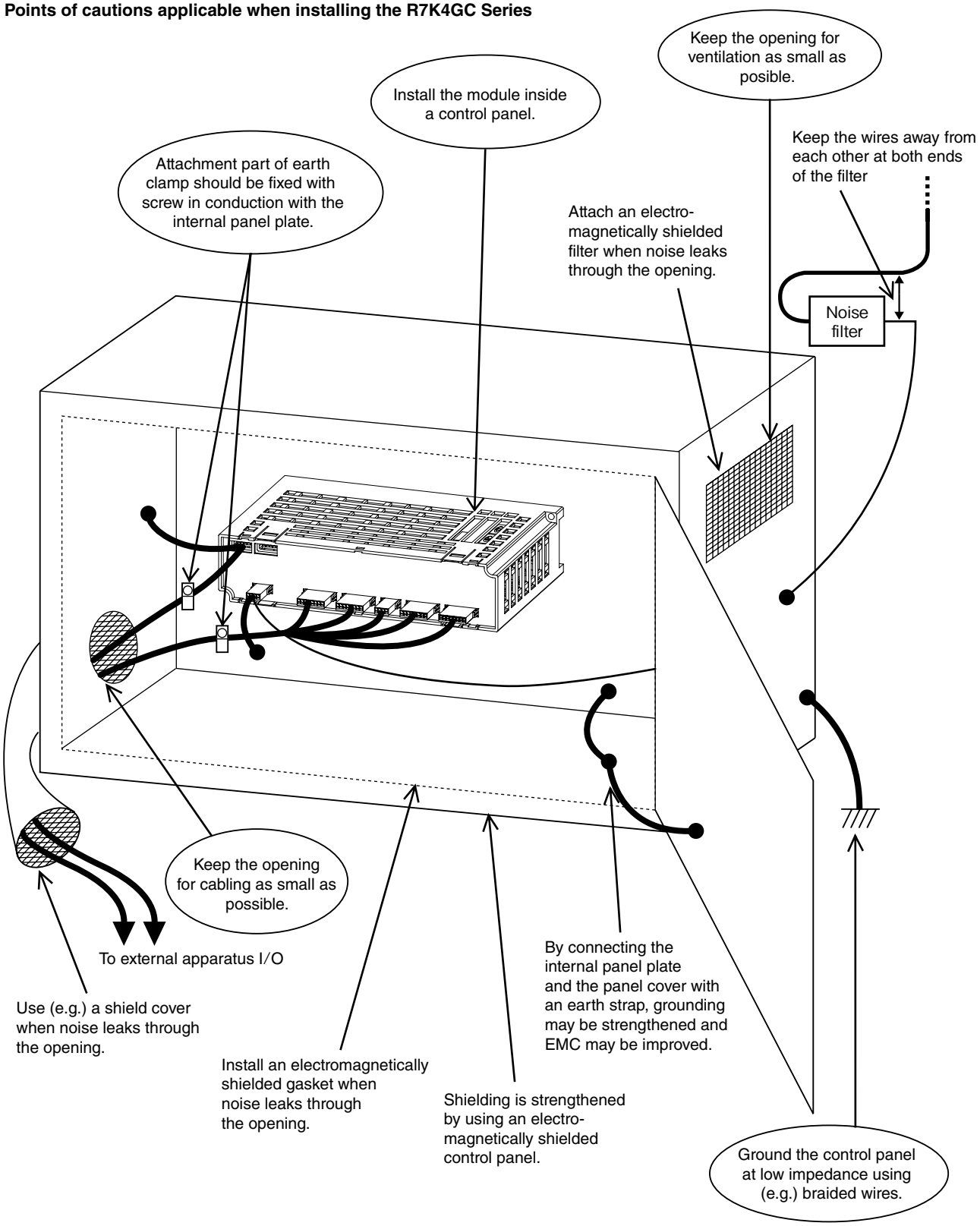
- Use control panels with an internal panel plate, both made of metal, when installing the module.
- Make sure to adequately ground the control panel and the internal panel plate with a thick cable to maintain low impedance at high frequency.
- Use shielded cables for the signals taken out of the control panel.
- Choose a thick and short cable to ground the FG terminal of the module to the internal panel plate of the control panel.
  Note: If electromagnetic radiation disturbance increases by grounding the FG terminal, remove the grounding.
- When painting the internal plate of the control panel, apply masking to expose metal surface to secure conductivity at the sections where the following parts are attached:
  - Bolts attaching the internal panel to the control panel
  - Ground for the FG of the module
  - Earth clamp on the shielded cable
- Noise emissions inside the control panel might leak through its openings. Design them as small as possible. Recommended diameter is 10 cm or less.

**Supplement:**

Additional measures may be taken depending upon actual installation sites. These points of cautions are illustrated in the next page.

- Prevent noise leakage by wrapping cables using shield covers, shield tubes and flexible conduits etc. if noise leaks through the cable outlet.
- Use an electromagnetic shield gasket and block up the gap between the control panel cabinet and its cover, if noise leaks through it.
- Connecting the internal panel plate and the cover of the control panel to the main cabinet using an earth strap may be effective to strengthen the grounding.
- Electromagnetically shielded control panel cabinet is effective for shielding.

**• Points of cautions applicable when installing the R7K4GC Series**



## ■ WARNINGS AND CAUTIONS WHEN LAYING CABLES

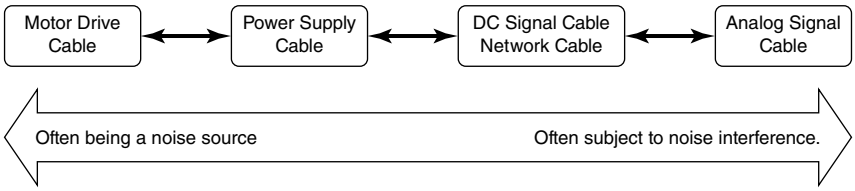
Signal cables connected to the module contain high-frequency components. Since these cables has the same effect as an antenna, they emit these high-frequency components to the external space as noise or overlaps noise from the external space on themselves.
Cables with shielding should be used for the signal line due to the above reason.
EMC conformance test is conducted in the condition that shielded cables and earth clamps are used with the module.
Warning and cautions when laying cables are stated below. These points of cautions are illustrated in the next page.

- Use shielded cables for those signal cables installed out of the control panel and for thermocouple and RTD extension wires.
- All the network cables connected to the module should be shielded.
- Use exclusively designed cables for the CC-Link.
- Expose the shield at a part of the cable cover, clip it with an earth clamp, and ground it to the internal panel of the control panel. A drain wire connected to the panel in a pig-tail form cannot maintain low impedance against high-frequency noise, thus grounding (noise shielding) in this form will not be effective.

**Supplement:**

Additional measures may be taken depending upon actual installation sites. These points of cautions are illustrated in the next page.

- Keep cables as short as possible. It prevents noise emissions from the cables and noise overlapping to the cables.
- Attach a ferrite core to reduce noise impact to the signal cables susceptible to the noise. Ferrite core can be attached close to the cable outlet of the control panel or close to the I/O terminal or connector, whichever is more effective. Also, the impact might be reduced by winding the cable around the ferrite core for extra turns or attaching multiple ferrite cores.
- Keep cables which are easily affected by noise away from those which can be a noise source.




In the following are examples of effective ways to lay cables separately:

- Keeping physical distance (farther than 20 cm from motor drive cables, farther than 10 cm for other groups).
- Dividing off by a grounded metal plate
- Grouping into separate grounded metal pipes or cable shields.

Wires on each side of a filter should not be too close to each other. Noise could ride onto the other side of cable.
Extra attention needs to be paid at the following parts.

- Noise filter that is enclosed in power cables.
- Ferrite core that is attached to signal cables.
- Noise limiting circuit (surge quenching circuit, transient absorber circuit, etc.) that is enclosed in signal cables.

**• Points of cautions applicable when wiring the R7K4GC Series**