

Remote I/O R3 Series

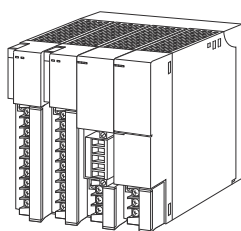
R3 SERIES GENERAL SPECIFICATIONS

Functions & Features

- Free combination of analog and discrete I/O
- Various open field bus (DeviceNet, Modbus, etc.)
- Direct sensor inputs
- Dual redundancy in communication

Typical Applications

- Remote I/O for DCS and PLC
- Personal computer I/O



ORDERING INFORMATION

Refer to the specifications of each module for details.

- Options are available for each model of R3-x, (except R3-DM). Refer to the data sheets of each model for detail.

NETWORK INTERFACE MODULE: R3-[1]-[2]

Refer to the specifications of each module for details.

[1] MODULE TYPE

- NC1:** CC-Link (Ver. 1.10; 16-point analog)
NC2: CC-Link (Ver. 1.10; 32-point analog)
NC3: CC-Link (Ver. 2.00)
NCIE1: CC-Link IE Field network
 (Power input code not selectable)
ND1: DeviceNet (16-point analog)
ND2: DeviceNet (32-point analog)
ND3: DeviceNet (64-point analog)
NE1: Ethernet (Modbus/TCP)
NEIP1: EtherNet/IP
 (Power input code not selectable)
NF1: T-Link (Fuji Electric)
NF2: T-Link (Fuji Electric T-Link interface module equivalent)
NF3: T-Link (Fuji Electric T-Link capsule equivalent)
 (Power input code K3, L3 not selectable)
NFL1: FL-net (Ver. 2.0; OPCN-2)
 (Power input code not selectable)
NM1: Modbus

NM3: Modbus

(Temperature control module supported)

NM4: Modbus (for 115.2 kbps)

(Power input code K3, L3 not selectable)

NML3: MECHATROLINK-III(MECHATROLINK-III)

NP1: PROFIBUS-DP

NL1: LonWorks (analog I/O 16 points, discrete I/O 48 points)

NL2: LonWorks (I/O 56 points)

NMW1F: For Modbus Wired Communication, 900 MHz Band Devices

(Power input codes K3 and L3 not selectable)

(For use in U.S. only)

[2] POWER INPUT

N: No power supply

AC power

M2: 100 - 240V AC

(Selectable only for module type NF3, NM4 and NMW1F)

K3: 100 - 120 V AC

L3: 200 - 240 V AC

DC power

R: 24 V DC

INTERFACE I/O MODULE: R3-[1]S

Refer to the specifications of each module for details.

[1] MODULE TYPE

GC1: CC-Link (Ver. 1.10/ Ver. 2.00)

GD1: DeviceNet

GE1: Ethernet (Modbus/TCP)

GFL1: FL-net (Ver. 2.0; OPCN-2)

GM1: Modbus

COMMUNICATION MODE

S: Single

BASE: R3-[1][2]

Refer to the specifications of each base for details.

[1] MODULE TYPE

BS: Base

BSW: Base, free I/O address

[2] NUMBER OF SLOTS

02: 2 slots (R3-BS only)

02P: 2 slots (R3-NP1 only)
 (R3-BS only)

04: 4 slots

06: 6 slots

08: 8 slots

10: 10 slots
12: 12 slots
14: 14 slots
16: 16 slots

I/O MODULE: R3-[1][2]

Refer to the specifications of each module for details.

[1] MODULE TYPE

• Analog Input

SS4: DC current input, 4 ch.
SS8: DC current input, 8 ch.
SS8N: DC current input, 8 ch., non-isolated
SS16N: DC current input, 16 ch., non-isolated
SV4: DC voltage input, 4 ch.
SV4A: DC voltage input, 4 ch., narrow span
SV4B: DC voltage input, 4 ch., wide span
SV4C: DC voltage input, 4 ch., wide span up to ± 50 V
SV8: DC voltage input, 8 ch.
SV8A: DC voltage input, 8 ch., narrow span
SV8B: DC voltage input, 8 ch., wide span
SV8C: DC voltage input, 8 ch., wide span up to ± 50 V
SV8N: DC voltage input, 8 ch., non-isolated
SV16N: DC voltage input, 16 ch., non-isolated
TS4: Thermocouple input, 4 ch.
TS8: Thermocouple input, 8 ch.
TS8A: Thermocouple input, 8 ch., high accuracy
RS4: RTD input, 4 ch.
RS4A: RTD input, 4 ch., high accuracy
RS8: RTD input, 8 ch.
RS8A: RTD input, 8 ch., high accuracy
RS8B: RTD input, 8 ch., ultra-high accuracy
MS4: Potentiometer input, 4 ch.
MS8: Potentiometer input, 8 ch.
DS4: 4 – 20 mA input w/exc., 4 ch.
DS4A: 4 – 20 mA input w/exc. (switch provided), 4 ch.
DS8N: 4 – 20 mA input w/exc., 8 ch., non-isolated
CT4: CT (AC current) input, 4 ch.
CT4A: AC current input, 4 ch., clamp-on current sensor CLSA use
CT4B: AC current input, 4 ch., clamp-on current sensor CLSB use
CT4C: AC current input, 4 ch., clamp-on current sensor CLSB-R5 use
CT8A: AC current input, 8 ch., clamp-on current sensor CLSA use
CT8B: AC current input, 8 ch., clamp-on current sensor CLSB use
CT8C: AC current input, 8 ch., clamp-on current sensor CLSB-R5 use
PT4: PT (AC voltage) input, 4 ch.
CZ4: Zero-phase current input, 4 ch.
WT1: Multi-power input, 1 circuit
WT1A: Multi power input, 4 ch., clamp-on current sensor CLSA use
WT1B: Multi power input, 4 ch., clamp-on current sensor CLSB use
WT4: AC power input, 4 points
WT4A: AC power input, 4 ch., clamp-on current sensor CLSA use

WT4B: AC power input, 4 ch., clamp-on current sensor CLSB use
WTU: AC power input, 2 ch., clamp-on current sensor CLSE use (Communication Mode 'S' only)

LC2: Strain gauge input, 2 ch.

US4: Universal input, 4 ch.

TC2: Temperature Control

(Only communication mode 'S' selectable)

MEX2: Valve Positioner

(for 2 systems; built-in SSR)

• Analog Output

YV4: DC voltage output, 4 ch.

YV8: DC voltage output, 8 ch.

YS4: DC current output, 4 ch.

• Pulse Input

PA2: Encoder input, 2 ch. (speed and position)

PA4: High speed pulse input, 4 ch.

PA4A: High speed totalized pulse input, 4 ch.

PA4B: Low speed totalized pulse input, 4 ch.

PA8: Totalized pulse input, 8 ch.

PA16: Totalized pulse input, 16 ch.

• Pulse Output

PC16A: Pulse output, 16 ch.

PD16: One-shot pulse output 16 ch. (Relay)

PD16A: One-shot pulse output 16 ch. (NPN)

PD16B: One-shot pulse output 16 ch. (Triac)

PD16C: One-shot pulse output 16 ch. (PNP)

• Discrete Input

BA32A: BCD input (ext. 24 V DC)

DA16: Optical isolation discrete input, 16 ch. (13 V DC)

DA16A: Optical isolation discrete input, 16 ch.

DA16B: Optical isolation discrete input, 16 ch. (ext. 100 V AC)

DA32A: Optical isolation discrete input, 32 ch.

DA64A: Optical isolation discrete input, 64 ch.

DA8C: Optical isolation discrete input, 8 ch. (3-wire)

• Discrete Output

BC32A: BCD output (open collector)

DC16: Relay output, 16 ch.

DC16A: Open collector output, 16 ch. (NPN)

DC16B: Triac output, 16 ch.

DC16C: Open collector output, 16 ch. (PNP)

DC32A: Open collector output, 32 ch.

DC32C: Open collector output, 32 ch.

(PNP transistor output, shortcircuit protection)

DC64A: Open collector output, 64 ch.

DC64C: Open collector output, 64 ch.

(PNP transistor output, shortcircuit protection)

DC8: Relay contact output, 8 ch.

DC8D: Photo MOSFET relay output, 8 ch.

RR8: Remote control relay control, 8 ch.

• Discrete I/O

DAC16: Discrete I/O (Di 8 ch., Do 8 ch.)

DAC16A: Discrete I/O (Di 8 ch., Do 8 ch., internal power)

• Alarm

AS4: DC current input alarm, 4 ch.
AS8: DC current input alarm, 8 ch.
AV4: DC voltage input alarm, 4 ch.
AV8: DC voltage input alarm, 8 ch.
AT4: Thermocouple input alarm, 4 ch.
AR4: RTD input alarm, 4 ch.
AD4: 4 – 20 mA input alarm w/exc., 4 ch.

[2] COMMUNICATION MODE

S: Single

W: Dual

I/O MODULE WITH CONNECTOR TERMINAL: R3Y-[1][2]

Refer to the specifications of each module for details.

[1] MODULE TYPE

• Analog I/O (FCN connector)

SS8: DC current input, 8 ch.
SS8N: DC current input, 8 ch., non-isolated
SS16N: DC current input, 16 ch., non-isolated
SV8: DC voltage input, 8 ch.
SV8A: DC voltage input, 8 ch., narrow span
SV8N: DC voltage input, 8 ch., non-isolated
SV16: DC voltage input, 16 ch., non-isolated
YV8: DC voltage output, 8 ch.
YS4: 4 – 20 mA output, 4 ch.
RS8: RTD input, 8 ch.
MS8: Potentiometer input, 8 ch.
DS4: 4 – 20 mA input, 4 ch. excitation supply
DS8N: 4 – 20 mA input, 8 ch. excitation supply, non-isolated

• Pulse I/O (FCN connector)

PA16: Totalized pulse input, 16 ch.

• Discrete I/O (FCN connector)

DA16: Optical isolation discrete input, 16 ch. (13 V DC)
DA16A: Optical isolation discrete input, 16 ch. (ext. 24 V DC)
DC16: Relay output, 16 ch.
DAC16D: Optical isolation discrete input, 8 ch. (internal power), photo MOSFET relay output, 8 ch.

[2] COMMUNICATION MODE

S: Single

W: Dual

I/O MODULE: R3S-[1][2]

Refer to the specifications of each module for details.

[1] MODULE TYPE

• Analog I/O (Separable tension clamp terminal)

SS8N: DC current input, 8 ch., non-isolated

SV8N: DC voltage input, 8 ch., non-isolated

YV4: DC voltage output, 4 ch., isolated

YS4: DC current output, 4 ch., isolated

RS4A: RTD input, 4 ch., high accuracy

• Pulse input (Separable tension clamp terminal)

PA8: Totalized pulse input, 8 ch., 32 Bits

• Discrete I/O (Separable tension clamp terminal)

DA16: Optical isolation discrete input, 16 ch. (13 V DC)

DC8: Relay contact output, 8 ch.

DAC16: Discrete I/O (Di 8 ch., Do 8 ch.)

DAC16A: Discrete I/O (Di 8 ch., Do 8 ch., internal power)

RR8: Remote control relay control, 8ch.

[2] COMMUNICATION MODE

S: Single

W: Dual

POWER SUPPLY MODULE: R3-[1]-[2]

Refer to the specifications of each module for details.

[1] MODULE TYPE

PS1: Power Supply Module, single slot
 (Continuous output current: 750 mA @ 20 V DC)
 (Power input code K3 and L3 are not selectable)
PS3: Power Supply Module, double slot
 (Continuous output current: 2.0 A @ 20 V DC)

[2] POWER INPUT

• AC power

K: 85 – 132 V AC

K3: 100 – 120 V AC (Selectable only for module type code PS3)

L: 170 – 264 V AC

L3: 200 – 240 V AC (Selectable only for module type code PS3)

• DC power

R: 24 V DC

P: 110 V DC

BLANK FILLER MODULE: R3-[1]

Refer to the specifications of each module for details.

[1] MODULE TYPE

DM: Blank filler module

DESCRIPTIONS

■ GENERAL

The Remote I/O R3 Series consists of power supply module(s), network interface module(s), I/O module(s) and a backplane (base) in free combinations.

Basically, each module only requires DIP switch setting

before it is installed.

A large variety of network and I/O modules can be selected to suit many different field applications.

- **Power Supply Module**

Converts AC or DC power inputs for use in the network modules and I/O modules, and for exciting discrete I/O.

- **Network Module**

Converts data between the open network fieldbus (Device-Net, etc.) and the internal communication bus, functioning as a Gateway between the two buses.

- **Interface I/O Module**

Works as a gateway to handle data on the open network fieldbus (Device-Net, etc.) with different protocol interface module.

- **I/O Module**

Performs: A/D conversion of field analog inputs; and D/A conversion of data received through the internal bus into analog/discrete outputs.

Single and dual communication modes are selectable.

- **Base**

Backplane with two independent communications buses and a power supply bus.

- **Blank Filler Module**

Used to install for unused slots.

■ SINGLE COMMUNICATION MODE

When the single communication mode is employed, the network module receives data from the field bus and sends it to analog/discrete output modules through the internal bus.

The output modules convert the data into analog or discrete outputs.

The input modules send out via the internal bus analog or discrete inputs to the network module. The network module outputs the data to the field bus.

■ DUAL COMMUNICATION MODE

A dual redundant communication system can be easily achieved by employing two network modules and using dual communication type I/O modules (model suffix code 'W').

Each I/O module is equipped with two independent communication ports, which are connected to the separate network modules. In normal conditions, output modules receive data from both network modules and output the signal from the preferred communication bus A.

When an error is detected in the fieldbus wiring, network module, or in the internal bus (comm. time error, data error, etc.), the output is switched to the data from the communication bus B. The bus A is checked and automatically back for use if it is in normal conditions.

If both are in error, the output modules hold the signal and stand by until one of the communications recovers. (The

output could be turned to OFF by setting.)

Input modules continuously respond to request-to-send from the both lines. This secures two independent communications.

■ HOT SWAPPABLE I/O MODULES

Each I/O and network module has an independent CPU.

Data is renewed by serial communications between modules. Therefore no momentary lapse or bumping of analog output occurs when switching communication buses in the dual communication mode.

Furthermore, removing or replacing modules does not adversely affect other modules on the same backplane. It is possible to replace them without removing the power supply.

However, replacing multiple modules at once may greatly change line voltage levels. We highly recommend to replace them one by one.

In order to avoid communication malfunction, mount modules as quickly and securely as possible.

RELATED PRODUCTS

- PC configurator software (model: R3CON)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

GENERAL SPECIFICATIONS

Connection: Refer to the specifications of each module.

Housing material: Flame-resistant resin (gray)

■ INTERNAL COMMUNICATION BUS

The read rate is of approx. 6 msec. per I/O module. Total communication cycle is multiplied by the number of I/O module.

■ DATA CONVERSION

Varies depending on the types of I/O modules. Refer to the specifications of the respective I/O modules for details.

- **Percent Data**

The scaled input range of 0 - 100 % is converted into hexadecimal 0000 - 2710 (0 - 10000). The operational range is from -15 to +115% of the input range. When the signal exceeds the lower or upper limit of the operational range, the data is fixed at -15% or +115%. Negative value is represented in 2's complements. The same applies to DC voltage or current output.

Note: The signal will remain within the operational range depending on the scaled 0% and 100% input values.

- **Engineering Unit Data: Temperature**

Temperature input (T/C or RTD) is converted into signed

binary data which equals 10 times its engineering unit value (°C). For example, 25.5°C is converted into 255. For °F temperature unit, the integer part of raw data is directly adopted. That is, 135.4°F is converted into 135. Minus temperature is converted into negative value represented in 2's complements.

(For R3-TS8A, R3-RSxA, R3-RSxB, temperature input is converted into signed binary data which equals 100 times its engineering unit value.)

- **Engineering Unit Data: Clamp-on Current Sensor** (Except R3-CTxC)

AC input from a clamp-on current sensor is converted into signed binary data which equals 100 times its engineering unit value (A). For example, 10 A is converted to 1000. The operational range is from 0 to +115% of the input range. When the signal exceeds the upper limit of the operational range, the data is fixed at +115%. No negative value is available.

Note 1: Percent data for R3-CTxC.

Note 2: The signal will not exceed +115% depending on the scaled 100% input value.

■ ZERO & SPAN SCALING

The network module inputs or outputs the internal conversion data by the preset scale.

INSTALLATION

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Mounting: Surface or DIN rail

CURRENT CONSUMPTION

The network and I/O modules operates by the DC voltage (20V) supplied from the power module. Arrange these modules in order that the total current consumed by these modules be within this capacity. If the current consumption exceeds the limit, reduce the number of modules to be supplied from the power module.

■ NETWORK INTERFACE MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)
R3-NC1	250 (350) *2	400 (500) *2	—	120
R3-NC2	250 (350) *2	400 (500) *2	—	130
R3-NC3	250 (350) *2	400 (500) *2	—	120
R3-NCIE1	—	—	—	170
R3-ND1	270 (350) *2	420 (500) *2	—	80
R3-ND2	270 (350) *2	420 (500) *2	—	80
R3-ND3	270 (350) *2	420 (500) *2	—	80
R3-NE1	250 (350) *2	400 (500) *2	—	100
R3-NEIP1	—	—	—	130
R3-NF1	250 (350) *2	400 (500) *2	—	130
R3-NF2	230 (350) *2	380 (500) *2	—	120
R3-NF3	230 (350) *2	380 (500) *2	—	120
R3-NFL1	—	—	—	130
R3-NM1	250 (350) *2	400 (500) *2	—	100
R3-NM3	250 (350) *2	400 (500) *2	—	100
R3-NM4	280 (350) *2	430 (500) *2	—	70
R3-NML3	250 (350) *2	400 (500) *2	—	110
R3-NP1	220 (350) *2	370 (500) *2	—	130
R3-NL1	250 (350) *2	400 (500) *2	—	100
R3-NL2	250 (350) *2	400 (500) *2	—	100
R3-NMW1F	250 (350) *2	400 (500) *2	—	100

■ INTERFACE I/O MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3-GC1	—	—	—	120	16
R3-GD1	—	—	—	80	16
R3-GE1	—	—	—	100	16
R3-GFL1	—	—	—	150	16
R3-GM1	—	—	—	100	16

■ POWER SUPPLY MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)
R3-PS1	750	1000	—	—
R3-PS3	2000	2200	—	—

*1. 10-minute output rating.

*2. Values in parentheses exclude the current consumption by the network module.

■ ANALOG I/O MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3-SS4	—	—	—	60	4
R3-SS8	—	—	—	100	8
R3-SS8N	—	—	—	60	8
R3-SS16N	—	—	—	100	16
R3-SV4	—	—	—	60	4
R3-SV4A	—	—	—	60	4
R3-SV4B	—	—	—	60	4
R3-SV4C	—	—	—	60	4
R3-SV8	—	—	—	100	8
R3-SV8A	—	—	—	100	8
R3-SV8B	—	—	—	100	8
R3-SV8C	—	—	—	100	8
R3-SV8N	—	—	—	100	8
R3-SV16N	—	—	—	100	16
R3-YV4	—	—	—	150	4
R3-YV8	—	—	—	200	8
R3-YS4	—	—	150	180	4
R3-YS4x/H	—	—	200	260	4
R3-TS4	—	—	—	70	4
R3-TS8	—	—	—	100	8
R3-TS8A	—	—	—	100	8
R3-RS4	—	—	—	70	4
R3-RS4A	—	—	—	70	4
R3-RS8	—	—	—	100	8
R3-RS8A	—	—	—	100	8
R3-RS8B	—	—	—	120	8
R3-MS4	—	—	—	50	4
R3-MS8	—	—	—	100	8
R3-DS4	—	—	150	210	4
R3-DS4A	—	—	150	210	4
R3-DS8N	—	—	—	60	8
R3-CT4	—	—	—	60	4
R3-CT4A	—	—	—	60	4
R3-CT4B	—	—	—	60	4
R3-CT4C	—	—	—	60	4
R3-CT8A	—	—	—	100	8
R3-CT8B	—	—	—	100	8
R3-CT8C	—	—	—	100	8
R3-PT4	—	—	—	60	4
R3-CZ4	—	—	—	60	4
R3-WT1	—	—	—	150	4, 8, 16
R3-WT1A	—	—	—	150	4, 8, 16
R3-WT1B	—	—	—	150	4, 8, 16
R3-WT4	—	—	—	150	4, 8, 16
R3-WT4A	—	—	—	150	4, 8, 16
R3-WT4B	—	—	—	150	4, 8, 16
R3-WTU	—	—	—	60	16, 32
R3-LC2	—	—	—	300	4
R3-US4	—	—	—	60	4
R3-TC2	—	—	—	120	8
R3-MEX2	—	—	—	60	4

*1. 10-minute output rating.

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3Y-SS8	—	—	—	100	8
R3Y-SS8N	—	—	—	60	8
R3Y-SS16N	—	—	—	100	16
R3Y-SV8	—	—	—	100	8
R3Y-SV8A	—	—	—	70	8
R3Y-SV8N	—	—	—	100	8
R3Y-SV16	—	—	—	100	16
R3Y-YV8	—	—	—	200	8
R3Y-YS4	—	—	150	180	4
R3Y-YS4x/H	—	—	200	260	4
R3Y-RS8	—	—	—	100	8
R3Y-MS8	—	—	—	100	8
R3Y-DS4	—	—	—	210	4
R3Y-DS8N	—	—	—	60	8
R3S-SS8N	—	—	—	60	8
R3S-SV8N	—	—	—	100	8
R3S-YV4	—	—	—	150	4
R3S-YS4	—	—	150	180	4
R3S-YS4x/H	—	—	200	260	4
R3S-RS4A	—	—	—	70	4

■ PULSE I/O MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3-PA2	—	—	—	80	8
R3-PA4	—	—	80	130	4
R3-PA4A	—	—	80	130	8
R3-PA4B	—	—	80	130	8
R3-PA8	—	—	—	70	16
R3-PA16	—	—	—	100	16
R3-PA16/A	—	—	—	80	16
R3-PC16A	—	—	—	100	16
R3-PD16	—	—	—	180	1
R3-PD16A	—	—	100	100	1
R3-PD16B	—	—	130	140	1
R3-PD16C	—	—	—	100	1
R3Y-PA16	—	—	—	100	16
R3Y-PA16/A	—	—	—	80	16
R3S-PA8	—	—	—	70	16

*1. 10-minute output rating.

■ DISCRETE I/O MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3-BA32A	—	—	—	90	4
R3-BC32A	—	—	—	150	4
R3-DA16	—	—	80	100	1
R3-DA16A	—	—	—	80	1
R3-DA16B	—	—	—	80	1
R3-DA32A	—	—	—	90	4
R3-DA64A	—	—	—	100	4
R3-DA8C	—	—	—	40	1
R3-DAC16	—	—	—	130	1
R3-DAC16A	—	—	—	350	1
R3-DC16	—	—	130	180	1
R3-DC16A	—	—	100	100	1
R3-DC16B	—	—	130	140	1
R3-DC16C	—	—	—	100	1
R3-DC32A	—	—	150	150	4
R3-DC32C	—	—	—	110	4
R3-DC64A	—	—	160	160	4
R3-DC64C	—	—	—	160	4
R3-DC8	—	—	30	60	1
R3-DC8D	—	—	30	70	1
R3-RR8	—	—	—	40	1
R3Y-DA16	—	—	80	100	1
R3Y-DA16A	—	—	—	80	1
R3Y-DC16	—	—	130	180	1
R3Y-DAC16D	—	—	—	150	1
R3S-DA16	—	—	80	100	1
R3S-DC8	—	—	30	60	1
R3S-DAC16	—	—	—	130	1
R3S-DAC16A	—	—	—	350	1
R3S-RR8	—	—	—	40	1

■ ALARM MODULE

MODEL	CONTINUOUS OUTPUT RATING (mA)	MAXIMUM *1 OUTPUT RATING (mA)	MINIMUM CURRENT CONSUMPTION (mA)	MAXIMUM CURRENT CONSUMPTION (mA)	DATA ALLOCATION
R3-AS4	—	—	—	60	1
R3-AS8	—	—	—	100	4
R3-AV4	—	—	—	60	1
R3-AV8	—	—	—	100	4
R3-AT4	—	—	—	70	1
R3-AR4	—	—	—	70	1
R3-AD4	—	—	—	210	1

*1. 10-minute output rating.

‘—’ under the Minimum Current Consumption indicates that the Maximum Current Consumption is always applied.

The Maximum Current Consumption for the output modules such as R3-DS4, R3-YS4, R3-DC16, R3-DC16A, R3-DC16B is applied when all channels are at their full-scale value or at ON. The Minimum Current Consumption for these modules is applied when all channels are at their minimum value or at OFF.

The total of the Maximum Current Consumption must be within the limit of the Continuous Output Rating. If the ON ratio is clearly identified, the current consumption can be calculated according to the following equation:

$$\text{Current Consumption} = \text{Min. Consumption} + (\text{Max. Consumption} - \text{Min. Consumption}) \times \text{ON Ratio}$$

In this case, the total of the Maximum Current Consumption must not exceed the Maximum Output Rating.

DATA IN ABNORMALITIES

■ NETWORK MODULES

Input signal behaviour in case of input module abnormalities (when the internal transmission between the input module and network module is lost) can be defined by setting DIP switches on the network module.

- **Input Hold**

Last input signals are held until a normal data is received.

- **Set to '0'**

The network module holds the data at '0' until a normal data is received.

■ OUTPUT MODULES

Field output behaviour in case of transmission abnormalities (when the output data is not updated within the predefined time period) can be defined by setting DIP switches on the output module.

- **Output Hold**

Last output signals are held until a normal data is received.

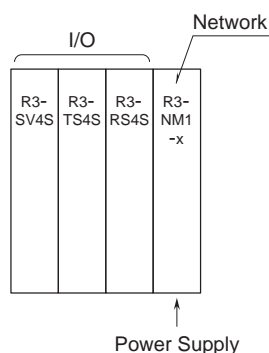
- **Output OFF**

Analog output modules hold the output signals at -15 %, and discrete output modules turns the output to OFF until a normal data is received.

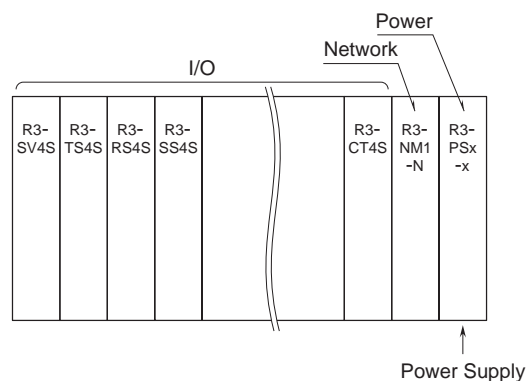
BASIC CONFIGURATIONS

■ SINGLE COMMUNICATION MODE

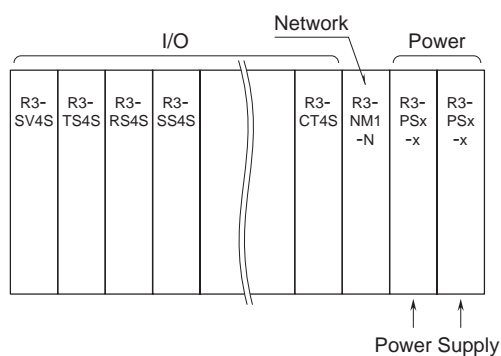
- Single network module with internal power supply; no power supply module



- Single network module with external power supply module



- Single network module with two external power supply modules

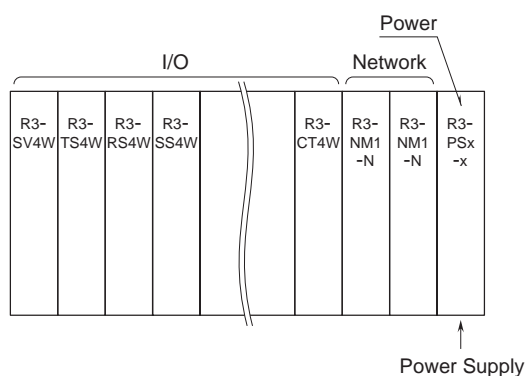


Caution:

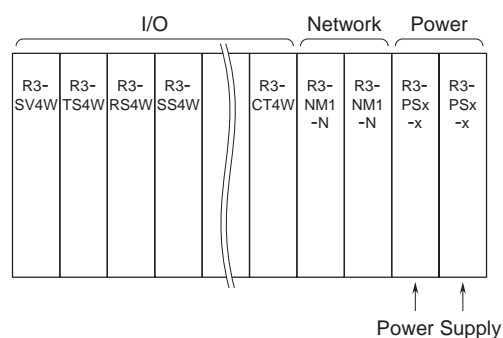
- No additional power supply module is available for the network module with internal power supply.

■ DUAL COMMUNICATION MODE

- Single power supply module

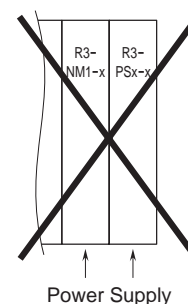
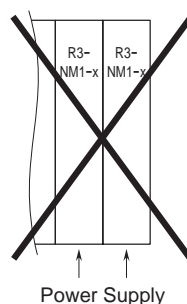


- Two power supply modules



Caution:

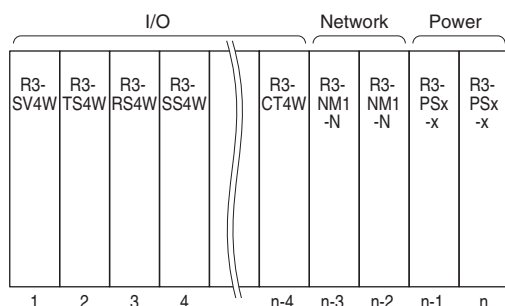
- Network module with internal power supply cannot be used for dual communication mode. Combinations of two network modules with internal power supply, or of a network module with internal supply and an external power supply is not possible.
- One of the network modules must be set to 'Main', while the other must be set to 'Sub' with DIP switches at the side of the module.



■ MODULE LOCATIONS

I/O data are assigned on the PLC's data area according to the physical locations of I/O modules, network modules and power supply modules, and to the network module's DIP switch setting.

Basically, install from the left-most slot (No. 1) in order of the I/O modules and the network modules. Be sure to install the power supply module in the right-most slot. For dual power supply, install the two modules in parallel in the right-most slot. If the I/O modules are not mounted next to each other, blank slots are also counted on the PLC's data area for blank data frames.



■ DIP SWITCH SETTING OF NETWORK MODULE

Network modules are equipped with DIP switches at the side to specify the data allocations for the PLC.

Data Allocation Type must be assigned to each I/O module position to specify how many data areas (four types) are to be occupied by each.

Two bits from SW1 and SW2 are assigned to each position, and data areas can be specified from the module No. 1 through 8. Setting for No. 9 and later modules is identical to No. 8.

Note:

Some network modules don't require DIP switch setting.
Refer to the specification of each network module.

■ LIMITATIONS

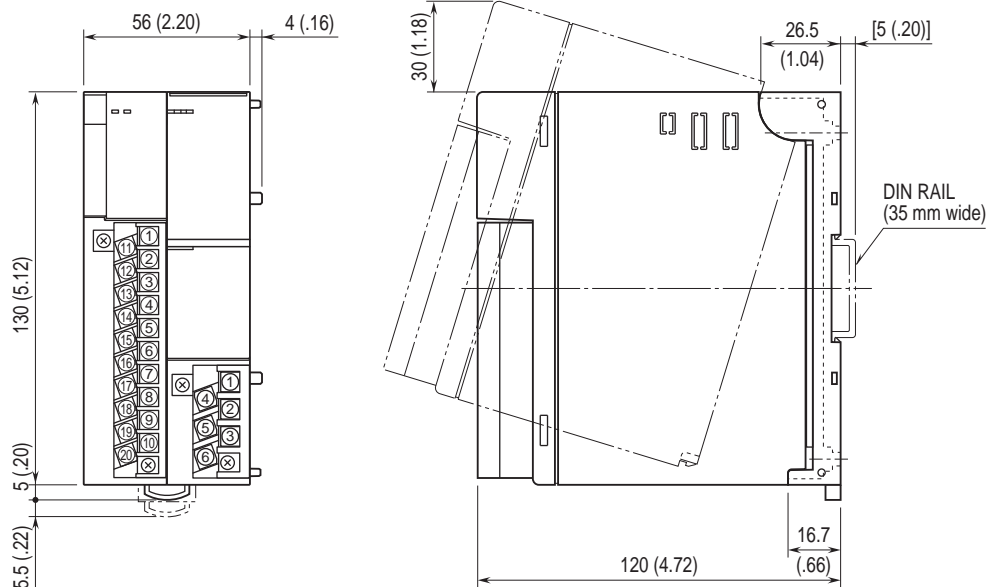
The maximum possible data areas depend upon types of network modules. For example, the model R3-NC1, CC-Link Interface Module, requires four (4) nodes per unit, limiting the maximum analog points to sixteen (16).

Refer to the data sheet for each model.

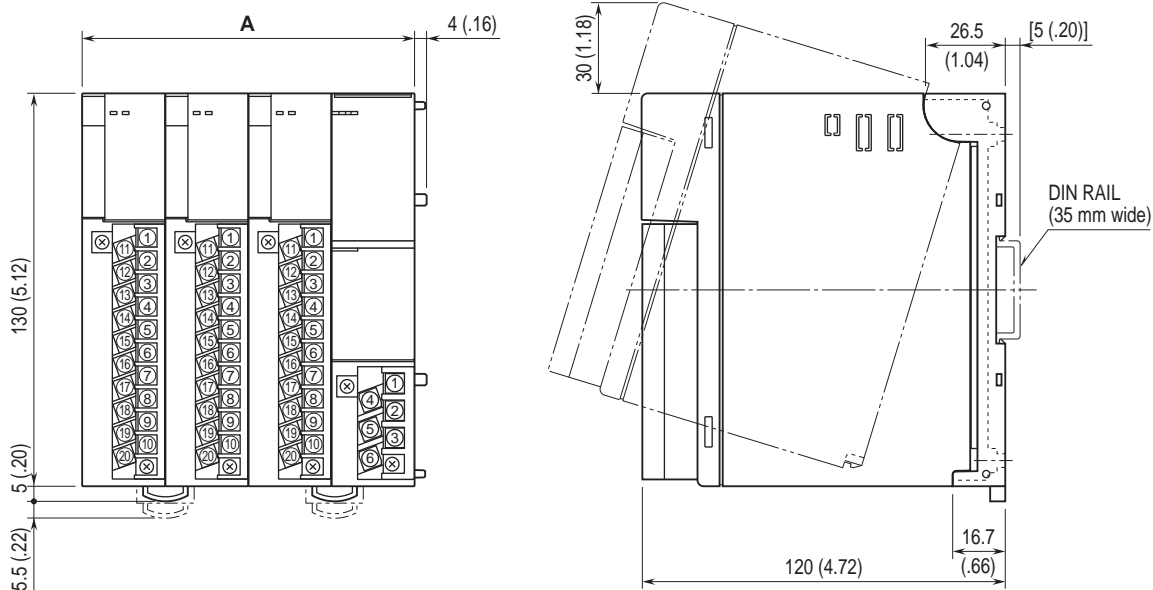
SW ASSIGNMENT		MODULE NO.
SW1-1	SW1-2	1
SW1-3	SW1-4	2
SW1-5	SW1-6	3
SW1-7	SW1-8	4
SW2-1	SW2-2	5
SW2-3	SW2-4	6
SW2-5	SW2-6	7
SW2-7	SW2-8	8
SW SETTING		DATA ALLOCATION
OFF	OFF	1
ON	OFF	4
OFF	ON	8
ON	ON	16

EXTERNAL DIMENSIONS unit: mm (inch)

■R3-BS02, BS02P



■R3-BSx04, BSx06, BSx08, BSx10, BSx12, BSx14, BSx16

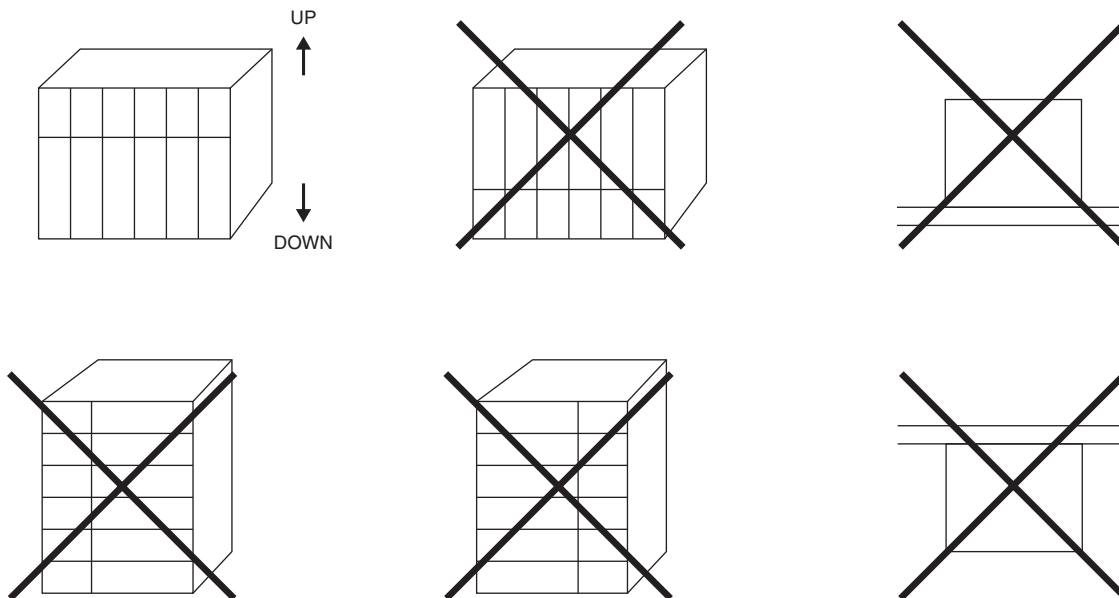


MODEL \ SIZE	A
R3-BSx04	112 (4.40)
R3-BSx06	168 (6.61)
R3-BSx08	224 (8.82)
R3-BSx10	280 (11.02)
R3-BSx12	336 (13.23)
R3-BSx14	392 (15.43)
R3-BSx16	448 (17.64)

MOUNTING REQUIREMENTS unit: mm (inch)

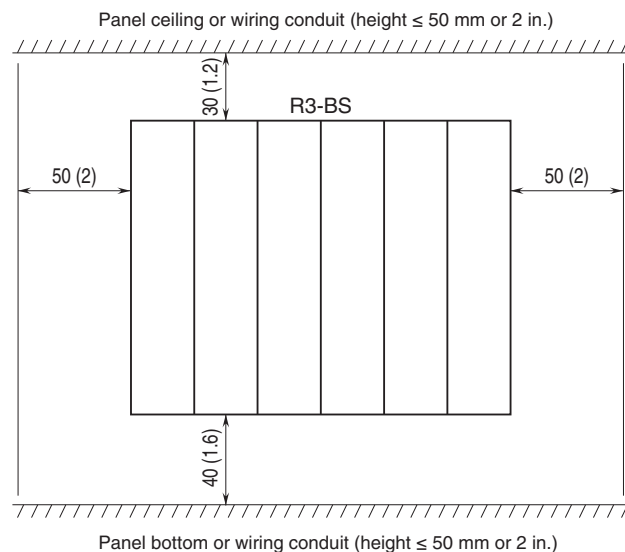
■ MOUNTING DIRECTION

The unit must be mounted on a vertical panel. Mounting in any other angle will cause internal temperature to rise, may shorten the product's life expectation or deteriorate its performance.

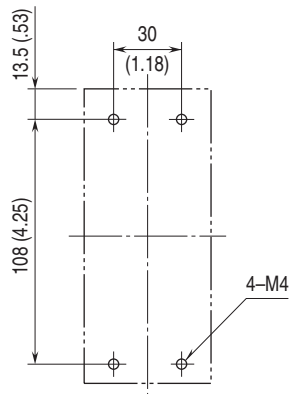


■ VENTILATION & MAINTENANCE SPACE

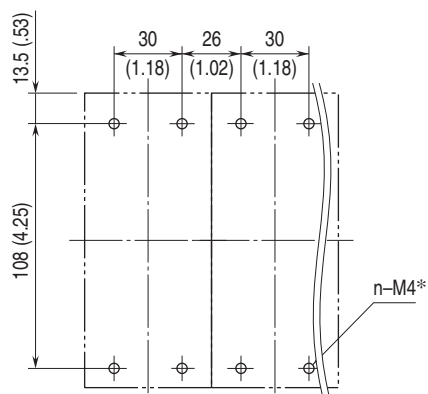
Maintain sufficient ventilation space. Do not mount the unit directly above devices which radiate great heat such as heaters, transformers or resistors. Maintenance space is also required above and below the unit.



■ R3-BS02, BS02P



■ R3-BSx04, BSx06, BSx08, BSx10, BSx12, BSx14, BSx16



*n = Number of slots × 2

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. This product 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

This product needs to be installed in a control panel. This is effective not only to ensure general safety but also to contain noise emissions by this product 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 are stated below.

- Use control panels with an internal panel plate, both made of metal, when installing.
- 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 Power Supply Module(s) and the Network Module(s) to the internal panel plate of the control panel.

Note: If electromagnetic radiation disturbance increases by grounding the FG terminal, remove the grounding.

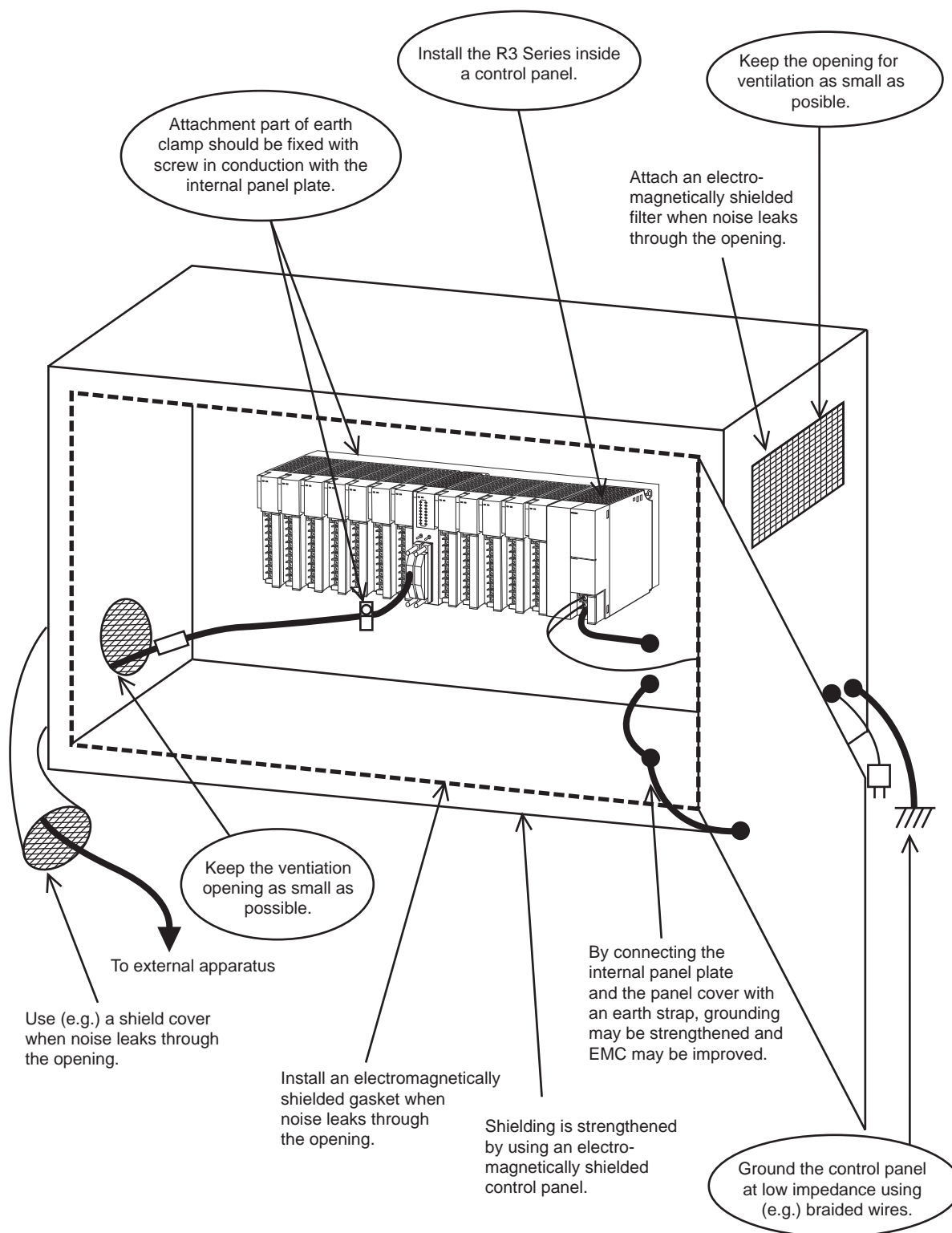
- When painting the internal plate of the control panel, apply masking to expose metal surface to secure conductivity at the sections where the following parts are attached:
 - Bolts attaching the internal panel to the control panel
 - Ground for the FG of the Power Supply Module(s) and the Network Module(s)
 - 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 below.

- 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 R3 Series



■ WARNINGS AND CAUTIONS WHEN LAYING CABLES

Signal cables connected to the R3 Series contain high-frequency components. Since these cables have the same effect as an antenna, they emit these high-frequency components to the external space as noise or overlap 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 R3 Series.

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 R3 series should be shielded.
- Use STP cables, called either S/FTP or SF/UTP in ISO/IEC 11801 : 2002, for R3-NEx.
- Use exclusively designed cables for the CC-Link, DeviceNet or PROFIBUS-DP.
- 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.

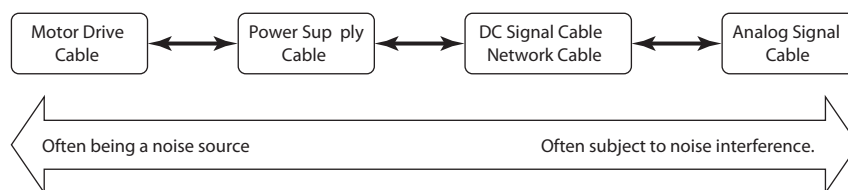
For DeviceNet, grounding should be taken at single point in the network.

- Attach a ferrite core in the vicinity of the input terminal or the connector for analog input module.
- Attach a ferrite core in the vicinity of the communication cable installed out of the control panel.

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:

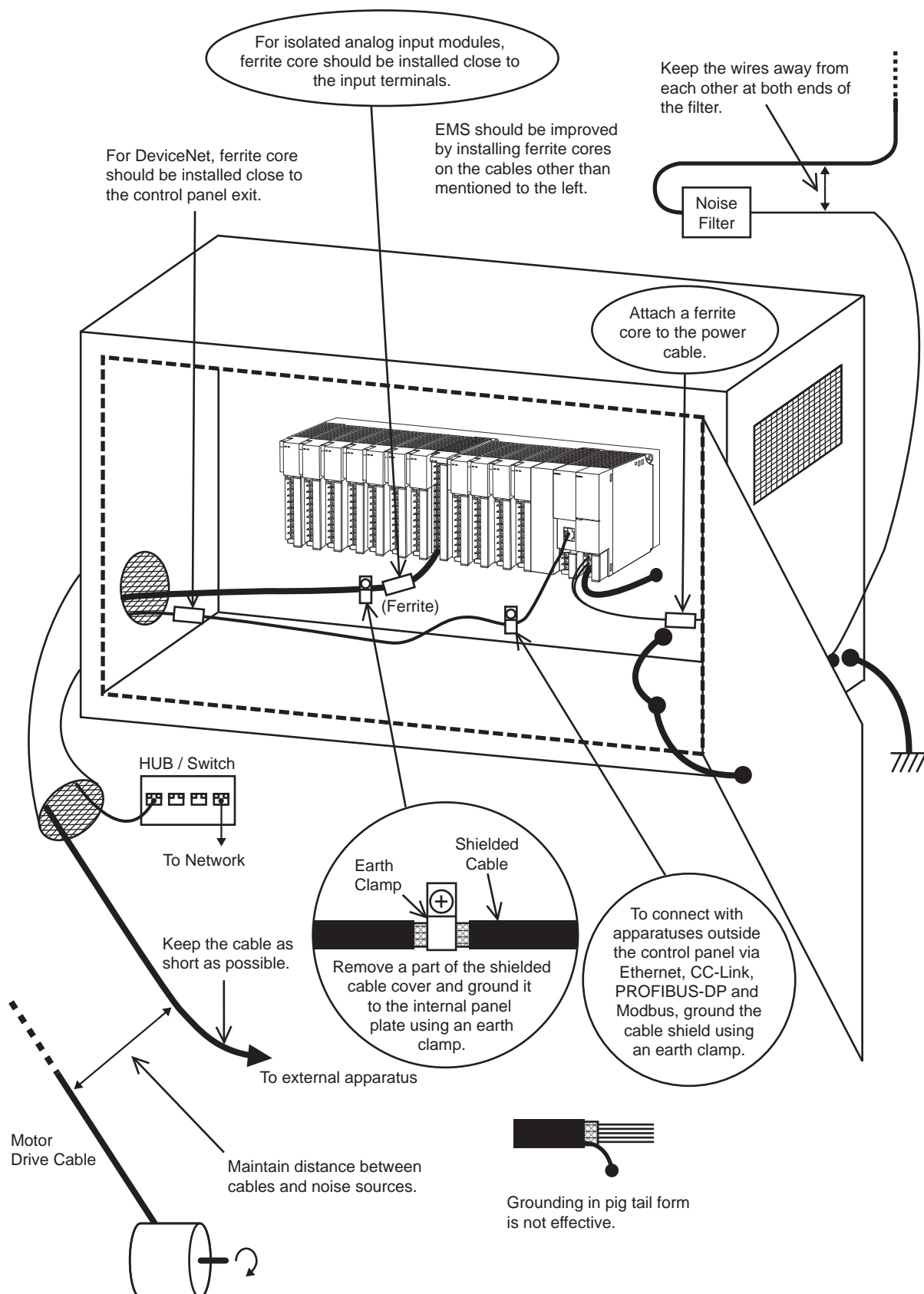
- Keeping physical distance (farther than 20 cm from motor drive cables, farther than 10 cm for other groups).
- Dividing off by a grounded metal plate
- Grouping into separate grounded metal pipes or cable shields.

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 R3 Series





Specifications are subject to change without notice.