

## Remote I/O R8 Series

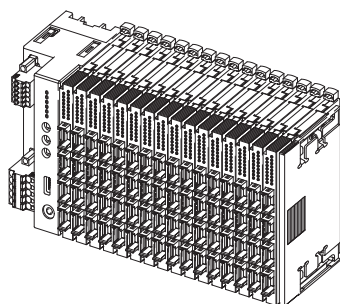
### R8 SERIES GENERAL SPECIFICATIONS

#### Functions & Features

- Remote I/O modules which interchange analog or digital I/O signals with the fieldbus
- Space-saving

#### Typical Applications

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



### ORDERING INFORMATION

- Power/Network module: R8-[1]-R  
Specify a code from below for [1].  
(e.g. R8-NM1-R)
- I/O module: R8-[1]  
Specify a code from below for [1].  
(e.g. R8-DA4A)
- Extension power supply module: R8-[1]-R  
Specify a code from below for [1].  
(e.g. R8-PS1-R)

### POWER/NETWORK MODULE: R8-[1]-R

Refer to the specifications for the respective models.

### [1] MODULE TYPE

- ND1:** DeviceNet
- NM1:** Modbus
- NECT1:** EtherCAT
- NC3:** CC-Link

### POWER INPUT

#### DC power

R: 24 V DC

(Operational voltage range:  $\pm 10\%$ ; ripple 10 %p-p max.)

### I/O MODULE: R8-[1]

Refer to the specifications for the respective models.

### [1] MODULE TYPE

#### • Analog Input

- SS2:** DC current input, (isolated), 2 points
- SS4NJ:** DC current input (built-in excitation, non-isolated), 4 points
- SS4N:** DC current input (non-isolated), 4 points
- SST8:** DC current input (isolated), 8 points
- SV2:** DC voltage input (isolated), 2 points
- SV4N:** DC voltage input (non-isolated), 4 points
- TS2:** Thermocouple input (isolated), 2 points
- RS4N:** RTD input (non-isolated), 4 points
- FS16N:** DC current/voltage input (built-in excitation, non-isolated), 16 points
- CT4E:** AC current input (RMS sensing, clamp-on current sensor, non-isolated), 4 points

#### • Analog Output

- YS2:** DC current output (isolated), 2 points
- YS2NJ:** DC current output (built-in excitation, non-isolated), 2 points
- YST4N:** DC current output (non-isolated), 4 points
- YV4N:** DC voltage output (non-isolated), 4 points

#### • Pulse Input

- PA4:** Totalized pulse input, 4 points
- PA4F:** High-speed totalized pulse input, 4 points

#### • Pulse Output

- PC4A:** Open collector output, 4 points

#### • Discrete Input

- DA4A:** Discrete input, 4 points
- DAM16A:** Discrete input (NPN), 16 points
- DAT16A2:** Discrete input (NPN), 16 points

#### • Discrete Output

- DC4A:** Discrete output (NPN), 4 points
- DC4A2:** Discrete output (NPN), 4 points
- DC4C:** Photo MOSFET relay output, 4 points
- DCT4D:** Relay output, 4 points
- DCM16A:** Discrete output (NPN), 16 points
- DCM16ALZ:** Discrete output (NPN) with full interlock, 16 points
- DCM16ALK:** Discrete output (NPN) with full and individual interlock, 16 points
- DCM16ALH:** Discrete output (NPN) with full and partial interlock, 16 points
- DCM32B2:** Discrete output (PNP), 32 points
- DCT16A2:** Discrete output (NPN), 16 points

#### • Temperature Control

- TC2:** Temperature Control Module

Since internal power supply source and internal communication bus are performed through the connector of each module, installation base is unnecessary.

**EXTENSION POWER SUPPLY MODULE: R8-[1]-R**

Refer to the specifications for the respective models.

**[1] MODULE TYPE**

PS1: Extension power supply module

**POWER INPUT**

- **DC power**

R: 24 V DC

(Operational voltage range:  $\pm 10\%$ ; ripple 10 %p-p max.)

**FUNCTIONS & FEATURES**

The R8 Series Remote I/O is composed of power/network modules, I/O modules and extension power supply module.

- **I/O MODULE**

Performs data conversion of field inputs; Data conversion of data received through the internal bus into outputs.

- **POWER/NETWORK MODULE**

The power/network module supplies the I/O modules with required internal electrical power source.

The power/network module changes the receiving data from internal bus into output signal and vice versa, acts as a gateway between transmission line and internal bus.

- **EXTENSION POWER SUPPLY MODULE**

Inserted between I/O modules and supply the power when output current of power/network module is insufficient.

- **DATA CONVERSION**

Depends upon the type of module and ranges.

For analog input module, 0 to 100 % of the selected range is converted into 0 to 10000 (dec) or 0000 to 2710 (hex). -5 to 0 % is represented in 2's complements.

Analog output is represented with 16-bit binary data. 0 to 10000 (dec) or 0000 to 2710 (hex)

is converted into 0 to 100 % of the selected range.

-5 to 0 % is represented in 2's complements.

For RTD, thermocouple input module at factory setting, data is represented with 16-bit signed binary data of engineering unit value ( $^{\circ}\text{C}$ ) multiplied by 10. e.g. In case of measuring  $27.5^{\circ}\text{C}$ , value is 275.

Refer to each model manual for details.

- **SCALING & ZERO & SPAN ADJUSTMENTS**

The PC Configurator Software (model: R8CFG) is available to scale 0 to 100 % data. It is available to configure in the range between -32000 and 32000. e.g. Configuring temperature range by Configurator Software enables to handle 100 to  $200^{\circ}\text{C}$  as value 0 to 10000.

- **HOT INSERTION/REMOVAL OF I/O MODULES**

Since internal power supply and internal bus are performed through the connector of each module, it cannot be replaced with the power on.

- **DIELECTRIC STRENGTH**

As dielectric strength differs depending on each module, refer to each specification sheet.

**RELATED PRODUCTS**

- PC configurator software (model: R8CFG)

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****Power input:**

- **R8-NM1-R, R8-NECT1-R, R8-ND1-R, R8-NC3-R, R8-PS1-R:** 24 V DC  $\pm 10\%$ ; ripple 10 %p-p max.

**Power consumption**

- **DC:** Approx. 12 W (Approx. 11 W for R8-PS1-R) 24 V DC (@ output current 1.6 A)

**Internal power**

- **DC:** 5 V DC
- **Operational current:** 1.6 A

**Excitation supply output**

- **DC:** 24 V DC  $\pm 10\%$
- **Operational current:** 10 A (8 A for R8-PS1-R) (Power output current consumption must be under rated current)

**Operating temperature:**  $-10$  to  $+55^{\circ}\text{C}$  (14 to  $131^{\circ}\text{F}$ )  
R8-NC3: 0 to  $55^{\circ}\text{C}$  (32 to  $131^{\circ}\text{F}$ )

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

**Atmosphere:** No corrosive gas or heavy dust

**Mounting:** DIN rail (35 mm wide)

**Connection**

- **Power/network module**
- **Power supply, exc. supply:**
  - Tension clamp style:** Front Twin Connection
  - Applicable wire size:** 0.2 to 2.5 mm<sup>2</sup>, stripped length 10 mm
- **Modbus:**
  - Tension clamp style:** Front Twin Connection
  - Applicable wire size:** 0.2 to 1.5 mm<sup>2</sup>, stripped length 10 mm
- **EtherCAT:** RJ-45 connector
- **DeviceNet:**
  - Tension clamp style:** Front Twin Connection
  - Communication cable:** Cable to meet the DeviceNet specification, Stripped length 10 mm
- **CC-Link:**
  - Tension clamp style:** Front Twin Connection
  - Communication cable:** Cable to meet the CC-Link specification, Stripped length 10 mm
- **I/O module:**

**Connection****·4 pin e-CON connector**

Unit side connector XN2D-1474-S002 (Omron)

Recommended cable side connector XN2A-1470 (Omron)\*<sup>1</sup>

Applicable wire size: 0.08 mm<sup>2</sup> (AWG28) - 0.5 mm<sup>2</sup> (AWG20)  
(Outer sheath diameter: max. 1.5 dia)

**·20 pin MIL connector**

Unit side connector XG4A-2034 (Omron), M-System's

Recommended cable side socket XG5N-201 (Omron)\*<sup>1</sup>

Recommended cable side contact XG5W-0231 (Omron)\*<sup>1</sup>

Applicable wire size: AWG22, number of conductor 17,  
diameter of conductor 0.16 mm

\*1. Not included in the package. Refer to the specifications  
of the product.

**·40 pin MIL connector**

Unit side connector XG4A-4034 (Omron), M-System's

Recommended cable side socket XG5N-401 (Omron)\*<sup>1</sup>

Recommended cable side contact XG5W-0231 (Omron)\*<sup>1</sup>

Applicable wire size: AWG22, number of conductor 17,  
diameter of conductor 0.16 mm

\*1. Not included in the package. Refer to the specifications  
of the product.

**•Extension power supply module:**

**Tension clamp style:** Front Twin Connection

**Applicable wire size:** 0.2 to 1.5 mm<sup>2</sup>, stripped length 10  
mm

**Housing material:** Flame-resistant resin (black)

**Max. number of I/O modules:** 16 (module address: 0 to 31)

**Internal communication bus:** Transmission cycle approx.

250 μsec / Module address

**■ WEIGHT**

R8-NM1: 160g (0.35 lb)

R8-NECT1: 180g (0.40 lb)

R8-ND1: 180g (0.40 lb)

R8-NC3: 180g (0.40 lb)

R8-CT4E: 65g (2.30 oz)

R8-DA4A: 60g (2.12 oz)

R8-DAM16A: 65g (2.30 oz)

R8-DAT16A2: 110g (0.24 lb)

R8-DC4A: 60g (2.12 oz)

R8-DC4A2: 60g (2.12 oz)

R8-DC4C: 60g (2.12 oz)

R8-DCT4D: 120g (0.26 lb)

R8-DCM16A: 65g (2.30 oz)

R8-DCM16ALZ: 110g (0.24 lb)

R8-DCM16ALK: 110g (0.24 lb)

R8-DCM16ALH: 110g (0.24 lb)

R8-DCM32B2: 110g (0.24 lb)

R8-DCT16A2: 110g (0.24 lb)

R8-FS16N: 110g (0.24 lb)

R8-PA4: 60g (2.12 oz)

R8-PA4F: 60g (2.12 oz)

R8-PC4A: 60g (2.12 oz)

R8-PS1: 100g (0.22 lb)

R8-RS4N: 60g (2.12 oz)

R8-SS2: 60g (2.12 oz)

R8-SS4N: 60g (2.12 oz)

R8-SS4NJ: 60g (2.12 oz)

R8-SST8: 100g (0.22 lb)

R8-SV2: 60g (2.12 oz)

R8-SV4N: 60g (2.12 oz)

R8-TC2: 110g (0.24 lb)

R8-TS2: 60g (2.12 oz)

R8-YS2: 110g (0.24 lb)

R8-YS2NJ: 60g (2.12 oz)

R8-YST4N: 120g (0.26 lb)

R8-YV4N: 60g (2.12 oz)

Protective cover: 15g (0.53 oz)

**■ DATA ALLOCATION**

R8-CT4E: 2

R8-DA4A: 1

R8-DAM16A: 1

R8-DAT16A2: 1

R8-DC4A: 1

R8-DC4A2: 1

R8-DC4C: 1

R8-DCT4D: 1

R8-DCM16A: 1

R8-DCM16ALZ: 1

R8-DCM16ALK: 1

R8-DCM16ALH: 1

R8-DCM32B2: 1

R8-DCT16A2: 1

R8-FS16N: 2

R8-PA4: 2

R8-PA4F: 2

R8-PC4A: 2

R8-RS4N: 2

R8-SS2: 2

R8-SS4N: 2

R8-SS4NJ: 2

R8-SST8: 2

R8-SV2: 2

R8-SV4N: 2

R8-TC2: 2

R8-TS2: 2

R8-YS2: 2

R8-YS2NJ: 2

R8-YST4N: 2

R8-YV4N: 2

**■ ADDRESSES IN USE**

R8-CT4E: 2

R8-DA4A: 1

R8-DAM16A: 1

R8-DAT16A2: 1  
 R8-DC4A: 1  
 R8-DC4A2: 1  
 R8-DC4C: 1  
 R8-DCT4D: 1  
 R8-DCM16A: 1  
 R8-DCM16ALZ: 1  
 R8-DCM16ALK: 1  
 R8-DCM16ALH: 1  
 R8-DCM32B2: 2  
 R8-DCT16A2: 1  
 R8-FS16N: 8  
 R8-PA4: 4  
 R8-PA4F: 4  
 R8-PC4A: 2  
 R8-RS4N: 2  
 R8-SS2: 1  
 R8-SS4N: 2  
 R8-SS4NJ: 2  
 R8-SST8: 4  
 R8-SV2: 1  
 R8-SV4N: 2  
 R8-TC2: 8  
 R8-TS2: 1  
 R8-YS2: 1  
 R8-YS2NJ: 1  
 R8-YST4N: 2  
 R8-YV4N: 2

## STANDARDS & APPROVALS

### EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

EN 50581

## CURRENT CONSUMPTION

The I/O modules operate by the DC voltage (5 V DC) supplied from the power/network module. Arrange these modules in order that the total current consumed by these modules be within the supply current capacity. If the current consumption exceeds the limit, insert an extension power supply module. Even if total consumption current of the I/O modules is less than the supply current capacity, the total install number of the modules is max. 16. (Except extension power supply module)

### ■ Max. current consumption

R8-CT4E: 100 mA  
 R8-DA4A: 80 mA  
 R8-DAM16A: 100 mA  
 R8-DAT16A2: 100 mA  
 R8-DC4A: 100 mA  
 R8-DC4A2: 100 mA  
 R8-DC4C: 120 mA  
 R8-DCT4D: 100 mA  
 R8-DCM16A: 110 mA  
 R8-DCM16ALZ: 160 mA  
 R8-DCM16ALK: 160 mA  
 R8-DCM16ALH: 160 mA  
 R8-DCM32B2: 110 mA  
 R8-DCT16A2: 110 mA  
 R8-FS16N: 100 mA  
 R8-PA4: 80 mA  
 R8-PA4F: 90 mA  
 R8-PC4A: 100 mA  
 R8-RS4N: 100 mA  
 R8-SS2: 100 mA  
 R8-SS4N: 80 mA  
 R8-SS4NJ: 80 mA  
 R8-SST8: 200 mA  
 R8-SV2: 100 mA  
 R8-SV4N: 80 mA  
 R8-TC2: 200mA  
 R8-TS2: 100 mA  
 R8-YS2: 80 mA  
 R8-YS2NJ: 70 mA  
 R8-YST4N: 70 mA  
 R8-YV4N: 160 mA

## USING EXCITATION SUPPLY

Some I/O modules use excitation supply, on the other hand some I/O modules do not. When excitation supply is cut off during power supply is on, operation is as the table shown below.

MODEL	EXC. SUPPLY	OPERATION AT ONLY EXC. SUPPLY CUT OFF
R8-SS2	—	Normal operation continued
R8-SS4NJ	✓	Exc. supply OFF, input normal operation continued
R8-SS4N	—	Normal operation continued
R8-SST8	—	Normal operation continued
R8-SV2	—	Normal operation continued
R8-SV4N	—	Normal operation continued
R8-TS2	—	Normal operation continued
R8-RS4N	—	Normal operation continued
R8-CT4E	—	Normal operation continued
R8-YS2	✓	Output 0 mA DC
R8-YS2NJ	✓	Exc. supply OFF, output 0mA DC
R8-YST4N	✓	Output 0 mA DC
R8-YV4N	—	Normal operation continued
R8-PA4	✓	Input OFF, voltage pulse normal operation continued
R8-PA4F	✓	Input OFF
R8-PC4A	✓	Output OFF
R8-DA4A	✓	Input OFF
R8-DAM16A	✓	Input OFF
R8-DAT16A2	✓	Input OFF
R8-DC4A2	✓	Output OFF
R8-DC4C	—	Normal operation continued
R8-DCT4D	✓	Output OFF
R8-DCM16A	✓	Output OFF
R8-DCM16ALZ	✓	Output OFF, input OFF
R8-DCM16ALK	✓	Output OFF, input OFF
R8-DCM16ALH	✓	Output OFF, input OFF
R8-DCM32B2	✓	Output OFF
R8-DCT16A2	✓	Output OFF
R8-FS16N	✓	Exc. supply OFF, input normal operation continued
R8-TC2	✓	Output 0 mA DC or 0 V DC Input 1, 2, CT input 1, 2, normal operation continued

✓: Excitation supply is used. —: Excitation supply is not used.

## ■ MAXIMUM CURRENT CONSUMPTION OF EXCITATION POWER SUPPLY

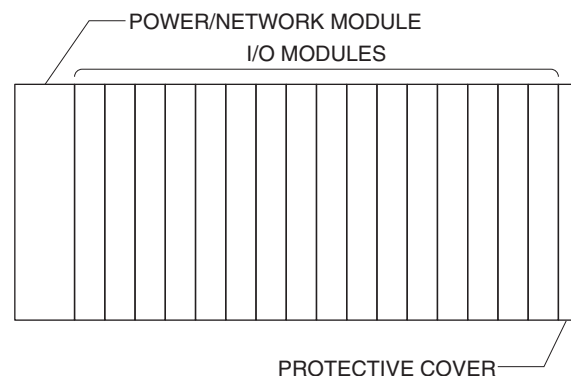
For following models, power supply of output is supplied from excitation power supply.

- R8-DCT4D: 40 mA
- R8-YS2: 60 mA
- R8-YS2NJ: 50 mA
- R8-YST4N: 90 mA
- R8-TC2: 60 mA

## BASIC CONFIGURATION

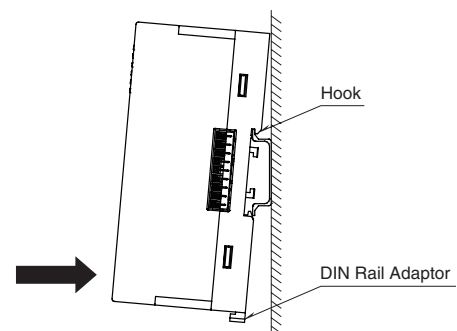
The number of I/O modules that can be mounted changes depending on power/network module. Refer to the specifications of each power/network module for details.

Although Module address position can be set arbitrary, avoid from address overlap.  
 4-point analog I/O module takes two addresses per module. For example with the model R8-SV4N located at the module address 5, the inputs 1 and 2 are assigned to the address 5, and the inputs 3 and 4 are to the address 6. Do not assign another module to the address 6. All 4 inputs (input 1 through 4) can be used with Data Allocation 2, while only the inputs 1 and 3 can be used with Data Allocation 1. Totalize pulse input 4 points module have 4 addresses available per module. Set to allocation area 2.  
 For modules which use more than 2 address, set address so that end address does not exceed 31. For totalize pulse input 4 points module, address should not exceed 28. Only for rightmost module, set termination resistor to enable. Protective cover included for power/network modules.

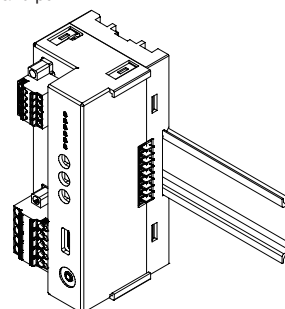


## ■ HOW TO MOUNT THE MODULE ON DIN RAIL

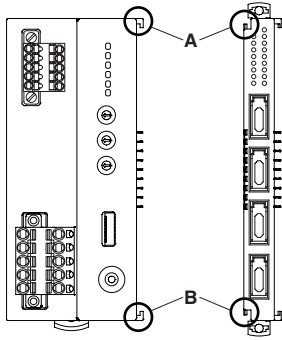
### • Power/Network Module



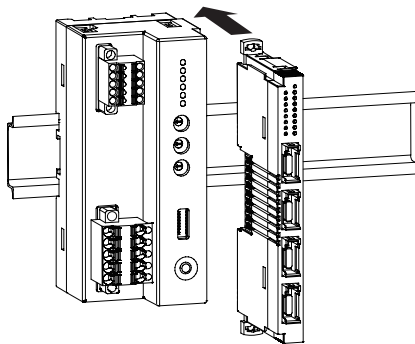
Position the upper hook at the rear on the DIN rail and push in the lower. When removing the module, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



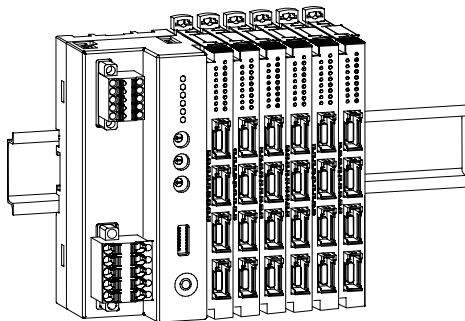
## • I/O Module



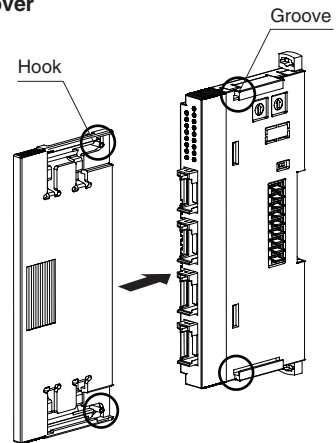
Confirm that the locking clamps of the I/O module are set.  
 Insert the module in parallel to the next one while aligning the grooves of both modules (A & B in the above figure).  
 Maintain it perpendicularly to the rail.



More I/O modules can be added in the same manner.

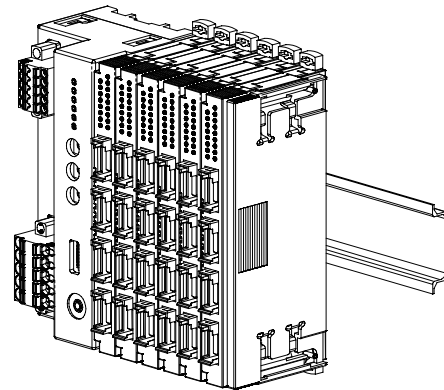


## • Protective Cover

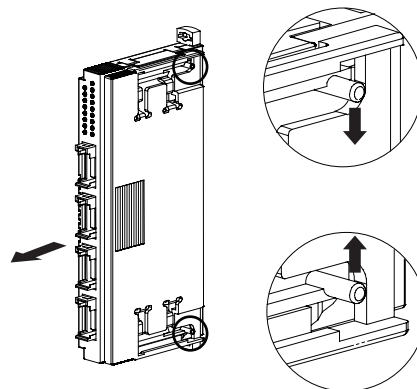


The protective cover is to be attached over the connected I/O module at the right end.

Align the hooks on the cover with the grooves of the module and slide it straight until the hooks are latched.

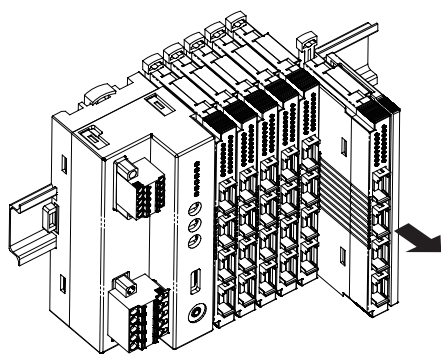
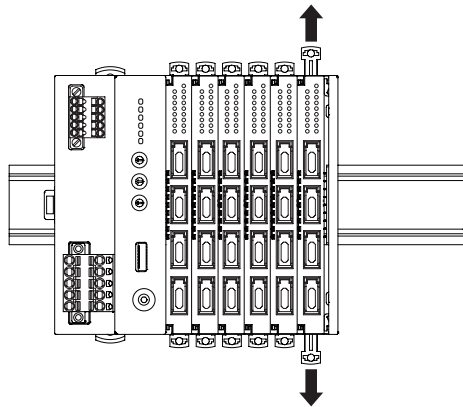


When removing the cover, pull it out while squeezing the hooks inward.

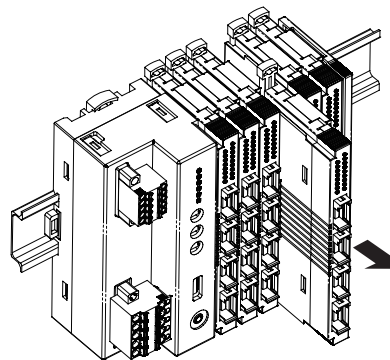
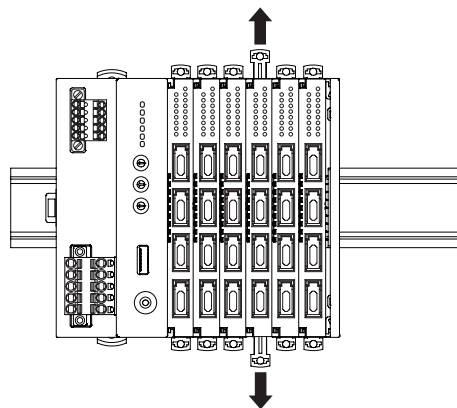


## ■ HOW TO UNMOUNT MODULES

Release the locking clamps and pull out straight the module.



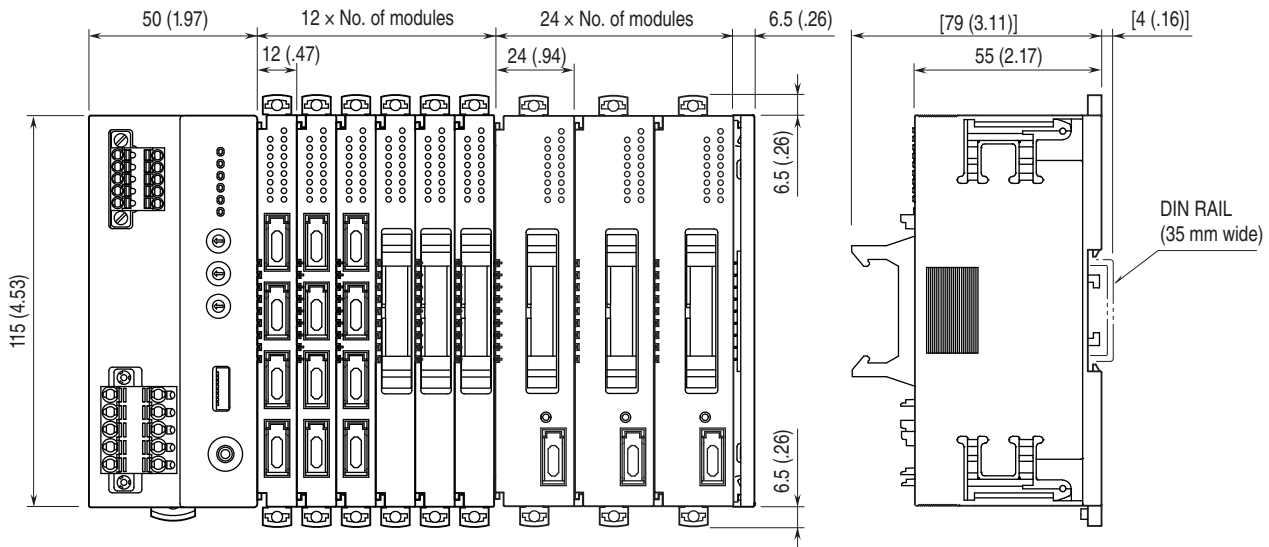
• Removing an intermediate module



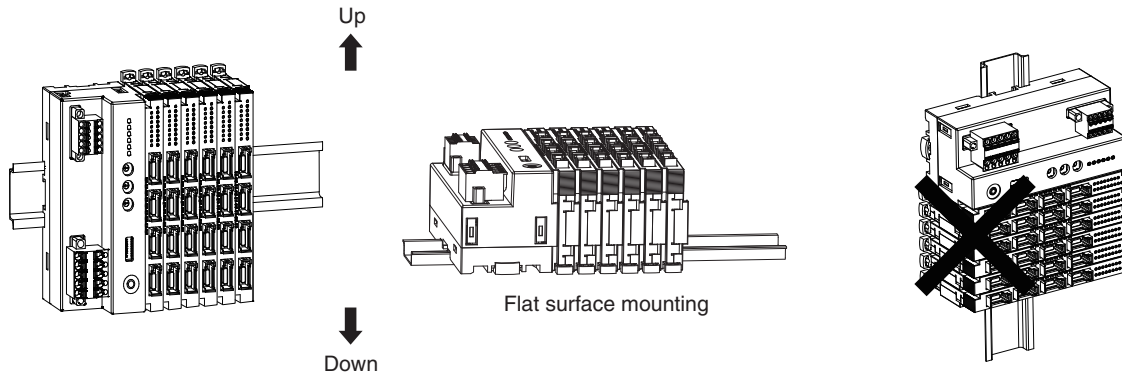
### Caution !

- 1) Be careful not to hurt your hand by pointed edges of the internal bus connector.
- 2) I/O modules cannot hold tightly on the DIN rail by themselves without power/network module.  
Secure them to the position if necessary by using DIN rail end plates.

## MOUNTING REQUIREMENTS unit: mm (inch)

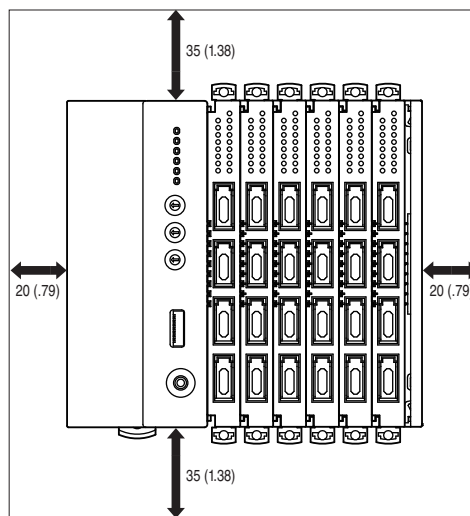


### ■ MOUNTING DIRECTION



### ■ MOUNTING TO PANEL: mm (inch)

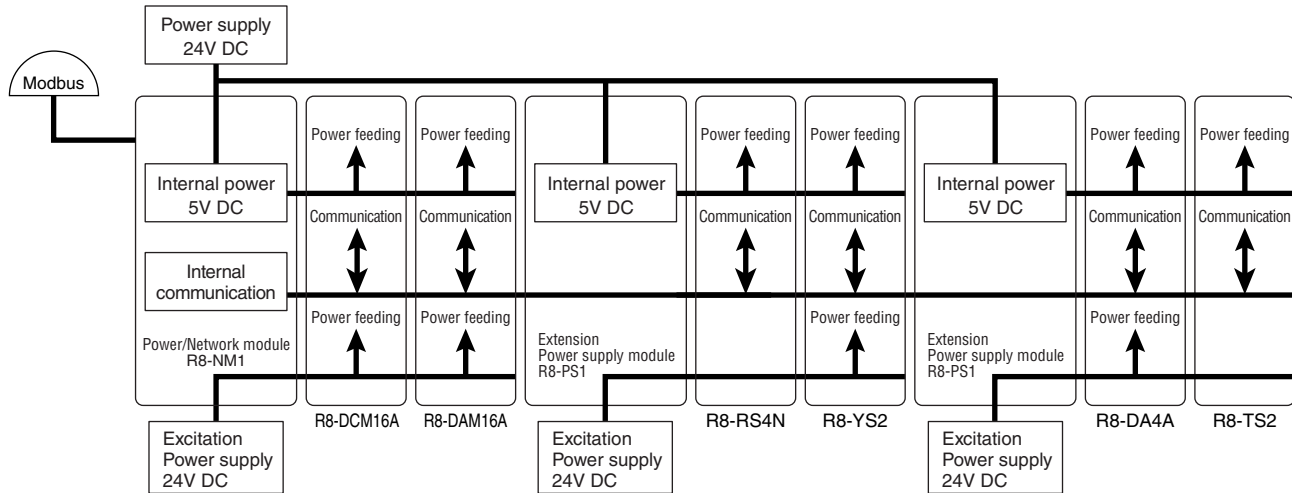
Leave enough space between the unit and the mounting panel.





**SYSTEM CONFIGURATION EXAMPLES**

■ **POWER/NETWORK MODULE: R8-NM1**



Note 1: Use same power source for Power/Network module and Extension power supply module.  
 Note 2: Extension power supply module can be used up to two units at the same time.



Specifications are subject to change without notice.