INSTRUCTION MANUAL

POWER/NETWORK MODULE
(DeviceNet)

MODEL **R8-ND1**

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:

Power/network module ....(1)
Protective cover ....(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.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

• The equipment must be mounted inside a panel.
• 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.

■ GENERAL PRECAUTIONS

• Before you remove or mount the unit, turn off the power supply.

■ POWER INPUT RATING & OPERATIONAL RANGE

• Locate the power input rating marked on the product and confirm its operational range as indicated below:
DC Power supply: 24V DC rating
    24V DC ± 10%, approx. 12W
    (@ internal power max. current 1.6A)
Excitation supply (excitation for I/O module):
    24V DC ± 10%, operational current 10A
(From power supply (excitation supply) connector, via connector for internal bus, supplied to each I/O module. Power output current consumption must be under operational current.)

■ 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 for analog module, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

INSTALLATION

Internal power supply/communication is connected via each module's connector, therefore no backplane base is required, however, hot-swapping of modules is not possible.

### ■ NODE ADDRESS & NETWORK SETTING

Settings of node address, baud rate, data allocation and I/O data area size must be completed before mounting the module.

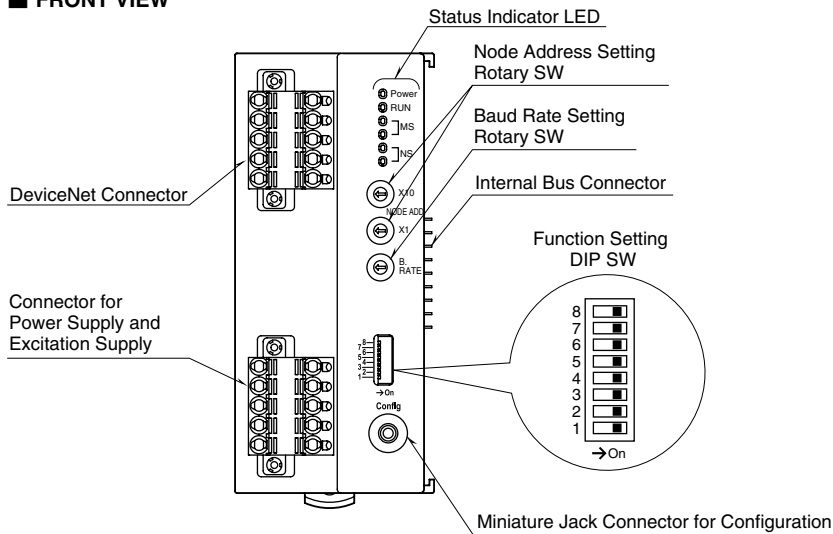### ■ HOW TO MOUNT THE MODULE ON DIN RAIL

• **Power/Network Module**
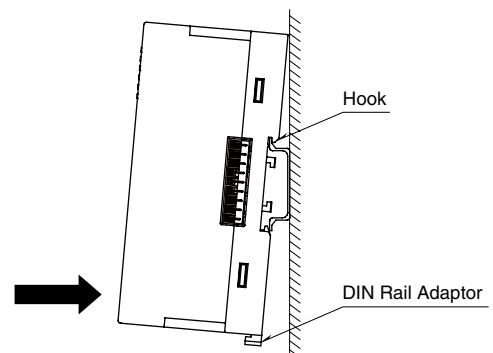
Position the upper hook at the rear on the DIN rail and push in the lower. When removing the module, push down the DIN rail adaptor utilizing a minus screwdriver and pull.
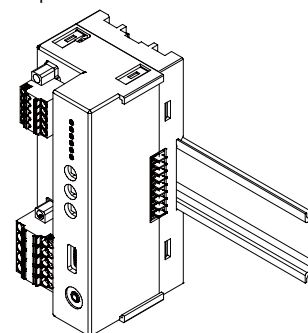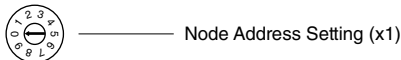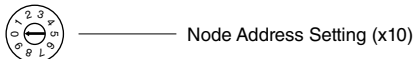
COMPONENT IDENTIFICATION

■ **FRONT VIEW**

■ **FRONT SWITCHES**

• **Node Address**

Node Address is selected from 0 to 63 in decimal. The upper switch determines the tens' place digit, while the lower switch does the ones' place digit of the address.
(Factory setting: 00)

Node Address Setting (x10)

Node Address Setting (x1)

• **Baud Rate**

Baud Rate is selected with the rotary switch. Positions 3 through 9 are unused. Be sure to select from 0 to 2.

0 : 125kbps
1 : 250kbps
2 : 500kbps

Baud Rate Setting
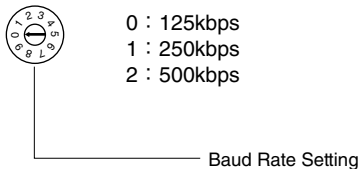
• **Data Allocation Mode: SW1**

SW	DATA ALLOCATION MODE	
	2	1
SW1	OFF (*)	ON

• **I/O data area size: SW2, 3, 4**

OUTPUT(words)		INPUT (words)	SW		
R8 INPUT DATA	R8 STATUS	R8 OUTPUT DATA	2	3	4
64	4	64	OFF	OFF	OFF
56	4	56	ON	OFF	OFF
48	3	48	OFF	ON	OFF
40	3	40	ON	ON	OFF
32	2	32	OFF	OFF	ON
24	2	24	ON	OFF	ON
16	1	16	OFF	ON	ON
8	1	8	ON	ON	ON

Note: Be sure to set unused SW5 through 8 to OFF.

■ **STATUS INDICATOR LED**

ID	STATE	COLOR	TO INDICATE
Power	ON	Green	Power supplied
RUN	ON / Blink	Green	Turns on or blinks depending on the status
MS	ON	Green	Normal operation
	ON	Red	Critical failure
	Blink		Minor failure
NS	ON	Green	Connections are established
	Blink		Connections are not established
	ON	Red	Critical Link failure
	Blink		Minor Link failure

■ **POWER SUPPLY, EXCITATION SUPPLY CONNECTOR ASSIGNMENT**

Printed-circuit board connector (Phoenix Contact)
  Unit side connector: MSTBV2,5/5-GF-5,08AU
  Cable side connector: TFKC2,5/5-STF-5,08AU
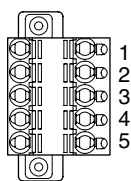
PIN No.	ID	FUNCTION
1	24V	Power supply 24V DC
2	0V	Power supply 0V DC
3	+	Excitation supply 24V DC
4	–	Excitation supply 0V DC
5	FE1	Grounding

■ **NETWORK CONNECTOR ASSIGNMENT**

Printed-circuit board connector (Phoenix Contact)
  Unit side connector: MSTBV2,5/5-GF-5,08AU
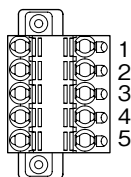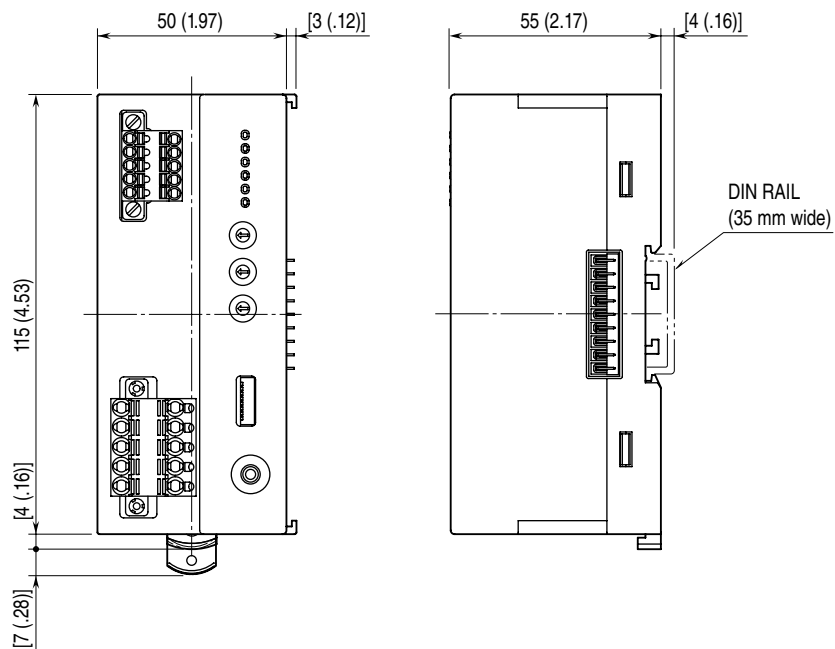 Cable side connector: TFKC2,5/5-STF-5,08AU M

PIN No.	ID	FUNCTION
1	V –	POWER (–)
2	CAN_L	Signal Low
3	Drain	Shield
4	CAN_H	Signal High
5	V +	POWER (+)

TERMINAL CONNECTIONS

Connect the unit as in the diagram below.
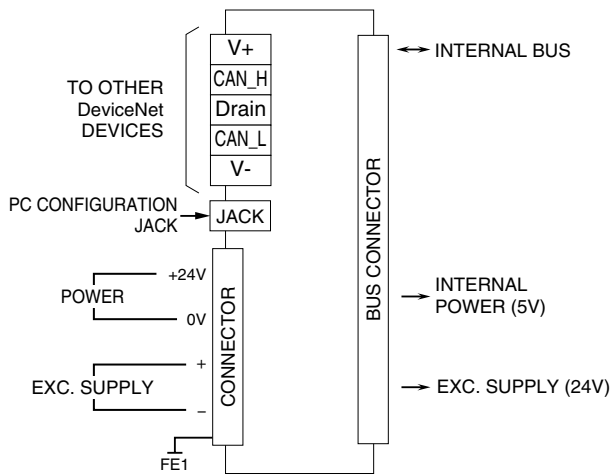
■ **EXTERNAL DIMENSIONS unit: mm (inch)**

• **Unit**

50 (1.97) [3 (.12)] 55 (2.17) [4 (.16)]

DIN RAIL
(35 mm wide)

115 (4.53)

[4 (.16)]

[7 (.28)]

• **PROTECTIVE COVER**

5 (.20) 50 (1.97)

115 (4.53)
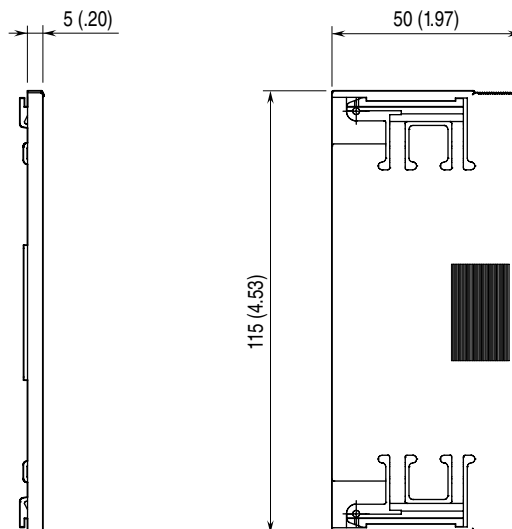
■ CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE1 terminal to the ground.

Caution: FE1 terminal is NOT a protective conductor terminal.

WIRING INSTRUCTIONS

■ TENSION CLAMP TERMINAL BLOCK

• Power Input, excitation supply

Applicable wire size: $0.2 - 2.5$ mm^2
Stripped length: 10 mm

• DeviceNet

Transmission cable: Approved for DeviceNet
Stripped length: 10 mm

DeviceNet I/O ASSIGNMENTS

The DIP SW located on the front of the module switches the unit's data allocation modes.
In the Data Allocation Mode 1, one (1) word is assigned per module. The second channels of 2-point analog I/O modules become unavailable. In the Data Allocation Mode 2, two (2) words are assigned per module regardless of whether the second word areas are required or not. When an I/O module of 32-bit data is used, set the Data Allocation Mode to 2.

4-point analog I/O modules take two addresses per module. For example, when the model R8-SV4N is 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. In this case, be sure not to assign another module to the address 6. All 4 inputs (input 1 through 4) are available with Data Allocation Mode 2, while only the inputs 1 and 3 can be used with Data Allocation Mode 1.

R8-ND1 also supports I/O mixed modules, being capable of both reading input data and writing output data.

■ DATA ALLOCATION MODE 1 (with SW2, 3, 4 = OFF, OFF, ON)

• Output Data Area
The figure below shows the allocation of data sent from R8-ND1 to the master.
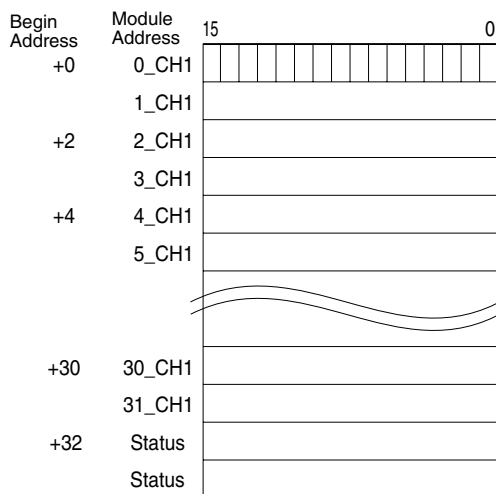
• Input Data Area
The figure below shows the allocation of data R8-ND1 receives from the master.
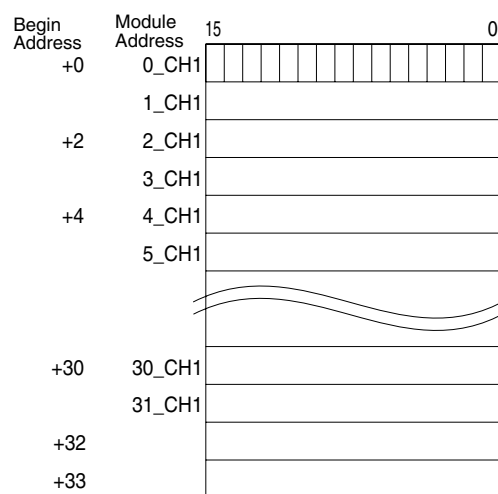
Each module takes one-word areas for input and output respectively, regardless of the module type. For example, when a connected module is an input type module, the input value is set in the output data area. Although the input data area is unused, it is still secured.

For I/O mixed modules, the both input and output data areas are used.

■ **STATUS**

The status of I/O modules is shown in the Status in the output data area.
 • Inputs of R8-TSx and/or R8-RSx (temperature input modules) burnout.
 • Input values of R8-SVx and/or R8-SSx (analog input modules) are out of the range of -5 to +105%.
In these cases, corresponding bits turn to "1". All the bits corresponding to unmounted modules turn to "1" as well.

Begin
Address+32 Status

| 15 | | | | | | | | | | | | | | | 0 |

Module Address 0_CH1
Module Address 1_CH1
Module Address 2_CH1

Module Address 15_CH1

Begin
Address+33 Status

| 15 | | | | | | | | | | | | | | | 0 |

Module Address 16_CH1
Module Address 17_CH1
Module Address 18_CH1

Module Address 31_CH1

■ **DATA ALLOCATION MODE 2 (with SW2, 3, 4 = OFF, OFF, OFF)**

• Output Data Area
The figure below shows the allocation of data sent from R8-ND1 to the master.

Begin Address	Module Address	15 ... 0
+0	0_CH1	
	0_CH2	
+2	1_CH1	
	1_CH2	
+4	2_CH1	
	2_CH2	
+62	31_CH1	
	31_CH2	
+64	Status	
+65	Status	
+66	Status	
+67	Status	

• Input Data Area
The figure below shows the allocation of data R8-ND1 receives from the master.

Begin Address	Module Address	15 ... 0
+0	0_CH1	
	0_CH2	
+2	1_CH1	
	1_CH2	
+4	2_CH1	
	2_CH2	
+62	31_CH1	
	31_CH2	
+64		
+65		
+66		
+67		

Each module takes two-word areas for input and output respectively, regardless of the module type. For example, when a connected module is an input type module, the input value is set in the output data area. Although the input data area is unused, it is still secured.
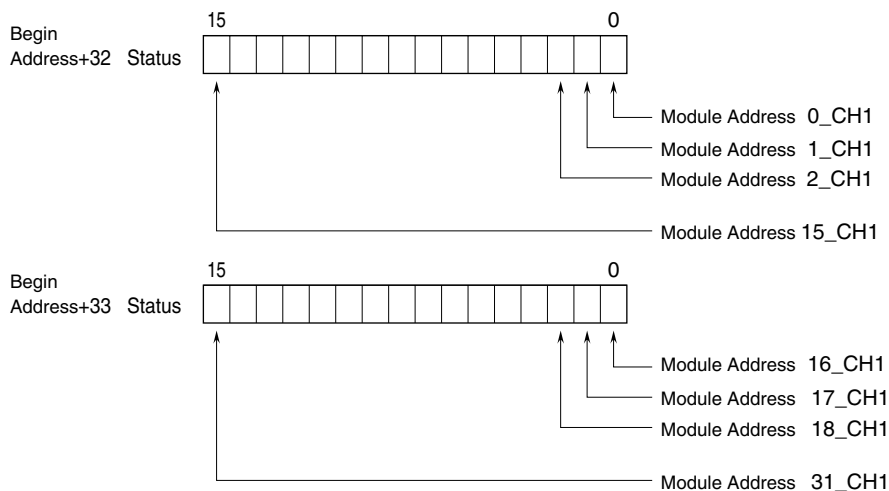For I/O mixed modules, the both input and output data areas are used.
For discrete I/O modules, areas of CH1 are used.

■ **STATUS**

The status of I/O modules is shown in the Status in the output data area.
 • Inputs of R8-TSx and/or R8-RSx (temperature input modules) burnout.
 • Input values of R8-SVx and/or R8-SSx (analog input modules) are out of the range of -5 to +105%.
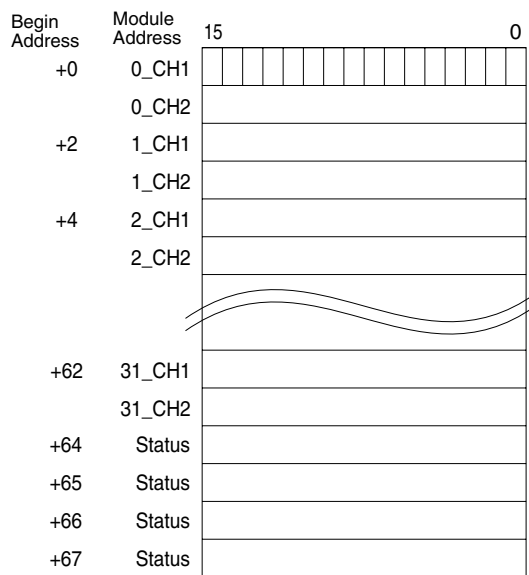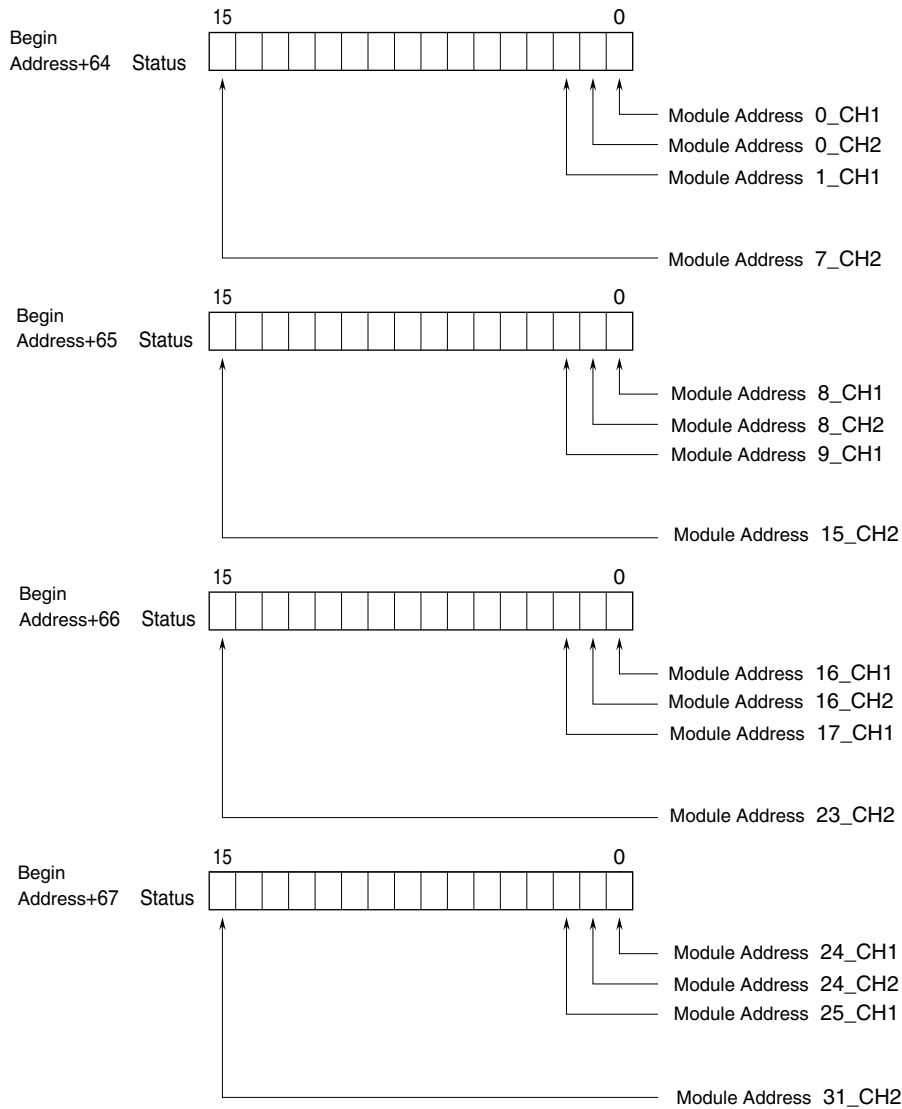In these cases, corresponding bits turn to "1". All the bits corresponding to unmounted modules turn to "1" as well.

Begin Address+64   Status

15 — 0

Module Address 0_CH1
Module Address 0_CH2
Module Address 1_CH1

Module Address 7_CH2

Begin Address+65   Status

15 — 0

Module Address 8_CH1
Module Address 8_CH2
Module Address 9_CH1

Module Address 15_CH2

Begin Address+66   Status

15 — 0

Module Address 16_CH1
Module Address 16_CH2
Module Address 17_CH1

Module Address 23_CH2

Begin Address+67   Status

15 — 0

Module Address 24_CH1
Module Address 24_CH2
Module Address 25_CH1

Module Address 31_CH2

■ **EDS FILE**

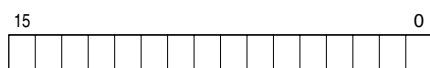EDS files are downloadable at our web site.

I/O DATA DESCRIPTIONS

■ ANALOG DATA

0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
Negative values are represented in 2's complements.

15   0

■ PULSE DATA (16-bit data)

Negative value is not available, the data is shown with the range 0 to 65535.
16-bit binary data is used for pulse data (16-bit data).

15   0

■ PULSE DATA (32-bit data)

32-bit binary data is used for pulse data (32-bit data).
Lower 16 bits are allocated a lower address and higher 16 bits are allocated a higher address.

+0   15 ... 0   Lower 16 bits

+1   15 ... 0   Higher 16 bits
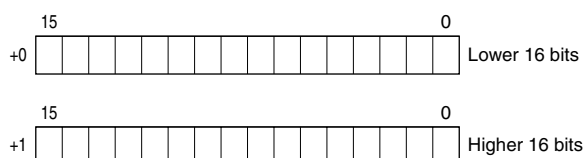
■ ANALOG DATA (Temperature date)

16-bit binary data is used for temperature data.
With °C, K temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.
With °F temperature unit, the integer section of raw data is directly converted into the data.
For example, 135.4°F is converted into 135.
Minus temperature is converted into negative values, represented in 2's complements.
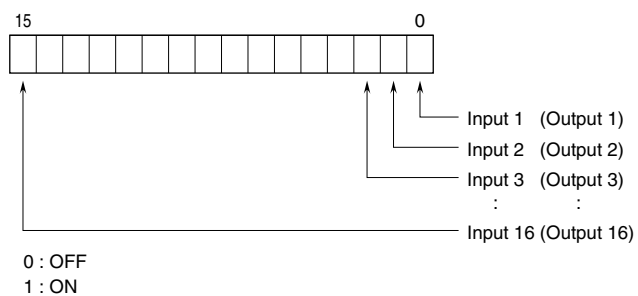
15   0

■ ANALOG DATA (CT data)

16-bit binary data is used for CT data.
Conversion data is shown by the engineering unit value multiplied by 100 or 1000. For example, for 520.35 A when 0 to 600 A range, the data is 52035 as the conversion data is the engineering value multiplied by 100.
Negative value is not available, the data is shown with the range 0 to 65535.

15   0

■ **DISCRETE DATA**


```
15                          0
```

Input 1 (Output 1)
Input 2 (Output 2)
Input 3 (Output 3)
    :   :
Input 16 (Output 16)

0 : OFF
1 : ON

For I/O mixed modules shown below, interlock status is assigned to input 1 (to 3) in addition to output 1 to 16.

R8-DCM16ALZ	Input 1	Full interlock
R8-DCM16ALK	Input 1	Full interlock
	Input 2	Individual interlock 1
	Input 3	Individual interlock 2
R8-DCM16ALH	Input 1	Full interlock
	Input 2	Partial interlock 1
	Input 3	Partial interlock 2