

ETHERNET POWER/NETWORK MODULE (Modbus/TCP)

MODEL **R8-NE1**

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 module 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 module, etc.

■ 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 $\pm$ 10%, approx. 12W
(@ internal power max. current 1.6A)
Excitation supply (excitation for I/O module):
24V DC $\pm$ 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.)

■ GENERAL PRECAUTIONS

- Before you remove or mount the module, turn off the power supply 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 module inside proper housing with sufficient ventilation.

- Do not install the module where it is subjected to continuous vibration. Do not subject the module 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.

■ SECURITY PRECAUTIONS

- In the network environment where this module is installed, to maintain the security of the system (availability, integrity, confidentiality) against unauthorized access from external devices via the network such as the Internet, DoS attacks, and other cyber attacks, take measures such as installing firewalls or VPNs.
- We will not be responsible for any issues arising from system troubles caused by cyber attacks.

■ AND

- The module 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

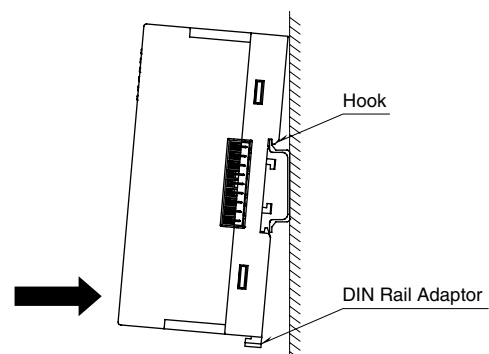
Internal power supply/communication is connected via each module's connector, therefore no backplane base is required, however, hot-swapping of modules is not possible.

■ IP ADDRESS & NETWORK SETTING

Settings of IP address and data allocation area must be completed before turning on the module.

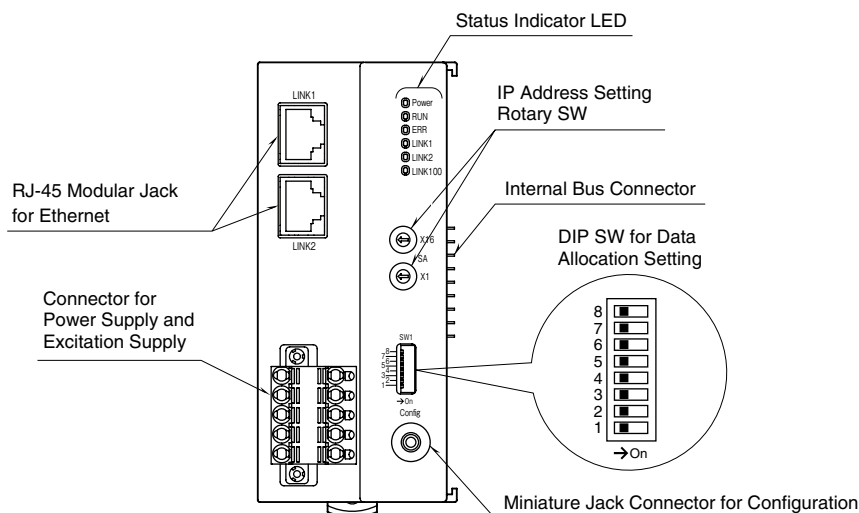
■ HOW TO MOUNT THE MODULE ON DIN RAIL

- Power/Network Module



Hang 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 SWITCHES

• IP Address

Set the host address of IP address with SA (×16 and ×1). Set 0 when using the IP host address set by PC Configurator Software (model: R8CFG).

DHCP client function is supported. Set IP address to FFH to enable DHCP client function.

Use PC Configurator Software to configure Network Address, Subnet Mask, and Default Gateway.

(Setting range: 0 to 255 (FFH)) (Factory setting: 0)

• Data Allocation Mode: SW1

SW1	DATA ALLOCATION MODE
OFF (*)	2
ON	1

(*) Factory default setting

Note: Set unused SW2 to 8 to OFF.

■ STATUS INDICATOR LED

ID	COLOR	FUNCTION
Power	Green	ON with normal internal power
RUN	Green	ON with normal communication
ERR	Red	ON with device error
LINK1	Green	ON with communication line 1 is in Link status.
LINK2	Green	ON with communication line 2 is in Link status.
LINK100	Green	ON with 100BASE communication

■ POWER SUPPLY, EXCITATION SUPPLY CONNECTOR ASSIGNMENT

Printed-circuit board connector (Phoenix Contact)

Module 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
2	0V	Power supply 0V
3	+	Excitation supply 24V
4	–	Excitation supply 0V
5	FE1	Grounding

PC CONFIGURATOR

The following parameter items can be set with using PC Configurator Software (model: R8CFG).
Refer to the users manual for the R8CFG for detailed operation of the software program.

■ INTERFACE SETTING

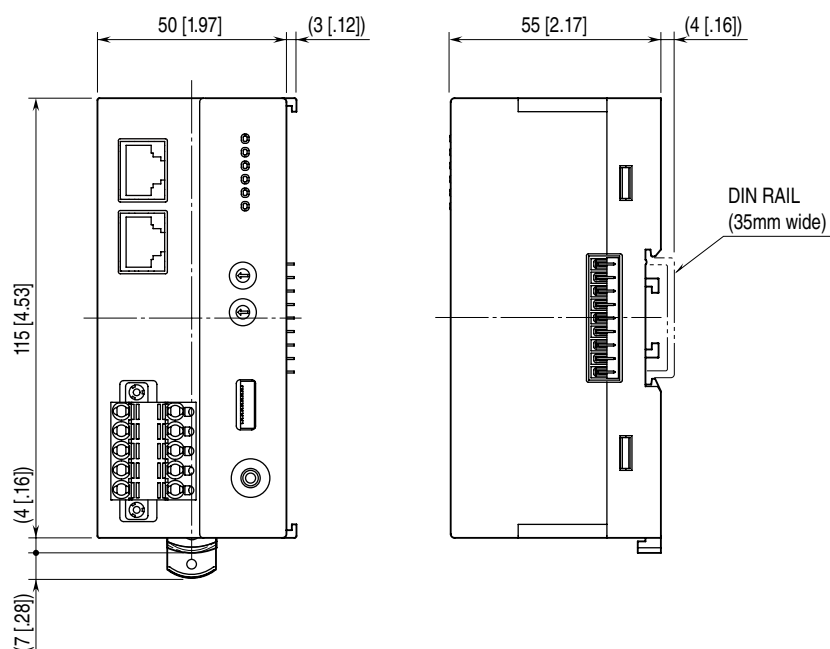
PARAMETER	SETTING RANGE	DEFAULT SETTING
IP Address	0.0.0.0 to 255.255.255.255	192.168.0.1
Subnet Mask	0.0.0.0 to 255.255.255.255	255.255.255.0
Default Gateway	0.0.0.0 to 255.255.255.255	192.168.0.100
Port number	502	502
Communication Timeout	1.0 to 3200.0 (sec.)	3.0 (sec.)

TERMINAL CONNECTIONS

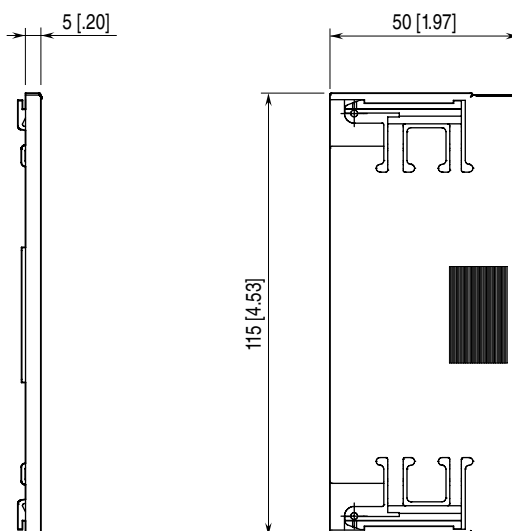
Connect the module as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm [inch]

• Module



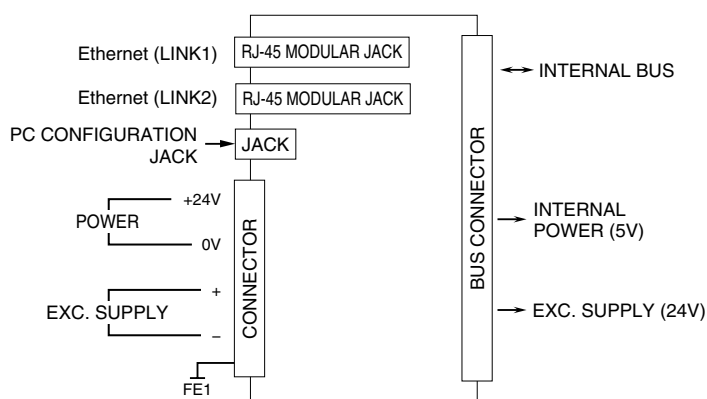
• Protective Cover



■ CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE1 terminal to 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 mm²

Stripped length: 10 mm

CHECKING ETHERNET CONNECTION

■ IP ADDRESS

Set the host address in the IP address using the front rotary switches.

When using the host address in the IP address set on the PC configurator software (model:R8CFG), set the switches to '0'.
When the network address, Subnet Mask, and Default Gateway need to be changed, do so on R8CFG.

■ CHECK WIRING

Connect an Ethernet cable to the front RJ-45 modular jack.

■ CHECK LED

When wiring is correct, LINK1 or LINK2 is turned on.

■ CHECK R8-NE1 CONNECTION

Open Command Prompt in Windows, and enter "ping command" as follows:

```
C:\WINDOWS>ping ***.***.***.***
(***.***.***.***: Enter IP address in decimal.)

ping ***.***.***.*** with 32 bytes of data:
Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64

Ping statistics for ***.***.***.***
Packets: Sent=4, Received=4, Lost=0(0% loss)
```

Replies in case of normal connection are as shown above. If the connection cannot be established normally due to e.g. wrong IP address, other replies such as "time over" will be received.

■ CHECK CONNECTION TO THE APPLICATION SOFTWARE

Check Point 1: LINK LED

LINK1 or LINK2 turns on when the module has established normal connections with PC, PLC, hub, and so on, regardless of data sending/receiving status.

In the case that they are not on, check power supply to the hub.

Check Point 2: RUN INDICATOR

When the module has transmitted/received data correctly to/from the application software, RUN indicator turns on in green.

MODBUS FUNCTION CODES & SUPPORTED CODES

■ Data and Control Functions

CODE	NAME	
01	Read Coil Status	Digital output from the slave
02	Read Input Status	Status of digital inputs to the slave
03	Read Holding Registers	General purpose register within the slave
04	Read Input Registers	Collected data from the field by the slave
05	Force Single Coil	Digital output from the slave
06	Preset Single Register	General purpose register within the slave
15	Force Multiple Coils	Digital output from the slave
16	Preset Multiple Registers	General purpose register within the slave

■ Exception Codes

CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave
02	Illegal Data Address	Address is not available within the slave
03	Illegal Data Value	Data is not valid for the function

MODBUS I/O ASSIGNMENTS

The DIP SW located at the side of the module switches the module's data allocation mode.

In the Data Allocation Mode 1, one (1) word is assigned per module. The second channel of analog I/O modules cannot be used. When I/O module of 32-bit data is used, set the Data Allocation Mode to 2.

In the Data Allocation Mode 2, two (2) words are assigned per module regardless of whether the second word area is required or not.

For discrete I/O, 16-channel area is automatically assigned to each module. With a 4-channel module, the bits assigned to ch. 5 through 16 remain "0."

A 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 Mode 2, while only the inputs 1 and 3 can be used with Data Allocation Mode 1.

Note: DO NOT access addresses other than mentioned below. Such access may cause problems such as inadequate operation.

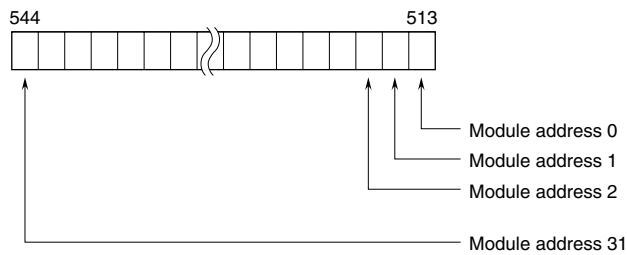
• Bit data area

Coil (0X)	1 – 16	Module address 0	Do 1 – 16 / Ao 1
	17 – 32	Module address 1	Do 1 – 16 / Ao 1
	33 – 48	Module address 2	Do 1 – 16 / Ao 1
	49 – 64	Module address 3	Do 1 – 16 / Ao 1
	:	:	:
	497 – 512	Module address 31	Do 1 – 16 / Ao 1
Inputs (1X)	1 – 16	Module address 0	Di 1 – 16 / Ai 1
	17 – 32	Module address 1	Di 1 – 16 / Ai 1
	33 – 48	Module address 2	Di 1 – 16 / Ai 1
	49 – 64	Module address 3	Di 1 – 16 / Ai 1
	:	:	:
	497 – 512	Module address 31	Di 1 – 16 / Ai 1
	513 – 544	Module status	

■ MODULE STATUS

Indicates the slots where I/O modules are mounted.

When the module is mounted, the corresponding bit turns to “1.”



• Word data area

The data allocation of word data area depends on the data allocation setting.

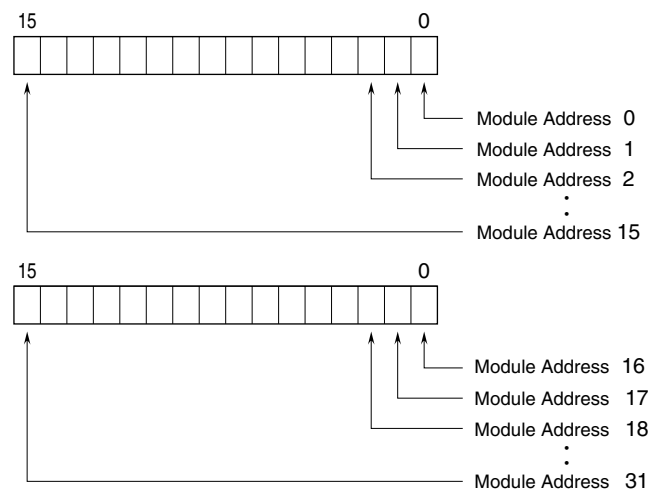
■ Data Allocation Mode 1 (SW1: ON)

Input Registers (3X)	1	Module address 0	Ai 1 / Di 1 – 16
	2	Module address 1	Ai 1 / Di 1 – 16
	3	Module address 2	Ai 1 / Di 1 – 16
	4	Module address 3	Ai 1 / Di 1 – 16
	:	:	:
	32	Module address 31	Ai 1 / Di 1 – 16
	33, 34	Module status	
	35, 36	Data error status	
Holding Registers (4X)	1	Module address 0	Ao 1 / Do 1 – 16
	2	Module address 1	Ao 1 / Do 1 – 16
	3	Module address 2	Ao 1 / Do 1 – 16
	4	Module address 3	Ao 1 / Do 1 – 16
	:	:	:
	32	Module address 31	Ao 1 / Do 1 – 16

■ MODULE STATUS

Indicates the slots where I/O modules are mounted.

When the module is mounted, the corresponding bit turns to “1.”

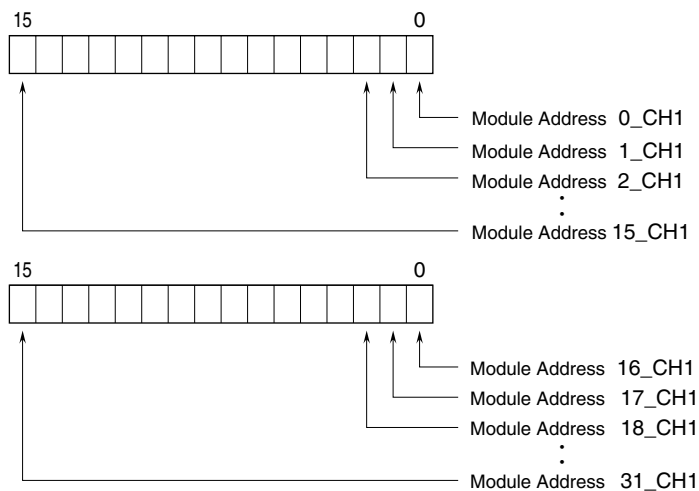


■ DATA ERROR STATUS

The data error status of I/O modules is shown in the Status.

- 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 “0” as well.



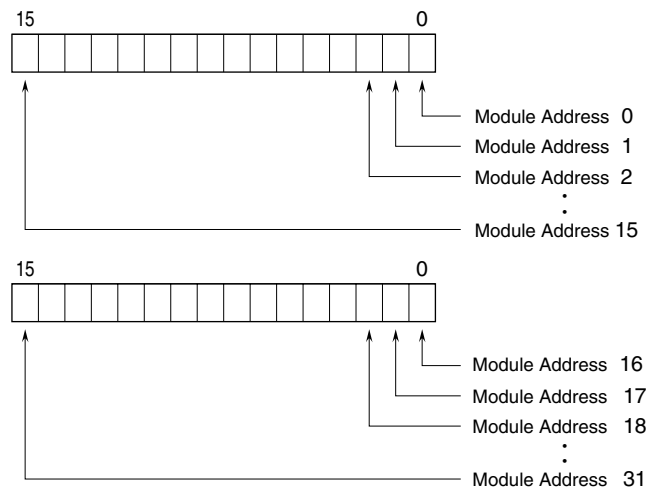
■ Data Allocation Mode 2 (SW1: OFF)

Input Registers (3X)	1	Module address 0	Ai 1 / Di 1 – 16
	2	Module address 0	Ai 2
	3	Module address 1	Ai 1 / Di 1 – 16
	4	Module address 1	Ai 2
	:	:	:
	63	Module address 31	Ai 1 / Di 1 – 16
	64	Module address 31	Ai 2
	65, 66	Module status	
	67, 68	Data error status	
	69, 70	Data error status	
Holding Registers (4X)	1	Module address 0	Ao 1 / Do 1 – 16
	2	Module address 0	Ao 2
	3	Module address 1	Ao 1 / Do 1 – 16
	4	Module address 1	Ao 2
	:	:	:
	63	Module address 31	Ao 1 / Do 1 – 16
	64	Module address 31	Ao 2

■ MODULE STATUS

Indicates the slots where I/O modules are mounted.

When the module is mounted, the corresponding bit turns to “1.”

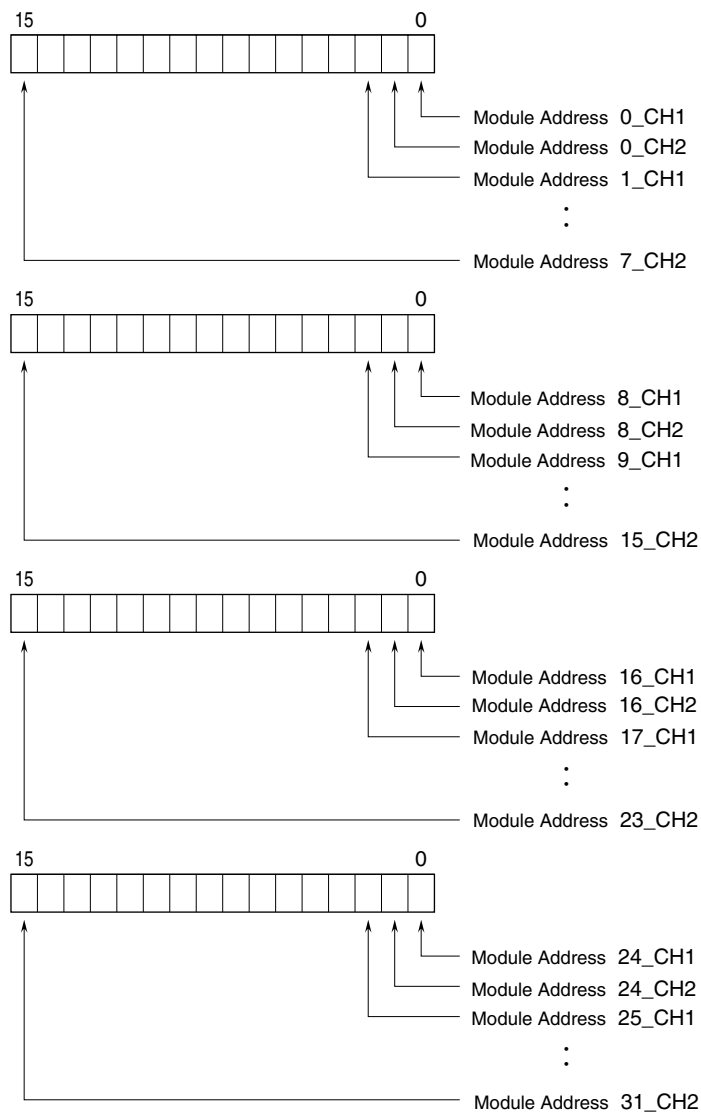


■ DATA ERROR STATUS

The data error 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 “0” as well.



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.



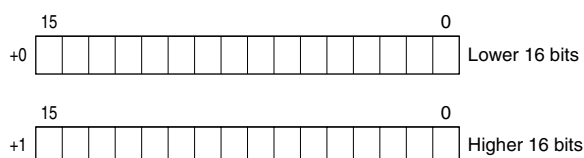
■ PULSE DATA (16-bit data)

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).



■ 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.



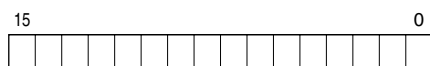
■ ANALOG DATA (Temperature data)

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.

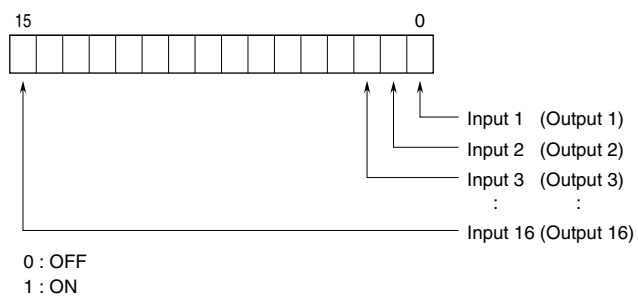


■ ANALOG DATA (CT data)

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.



■ DISCRETE DATA



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