POWER/NETWORK MODULE
(EtherNet/IP)

MODEL **R8-NEIP1**

BEFORE USE ....

Thank you for choosing M-System. 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 M-System's 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.

■ IP ADDRESS & NETWORK SETTING

Settings of IP address, data allocation and I/O data area size must be completed before mounting the module.
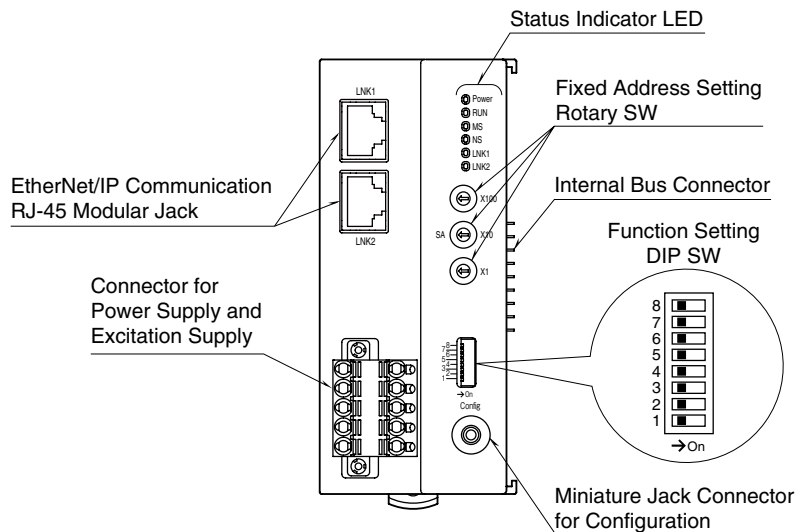
■ HOW TO MOUNT THE MODULE ON DIN RAIL

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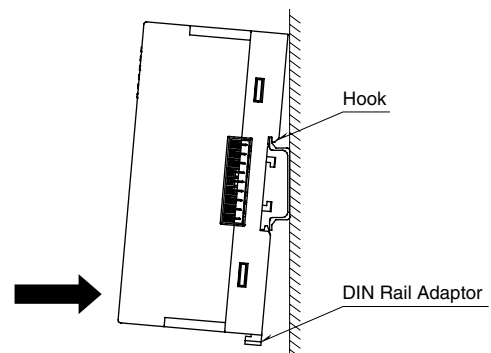
Hang the upper hook at the rear on the DIN rail and push in the lower. When removing the module, push down the DIN rail adaptor utilizing a minus screwdriver and pull.

COMPONENT IDENTIFICATION

Status Indicator LED

Fixed Address Setting Rotary SW

Internal Bus Connector

Function Setting DIP SW

EtherNet/IP Communication RJ-45 Modular Jack

Connector for Power Supply and Excitation Supply

Miniature Jack Connector for Configuration

■ FRONT SWITCHES

• IP Address

Set the host address of IP address with SA (x100, x10 and x1). Set 0 when using the IP host address set by PC Configurator Software (model: R8CFG). Use PC Configurator Software to configure Network Address, Subnet Mask, and Default Gateway. (Setting range: 0 to 255) (Factory setting: 0)

IP Host Address Setting (x100)

IP Host Address Setting (x10)

IP Host Address Setting (x1)
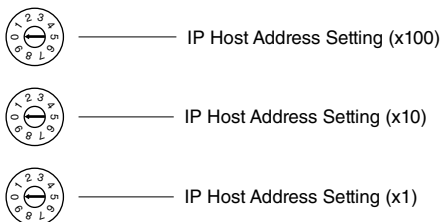
• Data Allocation Mode: SW1

SW1	DATA ALLOCATION MODE
OFF(*)	2
ON	1

(*) Factory default setting

• I/O data area size: SW2, 3

When the data allocation mode "2" (SW1 = OFF).

SW		OUTPUT			INPUT		
SW2	SW3	R8 INPUT DATA (words)	R8 STATUS (words)	SIZE (bytes)	R8 OUTPUT DATA (words)	RESERVED AREA (words)	SIZE (bytes)
OFF (*)	OFF (*)	64	6	140	64	6	140
ON	OFF	48	6	108	48	6	108
OFF	ON	32	6	76	32	6	76
ON	ON	16	6	44	16	6	44

(*) Factory default setting.

When the data allocation mode "1" (SW1 = ON)

SW		OUTPUT			INPUT		
SW2	SW3	R8 INPUT DATA (words)	R8 STATUS (words)	SIZE (bytes)	R8 OUTPUT DATA (words)	RESERVED AREA (words)	SIZE (bytes)
OFF	OFF	32	4	72	32	4	72
ON	OFF	16	4	40	16	4	40

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	Data communicating
MS	ON	Green	Normal operation
	ON	Red	Critical failure
	Blink		Duplicated IP address, Internal data error
NS	ON	Green	Connections are established
	Blink		Connections are not established
	ON	Red	Duplicated IP address
	Blink		Communication timeout
LNK1	ON	Green	Link 1 established
LNK2	ON	Green	Link 2 established

■ **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
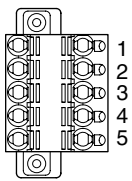
PIN No.	ID	FUNCTION
1	24V	Power supply 24V DC
2	0V	Power supply 0V DC
3	+	Excitation supply 24V DC
4	–	Excitation supply 0V DC
5	FE1	Grounding

PC CONFIGURATOR

With configurator software, settings shown below are available.
Refer to the software manual of R8CFG for detailed operation.

■ **NETWORK MODULE SETTING**

PARAMETER	SETTING RANGE	DEFAULT SETTING
IP Address	0.0.0.0 to 255.255.255.255	192.168.0.250
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	192.168.0.1
Communication Timeout	0.0 to 3200.0 (sec.)	3.0 (sec.)

TERMINAL CONNECTIONS

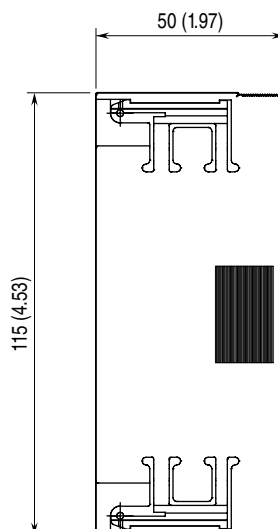Connect the unit as in the diagram below.

■**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

EtherNet/IP RJ-45 MODULAR JACK

INTERNAL BUS

EtherNet/IP RJ-45 MODULAR JACK

PC CONFIGURATION JACK → JACK

BUS CONNECTOR

+24V
POWER
0V

INTERNAL POWER (5V)

EXC. SUPPLY +
−

CONNECTOR

EXC. SUPPLY (24V)

FE1
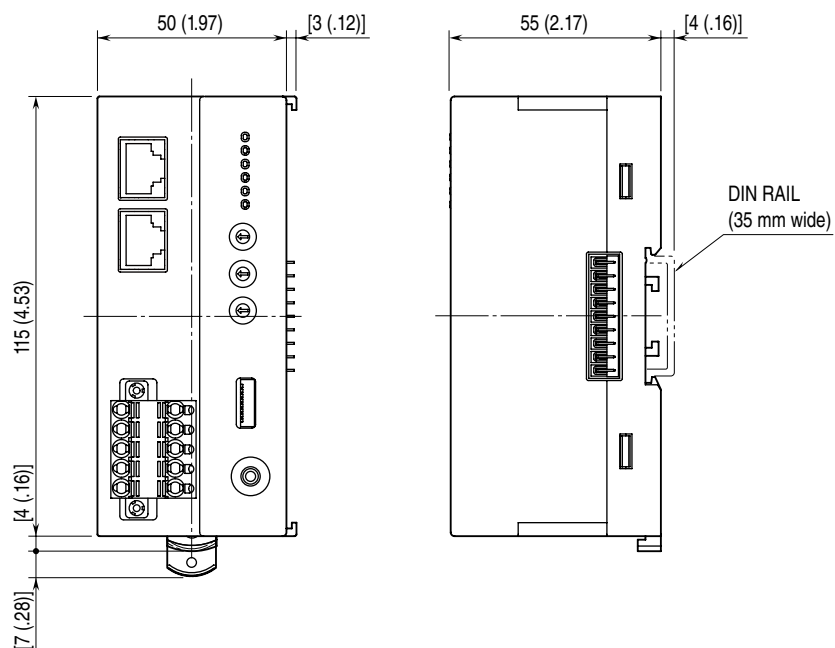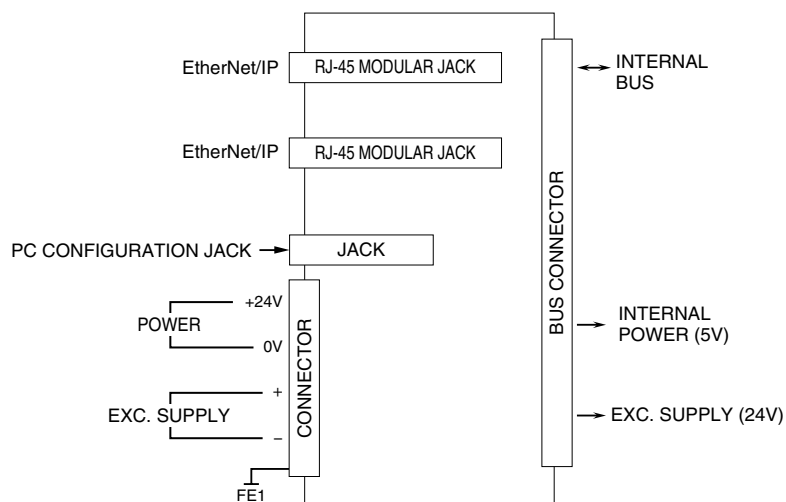
WIRING INSTRUCTIONS

■ TENSION CLAMP TERMINAL BLOCK

• Power Input, excitation supply
Applicable wire size: 0.2 – 2.5 mm²
Stripped length: 10 mm

CHECKING ETHERNET/IP 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.

To configure a DLR (Device Level Ring) network, perform wiring so as to form a ring topology.

The DLR network requires at least one node as a ring supervisor.

The customer shall prepare one or more ring supervisors separately as the R8-NEIP1 unit does not function as one.

■ CHECK LED

When wiring is correct, LNK1 or LNK2 is turned on.

■ CHECK R8-NEIP1 CONNECTION

Enter "ping command" on the Windows MS-DOS 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

LNK1 or LNK2 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: MS AND NS INDICATOR

When the module has transmitted/received data correctly to/from the application software, MS and NS indicators turn on in green

TRANSMISSION DATA DESCROPTION

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.
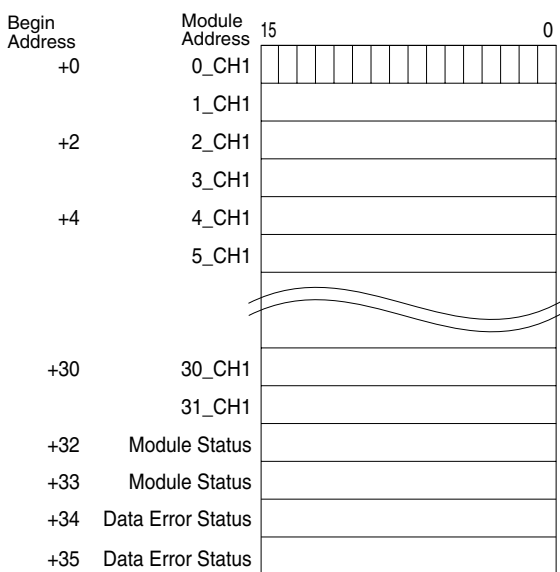
4-point analog I/O modules take two addresses per module. For example, when the model R8-SV4N is located at the module address 5, the inputs 1 and 2 are assigned to the address 5, and the inputs 3 and 4 are to the address 6. In this case, be sure not to assign another module to the address 6. All 4 inputs (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-NEIP1 also supports I/O mixed modules, being capable of both reading input data and writing output data.

■ DATA ALLOCATION MODE 1 (with SW1 = ON, SW2, 3 = OFF, OFF)

• Output Data Area
The figure below shows the allocation of data sent from R8-NEIP1 to the master.

Begin Address	Module Address	15 ... 0
+0	0_CH1	
	1_CH1	
+2	2_CH1	
	3_CH1	
+4	4_CH1	
	5_CH1	
+30	30_CH1	
	31_CH1	
+32	Module Status	
+33	Module Status	
+34	Data Error Status	
+35	Data Error Status	

• Input Data Area
The figure below shows the allocation of data R8-NEIP1 receives from the master.

Begin Address	Module Address	15 ... 0
+0	0_CH1	
	1_CH1	
+2	2_CH1	
	3_CH1	
+4	4_CH1	
	5_CH1	
+30	30_CH1	
	31_CH1	
+32		
+33		
+34		
+35		
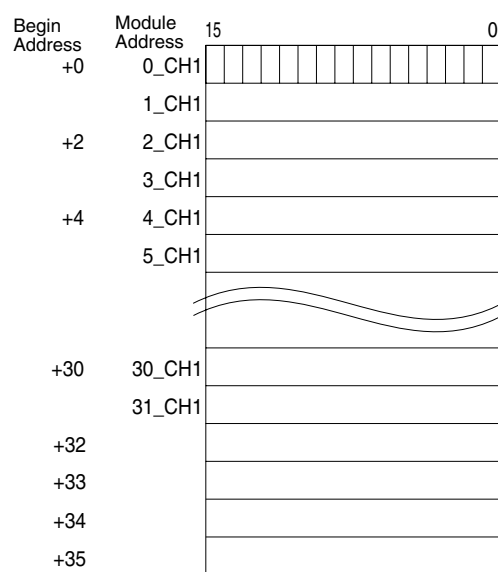
Each module takes one-word areas for input and output respectively, regardless of the module type. For example, when a connected module is an input type module, the input value is set in the output data area. Although the input data area is unused, it is still secured.
For I/O mixed modules, the both input and output data areas are used.

■**MODULE STATUS**

Indicates the slots where I/O modules are mounted.
When the module is mounted, the corresponding bit turns to "1."

Begin
Address+32

```
15                                    0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Module Address 0
Module Address 1
Module Address 2
Module Address 15

Begin
Address+33

```
15                                    0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Module Address 16
Module Address 17
Module Address 18
Module Address 31

■**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 "1" as well.

Begin
Address+34

```
15                                    0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Module Address 0_CH1
Module Address 1_CH1
Module Address 2_CH1
Module Address 15_CH1

Begin
Address+35

```
15                                    0
┌──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┬──┐
│  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │  │
└──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┴──┘
```

Module Address 16_CH1
Module Address 17_CH1
Module Address 18_CH1
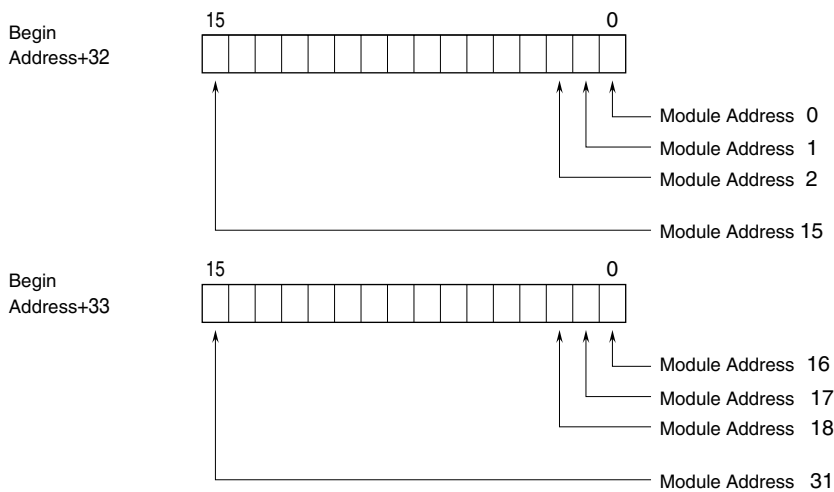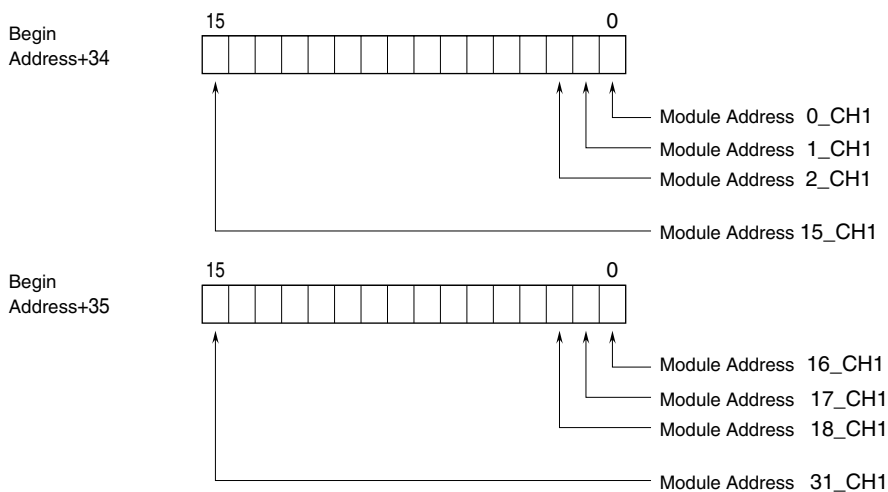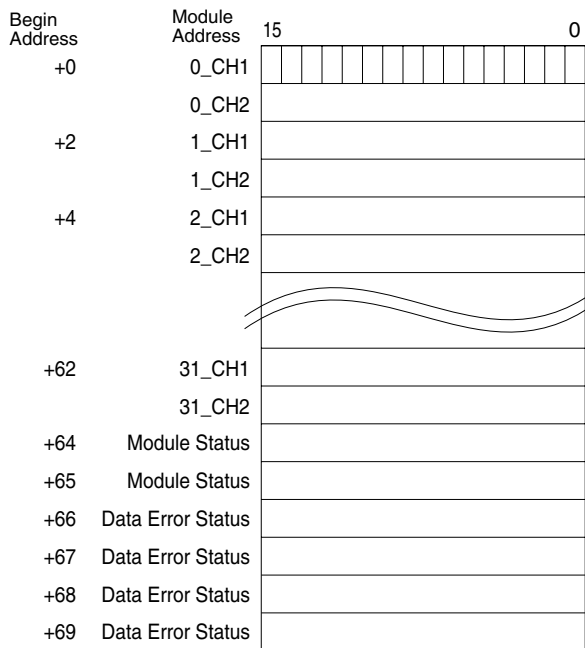Module Address 31_CH1

■ **DATA ALLOCATION MODE 2 (with SW1 = OFF, SW2, 3 = OFF, OFF)**

• Output Data Area
The figure below shows the allocation of data sent from R8-NEIP1 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	Module Status	
+65	Module Status	
+66	Data Error Status	
+67	Data Error Status	
+68	Data Error Status	
+69	Data Error Status	

• Input Data Area
The figure below shows the allocation of data R8-NEIP1 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		
+68		
+69		
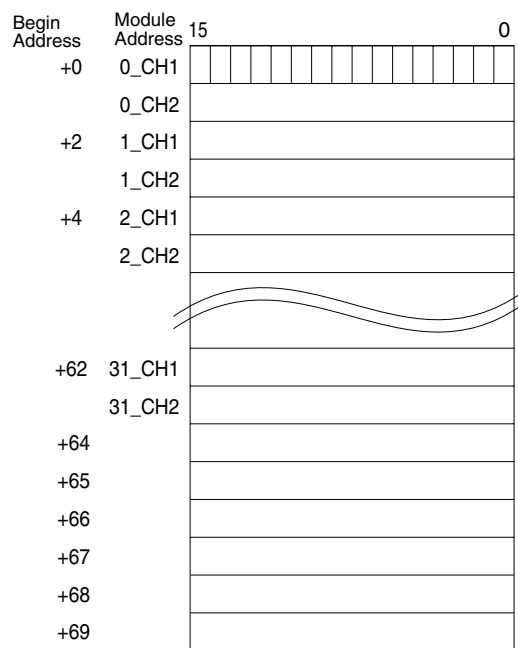
Each module takes two-word areas for input and output respectively, regardless of the module type. For example, when a connected module is an input type module, the input value is set in the output data area. Although the input data area is unused, it is still secured.
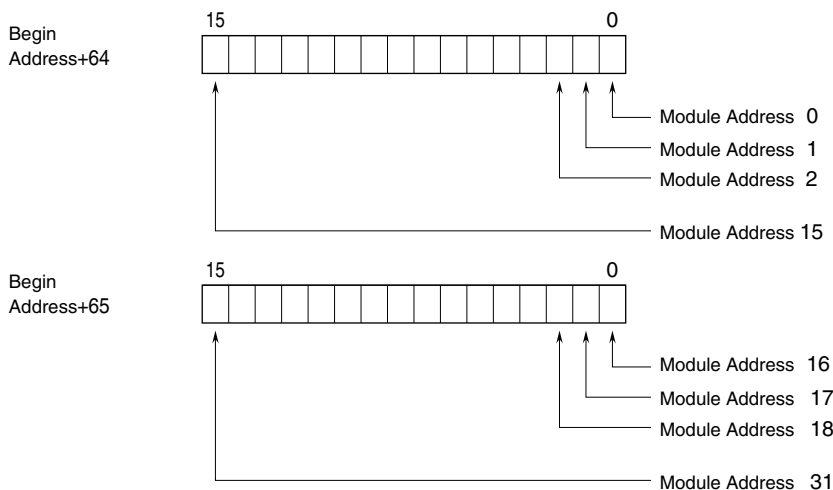For I/O mixed modules, the both input and output data areas are used.
For discrete I/O modules, areas of CH1 are used.

■ **MODULE STATUS**

Indicates the slots where I/O modules are mounted.
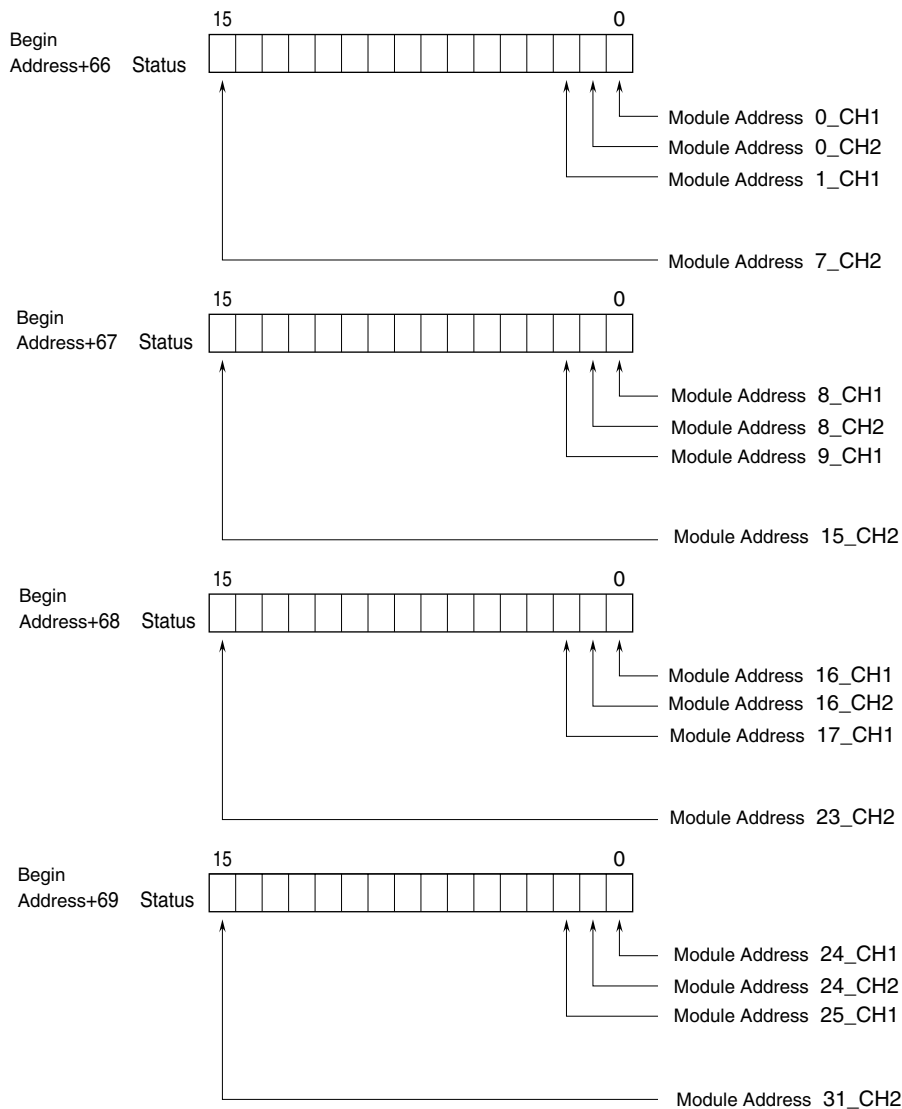When the module is mounted, the corresponding bit turns to "1."

Begin Address+64 15 ... 0
Module Address 0
Module Address 1
Module Address 2
Module Address 15

Begin Address+65 15 ... 0
Module Address 16
Module Address 17
Module Address 18
Module Address 31

■**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 "1" as well.

Begin
Address+66   Status
```
15                                        0
[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
```
Module Address 0_CH1
Module Address 0_CH2
Module Address 1_CH1

Module Address 7_CH2

Begin
Address+67   Status
```
15                                        0
[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
```
Module Address 8_CH1
Module Address 8_CH2
Module Address 9_CH1

Module Address 15_CH2

Begin
Address+68   Status
```
15                                        0
[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
```
Module Address 16_CH1
Module Address 16_CH2
Module Address 17_CH1

Module Address 23_CH2

Begin
Address+69   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 M-System's 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.

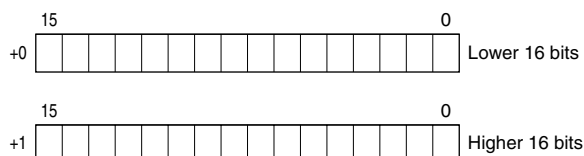15   0
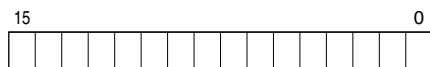
■ PULSE DATA (16-bit data)

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**

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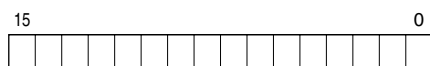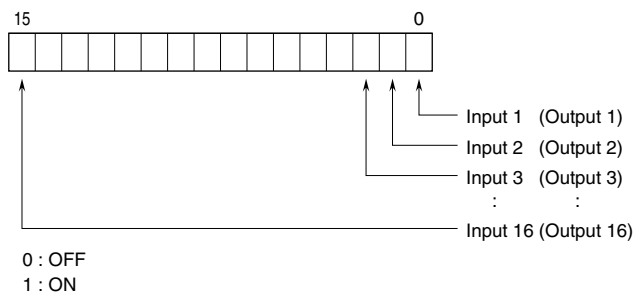
For I/O mixed modules shown below, interlock status is assigned to input 1 (to 3) in addition to output 1 to 16.

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