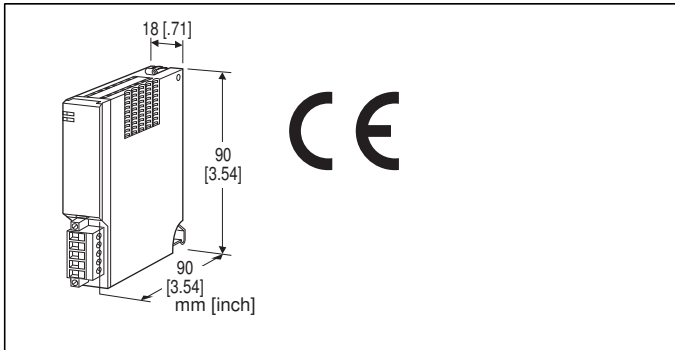


Remote I/O R5 Series

MODBUS INTERFACE MODULE



MODEL: R5-NM1[1]

ORDERING INFORMATION

- Code number: R5-NM1[1]
- Specify a code from below for [1].
(e.g. R5-NM1/Q)
- Specify the specification for option code /Q
(e.g. /C01)

[1] OPTIONS

- blank:** none
/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

- /C01: Silicone coating
- /C02: Polyurethane coating
- /C03: Rubber coating

RELATED PRODUCTS

- PC configurator software (model: R5CON)
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.

PACKAGE INCLUDES...

- Terminating resistor (110 Ω, 0.25 W)

GENERAL SPECIFICATIONS

Connection

Modbus: Euro type connector terminal
 (applicable wire size: 0.2 to 2.5 mm², stripped length 7

mm)

Internal bus: Via the Installation Base (model: R5-BS)

Internal Power: Via the base (model: R5-BS)

Isolation: Modbus to internal bus or internal power

RUN indicator: Bi-color (green/red) LED; Green ON in normal communication; Red ON when receiving data (Function selected with DIP SW)

ERR indicator: Bi-color (green/red) LED;

Green ON or blinking at communication error; Red ON at transmitting data (Function selected with DIP SW)

Data allocation: Mode 1 or 2 set with the side DIP switch

MODBUS COMMUNICATION

Standard: Conforms to TIA/EIA-485-A

Transmission distance: 500 meters max.

Transmission media: Shielded twisted-pair cable
(CPEV-S 0.9 dia.)

Transmission setting: DIP switch

Data: RTU (Binary) or ASCII

Parity: None, even or odd

Baud rate: 4800, 9600, 19.2 k, 38.4 k (bps)

Node address: DIP switch; 01 – F7

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: Installation Base (model: R5-BS)

Weight: 100 g (0.22 lb)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute (Modbus to internal bus or internal power)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

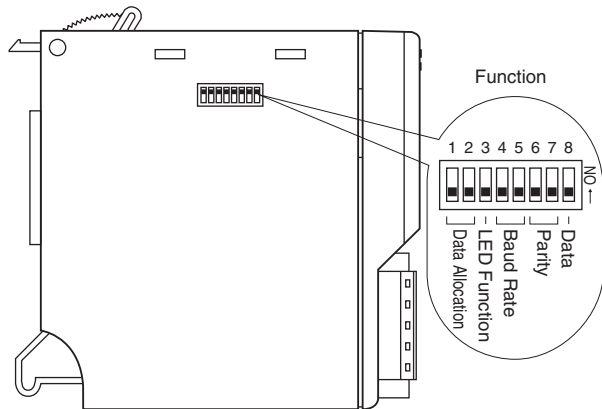
EMI EN 61000-6-4

EMS EN 61000-6-2

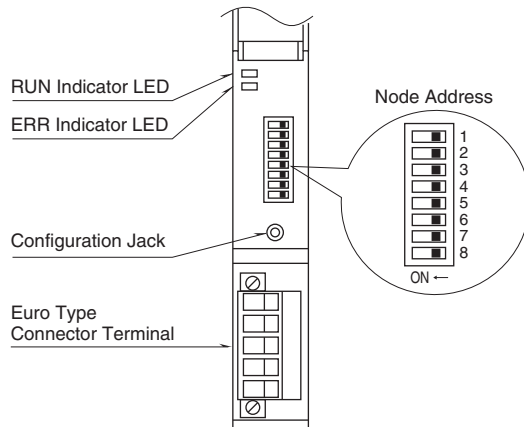
RoHS Directive

EXTERNAL VIEW

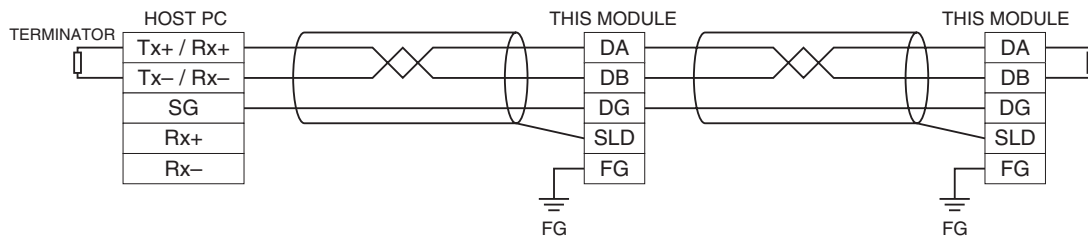
■ SIDE VIEW



■ FRONT VIEW



COMMUNICATION CABLE CONNECTIONS



MODBUS FUNCTION CODES & SUPPORTED CODES

■ DATA & CONTROL FUNCTIONS

CODE	NAME		
01	Read Coil Status	X	Digital output from the slave (read/write)
02	Read Input Status	X	Status of digital inputs to the slave (read only)
03	Read Holding Registers	X	General purpose register within the slave (read/write)
04	Read Input Registers	X	Collected data from the field by the slave (read only)
05	Force Single Coil	X	Digital output from the slave (read/write)
06	Preset Single Register	X	General purpose register within the slave (read/write)
07	Read Exception Status		
08	Diagnostics	X	
09	Program 484		
10	Poll 484		
11	Fetch Comm. Event Counter		Fetch a status word and an event counter
12	Fetch Comm. Event Log		A status word, an event counter, a message count and a field of event bytes
13	Program Controller		
14	Poll Controller		
15	Force Multiple Coils	X	Digital output from the slave (read/write)
16	Preset Multiple Registers	X	General purpose register within the slave (read/write)
17	Report Slave ID		Slave type/'RUN' status
18	Program 884/M84		
19	Reset Comm. Link		
20	Read General Reference		
21	Write General Reference		
22	Mask Write 4X Register		
23	Read/Write 4X Register		
24	Read FIFO Queue		

■ Exception Codes

CODE	NAME		
01	Illegal Function	X	Function code is not allowable for the slave
02	Illegal Data Address	X	Address is not available within the slave
03	Illegal Data Value	X	Data is not valid for the function
04	Slave Device Failure		
05	Acknowledge		
06	Slave Device Busy		
07	Negative Acknowledge		
08	Memory Parity Error		

■ Diagnostic Subfunctions

CODE	NAME		
00	Return Query Data	X	Loop back test
01	Restart Comm. Option	X	Reset the slave and clear all counters
02	Return Diagnostic Register	X	Contents of the diagnostic data (2 bytes)
03	Change ASCII Input Delimiter	X	Delimiter character of ASCII message
04	Force Listen Only Mode	X	Force the slave into Listen Only Mode

MODBUS I/O ASSIGNMENT

The DIP SW located at the side of the module switches the unit'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. 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."

Coil (0X)	1 – 16	Module 1	Do 1 – 16	
	17 – 32	Module 2	Do 1 – 16	
	33 – 48	Module 3	Do 1 – 16	
	49 – 64	Module 4	Do 1 – 16	
	:	:	:	
	241 – 256	Module 16	Do 1 – 16	
Inputs (1X)	1 – 16	Module 1	Di 1 – 16	
	17 – 32	Module 2	Di 1 – 16	
	33 – 48	Module 3	Di 1 – 16	
	49 – 64	Module 4	Di 1 – 16	
	:	:	:	
		241 – 256	Module 16	Di 1 – 16
		257 – 272	Active Module Map	
	273 – 288	Status		
	289 – 320	Channel Status		

■Data Allocation Mode 1

Input Registers (3X)	1	Module 1	Ai 1 (INT)	
	2	Module 2	Ai 1 (INT)	
	3	Module 3	Ai 1 (INT)	
	4	Module 4	Ai 1 (INT)	
	:	:	:	
	16	Module 16	Ai 1 (INT)	
	17, 18	Module 1	Ai 1 (Float)	
	19, 20	Module 2	Ai 1 (Float)	
	21, 22	Module 3	Ai 1 (Float)	
	23, 24	Module 4	Ai 1 (Float)	
	:	:	:	
		47, 48	Module 16	Ai 1 (Float)
	Holding Registers (4X)	1	Module 1	Ao 1 (INT)
2		Module 2	Ao 1 (INT)	
3		Module 3	Ao 1 (INT)	
4		Module 4	Ao 1 (INT)	
:		:	:	
16		Module 16	Ao 1 (INT)	
17, 18		Module 1	Ao 1 (Float)	
19, 20		Module 2	Ao 1 (Float)	
21, 22		Module 3	Ao 1 (Float)	
23, 24		Module 4	Ao 1 (Float)	
:		:	:	
		47, 48	Module 16	Ao 1 (Float)

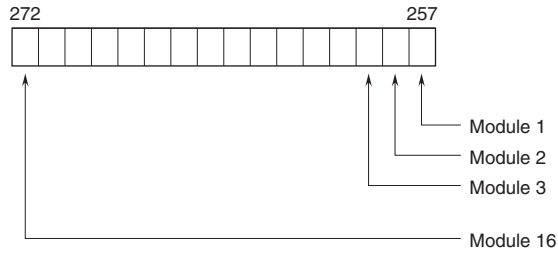
■Data Allocation Mode 2

Input Registers (3X)	1	Module 1	Ai 1 (INT)
	2	Module 1	Ai 2 (INT)
	3	Module 2	Ai 1 (INT)
	4	Module 2	Ai 2 (INT)
	:	:	:
	31	Module 16	Ai 1 (INT)
	32	Module 16	Ai 2 (INT)
	33, 34	Module 1	Ai 1 (Float)
	35, 36	Module 1	Ai 2 (Float)
	37, 38	Module 2	Ai 1 (Float)
	39, 40	Module 2	Ai 2 (Float)
	:	:	:
		93, 94	Module 16
	95, 96	Module 16	Ai 2 (Float)
Holding Registers (4X)	1	Module 1	Ao 1 (INT)
	2	Module 1	Ao 2 (INT)
	3	Module 2	Ao 1 (INT)
	4	Module 2	Ao 2 (INT)
	:	:	:
	31	Module 16	Ao 1 (INT)
	32	Module 16	Ao 2 (INT)
	33, 34	Module 1	Ao 1 (Float)
	35, 36	Module 1	Ao 2 (Float)
	37, 38	Module 2	Ao 1 (Float)
	39, 40	Module 2	Ao 2 (Float)
	:	:	:
		93, 94	Module 16
	95, 96	Module 16	Ao 2 (Float)

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

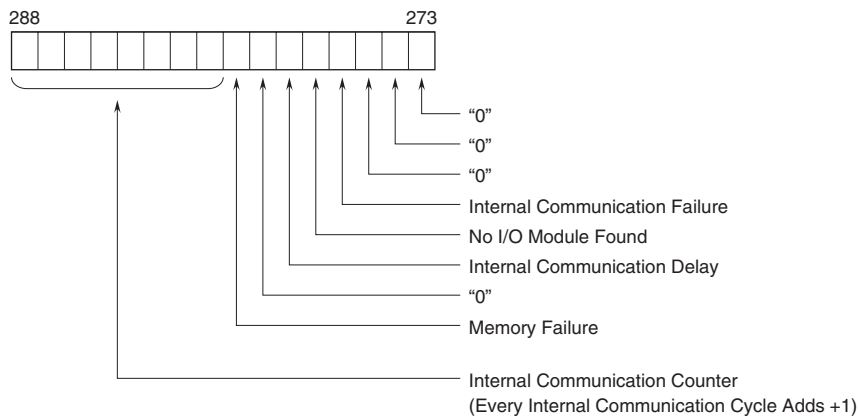
■ ACTIVE MODULE MAP

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



■ STATUS

Communication status data. When the module is unmounted, the module type is not correct, or when communication errors occur frequently, the corresponding bit turns to "1."



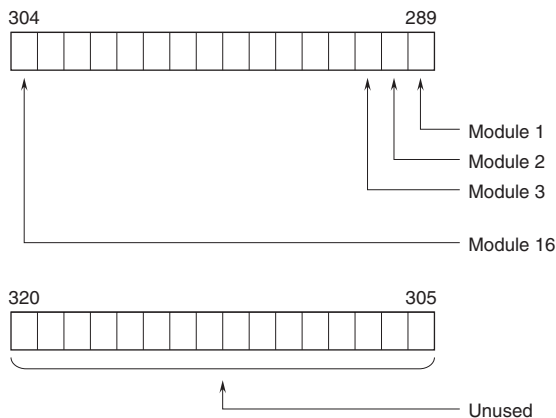
■ CHANNEL STATUS

Analog input modules check high/low limits and ADC. When there is an error in one or more channels, the bit corresponding to the channels turns to "1." The bit corresponding to unmounted channels turns to "1."

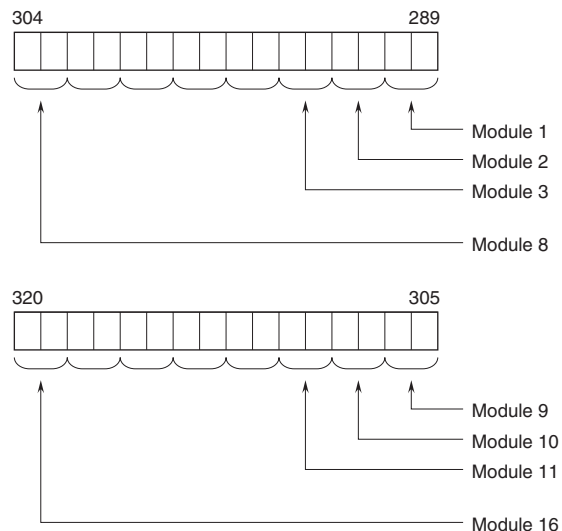
DC current output modules check output wire breakdown to alert as an error. The bit corresponding to the channels turns to "1."

In the Data Allocation Mode 2, among the two bits assigned for each module, the least significant bit is used for channel 1 of a two-channel analog module or for a discrete module.

• Data Allocation Mode 1



• Data Allocation Mode 2



I/O DATA DESCRIPTIONS

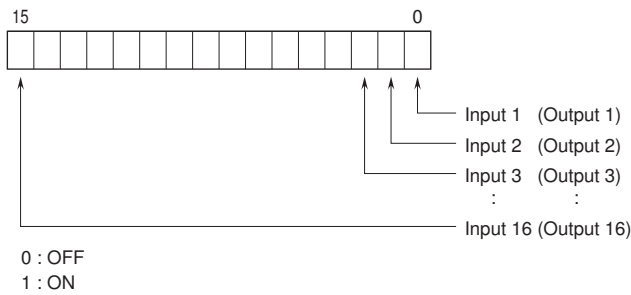
The data allocations for typical I/O modules are shown below.
Refer to the manual for each module for detailed data allocations.

ANALOG 16 BITS DATA

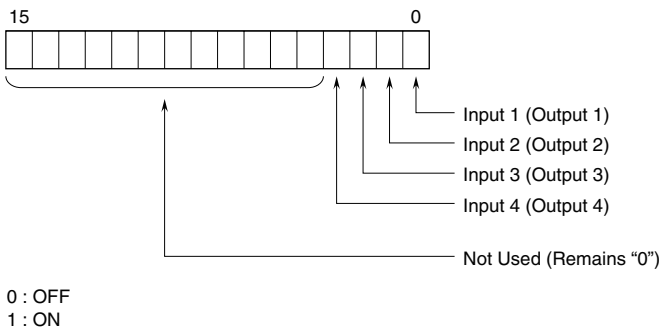
0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
With °C or Kelvin temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.
With °F temperature unit, the integer section of raw data is directly converted into the data. For example, 135.4°F is converted into 135.
Negative values are represented in 2's complements.



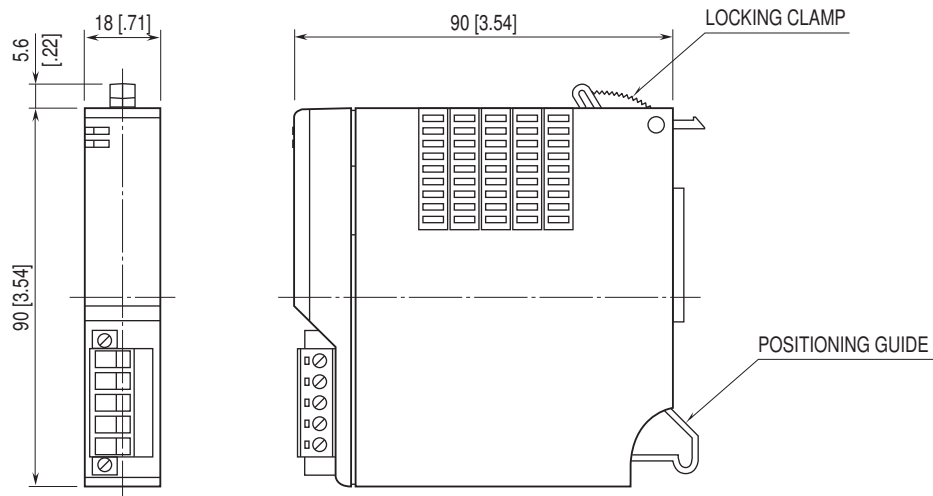
16-POINT DISCRETE DATA



4-POINT DISCRETE DATA



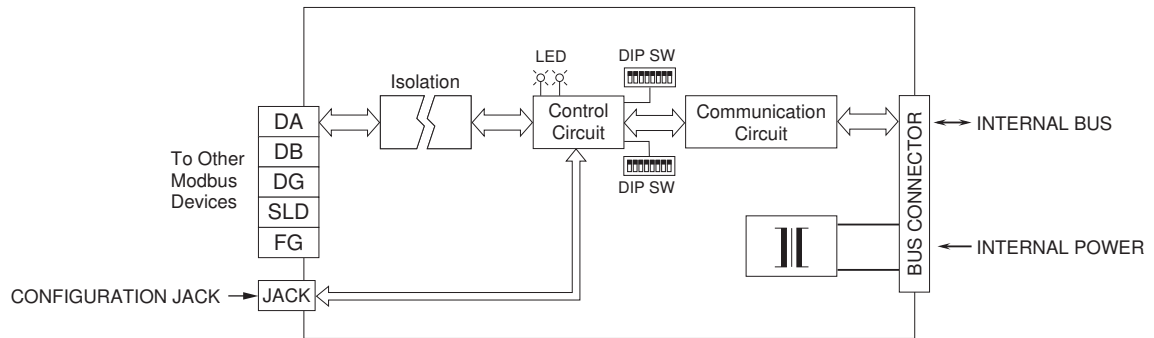
EXTERNAL DIMENSIONS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FG terminal is NOT a protective conductor terminal.



Note: The FG terminal is NOT connected with the FG of the power supply module (model: R5-PS).



Specifications are subject to change without notice.