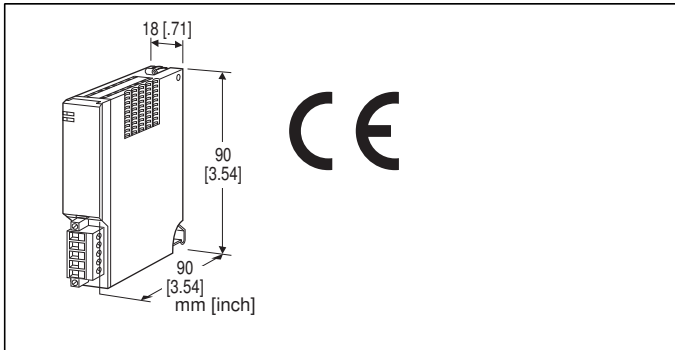


Remote I/O R5 Series

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 our web site.)

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

RELATED PRODUCTS

- PC configurator software (model: R5CON)
Downloadable at our 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

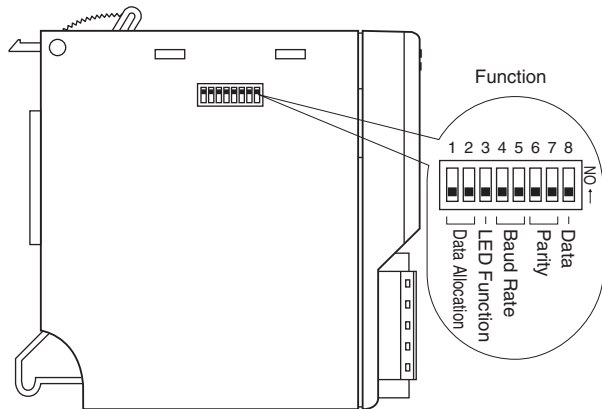
EMI EN 61000-6-4

EMS EN 61000-6-2

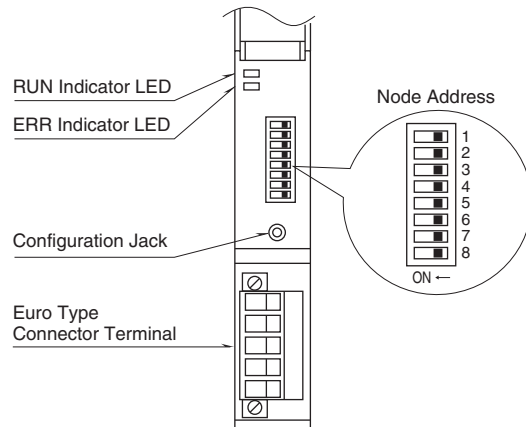
RoHS Directive

EXTERNAL VIEW

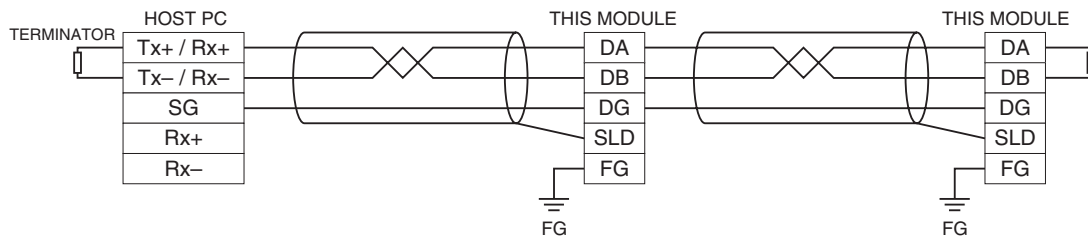
■ SIDE VIEW



■ 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.

I/O DATA DESCRIPTIONS

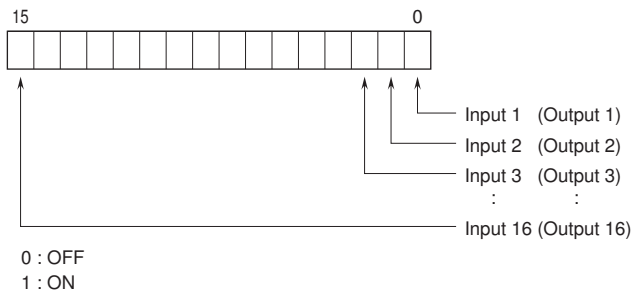
The data allocations for typical I/O modules are shown below.
Refer to the manual for each module for detailed data allocations.

■ ANALOG 16 BITS DATA

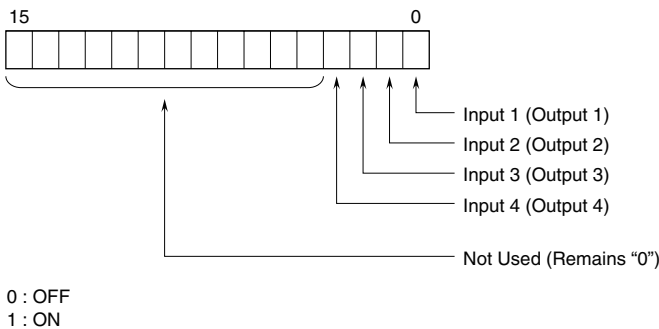
0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
With °C or Kelvin temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.
With °F temperature unit, the integer section of raw data is directly converted into the data. For example, 135.4°F is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



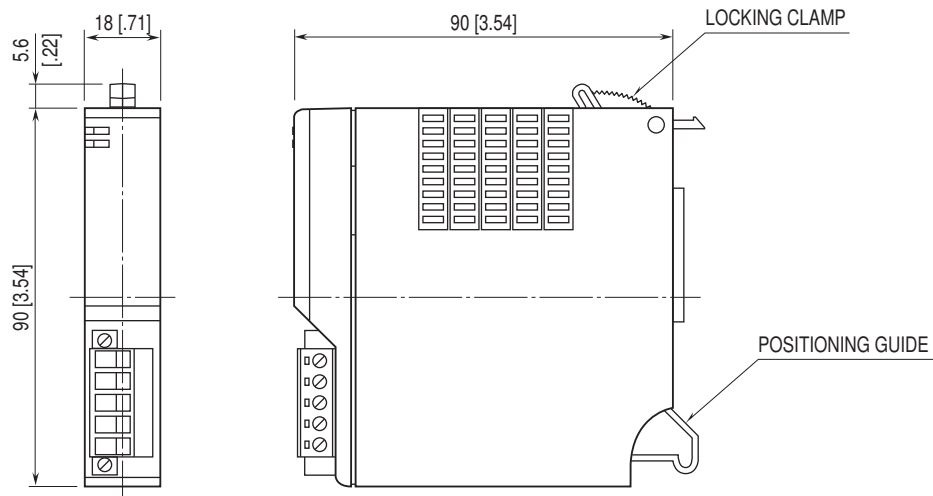
■ 16-POINT DISCRETE DATA



■ 4-POINT DISCRETE DATA



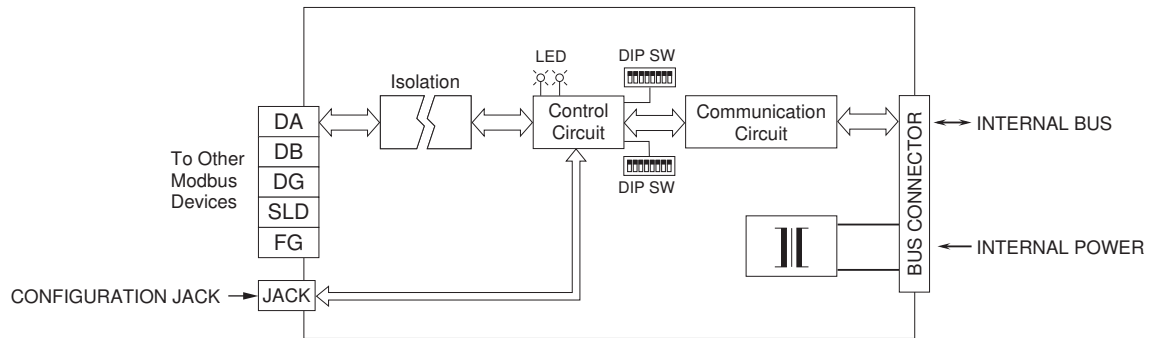
EXTERNAL DIMENSIONS unit: mm [inch]



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.