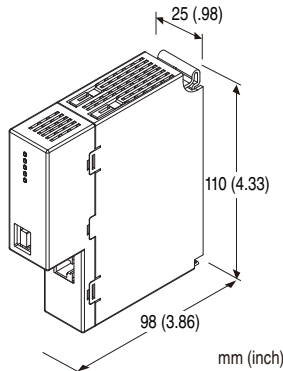# MODEL: R30NE1

Remote I/O R30 Series

MODBUS/TCP INTERFACE MODULE

Functions & Features
• Interchanges analog or discrete I/O signals with the filedbus (Modbus/TCP).

25 (.98)

110 (4.33)

98 (3.86)

mm (inch)

MODEL: R30NE1[1]

ORDERING INFORMATION

• Code number: R30NE1[1]
Specify a code from below for [1].
  (e.g. R30NE1/Q)
• Specify the specification for option code /Q
  (e.g. /C01/SET)

[1] OPTIONS

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

SPECIFICATIONS OF OPTION: Q (multiple selections)
COATING (For the detail, refer to M-System's web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating
EX-FACTORY SETTING
/SET: Preset according to the Ordering Information Sheet
  (No. ESU-9019)

RELATED PRODUCTS

• PC configurator software (model: R30CFG)
• PC configurator software (model: R30CON)
Downloadable at M-System's web site.
For connecting to PC, use commercially available Mini-B type USB cable. (provided by user)
• R3 series I/O modules (except R3-TC2)

GENERAL SPECIFICATIONS

Connection
  Ethernet: RJ-45 connector
  Internal bus: Via the Installation Base (model: R30BS)
  Internal power: Via the Installation Base (model: R30BS)
Isolation: Ethernet to internal bus or internal power
Setting input type & input range:
  R30 series I/O module: PC configuration software (model: R30CFG)
  R3 series I/O module: PC configuration software (model: R3CON)
Internal bus communication cycle: Approx. 1 msec.
Status indicator LEDs: PWR, RUN, ERR
(Refer to the instruction manual for details.)

ETHERNET COMMUNICATION

Communication Standard: IEEE 802.3u
Transmission: 10BASE-T, 100BASE-TX
Baud rate: 10/100 Mbps (Auto Negotiation function)
Protocol: Modbus/TCP
Data: RTU (Binary)
Max. number of socket connections: 2
Transmission media: 10BASE-T (STP, Category 5), 100BASE-TX (STP, Category 5e)
Max. length of fieldbus segment: 100 meters
Ethernet indicator LEDs: LINK10, LINK100
IP address: 192.168.0.1 (factory setting);
can be set/changed using PC Configurator Software (model: R30CFG)
Port No.: 502

INSTALLATION

Current consumption: 110 mA
Operating temperature: -10 to +55°C (14 to 131°F)
Storage temperature: -20 to +65°C (-4 to +149°F)
Operating humidity: 10 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: Installation Base (model: R30BS)
Weight: 105 g (3.70 oz)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
(Ethernet to internal bus or internal power)
1500 V AC @ 1 minute (power input to FE; isolated on the power supply module)

STANDARDS & APPROVALS

EU conformity:
EMC Directive
  EMI EN 61000-6-4
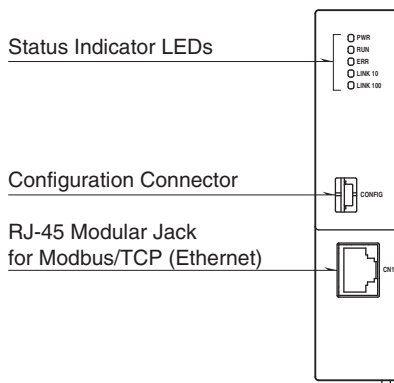 EMS EN 61000-6-2
RoHS Directive
  EN 50581

PC CONFIGURATOR

The following parameters can be set with using PC Configurator Software (model: R30CFG)
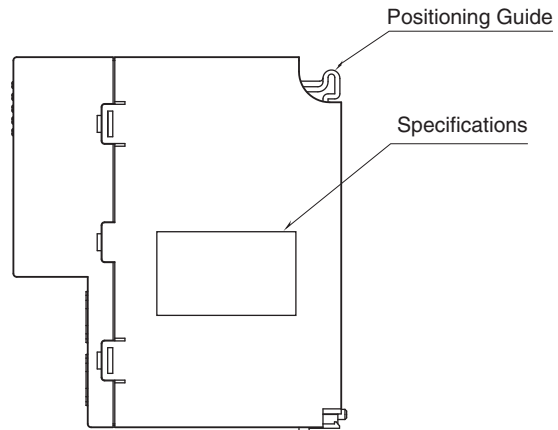Refer to the users manual for the R30CFG for detailed operation of the software program.

PARAMETER	SETTING RANGE	DEFAULT
Timeout	0.2. to 3200.0 (sec.)	3.0 (sec.)
IP address	0 to 255	192.168.0.1
Subnet mask	0 to 255	255.255.255.0
Default gateway	0 to 255	192.168.0.100
Port No. 1	1 to 32000	502
Port No. 2	1 to 32000	502
Port No. 3	1 to 32000	502
Port No. 4	1 to 32000	502
Linger time	3.0 to 3200.0 (sec.)	180.0 (sec.)

EXTERNAL VIEW

■ FRONT VIEW

Status Indicator LEDs
PWR
RUN
ERR
LINK 10
LINK 100

Configuration Connector — CONFIG

RJ-45 Modular Jack for Modbus/TCP (Ethernet) — CN1

■ SIDE VIEW

Positioning Guide

Specifications

■ BOTTOM VIEW

Base Fixing Screw

Lock Tab
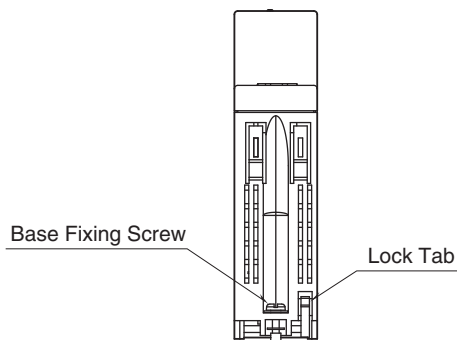
MODBUS FUNCTION CODES & SUPPORTED CODES

■ 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	X	Fetch a status word and an event counter
12	Fetch Comm. Event Log	X	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	X	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

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1 to 2048		Discrete Output
Input (1X)	1 to 2048		Discrete Input
	2049 to 2064		Module Status (R30 series)
	2065 to 2080		Module Status (R3 series)
	2081 to 2096		Error Status (R30 series)
	2097 to 2112		Error Status (R3 series)
	2113 to 2128		Data Error Status (R30 series)
	2129 to 2144		Data Error Status (R3 series)
Input Register (3X)	1 to 512	I	Analog Input
Holding Register (4X)	1 to 512	I	Analog Output

■ **DATA TYPE**

I: Integer; 0 to 10000 (0 to 100%)

Note: DO NOT access addresses other than mentioned above.
      Accessing such an address may result in problem such as malfunction of the unit.

1) Module Status indicates whether or not an I/O module is mounted on each slot.
   The bit corresponding to the mounted slot turns to '1', and the unmounted slot to '0'.

2) Error Status indicates occurrence of an error of each module as described below.
   The bit corresponding to the module having an error turns to '1'.

   - R3-TSx, R3x-RSx, R3-US4 (input type: T/C or RTD): Input burnout
   - R3x-DA16A: Power input error or disconnection
   - R3x-YS4: Output disconnection

3) Data Error Status indicates occurrence of an error of each module as described below.
   The bit corresponding to the module having an error turns to '1'.

   - Analog input modules transmitting 0 to 100% scaling value: Input overrange (≤ -15% or ≥ 115%)
   - R30YS4: Output disconnection
   - R30TS4, R30RS4, R30USx (input type: T/C or RTD): Input burnout
   - R3-TSx, R3x-RSx, R3-US4 (input type: T/C or RTD): Input burnout
   - R3-US4 (input type: voltage): Input overrange (≤ -10% or ≥ 110%)

4) I/O Data (discrete input, discrete output, analog input, analog output) Assignment
This unit recognizes type (No. of data areas) of each I/O module mounted on the same base, and automatically assigns it to each data area in the order of slot number. See table below.

Each data area is allocated only with the data of the assigned module and still has space.
When data of each data area is transmitted to the host PC/PLC in the order of slot number, other types of data of the latter slot number, if any, are allocated and transmitted together so that each type of data is transmitted sequentially; that is, no blank data is transmitted. See figures below.

I/O Data Assignment is performed only when the power is turned on.
Be sure to turn the power off and on again when the module configuration has been changed.
The max. number of data areas per node is 64.
Thus, the total number of data areas of the mounted I/O modules must be equal to or less than 64.
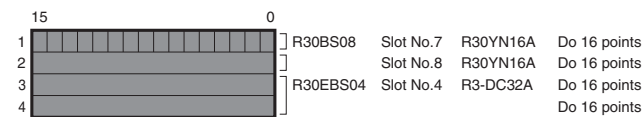When there is a blank slot, data of the latter slot number is transmitted to the host PC/PLC so that no blank data is transmitted.
The table below shows an example of I/O configuration and the figures show how I/O data are assigned.

BASE	SLOT NO.	MODEL	DATA AREAS
R30BS08	PWR	R30PS1	–
	COM	R30NE1	–
	1	R30SV4	4
	2	R30US2	2
	3	R30TS4	4
	4	R30YV4	4
	5	R30XN16A	1
	6	R30XN16A	1
	7	R30YN16A	1
	8	R30YN16A	1
R30EBS04	1	R3-SV8	8
	2	R3-YV8	8
	3	R3-DA32A	2
	4	R3-DC32A	2

■ **Coil (0X)**
The figure below indicates discrete output.

	R30BS08	Slot No.7	R30YN16A	Do 16 points
		Slot No.8	R30YN16A	Do 16 points
	R30EBS04	Slot No.4	R3-DC32A	Do 16 points
				Do 16 points

■ **Input (1X)**
The figure below indicates discrete input.

	R30BS08	Slot No.5	R30XN16A	Di 16 points
		Slot No.6	R30XN16A	Di 16 points
	R30EBS04	Slot No.3	R3-DA32A	Di 16 points
				Di 16 points
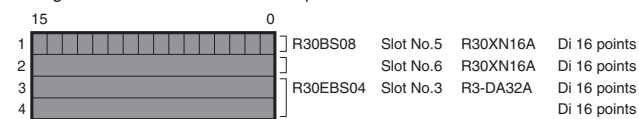
■ **Input Register (3X)**
The figure below indicates analog input.

	R30BS08	Slot No.1	R30SV4	CH1
				CH2
				CH3
				CH4
		Slot No.2	R30US2	CH1
				CH2
		Slot No.3	R30TS4	CH1
				CH2
				CH3
	R30EBS04	Slot No.1	R3-SV8	CH1
				CH2
				CH3
				CH4
				CH5
				CH6
				CH7
				CH8
				CH9
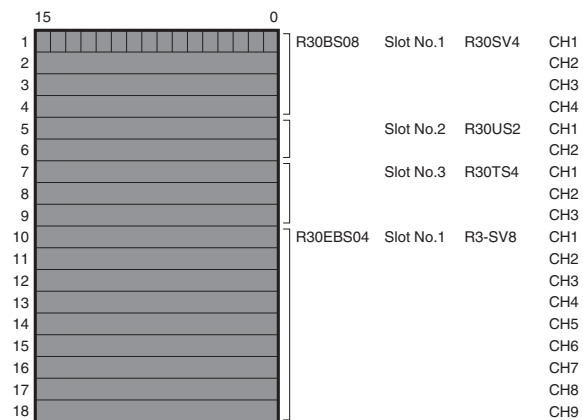
■ **Holding Register (4X)**
The figure below indicates analog output.

	R30BS08	Slot No.4	R30YV4	CH1
				CH2
				CH3
				CH4
	R30EBS04	Slot No.2	R3-YV8	CH1
				CH2
				CH3
				CH4
				CH5
				CH6
				CH7
				CH8
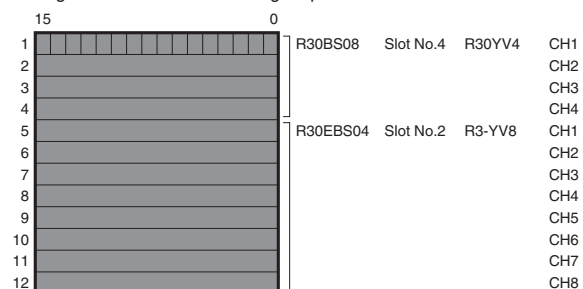
MODULE STATUS, ERROR STATUS, DATA ERROR STATUS

Shows each module's availability and error status.
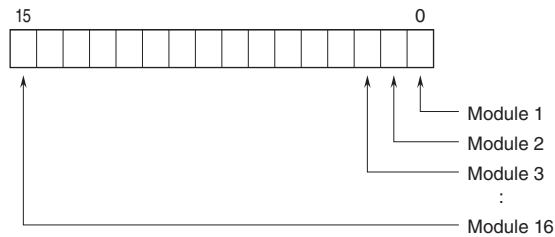
I/O DATA DESCRIPTIONS

The data allocations for typical I/O modules are shown below.

Refer to the manual for each module for detailed data allocations.

■ ANALOG DATA (16-bit data, models: R30SV2, R30SV4, R30YV4, R30YS4, R30US2, R30US4 etc.)

16-bit binary data.
Basically, 0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
Negative percentage is represented in 2's complements.

■ ANALOG DATA (16-bit data, models: R30RS4, R30TS4, R30US2, R30US4, etc.)

16-bit binary data.
With °C 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 (16-bit data, models: R30CT4E etc.)

16-bit binary data.
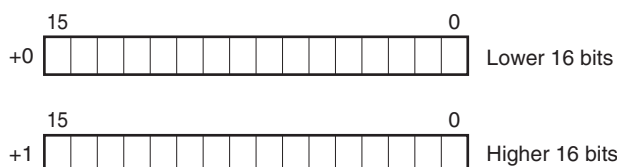Integer obtained by multiplying unit value (A) by 100.
In case of CLSE-R5, integer obtained by multiplying unit value (A) by 1000.

■ ANALOG DATA (32-bit data, models: R3-PA2, PA4A, WT1, WT4, etc.)

32-bit binary data is used for accumulated counts, encoder positions and active energy.
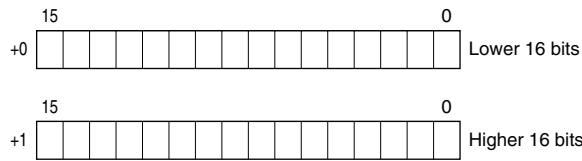Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.
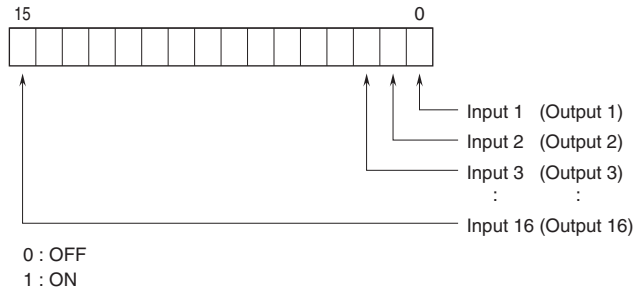
■ ANALOG DATA (32-bit data, models: R3-BA32A, BC32A, etc.)
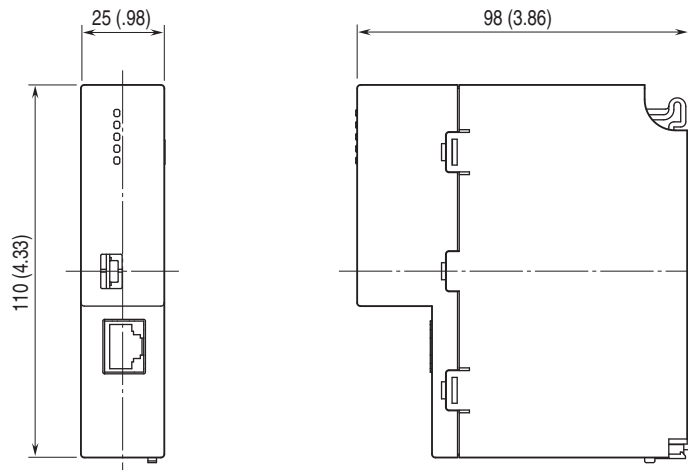
32-bit binary data is used for BCD.
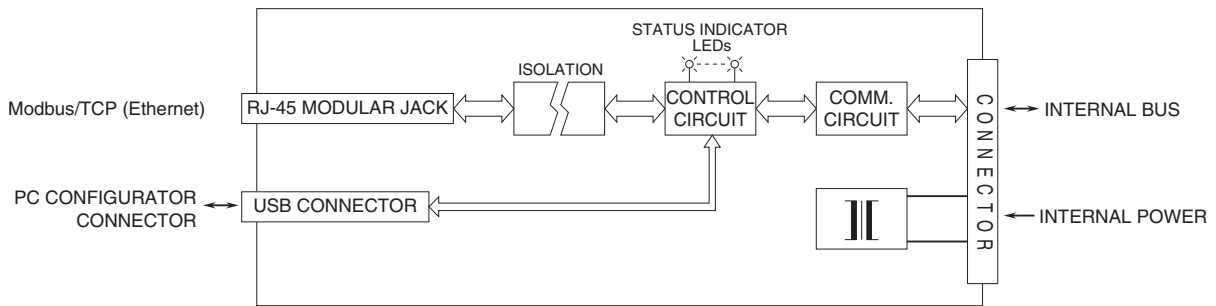Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.

■ 16-POINT DISCRETE DATA (models: R30XN16A, R30YN16A, R30YN16C etc.)

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

0 : OFF
1 : ON

DIMENSIONS unit: mm (inch)

25 (.98)
98 (3.86)
110 (4.33)

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

Modbus/TCP (Ethernet) — RJ-45 MODULAR JACK — ISOLATION — CONTROL CIRCUIT — COMM. CIRCUIT — CONNECTOR — INTERNAL BUS

STATUS INDICATOR LEDs

PC CONFIGURATOR CONNECTOR — USB CONNECTOR

INTERNAL POWER

⚠ Specifications are subject to change without notice.