

Remote I/O R6 Series

MODBUS INTERFACE MODULE

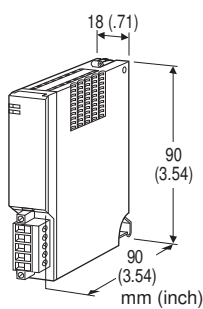
(for 32-point analog signals)

Functions & Features

- Free combination of analog and discrete I/O
- Direct sensor inputs
- Space-saving
- Low power consumption
- CE marking

Typical Applications

- Remote I/O for DCS and PLC



MODEL: R6-NM1

ORDERING INFORMATION

- Code number: R6-NM1

PACKAGE INCLUDES...

- Terminating resistor (110 Ω , 0.25 W)

GENERAL SPECIFICATIONS

Connection

Network: Euro type connector terminal

Internal bus: Via the Installation Base (model: R6x-BS)

Power supply: Via the Installation Base (model: R6x-BS)

Max. number of I/O modules: 16 (analog 32 points)

Isolation: Modbus to internal bus or internal power

RUN indicator: Bi-color (green/red) LED; green in normal communications; red when receiving (Function selected with DIP SW3)

ERR indicator: Bi-color (green/red) LED; the green ON/ blinks in communication errors; red when transmitting (Function selected with DIP SW3)

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

MODBUS COMMUNICATION

Transmission standard: Conforms to RS-485, EIA

Transmission distance: 500 meters max.

Transmission media: Shielded twisted-pair cable

Transmission setting: DIP switch

Data mode: 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 to 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: R6x-BS)

Weight: 100 g (3.53 oz)

PERFORMANCE

Insulation resistance: $\geq 100 \text{ M}\Omega$ with 500 V DC

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

STANDARDS & APPROVALS

CE conformity:

EMC Directive (2004/108/EC)

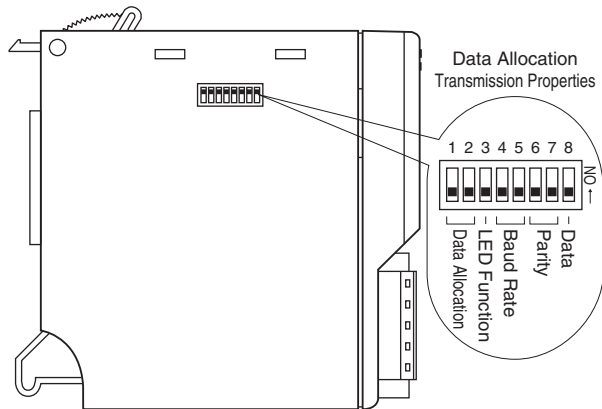
EMI EN 61000-6-4: 2007

EMS EN 61000-6-2: 2005

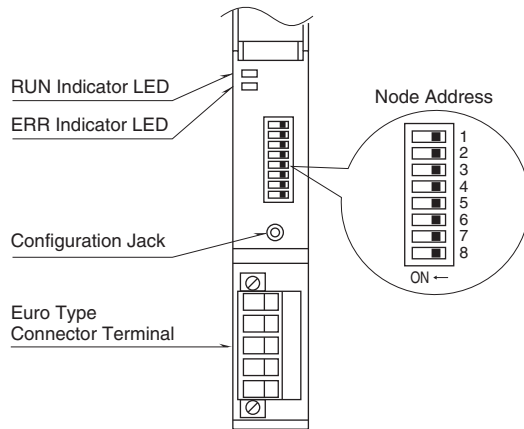


EXTERNAL VIEW

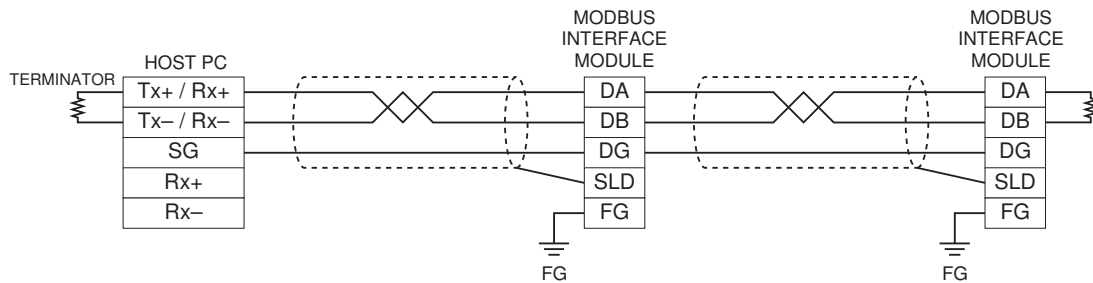
■ SIDE VIEW



■ 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 Registers	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		
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	X	
05	Acknowledge	X	
06	Slave Device Busy	X	
07	Negative Acknowledge	X	
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 ASSIGNMENTS

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."



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

Coil (0X)	1 – 16	Module address 0	Do 1 – 4
	17 – 32	Module address 1	Do 1 – 4
	33 – 48	Module address 2	Do 1 – 4
	49 – 64	Module address 3	Do 1 – 4
	:	:	:
	241 – 256	Module address 15	Do 1 – 4
Inputs (1X)	1 – 16	Module address 0	Di 1 – 4
	17 – 32	Module address 1	Di 1 – 4
	33 – 48	Module address 2	Di 1 – 4
	49 – 64	Module address 3	Di 1 – 4
	:	:	:
	241 – 256	Module address 15	Di 1 – 4
	257 – 272	Active module map	
	273 – 288	Status	
289 – 320	Channel status		

■ Data Allocation Mode 1

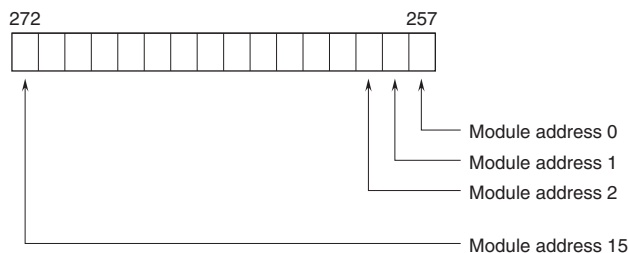
Input Registers (3X)	1	Module address 0	Ai 1 (INT)	
	2	Module address 1	Ai 1 (INT)	
	3	Module address 2	Ai 1 (INT)	
	4	Module address 3	Ai 1 (INT)	
	:	:	:	
	16	Module address 15	Ai 1 (INT)	
	17, 18	Module address 0	Ai 1 (Float)	
	19, 20	Module address 1	Ai 1 (Float)	
	21, 22	Module address 2	Ai 1 (Float)	
	23, 24	Module address 3	Ai 1 (Float)	
	:	:	:	
	47, 48	Module address 15	Ai 1 (Float)	
	Holding Registers (4X)	1	Module address 0	Ao 1 (INT)
		2	Module address 1	Ao 1 (INT)
3		Module address 2	Ao 1 (INT)	
4		Module address 3	Ao 1 (INT)	
:		:	:	
16		Module address 15	Ao 1 (INT)	
17, 18		Module address 0	Ao 1 (Float)	
19, 20		Module address 1	Ao 1 (Float)	
21, 22		Module address 2	Ao 1 (Float)	
23, 24		Module address 3	Ao 1 (Float)	
:		:	:	
47, 48		Module address 15	Ao 1 (Float)	

■ Data Allocation Mode 2

Input Registers (3X)	1	Module address 0	Ai 1 (INT)
	2	Module address 0	Ai 2 (INT)
	3	Module address 1	Ai 1 (INT)
	4	Module address 1	Ai 2 (INT)
	:	:	:
	31	Module address 15	Ai 1 (INT)
	32	Module address 15	Ai 2 (INT)
	33, 34	Module address 0	Ai 1 (Float)
	35, 36	Module address 0	Ai 2 (Float)
	37, 38	Module address 1	Ai 1 (Float)
	39, 40	Module address 1	Ai 2 (Float)
	:	:	:
	93, 94	Module address 15	Ai 1 (Float)
	95, 96	Module address 15	Ai 2 (Float)
Holding Registers (4X)	1	Module address 0	Ao 1 (INT)
	2	Module address 0	Ao 2 (INT)
	3	Module address 1	Ao 1 (INT)
	4	Module address 1	Ao 2 (INT)
	:	:	:
	31	Module address 15	Ao 1 (INT)
	32	Module address 15	Ao 2 (INT)
	33, 34	Module address 0	Ao 1 (Float)
	35, 36	Module address 0	Ao 2 (Float)
	37, 38	Module address 1	Ao 1 (Float)
	39, 40	Module address 1	Ao 2 (Float)
	:	:	:
	93, 94	Module address 15	Ao 1 (Float)
	95, 96	Module address 15	Ao 2 (Float)

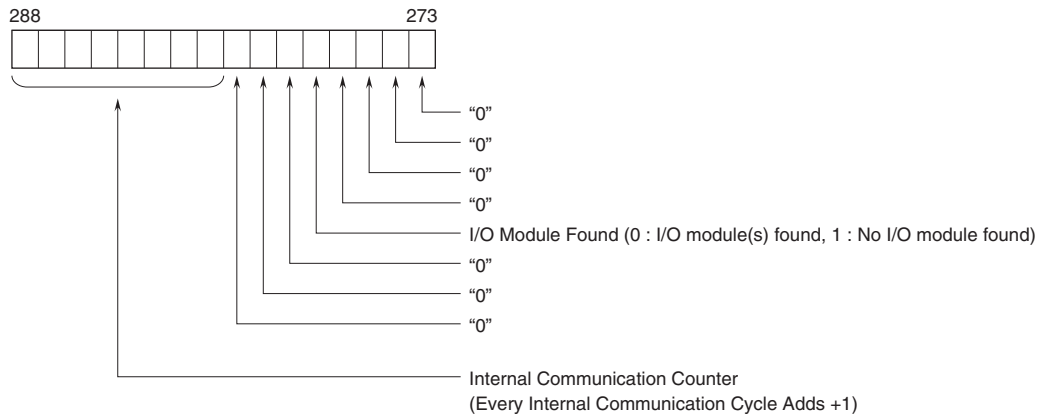
■ ACTIVE MODULE MAP

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 one or more I/O modules are mounted on the base, the corresponding bit turns to "0."



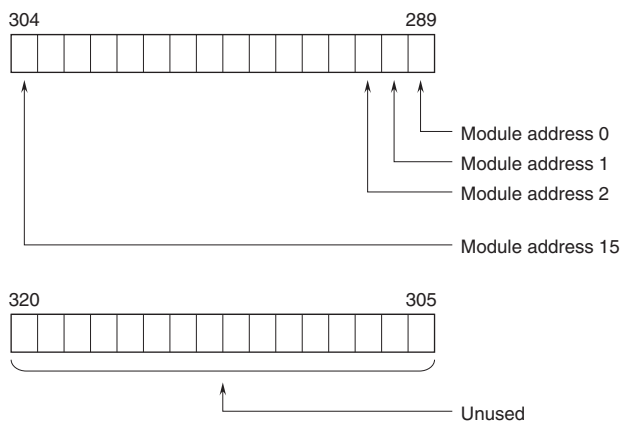
■ CHANNEL STATUS

Channel Status shows the I/O module's data error.

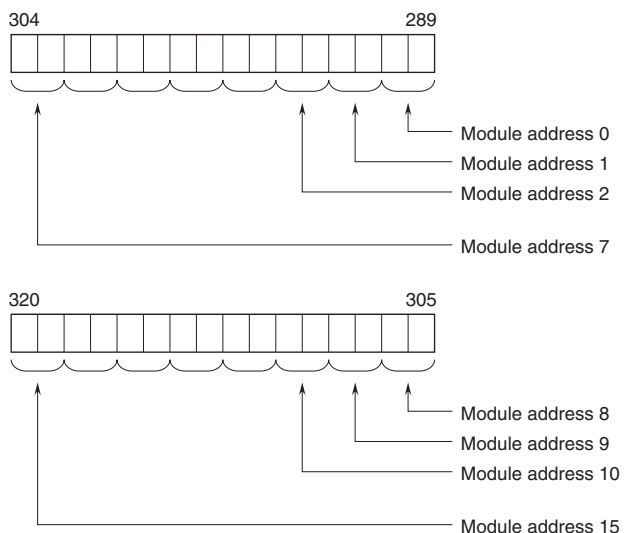
- Input overrange ($\leq -15\%$ or $\geq +115\%$) of Input modules except R6x-TSx and -RSx.
- Inputs of R6x-TSx, -RSx burnout.
- Output wire breakdown of R6x-YSx (Firmware Version 2.00 or later).

In the above case, the corresponded bit is "1."

• Data Allocation Mode 1



• Data Allocation Mode 2



In the Data Allocation Mode 2, the LSB is used for channel 1, and the MSB for channel 2, of an analog module.

I/O DATA DESCRIPTIONS

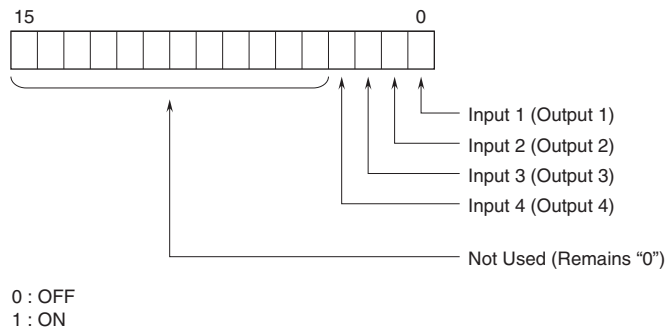
■ ANALOG DATA

0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).

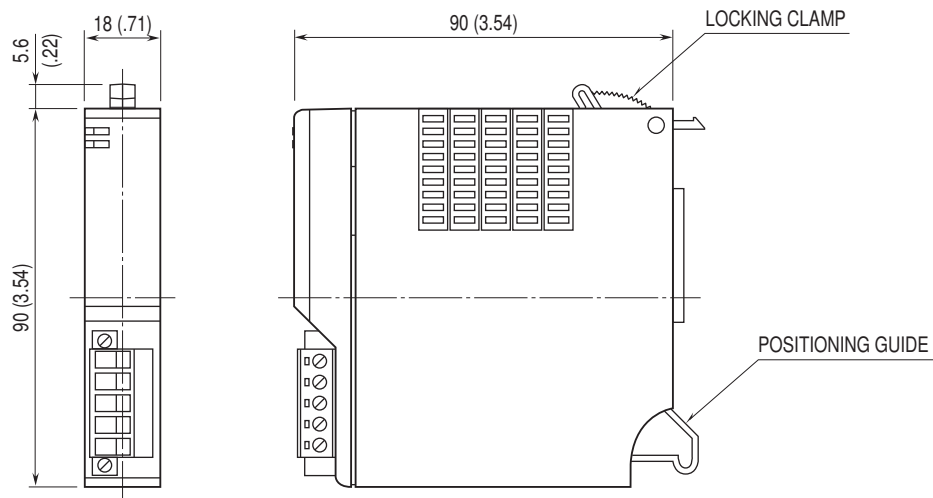
Negative values are represented in 2's complements.



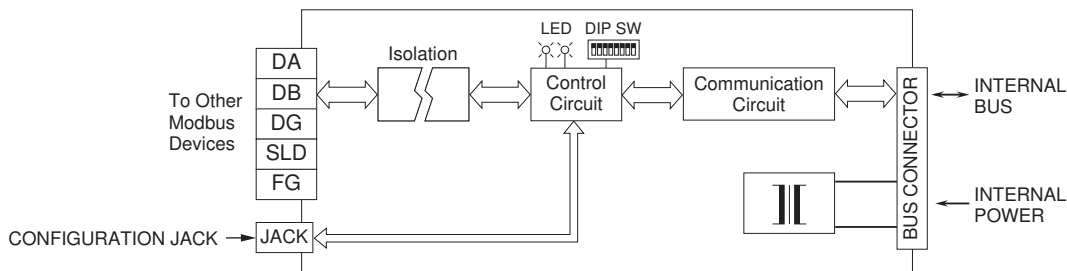
DISCRETE DATA



DIMENSIONS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.