

MODBUS I/O MODULE

(remote control relay control , 8 points, independent output common, 115.2 kbps)

MODEL R7M-RR8C**BEFORE USE**

Thank you for choosing us. 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 our sales office or representatives.

■ PACKAGE INCLUDES:

Remote control relay control module(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**■ POWER INPUT RATING & OPERATIONAL RANGE**

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
24V AC rating: 24V $\pm$ 10%, 50/60 Hz, approx. 140mA
24V DC rating: 24V $\pm$ 10%, approx. 60mA

■ GENERAL PRECAUTIONS

- Before you remove the unit or mount it, turn off the power supply and output signal for safety.
- Before you remove the terminal block or mount it, make sure to turn off the power supply and output signal for safety.
- DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

■ 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

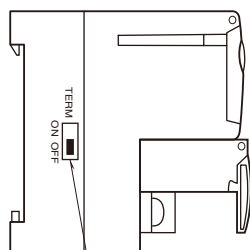
- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.
- Be sure to close the terminal cover for safety.

■ AND

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

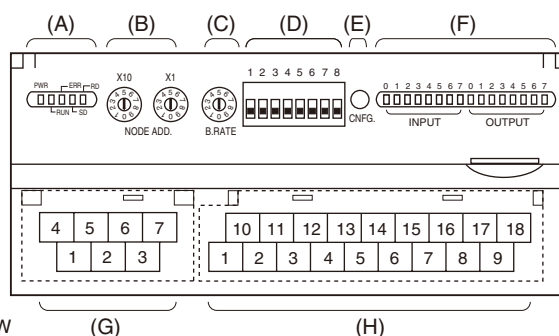
COMPONENT IDENTIFICATION

■ SIDE VIEW



(I) Terminating Resistor SW

■ FRONT VIEW



- (A) Status Indicator LED
- (B) Node Address Setting Rotary SW
- (C) Baud Rate Setting Rotary SW
- (D) Operating Mode Setting DIP SW (SW1)
- (E) PC Configurator Jack
- (F) I/O Status Indicator LED
- (G) Modbus, Power Supply Terminals
- (H) Output Terminals
- (I) Terminating Resistor SW

■ STATUS INDICATOR LED

ID	COLOR	FUNCTION
PWR	Red	Turns on when the internal 5V is supplied normally.
RUN	Red	Turns on in normal communications conditions.
ERR	Red	Turns on when the received data is abnormal.
SD	Red	Turns on when the module is transmitting.
RD	Red	Turns on when the module is receiving.

■ I/O STATUS INDICATOR LED

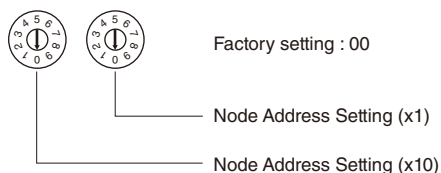
Feedback input status and output bit status are indicated with red LED.

ON : LED ON

OFF : LED OFF

■ NODE ADDRESS

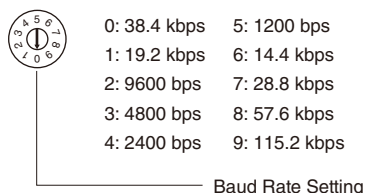
Node Address is selected between 1 and 99 in decimal. The left switch determines the tenth place digit, while the right switch does the ones place digit of the address.



■ BAUD RATE

Baud Rate is selected with the rotary switch.

(Factory setting: 0)



■ OPERATING MODE

(*) Factory setting

• Extension: SW1-1, 1-2

SW1-1	SW1-2	EXTENSION
OFF	OFF	No extension (*)
ON	OFF	Discrete input, 8 or 16 points
OFF	ON	Discrete output, 8 or 16 points

• Output of the extension module at the loss of communication

Select “Output Clear (OFF)” or “Output Hold (factory default setting)” using the Configurator Software (model: R7CON).

• Output of the extension module when the communication is restored

“Output Clear”: The output value before the communication loss is output when the communication is restored. However, if a query instructs ON or OFF about output of the extension module when the communication is restored, the instructed content is output.

“Output Hold”: The output at the moment of communication loss is held.

• Output Data Length: SW1-3

SW1-3	OUTPUT DATA LENGTH
OFF	8-bit (*)
ON	16-bit

Note: Be sure to set unused SW1-4 through 1-8 to OFF.

■ POWER SUPPLY, MODBUS TERMINAL ASSIGNMENT

4	5	6	7
DA	DG	U(+)	V(-)
1	2	3	
DB	SLD	FG	

NO.	ID	FUNCTION, NOTES
1	DB	----
2	SLD	Shield
3	FG	FG
4	DA	----
5	DG	----
6	U(+)	Power input (+)
7	V(-)	Power input (-)

■ OUTPUT TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
NC	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
1	2	3	4	5	6	7	8	9
NC	C0	C1	C2	C3	C4	C5	C6	C7

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	C0	Common 0	11	Y0	Output 0
3	C1	Common 1	12	Y1	Output 1
4	C2	Common 2	13	Y2	Output 2
5	C3	Common 3	14	Y3	Output 3
6	C4	Common 4	15	Y4	Output 4
7	C5	Common 5	16	Y5	Output 5
8	C6	Common 6	17	Y6	Output 6
9	C7	Common 7	18	Y7	Output 7

■ TERMINATING RESISTOR

To use the terminating resistor, turn the switch ON, and OFF to invalidate.

(Factory setting: OFF)

■ EXTENSION MODULE

Combinations with all extension modules are available.

PC CONFIGURATOR

The following parameter items can be set with using PC Configurator Software (model: R7CON).
Refer to the users manual for the R7CON for detailed operation of the software program.

■ INTERFACE SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Communication Timeout	0.0 – 3276.7 (sec.)	3.0 (sec.)
Data Mode	RTU / ASCII	RTU
Parity	NONE / ODD / EVEN	NONE

■ EXTENSION MODULE SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Output Hold/Clear	Output Hold Output Clear	Output Hold

INPUT OUTPUT DATA BIT & DATA ALLOCATION

Output data length can be set with the front DIP switch. Input data length is regardless of output data length, feedback inputs 1 to 8 are assigned to bit 0 to 7.

Input ON: 1, Input OFF: 0

■ OUTPUT DATA BIT: 8 BITS (SW1-3: OFF)

When output data bit is 8 bits, set each output with 1 bit. The table below shows data allocation.

BIT	SETTING	OPERATION
0	0	Output 1 OFF
	1	Output 1 ON
1	0	Output 2 OFF
	1	Output 2 ON
2	0	Output 3 OFF
	1	Output 3 ON
3	0	Output 4 OFF
	1	Output 4 ON
4	0	Output 5 OFF
	1	Output 5 ON
5	0	Output 6 OFF
	1	Output 6 ON
6	0	Output 7 OFF
	1	Output 7 ON
7	0	Output 8 OFF
	1	Output 8 ON
8	—	Unused
9	—	Unused
10	—	Unused
11	—	Unused
12	—	Unused
13	—	Unused
14	—	Unused
15	—	Unused

ON (or OFF) cannot be set consecutively, because when each bit is “1”, ON is set and when each bit is “0”, OFF is set.

■ OUTPUT DATA BIT: 16 BITS (SW1-3: ON)

When output data bit is 16 bits, set each output with 2 bits. The table below shows data allocation.

BIT	SETTING	OPERATION
0, 1	0, 0	Output 1 RESET
	1, 0	Output 1 ON
	0, 1	Output 1 OFF
	1, 1	Output 1 RESET
2, 3	0, 0	Output 2 RESET
	1, 0	Output 2 ON
	0, 1	Output 2 OFF
	1, 1	Output 2 RESET
4, 5	0, 0	Output 3 RESET
	1, 0	Output 3 ON
	0, 1	Output 3 OFF
	1, 1	Output 3 RESET
6, 7	0, 0	Output 4 RESET
	1, 0	Output 4 ON
	0, 1	Output 4 OFF
	1, 1	Output 4 RESET
8, 9	0, 0	Output 5 RESET
	1, 0	Output 5 ON
	0, 1	Output 5 OFF
	1, 1	Output 5 RESET
10, 11	0, 0	Output 6 RESET
	1, 0	Output 6 ON
	0, 1	Output 6 OFF
	1, 1	Output 6 RESET
12, 13	0, 0	Output 7 RESET
	1, 0	Output 7 ON
	0, 1	Output 7 OFF
	1, 1	Output 7 RESET
14, 15	0, 0	Output 8 RESET
	1, 0	Output 8 ON
	0, 1	Output 8 OFF
	1, 1	Output 8 RESET

By setting with 2 bits, the module operates as shown above. ON or OFF can be set consecutively. To output ON signal twice successively, set ON signal as (1, 0), set RESET (0, 0) or RESET (1, 1), and then set ON (1, 0) again.

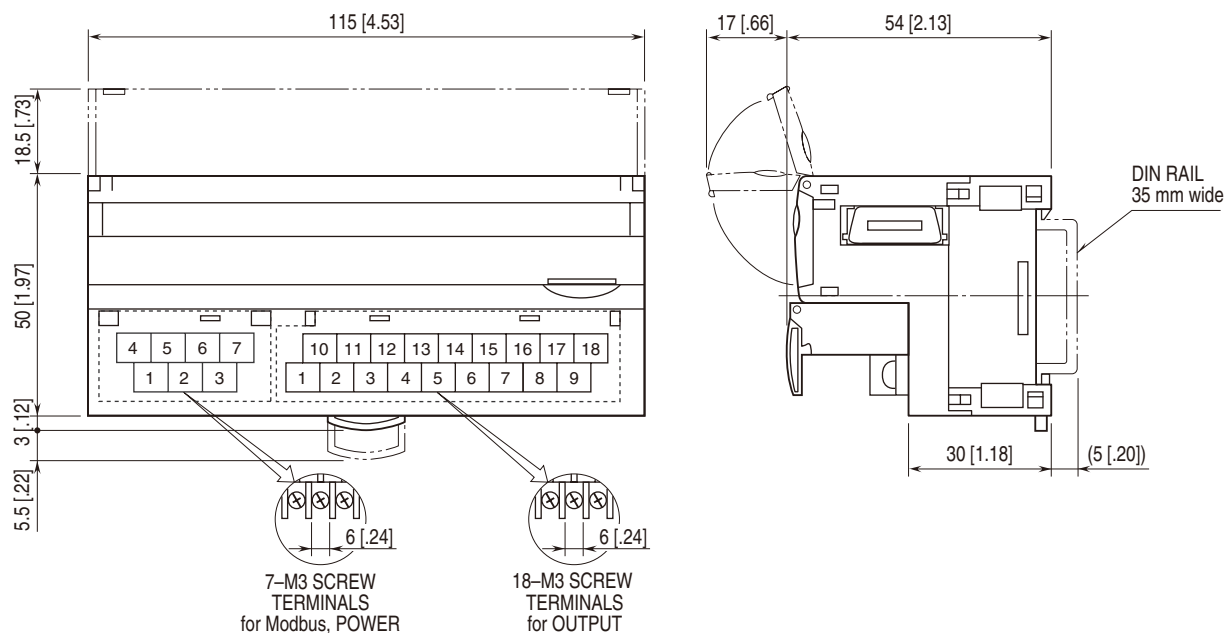
■ FEEDBACK INPUT

BIT	CHANNEL	DATA	STATE
0	Y0	0	OFF Output
		1	ON Output
1	Y1	0	OFF Output
		1	ON Output
2	Y2	0	OFF Output
		1	ON Output
3	Y3	0	OFF Output
		1	ON Output
4	Y4	0	OFF Output
		1	ON Output
5	Y5	0	OFF Output
		1	ON Output
6	Y6	0	OFF Output
		1	ON Output
7	Y7	0	OFF Output
		1	ON Output
8	—	—	Invalid
9	—	—	Invalid
10	—	—	Invalid
11	—	—	Invalid
12	—	—	Invalid
13	—	—	Invalid
14	—	—	Invalid
15	—	—	Invalid

TERMINAL CONNECTIONS

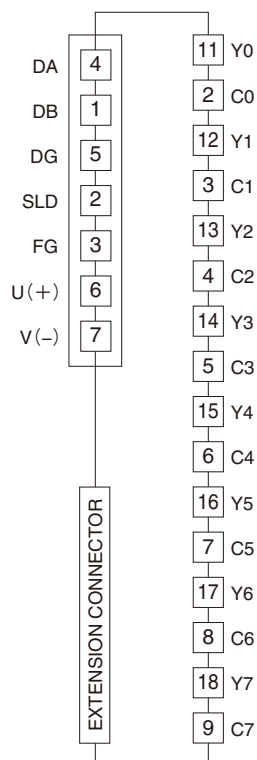
Connect the unit as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm [inch]

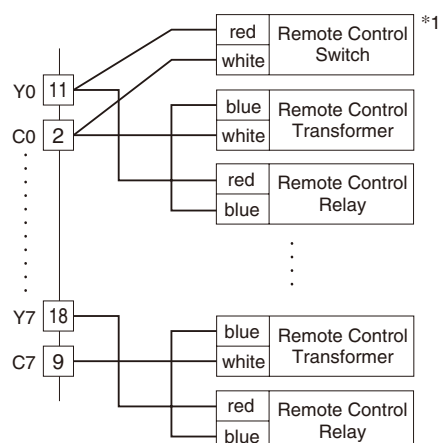


■ CONNECTION DIAGRAM

Caution: FG terminal is NOT a protective conductor terminal.



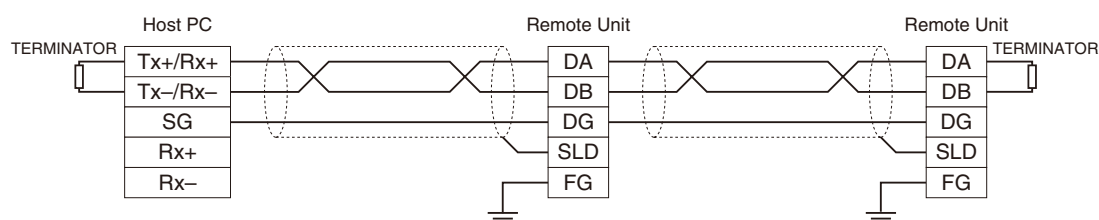
■ Output Connection Example



*1. Maximum four remote control switches can be connected in parallel.

COMMUNICATION CABLE CONNECTIONS

■ MASTER CONNECTION



Be sure to turn on the terminating resistor setting of the units at both ends of transmission line.

When the unit does not have a terminating resistor setting, connect a terminating resistor (110Ω, 0.25W) across DA and DB.

The Host PC can be located other than at the extreme ends of transmission line.

MODBUS FUNCTION CODES & SUPPORTED CODES

■ DATA AND CONTROL FUNCTIONS

CODE	NAME	
01	Read Coil Status	Digital output from the slave
02	Read Input Status	Status of digital inputs to the slave
03	Read Holding Registers	General purpose register within the slave
04	Read Input Registers	Collected data from the field by the slave
05	Force Single Coil	Digital output from the slave
06	Preset Single Register	General purpose register within the slave
08	Diagnostics	
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
15	Force Multiple Coils	Digital output from the slave
16	Preset Multiple Registers	General purpose register within the slave
17	Report Slave ID	Slave type / 'RUN' status

■ EXCEPTION CODES

CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave
02	Illegal Data Address	Address is not available within the slave
03	Illegal Data Value	Data is not valid for the function

■ DIAGNOSTIC SUBFUNCTIONS

CODE	NAME	
00	Return Query Data	Loop back test

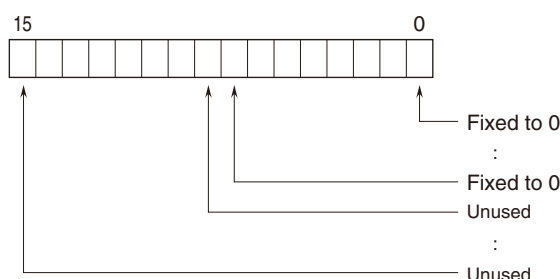
MODBUS I/O ASSIGNMENT

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1 – 16		Digital Output (discrete output of the basic module)
	17 – 32		Digital Output (discrete output of the extension module)
Inputs (1X)	1 – 16		Digital Input (discrete input of the basic module)
	17 – 32		Digital Input (discrete input of the extension module)
	33 – 48		Reserved (unused)
	49 – 64		Module Status
	65 – 80		Reserved (unused)
Input Registers (3X)	1 – 48	----	Analog Input (unused)
Holding Registers (4X)	1 – 48	----	Analog Output (unused)

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

■ STATUS

Bit 0 to 7: Fixed to 0.



WIRING INSTRUCTIONS

■ SCREW TERMINAL

Torque: 0.5 N·m

■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.

Applicable wire size: 0.25 to 1.65 mm² (AWG 22 to 16)

Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd, Nichifu Co., Ltd

