Remote I/O R7 Series

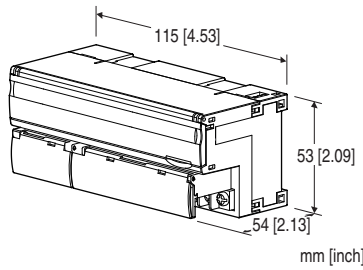
(No. ESU-7803-AK)

MODBUS I/O MODULE

(NPN discrete input & NPN transistor output, 8 points each, 115.2 kbps)

Functions & Features

• 8 points NPN discrete input and 8 points NPN transistor output module for Modbus
• Extension module can be connected



MODEL:R7M-DAC16C-R[1]

ORDERING INFORMATION

• Code number: R7M-DAC16C-R[1]
Specify a code from below for [1].
(e.g. R7M-DAC16C-R/Q)
• Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

DAC16C: NPN discrete input &
NPN transistor output, 8 points each

POWER INPUT

DC Power
R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[1] OPTIONS

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

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating
EX-FACTORY SETTING
/SET: Preset according to the Ordering Information Sheet

RELATED PRODUCTS

• PC Configurator cable (model: MCN-CON or COP-US)
• PC configurator software (model: R7CON)
Downloadable at our web site.
• Discrete input extension module (model: R7M-EAx)
• Discrete output extension module (model: R7M-ECx)

GENERAL SPECIFICATIONS

Connection: M3 separable screw terminal (torque 0.5 N·m)
Solderless terminal: Refer to the drawing at the end of the section.
Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd., Nichifu Co., Ltd.
Applicable wire size: 0.25 to 1.65 mm^2 (AWG 22 to 16)
Screw terminal: Nickel-plated steel
Housing material: Flame-resistant resin (gray)
Isolation: I/O to Modbus or FG to power
Output mode setting: disabled (*), enabled
Selectable with the front DIP switch
(*) Factory default setting
When the output mode setting is enabled, it is possible to set the operation mode for every two outputs points by using the configurator software (model: R7CON).
For example, the following settings are possible.
Output 0: Continuance Output
Output 1: Continuance Output
Output 2: ON/OFF Control Output
Output 3: ON/OFF Control Output
Output 4: ON/OFF Control Output
Output 5: ON/OFF Control Output
Output 6: Continuance Output
Output 7: Continuance Output
Operating mode setting: Continuance Output (*), ON/OFF Control Output
Selectable with the front DIP switch
(*) Factory default setting
ON/OFF control output setting: 100 msec. (*), 200 msec., 300 msec., 500 msec., 1 sec., 2 sec., 5 sec., 10 sec.
Selectable with the front DIP SW
(*) Factory default setting
Extension: No extension (*), Discrete input 8 or 16 points, Discrete output 8 or 16 points
Selectable with the front DIP SW
(*) Factory default setting
Output at the loss of communication:
Hold the output (*), Reset the output
Selectable with the front DIP SW
(*) Factory default setting
Status indicator LEDs: PWR, RUN, ERR, SD, RD

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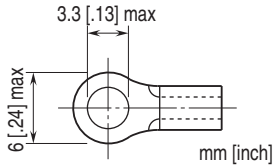
(Refer to the instruction manual)
Discrete I/O status indicator LED: LED turns on with I/O ON
Configurator connection: 2.5 dia. miniature jack
■Recommended solderless terminal



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.)
Communication parameter: With Configurator Software (model: R7CON)
- **Data Mode**: RTU (default) or ASCII
- **Parity:** NONE (default), ODD or EVEN
- **Data bit:** 8: RTU (default), 7: ASCII
- **Stop bit:** 1 or 2 (default)

Baud rate setting: With rotary switch
115.2 kbps, 57.6 kbps, 38.4 kbps (default), 28.8 kbps, 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, 1200 bps
Node address setting: 1 - 99 (with rotary switch) (factory default setting: 00)
Terminating resistor: Built-in (Selected with the DIP SW; factory setting: disabled)

INPUT SPECIFICATIONS

Common: Positive common (NPN) per 8 points
Maximum inputs applicable at once: No limit (at 24 V DC)
Rated input voltage: 24 V DC ±10 %; ripple 5 %p-p max.
ON voltage / current: ≥ 15 V DC (X0 to X7 input teriminal - C+) / ≥ 3.5 mA
OFF voltage / current: ≤ 5 V DC (X0 to X7 input teriminal - C+) / ≤ 1 mA
Input current: ≤ 5.5 mA per point at 24 V DC
Input resistance: Approx. 4.4 kΩ
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.0 msec.

OUTPUT SPECIFICATIONS

Common: Negative common (NPN) per 8 points
Maximum outputs applicable at once: No limit (at 24 V DC)
Rated load voltage: 24 V DC ±10 %
Rated output current: 0.1 A per point, 0.8 A per common
Residual voltage: ≤ 1.2 V
Leakage current: ≤ 0.1 mA
ON delay: ≤ 0.5 msec.
OFF delay: ≤ 1.0 msec.
Overload current protection function: Limits the current value when overcurrent is detected
Overheat Protection Function:
Turns OFF the output when overheat is detected
(When driving an inductive load, connect a diode in parallel with the load.)

INSTALLATION

Current consumption
•**DC**: Approx. 40 mA
Operating temperature: -10 to +55°C (14 to 131°F)
Storage temperature: -20 to +65°C (-4 to +149°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: DIN rail (35 mm rail)
Weight: 200 g (0.44 lb)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (I/O to Modbus or FG to power)

STANDARDS & APPROVALS

Refer to the manuals to comply with the standards.
EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive

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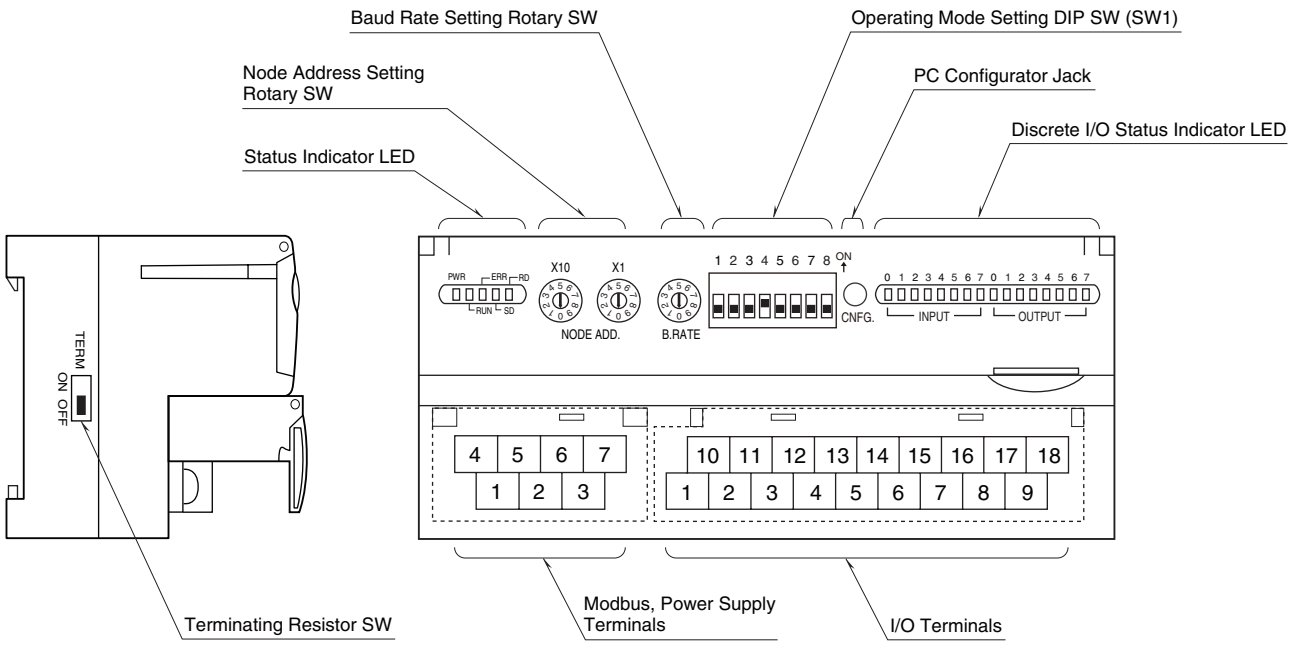
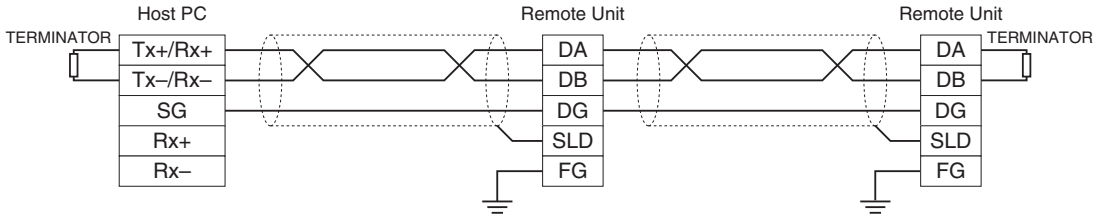
EXTERNAL VIEW

■ SIDE VIEW ■ FRONT VIEW



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.

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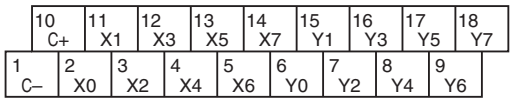
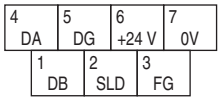
TERMINAL ASSIGNMENTS

■I/O TERMINAL ASSIGNMENT



NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	C–	Common–	10	C+	Common+
2	X0	Input 0	11	X1	Input 1
3	X2	Input 2	12	X3	Input 3
4	X4	Input 4	13	X5	Input 5
5	X6	Input 6	14	X7	Input 7
6	Y0	Output 0	15	Y1	Output 1
7	Y2	Output 2	16	Y3	Output 3
8	Y4	Output 4	17	Y5	Output 5
9	Y6	Output 6	18	Y7	Output 7

■ POWER SUPPLY, MODBUS TERMINAL ASSIGNMENT



NO.	ID	FUNCTION, NOTES
1	DB	----
2	SLD	Shield
3	FG	FG
4	DA	-----
5	DG	----
6	+24 V	Power input (24 V DC)
7	0 V	Power input (0 V DC)

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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

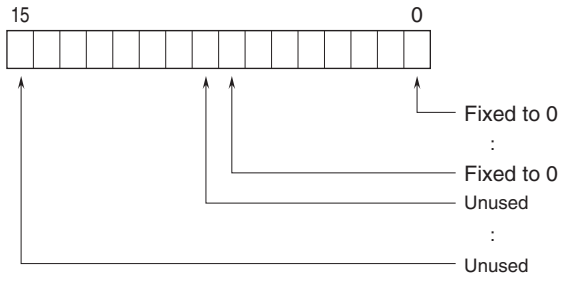
MODBUS I/O ASSIGNMENT

	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.



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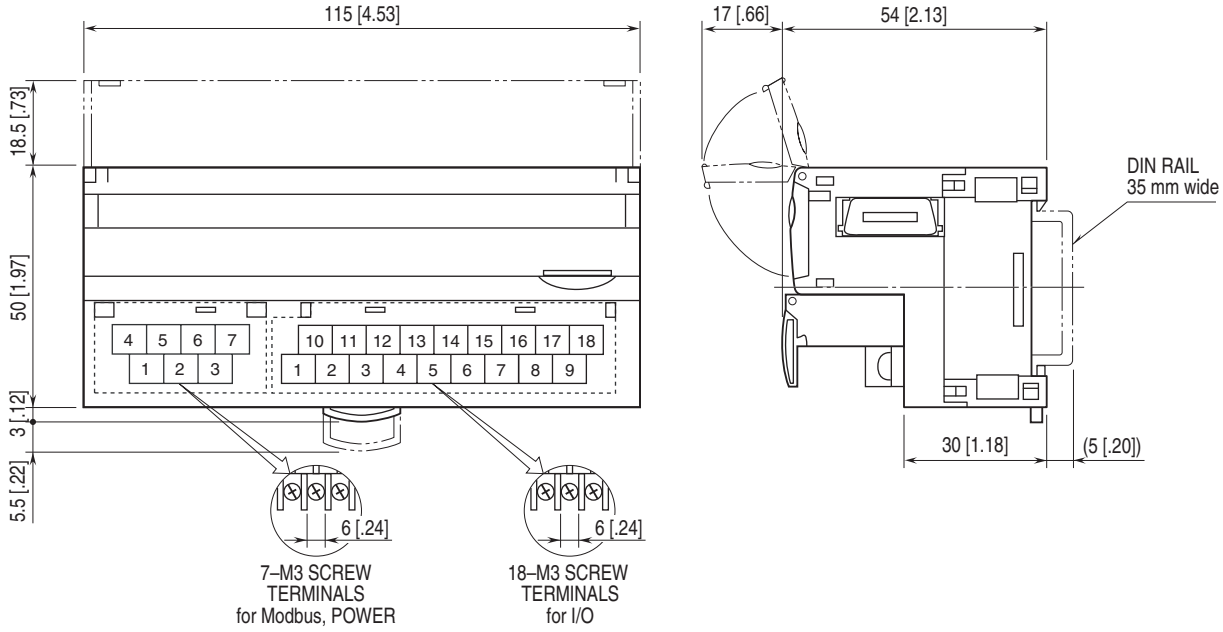
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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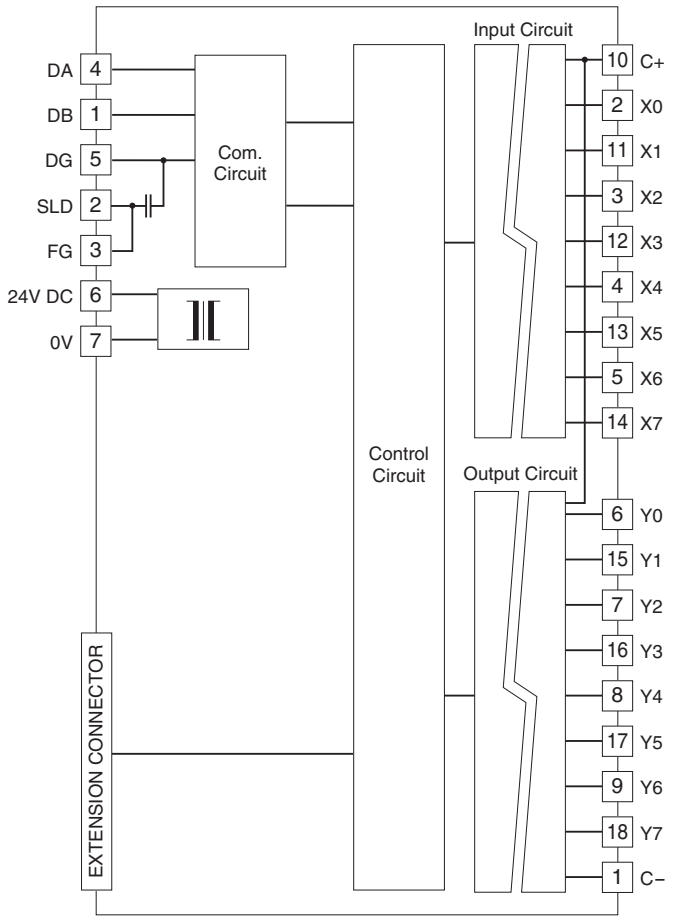
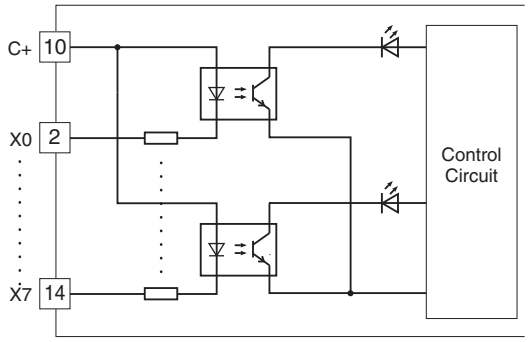
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

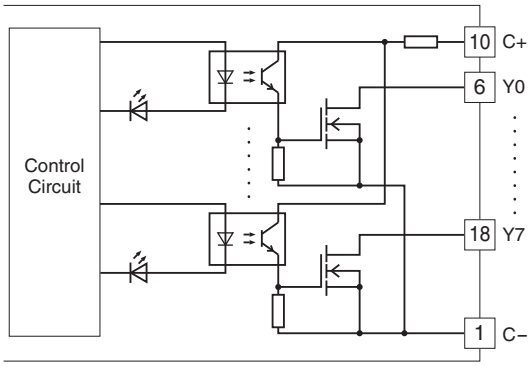
Caution: FG terminal is NOT a protective conductor terminal.



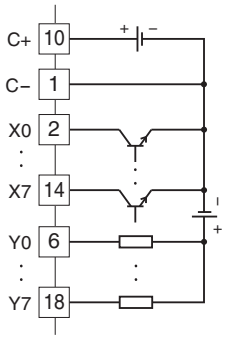
■ **Input Circuit**



■ **Output Circuit**



■ **I/O Connection Example**



⚠ Specifications are subject to change without notice.

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