

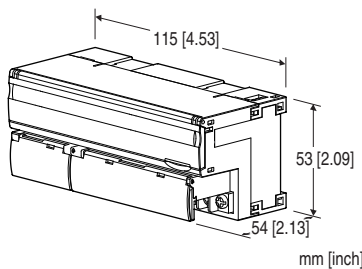
Remote I/O R7 Series

MODBUS I/O MODULE

(AC current input, 4 points, isolated, RMS sensing, clamp-on current sensor CLSE use)

Functions & Features

- 4 points AC current I/O module for Modbus
- Extension module can be connected
- Input range can be selected with the front DIP switches for all channels.
- Individual channels, zero adjustment, span adjustment, and scaling can be set with the configurator software (model: R7CON)



MODEL:R7M-CT4E-R[1]

ORDERING INFORMATION

- Code number: R7M-CT4E-R[1]
- Specify a code from below for [1].
(e.g. R7M-CT4E-R/Q)
- Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

CT4E: AC current input, 4 points, clamp-on current sensor CLSE use

POWER INPUT

DC Power

R: 24 V DC

(Operational voltage range 24 V \pm 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
(No. ESU-7803-R)

RELATED PRODUCTS

- PC Configurator cable (model: MCN-CON or COP-US)
 - PC configurator software (model: R7CON)
- Downloadable at our web site.
- Clamp-on current sensor (model: CLSE)
- The clamp-on current sensors, not included in this product package, must be ordered separately. Required number depends upon the system configuration.
- Discrete input extension module (model: R7M-EAx)
 - Discrete output extension module (model: R7M-ECx)

PACKAGE INCLUDES...

- Terminating resistor (110 Ω , 0.25 W)

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 mm² (AWG 22 to 16)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (gray)

Isolation: Input 0 to input 1 to input 2 to input 3 to Modbus or FG to power

Input waveform

RMS sensing: Up to 15 % of 3rd harmonic content

Zero adjustments: Configurable via R7CON

Span adjustments: Configurable via R7CON

Input range: Selectable with the DIP SW on the front of the unit or configurable via R7CON

Extension: No extension (*), Discrete input 8 or 16 points, Discrete output 8 or 16 points

Selectable with the front DIP SW

(* Factory default setting)

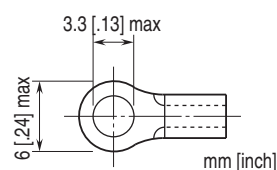
Conversion rate: Selectable with the front DIP SW

Status indicator LEDs: PWR, RUN, ERR, SD, RD

(Refer to the instruction manual)

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

38.4 kbps (default), 19.2 kbps, 9600 bps, 4800 bps

Node address setting: 1 - 99 (with rotary switch) (factory
default setting: 00)

Response time: ≤ 1.0 sec. (0 - 90 %)

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute (input 0 to input
1 to input 2 to input 3 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

INPUT SPECIFICATIONS

Input range (Optional)

CLSE-R5: 0 - 5 A AC

CLSE-05: 0 - 50 A AC

CLSE-10: 0 - 100 A AC

CLSE-20: 0 - 200 A AC

CLSE-40: 0 - 400 A AC

CLSE-60: 0 - 600 A AC (*)

(*) Factory setting

Frequency: 50 / 60 Hz (45 - 65 Hz)

Operational range: 5 - 115 % of rating (Operational range
for the CLSE-60 is limited up to approx. 109 % (65535).)

Overload capacity: 120 % of rating (continuous)

Note: Use in the circuits below 480 V.

INSTALLATION

Current consumption

- DC: Approx. 100 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

Conversion rate / conversion accuracy:

10 msec./ ± 2.0 %, 20 msec./ ± 1.0 %, 40 msec./ ± 0.5 %, 80 msec./ ± 0.5 % (*)

(*) Factory setting

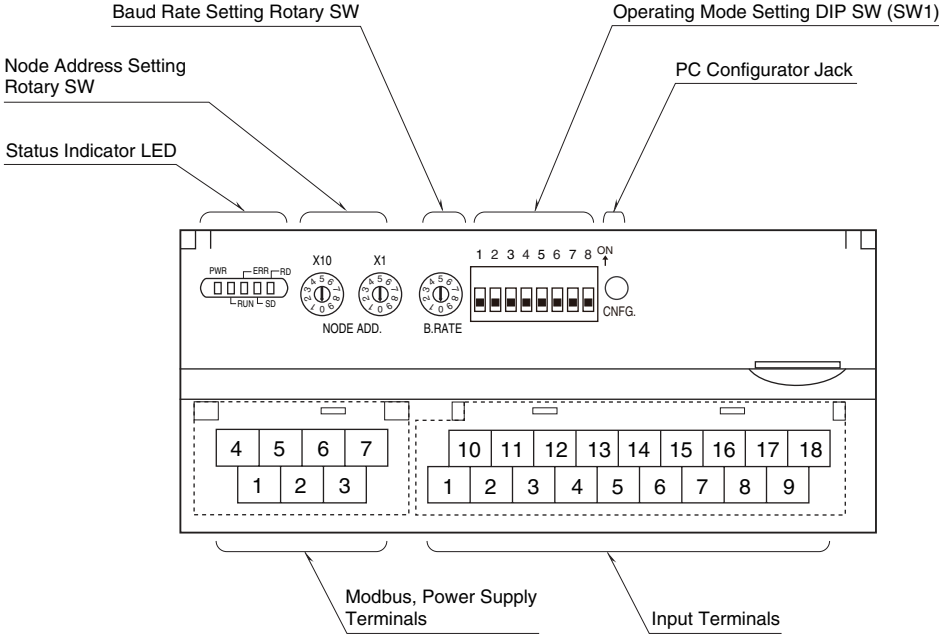
(The conversion accuracy does not include the accuracy of
the sensor)

Data range: Engineering unit value (A) $\times 100$ (integer)

(For CLSE-R5, engineering unit value (A) $\times 1000$ (integer))

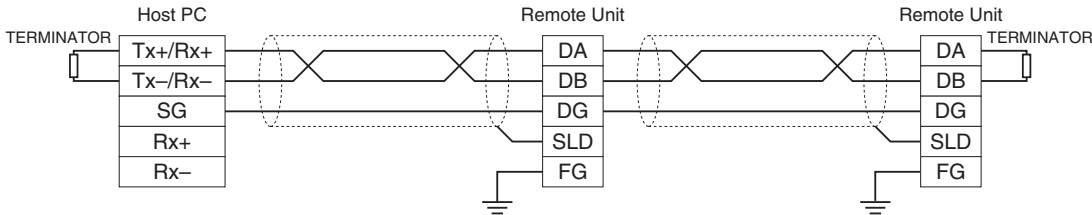
Temp. coefficient: ± 0.015 %/°C (± 0.008 %/°F)

EXTERNAL VIEW



COMMUNICATION CABLE CONNECTIONS

■ MASTER CONNECTION



Be sure to connect the terminating resistor included in the product package to the unit at both ends of transmission line.
 The terminator must be connected across DA and DB.
 The Host PC can be located other than at the extreme ends of transmission line.

TERMINAL ASSIGNMENTS

■ **INPUT TERMINAL ASSIGNMENT**

10	11	12	13	14	15	16	17	18
K0	L0	K1	L1	NC	K2	L2	K3	L3
1	2	3	4	5	6	7	8	9
NC	NC	NC	NC	NC	NC	NC	NC	NC

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	K0	AC current K0
2	NC	No connection	11	L0	AC current L0
3	NC	No connection	12	K1	AC current K1
4	NC	No connection	13	L1	AC current L1
5	NC	No connection	14	NC	No connection
6	NC	No connection	15	K2	AC current K2
7	NC	No connection	16	L2	AC current L2
8	NC	No connection	17	K3	AC current K3
9	NC	No connection	18	L3	AC current L3

■ **POWER SUPPLY, MODBUS TERMINAL ASSIGNMENT**

4	5	6	7
DA	DG	+24 V	0V
1	2	3	
DB	SLD	FG	

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)

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

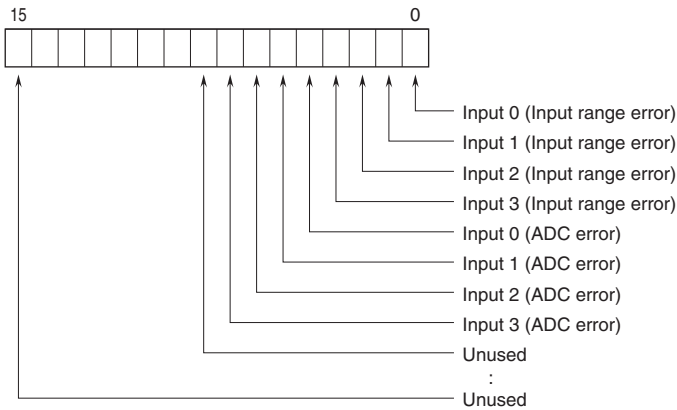
	ADDRESS	DATA TYPE	DATA
Coil (0X)	1 – 16		Digital Output (discrete output of the basic module) (unused)
	17 – 32		Digital Output (discrete output of the extension module)
Inputs (1X)	1 – 16		Digital Input (discrete input of the basic module) (unused)
	17 – 32		Digital Input (discrete input of the extension module)
	33 – 48		Reserved (unused)
	49 – 64		Module Status
	65 – 80		Reserved (unused)
Input Registers (3X)	1 – 4	I	Analog Input
	5 – 16	----	Reserved (unused)
	17 – 24	F	Analog Input
	25 – 48	----	Reserved (unused)
Holding Registers (4X)	1 – 48	----	Analog Output (unused)

I : Integer, -1500 – +11500 (-15 – +115%)

F : Floating

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

■ STATUS



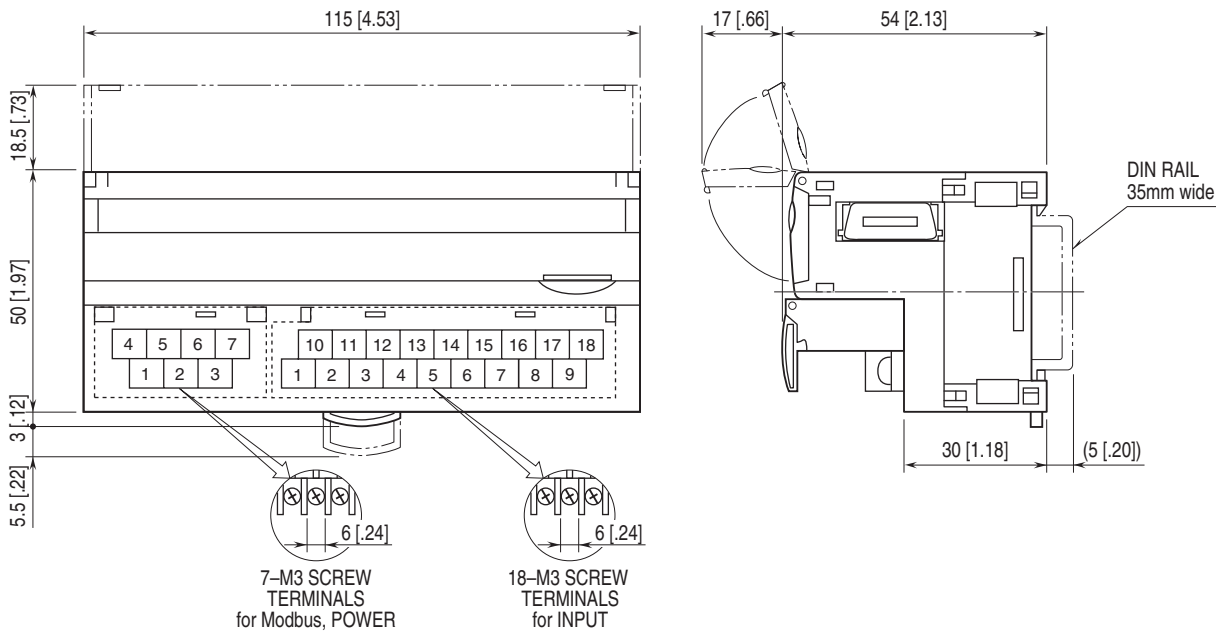
Input range error ($\geq 115\%$)
 0 : Normal 1 : Error
 ADC error (no response from ADC)
 0 : Normal 1 : Error

DATA CONVERSION

■ ENGINEERING UNIT CONVERSION

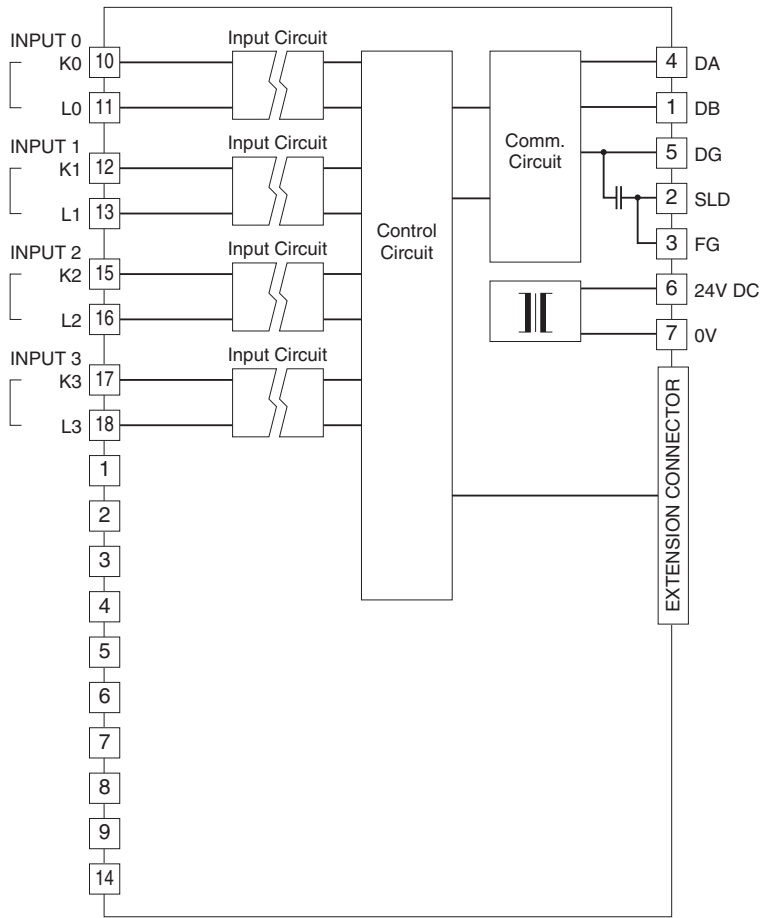
Integer obtained by multiplying engineering unit value (A) by 100 is represented in 16-bit.
 (For CLSE-R5, integer obtained by multiplying engineering unit value (A) by 1000.)

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]

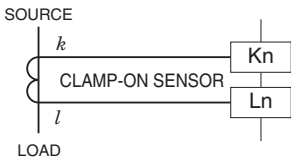


SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FG terminal to ground.
 Caution: FG terminal is NOT a protective conductor terminal.



■ Input Connection Example



Specifications are subject to change without notice.