

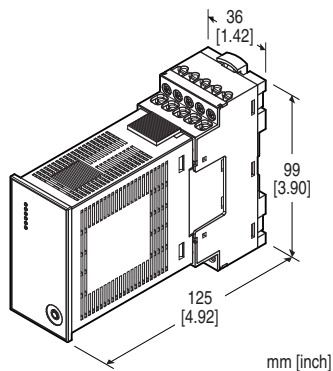
## Plug-in Remote I/O R10 Series

### MODBUS I/O MODULE

(4 points, RMS sensing, clamp-on current sensor input)

#### Functions & Features

- Plug-in construction
- Modbus-RTU protocol communication
- Easy-to-install clamp-on type current sensor without needing a current transformer
- Wide input range from 5 A up to 600 A
- High-density mounting



Note: The figure shows the combination of the unit and the base.

### MODEL: R10M-CT4E-R[1]

#### ORDERING INFORMATION

- Code number: R10M-CT4E-R[1]
- Specify a code from below for [1].  
(e.g. R10M-CT4E-R/Q)
- Specify the specification for option code /Q  
(e.g. /C01)

#### I/O TYPE

**CT4E:** Clamp-on current sensor CLSE use 4 points

#### 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

#### RELATED PRODUCTS

- Installation base (model: R10-BS)

- PC configurator software (model: R10CFG)

The configurator software is downloadable at our web site. A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

- 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.

#### PACKAGE INCLUDES...

- Terminating resistor 110Ω (0.25W)

#### GENERAL SPECIFICATIONS

**Construction:** Plug-in

**Connection**

- Connected to base with connector
- Base

M2.6 screw terminals (torque: 0.5 N·m)

Applicable solderless terminal size (M3)

**Screw terminal:** Nickel-plated steel

**Housing material:** Flame-resistant resin (black)

**Isolation:** Input to Modbus to power input to FE1

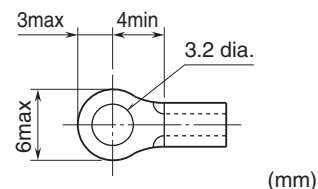
**Input waveform**

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

**Status indicators:** Power, Run, Error

**Configuration:** Select sensors for 4 points (CT1, CT2, CT3, CT4) each with PC Configurator Software (model: R10CFG)

■ Recommended solderless terminal size - M3 (unit: mm)



## MODBUS COMMUNICATION

RS-485

**Standard:** Conforms to TIA/EIA-485-A

**Protocol:** Modbus-RTU, Modbus-ASCII

**Transmission distance:** 500 meters max.

**Transmission media:** Shielded twisted-pair cable  
(CPEV-S 0.9 dia.)

**Status indicator LED:** RD, SD

**Transmission setting:** PC configurator software

## INPUT SPECIFICATIONS

**Input setting:** PC configurator software

**Clamp-on current sensor (CT1, CT2)**

Input (sensor & range)

**CLSE-R5:** 0 - 5 A

**CLSE-05:** 0 - 50 A

**CLSE-10:** 0 - 100 A

**CLSE-20:** 0 - 200 A

**CLSE-40:** 0 - 400 A

**CLSE-60:** 0 - 600 A

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

**Operational range:** 0 - 105 % of rating

**Overload capacity**

**CLSE-R5:** 10 A continuous

**CLSE-05:** 60 A continuous

**CLSE-10:** 120 A continuous

**CLSE-20:** 240 A continuous

**CLSE-40:** 480 A continuous

**CLSE-60:** 720 A continuous

Be sure that the input voltage is of 480 V or less.

## INSTALLATION

**Current consumption:**  $\leq 90$  mA

**Operating temperature:** -10 to +55°C (14 to 131°F)

**Storage temperature:** -10 to +55°C (14 to +131°F)

**Operating humidity:** 10 to 90 %RH (non-condensing)

**Atmosphere:** No corrosive gas or heavy dust

**Mounting:** Installation Base (model: R10BS)

**Weight:** 120 g (0.26 lb) except base

## PERFORMANCE

**Conversion accuracy:**  $\pm 1$  % except the sensor accuracy

**Conversion rate:** 14 ms

**Data range**

**CLSE-R5:** Integer that engineering unit value (A) multiplied by 1000

**CLSE-05, CLSE-10, CLSE-20:** Integer that engineering unit value (A) multiplied by 100

**CLSE-40, CLSE-60:** Integer that engineering unit value (A) multiplied by 10

(Scaling of converted data is configurable with the

configurator software)

**Temp. coefficient:**  $\pm 0.03$  %/°C ( $\pm 0.02$  %/°F)

**Response time:**  $\leq 2$  sec. (0 - 90 %)

**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC

**Dielectric strength:** 1500 V AC @ 1 minute (input to Modbus to power input to FE1)

## STANDARDS & APPROVALS

**EU conformity:**

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

## CONFIGURATOR SOFTWARE SETTING

The following parameters can be set with using PC Configurator Software (model: R10CFG)  
 Refer to the users manual for the R30CFG for detailed operation of the software program.

### ■ INPUT SETTING

Each channel can be set independently.

ITEM	SETTING RANGE	DEFAULT SETTING
Clamp-on Current Sensor	CLSE-R5 / CLSE-05 / CLSE-10 / CLSE-20 / CLSE-40 / CLSE-60	CLSE-R5
Zero Input	CLSE-R5: 0.000 - 5.000 ( $\leq$ full input)	0.000
	CLSE-05: 0.00 - 50.00 ( $\leq$ full input)	
	CLSE-10: 0.00 - 100.00 ( $\leq$ full input)	
	CLSE-20: 0.00 - 200.00 ( $\leq$ full input)	
	CLSE-40: 0.00 - 400.00 ( $\leq$ full input)	
	CLSE-60: 0.00 - 600.00 ( $\leq$ full input)	
Full Input	CLSE-R5: 0.000 - 5.000 ( $\geq$ zero input)	0.000
	CLSE-05: 0.00 - 50.00 ( $\geq$ zero input)	
	CLSE-10: 0.00 - 100.00 ( $\geq$ zero input)	
	CLSE-20: 0.00 - 200.00 ( $\geq$ zero input)	
	CLSE-40: 0.00 - 400.00 ( $\geq$ zero input)	
	CLSE-60: 0.00 - 600.00 ( $\geq$ zero input)	
Zero Fine Adjust	-320.00 - 320.00	0.00 (%)
Gain Zero Adjust	-3.2000 - 3.2000	1.0000
Zero Scaling	-32000 - 32000	0
Full Scaling	-32000 - 32000	10000
Cutout	0.0 - 5.0 (%)	1.0 (%)

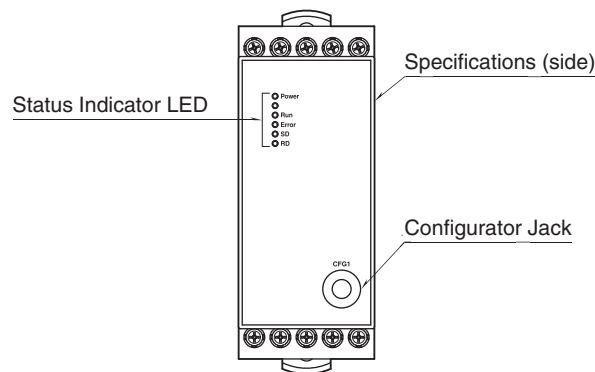
### ■ MODBUS SETTING

ITEM	SETTING RANGE	DEFAULT SETTING
Data Mode	Modbus-RTU / Modbus-ASCII	Modbus-RTU
Address	1 - 247	1
Baud Rate	38400 / 19200 / 9600 / 4800 bps	38400 bps
Parity	None / Odd / Even	None
Communication timeout duration	0.1 - 3200.0 (sec.)	3.0 sec.

Depending on data mode and parity bit setting, data bit and stop bit are as following.

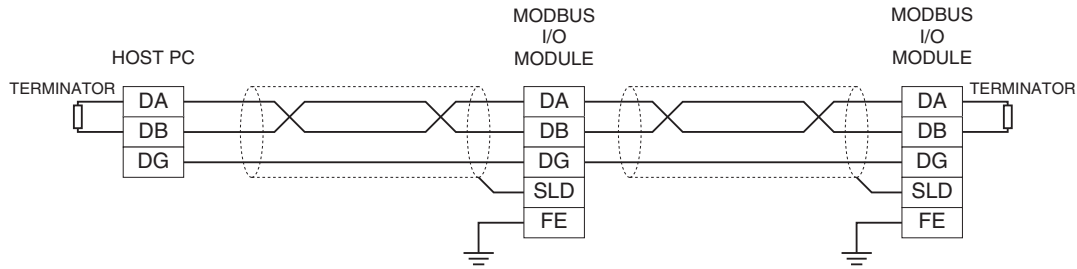
DATA MODE	PARITY BIT	DATA BIT	STOP BIT
Modbus-RTU	None	8	2
	Odd or Even	8	1
Modbus-ASCII	None	7	2
	Odd or Even	7	1

## EXTERNAL VIEW



## MODBUS WIRING CONNECTION

### ■ WIRING COMMUNICATION WITH HOST PC



Note: The terminator must be connected across "DA" and "DB" at both ends of communication line.

## TERMINAL ASSIGNMENTS

### ■ BASE

1 K1	2 K2	3 K3	4 K4	5 NC
6 L1	7 L2	8 L3	9 L4	10 NC
11 FE	12 DB	13 DA	14 NC	15 FE1
16 SLD	17 DG	18 NC	19 24V	20 0V

PIN NO.	ID	FUNCTION	PIN NO.	ID	FUNCTION
1	K1	Input 1-K	11	FE	Modbus grounding
2	K2	Input 2-K	12	DB	DB
3	K3	Input 3-K	13	DA	DA
4	K4	Input 4-K	14	NC	Unused
5	NC	Unused	15	FE1	Power grounding
6	L1	Input 1-L	16	SLD	Shield
7	L2	Input 2-L	17	DG	DG
8	L3	Input 3-L	18	NC	Unused
9	L4	Input 4-L	19	24V	Power supply 24V DC
10	NC	Unused	20	0V	Power supply 0V DC

\* Base does not come with the unit. Please order separately.

## MODBUS FUNCTION CODES & SUPPORTED CODES

Modbus function codes are shown below

### ■ DATA AND CONTROL FUNCTIONS

CODE	NAME	
02	Read Input Status	Status of digital inputs to the slave (read only)
04	Read Input Registers	Collected data from the field by the slave (read only)

### ■ 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

## MODBUS I/O ASSIGNMENT

	ADDRESS	DATA TYPE	DATA
Input (0X)	1		Analog input 1 error (input range error)
	2		Analog input 2 error (input range error)
	3		Analog input 3 error (input range error)
	4		Analog input 4 error (input range error)
Input Register (3X)	1	I	Analog Input (analog input 1)
	2	I	Analog Input (analog input 2)
	3	I	Analog Input (analog input 3)
	4	I	Analog Input (analog input 4)

Note: DO NOT access addresses other than the ones mentioned above. Such access may cause problems such as malfunction.

### ■ DATA TYPE

I: Integer, 0 - 65535

### ■ STATUS

1 bit: indicates input status.

input range error ( (Input range is out of the range)

0: Normal

1: Error

## DATA CONVERSION

### ■ ENGINEERING UNIT CONVERSION

CLSE-R5 is multiplied by 1000, CLSE-10 and CLSE-20 is multiplied 100, CLSE-40 and CLSE-60 is multiplied by 10, expressed in 16 bits (0 - 65535).

### ■ SCALED ANALOG DATA (16-bit) CONVERSION



The data is 0 to 10000 for scaling 0 to 100% setting.

If the input range is 0 to +105% (0 to +10500) and that is out of range, the data is fixed to 0 or 10500.

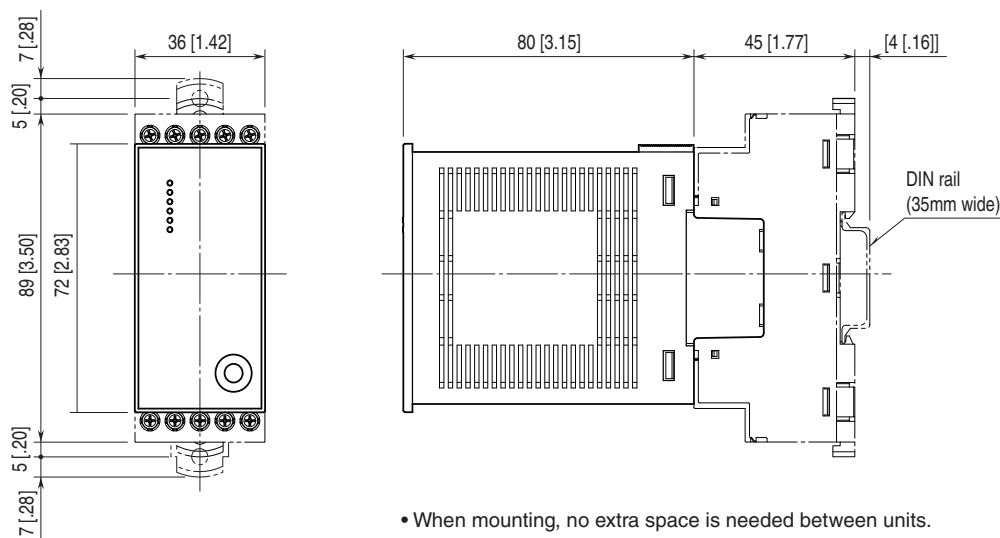
### ■ DATA ERROR STATUS

Data error status is indicated by 1 bit.

0: OFF

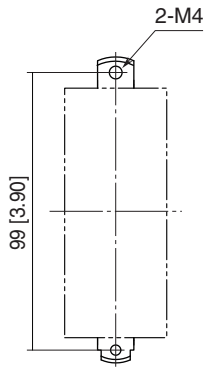
1: ON

## EXTERNAL DIMENSIONS unit: mm [inch]



• When mounting, no extra space is needed between units.

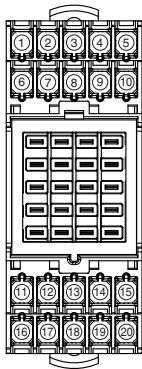
**MOUNTING REQUIREMENTS** unit: mm [inch]



\* Mounting requirements for base.

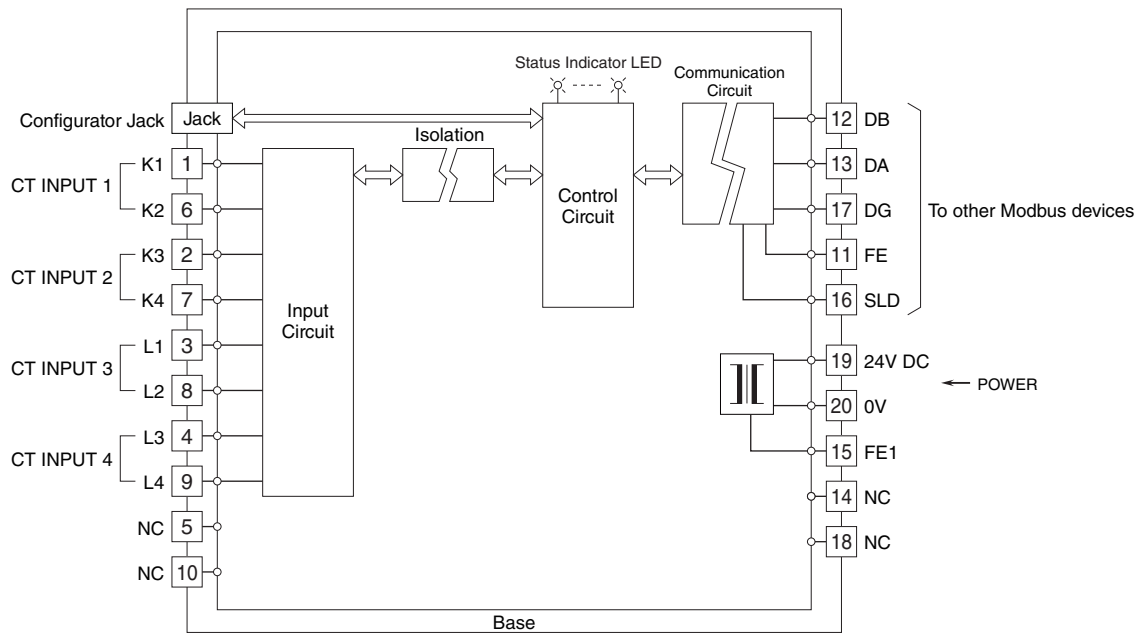
**TERMINAL ASSIGNMENTS**

■ BASE

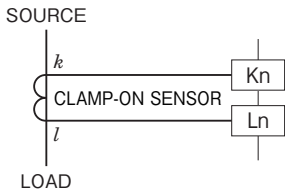


\* Base does not come with the unit. Please order separately.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



■ INPUT CONNECTION



**⚠** Specifications are subject to change without notice.