

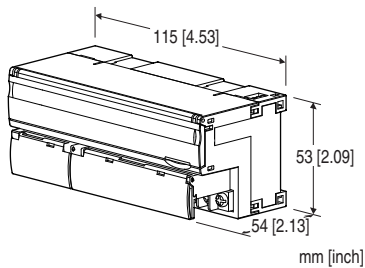
## Remote I/O R7 Series

### MODBUS I/O MODULE

(DC voltage output, 2 points, isolated)

#### Functions & Features

- 2 points DC voltage output module for Modbus
- Extension module can be connected
- Output 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-YV2-R[1]

#### ORDERING INFORMATION

- Code number: R7M-YV2-R[1]
- Specify a code from below for [1].  
(e.g. R7M-YV2-R/Q)
- Specify the specification for option code /Q  
(e.g. /C01/SET)

#### I/O TYPE

**YV2:** DC voltage output, 2 points

#### POWER INPUT

##### DC Power

R: 24 V DC

(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

#### [1] OPTIONS

##### Standards & Approvals

blank: CE marking

/UL: UL approval, CE marking

##### Other Options

blank: none

/Q: Option other than the above (specify the specification)

(UL not available)

#### 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-D)

#### 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)

#### PACKAGE INCLUDES...

- Terminating resistor (110  $\Omega$ , 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 mm<sup>2</sup> (AWG 22 to 16)

**Screw terminal:** Nickel-plated steel

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

**Isolation:** Output 0 to output 1 to Modbus or FG to power

**Zero adjustments:** Configurable via R7CON

**Span adjustments:** Configurable via R7CON

**Output range:** Selectable with the front DIP SW 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

##### Output at the loss of communication:

Hold the output (\*), Reset the output

Selectable with the front DIP SW

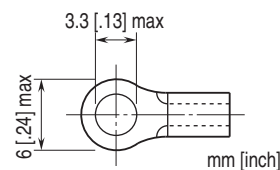
(\* ) Factory default setting

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

(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)

## OUTPUT SPECIFICATIONS

### ■ Narrow Span voltage

**Output range:** -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

**Load resistance:**  $\geq 100 \text{ k}\Omega$

### ■ Wide Span voltage

**Output range:** -10 - +10 V DC (\*), -5 - +5 V DC, 0 - 10 V DC,  
0 - 5 V DC, 1 - 5 V DC

(\* factory default setting)

**Load resistance:**  $\geq 100 \text{ k}\Omega$

### ■ Operational range

**Except -10 to +10 V DC:** -15 to +115 % of output range

**-10 to +10 V DC:** Approx. -11.5 to +11.5 V DC

## 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:** 180 g (0.40 lb)

## PERFORMANCE

**Conversion accuracy:**  $\pm 0.1 \%$

**Data range:** 0 - 10000 of the output range

(Scaling of converted data is configurable with the configurator software (model: R7CON))

**Temp. coefficient:**  $\pm 0.015 \%/^{\circ}\text{C}$  ( $\pm 0.008 \%/^{\circ}\text{F}$ )

**Response time:** 250 msec. (0 - 90 %)

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

**Dielectric strength:** 1500 V AC @ 1 minute (output 0 to output 1 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

**Approval:**

UL/C-UL nonincendive Class I, Division 2,

Groups A, B, C, and D

(ANSI/UL 121201, CAN/CSA-C22.2 No.213-17)

UL/C-UL general safety requirements

(UL 61010-1, CAN/CSA-C22.2 No.61010-1)

Note: This equipment is to be supplied by a Class 2 power supply when using as conformity with UL/C-UL.

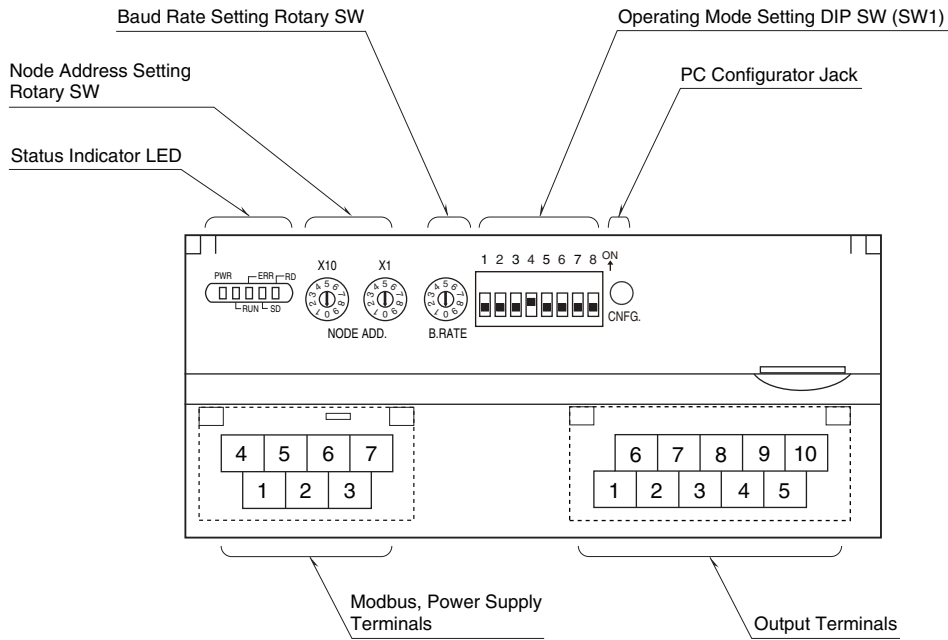
## FUNCTIONS

**Output hold function:**

Output at the loss of communication is selectable from output clear (fix the output at -15 % or approx. -11.5 V) and output hold (last normally received data) with DIP switch.

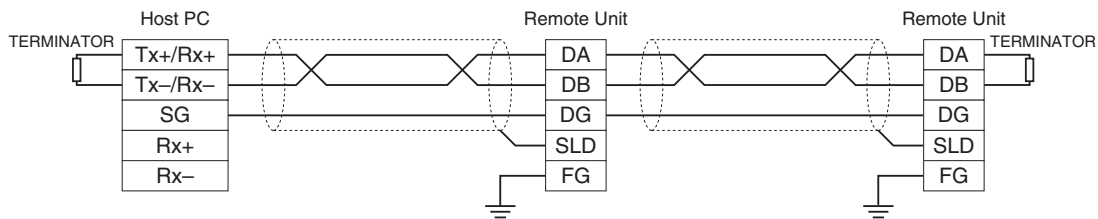
At the startup, it outputs -15 % or approx. -11.5 V until the communication is established and normal data is received.

## 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**

■ **OUTPUT TERMINAL ASSIGNMENT**

6	7	8	9	10
NC	VH0	VLO	VH1	VL1
1	2	3	4	5
NC	COM0	COM0	COM1	COM1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	6	NC	No connection
2	COM0	Common 0	7	VH0	Wide span volt. 0
3	COM0	Common 0	8	VLO	Narrow span volt. 0
4	COM1	Common 1	9	VH1	Wide span volt. 1
5	COM1	Common 1	10	VL1	Narrow span volt. 1

■ **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 – 48	----	Analog Input (unused)
Holding Registers (4X)	1 – 2	I	Analog Output
	3 – 16	----	Reserved (unused)
	17 – 20	F	Analog Output
	21 – 48	----	Reserved (unused)

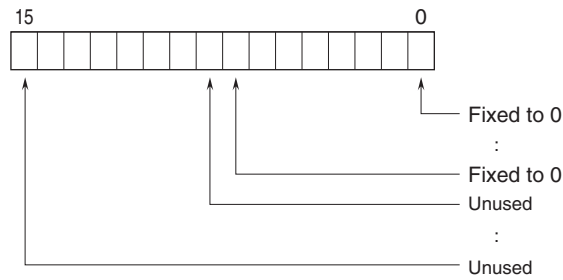
I : Integer, -1500 – +11500 (-15 – +115%)

F : Floating

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

## ■ STATUS

Bit 0 to 7: Fixed to 0.



## DATA CONVERSION

### ■ OUTPUT RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Digital output data is converted into analog representations of 0 – 100% proportional to each scaled range.

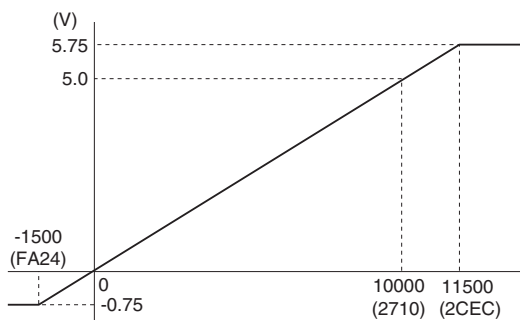
Overrange output is possible from -15 to +115% of the nominal range.

When the signal exceeds the limit, the data is fixed at -15% or +115%.

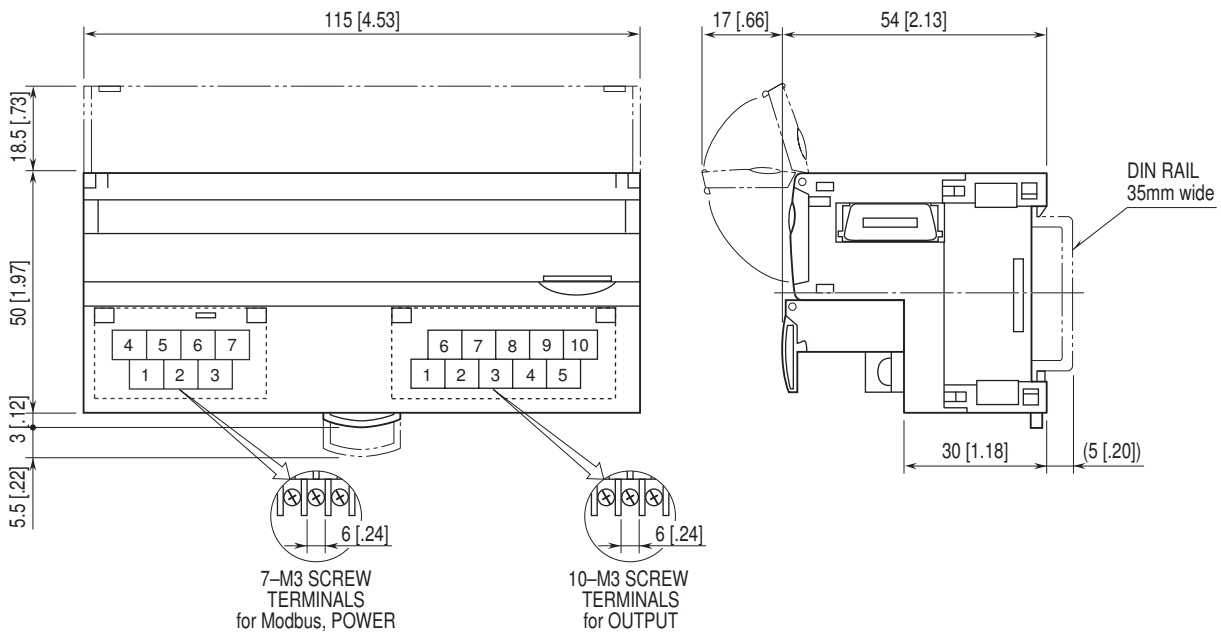
(approx. -11.5 V or +11.5 V when the output range is -10 - +10 V)

#### • Output Range 0 – 5V DC

Digital Value, Decimal	Digital Value, HEX	Output Value, Engineering Unit	Output Value, %
-1500	FA24	≤ -0.75V	-15%
0	0	0V	0%
10000	2710	5V	100%
11500	2CEC	≥ 5.75V	115%

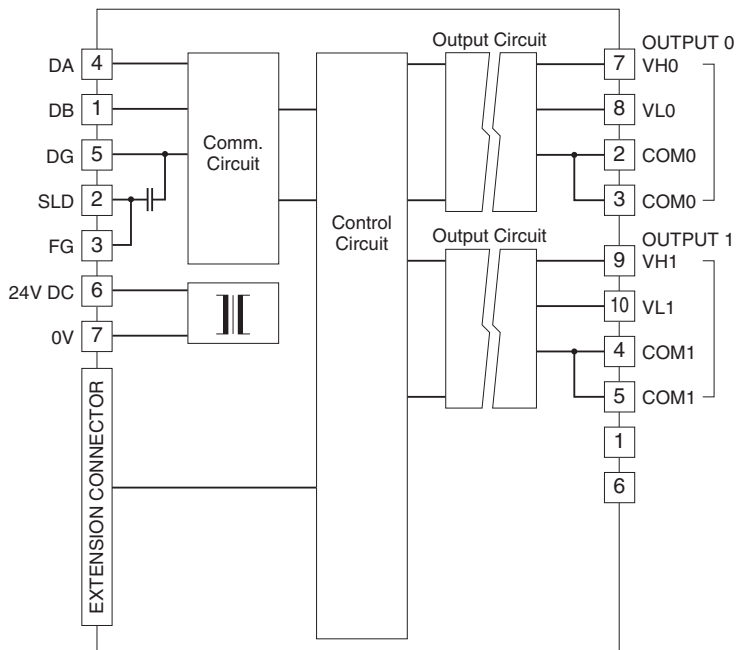


## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



## 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.



### Output Connection Examples





Specifications are subject to change without notice.