

Super-mini Signal Conditioners Mini-M Series

RTD TRANSMITTER

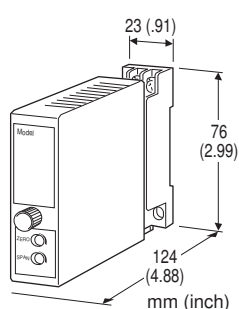
(photovoltaic system, instrument shelter)

Functions & Features

- Accepts direct input from an RTD
- Linearization
- Burnout
- "Active bridge" circuit containing two constant current sources allows large leadwire resistances up to 200 Ω
- Fast response type available

Typical Applications

- Long distance transmission between the RTD and the transmitter



MODEL: M2RT-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: M2RT-[1][2]-[3][4]
Specify a code from below for each [1] through [4].
(e.g. M2RT-4A-M2/BL/CE/Q)
- Temperature range (e.g. 0 - 500°C)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01/S01)

For the input code C, specify also the following. If not specified, Cu 10 Ω @25°C (usable range -200 - +260°C) will be used.

- Input type (e.g. Cu 10 Ω)
- Resistance range (e.g. 9.038 - 12.891 Ω)

[1] INPUT RTD (2- or 3-wire)

1: JPt 100 (JIS'89)

(Usable range: -200 to +500°C, -328 to +932°F; min.span: 50°C, 90°F)

3: Pt 100 (JIS'89)

(Usable range: -200 to +650°C, -328 to +1202°F; min.span: 50°C, 90°F)

4: Pt 100 (JIS'97, IEC)

(Usable range: -200 to +650°C, -328 to +1202°F; min.span: 50°C, 90°F)

5: Pt 50 Ω (JIS'81)

(Usable range: -200 to +500°C, -328 to +932°F; min.span: 100°C, 180°F)

6: Ni 508.4 Ω

(Usable range: -50 to +200°C, -58 to +392°F; min.span: 30°C, 54°F)

C: Cu (Refer to 'Cu INPUT'.)

0: Specify

Note: Consult M-System for 2-wire RTD

[2] OUTPUT

Current

A: 4 - 20 mA DC (Load resistance 750 Ω max.)B: 2 - 10 mA DC (Load resistance 1500 Ω max.)C: 1 - 5 mA DC (Load resistance 3000 Ω max.)D: 0 - 20 mA DC (Load resistance 750 Ω max.)E: 0 - 16 mA DC (Load resistance 900 Ω max.)F: 0 - 10 mA DC (Load resistance 1500 Ω max.)G: 0 - 1 mA DC (Load resistance 15 k Ω max.)

Voltage

1: 0 - 10 mV DC (Load resistance 10 k Ω min.)2: 0 - 100 mV DC (Load resistance 100 k Ω min.)3: 0 - 1 V DC (Load resistance 1000 Ω min.)4: 0 - 10 V DC (Load resistance 10 k Ω min.)5: 0 - 5 V DC (Load resistance 5000 Ω min.)6: 1 - 5 V DC (Load resistance 5000 Ω min.)

0: Specify voltage (See OUTPUT SPECIFICATIONS)

[3] POWER INPUT

AC Power

M2: 100 - 240 V AC (Operational voltage range 85 - 264 V, 47 - 66 Hz)

DC Power

R: 24 V DC

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

R2: 11 - 27 V DC

(Operational voltage range 11 - 27 V, ripple 10 %p-p max.)

(Select 'N' for 'Standards & Approvals' code.)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)

[4] OPTIONS (multiple selections)

Response Time (0 - 90 %)

blank: Standard ($\leq$ 0.5 sec.)

/K: Fast Response (Approx. 25 msec.)

Burnout

blank: Upscale burnout

/BL: Downscale burnout

Standards & Approvals (must be specified)

/N: Without CE

/CE: CE marking

Other Options

blank: none

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

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

TERMINAL SCREW MATERIAL

/S01: Stainless steel

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3 screw terminals (torque 0.8 N·m)

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Overrange output: Approx. -10 to +120 % at 1 - 5 V

Zero adjustment: -5 to +5 % (front)

Span adjustment: 95 to 105 % (front)

Linearization: Standard (not available for the input code C)

INPUT SPECIFICATIONS

Input: 2- or 3-wire RTD (Refer to 'Cu Input' for the input code C.)

Maximum leadwire resistance: 200 Ω per wire (3-wire)

Sensing current: 2 mA (Pt); 1 mA (Ni 508.4 Ω)

OUTPUT SPECIFICATIONS

■ **DC Voltage:** -10 - +12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 1 mA max.; at ≥ 0.5 V

INSTALLATION

Power Consumption

• **AC:**

Approx. 3 VA at 100 V

Approx. 4 VA at 200 V

Approx. 5 VA at 264 V

• **DC:** Approx. 3 W

Performance-guaranteed temperature: -15 to + 65°C (5 to 149 °F)

Operating temperature: -20 to +80 °C (-4 to +176°F); must be higher than -10°C (14°F) at power on

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

Mounting: Surface or DIN rail

Weight: 150 g (0.33 lb)

PERFORMANCE in percentage of span

Accuracy: ± 0.2 %

Refer to 'Cu INPUT' for the input code C.

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

(± 0.03 %/°C (± 0.017 %/°F) for outside of the performance-guaranteed temperature range)

Refer to 'Cu Input' for the input code C.

Burnout response: ≤ 10 sec.

Line voltage effect: ± 0.1 % over voltage range

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 2000 V AC @1 minute (input to output to power to ground)

Cu INPUT

■ INPUT

• **Sensing current (resistance span):**

$140 \Omega \leq \text{Span} \leq 300 \Omega$: 1 mA

$12 \Omega \leq \text{Span} < 140 \Omega$: 2 mA

$8 \Omega \leq \text{Span} < 12 \Omega$: 3 mA

$3.5 \Omega \leq \text{Span} < 8 \Omega$: 5 mA

• **Max. leadwire resistance:**

200 Ω or the value calculated using the equation below, whichever is smaller.

Leadwire resistance(Ω) = $(2500 - 100\% \text{ resistance}(\Omega)) \times \text{Sensing current}(\text{mA}) \div (3 \times \text{Sensing current}(\text{mA}))$

• **Usable range:**

$3.5 \Omega \leq \text{Resistance span}(\Omega) \leq 300\Omega$

$100 \% \text{ resistance}(\Omega) < (2500 - 3 \times \text{Leadwire resistance}(\Omega)) \times \text{Sensing current}(\text{mA}) \div \text{Sensing current}(\text{mA})$

■ PERFORMANCE

• **Accuracy**

Resistance span $\geq 20 \Omega$: ± 0.2 %

Otherwise use the equation below:

$\text{Accuracy}(\%) = 0.02(\Omega) \div \text{Resistance span}(\Omega) \times 100 + 0.1(\%) \times 40(\text{mV}) \div (\text{Resistance span}(\Omega) \times \text{Sensing current}(\text{mA}))$

• **Temperature coefficient**

Resistance span(Ω) × Sensing current(mA) $\geq 40(\text{mV})$: ± 0.015 %/°C

Otherwise use the equation below:

$\text{Temperature coefficient}(\%/^{\circ}\text{C}) = 0.015(\%/^{\circ}\text{C}) \times 40(\text{mV}) \div (\text{Resistance span}(\Omega) \times \text{Sensing current}(\text{mA}))$

STANDARDS & APPROVALS

CE conformity:

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007

EMS EN 61000-6-2: 2005

Low Voltage Directive (2006/95/EC)

EN 61010-1: 2001

Installation Category II

Pollution Degree 2

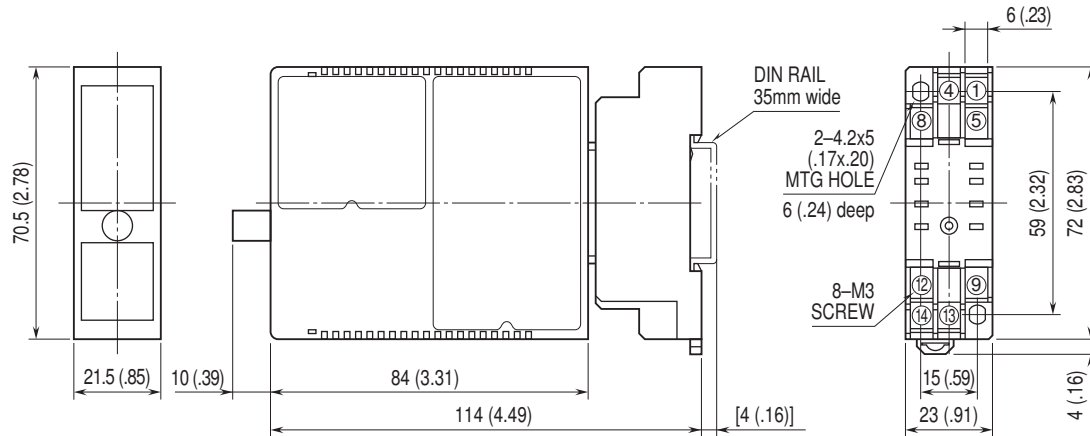
(Operational Temperature must be with -5 to +55°C (23 to 131°F))

131°F))

Input or output to power: Reinforced insulation (300 V)

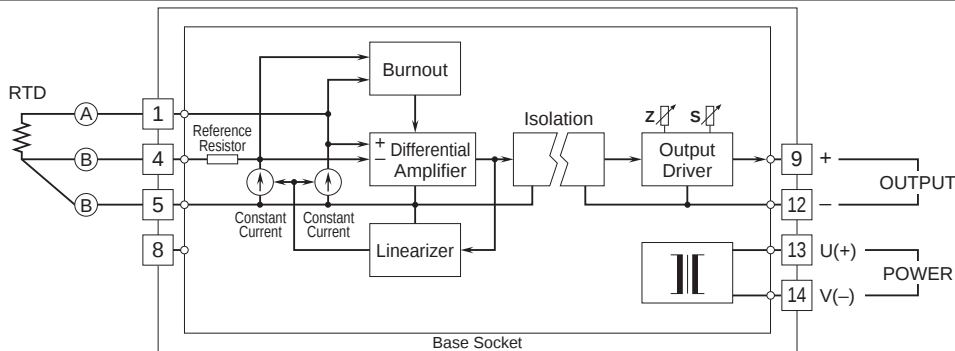
Input to output: Basic insulation (300 V)

DIMENSIONS unit: mm (inch)



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

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.