

## Super-mini Signal Conditioners Mini-M Series

### RTD TRANSMITTER

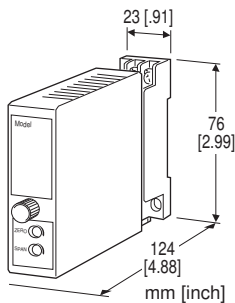
(photovoltaic system, instrument shelter)

#### 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  $\Omega$
- 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 of [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 $\Omega$  @25°C (usable range -140 - +260°C) will be used.

- Input type (e.g. Cu 10 $\Omega$ )
- Resistance range (e.g. 9.038 - 12.891  $\Omega$ )

### [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  $\Omega$  (JIS'81)

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

**6:** Ni 508.4  $\Omega$

(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  $\Omega$  max.)

**B:** 2 - 10 mA DC (Load resistance 1500  $\Omega$  max.)

**C:** 1 - 5 mA DC (Load resistance 3000  $\Omega$  max.)

**D:** 0 - 20 mA DC (Load resistance 750  $\Omega$  max.)

**E:** 0 - 16 mA DC (Load resistance 900  $\Omega$  max.)

**F:** 0 - 10 mA DC (Load resistance 1500  $\Omega$  max.)

**G:** 0 - 1 mA DC (Load resistance 15 k $\Omega$  max.)

#### Voltage

**1:** 0 - 10 mV DC (Load resistance 10 k $\Omega$  min.)

**2:** 0 - 100 mV DC (Load resistance 100 k $\Omega$  min.)

**3:** 0 - 1 V DC (Load resistance 1000  $\Omega$  min.)

**4:** 0 - 10 V DC (Load resistance 10 k $\Omega$  min.)

**5:** 0 - 5 V DC (Load resistance 5000  $\Omega$  min.)

**6:** 1 - 5 V DC (Load resistance 5000  $\Omega$  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
- /C04: Polyolefin 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

- Maximum leadwire resistance:** 200 Ω per wire (3-wire)
- Sensing current:** 2 mA (Pt); 1 mA (Ni 508.4 Ω)
- Refer to 'Cu Input' for the input code C.

## 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 (±0.02 %/°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 Ω ≤ Span ≤ 300 Ω : 1 mA
  - 12 Ω ≤ Span < 140 Ω : 2 mA
  - 8 Ω ≤ Span < 12 Ω : 3 mA
  - 3.5 Ω ≤ Span < 8 Ω : 5 mA
- **Max. leadwire resistance:**
  - 200 Ω or the value calculated using the equation below, whichever is smaller.
  - Leadwire resistance(Ω) = (2500 - 100% resistance(Ω) × Sensing current(mA)) ÷ (3 × Sensing current(mA))
- **Usable range:**
  - 3.5 Ω ≤ Resistance span(Ω) ≤ 300Ω
  - 0 % resistance(Ω) ≥ 3.25 Ω
  - 100 % resistance(Ω) ≤ (2500 - 3 × Leadwire resistance (Ω) × Sensing current (mA)) ÷ Sensing current (mA)

### ■ PERFORMANCE

- **Accuracy**
- Resistance span ≥ 20 Ω: ±0.2 %**
- Otherwise use the equation below:**
  - Accuracy(%) = 0.02(Ω) ÷ Resistance span(Ω) × 100 + 0.1(%) × 40(mV) ÷ (Resistance span(Ω) × Sensing current(mA))
- **Temperature coefficient**
- Resistance span(Ω) × Sensing current(mA) ≥ 40(mV):** ±0.015 %/°C
- Otherwise use the equation below:**
  - Temperature coefficient(%/°C) = 0.015(%/°C) × 40(mV) ÷ (Resistance span(Ω) × Sensing current(mA))

## STANDARDS & APPROVALS

- EU conformity:**
  - EMC Directive
    - EMI EN 61000-6-4
    - EMS EN 61000-6-2
  - Low Voltage Directive
    - EN 61010-1
  - Installation Category II
  - Pollution Degree 2

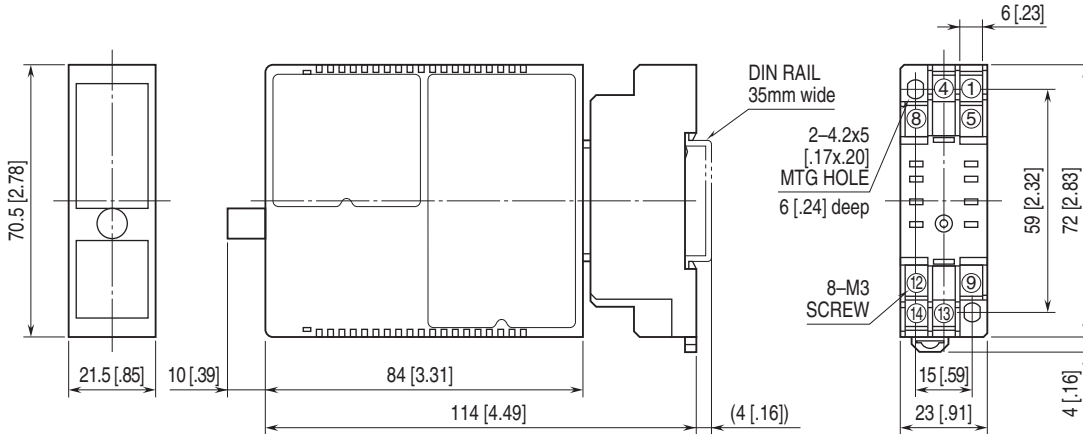
(Operational Temperature must be with -5 to +55°C (23 to 131°F))

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

Input to output: Basic insulation (300 V)

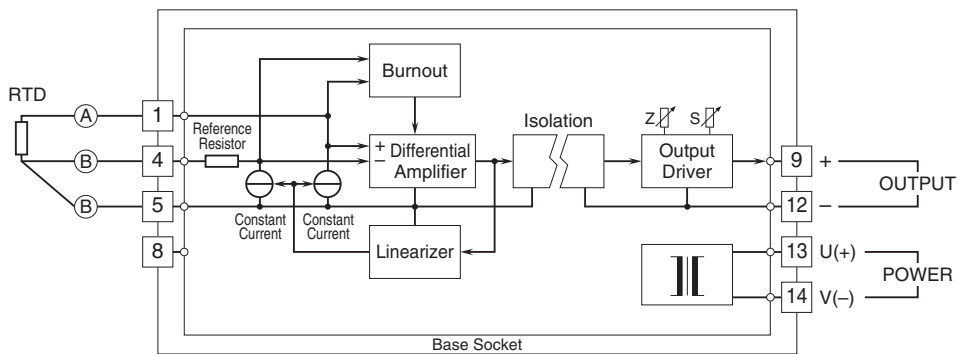
RoHS Directive

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



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.