

## Super-mini Signal Conditioners Mini-M Series

(Configurator software is used to change input type and temperature range.)

### RTD TRANSMITTER

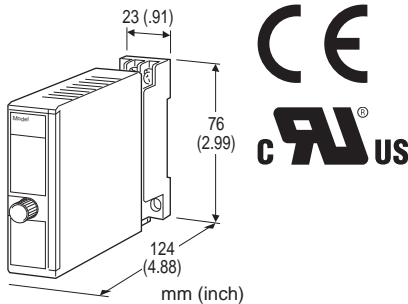
(PC programmable)

#### Functions & Features

- Accepts direct input from an RTD and provides a standard process signal
- PC programmable
- User's temperature table can be used
- Leadwire resistance compensation

#### Typical Applications

- Long distance transmission between the RTD and the transmitter
- Combination with intrinsic safety barriers



### [2] OUTPUT

#### Current

**Z1:** Range 0 - 20 mA DC

#### Voltage

**V1:** Range -2.5 - +2.5 V DC

**V2:** Range -10 - +10 V DC

(Configurator software is used to change output over the described range of the selected suffix code. For changing out of this range, set the Output Range Selectors inside the unit before software adjustment.)

### [3] POWER INPUT

#### AC Power

**M2:** 100 - 240 V AC (Operational voltage range 85 - 264 V, 47 - 66 Hz)  
(90 - 264 V for UL)

#### DC Power

**R:** 24 V DC

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

**P:** 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)  
(110 V  $\pm$ 10 % for UL)

## MODEL: M2XR2-[1][2]-[3][4]

### ORDERING INFORMATION

- Code number: M2XR2-[1][2]-[3][4]

Specify a code from below for each [1] through [4].

(e.g. M2XR2-4Z1-R/BL/CE/Q)

Input Code 4: Pt 100 (JIS '97, IEC) setting will be used if the input code is not specified.

- Temperature range (e.g. 0 - 500°C)
- Output range (e.g. 4 - 20 mA DC)
- Specify the specification for option code /Q (e.g. /C01/S01)

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

- 1: JPt 100 (JIS'89)
  - 3: Pt 100 (JIS'89)
  - 4: Pt 100 (JIS'97, IEC)
  - 5: Pt 50  $\Omega$  (JIS'81)
  - 6: Ni 508.4  $\Omega$
  - 7: Pt 1000
  - 8: Ni 100
  - 9: Cu 10 @25°C
  - 0: Specify (Please provide a resistance table.)
- Note: Consult M-System for 2-wire RTD

### [4] OPTIONS (multiple selections)

#### Burnout

**blank:** Upscale burnout

**/BL:** Downscale burnout

(UL not available)

**/BN:** No burnout

(UL not available)

#### Standards & Approvals (must be specified)

**/N:** Without CE or UL

**/CE:** 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 M-System's web site.)

**/C01:** Silicone coating

**/C02:** Polyurethane coating

**/C03:** Rubber coating

#### TERMINAL SCREW MATERIAL

**/S01:** Stainless steel



## RELATED PRODUCTS

- JX configurator connection kit (model: JXCON)

## 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. -15 to +115 %  
 (Negative current output is not provided.)  
**Manual zero adjustments:** -5 to +5 %  
 (factory setting: 0 %)  
**Manual span adjustments:** 95 to 105 %  
 (factory setting: 100 %)  
**Programming:** Downloaded from PC; input type and range, output range, zero and span, simulating output, etc.  
**Burnout:** Upscale standard; downscale or no burnout optional by programming  
**Linearization:** Standard  
**Status indicator LED:** Blinking patterns indicate different operating status of the transmitter.  
**Configurator connection:** 2.5 dia. miniature jack; RS-232-C level

## INPUT SPECIFICATIONS

**Maximum leadwire resistance:** 20 Ω per wire (3-wire)  
**Sensing current:** ≤ 1.0 mA  
**Temperature range:** See Table 1.

If not specified, the input range is shown below.

- 1: JPt 100 (JIS '89) 0 - 100°C
- 3: Pt 100 (JIS '89) 0 - 100°C
- 4: Pt 100 (JIS '97, IEC) 0 - 100°C
- 5: Pt 50 Ω (JIS '81) 0 - 200°C
- 6: Ni 508.4 Ω 0 - 100°C
- 7: Pt 1000 0 - 100°C
- 8: Ni 100 0 - 100°C
- 9: Cu 10 @25°C 0 - 100°C

## OUTPUT SPECIFICATIONS

■ **DC Current**  
**Operational range:** 0 - 24 mA DC  
**Output range:** 0 - 20 mA DC  
**Minimum span:** 1 mA  
**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.  
**Load resistance:** Output drive 15 V max.  
 (e.g. 4 - 20 mA: 750 Ω [15 V / 20 mA])

If not specified, the output range is 4 - 20 mA DC.

### ■ DC Voltage

**Code V1 (narrow spans)**  
**Operational range:** -3 - +3 V DC  
**Output range:** -2.5 - +2.5 V DC  
**Minimum span:** 250 mV  
**Code V2 (wide spans)**  
**Operational range:** -11.5 - +11.5 V DC  
**Output range:** -10 - +10 V DC  
**Minimum span:** 1 V  
**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.  
**Load resistance:** Output drive 1 mA max.  
 (e.g. 1 - 5 V: 5000 Ω [5 V / 1 mA])  
 If not specified, the output range is shown below.  
 V1: 0 - 1 V DC  
 V2: 1 - 5 V DC

## INSTALLATION

### Power Consumption

• **AC:**  
 Approx. 3 VA at 100 V  
 Approx. 4 VA at 200 V  
 Approx. 5 VA at 264 V  
 • **DC:** Approx. 2 W  
**Operating temperature:** -30 to +60°C (-22 to +140°F)  
**Operating humidity:** 30 to 90 %RH (non-condensing)  
**Mounting:** Surface or DIN rail  
**Weight:** 120 g (0.26 lb)

## PERFORMANCE

**Accuracy:** Table 1 value or ±0.1 % of span, whichever is greater. Add 0.2 % when the output span equals 1/10 or narrower of the max. span.  
**Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F) of max. span at -5 to +55°C [23 to 131°F]  
**Response time:** ≤ 0.9 sec. (0 - 90 %)  
**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)

## CALCULATION EXAMPLES OF OVERALL ACCURACY

### [Example 1]

Input: Pt 100 (JIS '97, IEC), 0 - 500°C  
 Output: 4 - 20 mA DC  
 1) ±0.15°C referred from Table 1, is converted into % by the following equation: 0.15°C / 500°C = 0.03%.  
 2) 0.03% ≤ 0.1% of span. ⇒ 0.1% is selected.



- 3) Output span 16 mA (= 20 mA - 4 mA)  
 Max. span 20 mA  
 Output span  $\geq 1/10$  of max. span  $\Rightarrow$  No need of adding 0.2%.  
 4) Overall accuracy equals  $\pm 0.1\%$  of span

**[Example 2]**

- Input: Pt 100 (JIS '97, IEC), 0 - 100°C  
 Output: 2.0 - 2.5 V DC  
 1)  $\pm 0.15^\circ\text{C}$  referred from Table 1, is converted into % by the following equation:  $0.15^\circ\text{C} / 100^\circ\text{C} = 0.15\%$ .  
 2)  $0.15\% \geq 0.1\%$  of span.  $\Rightarrow$  0.15% is selected.  
 3) Output span 0.5 V (= 2.5 V - 2.0 V)  
 Max. span 5 V  
 Output span  $\leq 1/10$  of max. span  $\Rightarrow$  Add 0.2%.  
 4) Overall accuracy equals  $\pm 0.35\%$  of span (0.15 + 0.2)

**Table 1.**

| RTD                  |    | MIN. SPAN | USABLE RANGE  | ACCURACY   |
|----------------------|----|-----------|---------------|------------|
| JPt 100 (JIS'89)     | °C | 20        | -200 to +500  | $\pm 0.15$ |
|                      | °F | 36        | -328 to +932  | $\pm 0.27$ |
| Pt 100 (JIS'89)      | °C | 20        | -200 to +850  | $\pm 0.15$ |
|                      | °F | 36        | -328 to +1562 | $\pm 0.27$ |
| Pt 100 (JIS'97, IEC) | °C | 20        | -200 to +850  | $\pm 0.15$ |
|                      | °F | 36        | -328 to +1562 | $\pm 0.27$ |
| Pt 50Ω (JIS'81)      | °C | 20        | -200 to +649  | $\pm 0.15$ |
|                      | °F | 36        | -328 to +1200 | $\pm 0.27$ |
| Ni 508.4Ω            | °C | 20        | -50 to +200   | $\pm 0.15$ |
|                      | °F | 36        | -58 to +392   | $\pm 0.27$ |
| Pt 1000Ω             | °C | 20        | -200 to +200  | $\pm 0.15$ |
|                      | °F | 36        | -328 to +392  | $\pm 0.27$ |
| Ni 100               | °C | 20        | -50 to +200   | $\pm 0.15$ |
|                      | °F | 36        | -58 to +392   | $\pm 0.27$ |
| Cu 10 (@25°C)        | °C | 20        | -50 to +200   | $\pm 0.50$ |
|                      | °F | 36        | -58 to +392   | $\pm 0.90$ |

**STANDARDS & APPROVALS**

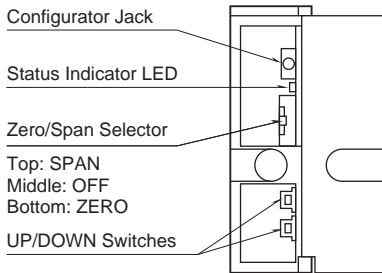
- CE conformity:**  
 EMC Directive (2004/108/EC)  
 EMI EN 61000-6-4: 2007/A1: 2011  
 EMS EN 61000-6-2: 2005  
 Low Voltage Directive (2006/95/EC)  
 EN 61010-1: 2010  
 Installation Category II  
 Pollution Degree 2  
 Input or output to power: Reinforced insulation (300 V)  
 Input to output: Basic insulation (300 V)

- Approval:**  
 UL/C-UL nonincendive Class I, Division 2,  
 Groups A, B, C, and D  
 (ANSI/ISA-12.12.01:2011, CAN/CSA-C22.2 No.213:1987)  
 UL/C-UL general safety requirements  
 (UL 61010B-1:2003, CAN/CSA-C22.2 No.61010-1:1992)

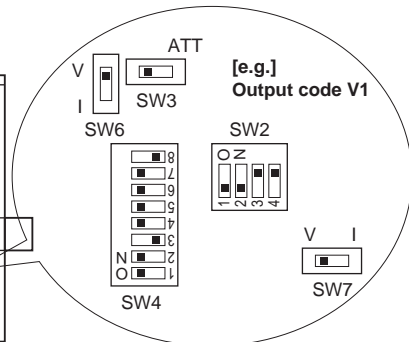
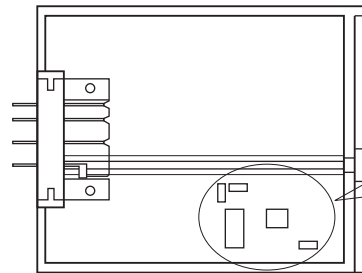


## EXTERNAL VIEW

### FRONT VIEW (with cover open)



### LEFT SIDE VIEW (with cover removed)

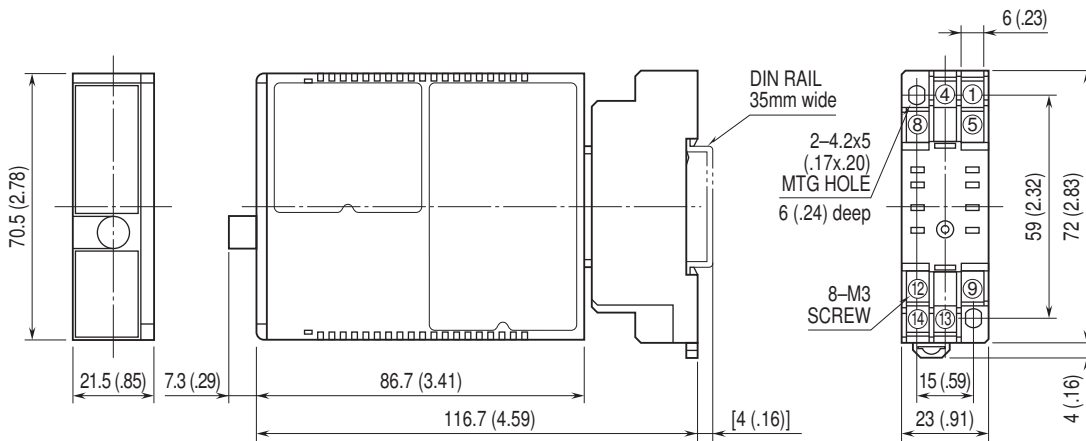


Output Range Selectors

The front cover cannot be turned open by 180 deg. when there is no extra space between units.

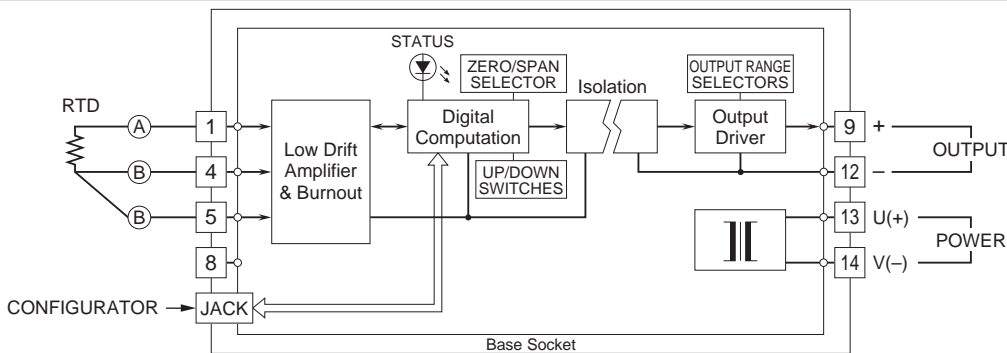
Refer to the instruction manual for detailed procedures.

## DIMENSIONS unit: mm (inch)



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.