

## Space-saving Dual Output Signal Conditioners Mini-MW Series

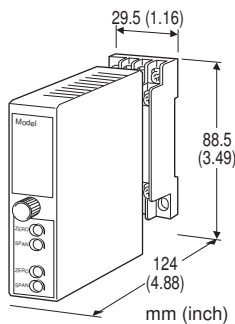
### RTD TRANSMITTER

#### 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
- Combination with intrinsic safety barriers



## MODEL: W2RS-[1][2][3]-[4][5]

### ORDERING INFORMATION

- Code number: W2RS-[1][2][3]-[4][5]

Specify a code from below for each [1] through [5].

(e.g. W2RS-4A6-M2/BL/CE/Q)

- Temperature range (e.g. 0 - 500°C)
- Special output ranges (For codes Z & 0)
- Specify the specification for option code /Q (e.g. /C01/V01)

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

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

Note: If one of the outputs should be a current range, specify it for the Output 1 to allow a greater load.

### [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 1

#### 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.)

**Z:** Specify current (See OUTPUT SPECIFICATIONS)

#### 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] OUTPUT 2

**Y:** None

#### Current

**A:** 4 - 20 mA DC (Load resistance 350  $\Omega$  max.)

**B:** 2 - 10 mA DC (Load resistance 700  $\Omega$  max.)

**C:** 1 - 5 mA DC (Load resistance 1400  $\Omega$  max.)

**D:** 0 - 20 mA DC (Load resistance 350  $\Omega$  max.)

**E:** 0 - 16 mA DC (Load resistance 430  $\Omega$  max.)

**F:** 0 - 10 mA DC (Load resistance 700  $\Omega$  max.)

**G:** 0 - 1 mA DC (Load resistance 7000  $\Omega$  max.)

**Z:** Specify current (See OUTPUT SPECIFICATIONS)

#### Voltage

Same range availability as Output 1

**[4] 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.)  
**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.)  
(110 V  $\pm$ 10 % for UL)

**[5] 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 or UL  
**/CE:** CE marking  
**/UL:** UL approval, 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 (UL not available)

**ADJUSTMENT**

**/V01:** Multi-turn fine adjustment (UL not available)

**TERMINAL SCREW MATERIAL**

**/S01:** Stainless steel (UL not available)

**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 1 to output 2 to power  
**Overrange output:** Approx. -10 to +120 % at 1 – 5 V  
**Zero adjustment:** -5 to +5 % (front)  
**Span adjustment:** 95 to 105 % (front)  
Adjustable individually for each output 1 and output 2.

**Burnout protection:** Upscale standard; downscale optional  
**At burnout:** Downscale  $\leq$  -10 %, Upscale  $\geq$  110 %  
**Linearization:** Standard (not available for the input code C)

**INPUT SPECIFICATIONS**

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

**OUTPUT SPECIFICATIONS**

■ **DC Current:** 0 – 20 mA DC  
**Minimum span:** 1 mA  
**Offset:** Max. 1.5 times span  
**Load resistance:** Output drive 15 V max. for Output 1;  
7 V max. for Output 2  
■ **DC Voltage:** -10 – +12 V DC (up to 10 V for Output 2)  
**Minimum span:** 5 mV  
**Offset:** Max. 1.5 times span  
**Load resistance:** Output drive 1 mA max.; at  $\geq$  0.5 V

**INSTALLATION****Power Consumption**

• **AC:**  
Approx. 4 VA at 100 V  
Approx. 5 VA at 200 V  
Approx. 6 VA at 240 V  
• **DC:** Approx. 3 W  
**Operating temperature:** -5 to +55°C (23 to 131°F)  
**Operating humidity:** 30 to 90 %RH (non-condensing)  
**Mounting:** Surface or DIN rail  
**Weight:** 200 g (0.44 lb)

**PERFORMANCE in percentage of span**

**Accuracy:**  $\pm$ 0.2 %  
(Refer to 'Cu INPUT' for the input code C.)  
**Temp. coefficient:**  $\pm$ 0.015 %/°C ( $\pm$ 0.008 %/°F)  
Refer to 'Cu Input' for the input code C.  
**Burnout response:**  $\leq$  10 sec.  
**Line voltage effect:**  $\pm$ 0.1 % over voltage range  
**Insulation resistance:**  $\geq$  100 M $\Omega$  with 500 V DC  
**Dielectric strength:** 2000 V AC @1 minute (input to output 1 to output 2 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

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

Input or output 1 or output 2 to power input:

Reinforced insulation (300 V)

Input to output 1 to output 2: Basic insulation (300 V)

RoHS Directive

EN 50581

**Approval:**

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

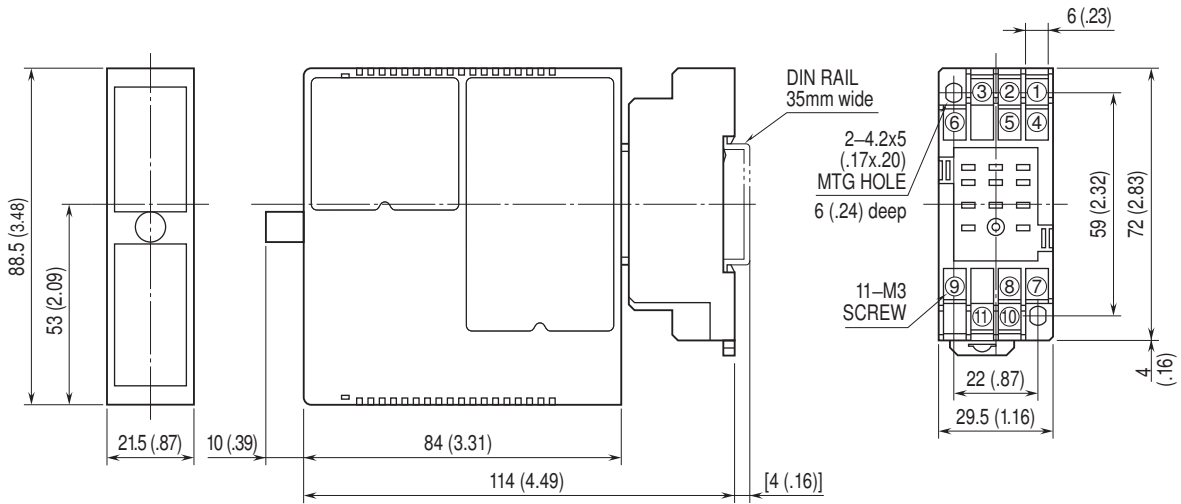
Groups A, B, C, and D

(ANSI/ISA-12.12.01, CAN/CSA-C22.2 No.213)

UL/C-UL general safety requirements

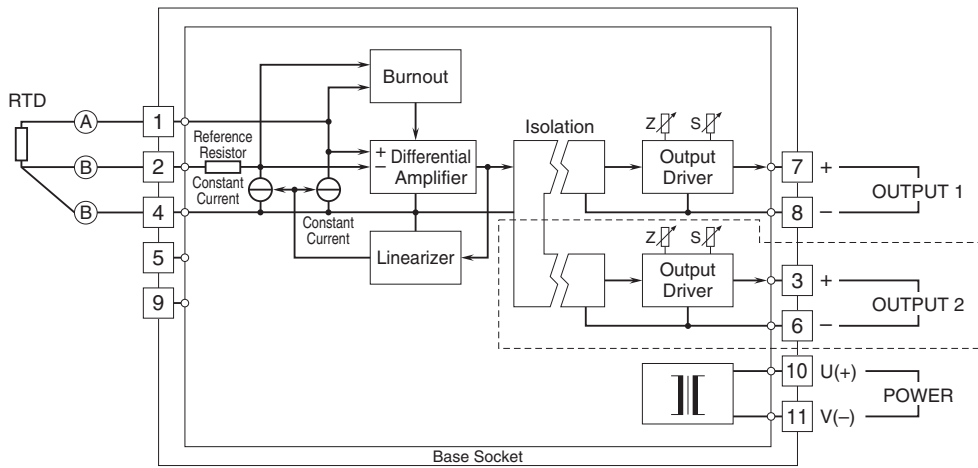
(UL 61010-1, CAN/CSA-C22.2 No.61010-1)

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Note: The section enclosed by broken line is only with 2nd output option.



Specifications are subject to change without notice.