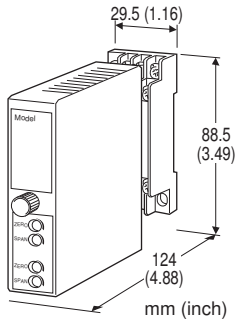
Space-saving Dual Output Signal Conditioners
Mini-MW Series

RTD TRANSMITTER
(1 mA sensing current)

Functions & Features
- Accepts direct input from an RTD
- Linearization
- Burnout
- 1 mA sensing current (except Cu Input)
- "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
- Combination with intrinsic safety barriers



MODEL: W2RS1–[1][2][3]-[4][5]

ORDERING INFORMATION
- Code number: W2RS1-[1][2][3]-[4][5]

Specify a code from below for each of [1] through [5].
(e.g. W2RS1-4A6-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 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)

Note: When the user requires a current and a voltage output, specify the current to be the Output 1 which allows 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 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 1
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 kΩ max.)
Z: Specify current (See OUTPUT SPECIFICATIONS)
Voltage
1: 0 – 10 mV DC (Load resistance 10 kΩ min.)
2: 0 – 100 mV DC (Load resistance 100 kΩ min.)
3: 0 – 1 V DC (Load resistance 1000 Ω min.)
4: 0 – 10 V DC (Load resistance 10 kΩ 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] OUTPUT 2
Y: None
Current
A: 4 – 20 mA DC (Load resistance 350 Ω max.)
B: 2 – 10 mA DC (Load resistance 700 Ω max.)
C: 1 – 5 mA DC (Load resistance 1400 Ω max.)
D: 0 – 20 mA DC (Load resistance 350 Ω max.)
E: 0 – 16 mA DC(Load resistance 430 Ω max.)
F: 0 – 10 mA DC (Load resistance 700 Ω max.)
G: 0 – 1 mA DC (Load resistance 7000 Ω 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)
DC Power
R: 24 V DC
(Operational voltage range 24 V ±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.)

[5] OPTIONS (multiple selections)

Response Time (0 – 90 %)
blank: Standard (≤ 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
ADJUSTMENT
/V01: Multi-turn fine adjustment
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 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.
At burnout: Downscale ≤ -10 %, Upscale ≥ 110 %
Linearization: Standard (not available for the input code C)

INPUT SPECIFICATIONS

Maximum leadwire resistance: 200 Ω per wire (3-wire)
Sensing current: 1 mA
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 ≥ 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: 100 g (3.53 oz)

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)
Refer to 'Cu Input' for the input code C.
Burnout response: ≤ 20 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 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:

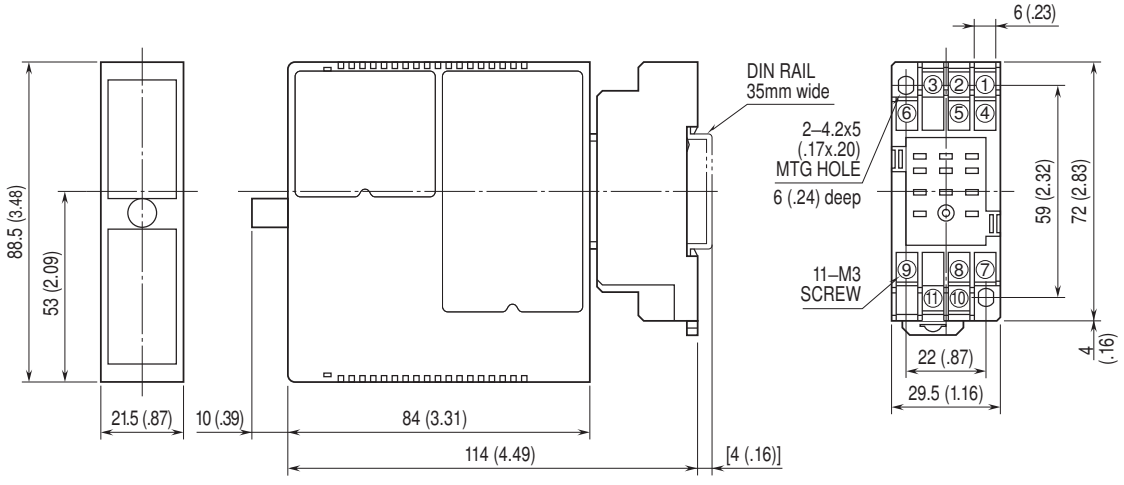
Reinforced insulation (300 V)

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

RoHS Directive

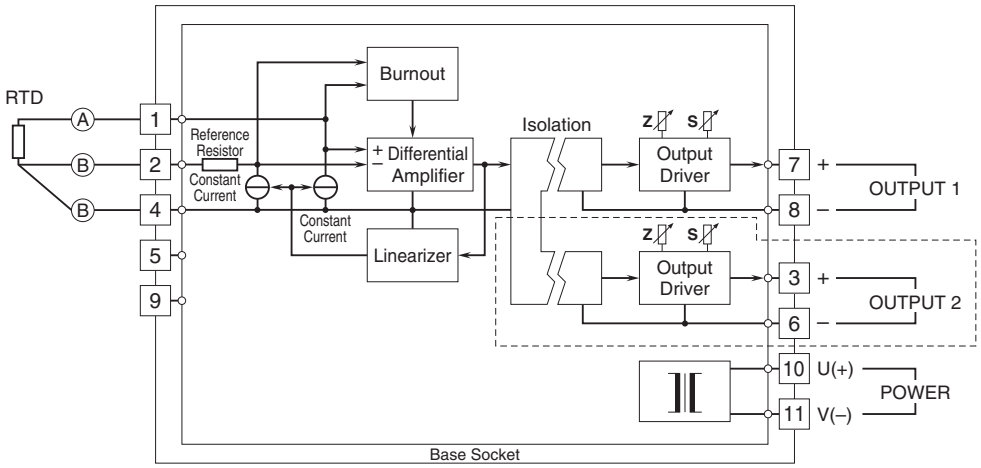
EN 50581

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.