

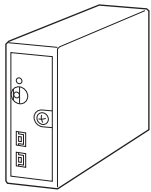
Dual Output Super-mini Signal Conditioners Pico-M Series

RTD CONVERTER

(PC programmable, CE)

Functions & Features

- Converts a wide variety of RTD input into two isolated, linearized process signals
- PC programmable
- Linearization
- Burnout protection
- User's temperature table can be used Space-saving, easy-to-maintain, multi-channel installation base



MODEL: M8XR3-[1][2]-R[3]

ORDERING INFORMATION

- Code number: M8XR3-[1][2]-R[3]

Specify a code from below for each [1] through [3].

- (e.g. M8XR3-4V2V2-R/Q)
- Specify the specification for option code /Q (e.g. /C01)
- Input range (e.g. 0 - 500°C)
- Output 1 / Output 2 (e.g. 1 - 5 V / 1 - 5 V DC)

Input Code 4: Pt 100 (JIS '97, IEC) setting will be used if the input code is not specified. If no I/O specifications are specified, model M8XR3-4V2V2-R/Q will be shipped. For the input suffix code 0, use Ordering Information Sheet (No. ESU-5471).

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

- 1:** JPt 100 (JIS'89)
(Usable range: -200 to +500°C, -328 to +932°F)
- 3:** Pt 100 (JIS'89)
(Usable range: -200 to +850°C, -328 to +1562°F)
- 4:** Pt 100 (JIS'97, IEC)
(Usable range: -200 to +850°C, -328 to +1562°F)
- 5:** Pt 50 Ω (JIS'81)
(Usable range: -200 to +649 °C, -328 to +1200°F)
- 6:** Ni 508.4 Ω
(Usable range: -50 to +200°C, -58 to +392°F)
- 7:** Pt 1000
(Usable range: -200 to +200°C, -328 to +392°F)
- 8:** Ni 100

(Usable range: -50 to +200°C, -58 to +392°F)

9: Cu 10 @25°C

(Usable range: -50 to +200°C, -58 to +392°F)

0: Specify

Note: Consult M-System for 2-wire RTD

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

[2] OUTPUT 1 / OUTPUT 2

V2Z1: Range -10 - +10 V DC / Range 0 - 20 mA DC

V2V2: Range -10 - +10 V DC / Range -10 - +10 V DC

(Configurator software is used to change output over the described range of the selected suffix code.

For changing between suffix codes, set the Output Range Selector on the side of unit before software adjustment.)

POWER INPUT

DC Power

R: 24 V DC

(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[3] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q

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

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

RELATED PRODUCTS

- Installation Base or Single Mount Base Socket (model: M8BSx)

This unit must be mounted on dedicated base or socket.

- JX configurator connection kit (model: JXCON)

GENERAL SPECIFICATIONS

Construction: Plug-in

Mounting screw: M3 screw (torque 0.3 N·m)

Housing material: Flame-resistant resin (black)

Power supply: Via the Installation Base terminals (model: M8BSx)

Isolation: Input to output 1 to output 2 to power

Overrange output: Approx. -15 to +115 %

Manual zero adjustments: -5 to +5 %

(factory setting: 0 %)

Manual span adjustments: 95 to 105 %

(factory setting: 100 %)

Programming: Downloaded from PC; RTD type, temp. range,



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output range, zero and span, simulating output, user's temperature table, linearization, etc.

Burnout protection: Upscale standard; downscale or no burnout optional by programming

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

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:** 0 - 20 mA DC

Operational range: 0 - 24 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 6 V max.

(e.g. 4 - 20 mA: 300 Ω [6 V ÷ 20 mA])

■ **DC Voltage:** -10 - +10 V DC

Operational range: -11.5 - +11.5 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.

V2Z1: 1 - 5 V / 4 - 20 mA DC

V2V2: 1 - 5 V / 1 - 5 V DC

INSTALLATION

Current consumption: Approx. 50 mA (70 mA for current output)

Operating temperature: 0 to 55°C (32 to 131°F)

Operating humidity: 30 to 95 %RH (non-condensing)

Mounting: Installation Base (model: M8BSx)

Weight: 70 g (2.5 oz)

PERFORMANCE

Accuracy: Input accuracy + output accuracy
Inversely proportional to the span.

See HOW TO CALCULATE THE ACCURACY.

• **Input accuracy:** (% of input range)

JPt 100 (JIS '89) : ±0.02 %

Pt 100 (JIS '89) : ±0.02 %

Pt 100 (JIS '97, IEC) : ±0.02 %

Pt 50 Ω (JIS '81) : ±0.02 %

Ni 508.4 Ω : ±0.02 %

Pt 1000 : ±0.02 %

Ni 100 : ±0.1 %

Cu 10 : ±0.2 %

• **Output accuracy:** (% of output range)

-10 - +10 V : ±0.02 %

0 - 20 mA : ±0.04 %

Temp. coefficient: ±0.015 %/°C (±0.008 %/°F) of I/O range at 0 to 55°C [32 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:

1500 V AC @1 minute (input to output 1 or output 2 or power to ground)

500 V AC @1 minute (output 1 to output 2 to power)

HOW TO CALCULATE THE ACCURACY

■ **Overall Accuracy**

[Example] Pt 100, 0 - 700°C, 1 - 5 V output

Input Accuracy

= Max. Range ÷ Input Span × Input Accuracy

= 1050 ÷ 700 × 0.02

= 0.03

Output Accuracy

= Max. Range ÷ Output Span × Output Accuracy

= 20 ÷ 4 × 0.02

= 0.1

Overall Accuracy

= 0.03 + 0.1

= ±0.13 %

■ **Accuracy with a User's Temperature Table**

Custom input accuracy + output accuracy

(Inversely proportional to the span)

Input Accuracy:

(a) Ω ÷ Input Span × 100 %

where (a) is 100mΩ or [Max. Range × 0.2 %], whichever is greater.

The accuracy applies only at the user's calibration points.

Data between each point is approximated with a linear line, thus is not applicable.

Output Accuracy: ≤ ±0.04 %



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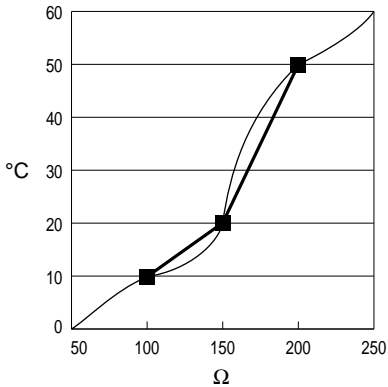
[Example] 100 - 200 Ω input, 1 - 5 V output

(a) is the greater value among: $200 \Omega \times 0.2 \% = 400 \text{ m}\Omega$, or $100 \text{ m}\Omega$, thus $400 \text{ m}\Omega$ is selected.

Input Accuracy = $400 \text{ m}\Omega \div 100 \Omega \times 100 = 0.4$

Output Accuracy = $20 \div 4 \times 0.04 = 0.2$

Overall Accuracy = $0.4 + 0.2 = \pm 0.6 \%$



Approximated Line ——— Actual Line
 Data Point

STANDARDS & APPROVALS

CE conformity:

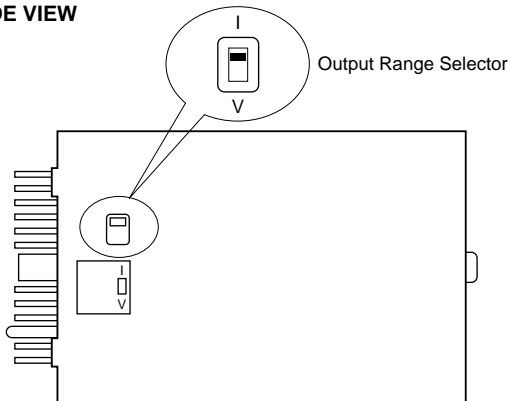
EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007/A1: 2011

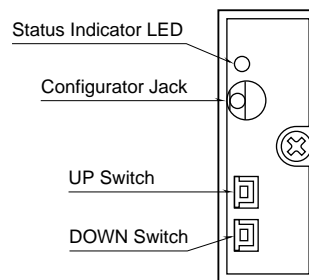
EMS EN 61000-6-2: 2005

EXTERNAL VIEWS

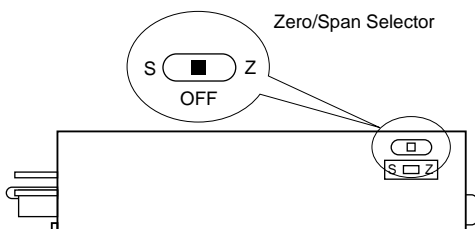
■SIDE VIEW



■FRONT VIEW



■BOTTOM VIEW



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Output Range Selector

(SW POSITION: RANGE)

I: V2Z1 (-10 - +10 V / 0 - 20 mA DC)

V: V2V2 (-10 - +10 V / -10 - +10 V DC)

Zero/Span Selector

(SW POSITION: MODE)

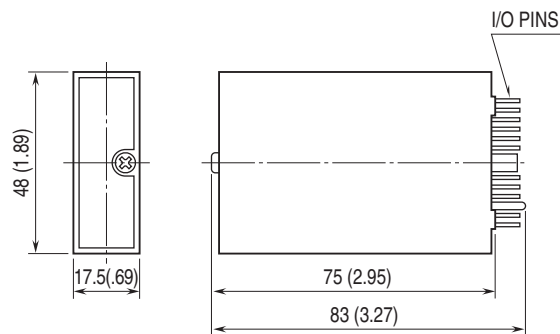
S: SPAN

Center: OFF

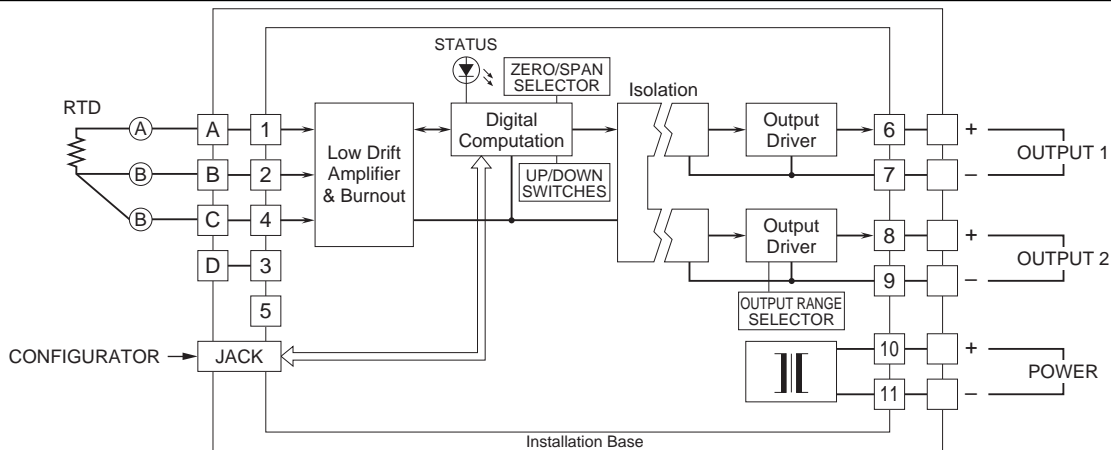
Z: ZERO

Zero/Span is calibrated by using UP/DOWN switches when the calibration mode is set. Refer to the instruction manual for detailed procedures.

DIMENSIONS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.

