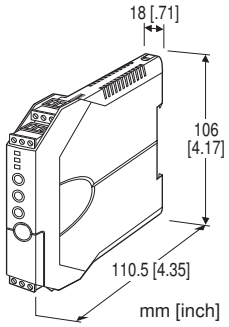
Space-saving Signal Conditioners M3-UNIT Series

RTD TRANSMITTER

(field- and PC-configurable)

Functions & Features

• Accepts an RTD input and provides an isolated, linearized DC signal
• Easy 'One-Step Cal' calibration using the front three control buttons without needing a PC; PC software is also usable
• Both input and output type and range are configurable
• Front control button function can be locked
• Linearization and burnout



MODEL: M3LR–R4/[1][2]

ORDERING INFORMATION

• Code number: M3LR-R4/[1][2]
Specify a code from below for each of [1] and [2].
(e.g. M3LR-R4/A/UL/Q)
• Specify the specification for option code /Q
(e.g. /C01)
• Orders will be shipped with default factory settings (3-wire Pt 100, 0 – 100°C input / 4 – 20 mA output).

INPUT – Field-selectable

RTD

Pt 100, Pt 200, Pt 300, Pt 400, Pt 500, Pt 1000,
Ni 100, Ni 120, Ni 508.4 Ω, Ni-Fe 604,
Cu 10 @ 25°C, Pt 50 Ω, JPt 100

OUTPUT – Field-selectable

Current

0 – 20 mA DC

Voltage

-2.5 – +2.5 V DC
-10 – +10 V DC

POWER INPUT

DC Power

R4: 10 – 32 V DC
(Operational voltage range 9 - 36 V, ripple 10 %p-p max.)

[1] CONFIGURATION OPTIONS

A: PC and field configurable
B: Field configurable

[2] OPTIONS (multiple selections)

Standards & Approvals

blank: CE marking
/UL: UL approval, CE marking

Other Options

blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)

/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating (UL not available)

RELATED PRODUCTS

• PC Configurator cable (model: MCN-CON or COP-US)
• PC configurator software (model: M3CFG)
Downloadable at our web site.

GENERAL SPECIFICATIONS

Construction: Small-sized front terminal structure
Connection: Euro type connector terminal
(applicable wire size: 0.2 to 2.5 mm^2, stripped length 8 mm)
Housing material: Flame-resistant resin (gray)
Isolation: Input to output to power
Overrange output: -15 to +115 %
Zero adjustment: -15 to +15 % (front)
Span adjustment: 85 to 115 % (front)
Burnout: Upscale (default), downscale or no burnout selectable
Linearization: Standard
Status indicator LED: Tri-color (green/amber/red) LED; Blinking patterns indicate operation status of the transmitter.
Configuration:
PC Configurator: (Model: M3LRCFG) via Windows PC connected to th front jack.
Programmable features include:
• I/O type, number of wires and range
• Zero and span adjustments
• Burnout action

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• User's RTD table setting
(max. 300 points, input resistance specified within 0 – 30 kΩ)
(Refer to the instruction manual)
'One-Step Cal' calibration: With I/O type and the full-scale range configured via the internal DIP switches, precise 0 % and 100 % ranges are calibrated via the front control buttons with a help of LED. Also I/O calibration and fine adjustment are available with a PC.
Configurator connection: 2.5 dia. miniature jack; RS-232-C level

INPUT SPECIFICATIONS

■ **RTD**: See Table 1.
Number of wires: 2, 3 or 4 wires
Excitation: ≤ 1.0 mA
Allowable leadwire resistance: 20 Ω per wire
Temperature range: See Table 1.

OUTPUT SPECIFICATIONS

■ **DC Current**
Maximum range: 0 – 20 mA DC
Minimum span: 1 mA
Conformance range: 0 – 24 mA DC
(Negative overrange current below 0 mA is not available.)
Offset: Lower range can be any specific value within the output range provided that the minimum span is maintained.
Load resistance: Output drive 12 V maximum

■ **DC Voltage**
Narrow Spans
Maximum range: -2.5 – +2.5 V DC
Minimum span: 250 mV
Conformance range: -3 – +3 V DC
Wide Spans
Maximum range: -10 – +10 V DC
Minimum span: 1 V
Conformance range: -11.5 – +11.5 V DC
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 maximum

INSTALLATION

Power consumption
•**DC**: Approx. 3 W
Operating temperature: -25 to +65°C (-13 to +149°F)
Max. 55°C (131°F) for UL approval
Operating humidity: 0 to 95 %RH (non-condensing)
Mounting: DIN rail
Weight: 100 g (0.22 lb)

PERFORMANCE

Accuracy: See Table 1 and refer to calculation examples of overall accuracy.
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F) of max. range 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: 1500 V AC @ 1 minute
(input to output or power to ground)
500 V AC @ 1 minute (output to power)

CALCULATION EXAMPLES OF OVERALL ACCURACY

■ **CALCULATION EXAMPLES OF OVERALL ACCURACY IN %**
1) Pt 100, 0 – 500°C, 4 – 20 mA DC output
Absolute value accuracy (Table 1): 0.15°C
0.15°C ÷ 500°C × 100 = 0.03 % < 0.1 %
Output span 16 mA (20 – 4) ≥ 2 mA (max. span 20 mA × 0.1) ➠ No adding 0.2 %
➠ Overall accuracy = ±0.1 % of span

2) Pt 100, 0 – 100°C, 2.0 – 2.5 V DC output
Absolute value accuracy (Table 1): 0.15°C
0.15°C ÷ 100°C × 100 = 0.15 % > 0.1 %
Output span 0.5 V (2.5 – 2.0) ≤ 0.5 (max. span 5 V × 0.1) ➠ Add 0.2 %
➠ Overall accuracy = 0.15 + 0.2 = ±0.35 % of span

STANDARDS & APPROVALS

EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive
Approval:
UL/C-UL general safety requirements
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

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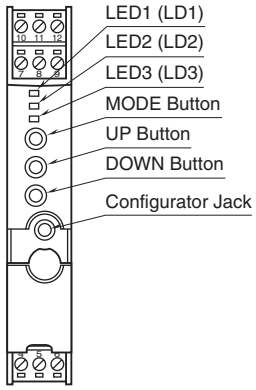
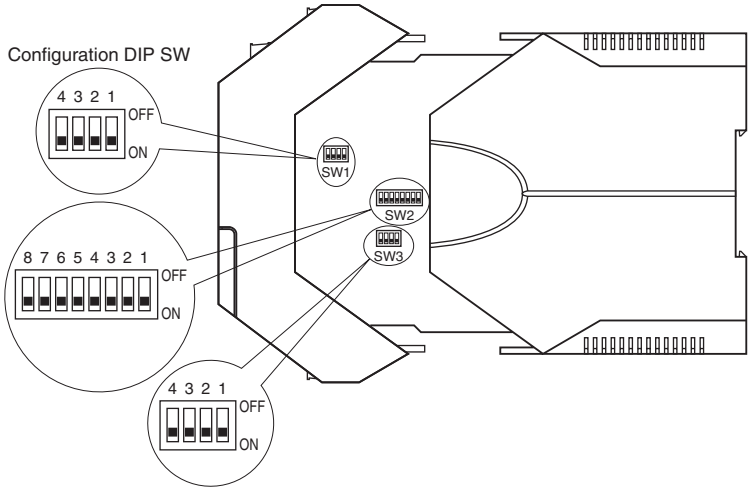
EXTERNAL VIEW

■ **FRONT VIEW**



■ **SIDE VIEW**



The DIP switch setting is required to select output types before setting a precise output range using the PC configurator software.
For detailed information on the configuration and calibration, refer to the instruction manual.

INPUT TYPE, RANGE & ACCURACY

■ **INPUT TYPE, RANGE & ACCURACY** **TABLE 1**

RTD	°C			°F		
	MIN. SPAN	MAXIMUM RANGE	ACCURACY*1	MIN. SPAN	MAXIMUM RANGE	ACCURACY*1
Pt 100 (JIS '97, IEC)	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 200	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 300	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 400	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 500	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 1000	20	-200 to +850	±0.15	36	-328 to +1562	±0.27
Pt 50Ω (JIS '81)	20	-200 to +649	±0.15	36	-328 to +1200	±0.27
JPt 100 (JIS '89)	20	-200 to +510	±0.15	36	-328 to +950	±0.27
Ni 100	20	-80 to +260	±0.15	36	-112 to +500	±0.27
Ni 120	20	-80 to +260	±0.15	36	-112 to +500	±0.27
Ni 508.4Ω	20	-50 to +200	±0.15	36	-58 to +392	±0.27
Ni-Fe 604	20	-200 to +200	±0.15	36	-328 to +392	±0.27
Cu 10 @ 25°C	20	-50 to +250	±0.50	36	-58 to +482	±0.90

*1. Or ±0.1% of span, whichever is greater.
If the selected output span equals to or narrower than the one-tenth of the maximum span, add 0.2%.

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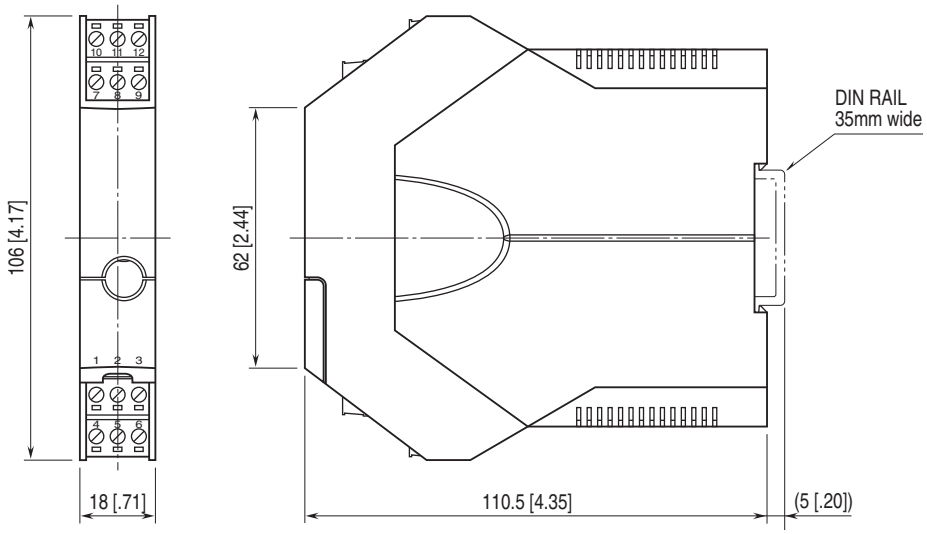
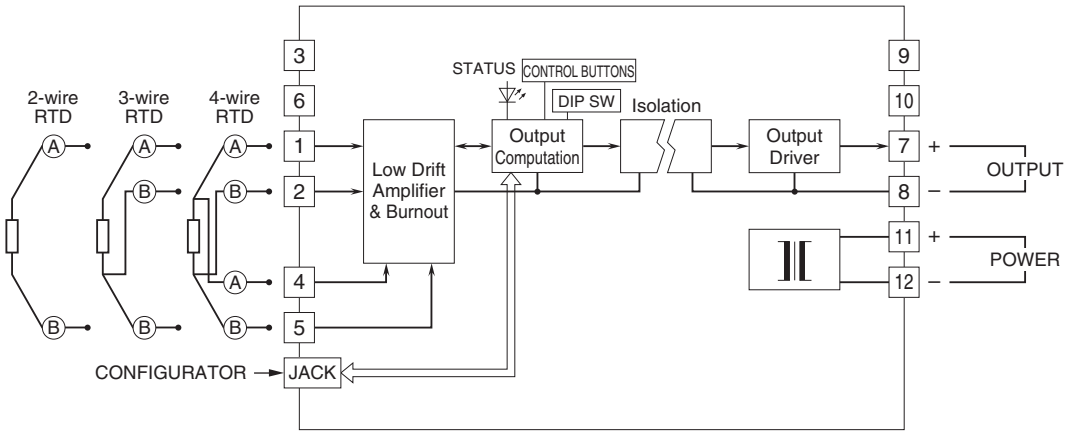
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



⚠ Specifications are subject to change without notice.

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