

Space-saving Signal Conditioners M3-UNIT Series

RTD TRANSMITTER
(field- and PC-configurable)

MODEL **M3LR**

MODEL & SUFFIX CODE SELECTION

MODEL _____ M3LR-R4/□□

INPUT SELECTION

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

OUTPUT SELECTION

◆DC Current: Usable range 0 – 20mA; min. span 1mA
◆DC Voltage: Usable range ±2.5V; min. span 250mV
Usable range ±10V; min. span 1V

POWER INPUT _____

R4: 10 – 32V DC

CONFIGURATION OPTIONS _____

A : PC and field configurable
B : Field configurable

OPTIONS _____

/UL : UL approval

ORDERING INFORMATION

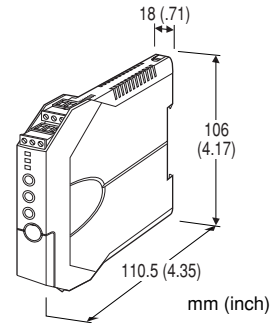
Specify code number (e.g. M3LR-R4/A). Orders will be shipped at default factory settings (Pt 100, 0 – 100°C input/4 – 20mA output).

RELATED PRODUCTS

- PC configurator software (model: M3CON)
Downloadable at M-System's web site:
<http://www.m-system.co.jp>
- PC configurator cable (model: MCN-CON)

GENERAL SPECIFICATIONS

Connection: Removable terminal block
Housing material: Flame-resistant resin (grey)
Isolation: Input to output to power
Overrange output: Approx. -15 – +115%
(Negative current output is not available even within this range.)
Fine zero and span adjustments: ±15% via the front control buttons
Burnout: Upscale (default), downscale or no burnout selectable



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
- Linearization and burnout
- UL approval

Configuration

'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.

PC configurator (model: M3CON): Via Windows PC connected to the front jack. Programmable features include:

- I/O type and range
- Zero and span adjustments
- Burnout action
- User's RTD table setting

Status indicator LED: Tri-color (green/amber/red) LED; Flashing patterns indicate operation status of the transmitter.

INPUT

■RTD (2-wire, 3-wire or 4-wire): See Table 1.
Excitation: ≤1.0mA
Allowable leadwire resistance: 20Ω per wire
Temperature range: See Table 1.

OUTPUT**■DC CURRENT****Maximum range:** 0 – 20mA DC**Minimum span:** 1mA**Conformance range:** 0 – 24mA DC**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.**Load resistance:** Output drive 12V maximum;
e.g. 600Ω [12V/20mA] with 4 – 20mA**■DC VOLTAGE****Narrow Spans (mV)****Maximum range:** -2.5 – +2.5V DC**Minimum span:** 250mV**Conformance range:** -3 – +3V DC**Wide Spans (V)****Maximum range:** -10 – +10V DC**Minimum span:** 1V**Conformance range:** -11.5 – +11.5V DC**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.**Load resistance:** Output drive 1mA maximum
e.g. 5000Ω [5V/1mA] with 1 – 5V**INSTALLATION****Power input:** Operational voltage range 9 – 36V DC;
approx. 3W; ripple 10% p-p max.**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**Dimensions:** W18×H106×D110.5 mm
(0.71"×4.17"×4.35")**Weight:** 100 g (0.22 lbs)**PERFORMANCE****Accuracy:** See Table 1.**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:** ≥100MΩ with 500V DC**Dielectric strength:** 1500V AC @1 minute
(input to output or power to ground)
500V @1 minute (output to power)**STANDARDS & APPROVALS****CE conformity:** EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Approval: UL/C-UL general safety requirements
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)**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/DIN/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 50 (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 508.4	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.

■CALCULATION EXAMPLES OF OVERALL ACCURACY IN %

1) Pt 100, 0 – 500°C, 4 – 20mA DC output

Absolute value accuracy (Table 1): 0.15°C

 $0.15^{\circ}\text{C} / 500^{\circ}\text{C} \times 100 = 0.03\% < 0.1\%$

Output span 16mA (20 – 4) ≥ 2mA (max. span 20mA × 0.1) ⇒ No adding 0.2%

⇒ Overall accuracy = ±0.1% of span

2) Pt 100, 0 – 100°C, 2.0 – 2.5V DC output

Absolute value accuracy (Table 1): 0.15°C

 $0.15^{\circ}\text{C} / 100^{\circ}\text{C} \times 100 = 0.15\% > 0.1\%$

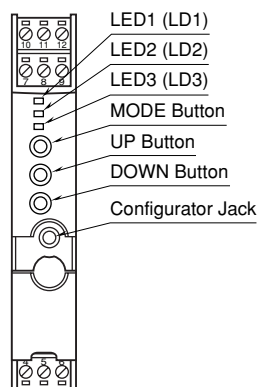
Output span 0.5V (2.5 – 2.0) ≤ 0.5 (max. span 5V × 0.1) ⇒ Add 0.2%

⇒ Overall accuracy = 0.15 + 0.2 = ±0.35% of span

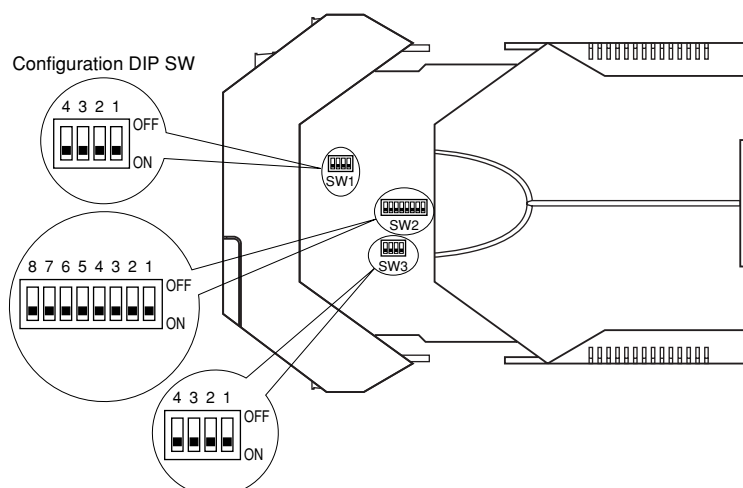
Specifications subject to change without notice.

EXTERNAL & INTERNAL VIEWS

■FRONT VIEW



■SIDE VIEW



DIP SWITCH SETTINGS

■CONFIGURATION MODE (SW2)

Table 2

MODE	SW2-8	Configuration mode can be confirmed with the front LED.
DIP SW	OFF	
PC	ON	

■RTD TYPE (SW2)

Table 3

RTD	SW2-7	SW2-6	SW2-5	SW2-4
Pt 100	OFF	OFF	OFF	OFF
Pt 200	OFF	OFF	OFF	ON
Pt 300	OFF	OFF	ON	OFF
Pt 400	OFF	OFF	ON	ON
Pt 500	OFF	ON	OFF	OFF
Pt 1000	OFF	ON	OFF	ON
Pt 50Ω	OFF	ON	ON	OFF
JPt 100	OFF	ON	ON	ON
Ni 100	ON	OFF	OFF	OFF
Ni 120	ON	OFF	OFF	ON
Ni 508.4Ω	ON	OFF	ON	OFF
Ni-Fe 604	ON	OFF	ON	ON
Cu 10 @25°C	ON	ON	OFF	OFF

■RTD WIRES (SW3)

Table 4

WIRES	SW3-4	SW3-3
2-wire	OFF	ON
3-wire	OFF	OFF
4-wire	ON	ON

■BURNOUT (SW3)

Table 5

BURNOUT	SW3-2	SW3-1
No burnout	OFF	ON
Upscale	OFF	OFF
Downscale	ON	OFF

■OUTPUT TYPE (SW2 & 1)

Table 6

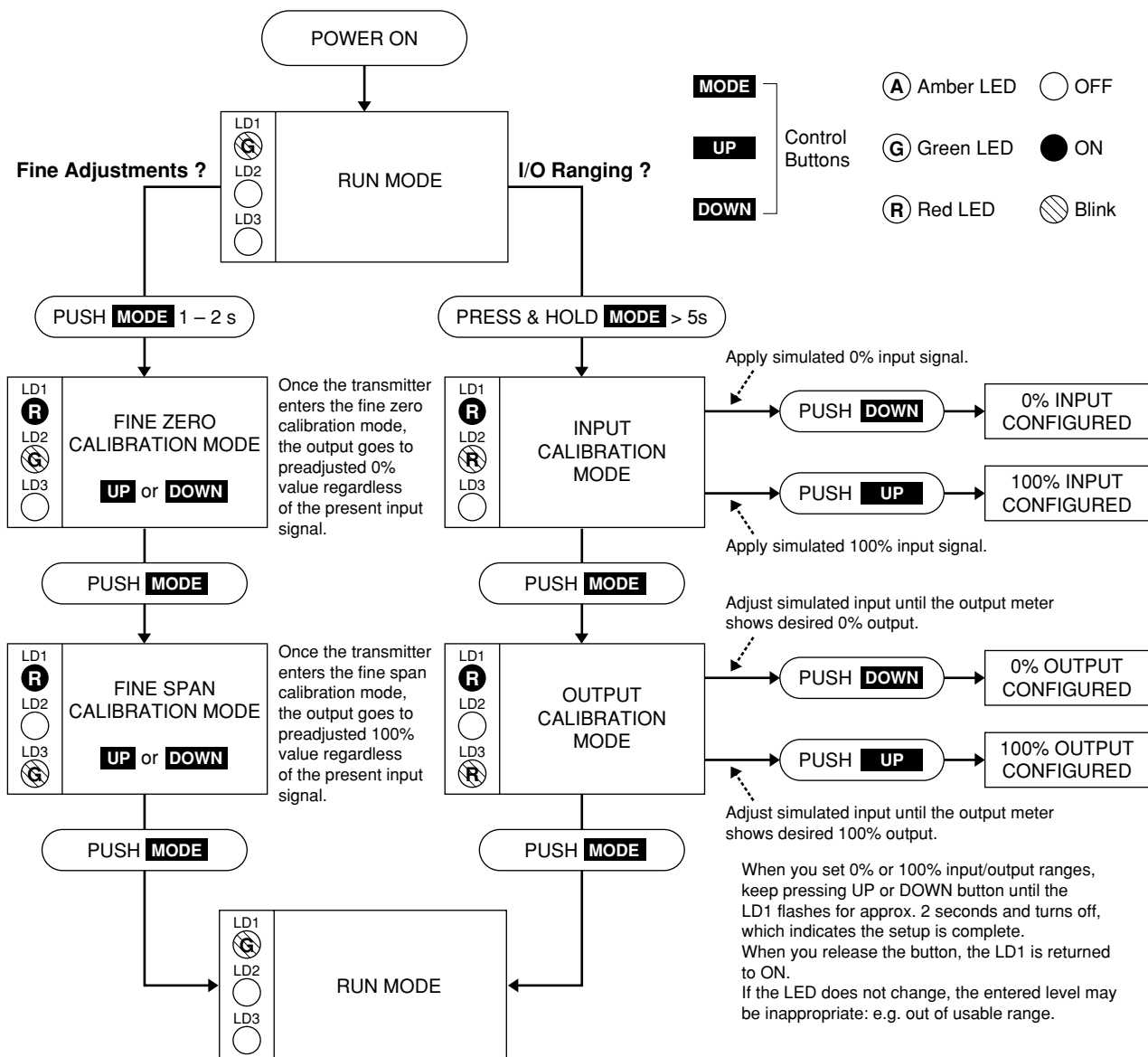
OUTPUT	SW2-3	SW2-2	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	OFF	OFF	ON	OFF	OFF
-2.5 – +2.5V	OFF	ON	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF	ON	OFF

■OUTPUT TYPE / PC CONFIG (SW1)

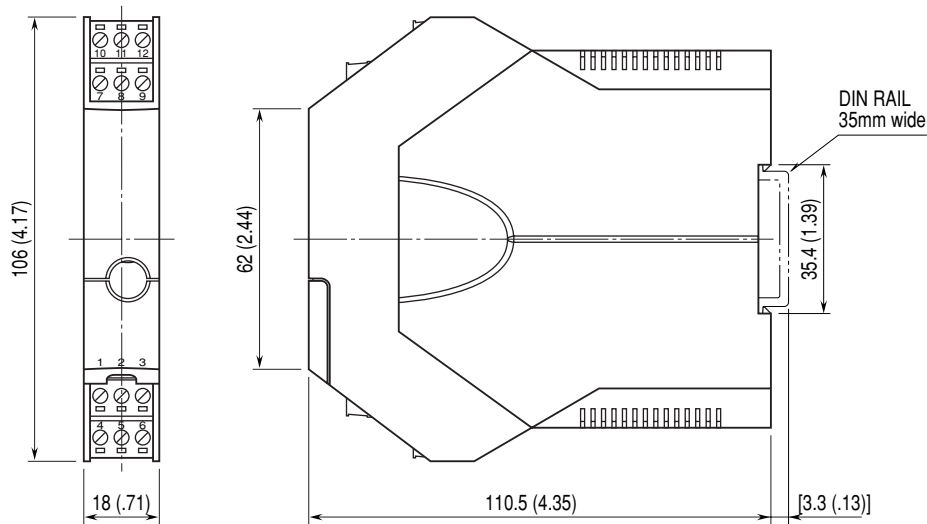
Table 7

OUTPUT	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	ON	OFF	OFF
-2.5 – +2.5V	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF

CALIBRATION FLOW CHART



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)



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