

Super-mini Signal Conditioners with Display Mini-M M2E Series

RTD TRANSMITTER

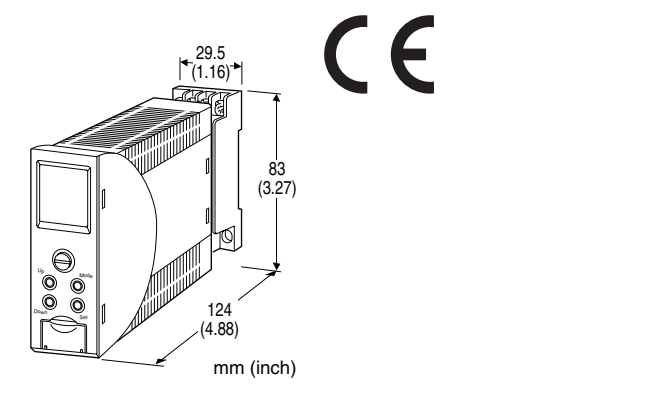
(PC programmable)

Functions & Features

- Accepts direct input from a RTD and provides a linearized process signal
- Adjustments with the front button
- Wide selection of RTD
- Leadwire resistance compensation
- OEL display with good visibility

Typical Applications

- Long distance transmission between the RTD and the transmitter



MODEL: M2EXR-[1][2]

ORDERING INFORMATION

- Code number: M2EXR-[1][2]

Specify a code from below for each [1] and [2].

- (e.g. M2EXR-M2/Q)
- Specify the specification for option code /Q (e.g. /C01/S01/SET)

INPUT - Field-selectable

RTD

JPt 100 (JIS'89), Pt 100 (JIS'89), Pt 100 (JIS'97, IEC), Pt 50Ω (JIS'81), Ni 508.4Ω, Pt 1000, Ni 100, Cu 10 @ 25°C

OUTPUT - Field-selectable

◆ DC Output

- Current output: 0 - 20 mA DC
- Voltage output: -5 - +5 V DC
- Voltage output: -10 - +10 V DC

[1] 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.)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)

[2] OPTIONS

blank: none

/Q: With options (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

TERMINAL SCREW MATERIAL

/S01: Stainless steel

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-5144)

RELATED PRODUCTS

- M2E configurator software (model: M2ECFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual (EM-5147) for the M2E configurator for applicable cable types.

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 (gray)

Isolation: Input to output to power

Overrange output: Approx. -10 to +110 % (Not available for current output not greater than 0 mA)

Input zero fine adj. range: -10 to +10°C (front button)

Input span fine adj. range: -10 to +10°C (front button)

Output zero fine adj. range: -5 to +5% (front button)

Output span fine adj. range: 95 to 105% (front button)

Output setting: DIP Switch on side panel (refer to the instruction manual)

Configuration: Program with front buttons or Via PC.

Programmable features include:

- RTD type
- Input setting
- Output range
- Output scaling
- Zero and span fine adjustments
- Loop test

Burnout protection: Upscale standard; downscale or no burnout optional by programming
(Refer to the operating manual (EM-5144-B) for detailed information.)

Linearization: Standard

Configurator connection: 2.5 dia. miniature jack;
RS-232-C level

DISPLAY

Display functions: Displays and sets measured range, engineering unit

Effective visual area: Approx. 15.6 × 20.8 mm (0.61" × 0.82")

Number of pixels: 68 × 95 (horizontal × vertical)

Character color: Yellow

Display life: Approx. 60000 hours

(Expected time for the Display brightness to be reduced to 50 % when the Display is used continuously with brightness setting 2 in 25 °C)

Display type: OEL display

Display digit: Negative 5 digits, positive 6 digits (-99999 to 999999)

Decimal point position:

- Input display: None, number of decimal places 1 or 2
- Output display: Settable arbitrarily

INPUT SPECIFICATIONS

Maximum leadwire resistance: 50 Ω per wire

Sensing current:

Pt 100, JPt 100, Pt 50 Ω, Ni 100, Cu 10: approx. 1.0 mA

Pt 1000, Ni 508.4 Ω: approx. 0.2 mA

Measurement rang: -5 to +105% of input setting value

Refer to the operating manual (EM-5144-B) for changing input range, setting value.

OUTPUT SPECIFICATIONS

■ DC Current

Output range: 0 - 20 mA DC

Conformance range: 0 - 22mA 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 15 V max.

(Not available to output less than 0 mA, output range may

not be extended to -10 %)

■ DC Voltage

Output range: -5 - +5 V DC, -10 - +10 V DC

Conformance range: -6.0 - +6.0 V DC, -12 - +12 V DC

Minimum span: 250 mV, 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.

INSTALLATION

Power Consumption

•AC:

Max. 4.5 VA at 100 V

Max. 6.5 VA at 200 V

Max. 8.5 VA at 264 V

•DC: Max. 2.3 W

Operating temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 10 to 85 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: Approx. 200 g (0.44 lb)

PERFORMANCE

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

See CALCULATION EXAMPLES OF OVERALL ACURACY.

• Input accuracy:

Input accuracy of table 1 or ±0.1 % of span, whichever is greater.

Pt, JPt: ±0.15°C

Ni: ±0.2°C

Cu10: ±1.0°C

• Display accuracy:

Input display: Input accuracy ±1 digit

Output display: Input accuracy + output accuracy ±1 digit

• Output accuracy: ±0.04 % of max. output range

Temp. coefficient: ±0.015 %/°C (±0.008 %/°F) of max. span

Input resolution: Max. 18 bits

Output resolution: Max. 16 bits

Response time (filter time constant: 0 sec.): ≤ 0.5 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: 2000 V AC @1 minute (input to output to power to ground)

CALCULATION EXAMPLES OF OVERALL ACCURACY

[Example]

- Input Accuracy

Input: Pt 100 (JIS'97, IEC) RTD, 0 - 100°C,

Output: 4 - 20 mA DC

1) Absolute value accuracy (Table 1): 0.15°C

2) $0.15^{\circ}\text{C} \div 100^{\circ}\text{C} \times 100 = 0.15\%$

3) $0.15\% > 0.1\%$ of span. \Rightarrow 0.15% is selected.

• Output Accuracy = Output Range Span (20 mA) \div Output Span Setting (16 mA) \times 0.04% = 0.05%

Overall accuracy = 0.15 + 0.05 = $\pm 0.2\%$

[Table 1]

INPUT RANGE	°C		
	MINIMUM SPAN	SETTING RANGE	ACCURACY
JPt 100 (JIS' 89)	20	-200.00 to +500.00	± 0.15
Pt 100 (JIS' 89)	20	-200.00 to +650.00	± 0.15
Pt 100 (JIS' 97, IEC)	20	-200.00 to +850.00	± 0.15
Pt 50 Ω (JIS' 81)	20	-200.00 to +649.00	± 0.15
Ni 508.4 Ω	20	-50.00 to +200.00	± 0.20
Pt 1000	20	-200.00 to +850.00	± 0.15
Ni 100	20	-50.00 to +200.00	± 0.20
Cu 10 @ 25°C	20	-50.00 to +250.00	± 1.00
INPUT RANGE	°F		
	MINIMUM SPAN	SETTING RANGE	ACCURACY
JPt 100 (JIS' 89)	36	-328.00 to +932.00	± 0.27
Pt 100 (JIS' 89)	36	-328.00 to +1202.00	± 0.27
Pt 100 (JIS' 97, IEC)	36	-328.00 to +1562.00	± 0.27
Pt 50 Ω (JIS' 81)	36	-328.00 to +1200.20	± 0.27
Ni 508.4 Ω	36	-58.00 to +392.00	± 0.36
Pt 1000	36	-328.00 to +1562.00	± 0.27
Ni 100	36	-58.00 to +392.00	± 0.36
Cu 10 @ 25°C	36	-58.00 to +482.00	± 1.80
INPUT RANGE	K		
	MINIMUM SPAN	SETTING RANGE	ACCURACY
JPt 100 (JIS' 89)	20	73.15 to 773.15	± 0.15
Pt 100 (JIS' 89)	20	73.15 to 923.15	± 0.15
Pt 100 (JIS' 97, IEC)	20	73.15 to 1123.15	± 0.15
Pt 50 Ω (JIS' 81)	20	73.15 to 922.15	± 0.15
Ni 508.4 Ω	20	223.15 to 473.15	± 0.20
Pt 1000	20	73.15 to 1123.15	± 0.15
Ni 100	20	223.15 to 473.15	± 0.20
Cu 10 @ 25°C	20	223.15 to 523.15	± 1.00

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

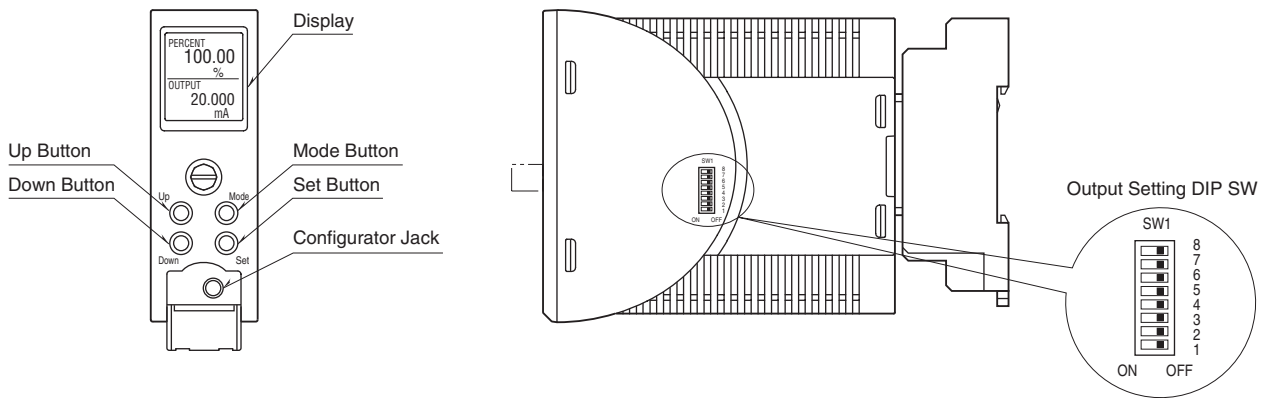
Input or output to power: Reinforced insulation (300 V)

Input to output: Basic insulation (300 V)

RoHS Directive

EN 50581

EXTERNAL VIEW



COMPONENT	FUNCTION
Display	Indicates present values, setting values and abnormal information. Two types of present values at upper and lower are displayed by setting.
Mode Button	Used to shift from measuring mode to each setting mode. Destination to shift is changed by the time pressing and holding the button. Used to return from each setting mode to measuring mode. (press and hold for 2 sec. or more)
Set Button	Used to change setting value of setting parameter. When at setting changeable state, used to enter (save) the setting value. Used to move on through digits of setting value for input/output scaling at setting changeable state,
Up Button	Used to shift through setting parameter, and to increase or select setting value.
Down Button	Used to shift through setting parameter, and to decrease or select setting value.
Configurator Jack	Used to configure with M2E configurator software (model: M2ECFG). At the same time, set the lockout setting of the unit to 'lock'.

Refer to the operating manual (EM-5144-B) for detailed procedures.

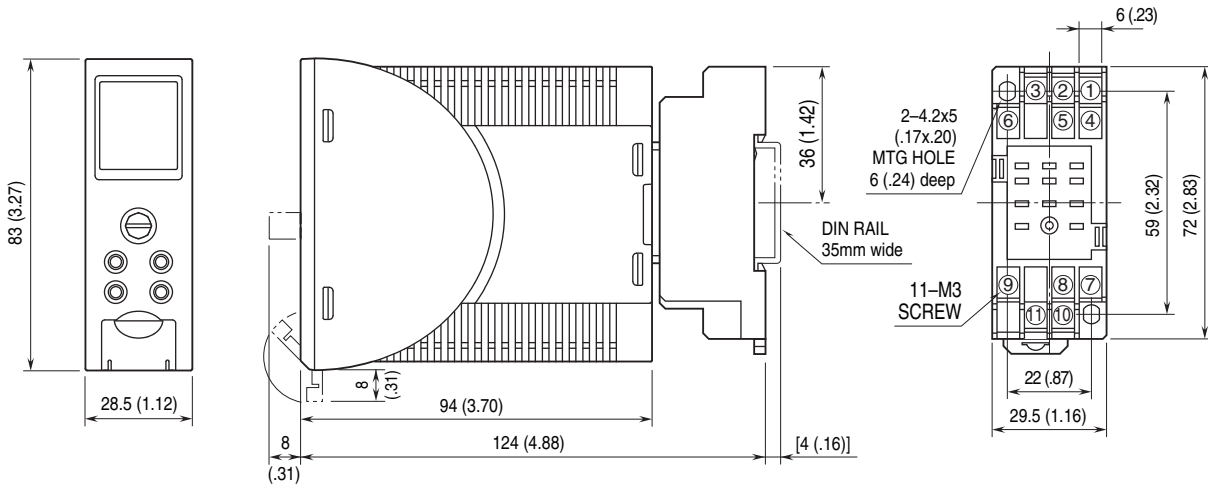
PARAMETER LIST

It is available to configure or confirm settings shown below by using front button. Configuring or confirming with PC is available when using M2E configurator software (model: M2ECFG).

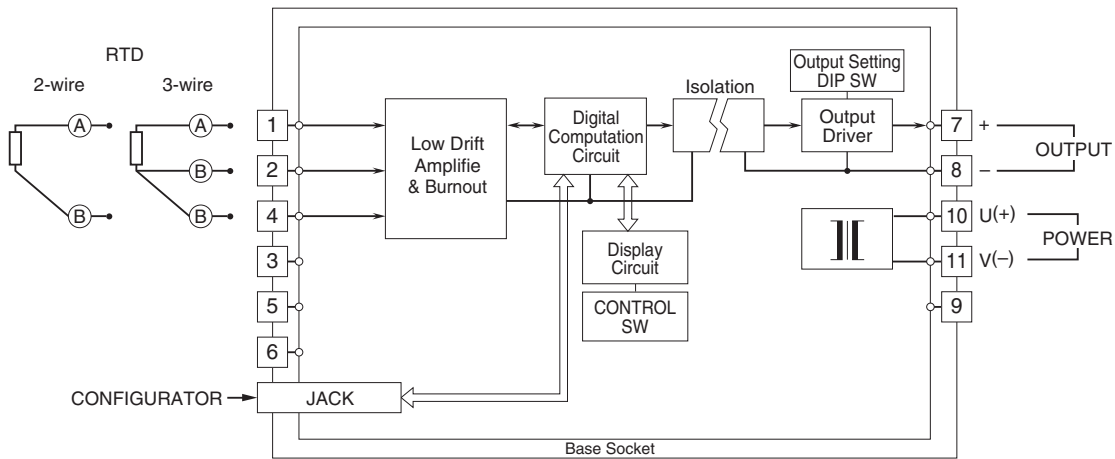
MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE	
Basic setting	01	Lockout setting	Lock / Unlock	—	Lock	
	11	Input range	JPt 100 (JIS'89) Pt 100 (JIS'89) Pt 100 (JIS'97, IEC) Pt 50Ω (JIS'81) Ni 508.4Ω Pt 1000 Ni 100 Cu 10 @ 25 °C	—	Pt 100 (JIS'97,IEC)	
	12	0 % input setting	JPt 100 (JIS'89) : -200.00 – 480.00 Pt 100 (JIS'89) : -200.00 – 630.00 Pt 100 (JIS'97, IEC) : -200.00 – 830.00 Pt 50Ω (JIS'81) : -200.00 – 629.00 Ni 508.4Ω : -50.00 – 180.00 Pt 1000 : -200.00 – 830.00 Ni 100 : -50.00 – 180.00 Cu 10 @ 25 °C : -50.00 – 230.00	°C	0.0	
	13	100 % input setting	JPt 100 (JIS'89) : -180.00 – 500.00 Pt 100 (JIS'89) : -180.00 – 650.00 Pt 100 (JIS'97, IEC) : -180.00 – 850.00 Pt 50Ω (JIS'81) : -180.00 – 649.00 Ni 508.4Ω : -30.00 – 200.00 Pt 1000 : -180.00 – 850.00 Ni 100 : -30.00 – 200.00 Cu 10 @ 25 °C : -30.00 – 250.00	°C	100.0	
	16	Input decimal point	No decimal point The number of decimal places : 1 or 2	—	1 place of decimals	
	17	Output range	0 – 20mA, -5 – +5V, -10 – +10V	—	0 – 20mA	
	18	0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000	
	19	100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000	
	20	0 % output scaling	-99999 – 999999	—	0.00	
	21	100 % output scaling	-99999 – 999999	—	100.00	
	22	Output decimal point	No decimal point The number of decimal places : 1 – 5	—	2 places of decimals	
	26	Loop test	-10.00 – 110.00	%	Cancel	
	Option setting	51	Burnout	None / Down / Up	—	Up
		52	Sensor wires	2 Wires / 3 Wires	—	3 Wires
53		Wire resistance	0.00 – 100.00	Ω	0.00	
61		Unit (OUT Scaling)	Choose from 68 types*	—	%	
64		Temperature unit	°C / °F / K	—	°C	
67		Filter time constant	0 – 30	sec.	0	
69		Input Zero fine adjust	-10.00 – 10.00	°C	0.00	
70		Input Span fine adjust	-10.00 – 10.00	°C	0.00	
71		Output Zero fine adjust	-5.000 – 5.000	%	0.000	
72		Output Span fine adjust	95.000 – 105.000	%	100.000	
Advanced setting	01	Lockout setting	Lock / Unlock	—	Lock	
	90	Display setting	Upper: choose from 5 types* Lower: choose from 6 types*	—	Upper: INPUT Lower: PERCENT	
	91	Brightness	1 (darkest) – 4 (brightest)	—	4	
	92	Display timeout	0 (always on), 1 – 60	min.	10	
	93	Reset all settings	OFF / RESET	—	OFF	
	01	Lockout setting	Lock / Unlock	—	Lock	

* For detailed types, refer to the operating manual (EM-5144 -B).

DIMENSIONS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.