

## Multi-channel Super-mini Signal Conditioners with Display M1E-4 Series

### SIGNAL TRANSMITTER

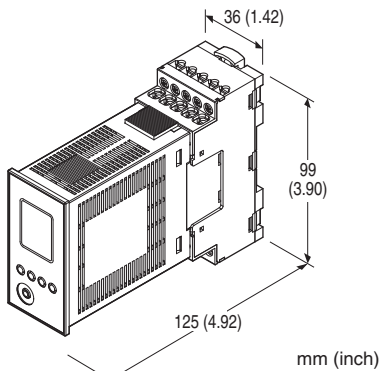
(4 channels, PC programmable)

#### Functions & Features

- Converts DC input from a sensor into a standard process signal
- 4 channels
- Isolation between inputs and outputs
- Adjustments with the front buttons
- OEL display with good visibility
- Linearization available for each channel (111 points)

#### Typical Applications

- Isolation between control room and field instrumentation
- Ideal for quick spare part



Note: The figure shows the combination of the unit and the base.

### MODEL: M1EXV-4-R[1]

#### ORDERING INFORMATION

- Code number: M1EXV-4-R[1]

Specify a code from below for [1].

- (e.g. M1EXV-4-R/Q)
- Specify the specification for option code /Q (e.g. /C01/SET)

#### NO. OF CHANNELS

4: 4 channels

#### INPUT - Field-selectable

##### ◆ DC Input

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

#### OUTPUT - Field-selectable

##### ◆ DC Output

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

#### POWER INPUT

##### DC Power

R: 24 V DC

(Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)

#### [1] 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

##### EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-6040)

#### RELATED PRODUCTS

- Installation base (model: M1E-BS2)
  - M1E configurator software (model: M1EFCG (M1E4CFG))
- 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-6041) for the M1E configurator for applicable cable types.

#### PACKAGE INCLUDES...

- Precision resistor module (model: REM3-250): 4

#### GENERAL SPECIFICATIONS

Construction: Plug-in

##### Connection

- Connected to base with connector
- Base

M2.6 screw terminals (torque: 0.5 N·m)

Applicable solderless terminal size (M3)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (black)

Isolation: Ch1 input to ch2 input to ch3 input to ch4 input to ch1 output to ch2 output to ch3 output to ch4 output to power

Overrange output: Approx. -5 to +105 % (Not available for

current output not greater than 0 mA)

**Zero fine adjustment:** -5 to +5 % (front button)

**Span fine adjustment:** 95 to 105 % (front button)

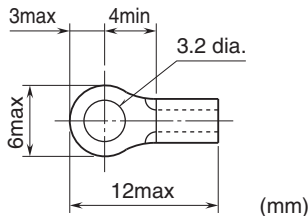
**Configuration:** Program with front buttons or Via PC.

**Programmable features include:** Refer to the parameter list.

**Configurator connection:** 2.5 dia. miniature jack;

RS-232-C level

■ **Recommended solderless terminal size - M3 (unit: mm)**



## DISPLAY

**Display functions:** Displays and sets measured range, engineering unit

**Display size:** Approx. 15.6 × 20.8 mm (0.61" × 0.82")

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

**Character color:** Yellow

**Display life:** Approx. 40000 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:** Selectable

## INPUT SPECIFICATIONS

### ■ DC Current

**Input resistance:** Precision resistor module (0.5 W) provided

**Input range:** 0 - 20 mA DC

**Minimum span:** 1 mA

The measurement available for -5 - +105% of input setting range.

### ■ DC Voltage

#### •Narrow Spans (mV)

**Input range:** -5 - +5 V DC

**Minimum span:** 250 mV

#### •Wide Spans (V)

**Input range:** -10 - +10 V DC

**Minimum span:** 1 V

**Input resistance:** 1 MΩ minimum

The measurement available for -5 - +105% of input setting range.

## OUTPUT SPECIFICATIONS

### ■ DC Current

**Output range:** 0 - 20 mA DC

**Conformance range:** 0 - 21mA DC

**Minimum span:** 1 mA

**Load resistance:** Output drive 15 V max.

(e.g. 4 - 20 mA: 750 Ω [15 V ÷ 20 mA])

(Not available to output less than 0 mA, output range may not be extended to -5 %)

### ■ DC Voltage

#### •Narrow Spans (mV)

**Output range:** -5 - +5 V DC

**Conformance range:** -5.5 - +5.5 V DC

**Minimum span:** 250 mV

#### •Wide Spans (V)

**Output range:** -10 - +10 V DC

**Conformance range:** -11 - +11 V DC

**Minimum span:** 1 V

**Load resistance:** 10 kΩ min.

## INSTALLATION

**Power consumption**

•DC: ≤ 5 W

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

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

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

**Mounting:** Surface or DIN rail

**Weight:** 130 g (0.29 lb) except base

## PERFORMANCE

**Accuracy:** Input accuracy + output accuracy

input accuracy + (output accuracy × segment gain) when segment gain > 1

See CALCULATION EXAMPLES OF OVERALL ACCURACY.

Inversely proportional to the setting span.

**Input accuracy:** (% of max. input range): ±0.03 %

**Display accuracy:**

Input display: Input accuracy ±1 digit

Output display: Input accuracy + output accuracy ±1 digit

**Output accuracy:** (% of max. output range)

0 - 20 mA: ±0.06 %

-5 - +5 V: ±0.03 %

-10 - +10 V: ±0.03 %

**Temp. coefficient (% of max. I/O range):** ±0.015 %/°C

(±0.008 %/°F)

**Response time (filter time constant: 0 sec.):** ≤ 0.5 sec.

(0 - 90 %)

**Line voltage effect:** ±0.1 % over voltage range

**Insulation resistance:** ≥ 100 MΩ with 500 V DC

**Dielectric strength:** 1500 V AC @ 1 minute

(Ch1 input to ch2 input to ch3 input to ch4 input to

ch1 output to ch2 output to ch3 output to ch4 output to power to ground)

## **CALCULATION EXAMPLES OF OVERALL ACCURACY**

[Example] Input signal: 1 - 5 V DC, Output signal: 4 - 20 mA DC, Max segment gain with linearization set: 1.5  
Input Range -5 - +5 V, Input Setting 1 - 5 V, Output Range 0 - 20 mA, Output Setting 4 - 20 mA, Segment Gain 1.5

### ■ Overall accuracy

- Input Accuracy = Input Range Span (10 V) ÷ Input Span (4 V) × 0.03 % = 0.075 %
  - Output Accuracy = Output Range Span (20 mA) ÷ Output Span (16 mA) × 0.06 % × Segment Gain (1.5) = 0.1125 %
- Overall Accuracy = 0.075 + 0.1125 = ±0.1875 %

## **STANDARDS & APPROVALS**

### EU conformity:

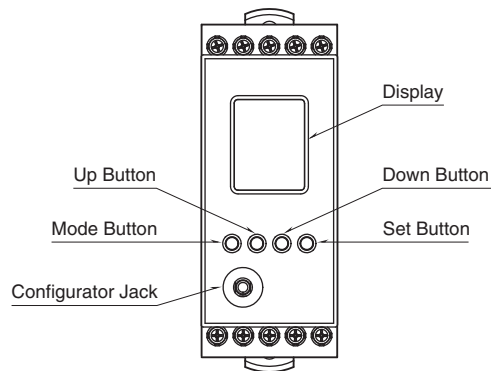
EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

## EXTERNAL VIEW



### COMPONENT FUNCTION

COMPONENT	FUNCTION
Display	Indicates present values, setting values and abnormal information. Two types of present values are displayed respectively at the upper and lower parts according to setting.
Mode button	Shifts from Measuring mode to each setting mode. The destination changes depending on how long the button is held down. While in each setting mode, pressing Mode button shifts to the setting mode for the next channel. Pressing Mode button for $\geq 2$ seconds returns to Measuring mode from each setting mode. In Measuring mode, shortly pressing the button shifts to the next screen.
Set button	Shifts the setting value of each setting parameter item to a setting changeable state. When at setting changeable state, used to move through the digits of setting value and to enter (save) the setting value.
Up button	Shifts through setting parameter items and to increase or select the setting value.
Down button	Shifts through setting parameter items and to decrease or select the setting value.
Configurator Jack	Used to perform configuration with M1E configurator software (model: M1ECFG). When using the software, set the Lockout setting of the unit to 'Lock'.

Refer to the operating manual (EM-6040-B) for detailed procedures of parameter settings.

## TERMINAL ASSIGNMENTS

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

No.	FUNCTION	No.	FUNCTION
1	Ch3 Input +	11	Ch1 Output +
2	Ch3 Input -	12	Ch1 Output -
3	Unused	13	Ch4 Output +
4	Ch1 Input +	14	Ch2 Output +
5	Ch1 Input -	15	Ch2 Output -
6	Ch4 Input +	16	Ch3 Output +
7	Ch4 Input -	17	Ch3 Output -
8	Unused	18	Ch4 Output -
9	Ch2 Input +	19	Power +
10	Ch2 Input -	20	Power -

\* Base does not come with the unit. Please order separately.

## PARAMETER LIST

It is available to configure or confirm settings shown below by using front buttons. Configuring or confirming with PC is available when using M1E configurator software (model: M1ECFG).

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch1 Setting	01	Lockout setting	Lock / Unlock	–	Lock
	02	Ch1 Enable	Disable / Enable	–	Enable
	11	Ch1 Input range	0 – 20 mA -5 – +5 V -10 – +10 V	–	-5 – +5 V
	12	Ch1 0 % input setting	0.00 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	1.000
	13	Ch1 100 % input setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA mV V	5.000
	14	Ch1 0 % input scaling	-99999 – 999999	–	0.00
	15	Ch1 100 % input scaling	-99999 – 999999	–	100.00
	16	Ch1 Input decimal point	No decimal point The number of decimal places: 1 – 5	–	2 places of decimals
	17	Ch1 Unit (INP Scaling)	Choose from 68 types*	–	%
	61	Ch1 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	62	Ch1 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	63	Ch1 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	71	Ch1 Filter time constant	0 – 30	sec.	0
	81	Ch1 Input Zero fine adjust	-5.000 – 5.000	%	0.000
	82	Ch1 Input Span fine adjust	95.000 – 105.000	%	100.000
	91	Ch1 Output Zero fine adjust	-5.000 – 5.000	%	0.000
	92	Ch1 Output Span fine adjust	95.000 – 105.000	%	100.000
	95	Ch1 User's table Linearization	Cancel / Set	–	Cancel
	98	Ch1 Loop test	-5.00 – 105.00	%	Cancel

\* For details on types, refer to the operating manual (EM-6040-B).

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch2 Setting	01	Lockout setting	Lock / Unlock	–	Lock
	102	Ch2 Enable	Disable / Enable	–	Enable
	111	Ch2 Input range	0 – 20 mA -5 – +5 V -10 – +10 V	–	-5 – +5 V
	112	Ch2 0 % input setting	0.00 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	1.000
	113	Ch2 100 % input setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA mV V	5.000
	114	Ch2 0 % input scaling	-99999 – 999999	–	0.00
	115	Ch2 100 % input scaling	-99999 – 999999	–	100.00
	116	Ch2 Input decimal point	No decimal point The number of decimal places: 1 – 5	–	2 places of decimals
	117	Ch2 Unit (INP Scaling)	Choose from 68 types*	–	%
	161	Ch2 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	162	Ch2 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	163	Ch2 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	171	Ch2 Filter time constant	0 – 30	sec.	0
	181	Ch2 Input Zero fine adjust	-5.000 – 5.000	%	0.000
	182	Ch2 Input Span fine adjust	95.000 – 105.000	%	100.000
	191	Ch2 Output Zero fine adjust	-5.000 – 5.000	%	0.000
	192	Ch2 Output Span fine adjust	95.000 – 105.000	%	100.000
	195	Ch2 User's table Linearization	Cancel / Set	–	Cancel
198	Ch2 Loop test	-5.00 – 105.00	%	Cancel	

\* For details on types, refer to the operating manual (EM-6040-B).

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch3 Setting	01	Lockout setting	Lock / Unlock	–	Lock
	202	Ch3 Enable	Disable / Enable	–	Enable
	211	Ch3 Input range	0 – 20 mA -5 – +5 V -10 – +10 V	–	-5 – +5 V
	212	Ch3 0 % input setting	0.00 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	1.000
	213	Ch3 100 % input setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA mV V	5.000
	214	Ch3 0 % input scaling	-99999 – 999999	–	0.00
	215	Ch3 100 % input scaling	-99999 – 999999	–	100.00
	216	Ch3 Input decimal point	No decimal point The number of decimal places: 1 – 5	–	2 places of decimals
	217	Ch3 Unit (INP Scaling)	Choose from 68 types*	–	%
	261	Ch3 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	262	Ch3 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	263	Ch3 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	271	Ch3 Filter time constant	0 – 30	sec.	0
	281	Ch3 Input Zero fine adjust	-5.000 – 5.000	%	0.000
	282	Ch3 Input Span fine adjust	95.000 – 105.000	%	100.000
	291	Ch3 Output Zero fine adjust	-5.000 – 5.000	%	0.000
	292	Ch3 Output Span fine adjust	95.000 – 105.000	%	100.000
	295	Ch3 User's table Linearization	Cancel / Set	–	Cancel
	298	Ch3 Loop test	-5.00 – 105.00	%	Cancel

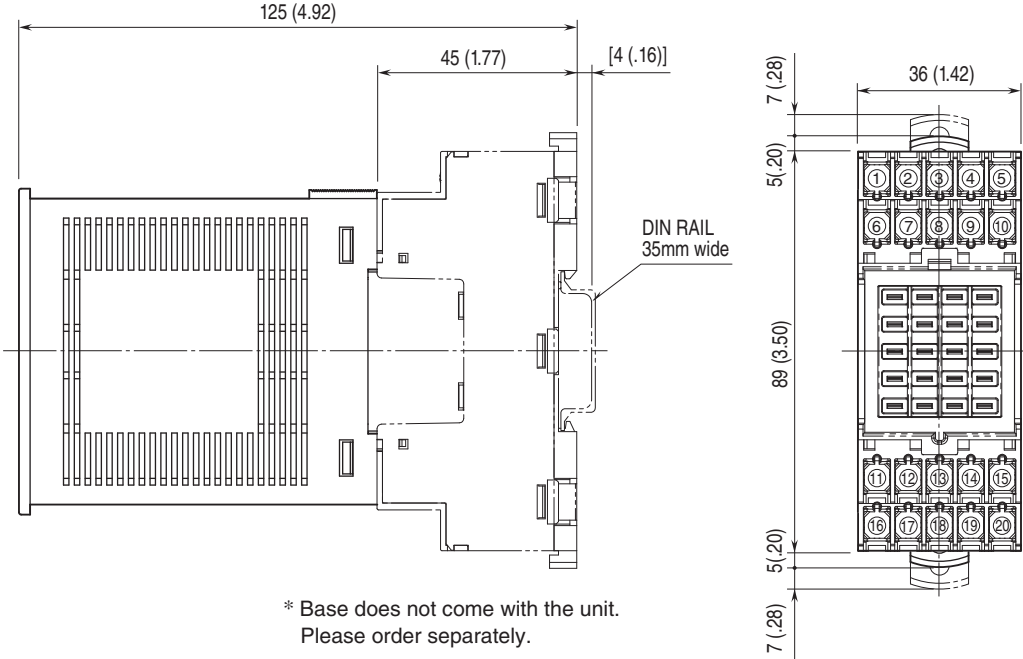
\* For details on types, refer to the operating manual (EM-6040-B).

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Ch4 Setting	01	Lockout setting	Lock / Unlock	–	Lock
	302	Ch4 Enable	Disable / Enable	–	Enable
	311	Ch4 Input range	0 – 20 mA -5 – +5 V -10 – +10 V	–	-5 – +5 V
	312	Ch4 0 % input setting	0.00 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	1.000
	313	Ch4 100 % input setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA mV V	5.000
	314	Ch4 0 % input scaling	-99999 – 999999	–	0.00
	315	Ch4 100 % input scaling	-99999 – 999999	–	100.00
	316	Ch4 Input decimal point	No decimal point The number of decimal places: 1 – 6	–	2 places of decimals
	317	Ch4 Unit (INP Scaling)	Choose from 68 types*	–	%
	361	Ch4 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	–	0 – 20 mA
	362	Ch4 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000
	363	Ch4 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000
	371	Ch4 Filter time constant	0 – 30	sec.	0
	381	Ch4 Input Zero fine adjust	-5.000 – 5.000	%	0.000
	382	Ch4 Input Span fine adjust	95.000 – 105.000	%	100.000
	391	Ch4 Output Zero fine adjust	-5.000 – 5.000	%	0.000
	392	Ch4 Output Span fine adjust	95.000 – 105.000	%	100.000
	395	Ch4 User's table Linearization	Cancel / Set	–	Cancel
	398	Ch4 Loop test	-5.00 – 105.00	%	Cancel
	Advanced	01	Lockout setting	Lock / Unlock	–
401		Display 1 setting	Upper: Choose from 16 types.* Lower: Choose from 17 types.*	–	Upper: Ch1 INPUT Lower: Ch1 OUTPUT
402		Display 2 setting	Upper: Choose from 17 types.* Lower: Choose from 17 types.*	–	Upper: Ch2 INPUT Lower: Ch2 OUTPUT
403		Display 3 setting	Upper: Choose from 17 types.* Lower: Choose from 17 types.*	–	Upper: Ch3 INPUT Lower: Ch3 OUTPUT
404		Display 4 setting	Upper: Choose from 17 types.* Lower: Choose from 17 types.*	–	Upper: Ch4 INPUT Lower: Ch4 OUTPUT
405		Display change time	0 (fixed), 1 – 60	sec.	3
406		Brightness	1 (darkest) – 4 (brightest)	–	4
407		Display timeout	0 (always on), 1 – 60	min.	10
408		Reset all settings	OFF / RESET	–	OFF
409		Version indication	–	–	–

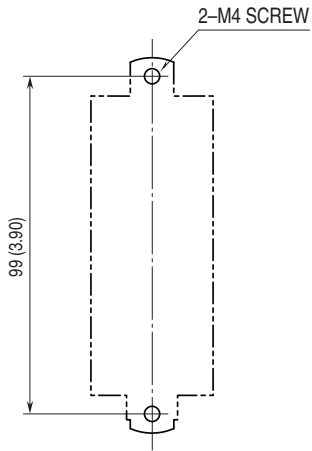
\* For details on types, refer to the operating manual (EM-6040-B).



**EXTERNAL DIMENSIONS unit: mm [inch]**



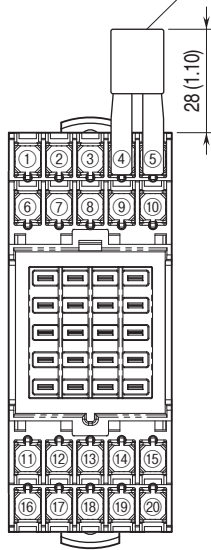
**MOUNTING REQUIREMENTS unit: mm [inch]**



\* Mounting requirements for base.

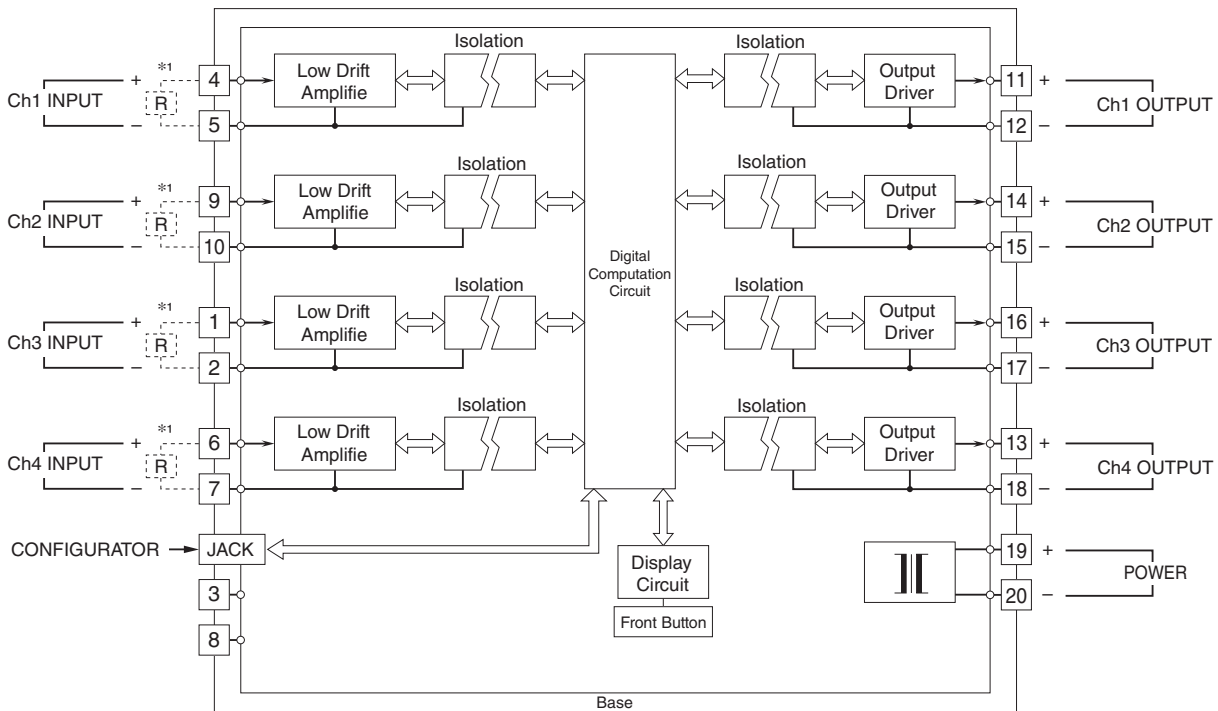
**TERMINAL ASSIGNMENTS unit: mm [inch]**

Precision resistor module (REM3)




\* Base does not come with the unit. Please order separately.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



\*1. For DC current input, attach the input resistor (R).

 Specifications are subject to change without notice.