

Plug-in Signal Conditioners M-UNIT

RATIO TRANSMITTER

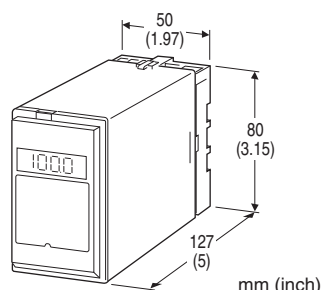
(input bias; non-isolated)

Functions & Features

- Providing precise matching of DC control signals to final control elements in open-or closed-loop systems
- Positive and negative ratio range
- Ratio adjustable from 0.1 to 4.0
- Bias adjustable within $\pm 100\%$
- High-density mounting

Typical Applications

- Ratio control for air/fuel flows
- Negative ratio for split control



MODEL: RT-[1][2][3]-[4][5]

ORDERING INFORMATION

- Code number: RT-[1][2][3]-[4][5]
Specify a code from below for each of [1] through [5].
(e.g. RT-16A-B/E/Q)
- Special input and output ranges (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01/S01)

[1] RATIO RANGE

- 1: Positive 0.1 – 1.1
- 2: Positive 0.5 – 1.5
- 3: Positive 0.2 – 2.2
- 4: Positive 0.5 – 4.0
- 6: Negative -0.1 – -1.1
- 7: Negative -0.5 – -1.5
- 8: Negative -0.2 – -2.2
- 9: Negative -0.5 – -4.0

[2] INPUT

Current

A: 4 – 20 mA DC (Input resistance 250 Ω)

A1: 4 – 20 mA DC (Input resistance 50 Ω)

- B: 2 – 10 mA DC (Input resistance 500 Ω)
- C: 1 – 5 mA DC (Input resistance 1000 Ω)
- D: 0 – 20 mA DC (Input resistance 50 Ω)
- E: 0 – 16 mA DC (Input resistance 62.5 Ω)
- F: 0 – 10 mA DC (Input resistance 100 Ω)
- G: 0 – 1 mA DC (Input resistance 1000 Ω)
- H: 10 – 50 mA DC (Input resistance 100 Ω)
- J: 0 – 10 μ A DC (Input resistance 1000 Ω)
- K: 0 – 100 μ A DC (Input resistance 1000 Ω)
- GW: -1 – +1 mA DC (Input resistance 1000 Ω)
- FW: -10 – +10 mA DC (Input resistance 100 Ω)
- Z: Specify current (See INPUT SPECIFICATIONS)

Voltage

- 1: 0 – 10 mV DC (Input resistance 10 k Ω min.)
- 15: 0 – 50 mV DC (Input resistance 10 k Ω min.)
- 16: 0 – 60 mV DC (Input resistance 10 k Ω min.)
- 2: 0 – 100 mV DC (Input resistance 100 k Ω min.)
- 3: 0 – 1 V DC (Input resistance 1 M Ω min.)
- 4: 0 – 10 V DC (Input resistance 1 M Ω min.)
- 5: 0 – 5 V DC (Input resistance 1 M Ω min.)
- 6: 1 – 5 V DC (Input resistance 1 M Ω min.)
- 4W: -10 – +10 V DC (Input resistance 1 M Ω min.)
- 5W: -5 – +5 V DC (Input resistance 1 M Ω min.)
- 0: Specify voltage (See INPUT SPECIFICATIONS)

[3] OUTPUT

Current

- A: 4 – 20 mA DC (Load resistance 750 Ω max.)
- B: 2 – 10 mA DC (Load resistance 1500 Ω max.)
- C: 1 – 5 mA DC (Load resistance 3000 Ω max.)
- D: 0 – 20 mA DC (Load resistance 750 Ω max.)
- E: 0 – 16 mA DC (Load resistance 900 Ω max.)
- F: 0 – 10 mA DC (Load resistance 1500 Ω max.)
- G: 0 – 1 mA DC (Load resistance 15 k Ω max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

Voltage

- 1: 0 – 10 mV DC (Load resistance 10 k Ω min.)
- 2: 0 – 100 mV DC (Load resistance 100 k Ω min.)
- 3: 0 – 1 V DC (Load resistance 100 Ω min.)
- 4: 0 – 10 V DC (Load resistance 1000 Ω min.)
- 5: 0 – 5 V DC (Load resistance 500 Ω min.)
- 6: 1 – 5 V DC (Load resistance 500 Ω min.)
- 4W: -10 – +10 V DC (Load resistance 2000 Ω min.)
- 5W: -5 – +5 V DC (Load resistance 1000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

[4] POWER INPUT**AC Power**

B: 100 V AC
 C: 110 V AC
 D: 115 V AC
 F: 120 V AC
 G: 200 V AC
 H: 220 V AC
 J: 240 V AC

DC Power

S: 12 V DC
 R: 24 V DC
 V: 48 V DC
 P: 110 V DC

[5] OPTIONS (multiple selections)**LCD Meter (for indicating value after ratio/bias adjustment)**

blank: Without

/E: With (0.0 - 100.0 % display)

Other Options

blank: none

/Q: Option other than the above (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

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3.5 screw terminals

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: Input or output to power

Overrange output: Approx. -10 to +120 % at 1 - 5 V

Bias adjustment: -100 - +100 % (front)

Equation: $X_o = K(X_i + B)$ for positive ratio (factory setting: $K = 1, B = 0$ %);

$X_o = K(X_i + B) + 100$ % for negative ratio (factory setting:

$K = -1, B = 0$ %)

where

X_o : output (%)

X_i : input (%)

K : ratio

B : bias

(-100 - +100 %; added to the input)

■ DISPLAY (LCD meter)

• Option code: /E

LCD digital display: 0.0 - 100.0 % (min. digit 0.1 %)
 (No scaling)

INPUT SPECIFICATIONS**■ DC Current:**

Shunt resistor attached to the input terminals (0.5 W)
 Specify input resistance value for code Z.

■ DC Voltage: -300 - +300 V DC

Minimum span: 3 mV

Offset: Max. 1.5 times span

Input resistance

Span 3 - 10 mV : ≥ 10 k Ω

Span 10 - 100 mV : ≥ 10 k Ω

Span 0.1 - 1 V : ≥ 100 k Ω

Span ≥ 1 V : ≥ 1 M Ω

OUTPUT SPECIFICATIONS

■ DC Current: 0 - 20 mA DC

Minimum span: 1 mA

Offset: Max. 1.5 times span

Load resistance: Output drive 15 V max.

■ DC Voltage: -10 - +12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 10 mA max.; 5 mA for negative voltage output; at ≥ 0.5 V

INSTALLATION**Power input**

• AC: Operational voltage range: rating ± 10 %, 50/60 ± 2 Hz, approx. 2 VA

• DC: Operational voltage range: rating ± 10 %, or 85 - 150 V for 110 V rating (ripple 10 %p-p max.) approx. 2.6 W (110 mA at 24 V)

Operating temperature: -5 to +60°C (23 to 140°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: 400 g (0.88 lb)

PERFORMANCE in percentage of span

Accuracy: $\pm 0.2\%$ (with ratio = 1, bias = 0 %)

Display accuracy: $\pm (0.2\% \text{ of FS} + 1 \text{ digit})$ (with ratio = 1, bias = 0 %)

Temp. coefficient: $\pm 0.02\% / ^\circ\text{C}$ ($\pm 0.01\% / ^\circ\text{F}$)

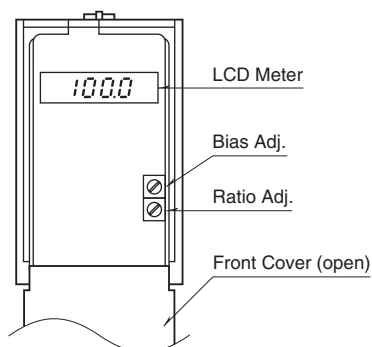
Response time: $\leq 0.5 \text{ sec.}$ (0 - 90 %)

Line voltage effect: $\pm 0.1\%$ over voltage range

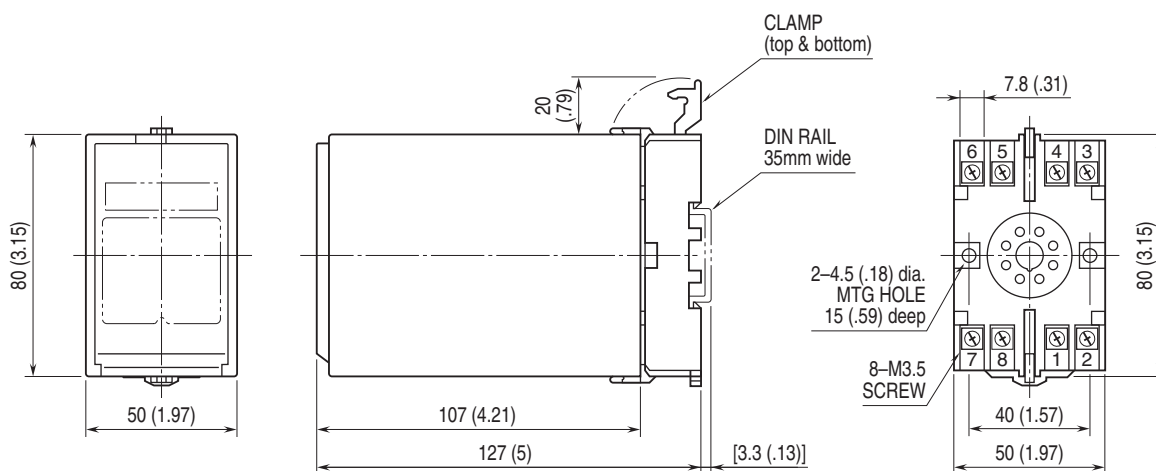
Insulation resistance: $\geq 100 \text{ M}\Omega$ with 500 V DC

Dielectric strength: 2000 V AC @1 minute (input or output to power to ground)

EXTERNAL VIEW

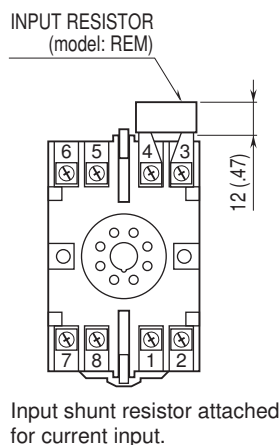


EXTERNAL DIMENSIONS unit: mm (inch)

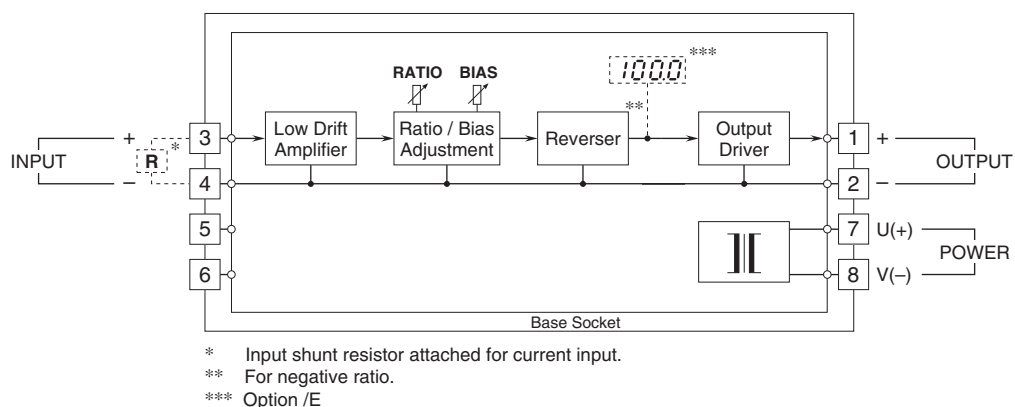


• When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm (inch)



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.