

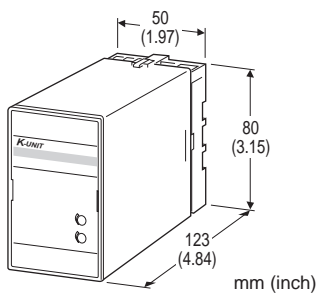
**Plug-in Signal Conditioners K-UNIT**

**RATIO TRANSMITTER**

(with input bias, 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  $\pm 100\%$
- Isolation up to 2000 V AC
- High-density mounting



**MODEL: KRTBS-[1][2][3]-[4][5]**

**ORDERING INFORMATION**

- **Code number:** KRTBS-[1][2][3]-[4][5]
- Specify a code from below for each [1] through [5].  
(e.g. KRTBS-16A-B/Q)
- Special input and output ranges (For codes Z & O)
  - 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  $\Omega$ )
- A1: 4 - 20 mA DC (Input resistance 50  $\Omega$ )
- B: 2 - 10 mA DC (Input resistance 500  $\Omega$ )
- C: 1 - 5 mA DC (Input resistance 1000  $\Omega$ )

- D: 0 - 20 mA DC (Input resistance 50  $\Omega$ )
- E: 0 - 16 mA DC (Input resistance 62.5  $\Omega$ )
- F: 0 - 10 mA DC (Input resistance 100  $\Omega$ )
- G: 0 - 1 mA DC (Input resistance 1000  $\Omega$ )
- H: 10 - 50 mA DC (Input resistance 100  $\Omega$ )
- J: 0 - 10  $\mu$ A DC (Input resistance 1000  $\Omega$ )
- K: 0 - 100  $\mu$ A DC (Input resistance 1000  $\Omega$ )
- GW: -1 - +1 mA DC (Input resistance 1000  $\Omega$ )
- FW: -10 - +10 mA DC (Input resistance 100  $\Omega$ )
- Z: Specify current (See INPUT SPECIFICATIONS)

**Voltage**

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

**[3] OUTPUT**

**Current**

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

**Voltage**

- 1: 0 - 10 mV DC (Load resistance 10 k $\Omega$  min.)
- 2: 0 - 100 mV DC (Load resistance 100 k $\Omega$  min.)
- 3: 0 - 1 V DC (Load resistance 100  $\Omega$  min.)
- 4: 0 - 10 V DC (Load resistance 1000  $\Omega$  min.)
- 5: 0 - 5 V DC (Load resistance 500  $\Omega$  min.)
- 6: 1 - 5 V DC (Load resistance 500  $\Omega$  min.)
- 4W: -10 - +10 V DC (Load resistance 2000  $\Omega$  min.)
- 5W: -5 - +5 V DC (Load resistance 1000  $\Omega$  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

## [5] OPTIONS

### Other 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

## 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 to 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)

## 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 :  $\geq 10$  k $\Omega$

Span 10 - 100 mV :  $\geq 10$  k $\Omega$

Span 0.1 - 1 V :  $\geq 100$  k $\Omega$

Span  $\geq 1$  V :  $\geq 1$  M $\Omega$

## 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  $\geq 0.5$  V

## INSTALLATION

### Power input

• **AC:** Operational voltage range: rating  $\pm 10$  %, 50/60  $\pm 2$  Hz, approx. 2 VA

• **DC:** Operational voltage range: rating  $\pm 10$  % ripple 10 %p-p max., approx. 2.6 W (110 mA at 24 V)

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

**Temp. coefficient:**  $\pm 0.02$  %/°C ( $\pm 0.01$  %/°F)

**Response time:**  $\leq 0.5$  sec. (0 - 90 %)

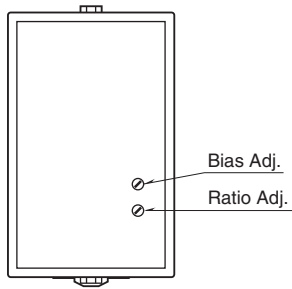
**Line voltage effect:**  $\pm 0.1$  % over voltage range

**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC

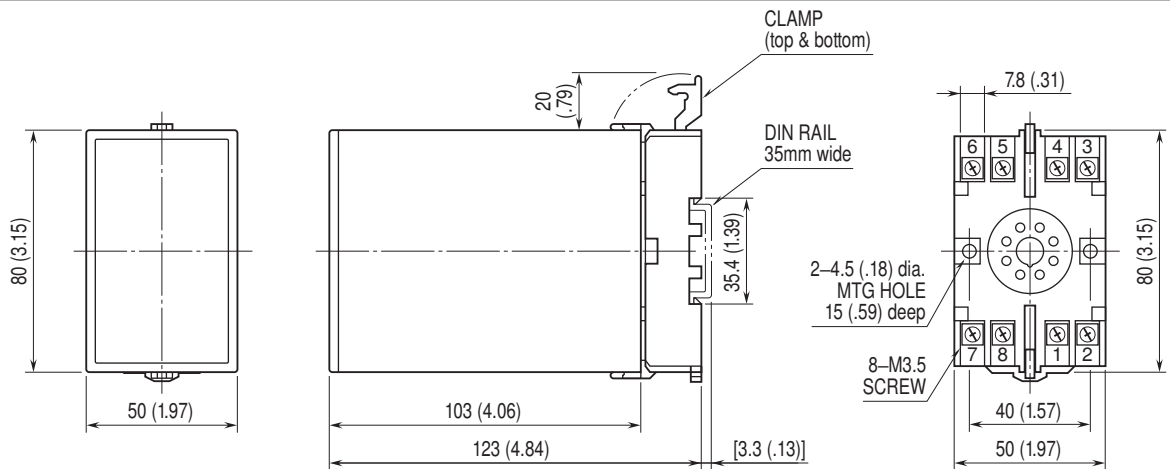
**Dielectric strength:** 2000 V AC @1 minute (input to output to power to ground)



## EXTERNAL VIEW

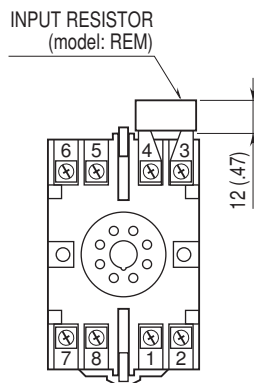


## DIMENSIONS unit: mm (inch)



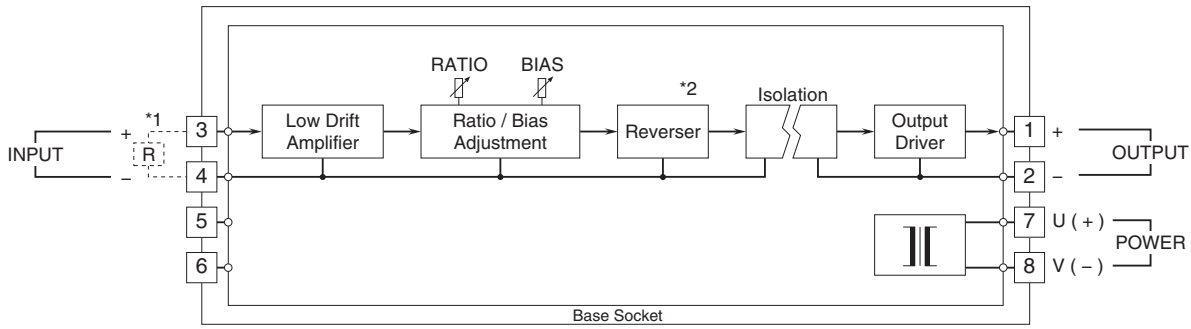
• When mounting, no extra space is needed between units.

## TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



\*1. Input shunt resistor attached for current input.  
 \*2. For negative ratio.



Specifications are subject to change without notice.

