

Space-saving Plug-in Signal Conditioners F-UNIT

RATIO TRANSMITTER

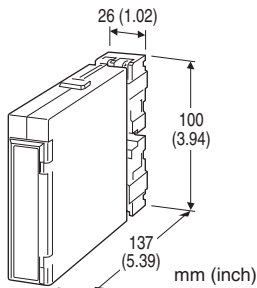
(with output bias, non-isolated)

Functions & Features

- Providing precise matching of DC control signals to final control elements in open- or closed-loop systems
- Monitor jacks provided for ratio & bias adjustments
- Ratio adjustable from 0.5 to 3.0
- Bias adjustable within $\pm 100\%$
- High-density mounting

Typical Applications

- Ratio control for air/fuel flows or for two flows
- Gain calculation for manipulated variable from a controller
- Large scale signal span adjustment



MODEL: FRT-[1][2]-[3]

ORDERING INFORMATION

- Code number: FRT-[1][2]-[3]
- Specify a code from below for each [1] through [3] (e.g. FRT-6A-K)
- Special input and output ranges (For codes Z & 0)

[1] INPUT

Current

- A: 4 - 20 mA DC (Input resistance 250 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)
- Z: Specify current (See INPUT SPECIFICATIONS)

Voltage

- 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.)

0: Specify voltage (See INPUT SPECIFICATIONS)

[2] 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 1000 Ω min.)
- 4: 0 - 10 V DC (Load resistance 10 k Ω min.)
- 5: 0 - 5 V DC (Load resistance 5000 Ω min.)
- 6: 1 - 5 V DC (Load resistance 5000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

[3] POWER INPUT

AC Power

K: 85 - 132 V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)

L: 170 - 264 V AC

(Operational voltage range 170 - 264 V, 47 - 66 Hz)

DC Power

R: 24 V DC

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

P: 110 V DC

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

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3.5 screw terminals (torque 0.8 N·m)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (black)

Isolation: Input or output to power

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

Ratio adjustment: 0.5 - 3.0 (front)

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

Monitor jack diameter: 2 mm (.08")

Equation: $X_o = KX_i + B$

where X_o : output (%)

X_i : input (%)

K : ratio

(linear characteristic; 0.5 - 3.0)

B : bias (-100 - +100 %)

(factory setting: $K = 1, B = 0\%$)



INPUT SPECIFICATIONS

■ DC Current:

Shunt resistor attached to the input terminals (0.5 W)

Specify input resistance value for code Z.

■ DC Voltage: 0 – 300 V DC

Minimum span: 1 V

Offset: Max. 1.5 times span

Input resistance: $\geq 1 \text{ M}\Omega$

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: 0 – 12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 1 mA max.; at $\geq 0.5 \text{ V}$

INSTALLATION

Power input

•AC: Approx. 4.5 VA

•DC: 24 V approx. 80 mA; 110 V approx. 20 mA

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

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

Mounting: Surface or DIN rail; Standard Rack Mounting

Frame BX-16H available

Weight: 200 g (0.44 lbs)

PERFORMANCE in percentage of span

Setpoint accuracy: $\pm 1.0 \%$ (for monitor output voltage)

Computing accuracy: $\pm 0.5 \%$ (with ratio=1, bias=0 %)

Temp. coefficient: $\pm 0.025 \%/^{\circ}\text{C}$ ($\pm 0.014 \%/^{\circ}\text{F}$)

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

Power input code R:

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

500 V AC @ 1 minute (I/O to power)

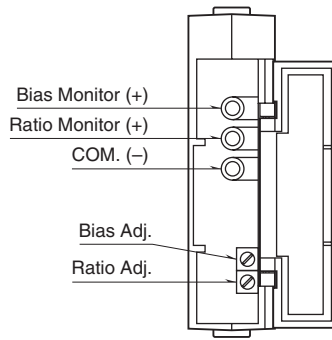
Power input code K, L, P:

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

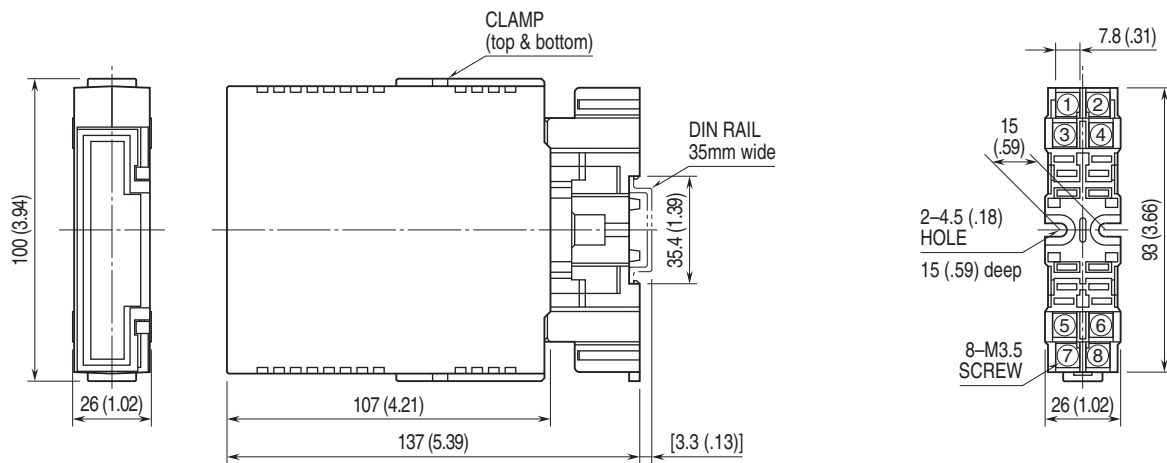
1500 V AC @ 1 minute (I/O to power)



EXTERNAL VIEW

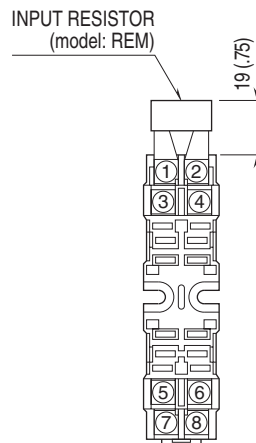


DIMENSIONS unit: mm (inch)



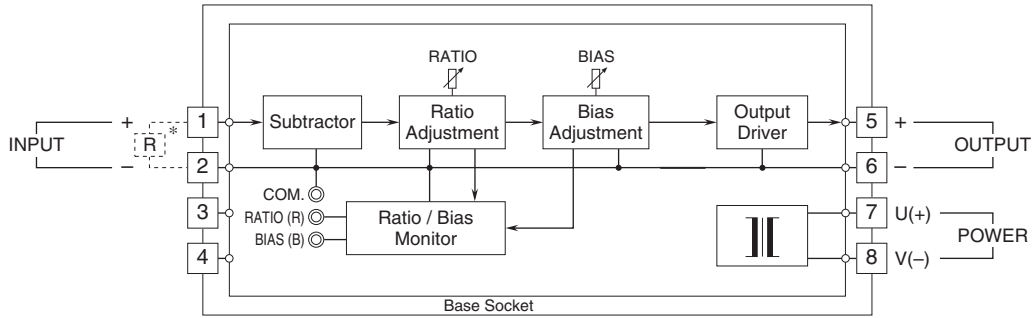
•When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



* Input shunt resistor attached for current input.



Specifications are subject to change without notice.

