

Space-saving Plug-in Signal Conditioners F-UNIT

RATIO TRANSMITTER

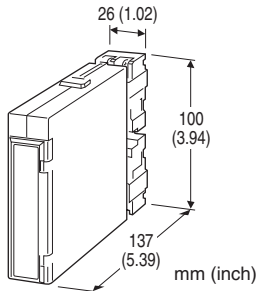
(output bias; non-isolated)

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 $\pm 100\%$
- Isolation up to 2000 V AC
- 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][4]

ORDERING INFORMATION

- Code number: FRT-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4].
(e.g. FRT-6A-K/Q)
- Special input and output ranges (For codes Z & Q)
- Specify the specification for option code /Q
(e.g. /C01/S01)

[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.)

[4] 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 (torque 0.8 N·m)
Screw terminal: Nickel-plated 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
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: $K = 1$, $B = 0$ %)

PERFORMANCE in percentage of span

Setpoint accuracy: ± 1.0 % (for monitor output voltage)
Computing accuracy: ± 0.5 % (with ratio=1, bias=0 %)
Temp. coefficient: ± 0.025 %/°C (± 0.014 %/°F)
Response time: ≤ 0.5 sec. (0 - 90 %)
Line voltage effect: ± 0.1 % over voltage range
Insulation resistance: ≥ 100 M Ω 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)

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: ≥ 1 M Ω

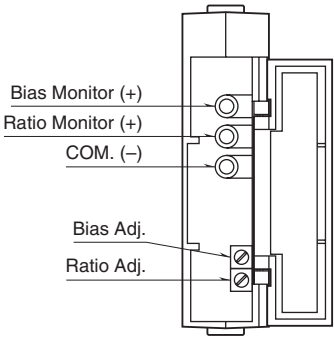
OUTPUT SPECIFICATIONS

■ **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:** 0 - 12 V DC
Minimum span: 5 mV
Offset: Max. 1.5 times span
Load resistance: Output drive 1 mA max.; at ≥ 0.5 V

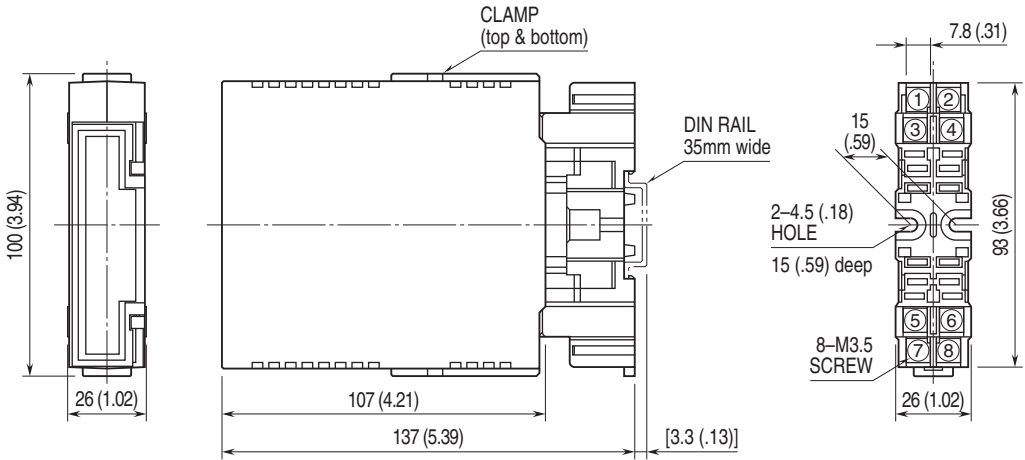
INSTALLATION

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 lb)

EXTERNAL VIEW

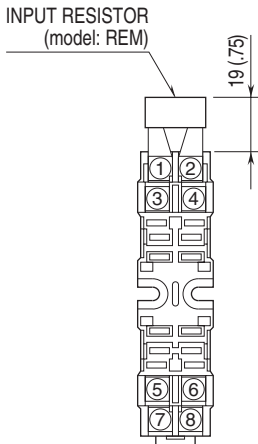


EXTERNAL DIMENSIONS unit: mm (inch)



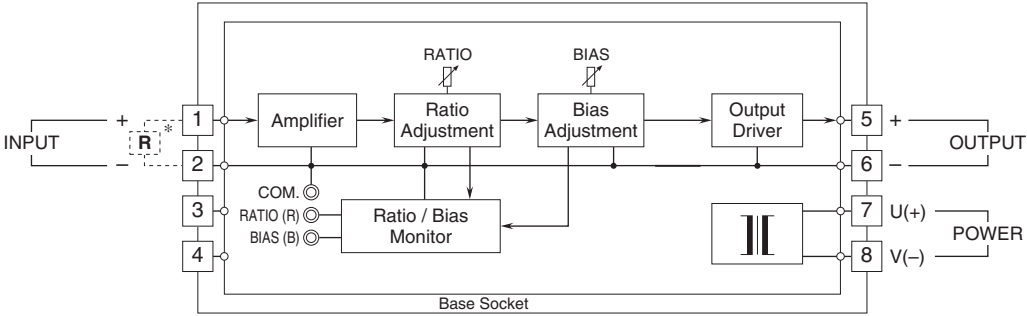
•When mounting, no extra space is needed between units.

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.