

Space-saving Plug-in Signal Conditioners F-UNIT

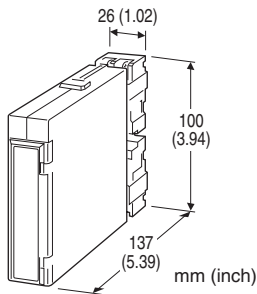
DC/FREQUENCY CONVERTER

Functions & Features

- Providing a pulse rate output in proportion to DC input signal
- High-density mounting

Typical Applications

- Totalizing applications in combination with a counter



MODEL: FAP-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: FAP-[1][2]-[3][4]

Specify a code from below for each of [1] through [4].

- (e.g. FAP-61-K/Q)
- Special input range (For codes Z & 0)
- Output frequency range (e.g. 0 – 500 Hz)
- Specify the specification for option code /Q (e.g. /C01/S01)

[1] INPUT

Current

- A: 4 – 20 mA DC (Input resistance 250 Ω)
- D: 0 – 20 mA DC (Input resistance 50 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)
- (0 % input must be 0 mA.)

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)
- (0 % input must be 0 V.)

[2] OUTPUT

- 1: Open collector (max. 1 kHz)
- 2: 5 V pulse (max. 1 kHz)
- 5: Photo MOSFET relay pulse (max. 30 Hz)

[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 to output to power

Zero adjustment: 0 – 5 % (front)

Span adjustment: 95 to 105 % (front)

INPUT SPECIFICATIONS

■ DC Current:

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

■ DC Voltage: 0 – 300V DC

Minimum span: 1V

Input resistance: 1 M Ω min.

OUTPUT SPECIFICATIONS

■ **Open Collector:** 30 V DC @100 mA (resistive load)
Frequency range: 0 - 10 pulses/hour through 1 kHz
Saturation voltage: 0.6 V DC

■ **5 V Pulse**

Frequency range: 0 - 10 pulses/hour through 1 kHz
Hi level: 3.0 - 5.5 V
Lo level: ≤ 0.5 V

Load resistance: 250 Ω min.

■ **Photo MOSFET Relay Pulse**

Frequency range: 0 - 10 pulses/hour through 30 Hz
Timer: Limits ON time within 75 ±25 msec.
Rating: 132 V AC @ 200 mA (cos φ = 1)
 30 V DC @ 200 mA (resistive load)
ON resistance: ≤ 2 Ω

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

Mounting: Surface or DIN rail; Standard Rack Mounting
 Frame BX-16H available

Weight: 190 g (0.42 lb)

PERFORMANCE in percentage of span

Accuracy: ±0.1 %

Temp. coefficient: ±0.015 %/°C (±0.008 %/°F)

Response time: Approx. 3 sec. (0 - 90 %)

Line voltage effect: ±0.1 % over voltage range

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength

Power input code R:

1000 V AC @ 1 minute (input to output)

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:

1000 V AC @ 1 minute (input to output)

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

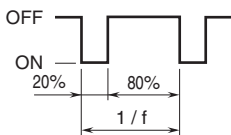
1500 V AC @ 1 minute (I/O to power)

OUTPUT PULSE WIDTH

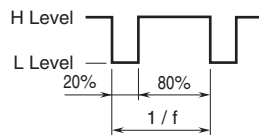
■ **Frequency less than 500 Hz at 100% input**

→ Duty ratio 20% (See the figure below)

• **Open Collector**



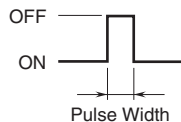
• **Voltage Pulse**



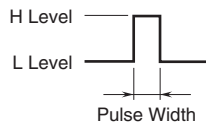
■ **Frequency greater than 500 Hz at 100% input**

→ See the figure and equation below.

• **Open Collector**



• **Voltage Pulse**

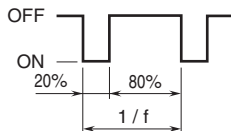


$$\text{Pulse Width [millisec.]} = \frac{1}{2.09 \times 100\% \text{ Frequency [kHz]}}$$

■ **Photo MOSFET Relay Pulse**

→ See the figure below. ON pulse width is limited within 75 ±25 msec. when the output frequency gets low (below 2 to 4 Hz).

• **Photo MOSFET Relay Pulse**



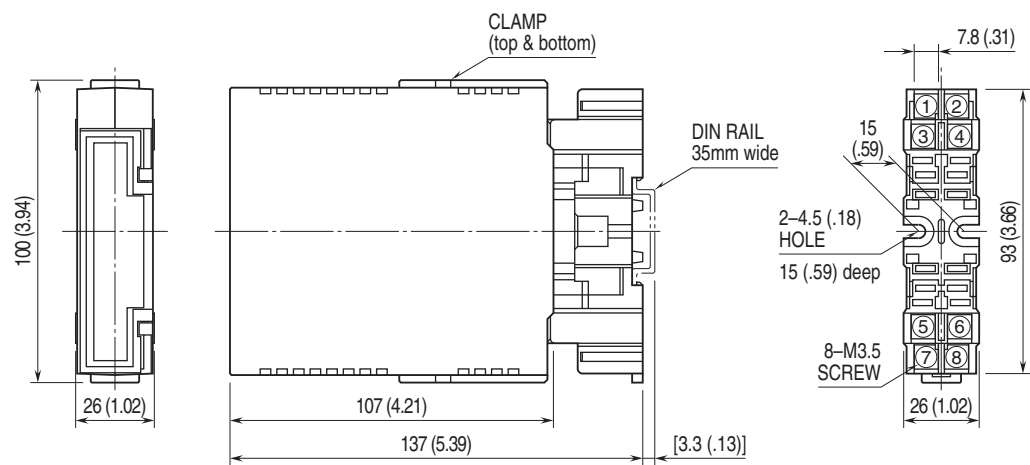
INSTALLATION

Power consumption

- **AC:** Approx. 4.5 VA
- **DC:** 24 V approx. 70 mA
110 V approx. 20 mA

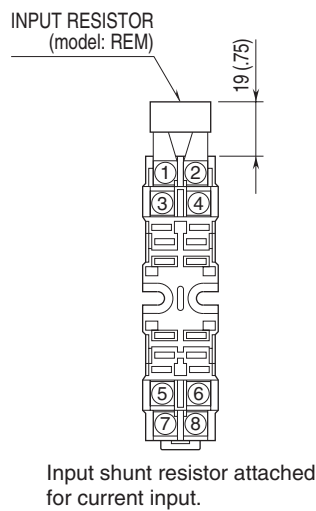
Operating temperature: -5 to +55°C (23 to 131°F)

EXTERNAL DIMENSIONS unit: mm (inch)

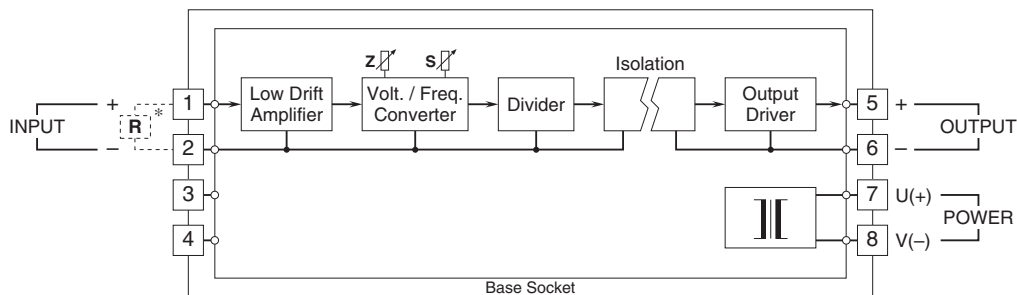


•When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm (inch)



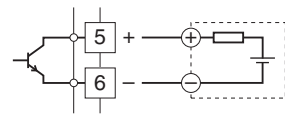
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



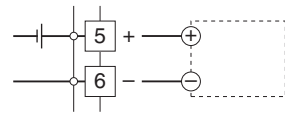
*Input shunt resistor attached for current input.

Output Connection Examples

■ Open Collector

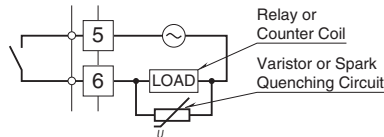


■ Voltage Pulse

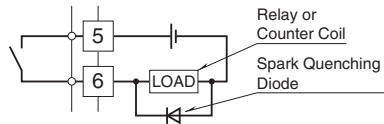


■ Photo MOSFET Relay Pulse

• AC Powered



• DC Powered



Specifications are subject to change without notice.