

## Space-saving Plug-in Signal Conditioners F-UNIT

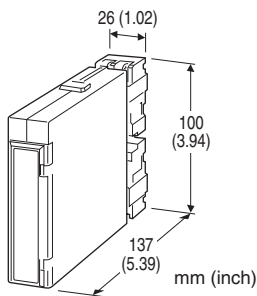
## DC/FREQUENCY CONVERTER

## Functions &amp; 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  $\Omega$ )
- D:** 0 - 20 mA DC (Input resistance 50  $\Omega$ )
- G:** 0 - 1 mA DC (Input resistance 1000  $\Omega$ )
- H:** 10 - 50 mA DC (Input resistance 100  $\Omega$ )
- Z:** Specify current (See INPUT SPECIFICATIONS)  
(0 % input must be 0 mA.)

## Voltage

- 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.)
- 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 $\Omega$  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)

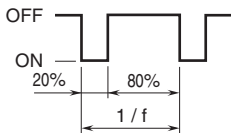
1500 V AC @ 1 minute (I/O to power)

## OUTPUT PULSE WIDTH

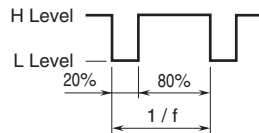
■ **Frequency less than 500 Hz at 100% input**

→ Duty ratio 20% (See the figure below)

• **Open Collector**



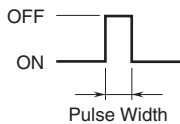
• **Voltage Pulse**



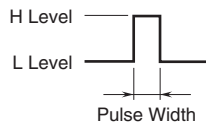
■ **Frequency greater than 500 Hz at 100% input**

→ See the figure and equation below.

• **Open Collector**



• **Voltage Pulse**

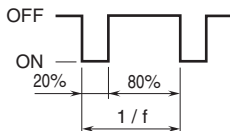


$$\text{Pulse Width [millisec.]} = \frac{1}{2.09 \times 100\% \text{ Frequency [kHz]}}$$

■ **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**

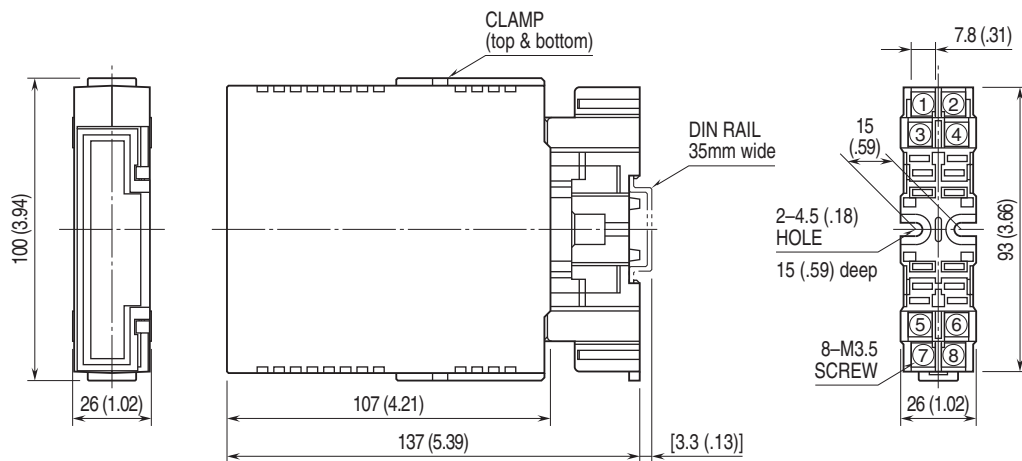
• **AC:** Approx. 4.5 VA

• **DC:** 24 V approx. 70 mA

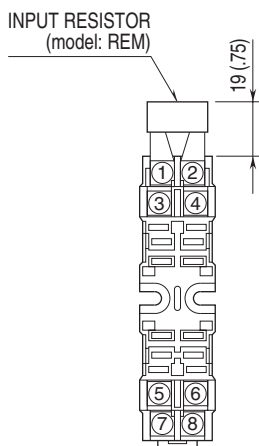
110 V approx. 20 mA

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

**EXTERNAL DIMENSIONS unit: mm (inch)**

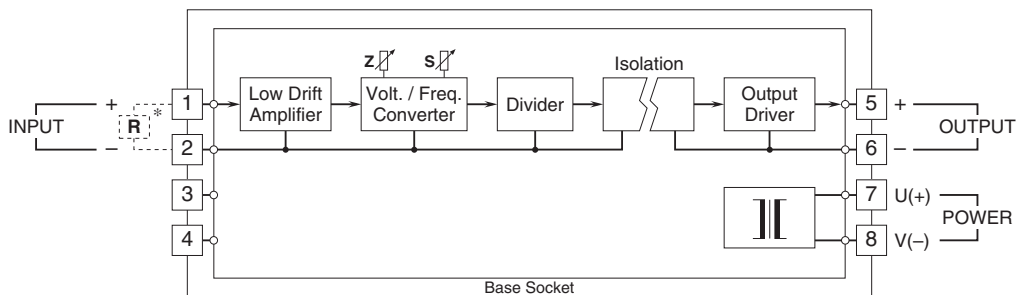


**TERMINAL ASSIGNMENTS unit: mm (inch)**



Input shunt resistor attached for current input.

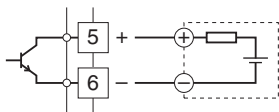
## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



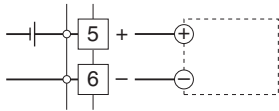
\*Input shunt resistor attached for current input.

### Output Connection Examples

#### ■ Open Collector

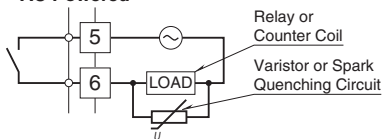


#### ■ Voltage Pulse

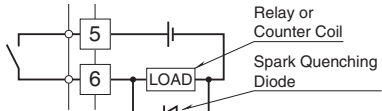


#### ■ Photo MOSFET Relay Pulse

##### • AC Powered



##### • DC Powered



Specifications are subject to change without notice.