

Space-saving Plug-in Signal Conditioners H-UNIT

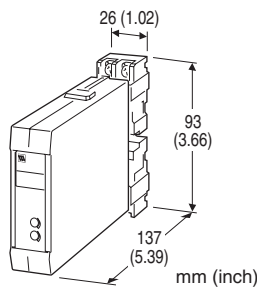
DC/FREQUENCY CONVERTER

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: HAP-[1][2]-R[3]

ORDERING INFORMATION

- Code number: HAP-[1][2]-R[3]
- Specify a code from below for each [1] through [3].
(e.g. HAP-61-R/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 MΩ min.)
- 4:** 0 - 10 V DC (Input resistance 1 MΩ min.)
- 5:** 0 - 5 V DC (Input resistance 1 MΩ min.)
- 6:** 1 - 5 V DC (Input resistance 1 MΩ 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)
- 3: Mercury relay contact (max. 30 Hz)

POWER INPUT

DC Power

- R:** 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[3] 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
- 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 MΩ 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.
- **Mercury Relay Contact:** 132 V AC @ 200 mA (cos φ = 1)
 30 V DC @ 200 mA (resistive load)
Frequency range: 0 - 10 pulses/hour through 30 Hz
Timer: Limits ON time ≤ 75 ±25 msec.
Relay life: ≥ 5 × 10⁸ cycles, mechanical
 ≥ 5 × 10⁷ cycles, electrical

- Response time:** ≤ 3 sec. (0 - 90 %)
- Line voltage effect:** ±0.1 % over voltage range
- Insulation resistance:** ≥ 100 MΩ with 500 V DC
- Dielectric strength:** 500 V AC @ 1 minute
 (input to output to power)
 1500 V AC @ 1 minute (input or output or power to ground)

OUTPUT PULSE WIDTH

- **Frequency less than 500 Hz at 100% input**
 → Duty ratio 20% (See the figure below)

<ul style="list-style-type: none"> • Open Collector 	<ul style="list-style-type: none"> • Voltage Pulse
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- **Frequency greater than 500 Hz at 100% input**
 → See the figure and equation below.

<ul style="list-style-type: none"> • Open Collector 	<ul style="list-style-type: none"> • Voltage Pulse
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$$\text{Pulse Width [millisec.]} = \frac{1}{2.09 \times 100\% \text{ Frequency [kHz]}}$$

- **Mercury Relay Contact**
 Frequency less than 4 Hz (100%) → Pulse width time 75 ±25 ms.
 Frequency greater than 4 Hz (100%) → Duty ratio 20%

INSTALLATION

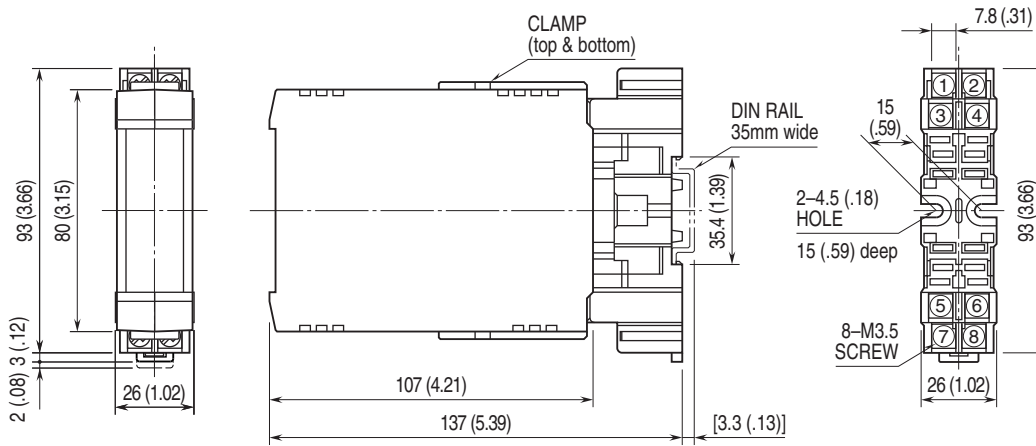
- Current consumption:** Approx. 60 mA
- Operating temperature:** -5 to +55°C (23 to 131°F)
- Operating humidity:** 30 to 90 %RH (non-condensing)
- Mounting:** Surface or DIN rail; Standard Rack Mounting
 Frame BX-16H available
- Weight:** 190 g (0.42 lbs)

PERFORMANCE in percentage of span

- Accuracy:** ±0.1 %
- Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F)

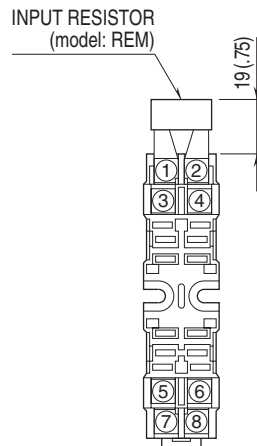


DIMENSIONS unit: mm (inch)



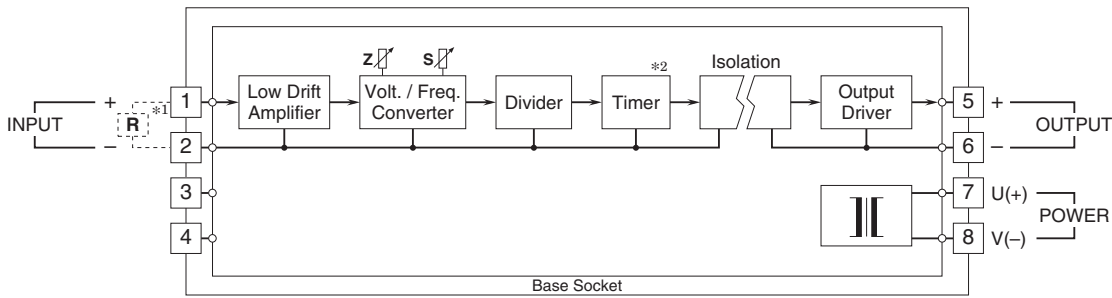
•When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm (inch)



Input shunt resistor attached for current input.

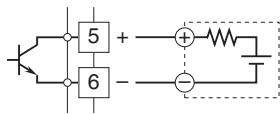
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



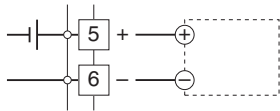
- *1. Input shunt resistor attached for current input.
- *2. Timer available for mercury relay contact option.

Output Connection Examples

■ Open Collector

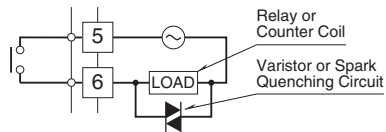


■ Voltage Pulse

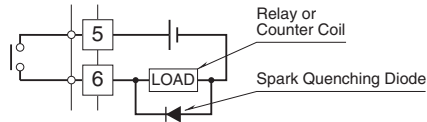


■ Relay

•AC Powered



•DC Powered



Specifications are subject to change without notice.