

Plug-in Signal Conditioners M-UNIT

LOW FREQUENCY TRANSMITTER

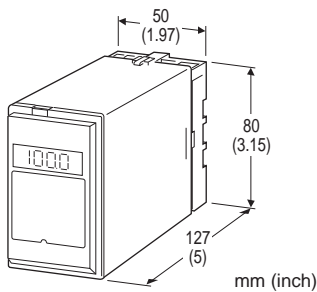
(50 Hz minimum)

Functions & Features

- Converting the output from a pulse-type transducer into a standard process signal
- Isolation up to 2000 V AC
- LCD meter (engineering unit display selectable)
- Simple loop test output (0 % and 100 %)
- High-density mounting

Typical Applications

- Positive displacement flowmeters, turbine flowmeters and vortex flowmeters
- Proximity switches



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

ORDERING INFORMATION

- Code number: SP-[1][2]-[3][4]
Specify a code from below for each [1] through [4].
(e.g. SP-2A-B/E2/Q)
- Frequency range (e.g. 0 - 10 kHz)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01/S01)

[1] INPUT

- 1: Dry contact
- 2: Voltage pulse

[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 kΩ max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

Voltage

- 1: 0 - 10 mV DC (Load resistance 10 kΩ min.)
- 2: 0 - 100 mV DC (Load resistance 100 kΩ min.)
- 3: 0 - 1 V DC (Load resistance 100 Ω min.)
- 4: 0 - 10 V DC (Load resistance 1000 Ω min.)
- 5: 0 - 5 V DC (Load resistance 500 Ω min.)
- 6: 1 - 5 V DC (Load resistance 500 Ω min.)
- 4W: -10 - +10 V DC (Load resistance 2000 Ω min.)
- 5W: -5 - +5 V DC (Load resistance 1000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

[3] POWER INPUT

AC Power

- B: 100 V AC
- C: 110 V AC
- D: 115 V AC
- F: 120 V AC
- G: 200 V AC
- H: 220 V AC
- J: 240 V AC

DC Power

- S: 12 V DC
- R: 24 V DC
- V: 48 V DC
- P: 110 V DC (Not selectable with Option /E2)

[4] OPTIONS (multiple selections)

Input Signal Indicator (after low-end cutout)

- blank: Without
- /E: With (0.0 - 100.0 % display)
- /E2: With (in engineering unit with backlight and the simple loop test output)

Other Options

- blank: none
- /Q: Option other than the above (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
- Screw terminal:** Chromated steel (standard) or stainless



steel

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Overrange output: 0 to 120 % at 1 - 5 V

Zero adjustment: -5 to +5 % (front)

Span adjustment: 95 to 105 % (front)

Display scaling: -10000 - +10000; ex-factory set to 0.00 - 100.00 (%)

Engineering unit: %, μ V, mV, V, mA, A, °C, °F, Ω , DEG K, mHz, Hz, kHz, VAC, AAC, mg, g, kg, t, rpm or rps selectable

Low-end cutout: 2 to 5 %

Simple loop test output: 0 % and 100 % signal simulated by selecting the front switch positions.

INPUT SPECIFICATIONS

Frequency range: 0 - 50 Hz through 10 kHz

Pulse width (time) requirement: Duty ratio 20 - 80 % at 100 % input

■ **Dry Contact:** Mechanical contact or open collector

Sensing: Approx. 7.5 V DC @1 mA

ON/OFF level: $\leq 200 \Omega / 0.6 \text{ V}$ for ON, $\geq 100 \text{ k}\Omega / 2 \text{ V}$ for OFF

■ **Voltage Pulse:** Square or sine waveforms

Input pulse sensing: Capacitor coupled; detecting pulse rise

Input amplitude: 2 - 50 Vp-p

Input impedance: 100 k Ω min.

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:** -10 - +12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 10 mA max.; 5 mA for negative voltage output; at $\geq 0.5 \text{ V}$

INSTALLATION

Power input

• **AC:** Operational voltage range: rating $\pm 10 \%$, 50/60 $\pm 2 \text{ Hz}$, approx. 2.5 VA (approx. 3.5 VA with Option /E2)

• **DC:** Operational voltage range: rating $\pm 10 \%$, or 85 - 150 V for 110 V rating ripple 10 % p-p max. approx. 2.5 W (100 mA at 24 V; approx. 3.5 W with Option /E2)

Operating temperature: -5 to +60°C (23 to 140°F)

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

Mounting: Surface or DIN rail

Weight: 350 g (0.77 lb)

PERFORMANCE in percentage of span

Accuracy: $\pm 0.3 \%$ (output 10 - 100 %)

Display accuracy: $\pm(0.3 \%$ of FS + 1 digit) (Output 10 - 100 %)

Simple loop test output setting accuracy: $\pm 0.5 \%$

Temp. coefficient: $\pm 0.015 \%$ /°C ($\pm 0.008 \%$ /°F)

Response time: (0 - 90 %)

Approx. 2 sec. for 0 - 50 Hz

Approx. 1 sec. for 0 - 100 Hz

Approx. 0.5 sec. for 0 - 500 Hz

Approx. 0.5 sec. for 0 - 10 kHz

Ripple: 0.2 %p-p max. with input $\geq 10 \%$

Line voltage effect: $\pm 0.1 \%$ over voltage range

Insulation resistance: $\geq 100 \text{ M}\Omega$ with 500 V DC

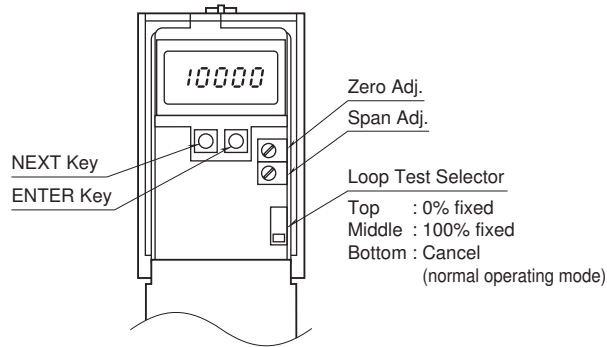
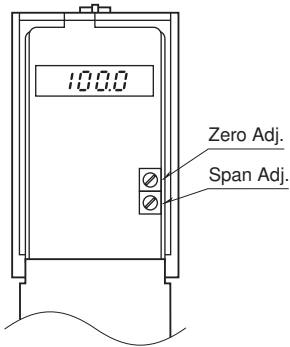
Dielectric strength: 2000 V AC @1 minute (input to output to power to ground)



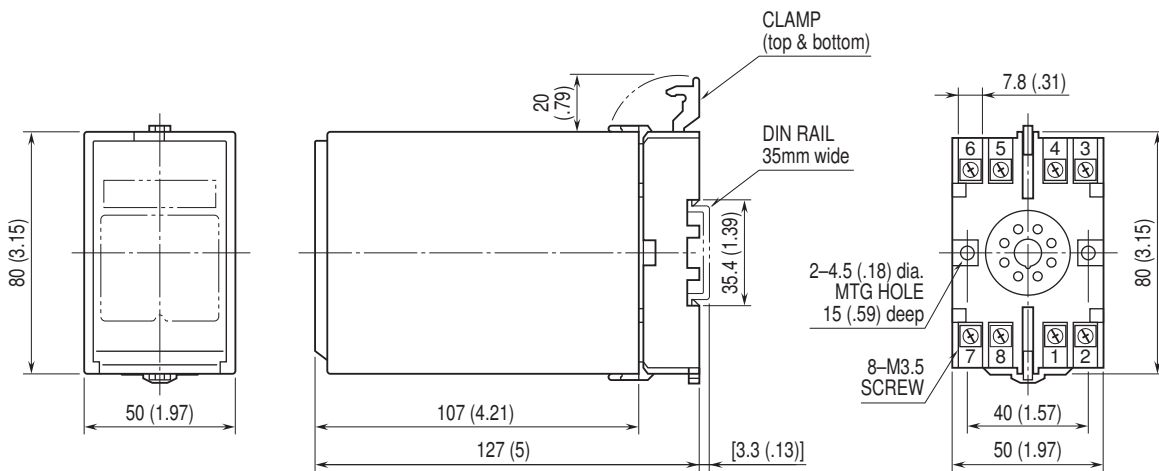
EXTERNAL VIEW

OPTION /E

OPTION /E2

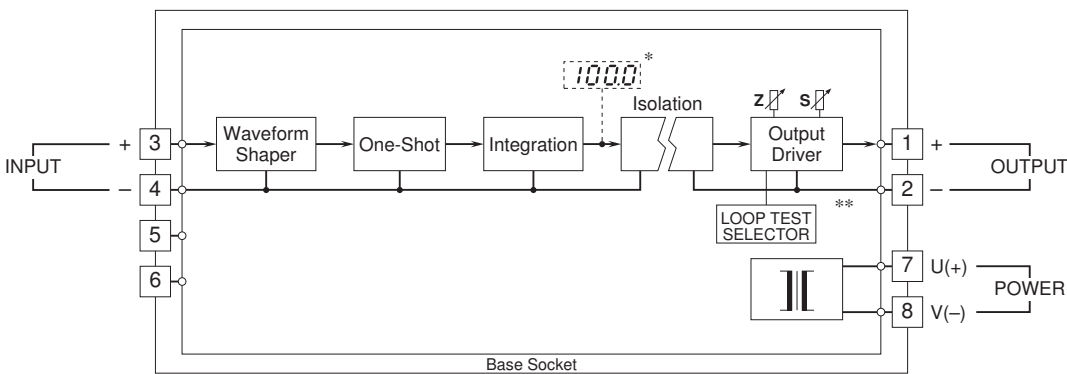


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

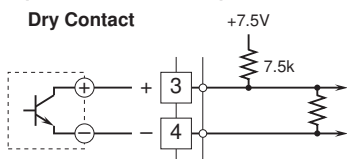


* Option /E, E2

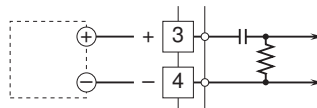
** Option /E2

Input Connection Examples

Dry Contact



Voltage Pulse





Specifications are subject to change without notice.

