

Plug-in Signal Conditioners M-UNIT

LOW FREQUENCY TRANSMITTER

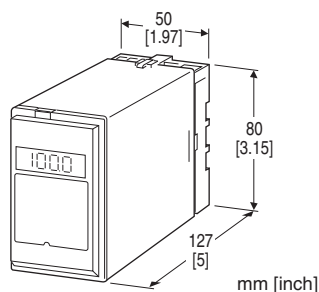
(50 Hz minimum)

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 of [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)

- LCD Meter (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 our 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)
Low-end cutout: 2 to 5 %
Simple loop test output: 0 % and 100 % signal simulated by selecting the front switch positions. (Only for option code /E2)

■ DISPLAY (LCD meter)

- **Option code:** /E

LCD digital display: 0.0 - 100.0 % (min. digit 0.1 %)
 (No scaling)

- **Option code:** /E2

LCD digital display: Engineering unit
Display scaling: -10000 - +10000
Decimal position: 10^{-1} - 10^{-4} or no decimal point
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
Back light: Green at normal, red at loop test output enable
Factory setting: scaling 0.00 - 100.00, unit: %

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 V for ON, $\geq 100 \text{ k}\Omega$ / 2 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 ≥ 0.5 V

INSTALLATION

Power input

- **AC:** Operational voltage range: rating ± 10 %, 50/60 ± 2 Hz, approx. 2.5 VA (approx. 3.5 VA with Option /E2)
- **DC:** Operational voltage range: rating ± 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)

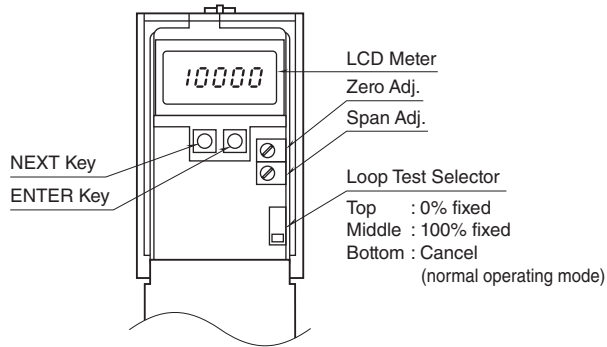
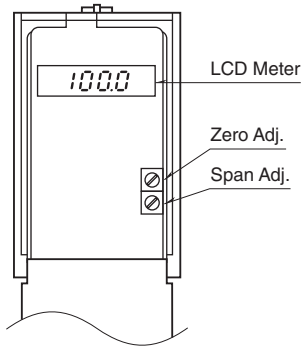
PERFORMANCE in percentage of span

Accuracy: ± 0.3 % (output 10 - 100 %)
Display accuracy: $\pm(0.3$ % of FS + 1 digit)
 (Output 10 - 100 %)
Simple loop test output setting accuracy: ± 0.5 %
Temp. coefficient: ± 0.015 %/°C (± 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 ≥ 10 %
Line voltage effect: ± 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)

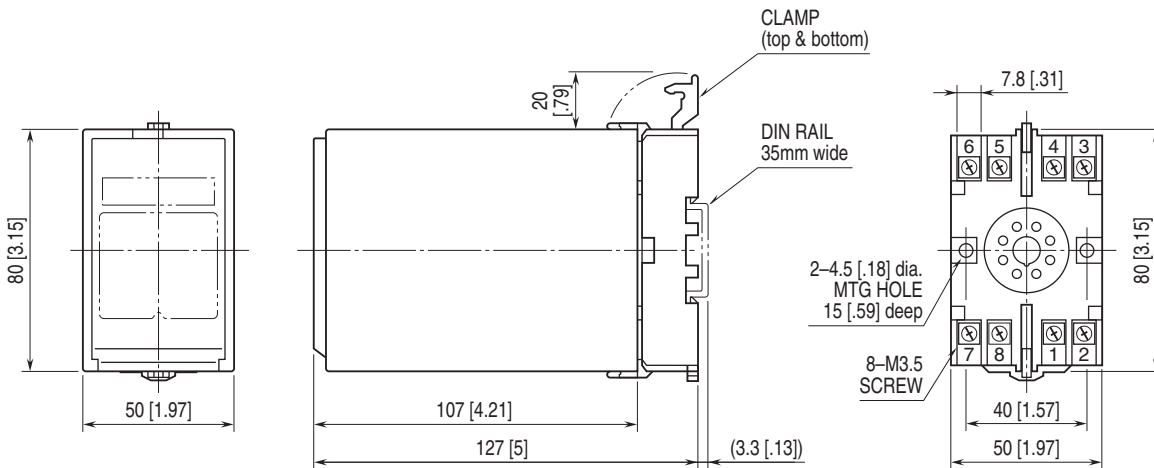
EXTERNAL VIEW

■ OPTION /E

■ OPTION /E2

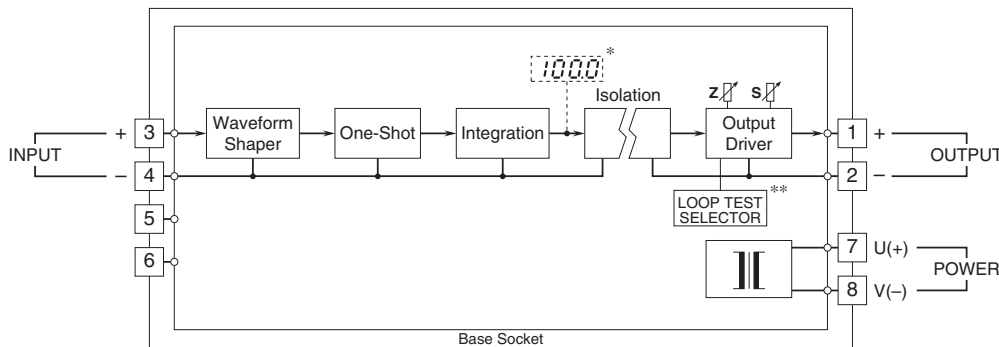


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

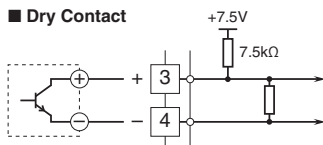


* Option /E, E2

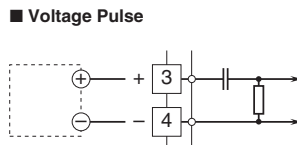
** Option /E2

Input Connection Examples

■ Dry Contact



■ Voltage Pulse





Specifications are subject to change without notice.