

Plug-in Signal Conditioners M-UNIT

LOW FREQUENCY TRANSMITTER

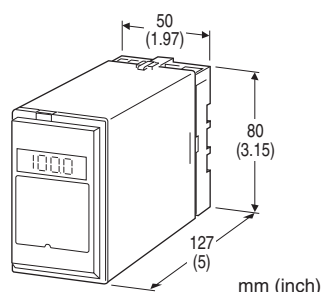
(50 Hz minimum)

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 k Ω max.)

Z: Specify current (See OUTPUT SPECIFICATIONS)

Voltage

- 1: 0 - 10 mV DC (Load resistance 10 k Ω min.)
2: 0 - 100 mV DC (Load resistance 100 k Ω 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 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)
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)

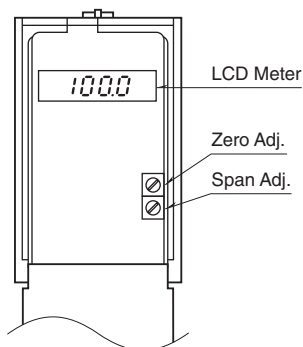
Operating temperature: -5 to +60°C (23 to 140°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: Surface or DIN rail
Weight: 350 g (0.77 lb)

PERFORMANCE in percentage of span

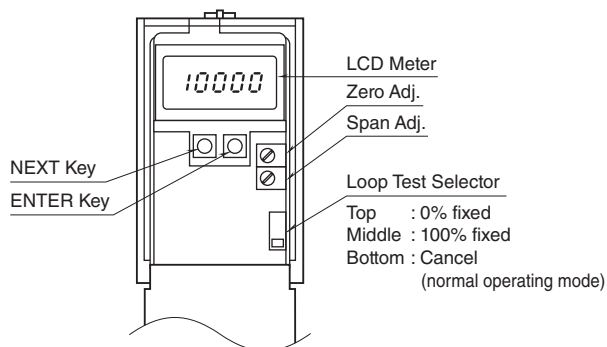
Accuracy: ± 0.3 % (output 10 – 100 %)
Display accuracy: $\pm (0.3 \text{ % of FS} + 1 \text{ digit})$
 (Output 10 – 100 %)
Simple loop test output setting accuracy: ± 0.5 %
Temp. coefficient: $\pm 0.015 \text{ %/}^\circ\text{C}$ ($\pm 0.008 \text{ %/}^\circ\text{F}$)
Response time: (0 – 90 %)
 Approx. 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

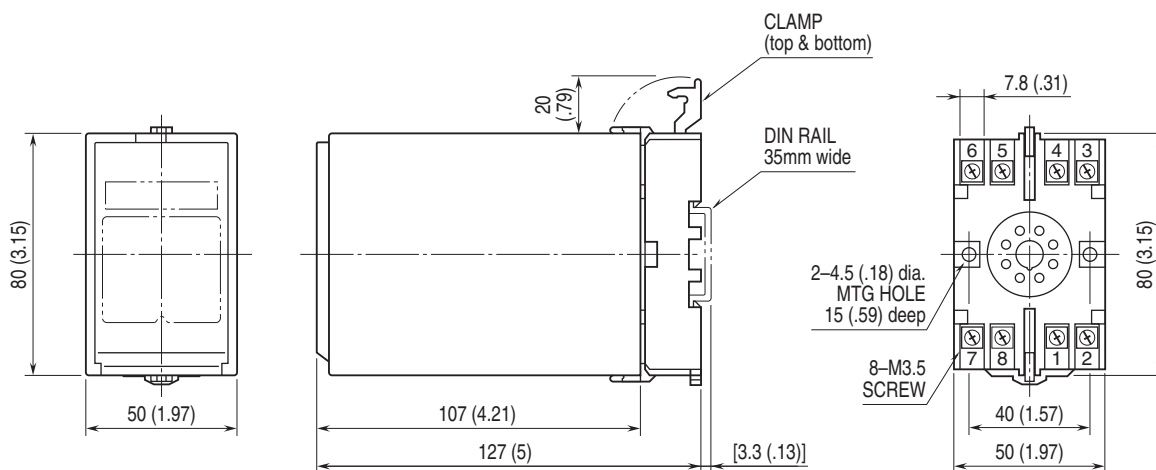
■ OPTION /E



■ OPTION /E2

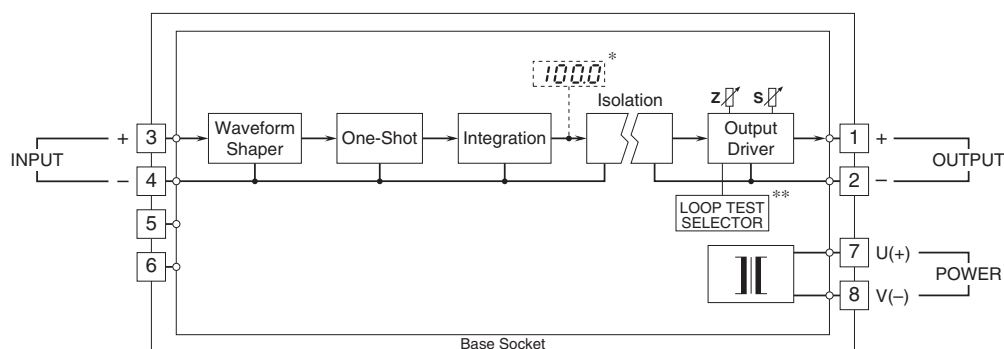


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

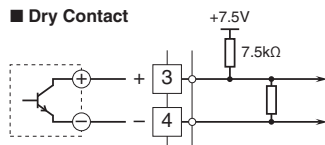
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



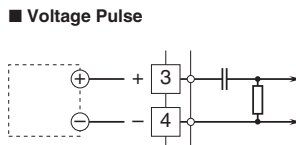
* Option /E, E2
** Option /E2

Input Connection Examples

■ Dry Contact



■ Voltage Pulse





Specifications are subject to change without notice.