

## Super-mini Signal Conditioners Mini-M Series

### LOW FREQUENCY TRANSMITTER

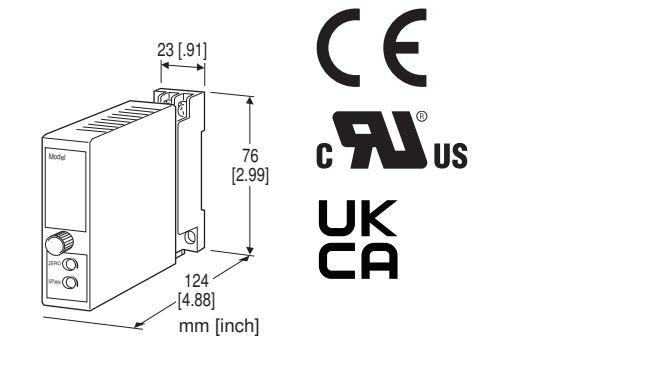
(50 Hz minimum)

#### Functions & Features

- Converts the output from a pulse-type transducer into a standard process signal

#### Typical Applications

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



### MODEL: M2SP-[1][2]-[3][4]

#### ORDERING INFORMATION

- Code number: M2SP-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4]. (e.g. M2SP-1A-M2/CE/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 1000 Ω min.)
- 4: 0 - 10 V DC (Load resistance 10 kΩ min.)
- 5: 0 - 5 V DC (Load resistance 5000 Ω min.)
- 6: 1 - 5 V DC (Load resistance 5000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

#### [3] POWER INPUT

##### AC Power

- M: 85 - 264 V AC (Operational voltage range 85 - 264 V, 47 - 66 Hz)  
(Select '/N' for 'Standards & Approvals' code.)
- M2: 100 - 240 V AC (Operational voltage range 85 - 264 V, 47 - 66 Hz)  
(90 - 264 V for UL)

##### DC Power

- R: 24 V DC  
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)
- R2: 11 - 27 V DC  
(Operational voltage range 11 - 27 V, ripple 10 %p-p max.)  
(Select '/N' for 'Standards & Approvals' code.)
- P: 110 V DC  
(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)  
(110 V ±10 % for UL)

#### [4] OPTIONS (multiple selections)

##### Low-end Cutout

- blank: With
- /DN: Without  
(Select '/N' for 'Standards & Approvals' code.)
- Standards & Approvals (must be specified)
- /N: Without CE, UKCA or UL
- /CE: CE marking
- /UK: CE, UKCA marking
- /UL: UL approval, CE marking
- 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 (UL not available)
- /C04: Polyolefin coating (UL not available)
- TERMINAL SCREW MATERIAL
- /S01: Stainless steel (UL not available)

## GENERAL SPECIFICATIONS

**Construction:** Plug-in  
**Connection:** M3 screw terminals (torque 0.8 N·m)  
**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)  
**Input pulse sensing:** DC coupled; detecting pulse rise  
**Input filter:** Provided with input range < 100 Hz (time constant approx. 1 msec.)  
**Low-end cutout:** 2 to 5 %  
 (For /DN option, the output signal may fluctuate when the input signal is less than 5 %.)

## INPUT SPECIFICATIONS

**Excitation:** 12 V DC @30 mA; shortcircuit protection  
**Frequency range:** 0 - 50 Hz through 10 kHz  
**■ Dry Contact:** Mechanical contact or open collector  
**Pulse width time requirement:** 20 µsec. min. for ON and OFF ≥ 5 msec. with input range < 100 Hz  
**Sensing:** Approx. 12 V DC @3 mA  
**ON/OFF level:** ≤ 200 Ω / 0.6 V for ON, ≥ 100 kΩ / 2.5 V for OFF  
**■ Voltage Pulse:** Square or sine waveforms  
**Pulse width time requirement:** 20 µsec. min. for high and low levels  
 ≥ 5 msec. with input range < 100 Hz  
**Hi level:** 2 - 50 V  
**Lo level:** ≤ 1 V  
**Input impedance:** 10 kΩ 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:** 0 - 12 V DC  
**Minimum span:** 5 mV  
**Offset:** Max. 1.5 times span  
**Load resistance:** Output drive 1 mA max.; at ≥ 0.5 V

## INSTALLATION

**Power Consumption**  
**•AC:**  
 Approx. 4 VA at 100 V  
 Approx. 5 VA at 200 V  
 Approx. 6 VA at 264 V  
**•DC:** Approx. 3 W  
**Operating temperature:** -5 to +55°C (23 to 131°F)  
**Operating humidity:** 30 to 90 %RH (non-condensing)  
**Mounting:** Surface or DIN rail  
**Weight:** 150 g (0.33 lb)

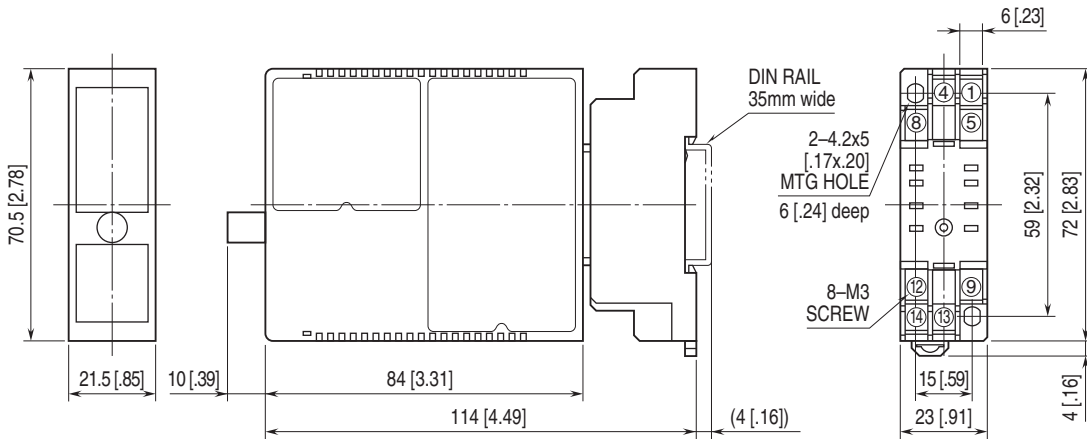
## PERFORMANCE in percentage of span

**Accuracy:** ±0.1 % (output 10 - 100 %)  
**Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F)  
**Response time:** (0 - 90%)  
 Approx. 1.8 sec. with 0 - 50 Hz  
 Approx. 0.7 sec. with 0 - 100 Hz  
 Approx. 0.5 sec. with 0 - 500 Hz  
 Approx. 0.5 sec. with 0 - 10 kHz  
**Ripple:** 0.2 %p-p max. with input ≥ 10 %  
**Line voltage effect:** ±0.1 % over voltage range  
**Insulation resistance:** ≥ 100 MΩ with 500 V DC  
**Dielectric strength:** 2000 V AC @1 minute (input to output to power to ground)

## STANDARDS & APPROVALS

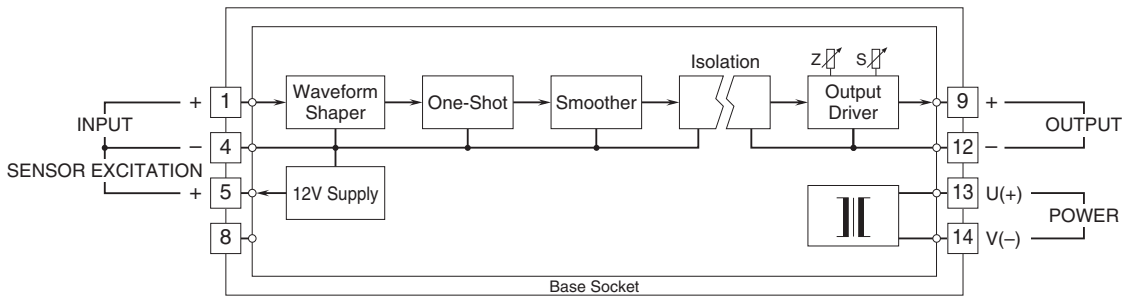
**EU conformity:**  
 EMC Directive  
 EMI EN 61000-6-4  
 EMS EN 61000-6-2  
 Low Voltage Directive  
 EN 61010-1  
 Installation Category II  
 Pollution Degree 2  
 Input or output to power: Reinforced insulation (300 V)  
 Input to output: Basic insulation (300 V)  
 RoHS Directive  
**UK conformity (UKCA):**  
 The UK legislations and designated standards are equivalent to the applicable EU directives.  
 (Refer to our website for more information about the legislations and designated standards.)  
**Approval:**  
 UL/C-UL nonincendive Class I, Division 2,  
 Groups A, B, C, and D  
 (ANSI/ISA-12.12.01, CAN/CSA-C22.2 No.213)  
 UL/C-UL general safety requirements  
 (UL 61010-1, CAN/CSA-C22.2 No.61010-1)

**EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]**



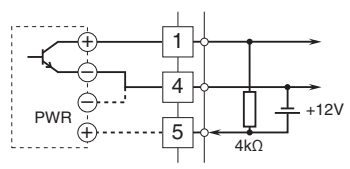
• When mounting, no extra space is needed between units.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**

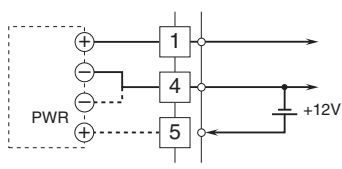


Input Connection Examples

■ Dry Contact



■ Voltage Pulse



Specifications are subject to change without notice.