

## Super-mini Signal Conditioners Mini-M Series

### LOW FREQUENCY TRANSMITTER

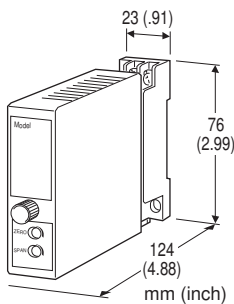
(50 Hz minimum)

#### 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



- 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)

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

### ORDERING INFORMATION

- Code number: M2SP-[1][2]-[3][4]  
Specify a code from below for each [1] through [4].  
(e.g. M2SP-1A-M2/CE/Q)
- Input frequency range (e.g. 0 - 10 kHz)
- 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.)

### [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 or UL

/CE: CE marking

/UL: UL approval, CE marking

#### Other Options

blank: none

/Q: Option other than the above (specify the specification)

(UL not available)

### 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 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  $\mu$ sec. min. for ON and OFF

**Sensing:** Approx. 12 V DC @3 mA

**ON/OFF level:**  $\leq$  200  $\Omega$  / 0.6 V for ON,  $\geq$  100 k $\Omega$  / 6 V for OFF

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

**Pulse width time requirement:** 20  $\mu$ sec. min. for high and low levels

**Hi level:** 2 - 50 V

**Lo level:**  $\leq$  1 V

**Input impedance:** 10 k $\Omega$  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  $\geq$  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 $^{\circ}$ C (23 to 131 $^{\circ}$ 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:**  $\pm$ 0.1 % (output 10 - 100 %)

**Temp. coefficient:**  $\pm$ 0.015 %/ $^{\circ}$ C ( $\pm$ 0.008 %/ $^{\circ}$ 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  $\geq$  10 %

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

**Insulation resistance:**  $\geq$  100 M $\Omega$  with 500 V DC

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

## STANDARDS & APPROVALS

**CE conformity:**

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007/A1: 2011

EMS EN 61000-6-2: 2005

Low Voltage Directive (2006/95/EC)

EN 61010-1: 2010

Installation Category II

Pollution Degree 2

Input or output to power: Reinforced insulation (300 V)

Input to output: Basic insulation (300 V)

**Approval:**

UL/C-UL nonincendive Class I, Division 2,

Groups A, B, C, and D

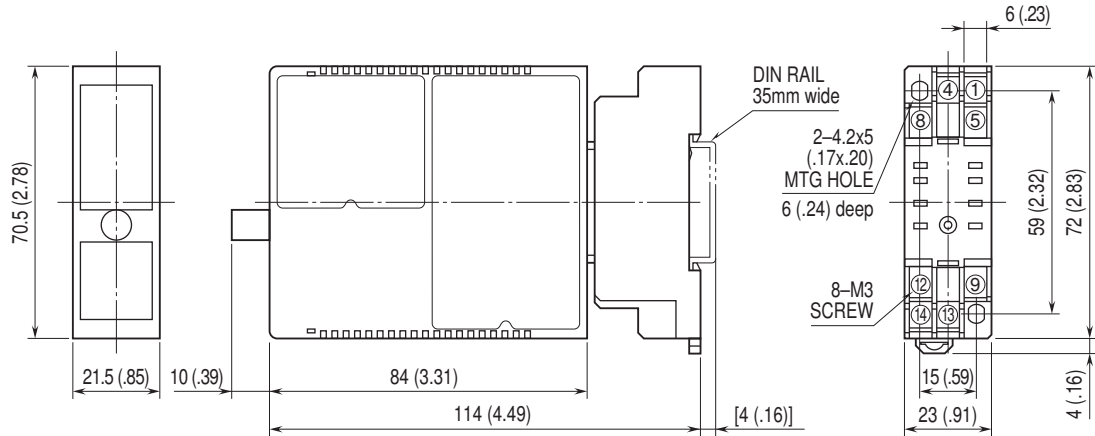
(ANSI/ISA-12.12.01:2011, CAN/CSA-C22.2 No.213:1987)

UL/C-UL general safety requirements

(UL 61010B-1:2003, CAN/CSA-C22.2 No.61010-1:1992)

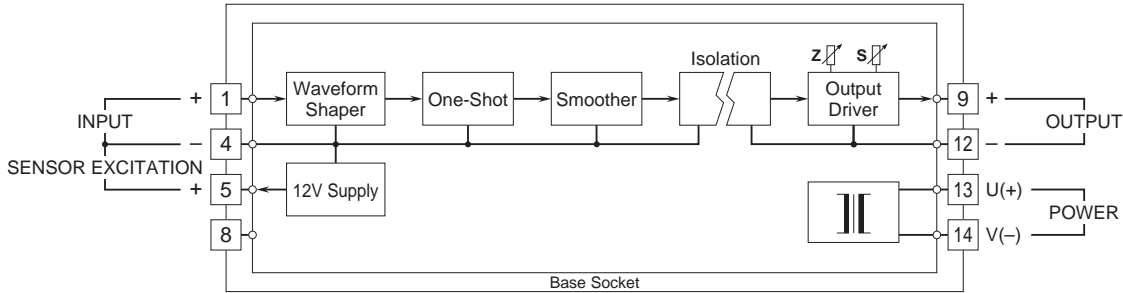


**DIMENSIONS unit: mm (inch)**



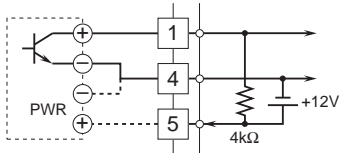
• When mounting, no extra space is needed between units.

**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**

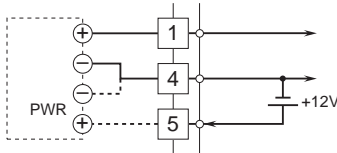


**Input Connection Examples**

■ Dry Contact



■ Voltage Pulse



Specifications are subject to change without notice.

