

## Super-mini Signal Conditioners Mini-M Series

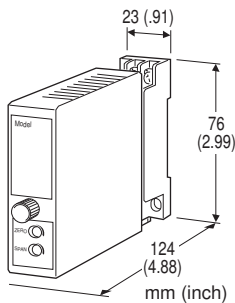
### POTENTIOMETER TRANSMITTER

#### Functions & Features

- Provides a DC output proportional to a potentiometer or slidewire position input
- Constant voltage excitation allows use with pots with total resistances from 100 Ω - 10 kΩ without affecting accuracy
- 50 % zero/span adjustments with minimal interaction
- Fast response type available

#### Typical Applications

- Tank levels
- Positions



## MODEL: M2MS-[1]-[2][3]

### ORDERING INFORMATION

- Code number: M2MS-[1]-[2][3]
- Specify a code from below for each [1] through [3].  
(e.g. M2MS-A-P/K/CE/Q)
- Special output range (For codes Z & 0)
  - Specify the specification for option code /Q  
(e.g. /C01/S01)

### INPUT

Total resistance 100 Ω - 10 kΩ

### [1] 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.)
- 4W: -10 - +10 V DC (Load resistance 10 kΩ min.)
- 5W: -5 - +5 V DC (Load resistance 5000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

### [2] 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)

### [3] OPTIONS (multiple selections)

#### Response Time (0 - 90 %)

**blank:** Standard (≤ 0.5 sec.)

**/K:** Fast Response (Approx. 25 msec.)

#### Standards & Approvals (must be specified)

**/N:** Without CE or UL

**/CE:** CE marking

**/UL:** UL approval, CE marking

#### Custom specification

(Refer to the custom specification list for difference of specification and combination of code numbers.)

**blank:** none

**/X1:** Upscale burnout (Total resistance: 1 - 5 kΩ)

(CE or UL not available)

#### Other Options

**blank:** none

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

## SPECIFICATIONS OF OPTION: Q

**COATING (For the detail, refer to M-System's web site.)**

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating (UL not available)

### ADJUSTMENT

/VN: Sealed adjustment holes (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

**Zero adjustment:** 0 - 50 % of total resistance (front)

**Span adjustment:** 50 - 100 % of total resistance (front)

## INPUT SPECIFICATIONS

**Minimum span:** 50 % of total resistance

**Excitation:** 0.5 V DC

## 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 1 mA max.; at  $\geq 0.5$  V

## INSTALLATION

**Power Consumption**

• **AC:**

Approx. 3 VA at 100 V

Approx. 4 VA at 200 V

Approx. 5 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:**  $\pm 0.1$  %

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

**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

**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

EN 50581

**Approval:**

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

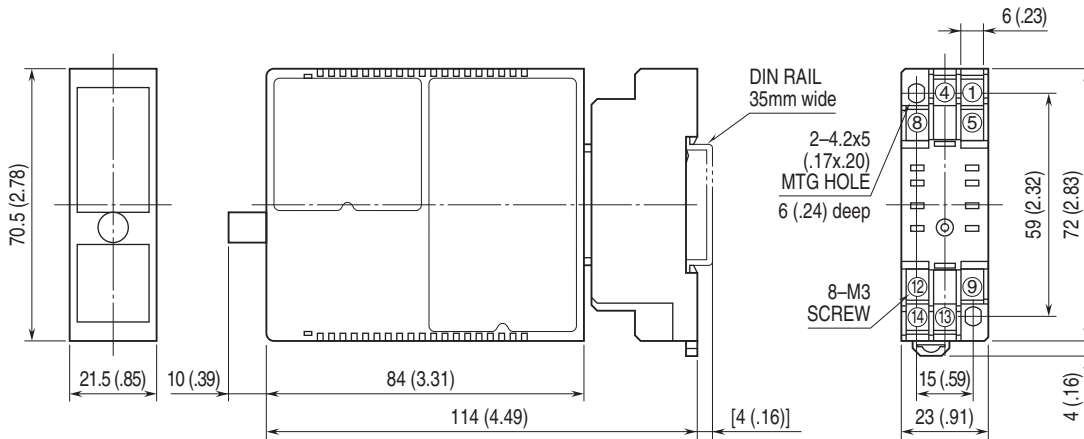
Groups A, B, C, and D

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

UL/C-UL general safety requirements

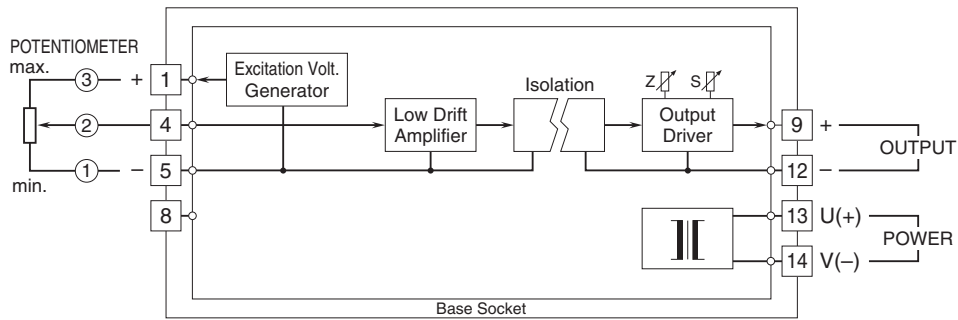
(UL 61010-1, CAN/CSA-C22.2 No.61010-1)

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.

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**CUSTOM SPECIFICATION LIST**

Refer to the following pages for each detailed custom specification.

**Custom specification:** Option /X1

■ Major specification changes

Burnout: Upscale (Total resistance: 1 - 5 kΩ)

**CUSTOM SPECIFICATION : OPTION /X1****Major specification changes**Burnout: Upscale (Total resistance 1 - 5 k $\Omega$ )**MODEL: M2MS-[1]-[2][3]/N/X1[3]**

Same as standard specification (without customization)  
except followings.

Refer to standard specification pages.

**ORDERING INFORMATION**

- Code number: M2MS-[1]-[2][3]/N/X1[3]

For [1] and [3] same code as standard specification is  
available.

(e.g. M2MS-A-P/K/N/X1/Q)

Refer to standard specification pages.

- Specify total resistance (e.g. 1 k $\Omega$ ).

**SPECIFICATION CHANGES**

- Input specifications

Available input range

- Total resistance: 1 - 5 k $\Omega$

- PERFORMANCE

Accuracy: Refer to the table shown below.

Temp. coefficient: Refer to the table shown below.

Burnout time:  $\leq$  60 sec.

- ACCURACY, TEMP. COEFFICIENT

TOTAL RESISTANCE	ACCURACY	TEMP. COEFFICIENT
1k $\Omega$	$\pm$ 0.2%	$\pm$ 0.03%/°C
1k $\Omega$ < R $\leq$ 2k $\Omega$	$\pm$ 0.25%	$\pm$ 0.03%/°C
2k $\Omega$ < R $\leq$ 5k $\Omega$	$\pm$ 0.3%	$\pm$ 0.04%/°C