

Super-mini Signal Conditioners Mini-M Series

UNIVERSAL TRANSMITTER

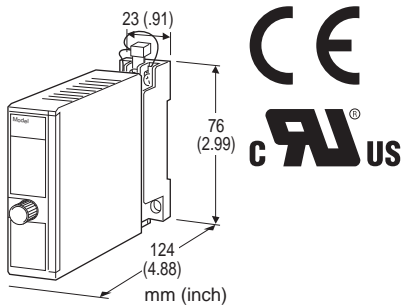
(PC programmable)

Functions & Features

- Accepts direct inputs from various sensors and provides a standard process signal
- I/O types and calibration ranges are fully programmable via a PC
- Linearization up to 100 points can be programmed for DC and potentiometer inputs
- Isolation between input - output - power
- CE marking
- UL approval

Typical Applications

- Signal conversion between control room and field instrumentation with isolation
- Ideal for use as a fast solution, multifunctional spare part



MODEL: M2XU-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: M2XU-[1][2]-[3][4]
- Specify a code from below for each [1] through [4]. (e.g. M2XU-00-R/CE/Q)
- Specify the specification for option code /Q (e.g. /C01/S01)

Non-specified orders will be shipped at default factory settings (M2XU-00: 4 - 20 mA input/4 - 20 mA output). However, the power suffix code **must** be specified. If you specify full code numbers without specific calibration ranges, default settings will be used.

[1] INPUT

0: User-calibrated (Factory default: 4 - 20 mA DC)
If the unit is to be factory-calibrated to a specific input type, please select from the following:

Current

Z1: Range 0 - 50 mA DC (Input resistance 100 Ω)

Voltage

S1: Range -1 - +1 V DC (Input resistance 1 MΩ min.)

S2: Range -10 - +10 V DC (Input resistance 1 MΩ min.)

Thermocouple

T1: (PR) (Usable Range 0 to 1760°C, 32 to 3200°F)

T2: K (CA) (Usable range -270 to +1370°C, -454 to +2498°F)

T3: E (CRC) (Usable range -270 to +1000°C, -454 to +1832°F)

T4: J (IC) (Usable range -210 to +1200°C, -346 to +2192°F)

T5: T (CC) (Usable range -270 to +400°C, -454 to +752°F)

T6: B (RH) (Usable range 0 to 1820°C, 32 to 3308°F)

T7: R (Usable range -50 to +1760°C, -58 to +3200°F)

T8: S (Usable range -50 to +1760°C, -58 to +3200°F)

T9: C(WRe 5-26) (Usable range 0 to 2315°C, 32 to 4199°F)

TN: N (Usable range -270 to +1300°C, -454 to +2372°F)

TU: U (Usable range -200 to +400°C, -328 to +752°F)

TL: L (Usable range -200 to +900°C, -328 to +1652°F)

TP: Platinel II(Usable range 0 to 1395°C, 32 to 2543°F)

T0: Specify (Please provide an emf table.)

RTD

(2- or 3-wire)

R1: JPt 100 (JIS'89)

(Usable range: -200 to +500°C, -328 to +932°F)

R3: Pt 100 (JIS'89)

(Usable range: -200 to +850°C, -328 to +1562°F)

R4: Pt 100 (JIS'97, IEC)

(Usable range: -200 to +850°C, -328 to +1562°F)

R5: Pt 50 Ω (JIS'81)

(Usable range: -200 to +649 °C, -328 to +1200°F)

R6: Ni 508.4 Ω

(Usable range: -50 to +200°C, -58 to +392°F)

R7: Pt 1000

(Usable range: -200 to +200°C, -328 to +392°F)

R8: Ni 100 (100 Ω @ 0°C)

(Usable range: -50 to +200°C, -58 to +392°F)

R9: Cu 10 (10 Ω @25°C)

(Usable range: -50 to +200°C, -58 to +392°F)

R0: Specify (Please provide a resistance table.)

Potentiometer

M: Total resistance 100 Ω - 10 kΩ

[2] OUTPUT

0: User-calibrated (Factory default: 4 - 20 mA DC)

If the unit is to be factory-calibrated to a specific output type, please select from the following:

Current

Z1: Range 0 - 20 mA DC

Voltage

V1: Range -2.5 - +2.5 V DC

V2: Range -10 - +10 V DC

[3] POWER INPUT

AC Power

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 \pm 10 %, ripple 10 %p-p max.)
P: 110 V DC
(Operational voltage range 85 – 150 V, ripple 10 %p-p max.)
(110 V \pm 10 % for UL)

[4] OPTIONS (multiple selections)

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

RELATED PRODUCTS

- JX configurator connection kit (model: JXCON)

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3 screw terminals (torque 0.8 N·m)

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Overrange output: Approx. -15 to +115 %
(Negative current output is not provided.)

Manual zero adjustments: -5 to +5 %
(factory setting: 0 %)

Manual span adjustments: 95 to 105 %
(factory setting: 100 %)

Programming: PC programmable features include:

- T/C and RTD type and temp. range
- Input and output ranges
- Zero and span adjustments
- Simulated output
- User's linearization table (max. 100 points, specified within

-15 – +115 % for both input and output)

• User's TC/RTD table

Burnout (T/C, RTD and Pot.): Upscale standard; downscale or no burnout options are PC programmable

Linearization (T/C, RTD input): Standard tables stored in memory

Cold junction compensation (T/C): CJC sensor (included) to be attached to the input terminals

Status indicator LED: Flashing patterns indicate different operating status of the transmitter.

Configurator connection: 2.5 dia. miniature jack; RS-232C level

INPUT SPECIFICATIONS

• **DC Current:** Shunt resistor attached to the input terminals (0.5 W)

Operational range: 0 – 70 mA DC with 100 Ω , 0.5 W

Input range: 0 – 50 mA DC

Minimum span: 2 mA

Offset: Lower range can be any specific value within the input range provided that the minimum span is maintained. If not specified, the input range is 4 – 20 mA DC.

• **DC Voltage**

Operational range: -11.5 – +11.5 V DC

Input range: -10 – +10 V DC

Minimum span: 10 mV for S1; 100 mV for S2

Offset: Lower range can be any specific value within the input range provided that the minimum span is maintained. If not specified, the input range is shown below.

S1: 0 – 100 mV DC

S2: 1 – 5 V DC

• **THERMOCOUPLE**

For T/C types K, E, T, B, R, S or N, the accuracy in the temperature ranges near the lower limit may be out of the described value. Consult M-System for more detail.

Input resistance: 1 M Ω min.

Burnout sensing: 45 nA \pm 10 %

Offset: Lower range can be any specific value within the input range provided that the minimum span is maintained. If not specified, the input range is shown below.

T1 PR : 0 – 1600°C

T2 K : 0 – 1000°C

T3 E : 0 – 500°C

T4 J : 0 – 500°C

T5 T : 0 – 300°C

T6 B : 0 – 1800°C

T7 R : 0 – 1600°C

T8 S : 0 – 1600°C

T9 C (WRe 5 - 26) : 0 – 2000°C

TN N : 0 – 1000°C

TU U : 0 – 300°C

TL L : 0 – 500°C

TP Platinel II : 0 - 1200°C

- **RTD:** 2- or 3-wire RTD

Maximum leadwire resistance: 200 Ω per wire (3 -wire)

Sensing current: ≤ 1.0 mA

If not specified, the input range is shown below.

R1: JPt 100 0 - 100°C

R3: Pt 100 0 - 100°C

R4: Pt 100 0 - 100°C

R5: Pt 50 Ω 0 - 200°C

R6: Ni 508.4 Ω 0 - 100°C

R7: Pt 1000 0 - 100°C

R8: Ni 100 0 - 100°C

R9: Cu 10 0 - 100°C

- **POTENTIOMETER:** 100 Ω - 10 kΩ

Minimum span:

(Range) 0 - 100 Ω : 2.5 Ω

0 - 300 Ω : 3.0 Ω

0 - 1000 Ω : 10 Ω

0 - 10 kΩ : 10 Ω

Excitation: ≤ 0.5 V DC at 1000 Ω

If not specified, the input range is 0 - 1000 Ω.

OUTPUT SPECIFICATIONS

- **DC Current**

Operational range: 0 - 24 mA DC

Output range: 0 - 20 mA DC

Minimum span: 1 mA

Offset: Lower range can be any specific value within the output range provided that the minimum span is maintained.

Load resistance: Output drive 15 V max.

(e.g. 4 - 20 mA: 750 Ω [15 V / 20 mA])

If not specified, the output range is 4 - 20 mA DC.

- **DC VOLTAGE**

Code V1 (narrow spans)

Operational range: -3 - +3 V DC

Output range: -2.5 - +2.5 V DC

Minimum span: 250 mV

Code V2 (wide spans)

Operational range: -11.5 - +11.5 V DC

Output range: -10 - +10 V DC

Minimum span: 1 V

Offset: Lower range can be any specific value within the output range provided that the minimum span is maintained.

Load resistance: Output drive 1 mA max.

(e.g. 1 - 5 V: 5000 Ω [5 V / 1 mA])

If not specified, the output range is shown below.

V1: 0 - 1 V DC

V2: 1 - 5 V DC

INSTALLATION

Power Consumption

- **AC Power input:** Approx. 6 VA

- **DC Power input:** Approx. 3 W

Operating temperature: -30 to +60°C (-22 to +140°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: 120 g (0.26 lbs)

PERFORMANCE

Accuracy: Input accuracy + output accuracy

Input accuracy (% of input range)

Inversely proportional to span.

(DC) -1 - +1 V : ±0.02

-10 - +10 V : ±0.02

0 - 50 mA : ±0.02

Except the input resistor error.

(T/C) (PR) : ±0.08

K (CA) : ±0.02

E (CRC) : ±0.02

J (IC) : ±0.04

T (CC) : ±0.06

B (RH) : ±0.12

R : ±0.08

S : ±0.08

C (WRe 5 - 26) : ±0.04

N : ±0.04

U : ±0.04

L : ±0.04

P (Platinel II) : ±0.04

(RTD) JPt 100 (JIS '89) : ±0.04

Pt 100 (JIS '89) : ±0.03

Pt 100 (JIS '97, IEC) : ±0.03

Pt 50 Ω (JIS '81) : ±0.04

Ni 508.4 Ω : ±0.05

Pt 1000 : ±0.08

Ni 100 : ±0.14

Cu 10 : ±0.6

(Pot.) 0 - 100 Ω : ±0.08

0 - 300 Ω : ±0.04

0 - 1000 Ω : ±0.04

0 - 10 kΩ : ±0.04

Output accuracy: ±0.02 % of output range

Inversely proportional to span.

Cold junction compensation error:

±0.4°C or ±0.7°F (at 20°C ±10°C or 68°F ±18°F)

Temp. coefficient

(at -5 to +55°C [23 to 131°F] of I/O range)

Input: ±0.016 %/°C (±0.009 %/°F) with current

±0.004 %/°C (±0.002 %/°F) with voltage

±0.004 %/°C (±0.002 %/°F) with T/C

±0.004 %/°C (±0.002 %/°F) with RTD

±0.004 %/°C (±0.002 %/°F) with Pot.

Output: ±0.013 %/°C (±0.007 %/°F)

Response time:

≤ 0.5 sec.(0 - 90 %) with current

≤ 0.5 sec.(0 - 90 %) with voltage

≤ 1.5 sec.(0 - 90 %) with T/C

≤ 0.9 sec.(0 - 90 %) with RTD

≤ 0.9 sec. (0 - 90 %) with Pot.

Burnout response: ≤ 10 sec.

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)

CALCULATION EXAMPLES OF OVERALL ACCURACY

[Example] Input Type -10 - +10 V, Input Range 1 - 5 V,

Output Type 0 - 20 mA, Output Range 0 - 10 mA

Max. Input Range (20 V) / Span (4 V) × 0.02 % = 0.1 %

Max. Output Range (20 mA) / Span (10 mA) × 0.02 % = 0.04 %

Overall accuracy = 0.1 + 0.04 = ±0.14 %

STANDARDS & APPROVALS

CE conformity:

EMC Directive (2004/108/EC)

EN 61000-6-4 (EMI)

EN 61000-6-2 (EMS)

Low Voltage Directive (2006/95/EC)

EN 61010-1

Installation Category II

Pollution Degree 2

Max. operating voltage 300 V

Input or output to power: Reinforced insulation

Input to output: Basic insulation

Approval:

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

Groups A, B, C, and D hazardous locations

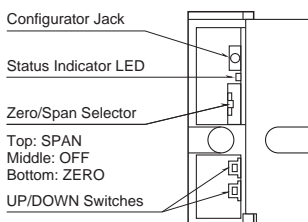
(UL 1604, CAN/CSA-C22.2 No.213)

UL/C-UL general safety requirements

(UL 61010B-1, CAN/CSA-C22.2 No.1010-1)

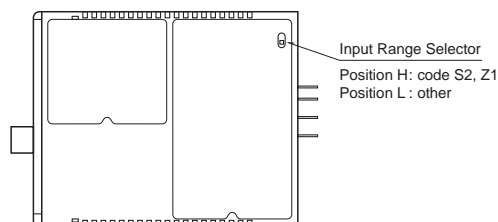
EXTERNAL VIEW

FRONT VIEW (with cover open)



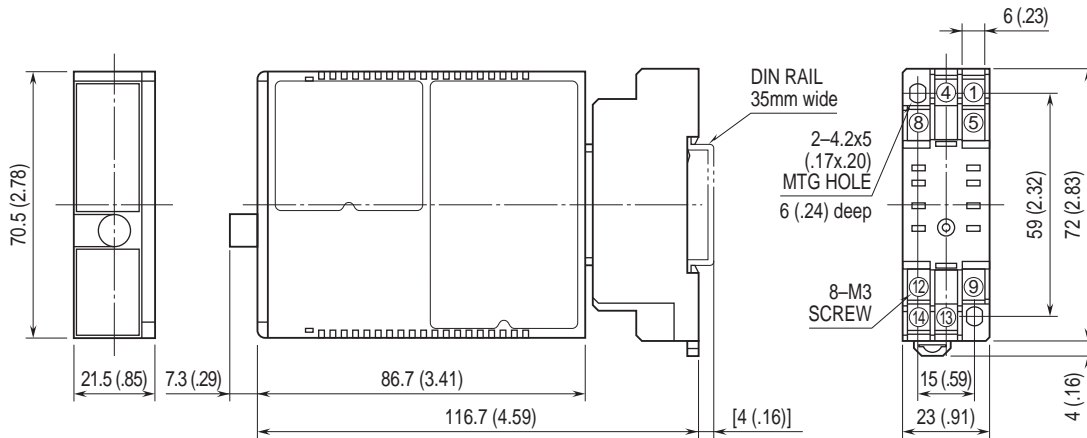
The front cover cannot be opened to 180 deg. when flush with neighboring units.

RIGHT SIDE VIEW



Refer to the instruction manual for detailed procedures.

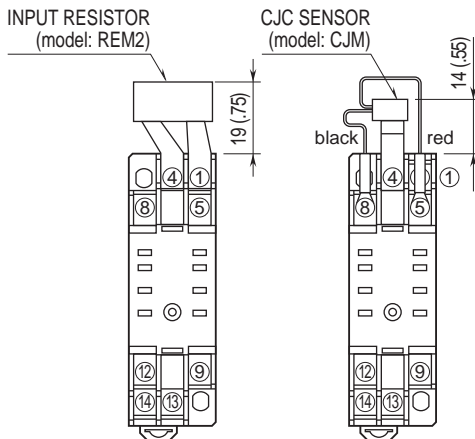
DIMENSIONS unit: mm (inch)



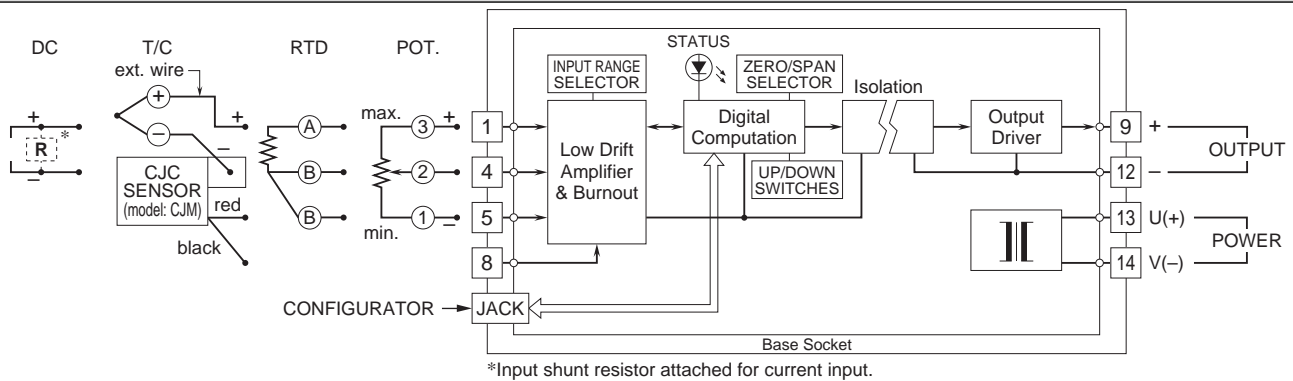
• When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm (inch)

Use the input resistor (model: REM2) for a DC current input, and the CJC sensor (model: CJM) for a thermocouple input, both included in the package.



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM





Specifications are subject to change without notice.