

Super-mini Signal Conditioners Mini-M Series

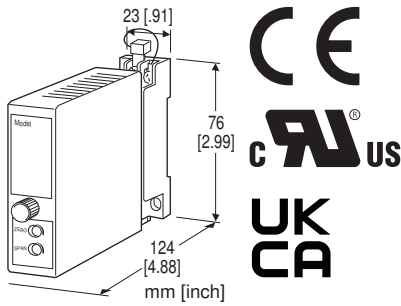
THERMOCOUPLE TRANSMITTER

Functions & Features

- Accepts direct input from a thermocouple and provides a standard process signal
- 5-segment linearization
- Burnout
- High-accuracy cold junction compensation
- Fast response type available

Typical Applications

- High-accuracy cold junction compensation benefits narrow span measurements
- 0.1 μ A burnout sensing enables long distance transmission with minimum offset drifts
- Electric furnace (isolation ensured even when 200 V AC power for heater leaks through furnace wall)
- No burnout type can connect to a single T/C in parallel with a recorder



MODEL: M2TS-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: M2TS-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4]. (e.g. M2TS-2A-M2/BL/CE/Q)
- Temperature range (e.g. 0 - 800°C)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q (e.g. /C01/V01)

[1] INPUT THERMOCOUPLE

- 1: (PR) (Usable Range 0 to 1760°C, 32 to 3200°F)
- 2: K (CA) (Usable range -270 to +1370°C, -454 to +2498°F)
- 3: E (CRC) (Usable range -270 to +1000°C, -454 to +1832°F)
- 4: J (IC) (Usable range -210 to +1200°C, -346 to +2192°F)
- 5: T (CC) (Usable range -270 to +400°C, -454 to +752°F)
- 6: B (RH) (Usable range 0 to 1820°C, 32 to 3308°F)
- 7: R (Usable range -50 to +1760°C, -58 to +3200°F)

- 8: S (Usable range -50 to +1760°C, -58 to +3200°F)
 N: N (Usable range -270 to +1300°C, -454 to +2372°F)
 0: Specify

[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 1000 Ω min.)
 4: 0 - 10 V DC (Load resistance 10 k Ω 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 \pm 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 \pm 10 % for UL)

[4] OPTIONS (multiple selections)

Response Time (0 - 90 %)

- blank: Standard (\leq 0.5 sec.)
 /K: Fast Response (Approx. 25 msec.)

Burnout

- blank: Upscale burnout
 /BL: Downscale burnout
 /BN: No burnout

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)

ADJUSTMENT

/V01: Multi-turn fine adjustment (UL not available)
/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
Overrange output: Approx. -10 to +120 % at 1 - 5 V
Zero adjustment: -5 to +5 % (front)
Span adjustment: 95 to 105 % (front)
Burnout: Upscale standard; downscale or no burnout optional
At burnout: Downscale \leq -10 %, Upscale \geq 110 %
Linearization: Standard
Cold junction compensation: CJC sensor attached to the input terminals

INPUT SPECIFICATIONS

Minimum span: 3 mV
Offset: Max. 1.5 times span
Input resistance: 30 k Ω min.
Burnout sensing: 0.1 μ A

MIN. span (in °C)

(PR): min. span 370°C
K (CA): min. span 75°C
E (CRC): min. span 50°C
J (IC): min. span 60°C
T (CC): min. span 75°C
B (RH): min. span 780°C
R: min. span 360°C
S: min. span 380°C

N: min. span 110°C

MIN. span (in °F)

(PR): min. span 670°F
K (CA): min. span 140°F
E (CRC): min. span 90°F
J (IC): min. span 110°F
T (CC): min. span 140°F
B (RH): min. span 1410°F
R: min. span 650°F
S: min. span 690°F
N: min. span 200°F

Remark: The described accuracy may be partially not satisfied when the temperature ranges below 0°C. Consult factory.

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 0.4 % (at over 400°C or 750°F for R, S and PR; over 770°C or 1420°F for B)
Cold junction compensation error
 (at 25°C \pm 10°C or 77°F \pm 18°F)
K, E, J, T & N: \pm 0.5°C or \pm 0.9°F
S, R & PR: \pm 1°C or \pm 1.8°F
Temp. coefficient: \pm 0.015 %/°C (\pm 0.008 %/°F)
 (at over 770°C or 1420°F for B)
Burnout response: \leq 10 sec.
Line voltage effect: \pm 0.1 % over voltage range
Insulation resistance: \geq 100 M Ω 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,

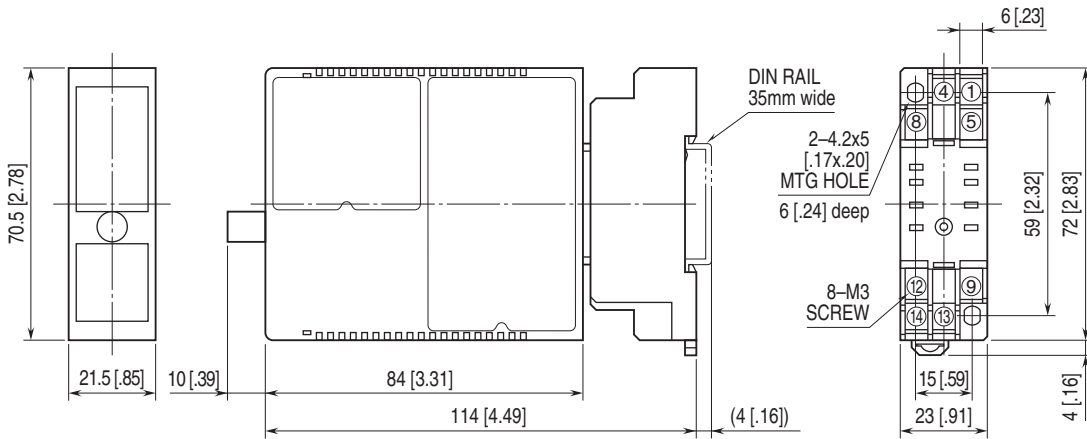
Groups A, B, C, and D

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

UL/C-UL general safety requirements

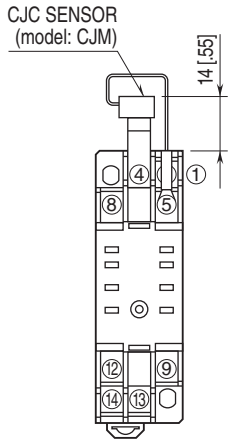
(UL 61010-1, CAN/CSA-C22.2 No.61010-1)

EXTERNAL DIMENSIONS unit: mm [inch]

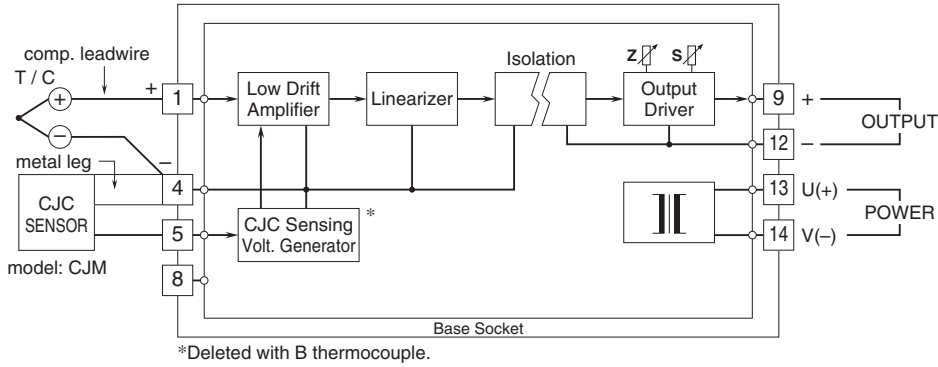



• When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



 Specifications are subject to change without notice.