

Plug-in Signal Conditioners M-UNIT

THERMOCOUPLE TRANSMITTER

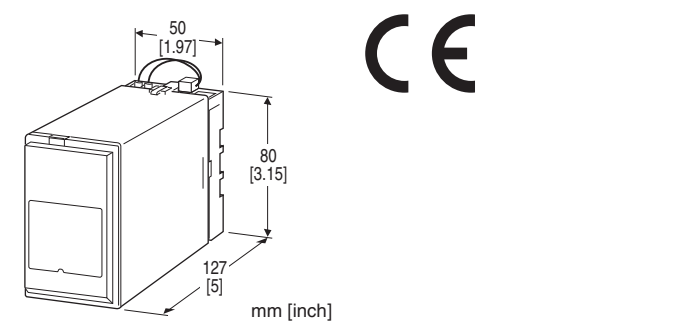
(CE)

Functions & Features

- Accepting direct input from a thermocouple and providing a standard process signal
- 7-segment linearization
- Burnout protection
- High-accuracy cold junction compensation
- Signal isolation
- Fast response type available
- High-density mounting

Typical Applications

- High-accuracy cold junction compensation benefits narrow span measurements
- 0.1 μA burnout sensing enables long distance transmission with minimum offset drifts
- Electric furnace (isolation)
- No burnout type can connect to a single T/C in parallel with a recorder



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

ORDERING INFORMATION

- Code number: TCS-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4].
(e.g. TCS-2A-B/K/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/S01)

[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 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 3000 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

- B: 100 V AC
 - C: 110 V AC
 - D: 115 V AC
 - F: 120 V AC
 - G: 200 V AC
 - H: 220 V AC
 - J: 240 V AC
- DC Power
- S: 12 V DC
 - R: 24 V DC
 - V: 48 V DC

[4] OPTIONS (multiple selections)

- Response Time (0 - 90 %)
- blank: Standard (≤ 0.5 sec.)
- /K: Fast Response (Approx. 25 msec.)
- Burnout
- blank: Upscale burnout
- /BL: Downscale burnout
- /BN: No burnout
- Standards & Approvals (must be specified)
- /CE: 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

TERMINAL SCREW MATERIAL

/S01: Stainless steel

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection: M3.5 screw terminals

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)

At burnout: Downscale \leq -10 %, Upscale \geq 110 %

(When the offset is negative, downscale \leq -8 %, upscale \geq 108 %.)

Linearization: Standard

Cold junction compensation: CJC sensor attached to the input terminals (B thermocouple is without CJC as standard)

INPUT SPECIFICATIONS

Minimum span: 3 mV

Offset: Max. 1.5 times span

Input resistance: 30 k Ω min.

Burnout sensing: 0.1 μ A

Minimum span (in $^{\circ}$ C)

(PR): min. span 370 $^{\circ}$ C

K (CA): min. span 75 $^{\circ}$ C

E (CRC): min. span 50 $^{\circ}$ C

J (IC): min. span 60 $^{\circ}$ C

T (CC): min. span 75 $^{\circ}$ C

B (RH): min. span 780 $^{\circ}$ C

R: min. span 360 $^{\circ}$ C

S: min. span 380 $^{\circ}$ C

N: min. span 110 $^{\circ}$ C

Minimum span (in $^{\circ}$ F)

(PR): min. span 670 $^{\circ}$ F

K (CA): min. span 140 $^{\circ}$ F

E (CRC): min. span 90 $^{\circ}$ F

J (IC): min. span 110 $^{\circ}$ F

T (CC): min. span 140 $^{\circ}$ F

B (RH): min. span 1410 $^{\circ}$ F

R: min. span 650 $^{\circ}$ F

S: min. span 690 $^{\circ}$ F

N: min. span 200 $^{\circ}$ F

Note: The described accuracy may be partially not satisfied when the temperature ranges below 0 $^{\circ}$ 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 3 V

INSTALLATION

Power input

- **AC:** Operational voltage range: rating \pm 10 %, 50/60 \pm 2 Hz, approx. 2 VA

- **DC:** Operational voltage range: rating \pm 10 % ripple 10 %p-p max., approx. 2.6 W (110 mA at 24 V)

Operating temperature: -5 to +60 $^{\circ}$ C (23 to 140 $^{\circ}$ F)

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

Mounting: Surface or DIN rail

Weight: 350 g (0.77 lb)

PERFORMANCE in percentage of span

Accuracy: \pm 0.3 % (at over 400 $^{\circ}$ C or 750 $^{\circ}$ F for R, S and PR; over 770 $^{\circ}$ C or 1420 $^{\circ}$ F for B)

Cold junction compensation error

(at 20 $^{\circ}$ C \pm 10 $^{\circ}$ C or 68 $^{\circ}$ F \pm 18 $^{\circ}$ F)

K, E, J, T & N: \pm 0.5 $^{\circ}$ C or \pm 0.9 $^{\circ}$ F

S, R & PR: \pm 1 $^{\circ}$ C or \pm 1.8 $^{\circ}$ F

Temp. coefficient: \pm 0.015 %/ $^{\circ}$ C (\pm 0.008 %/ $^{\circ}$ F)

(at over 400 $^{\circ}$ C or 750 $^{\circ}$ F for R, S and PR; over 770 $^{\circ}$ C or 1420 $^{\circ}$ 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:

1350 V AC @1 minute (input to output)

2300 V AC @1 minute (input or output to power to ground)

STANDARDS & APPROVALS

EU conformity:

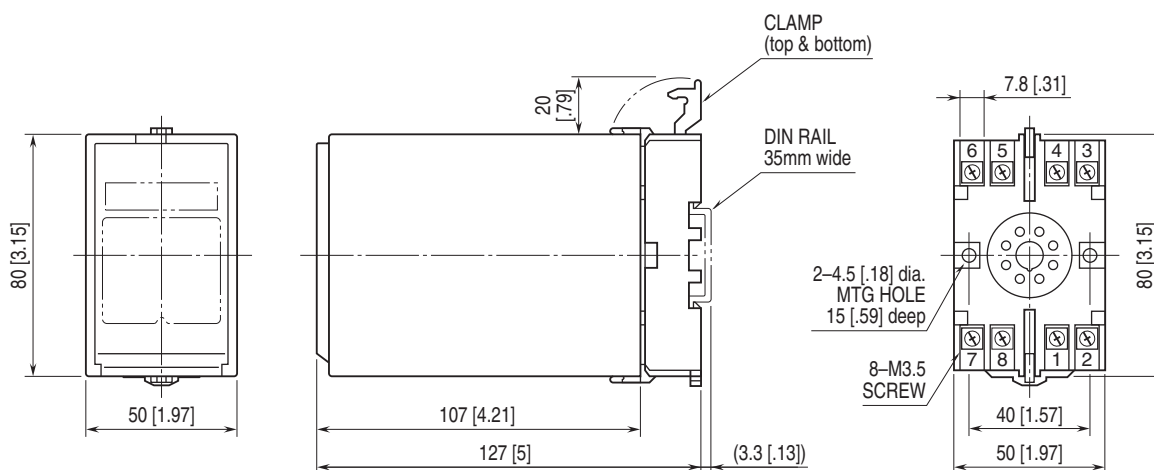
EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

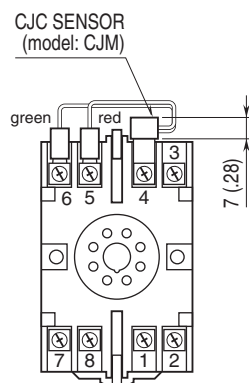
Low Voltage Directive
 EN 61010-1
 Installation Category II
 Pollution Degree 2
 Input or output to power: Reinforced insulation (300 V)
 Input to output: Basic insulation (300 V)
 RoHS Directive

EXTERNAL DIMENSIONS unit: mm [inch]

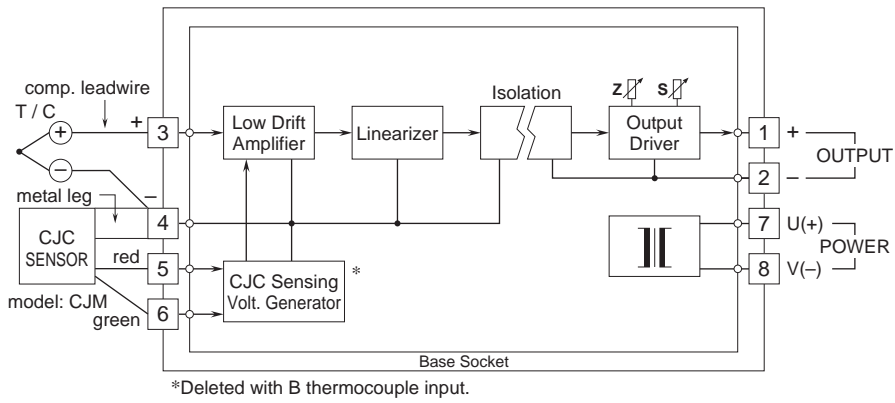


• When mounting, no extra space is needed between units.

TERMINAL ASSIGNMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.