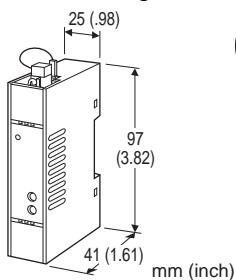


## Super-mini Terminal Block Signal Conditioners M5-UNIT

### THERMOCOUPLE TRANSMITTER

#### Functions & Features

- Accepts direct input from a thermocouple and provides a standard process signal
- Linearization and burnout
- Cold junction compensation
- Fast response type available
- High-density mounting
- Power LED
- CE marking for 24 V power



M5TS-□□-□□

#### ORDERING INFORMATION

Specify a code from below for each [1] through [4].

- Code number: M5TS-[1][2]-[3][4]  
(e.g. M5TS-2A-R/K/BL/Q)

Specify variables.

- 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 550 Ω max.)
- D: 0 - 20 mA DC (Load resistance 550 Ω max.)

Z: Specify current (See OUTPUT SPECIFICATIONS)

##### Voltage

- 1: 0 - 10 mV DC (Load resistance 100 kΩ min.)  
(CE not available)
- 2: 0 - 100 mV DC (Load resistance 100 kΩ min.)  
(CE not available)
- 3: 0 - 1 V DC (Load resistance 100 Ω min.)
- 4: 0 - 10 V DC (Load resistance 1000 Ω min.)
- 5: 0 - 5 V DC (Load resistance 500 Ω min.)
- 6: 1 - 5 V DC (Load resistance 500 Ω min.)
- 1W: -10 - +10 mV DC (Load resistance 100 kΩ min.)  
(CE not available)
- 2W: -100 - +100 mV DC (Load resistance 100 kΩ min.)  
(CE not available)
- 3W: -1 - +1 V DC (Load resistance 800 Ω min.)
- 4W: -10 - +10 V DC (Load resistance 8000 Ω min.)
- 5W: -5 - +5 V DC (Load resistance 4000 Ω min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)
- 01: Specify voltage (See OUTPUT SPECIFICATIONS)  
(CE not available)

#### [3] POWER INPUT

##### AC Power

- M: 85 - 264 V AC (Operational voltage range 85 - 264 V,  
47 -66 Hz)  
(CE not available)

##### DC Power

- R: 24 V DC  
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

#### [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

##### OTHER OPTIONS

- blank: none
- /Q: Option other than the above (specify the specification)

##### OPTION SPECIFICATIONS OF /Q (multiple selections)

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

- /C01: Silicone coating
- /C02: Polyurethane coating
- /C03: Rubber coating

##### ADJUSTMENT

- /V01: Multi-turn fine adjuster

## GENERAL SPECIFICATIONS

**Construction:** Terminal block  
**Connection:** M3.5 screw terminals (torque 0.8 N·m)  
**Screw terminal:** Nickel-plated steel  
**Housing material:** Flame-resistant resin (black)  
**Isolation:** Input to output to power  
**Zero adjustment:** -2 to +2 % (front)  
**Span adjustment:** 98 to 102 % (front)  
**Linearization:** Standard  
**Cold junction compensation:** CJC sensor attached to the input terminals  
**Power LED:** Green light turns on when the power is supplied.

## INPUT SPECIFICATIONS

**Minimum span:** 3 mV  
**Input resistance:** 20 kΩ min.  
**Burnout sensing:** 0.1 μA

### Lower temperature range & span (in °C)

**(PR):** Lower range 0 to 880°C; min. span 370°C  
**K (CA):** Lower range -270 to +1200°C; min. span 75°C  
**E (CRC):** Lower range -270 to +750°C; min. span 50°C  
**J (IC):** Lower range -210 to +800°C; min. span 60°C  
**T (CC):** Lower range -270 to +325°C; min. span 75°C  
**B (RH):** Lower range 0 to 750°C; min. span 780°C  
**R:** Lower range -50 to +550°C; min. span 360°C  
**S:** Lower range -50 to +550°C; min. span 380°C  
**N:** Lower range -270 to +1100°C; min. span 110°C

### Lower temperature range & span (in °F)

**(PR):** Lower range 32 to 1616°F; min. span 670°F  
**K (CA):** Lower range -454 to +2192°F; min. span 140°F  
**E (CRC):** Lower range -454 to +1382°F; min. span 90°F  
**J (IC):** Lower range -346 to +1472°F; min. span 110°F  
**T (CC):** Lower range -454 to +617°F; min. span 140°F  
**B (RH):** Lower range 32 to 1382°F; min. span 1450°F  
**R:** Lower range -58 to +1022°F; min. span 680°F  
**S:** Lower range -58 to +1022°F; min. span 700°F  
**N:** Lower range -454 to +2012°F; min. span 200°F

**Note 1:** The described accuracy may be partially not satisfied when the temperature ranges below 0°C. Consult M-System.

**Note 2:** Consult M-System for the range out of the above list.

## OUTPUT SPECIFICATIONS

• **DC Current:** 0 – 20 mA DC  
**Minimum span:** 1 mA  
**Offset:** Max. 1.5 times span  
**Load resistance:** Output drive 11 V max.

• **DC Voltage**  
**Output code 0 (CE)**  
**Voltage range:** -10 – +10 V DC  
**Minimum span:** 1 V  
**Offset:** Max. 1.5 times span  
**Load resistance:** Output drive 10 mA max.; at ≥1 V  
Max. 1.25 mA output drive for negative voltage  
**Output code 01 (Not CE)**  
**Voltage range:** -1 – +1 V DC  
**Minimum span:** 10 mV  
**Offset:** Max. 1.5 times span  
**Load resistance:** Min. 100 kΩ  
Min. 1 MΩ for negative voltage

## INSTALLATION

### Power Consumption

• **AC Power input:**  
Approx. 2 VA at 100 V  
Approx. 3 VA at 200 V  
Approx. 3 VA at 264 V

• **DC Power input:** Approx. 2 W

**Operating temperature:** -5 to +55°C (23 to 131°F)

**Operating humidity:** 0 to 90 %RH (non-condensing)

**Mounting:** DIN rail

**Weight:** 80 g (2.8 oz)

## PERFORMANCE in percentage of span

**Accuracy** (whichever is greater)

**K, E, J:** ±0.1 % of FS or ±0.2°C

**T, N:** ±0.2 % of FS or ±0.2°C

**PR, B, R, S:** ±0.3 % of FS

(at over 400°C for R, S and PR; over 770°C for B)

**Cold junction compensation error**

(at 20°C ±10°C or 68°F ±18°F)

**K, E, J, T, N:** ±0.5°C or ±0.9°F max.

**S, R, PR:** ±1°C or ±1.8°F max.

**Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F)

(at over 400°C for R, S and PR; over 770°C for B)

**Burnout response:** ≤ 10 sec.

**Line voltage effect:** ±0.1 % over voltage range

**Insulation resistance:** ≥ 100 MΩ with 500 V DC

**Dielectric strength** (input to output to power to ground)

**DC powered:** 2000 V AC @1 minute

**AC powered:** 1500 V AC @1 minute

## STANDARDS & APPROVALS

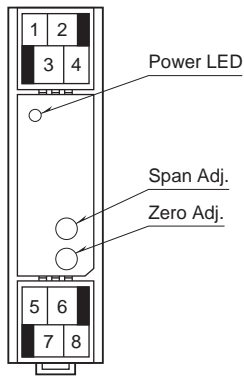
**CE conformity:**

EMC Directive (2004/108/EC)

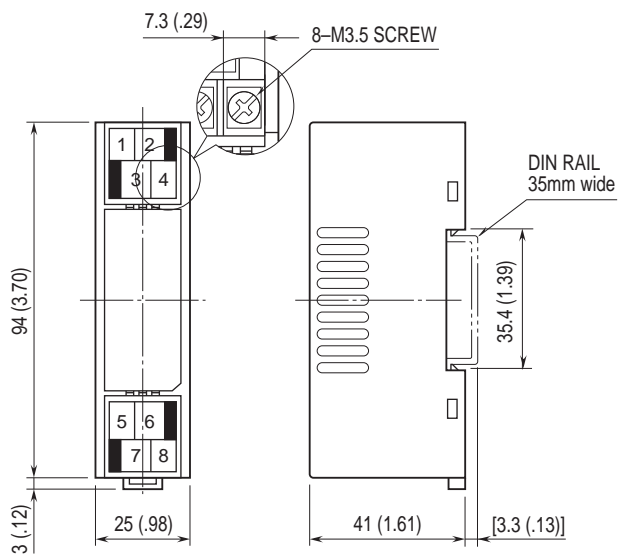
EN 61000-6-4 (EMI)

EN 61000-6-2 (EMS)

## FRONT VIEW

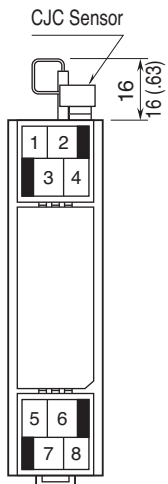


## DIMENSIONS unit: mm (inch)

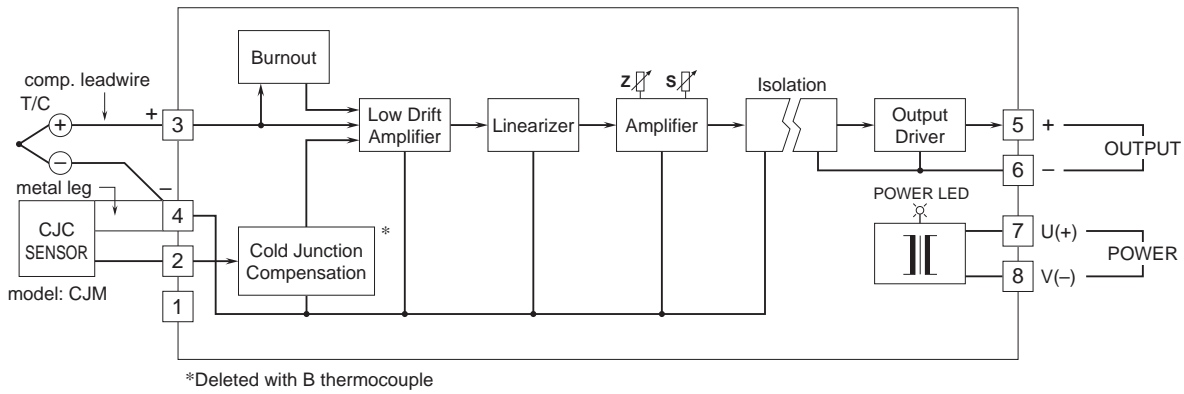


• When mounting, no extra space is needed between units.

## TERMINAL ASSIGNMENTS unit: mm (inch)



## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.