

**Super-mini Signal Conditioners F2 Series**

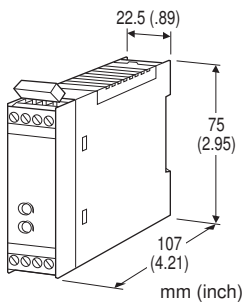
**THERMOCOUPLE TRANSMITTER**

**Functions & Features**

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

**Typical Applications**

- High-accuracy cold junction compensation benefits narrow span measurements
- 0.1  $\mu$ A 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: F2TS-[1][2]-R[3]**

**ORDERING INFORMATION**

- Code number: F2TS-[1][2]-R[3]
- Specify a code from below for each of [1] through [3]. (e.g. F2TS-2A-R/BL)
- Temperature range (e.g. 0 - 800°C)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q (e.g. /C01)

**[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  $\Omega$  max.)
- B: 2 - 10 mA DC (Load resistance 1500  $\Omega$  max.)
- C: 1 - 5 mA DC (Load resistance 3000  $\Omega$  max.)
- D: 0 - 20 mA DC (Load resistance 750  $\Omega$  max.)
- E: 0 - 16 mA DC (Load resistance 900  $\Omega$  max.)
- F: 0 - 10 mA DC (Load resistance 1500  $\Omega$  max.)
- G: 0 - 1 mA DC (Load resistance 15 k $\Omega$  max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

**Voltage**

- 1: 0 - 10 mV DC (Load resistance 10 k $\Omega$  min.)
- 2: 0 - 100 mV DC (Load resistance 100 k $\Omega$  min.)
- 3: 0 - 1 V DC (Load resistance 1000  $\Omega$  min.)
- 4: 0 - 10 V DC (Load resistance 10 k $\Omega$  min.)
- 5: 0 - 5 V DC (Load resistance 5000  $\Omega$  min.)
- 6: 1 - 5 V DC (Load resistance 5000  $\Omega$  min.)
- 0: Specify voltage (See OUTPUT SPECIFICATIONS)

**POWER INPUT**

**DC Power**

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

**[3] 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

**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

## GENERAL SPECIFICATIONS

**Construction:** Stand-alone; terminal access at the front  
**Connection:** Euro type connector terminal  
 (applicable wire size: 0.2 to 2.5 mm<sup>2</sup>, stripped length 7 mm)  
**Housing material:** Flame-resistant resin (black)  
**Isolation:** Input to output to power  
**Zero adjustment:** -5 to +5 % (front)  
**Span adjustment:** 95 to 105 % (front)  
**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 kΩ min.  
**Burnout sensing:** 0.1 μA

**Minimum 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

**Minimum 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

**Note:** 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 ≥ 0.5 V

## INSTALLATION

**Current consumption**  
 •DC: Approx. 80 mA  
**Operating temperature:** -5 to +55°C (23 to 131°F)  
**Operating humidity:** 30 to 90 %RH (non-condensing)  
**Mounting:** DIN rail  
**Weight:** 150 g (0.33 lb)

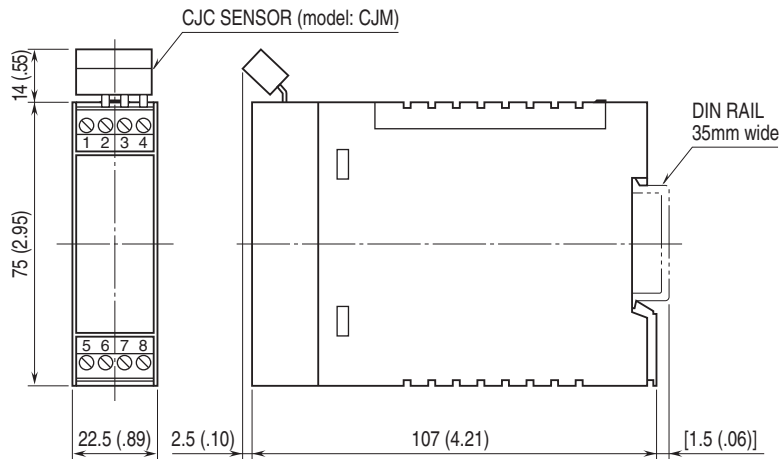
## PERFORMANCE in percentage of span

**Accuracy:** ±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 20°C ±10°C or 68°F ±18°F)  
 K, E, J, T, N: ±0.5°C or ±0.9°F  
 S, R, PR: ±1°C or ±1.8°F  
**Temp. coefficient:** ±0.015 %/°C (±0.008 %/°F)  
 (at over 400°C or 750°F for R, S and PR; over 770°C or 1420°F for B)  
**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)

## STANDARDS & APPROVALS

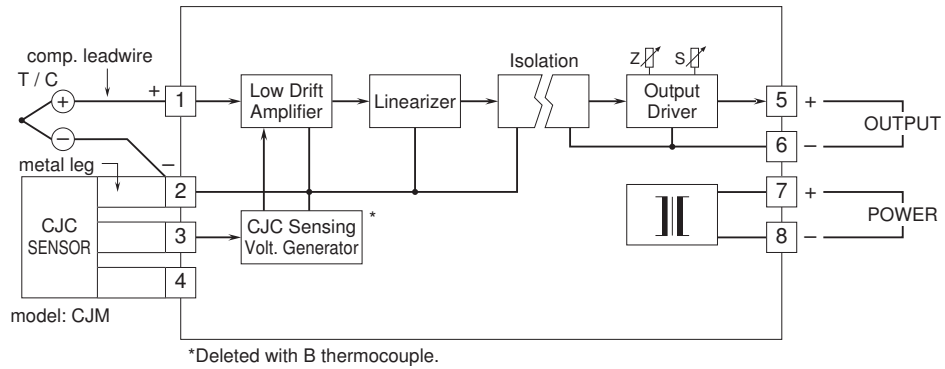
**EU conformity:**  
 EMC Directive  
 EMI EN 61000-6-4  
 EMS EN 61000-6-2  
 RoHS Directive  
 EN 50581  
**Approval:**  
 UL/C-UL general safety requirements  
 (UL 3111-1, CAN/CSA-C22.2 No.1010-1)

**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.