

**Space-saving Dual Output Signal Conditioners  
Mini-MW Series**

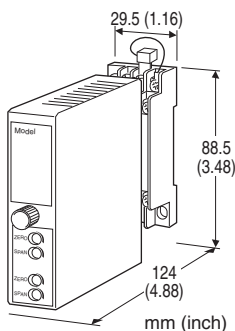
**THERMOCOUPLE TRANSMITTER**

**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  $\mu$ 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: W2TS-[1][2][3]-[4][5]**

**ORDERING INFORMATION**

- Code number: W2TS-[1][2][3]-[4][5]
- Specify a code from below for each [1] through [5]. (e.g. W2TS-2A6-M2/BL/CE/Q)
- Temperature range (e.g. 0 - 800°C)
- Special output ranges (For codes Z & 0)
- Specify the specification for option code /Q (e.g. /C01/V01)

Note: If one of the outputs should be a current range, specify it for the Output 1 to allow a greater load.

**[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 1**

**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)

**[3] OUTPUT 2**

Y: None

**Current**

- A: 4 - 20 mA DC (Load resistance 350  $\Omega$  max.)
- B: 2 - 10 mA DC (Load resistance 700  $\Omega$  max.)
- C: 1 - 5 mA DC (Load resistance 1400  $\Omega$  max.)
- D: 0 - 20 mA DC (Load resistance 350  $\Omega$  max.)
- E: 0 - 16 mA DC (Load resistance 430  $\Omega$  max.)
- F: 0 - 10 mA DC (Load resistance 700  $\Omega$  max.)
- G: 0 - 1 mA DC (Load resistance 7000  $\Omega$  max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

**Voltage**

Same range availability as Output 1

## [4] 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.)

**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)

## [5] 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 or UL  
**/CE:** CE 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 M-System's web site.)

**/C01:** Silicone coating  
**/C02:** Polyurethane coating  
**/C03:** Rubber coating (UL not available)

#### ADJUSTMENT

**/V01:** Multi-turn fine adjustment (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 1 to output 2 to power  
**Overrange output:** Approx. -10 to +120 % at 1 – 5 V  
**Zero adjustment:** -5 to +5 % (front)  
**Span adjustment:** 95 to 105 % (front)

Adjustable individually for each output 1 and output 2.  
**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 $\Omega$  min.  
**Burnout sensing:** 0.1  $\mu$ 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. for Output 1; 7 V max. for Output 2  
■ **DC Voltage:** -10 – +12 V DC (up to 10 V for Output 2)  
**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. 4 VA at 100 V

Approx. 5 VA at 200 V

Approx. 6 VA at 240 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:** 200 g (0.44 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  $\pm 10^\circ\text{C}$  or 77°F  $\pm 18^\circ\text{F}$ )**K, E, J, T & N:**  $\pm 0.5^\circ\text{C}$  or  $\pm 0.9^\circ\text{F}$ **S, R & PR:**  $\pm 1^\circ\text{C}$  or  $\pm 1.8^\circ\text{F}$ **Temp. coefficient:**  $\pm 0.015\%/^\circ\text{C}$  ( $\pm 0.008\%/^\circ\text{F}$ )

(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:**  $\geq 100\text{ M}\Omega$  with 500 V DC**Dielectric strength:** 2000 V AC @1 minute (input to output

1 to output 2 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 1 or output 2 to power input:

Reinforced insulation (300 V)

Input to output 1 to output 2: Basic insulation (300 V)

RoHS Directive

EN 50581

**Approval:**

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

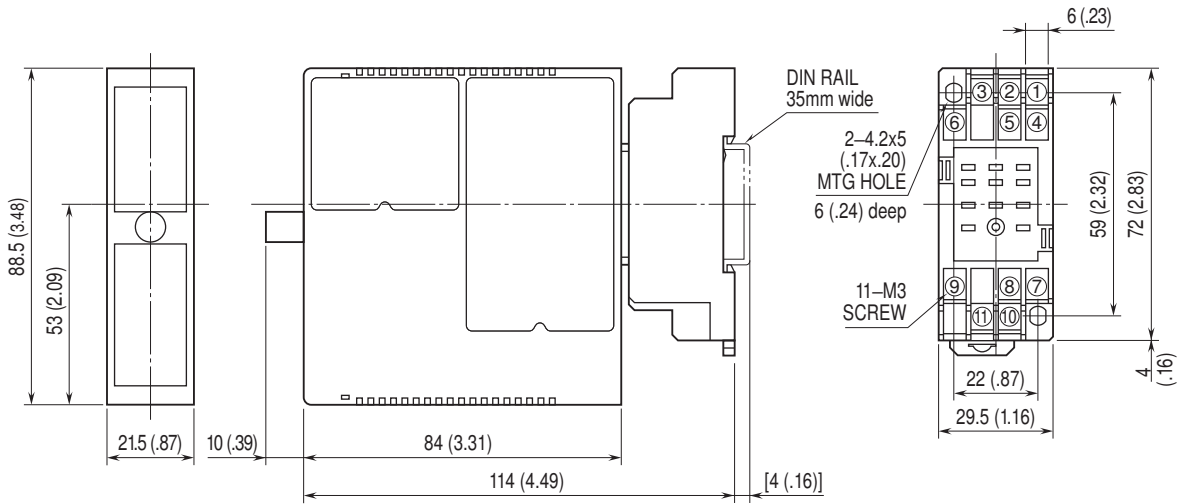
Groups A, B, C, and D

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

UL/C-UL general safety requirements

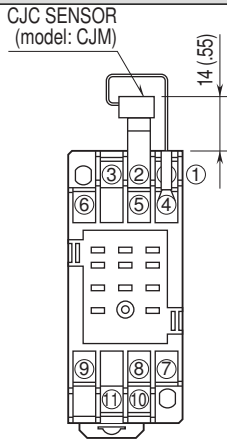
(UL 61010-1, CAN/CSA-C22.2 No.61010-1)

## EXTERNAL DIMENSIONS unit: mm (inch)

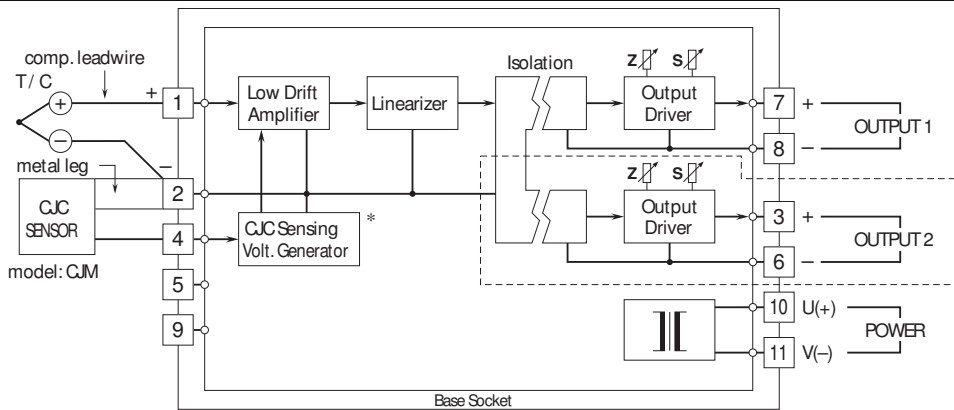


• When mounting, no extra space is needed between units.

## TERMINAL ASSIGNMENTS unit: mm (inch)



## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



\*Deleted with B thermocouple.

Note: The section enclosed by broken line is only with 2nd output option.



Specifications are subject to change without notice.