

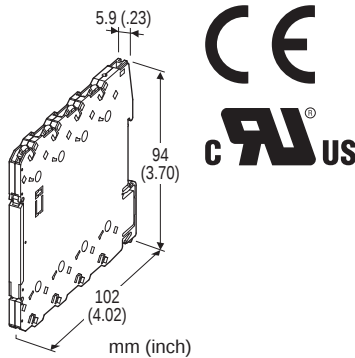
Tension-Clamp Ultra-Slim Signal Conditioners M6S Series

THERMOCOUPLE TRANSMITTER

(PC programmable)

Functions & Features

- Maintenance-free tension clamp connection
- 5.9-mm wide ultra-slim design
- Low profile allows the M6S module mounted in a 120-mm deep panel
- Accepts a thermocouple input and provides an isolated, linearized DC signal
- Cold junction compensation, linearization and burnout protection
- PC programmable
- High-density mounting
- Power indicator LED



MODEL: M6SXT-[1][2]-R[3]

ORDERING INFORMATION

- Code number: M6SXT-[1][2]-R[3]
Specify a code from below for each [1] through [3].
(e.g. M6SXT-2Z1-R/Q)
- Temperature range (e.g. 0 - 1000°C)
- Output range (e.g. 4 - 20 mA DC)
- Specify the specification for option code /Q
(e.g. /SET)

[1] INPUT THERMOCOUPLE

- 1: (PR)
- 2: K (CA)
- 3: E (CRC)
- 4: J (IC)
- 5: T (CC)
- 6: B (RH)
- 7: R
- 8: S
- N: N

0: Specify (Please provide a emf table.)

(Configurator software is used to change the input type and precise range.)

[2] OUTPUT

Current

Z1: Range 0 - 20 mA DC

Voltage

V2: Range -10 - +10 V DC

V3: Range -5 - +5 V DC

(Configurator software is used to change output over the described range of the selected suffix code.

For changing between suffix codes, set the Output Range Selector on the side of unit before software adjustment.)

POWER INPUT

DC Power

R: 24 V DC

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

[3] OPTIONS

Standards & Approvals

blank: CE marking

/UL: UL approval, CE marking

Other Options

blank: none

/Q: Option other than the above (specify the specification)

(UL not available)

SPECIFICATIONS OF OPTION: Q

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet
(No. ESU-7831)

RELATED PRODUCTS

- PC configurator software (model: M6CFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

GENERAL SPECIFICATIONS

Connection

Input and output: Tension clamp

Power input: Via the Installation Base (model: M6SBS)
or Tension clamp

Applicable wire size: 0.2 to 2.5 mm², stripped length 8 mm

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Overrange output: -2 – +102 %

(Negative current output is not available.)

Zero adjustment: -2 to +2 % (PC programming)

Span adjustment: 98 to 102 % (PC programming)

Burnout: Upscale standard; downscale or no burnout optional by programming

Linearization: Standard

Cold Junction Compensation: CJC sensor incorporated

Power LED: Green light turns on when the power is supplied.

Status indicator LED: Orange LED; Blinking patterns indicate different operating status of the transmitter.

Programming: Downloaded from PC; input type and range, output type and range, zero and span, burnout type, user's linearization table, temperature unit, cold junction compensation, response characteristics (version 1.30 or later), cold junction compensation, filter time constant, etc. For detailed information, refer to the users manual for the PC configurator.

Configurator connection: 2.5 dia. miniature jack; RS-232-C level

Minimum span: 1 V

Code V3 (narrow spans)

Output range: -5 – +5 V DC

Conformance range: -5.2 – +5.2 V DC

Minimum span: 0.5 V

Offset: Lower range can be any specific value within the output range provided that the minimum span is maintained.

Load resistance: Output drive 1 mA max.
(e.g. 1 – 5 V: 5000 Ω [5 V/1 mA])

If not specified, the output range is shown below.

V2: 0 – 10 V DC

V3: 1 – 5 V DC

INSTALLATION

Power consumption: Approx. 0.5 W

Operating temperature: -20 to +55°C (-4 to +131°F)

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

Mounting: Installation Base (model: M6SBS) or DIN rail

Weight: 65 g (2.3 oz)

INPUT SPECIFICATIONS

Input resistance: 1 MΩ min.

Burnout sensing: ≤ 0.2 μA

Temperature range: See Table 1.

If not specified, the input range is shown below.

1 PR: 0 – 1600°C

2 K: 0 – 1000°C

3 E: 0 – 500°C

4 J: 0 – 500°C

5 T: 0 – 300°C

6 B: 500 – 1600°C

7 R: 500 – 1600°C

8 S: 0 – 1600°C

N N: 0 – 1000°C

PERFORMANCE

Overall accuracy: Input accuracy + output accuracy

• **Input accuracy:** Accuracy (Table 1) + Cold Junction Compensation Error 3°C (5.4°F)

• **Output accuracy:** Max. Output Range ÷ Span × ±0.04%

Cold junction compensation error:

±3°C at 25 ±10°C

±5.4°F at 77 ±18°F

Temp. coefficient: ±0.01 %/°C (±0.006 %/°F) of max. span

Response time: ≤ 0.5 sec. (0 – 90 %)

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)

OUTPUT SPECIFICATIONS

■ DC Current

Output range: 0 – 20 mA DC

Conformance range: 0 – 20.4 mA DC

Minimum span: 1 mA

Offset: Lower range can be any specific value within the output range provided that the minimum span is maintained.

Load resistance: Output drive 11 V max.

(e.g. 4 – 20 mA: 550 Ω [11 V/20 mA])

If not specified, the output range is 4 – 20 mA DC.

■ DC Voltage

Code V2 (wide spans)

Output range: -10 – +10 V DC

Conformance range: -10.4 – +10.4 V DC



CALCULATION EXAMPLES OF OVERALL ACCURACY

[Example] K thermocouple, 0 - 1000°C, 4 - 20 mA DC output

Absolute value accuracy (Table 1): 0.25°C

CJC error (3°C) added: 3.25°C

• Input accuracy = $3.25^{\circ}\text{C} \div 1000^{\circ}\text{C} \times 100 = 0.325 \%$

Output span: 16 mA (20 - 4)

• Output accuracy = $20 \text{ mA} \div 16 \text{ mA} \times 0.04 = 0.05 \%$

Overall accuracy including CJC error = $0.325 + 0.05 = \pm 0.38 \%$ of span

Table 1.

THERMOCOUPLE	°C			
	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY
(PR)	20	0 to 1760	0 to 1760	±1.00
K (CA)	20	-270 to +1370	-150 to +1370	±0.25
E (CRC)	20	-270 to +1000	-170 to +1000	±0.20
J (IC)	20	-210 to +1200	-180 to +1200	±0.25
T (CC)	20	-270 to +400	-170 to +400	±0.25
B (RH)	20	100 to 1820	400 to 1760	±0.75
R	20	-50 to +1760	200 to 1760	±0.50
S	20	-50 to +1760	0 to 1760	±0.50
N	20	-270 to +1300	-130 to +1300	±0.30

THERMOCOUPLE	°F			
	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY
(PR)	36	32 to 3200	32 to 3200	±1.80
K (CA)	36	-454 to +2498	-238 to +2498	±0.45
E (CRC)	36	-454 to +1832	-274 to +1832	±0.36
J (IC)	36	-346 to +2192	-292 to +2192	±0.45
T (CC)	36	-454 to +752	-274 to +752	±0.45
B (RH)	36	212 to 3308	752 to 3200	±1.35
R	36	-58 to +3200	392 to 3200	±0.90
S	36	-58 to +3200	32 to 3200	±0.90
N	36	-454 to +2372	-202 to +2372	±0.54

STANDARDS & APPROVALS**CE conformity:**

EMC Directive (2004/108/EC)

EMI EN 61000-6-4: 2007

EMS EN 61000-6-2: 2005

Approval:

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

Groups A, B, C, and D

(ANSI/ISA-12.12.01:2007, CAN/CSA-C22.2 No.213:1987)

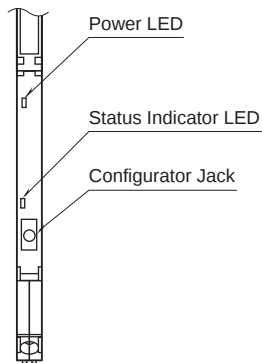
UL/C-UL general safety requirements

(UL 61010-1:2005, CAN/CSA-C22.2 No.61010-1:2004)

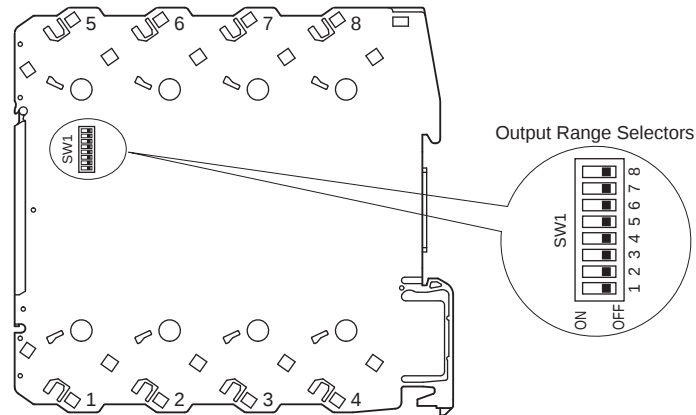


EXTERNAL VIEW

■ FRONT VIEW (with the cover open)



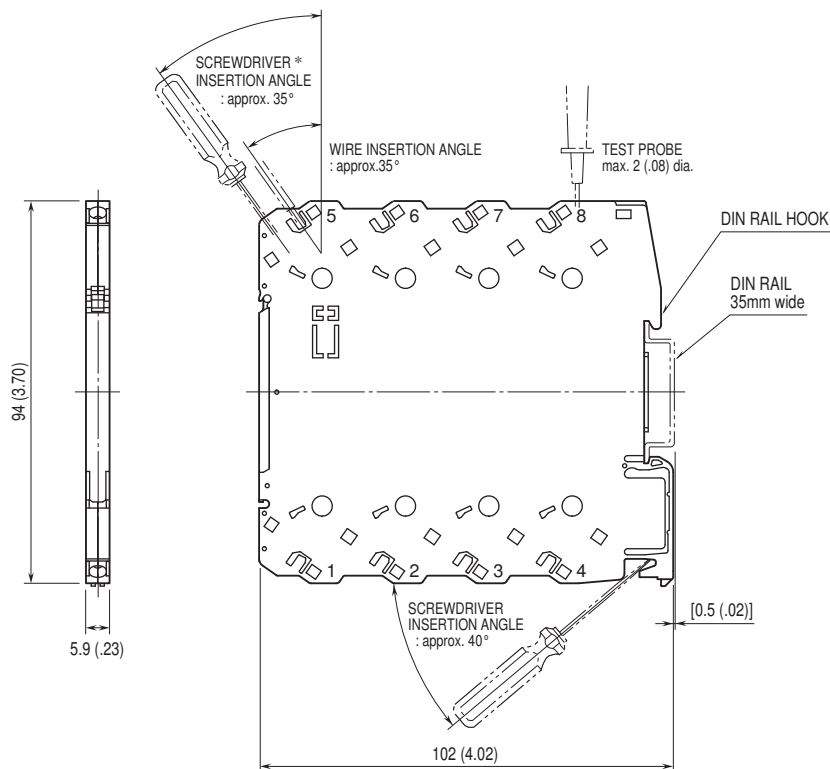
■ SIDE VIEW



The DIP switch setting is required to select output types before setting a precise output range using PC Configurator Software (model: M6CFG).

Refer to the instruction manual for detailed procedures.

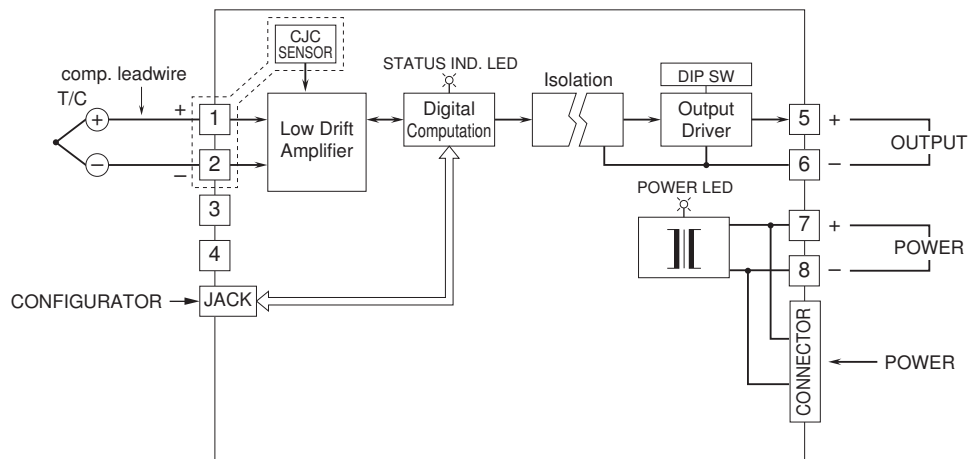
DIMENSIONS unit: mm (inch)



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

*Use a minus screwdriver: tip width 3.8 mm max., tip thickness 0.5 to 0.6 mm

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



Specifications are subject to change without notice.