

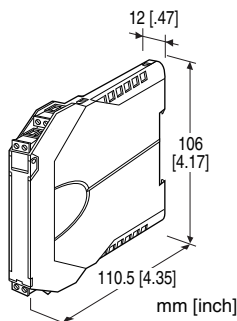
## Super-space-saving Signal Conditioners M3S-UNIT Series

### THERMOCOUPLE TRANSMITTER

(PC programmable)

#### Functions & Features

- Accepts a thermocouple input and provides an isolated, linearized DC signal
- Cold junction compensation, linearization and burnout protection
- PC programmable
- Universal AC/DC power input
- High-density mounting
- Power and status indicator LED



### MODEL: M3SXT-[1][2]-[3][4]

#### ORDERING INFORMATION

- Code number: M3SXT-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4].  
(e.g. M3SXT-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. /C01)

#### [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.)

#### [3] POWER INPUT

AC Power

**M2:** 100 - 240 V AC (Operational voltage range 90 - 264 V, 47 - 66 Hz)

DC Power

**R:** 24 V DC

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

Universal

**AD:** 100 - 240 V AC / 24 - 240 V DC (universal)

(Operational voltage range 90 - 264 V AC, 47 - 66 Hz / 21.6 - 264 V DC, ripple 10 %p-p max.)

#### [4] OPTIONS

**blank:** none

**/Q:** With options (specify the specification)

#### SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)

**/C01:** Silicone coating

**/C02:** Polyurethane coating

**/C03:** Rubber coating

#### RELATED PRODUCTS

- PC configurator software (model: M3SCFG)

Downloadable at our 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

**Construction:** Small-sized front terminal structure  
**Connection:** Euro type connector terminal  
**Applicable wire size:** 0.2 to 2.5 mm<sup>2</sup>, stripped length 8 mm  
**Housing material:** Flame-resistant resin (gray)  
**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 indicator LED:** Green LED 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 (max. 300 points, input emf specified within  $\pm 1000$  mV), etc.  
 Refer to the instruction manual for details.  
**Configurator connection:** 2.5 dia. miniature jack; RS-232-C level

## INPUT SPECIFICATIONS

**Input resistance:** 1 M $\Omega$  minimum  
**Burnout sensing:** 0.1  $\mu$ A  
 Factory setting:  
 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

## 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  $\Omega$  [11 V  $\div$  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  
**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  $\Omega$  [5 V  $\div$  1 mA])  
 If not specified, the output range is shown below.  
 V2: 0 - 10 V DC  
 V3: 1 - 5 V DC

## INSTALLATION

### Power consumption

• **AC:**  
 Approx. 2 VA at 100 V  
 Approx. 3 VA at 200 V  
 Approx. 4 VA at 264 V  
 • **DC:**  
 R: Approx. 0.5 W  
 AD: Approx. 1 W  
**Operating temperature:** -10 to +55°C (14 to 131°F)  
**Operating humidity:** 30 to 90 %RH (non-condensing)  
**Mounting:** DIN rail  
**Weight:** 85 g (3.0 oz)

## PERFORMANCE

**Overall accuracy:** Input accuracy + output accuracy  
**Input accuracy:** Accuracy + Cold Junction Compensation  
 Error 1°C (1.8°F)  
**Output accuracy:** Max. Output Range / Span  $\times$   $\pm 0.04$  %  
**Cold junction compensation error:**  
 $\pm 1^\circ\text{C}$  max. at 25  $\pm 10^\circ\text{C}$   
 $\pm 1.8^\circ\text{F}$  max. at 77  $\pm 18^\circ\text{F}$   
**Temp. coefficient:**  $\pm 0.015$  %/ $^\circ\text{C}$  ( $\pm 0.008$  %/ $^\circ\text{F}$ ) of max. span  
**Response time:**  $\leq 0.5$  sec. (0 - 90 %)  
**Burnout response:**  $\leq 10$  sec.  
**Line voltage effect:**  $\pm 0.1$  % over voltage range  
**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC  
**Dielectric strength:** 2000 V AC @1 minute (input to output to power to ground)

## CALCULATION EXAMPLES OF OVERALL ACCURACY

Input: K thermocouple, 0 - 1000°C, Output: 4 - 20 mA DC

Absolute value accuracy (Table 1): 0.25°C

CJC error (1°C) added: 1.25°C

➤ Input accuracy =  $1.25^{\circ}\text{C} \div 1000^{\circ}\text{C} \times 100 = 0.125\%$

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 =  $0.125 + 0.05 = \pm 0.18\%$  of span

## 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

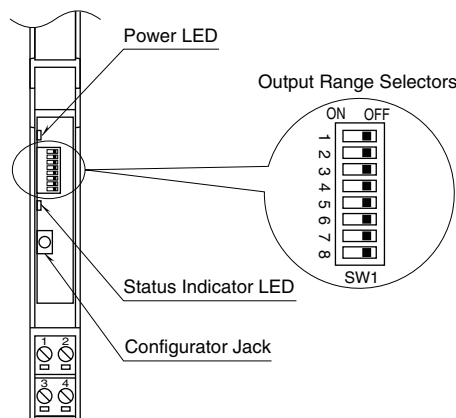
Pollution Degree 2

Input or output to power: Reinforced insulation (300 V)

Input to output: Basic insulation (300 V)

RoHS Directive

## EXTERNAL VIEW

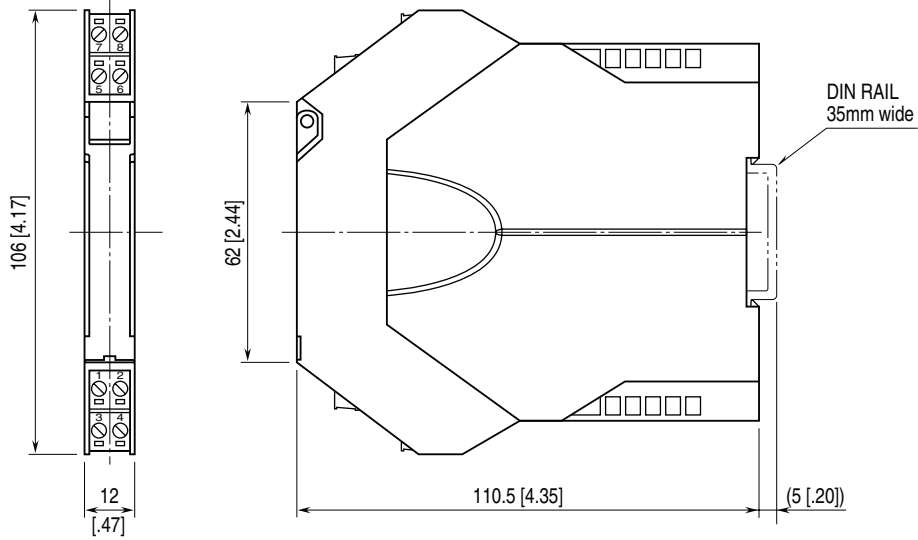


## INPUT TYPE, RANGE & ACCURACY

Table 1.

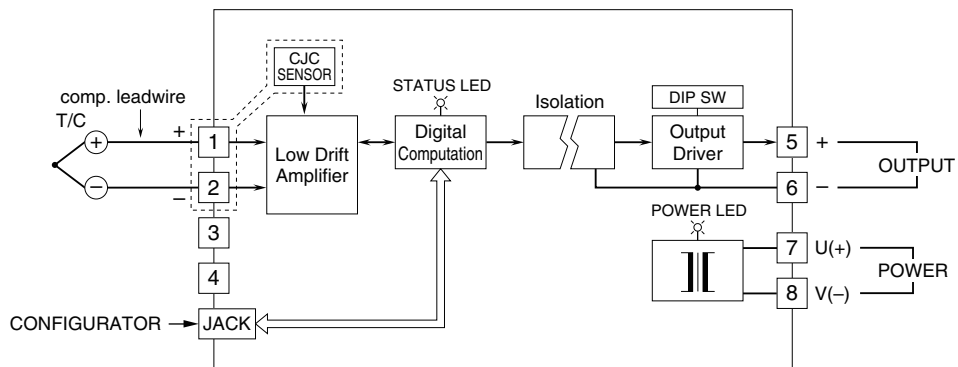
THERMOCOUPLE	°C				°F			
	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY	MIN. SPAN	MAXIMUM RANGE	CONFORMANCE RANGE	ACCURACY
(PR)	20	0 to 1760	0 to 1760	±1.00	36	32 to 3200	32 to 3200	±1.80
K (CA)	20	-270 to +1370	-150 to +1370	±0.25	36	-454 to +2498	-238 to +2498	±0.45
E (CRC)	20	-270 to +1000	-170 to +1000	±0.20	36	-454 to +1832	-274 to +1832	±0.36
J (IC)	20	-210 to +1200	-180 to +1200	±0.25	36	-346 to +2192	-292 to +2192	±0.45
T (CC)	20	-270 to +400	-170 to +400	±0.25	36	-454 to +752	-274 to +752	±0.45
B (RH)	20	100 to 1820	400 to 1760	±0.75	36	212 to 3308	752 to 3200	±1.35
R	20	-50 to +1760	200 to 1760	±0.50	36	-58 to +3200	392 to 3200	±0.90
S	20	-50 to +1760	0 to 1760	±0.50	36	-58 to +3200	32 to 3200	±0.90
N	20	-270 to +1300	-130 to +1300	±0.30	36	-454 to +2372	-202 to +2372	±0.54

## 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.