

Thermocouple Input Socket Mount Field Configurable Signal Conditioner



- ✓ Provides Isolated, Linearized DC Output in Proportion to Thermocouple Input
- ✓ Field Configurable Thermocouple Types
- ✓ Eliminates Ground Loops
- ✓ Thermocouple Burnout Detection
- ✓ Wide-Ranging 50% Zero and Span Adjustability
- ✓ ASIC Technology for Enhanced Reliability

The SMSC-TC isolating thermocouple conditioner offers wide ranging input and output capability. The SMSC-TC can be field configured by the user to accept input from thermocouple Types J, K, T, E, R, S, and B and to provide current or voltage output. The output is linearized to temperature according to the particular thermocouple type.

The SMSC-TC is a three-port industrial isolator—the output is optically isolated from the input up to 1500 V, and both input and output are transformer isolated from the line power. Isolation allows the noise reduction benefits of grounded thermocouples to be realized without creating ground loop problems and it provides faster response. The SMSC-TC utilizes the latest in advanced analog/digital signal processing technology. In addition to its multiple microprocessors, it employs special ASIC circuitry for high accuracy and reliability.

The SMSC-TC is equipped with cold-junction compensation (CJC) circuitry to provide ice-point reference. Upscale, downscale or disabled thermocouple burnout detection is switch selectable.

The SMSC-TC is useful in any application requiring an isolated DC output from a thermocouple input. Typical applications include energy management and data acquisition of process temperatures. The output of the SMSC-TC can drive a digital meter for direct display or interface with a computer for monitoring and control applications.

Model SMSC-TC is equipped with top-mounted LEDs for INPUT (green), TROUBLE (yellow) and CAL OK (yellow). At start-up, both the INPUT and the CAL OK LEDs light up momentarily for 1 second. Afterwards, these LEDs flash alternately for 10 seconds while startup takes place.



The input LED is a diagnostic tool. It remains continuously lit if the measured temperature is within the selected range of the thermocouple. However, if the measured temperature is outside the full range of the thermocouple (for example, for a Type J below minus 200°C or above 750°C), the LED will flash at a rate of 4 or 8 Hz for under/over range, respectively. If the thermocouple is within the full temperature range, but outside the selected sub-range (for example, if a Type J thermocouple is set for a range of 375 to 500°C and the temperature is either below 375°C or above 500°C) the LED will flash at 0.5 or 1 Hz respectively.

The CAL OK LED is continuously on when the device is properly storing the factory calibration reference voltage. The TROUBLE LED is off during normal operation of the device.

A major advantage of the SMSC-TC is its wide ranging capabilities and ease of configuration. The SMSC-TC enables 50% input zero and span adjustability within the selected sub-range.

For example for Type E thermocouple range from -18 to 125°C, since the span can be contracted by 50%, this enables an input span as narrow as 50% of 143, or 72°C. This span can then be positioned anywhere within the temperature range and can have a zero step-up as large as 50% of the full scale range (e.g. span can start as high as 53°C).

The factory default configuration for the model SMSC-TC is as follows:

Input: Type J

Range: 0 to 500°C (32 to 932°F)

Output: 4 to 20 mA

Burn Out: Upscale



Thermocouple Types and Temperature Ranges (Field-Selectable)

Type	Temperature Range
J	-18 to 750°C (0 to 1382°F)
	-18 to 500°C (0 to 932°F)
	-18 to 250°C (0 to 482°F)
	-18 to 125°C (0 to 257°F)
	500 to 750°C (932 to 1382°F)
	250 to 500°C (482 to 932°F)
	125 to 250°C (257 to 482°F)
	375 to 500°C (707 to 932°F)
	-200 to 750°C (-328 to 1382°F)
	-200 to 250°C (-328 to 482°F)
	-200 to 0°C (-328 to 32°F)
K	-18 to 1370°C (0 to 2498°F)
	-18 to 1000°C (0 to 1832°F)
	-18 to 500°C (0 to 932°F)
	-18 to 250°C (0 to 482°F)
	-18 to 125°C (0 to 257°F)
	1000 to 1370°C (1832 to 2498°F)
	500 to 1000°C (932 to 1832°F)
	250 to 500°C (482 to 932°F)
	125 to 250°C (257 to 482°F)
	750 to 1000°C (1382 to 1832°F)
	375 to 500°C (707 to 932°F)
	-200 to 750°C (-328 to 1382°F)
	-200 to 250°C (-328 to 482°F)
	-200 to 0°C (-328 to 32°F)
T	-18 to 400°C (0 to 752°F)
	-18 to 250°C (0 to 482°F)
	-18 to 125°C (0 to 257°F)
	250 to 400°C (482 to 752°F)
	125 to 250°C (257 to 482°F)
	375 to 400°C (707 to 752°F)
	-150 to 400°C (-238 to 752°F)
	-150 to 250°C (-238 to 482°F)
	-150 to 0°C (-238 to 32°F)
	-150 to 0°C (-238 to 32°F)

Type	Temperature Range
E	-18 to 1000°C (0 to 1832°F)
	-18 to 500°C (0 to 932°F)
	-18 to 250°C (0 to 482°F)
	-18 to 125°C (0 to 257°F)
	500 to 1000°C (932 to 1832°F)
	250 to 500°C (482 to 932°F)
	125 to 250°C (257 to 482°F)
	750 to 1000°C (1382 to 1832°F)
	375 to 500°C (707 to 932°F)
	-150 to 750°C (-238 to 1382°F)
R, S	-150 to 250°C (-238 to 482°F)
	-150 to 0°C (-238 to 32°F)
	50 to 1760°C (122 to 3200°F)
	50 to 1000°C (122 to 1832°F)
	50 to 500°C (122 to 932°F)
	50 to 250°C (122 to 482°F)
	1000 to 1760°C (1832 to 3200°F)
	500 to 1000°C (932 to 1832°F)
	250 to 500°C (482 to 932°F)
	125 to 250°C (257 to 482°F)
B	1500 to 1760°C (2732 to 3200°F)
	750 to 1000°C (1382 to 1832°F)
	375 to 500°C (707 to 932°F)
	500 to 1820°C (932 to 3308°F)
	1000 to 1820°C (1832 to 3308°F)
	500 to 1000°C (932 to 1832°F)
	1500 to 1820°C (2732 to 3308°F)
	750 to 1000°C (1382 to 1832°F)

Specifications INPUT

Ranges: Field configurable, see table

Impedance: >1 MΩ

Input Bias Current (Burnout Detection): <1.5 μA

Overvoltage: ±10V differential

Common Mode (Input to Ground): 1500 Vdc or peak AC, max

Zero and Span Range:

Zero Turn-Up: 0 to 50% of full scale range

Span Turn-Down: 100 to 50% of full scale range

OUTPUT

Voltage Output (Dip-Switch Selectable):

Ranges: 0 to 5 V, 0 to 10 V

Impedance: <10 Ω

Drive: 10 mA max (1 kΩ min)

Current Output (Dip-Switch Selectable):

Ranges: 0 to 1 mA, 4 to 20 mA

Impedance: >100 kΩ

Compliance: 10 V max (500 Ω max @ 20 mA)

Response Time (10 to 90%): 500 mSec, typical

Stability: ±0.04%/°C of full scale range

Isolation: 1500 Vdc or peak AC between input, output and power

ESD Susceptibility: Meets IEC 801-2, Level 2 (4 kV)

Common Mode Rejection: DC to 60 Hz: 120 dB

LED Indicators:

Trouble LED: Yellow - off during normal device operation

Input LED: Green - continuously on if input is within selected range, flashes otherwise

CAL OK LED: Yellow - continuously on in normal device operation

Thermocouple Burnout Detect: Field-configurable Upscale or Downscale, or disabled

Humidity (Non-Condensing):

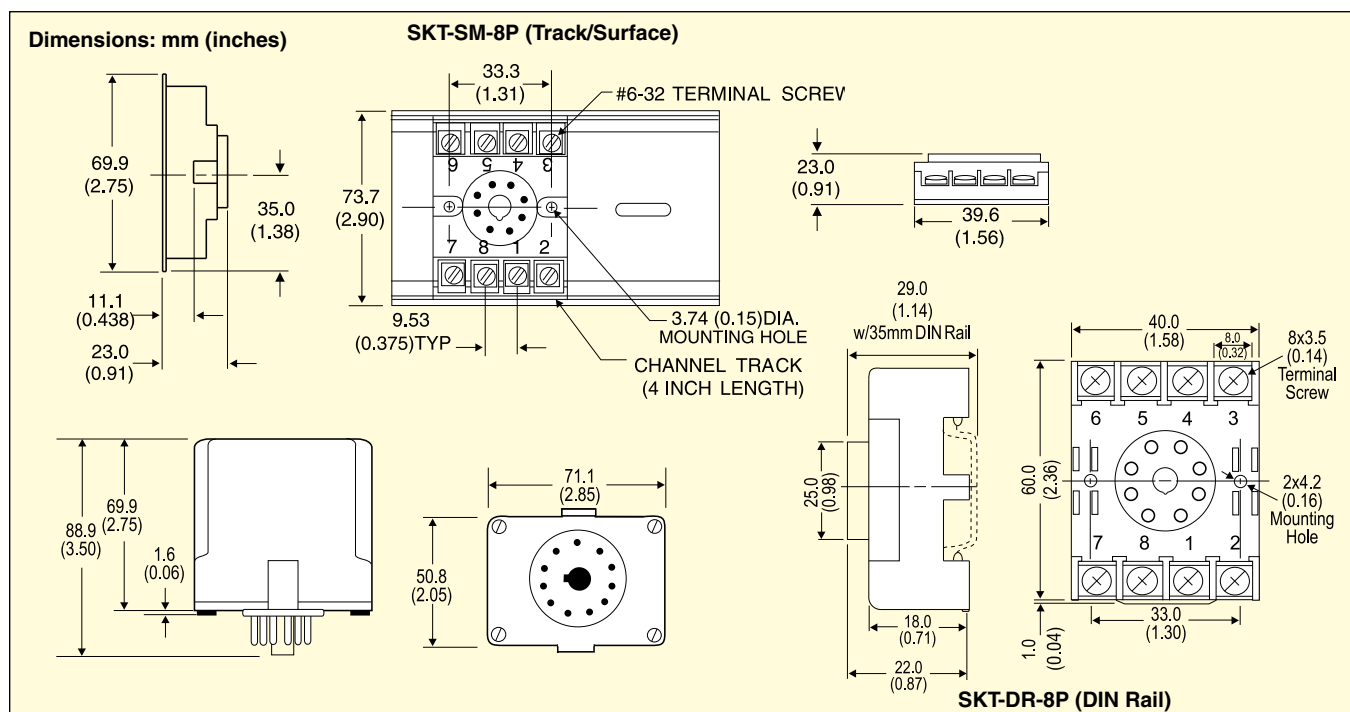
Operating: 25 to 95% RH @ 45°C (113°F)

Soak: 90% RH for 24 Hours @ 65°C (149°F)

Thermocouple Type	Temperature Range	Accuracy
J	-200 to 750°C (-328 to 1382°F)	±2.0°C (±3.6°F)
K	-200 to -140°C (-328 to -220°F)	±5.0°C (±9.0°F)
	-140 to 1250°C (-220 to -2282°F)	±2.0°C (±3.6°F)
	1250 to 1370°C (2282 to 2498°F)	±4.0°C (±7.2°F)
T	-150 to 400°C (-238 to 752°F)	±3.0°C (±5.4°F)
E	-150 to 1000°C (-238 to 1832°F)	±2.5°C (±4.5°F)
R	50 to 1760°C (122 to 3200°F)	±6.0°C (±10.8°F)
S	50 to 1760°C (12 to 3200°F)	±6.0°C (±10.8°F)
B	500 to 1820°C (932 to 3308°F)	±5.0°C (±9.0°F)

Temperature Range:**Operating:** 0 to 60°C (32 to 140°F)**Storage:** -15 to 75°C (5 to 167°F)**Power:****Consumption:** 3 W typical, 5 W max**Standard:** 120 Vac ±10%, 50 to 60 Hz**Optional:** 240 Vac**Weight:** 282 g (0.62 lb)

OMEGACARESM extended warranty program is available for models shown on this page. Ask your sales representative for full details when placing an order. OMEGACARESM covers parts, labor and equivalent loaners.

**To Order**

Model No.	Description
SMSC-TC	Thermocouple input socket mount field configurable signal conditioner
SKT-DR-8P	8-pin socket, DIN rail mount
SKT-SM-8P	8-pin socket, surface mount
SM-RAIL-2	35 mm DIN rail, 2 m (6.6') length
SMRS	Retaining spring (secures signal conditioner module into DIN rail or surface mount socket)

Comes complete with operator's manual.

Ordering Example: SMSC-TC thermocouple input socket mount field configurable signal conditioner, SKT-SM-8P 8-pin socket, surface mount and OCW-1 OMEGACARE extends standard 1 year warranty to a total of 2 years.