OPERATING SPECIFICATIONS
SEM1500/TC

DIN RAIL MOUNTED ISOLATED THERMOCOUPLE TRANSMITTER

1.0 DESCRIPTION

This device is a low cost isolated thermocouple two wire 4-20 mA output temperature transmitter. Automatic thermocouple cold junction compensation is provided. The output is directly referenced to the mV input, allowing linearization to be carried out by the loop monitoring instrumentation, if required. The device is housed inside a plastic enclosure, suitable for DIN rail mounting. Screw terminals are provided for wire connections. The enclosure provides access to side entry coarse offset and span adjusters together with a thermocouple selector.

2.0 SPECIFICATION @ 20°C

2.1 SEM1500/TC

INPUT

TYPE	Isolated mV input to accept mV or T/C Types K, T, N, J, R, S.
ISOLATION	500V DC (Flash tested to 1kV)
IMPEDANCE	> 1μΩ
COLD JUNCTION	Automatic compensation may be selected for the above T/C or zero compensation may be selected for mV or differential T/C measurement.
ACCURACY	(Typical) ±0.2°C @ 20°C ambient ±0.05°C/°C
LINEARITY	±0.005% for mV inputs T/C Ranges are non linear and directly referenced to t/c mV.
BURN OUT	Up scale standard (down scale burnout to order)
RANGE SELECT	Coarse Settings by side entry 16 position rotary screw adjustment switches. Fine by front access pots

RANGES	OFFSET °C (4 mA Reading)	SPAN °C (for 4-20 mA)
K	-200 to 400	100 to 1200
T	-200 to 300	100 to 400
J	-200 to 300	70 to 750
N	-200 to 400	150 to 1200
R	0 to 1000	500 to 1700
S	0 to 1000	500 to 1760
mV *	-5 to 15mV	3 to 50 mV

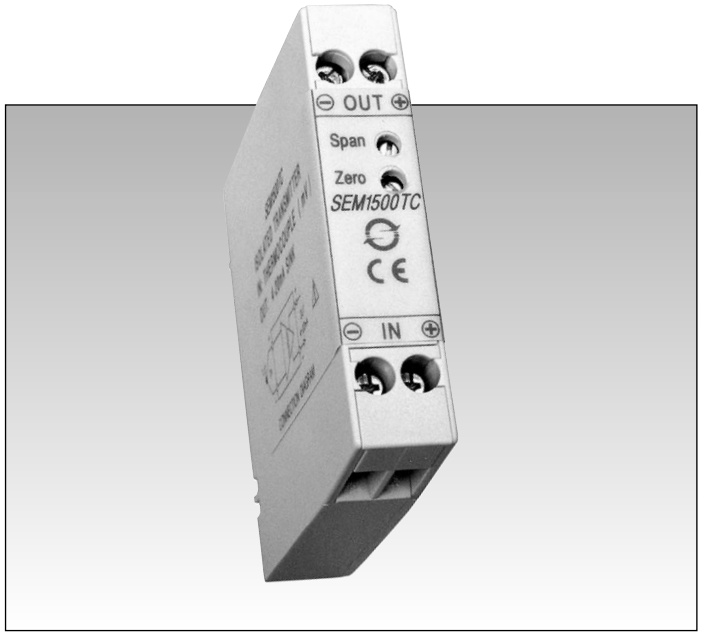
** Also suitable for differential T/C input (i.e. back to back coupled)*

OUTPUT

TYPE	Passive 2 wire current output
RANGE	4 to 20 mA (30 mA MAX)
PROTECTION	Reverse connection plus overvoltage
VOLTAGE	10 - 30V DC
RIPPLE	Less than 40μA/V (Measured at 1V ripple 50 Hz)
RESPONSE	200 mS to reach 70% of final value

2.2 General Specifications

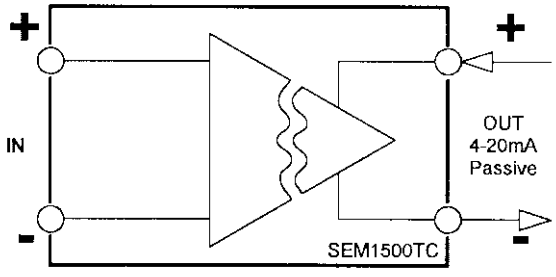
AMBIENT	0-50°C; 10-95% RH non condensing
CONNECTION	Captive clamp screws
CABLE SIZE	4 mm sq solid / 2.5mm sq stranded
CASE MATERIAL	Grey Polyamide
FLAMMABILITY	To UL94-VO VDE 0304 Part 3, level IIIA
DIMENSIONS	60 x 60 x 12.5 mm
MOUNTING	Snap on "top hat" rail (DIN EN 50022-35)
WEIGHT	45g
COMPLIANT WITH	EN50081-1, EN50082-1



3.0 INSTALLATION

3.1 Mechanical

This transmitter must be housed within a suitable enclosure that will provide protection from the external environment, ensuring that the stated temperature and humidity operating ranges are not exceeded. It is good practice to mount the transmitter away from sources of electrical and magnetic radiated noise, such as switchgear and transformers. The SEM1500TC enclosure is designed to snap fit onto a standard "TOP HAT" DIN rail. To remove from rail, apply pressure at the bottom face at the back upwards towards the rail to release the spring clip and tip away from the top. The transmitter may be mounted in any orientation and stacked side by side along the rail. Span and offset fine adjustments can be made from the front panel, while re-ranging the transmitter requires access to adjusters in the case side.



3.2 Electrical

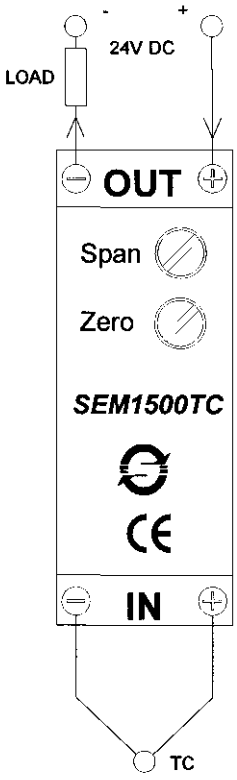
Connection to the transmitter are made via screw terminals. To maintain EMC compliance twisted pair (screened) cables are recommended for the signal connections. The correct type of wire must be used for sensor connections, compensating wire for thermocouple inputs, mV inputs must use screened copper wires, Incorrect sensor connection or sensor wire burnout will result in the output current saturating up scale on standard units (optically downscale if requested at time of order).

It is good practice to ensure all 4-20 mA signal loops are grounded at one point. Care must be taken when designing a 4-20 mA circuit to ensure that the total burden of the loop, (that is the total voltage requirement of all the equipment connected in the loop at 20 mA) does not exceed the loop power supply voltage.

To operate correctly the SEM1500TC requires a minimum of 10 volts across its output terminals.

The transmitter is protected against reverse connection and over voltage. Figure 1 shows a typical 4-20 mA circuit, the load resistor represents equipment such as indicators, loggers, PLC, etc.

Figure 1



4.0 RANGES

The SEM1500TC is normally supplied factory ranged, but if required, the transmitter range can be changed by means of coarse, and multi turn fine, offset and span adjusters.

The following equipment is required:

- – Precision mV/Thermocouple calibrator, to simulate T/C input
- – milliamp meter (digital); accuracy 0.05% on 9 to 20 mA range
- – Power Supply; 24V DC 30 mA Min
- – Trim tool

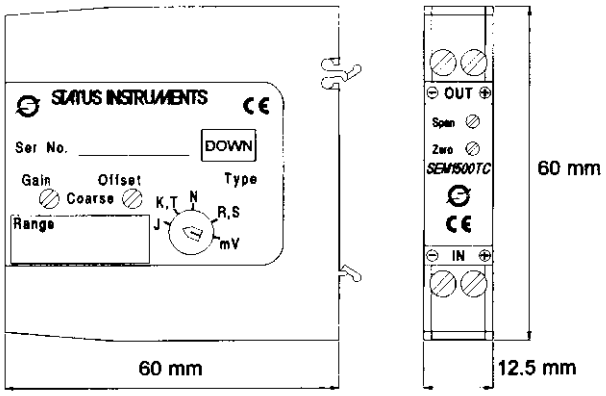
Decide on the range required and ensure the transmitter is capable of this range. If a range was not specified at time of order, the transmitter will leave the factory set as type K 0 to 1000°C.

1. Connect calibrator to input terminals using the correct cable type, ensure polarity is correct. Connect as above, with the mA meters in place of, or in series with the load. Turn on. Allow a few minutes before calibration to allow the transmitter to stabilize after handling. Set Type selector on side panel to the type of input required, i.e. T/C type or mV.

   Let Tlo = Temperature (mV) at 4 mA output, Thi = Temperature (mV) at 20 mA output.

2. Set calibrator to simulate Tlo, first rotate offset (coarse) to obtain a output reading close to 4 mA. Use zero adjuster to trim reading to 4 mA. Use zero adjuster to trim reading to 4 mA ±0.005 mA. (If zero trim reaches end of travel, re-adjust coarse offset adjuster one step then re-adjust zero offset).
3. Set calibrator to simulate Thi, first rotate coarse gain to obtain a output reading close to 20 mA. Use span adjuster to trim reading to 20 mA ±0.005 mA. (If span trim reaches end of travel, re-adjust coarse gain adjuster one step and re-adjust fine span. Note clockwise rotation of the coarse adjuster reduces output current).
4. Set calibrator to Tlo, adjust zero offset for 4.00 mA ±0.005 mA.
5. Set calibrator to Thi, adjust zero span for 20.000 mA ±0.005 mA.
6. Repeat setups 4, 5 until both points are in calibration.
7. Turn off power and remove wires. Mark transmitter with the new range.

5.0 MECHANICAL DETAIL



NB. If word “DOWN” appears where shown in label text box then unit has been factory set in the “Down Scale” option, whereas if text box has been left blank then “Up Scale” option has been set.

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