

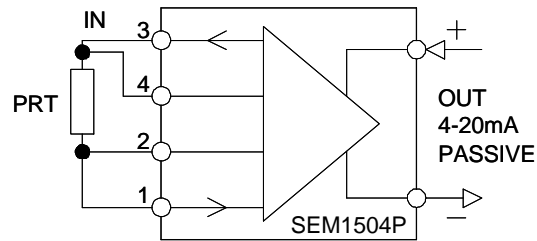
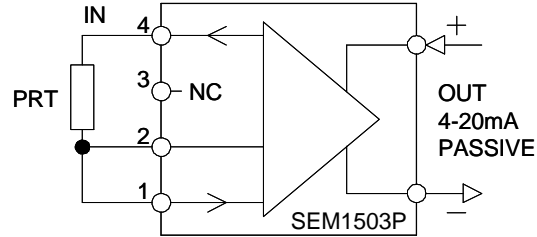
## 1.0 DESCRIPTION

Temperature transmitters designed to accept a standard platinum resistance sensor (SEM1503/P; Pt100 2 or 3 wire, SEM1504/P; Pt100 2 or 4 wire) to BS EN 60751;1996, DIN 43760 and convert the temperature to a 4-20mA current loop. It is housed in a purpose designed DIN rail mount enclosure.

The transmitters are supplied to standard factory calibrated ranges, but can be user re-ranged to operate over most of the temperature ranges encountered in industrial and building management applications. The enclosure provides trim potentiometer access, allowing fine re-calibration adjustments to be made at both ends of the scale.

## 2.0 SPECIFICATION @ 20°C

<b>INPUT</b>	<b>Type</b>	Pt100 2 or 3 wire (SEM1503/P) Pt100 2 or 4 wire (SEM1504/P) BS EN60751;1996, DIN 43760
	<b>Accuracy</b>	Accuracy $\pm 0.15^\circ\text{C} \pm \%$ reading as follows:- 500°C to 600°C 0.4% rdg 200°C to 560°C 0.2% rdg 0°C to 200°C 0.1% rdg 0° to -100°C 0.2% rdg -100°C to -180°C 0.4% rdg
	<b>Range Select</b>	Coarse Settings by side entry 16 position rotary screw adjustment switches. Fine setting by front access pots. (4 mA Reading)
	<b>Ranges Excitation</b>	2mA nominal SEM1503P 1mA nominal SEM1504P
<b>OUTPUT</b>	<b>Type</b>	Passive 2 wire current output
	<b>Range</b>	4 to 20 mA (30 mA max)
	<b>Protection</b>	Reverse connection plus over voltage
	<b>Voltage</b>	10 - 30 V DC
	<b>Thermal Stability</b> <b>Ripple</b>	Typical 100ppm/°C overall Less than 40µA/V (Measured at 1V ripple 50 Hz)
<b>Response</b> <b>Max Load</b>	100 mS to reach 70% of final value 700R @ 24V	
<b>GENERAL</b>	<b>Ambient</b>	0 - 50°C; 10-95% RH Non condensing
	<b>Connection</b>	Captive clamp screws
	<b>Cable Size</b>	4 mm sq solid / 2.5mm sq stranded
	<b>Case Material</b>	Grey Polyamide
	<b>Flammability</b>	To UL94-VO VDE 0304 Part 3, level IIIA
	<b>Protection</b>	IP20
	<b>Dimensions</b> <b>Mounting</b> <b>Compliant With</b>	60 x 75 x 12.5 mm, 45 grams Snap on top hat (DIN EN 50022-35) 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 noise, such as switchgear and transformers. The transmitter 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.

### 3.2 ELECTRICAL

Connections to the transmitter are made via screw terminals, with wire protection plates provided on each terminal. To maintain CE compliance twisted pair (screened) cables should be used for the signal connections with screens grounded at one end only.

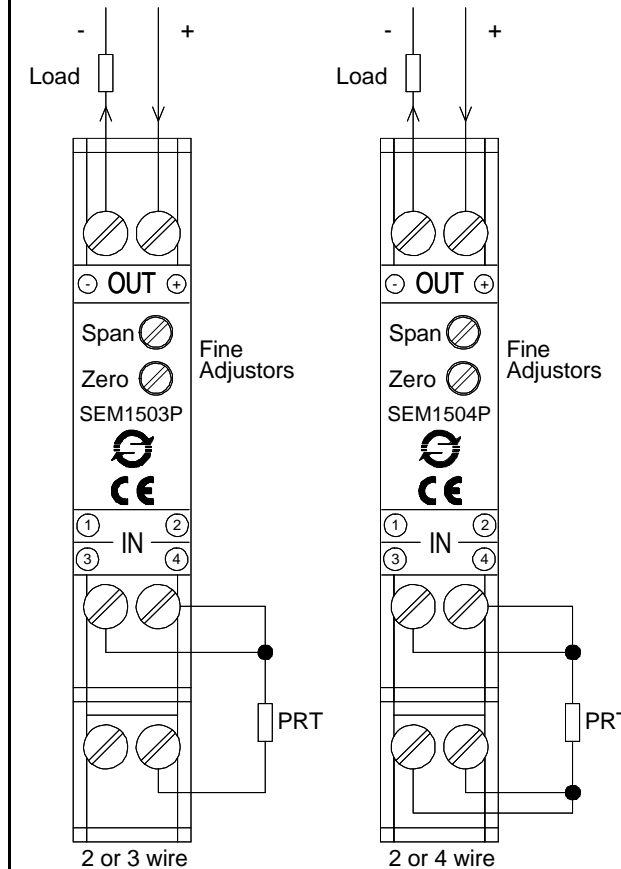
**SEM1503/P** The sensor is connected with two or three wires, the third is used to compensate for cable resistance, all three wires must be of the same size and type in order for this compensation to work correctly. Incorrect sensor connection or sensor wire break will result in the output current saturating either up or down scale. It is good practice to ensure all 4-20mA signal loops are grounded at one point.

**SEM1504/P** The sensor is connected with two or four wires. Incorrect sensor connection or sensor wire break will result in the output current saturating up scale. It is good practice to ensure all 4-20mA signal loops are grounded at one point.

Care must be taken when designing a 4-20mA 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 20mA) does not exceed the power supply voltage.

To operate correctly the transmitter 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 4-20mA circuit, the load resistor represents equipment such as indicators, loggers, PLC etc.

Figure 1



#### 4.0 RANGE SETTING AND CALIBRATION

The following equipment is required:-

- Precision resistors or resistance decade box to simulate Pt100
- DC milliamp meter (digital) ; accuracy 0.05% on 0 to 20 mA range
- Power Supply; 24V DC 30mA Min
- Trim tool and Pt100 resistance tables.

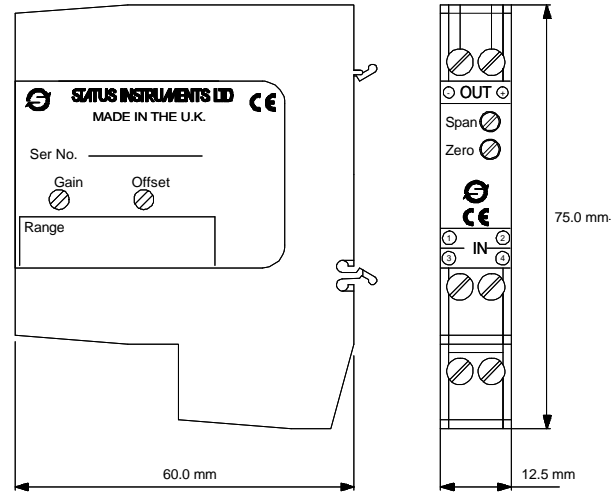
Decide on the range you require and ensure the transmitter is capable of this range. If a range has not been specified at time of order, the transmitter will leave the factory set as 0 to 100°C.

- 1 Connect Resistance box to input terminals. Ensure 3 identical wires are used on the SEM1503P, 4 identical wires used on the SEM1504P. Connect + Signal Terminal to + power supply terminal. Connect mA meter in series with the return wire from the - Signal terminal to - terminal on power supply. Turn on. Allow a few minutes before calibration for the transmitter to stabilise after handling.

Let  $T_l$  = Temperature at 4mA output  
Th = Temperature at 20 mA output

- 2 Set resistance box to simulate  $T_l$ , first rotate coarse offset to obtain a output reading close to 4mA. Use fine zero adjuster to trim reading to  $4\text{mA} \pm 0.005\text{mA}$ . (If fine trim hits end of travel re-adjust coarse adjuster one step re-adjust fine offset).
- 3 Set resistance box to simulate  $T_h$ , first rotate coarse gain to obtain a output reading close to 20mA. Use fine span adjuster to trim reading to  $20\text{mA} \pm 0.005\text{mA}$ . (If fine trim hits end of travel re-adjust coarse adjuster one step re-adjust fine span. Note clockwise rotation of the coarse adjuster reduces output current)
- 4 Set resistance box to  $T_l$ , adjust fine offset for  $4.00\text{ mA} \pm 0.005\text{mA}$ .
- 5 Set resistance box for  $T_h$ , adjust fine span for  $20.000\text{ mA} \pm 0.005\text{mA}$ .
- 6 Repeat steps 4, 5 until both points are in calibration.
- 7 Turn off power and remove wires. Mark transmitter with the new range.

#### 5.0 MECHANICAL



## SEM1503/P & SEM1504/P

## DIN Rail Mounted Pt100 Transmitter

Designed, manufactured and supported by :

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