

## RESISTANCE THERMOMETERS

### Application :

The resistance thermometers are intended, above all, for temperature measurements in the industry. High measurement accuracy, wide range of temperatures measured, excellent long-time stability and low non-linearity of the resistance vs. temperature plots are offering a wide range of application even in challenging applications. The thermometers differ in design which is application specific.

Standard design thermometers use the platinum temperature sensor Pt100/B. Other types, such as Pt100/A, Pt1000, Ni1000, double sensors or other temperature sensors may be used on request.

Our product range includes stem thermometers intended to measure the temperature of flowing both liquid and gaseous media, contact thermometers to measure pipeline temperatures, as well as wall-mounted thermometers to measure the ambient temperature. Permanent press-on (spring loaded) or adjustable (collet-type) fixing nut thermometers are well-suited to measure the temperature of solid materials. Our product range includes also several thermometer types intended to measure the temperature of electric machine windings.

The thermometers that are equipped with a connecting head may include a built-in PP100 converter which converts the thermometer output quantity (resistance) into a 4-20mA unified signal. This output is linearized, i.e., the electric current change is directly proportional to the temperature variation. The converter is so designed that it can replace the terminal board in the thermometer head.

### Specifications of Pt100 temperature sensors:

These sensors feature the so-called evaporation design, where a thin platinum layer is evaporated on the ceramic substrate. The sensor resistance is precision laser-trimmed to the rated value. This design features a high shock resistance.

Normally, temperature sensors in accuracy classes A and B are available, being screened into subgroups with a 0.01°C accuracy each. Every consignment is accompanied with an output check certificate. The sensors conform to DIN IEC 751 standard.

0°C resistance:	100Ω
Sensor dimensions:	2x5x1.5mm or 1.6x3.2x1mm
Measuring current:	max. 2mA (max. 1mA for smaller-size model)
Leads:	gold-plated nickel, 0.25x0.15x10mm
Maximum operating temperature:	„A“ -50...+400°C „B“ -50...+500°C
Stability:	maximum 0°C deviation after a 6000-hour exposition to +400°C is 0.055Ω (0.14°C)

Accuracy class	Tolerance (°C)	Resistance tolerance at 0°C	TCR (Alpha) Ω/Ω /°C
A	±(0.15+0.002t)	±0.06	0.003851±0.000005
B	±(0.30+0.005t)	±0.12	0.003851±0.000012

### Pt 100: Resistance versus temperature chart

Temperature (°C)	-100	-0	Temperature (°C)	0	100	200	300	400	500	600	700	800
0	60.26 4.07	100.00 3.91	0	100.00 3.90	138.51 3.78	175.86 3.67	212.05 3.56	247.09 3.44	280.98 3.32	313.71 3.21	345.28 3.10	375.70 2.98
-10	56.19 4.08	96.09 3.93	10	103.90 3.89	142.29 3.78	179.53 3.66	215.61 3.54	250.53 3.43	284.30 3.32	316.92 3.20	348.38 3.08	378.68 2.97
-20	52.11 4.11	92.16 3.94	20	107.79 3.88	146.07 3.76	183.19 3.65	219.15 3.53	253.96 3.42	287.62 3.30	320.12 3.18	351.46 3.07	381.65 2.95
-30	48.00 4.12	88.22 3.95	30	111.67 3.87	149.83 3.75	186.84 3.63	222.68 3.53	257.38 3.40	290.92 3.29	323.30 3.18	354.53 3.06	384.60 2.95
-40	43.88 4.16	84.27 3.96	40	115.54 3.86	153.58 3.75	190.47 3.63	226.21 3.51	260.78 3.40	294.21 3.28	326.48 3.16	357.59 3.05	387.55 2.93
-50	39.72 4.18	80.31 3.98	50	119.40 3.84	157.33 3.72	194.10 3.61	229.72 3.49	264.18 3.38	297.49 3.26	329.64 3.15	360.64 3.03	390.48
-60	35.54 4.20	76.33 4.00	60	123.24 3.84	161.05 3.72	197.71 3.60	233.21 3.49	267.56 3.37	300.75 3.26	332.79 3.14	363.67 3.03	
-70	31.34 4.24	72.33 4.00	70	127.08 3.82	164.77 3.71	201.31 3.59	236.70 3.48	270.93 3.36	304.01 3.24	335.93 3.13	366.70 3.01	
-80	27.10 4.27	68.33 4.03	80	130.90 3.81	168.48 3.69	204.90 3.58	240.18 3.46	274.29 3.35	307.25 3.24	339.06 3.12	369.71 3.00	
-90	22.85 4.31	64.30 4.04	90	134.71 3.80	172.17 3.69	208.48 3.57	243.64 3.45	277.64 3.34	310.49 3.22	342.18 3.10	372.71 2.99	
-100	18.52	60.26	100	138.51	175.86	212.05	247.09	280.98	313.71	345.28	375.70	

The figures placed below the resistance values indicate the resistance variation per 10°C.

The resistance values of Pt500 and Pt1000 are calculated by multiplying the above data by a factor of 5 or 10, respectively.

Example: -50°C = 80.31Ω  
+110°C = 142.29Ω  
+112°C = 142.29Ω + 0.2x3.78 = 143.05Ω