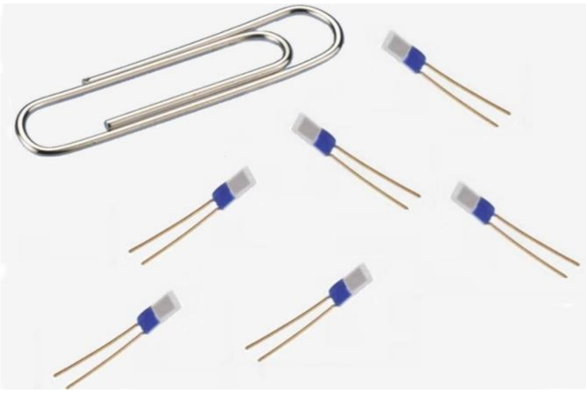
URT Series (Thin Film) RTD Sensors



Pt100/500/1000 Elements, Thin Film

P Pt100/500/1000 elements to IEC751 Class A/B
For use from –50°C to +500°C
Thin film construction.
Suitable for surface & immersion applications where protected
Vibration resistant

Specifications

Sensor type:	Pt100/500/1000 (100/500/1000 Ohms @ 0°C)
Insulation resistance:	Exceed 100M ohm at 500V DC (@Room Temp.)
Operation Temperature range:	-50°C to +500°C
Resistance **Tolerance** (at 0°C):	Class A / Class B = 0.06Ω/ 0.12Ω
Temperature coefficient:	TCR ppm/°C 3850
Insulation resistance :	> 100 M at 20℃; > 2 M at 500℃
Self-heating:	<0.4C/mW at 0℃ (in Air, 1m/Sec)
Thermal response time (90%):	10 Sec. Max. (in Air, 1m/Sec)
Measuring current 100 :	0.5 to 2.0 mA (self-heating has to be considered)
Response time	water current (v = 0.4 m/s): t0.5 = 0.06 s t0.9 = 0.20 s air stream (v = 2 m/s): t0.5 = 3.0 s t0.9 = 13.0 s

Reliability test

- High temperature test
  Keep the Pt sensors in ＋500°C for 1000 hours.
- Low temperature test
  Keep the Pt sensors in －50°C for 1000 hours.
- Humidity test
  Keep the Pt sensors in 60°C and 90°C to 95% HR for 1000 hours.
- Thermal shock test
  Keep the Pt sensors in 0°C ice water for at least to 15sec ., then within 10sec. Directly put into 100°C hot water for least to 15sec, the above process should be proceeded for least 10 cycles.
  After each item test, valuation of item 1-1 should be within 0.12% and item 1-3 Should exceed 100M at 500V DC.

Characteristics

1-1 Electrical

1-1-1 Insulation Resistance

1000M ohm or more

The Pt-SMD shall be cramped in the metallic block and tested, as shown below.

Test Voltage: 100V DC for 1 minute at room temperature.

The resistance of a platinum wire with temperature to measure the change in temperature.

The equation for such a change is:

$$R_\theta = R_o(1 + \alpha\theta + \beta\theta^2)$$

where <θ is the temperature change and α and β are constants, β being much smaller than α. We therefore ignore the term β^2 and assume that the resistance of the wire varies uniformly with temperature: α is the temperature coefficient of resistance of the material.

For platinum a = 3.8x10-4 oC-1.

A simple form of the platinum resistance thermometer is shown in Figure 1. It consists of a platinum wire wound non- inductively on a mica former and held in a glass tube by silica spacers.

The resistance of the wire is measured with a Wheatstone bridge network and to allow for the change in resistance of the leads a set of dummy leads are included in the opposite arm of the bridge (see Figure 2).

This type of thermometer has a large range, from -200 oC to +1100 oC and this can be extended by the use of different wires. Bronze has a range starting at -260 oC and using carbon temperatures as low as -270 oC can be measured.

The advantages of the resistance thermometer are its convenient size, wide range and high sensitivity (0.000 05 oC). It can only be used for steady readings, however, and is not direct-reading.

Relationship of temperature with Resistance

When t≧t0°C	When t ＜0°C
$Rt= R0 (1+At\ Bt^2)$	$Rt= R0 [1+At\ Bt^2+C(t-100)\ t^3]$
A = 3.9083E-3	B = 3.9083E-03
B = -5.7750E-7	B = -5.7750E-7
C = -4.1830E-12	R_0= 1.000E+02

Ordering Information

Order Map	URT	100	□	-	□□□□
	Series Code	Resistance	Res. Class		Appearance