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PTRB102BT04

Platinum Temperature Sensor

PT1000, 13 x 2.8, Class B(cryo), cable assembly, ceramic tube

Features

- R_0: 1000 Ω
- TCR 3850ppm/K
- Application temperature -200°C…200°C
- Resistance tolerance ±0.12%
- Size 13 mm x 2.8 mm (length/diameter)
- 600mm AWG 26 PTFE insulated lead extension

Applications

- Specific Cryo-Temperature feedback control
- Industrial applications
- Medical

Product Description

This sensor is a resistance temperature detector (RTD) using a platinum resistor as sensing element. This platinum resistor consists of a structured platinum film on a ceramic substrate, passivated by a ceramic cover. The connection wires are protected with glass ceramic on the welding area. This standard element with PTFE-insulated lead wire extension is mounted into a ceramic tube. The material for the connection wire is gold coated nickel wire extended with PTFE insulated Ag-coated stranded copper wire.

The characteristic curve of this Platinum RTD complies with DIN EN 60751. The usage of Platinum as resistive material guarantees high long term stability.

Within the extended temperature range between -200 °C and -50 °C the characteristic curve of this Platinum RTD can be calculated using the same mathematical expression as between -50 °C and 0 °C.

To avoid hysteresis, the element is pre aged in liquid nitrogen. The element is designed, to perform measurements at -196°C (liquid nitrogen).

Due to relative small outline and low mass this RTD has a low time constant; therefore it is a suitable solution for fast and precise feedback control systems.

- Platinum Temperature Sensor
- Conformal to DIN EN 60751
- Global interchangeability
- Wide temperature range
- Fast response time
- Special Class B (F0.3) accuracy for measurements at -196°C
- Small outline dimensions
- Gold coated nickel lead wires with lead extension

Sensor properties

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Nominal Resistance at 0 °C	R_0	Class B (F0.3) Cryo	998.8	1000.0	1002.4	Ω
Nominal Resistance at -196 °C	R_{-196}	Class B (F0.3) Cryo	196.90	202.50	208.10	Ω
Temperature Tolerance at -196 °C	$\Delta\vartheta$		-1.3	0	+1.3	K
Temperature Coefficient of Resistance	TCR	0 °C, 100 °C		3850		ppm/°C
Tolerance Temperature Range *		Class B (F0.3)	-200		200	°C
Self-Heating Coefficient in air, flow: 1 m/s				0.2		°C/mW
Response Time Water Flow: 0.4 m/s	$\tau_{W,0.9}$			3		s
Response Time Air Flow: 1 m/s	$\tau_{A,0.9}$			40		s
Measuring Current		Class B (F0.3)			0.7	mA
Lead wire Au-coated Ni-wire		Diameter length		0.25 7		mm mm
Lead extension Ag-coated stranded copper wire PTFE insulated		Diameter length		0.8 600		mm mm
Pre-aging condition			-200		150	°C

**possible operating temperature range is, -200°C to +270°C for PTFE insulated wire type.*
Specified accuracy is not guaranteed if the sensor is exposed to temperatures outside the specified tolerance temperature range.

Calculation Formulas

The calculation formulas of this Pt-RTD are defined in DIN EN 60751 as following:

For T ≥ 0 °C: $R_{(T)} = R_{(0)} * (1 + a * T + b * T^2)$

For T < 0 °C: $R_{(T)} = R_{(0)} * [1 + a * T + b * T^2 + c * (T-100°C) * T^3]$

Polynomial coefficients: a = 3.9083E-03 b = -5.775E-07 c = -4.183E-12

Tolerances: Class B (F 0.3) extended: - (0.3+0.005*|T/°C|) °C; +(0.6+0.005*|T/°C|) °C (-150 … +300 °C)
± (0.3+0.005*|T/°C|) °C (-200 … -150 °C)