Platinum Temperature Sensor

Product Name: **P0K5.202.6W.A.010**

Order Code: **158830**

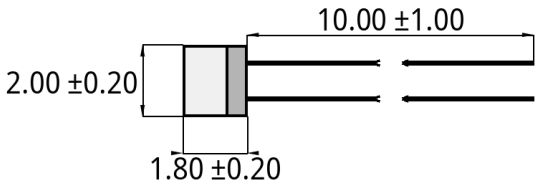
innovative Sensor Technology

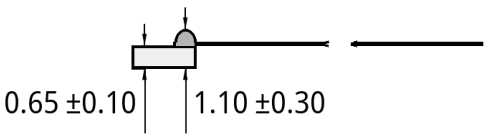
physical · chemical · biological

1 Technical Data

Standard	IEC 60751, Class F 0.15			
TCR	3850 ppm/K			
Operating Temperature Range	-200 °C to 600 °C			
Nominal Resistance (R_0)	500.0 Ω at 0 °C			
Recommended Measurement Current	0.5 mA			
Connection	Draht, Ni/Pt, 0.20mm 99.6%			
Thermal Response Time in Seconds	Medium	$t_{0.5}$	$t_{0.63}$	$t_{0.9}$
	Water (0.3 m/s)	0.104	0.15	0.345
	Air (3 m/s)	2.98	4.3	9.9
Self-Heating Coefficient (E)	Medium	E (in °C/mW)		ΔT (in mK)
	Ice Water (0 m/s)	0.031		3.88
	Air (3 m/s)	0.313		39.1
Long-Term Stability	Less than 0.04% drift after 1000 h at 600 °C			
Storage	Original packaging, 10 °C to 30 °C, RH 50 ± 10 %			

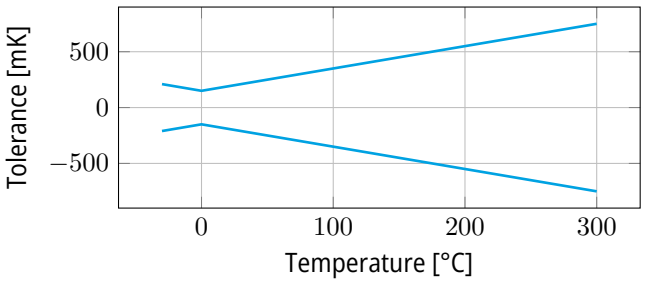
2 Technical Drawing





Dimensions in mm

3 Tolerances



Temperature [°C]	Tolerances [mK]
-30	-210, 210
0	-150, 150
300	-750, 750

4 Temperature-Resistance Relationship

$$R(T) = R_0\left(1 + A \cdot T + B \cdot T^2\right), \qquad \text{for } 0\,°\text{C} \leq T \leq 850\,°\text{C} \tag{1}$$

$$R(T) = R_0\left(1 + A \cdot T + B \cdot T^2 + C \cdot (T - 100\,°\text{C}) \cdot T^3\right), \qquad \text{for } -200\,°\text{C} \leq T < 0\,°\text{C} \tag{2}$$

A	$3.9083 \times 10^{-3}\,°\text{C}^{-1}$
B	$-5.7750 \times 10^{-7}\,°\text{C}^{-2}$
C	$-4.1830 \times 10^{-12}\,°\text{C}^{-4}$

5 Measurement Current

The effect of the applied current depends strongly on the sensor's application and can cause significant self-heating. To minimize this, the measurement current should be kept as low as possible, ideally less than 0.5 mA. For our measurements, the electrical contact point is 5 mm from wire end. During the final inspection, this product is measured at two temperatures with a difference of 60 °C.

$$\Delta T = R \cdot I^2 \cdot E \cdot 1000$$

6 Operating Conditions

Unfortunately it is not possible to test the sensor behavior in all application and installation conditions. Therefore the customer needs to test the compatibility of the sensor element with the application and/or the installation conditions. With certain ceramic casting compounds for instance there can occur chemical reactions between the passivation glass and the fixation glass. Potential problems can also arise due to strong creeping polymers (e.g. uncured silicones) or due to the reaction between plastic-based casting compounds with the plastic-based wire fixations, used for directly welded wires. The use of bare sensors in long-term humid environment as well as in aggressive atmospheres has to be avoided; the same applies to the direct dipping of the sensor into liquids. Furthermore mechanical pressure on the sensors, e.g. caused by hard or strong post-curing casting compounds should be avoided. Some epoxy-based casting compounds might become conductive above Tg and therefore cause a bypass via the sensor wires, which can lead to a lower resistance reading. For sensors at higher temperatures (> +600 °C) oxygen access should be guaranteed in order to counter post-oxidation-effects in stainless steel housings. Alternatively the construction should be chosen in a way that no significant decrease of the oxygen partial pressure might occur in the installation. In principle, stainless steel parts should be carefully cleaned and pre-oxidized.

7 Voltage Sensitivity

Platinum temperature sensors are passive components that cannot be actively protected against overvoltage events such as ESD. Their design minimizes effects caused by ESD events, but proper handling and external protection during the customer's assembly process are essential.

8 Appearance

Various automation processes are implemented to ensure redundant manufacturing processes. Therefore, sensors may differ in appearance.

9 Further Information

More information regarding our products can be found on our website in the download section.

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