

MODEL 162K HIGH TEMPERATURE STANDARD PLATINUM RESISTANCE THERMOMETER

- > Temperature Range 0°C to 1100°C
- > ITS-90 Interpolation Standard
- > Drift Rate Less Than 0.010°C per 100 hours at 1100°C
- > Insulation Resistance Test Lead
- > Hermetically Sealed in Quartz Sheath



DESCRIPTION

Model 162K is a high temperature standard platinum resistance thermometer, and satisfies all the requirements as a defining instrument on the International Temperature Scale of 1990 (ITS-90). The excellent stability, low self-heating error, and immersion characteristics of this thermometer meet or exceed the acceptance criteria required by the most demanding standards laboratories. The 162K can be calibrated from the triple point of water (0.01°C) to the freezing point of silver (961.78°C) with expanded uncertainty ($k=2$) less than 0.002°C, as calibrated by the National Institute of Standards and Technology (NIST).

CONSTRUCTION

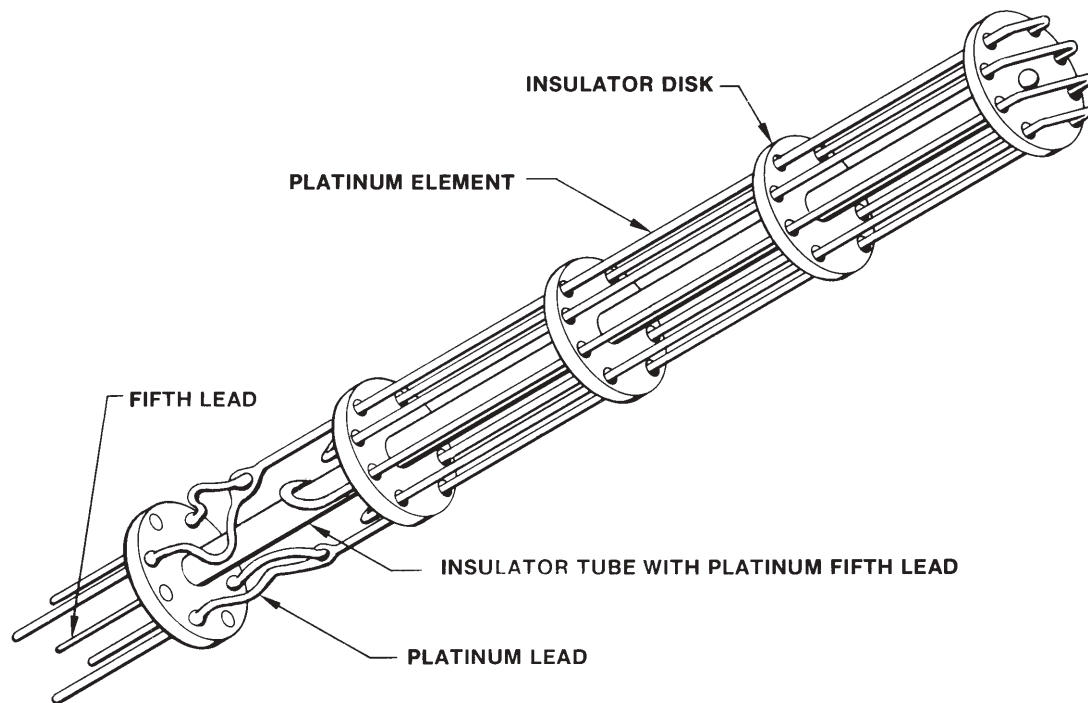
The nominal 0.25 ohm sensing element of the 162K is made of annealed platinum wire with purity not less than 99.999%. The wire is formed into a single layer filament and supported by multiple quartz disks, as shown in the illustration on page 2. This straight wire or "birdcage" configuration ensures strain-free operation, promotes low self-heating, and minimizes inductance. The sensing element is attached to four creep resistant platinum lead wires and hermetically sealed in a quartz sheath containing a dry mixture of argon and oxygen gas. A matte finish on the sheath minimizes heat loss due to radiation.

The external cable consists of four 20 gage silver coated copper lead wires, Teflon* insulated, twisted, and covered with a braided shield and silicone rubber jacket. Each lead wire is terminated with a gold plated copper spade lug with a color-coded PVC molded strain relief. Fine stranding provides excellent flexibility and long-term reliability.

* Teflon is a trademark of Dupont Co.

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Platinum Resistance Sensing Element



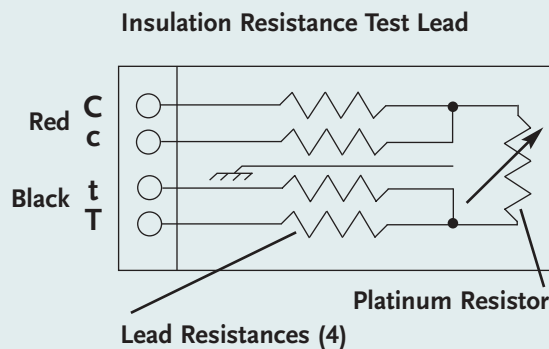
Electrical Circuit

The thermometer includes four leads so that lead resistance effectively cancels when used with a four terminal bridge or meter.

Sensitive Portion

The platinum resistor is located within the first 2 inches of the sheath tip. To minimize conduction error, the standard should be immersed to an adequate depth. In general, the depth is dependent upon the temperature and the medium being measured. Six inches is sufficient in a well-agitated oil or ice bath. The standard is long enough for accurate measurements in well-designed fixed point cells or furnaces.

ELECTRICAL SCHEMATIC



SPECIFICATIONS

Temperature Range

0°C to 1100°C. Maximum temperature for head and cabling is 125°C.

Stability

Model 162K temperature standard has a maximum $R(0.01^\circ\text{C})$ drift rate less than 0.010°C per 100 hours of exposure to temperatures up to 1100°C . Drift rate is significantly reduced when the standard is used at temperatures below 1000°C . Typical drift rates at 961.78°C are less than 0.002°C per 100 hours.

Self-Heating

The temperature rise (self-heating) of the platinum resistor element is less than 0.003°C when measured in a stirred ice bath. The nominal value is 0.002°C using an excitation current of 10 mA.

Insulation Resistance

A fifth wire runs between the resistor and the rear housing. This lead, being insulated and equidistant from the 4 leadwires, is used to measure insulation resistance. Resistance from the element to the case is greater than 1000 megohms at 100 VDC at room temperature, and greater than 1 megohm at 1 VDC at 1064°C . This parallel shunting resistance corresponds to an error in temperature measurement of less than 0.0005°C .

SPECIFICATIONS (continued)

Resistance-Temperature Relationship

Model 162K standard is suitable for interpolating temperatures from 0°C to 1100°C . Ice point resistance value is between 0.20 and 0.25 ohms. Model 162K resistance ratio, W , satisfies ITS-90 requirements:

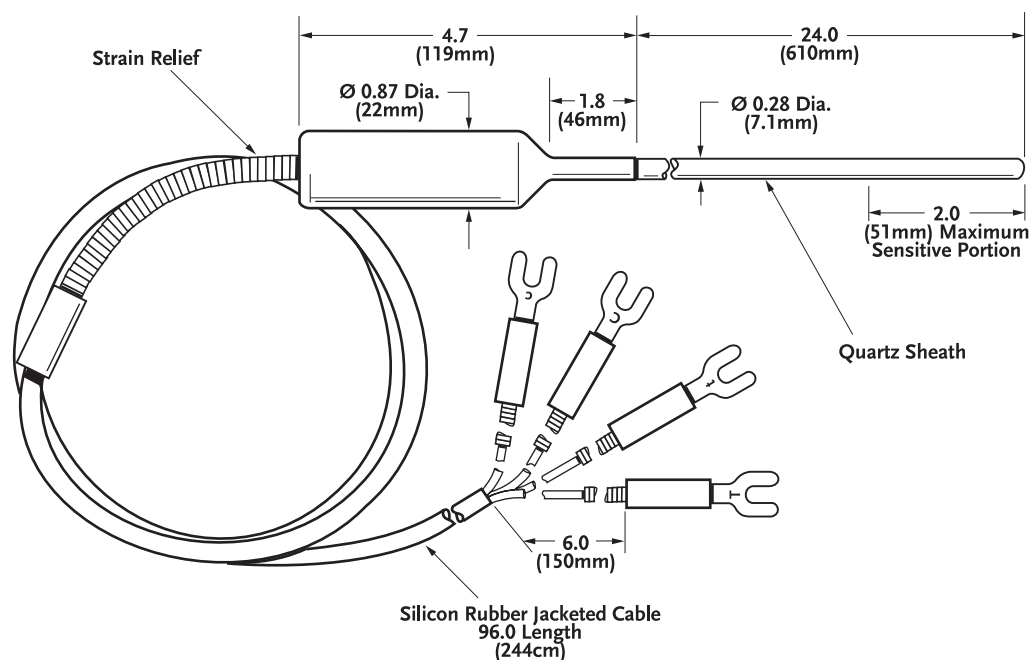
$$W(29.7646^\circ\text{C}) \vee 1.11807$$

$$W(961.78^\circ\text{C}) \vee 4.2844$$

Identification

The following information is engraved on the housing:
Rosemount Aerospace Inc.
Standard Platinum Resistance Thermometer
Model 162K Serial Number _____

CONFIGURATION DRAWING



All dimensions in inches

MODEL 162K HIGH TEMPERATURE STANDARD PLATINUM RESISTANCE THERMOMETER

CALIBRATION

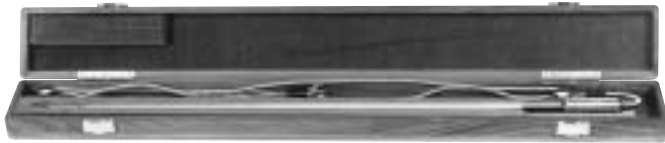
Model 162K is suited for calibration over all or part of the operating temperature range of 0°C to 1100°C. We offer several fixed-point and comparison calibration options traceable to NIST. Alternatively, the thermometer may be submitted directly to the NIST or similar standards laboratory.

PRODUCT INFORMATION

We offer a complete line of reference thermometers and related calibration services. Contact one of our sales representatives nearest you, or contact us direct for specific product information.

STORAGE CASE

Model 162K is supplied with an attractive storage case.



FOR ADDITIONAL INFORMATION

To learn more about the Model 162K High Temperature Standard Platinum Resistance Thermometer, call Goodrich at 651 681 8900.



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