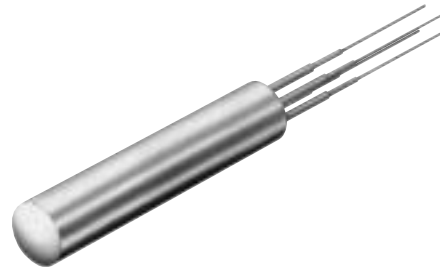


**MODEL 162D
CAPSULE STANDARD
PLATINUM RESISTANCE THERMOMETER**

- > **Temperature Range -269°C to $+250^{\circ}\text{C}$**
- > **Excellent Stability and Low Self-heating**
- > **Hermitically Sealed in Metal Sheath**
- > **ITS-90 Interpolation Standard**



DESCRIPTION

Model 162D is a capsule-type 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 and low self-heating error of this thermometer meet or exceed the acceptance criteria required by the most demanding standards laboratories. The 162D can be calibrated from approximately -260°C to $+232^{\circ}\text{C}$ with expanded uncertainty ($k=2$) less than or equal to 0.001°C , as calibrated by the National Institute of Standards and Technology (NIST).

CONSTRUCTION

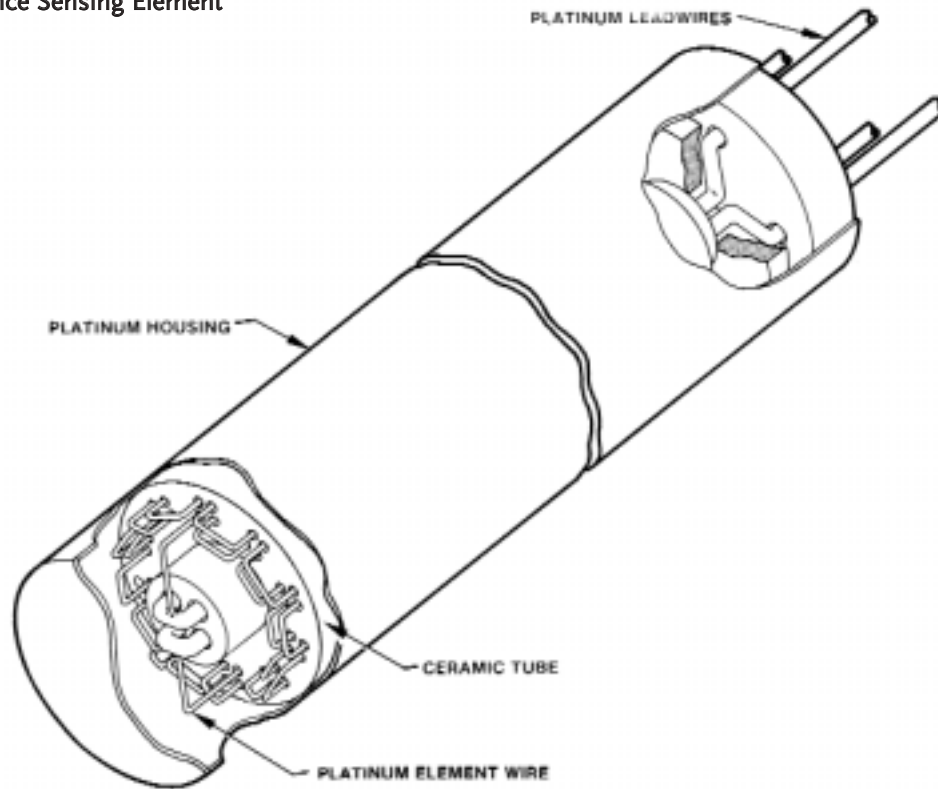
The nominal 25.5 ohm sensing element of the 162D is made of annealed platinum wire with purity not less than 99.999%. The wire is formed into a single layer filament and supported within a multi-bore ceramic tube and platinum case (see element drawing). This straight wire or "birdcage" configuration ensures strain-free operation, promotes low self-heating, minimizes inductance, and limits wire displacement caused by mechanical shock. The sensing element is hermetically sealed in an Inconel* X-750 sheath containing dry helium gas.

The thermometer includes four platinum lead wires so that lead resistance effectively cancels when used with four terminal bridge or meter. Optional lead wire extensions are also available.

* Inconel is a trademark of International Nickel Co.

MODEL 162D CAPSULE STANDARD PLATINUM RESISTANCE THERMOMETER

Platinum Resistance Sensing Element



Electrical Circuit

Model 162D standard is provided with four leads to effectively cancel lead resistance when measured with a four terminal resistance bridge (see electrical schematic).

SPECIFICATIONS

Temperature Range: -269°C to $+250^{\circ}\text{C}$

Stability

When cycled over the specified temperature range, the $R(0.01^{\circ}\text{C})$ shall repeat within the equivalent of 0.001°C . For routine laboratory service, the stability is typically better than 0.01°C per year.

Self-Heating

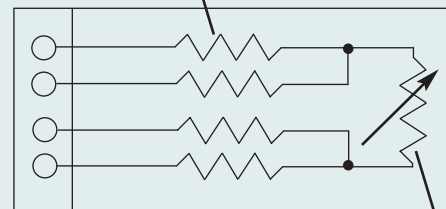
The self-heating error shall not exceed $0.6\text{ m}^{\circ}\text{C}/\text{mA}^2$ when measured at the triple point of water (0.01°C). The nominal value is $0.3\text{ m}^{\circ}\text{C}$ with 1 mA current.

Insulation Resistance

Insulation resistance between the platinum resistor and the outside sheath is greater than 1000 megohms at 100 VDC and room temperature.

ELECTRICAL SCHEMATIC

Lead Resistances (4)



Platinum Resistor

SPECIFICATIONS (continued)

Pressure Range

When used in the specified temperature range, the standard will operate in a 0 to 1000 psia environment.

Resistance-Temperature Relationship

Model 162D is suitable for interpolating temperatures on the International Temperature Scale of 1990. The nominal resistance at 0°C is 25.55 ohms and varies from 0.03 ohms at -260°C to 50.1 ohms at +250°C. A slope of approximately 0.1 ohms/°C allows for convenient interpolation over the -200°C to +250°C range.

Model 162D resistance ratio, W , satisfies the requirements of the ITS-90:

$$W(-38.8344^{\circ}\text{C}) \approx 0.844235$$

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

Response

The standard's response, defined as the time required for the resistor to reach 63.2 percent of a step change in temperature, is less than five seconds. Test based on immersing sensor, stabilized at 20°C in 76°C oil circulating at 3 feet per second.

Identification

The thermometer is engraved with a unique serial number.

The storage case includes the following:

Rosemount Aerospace Inc.

Standard Platinum Resistance Thermometer

Model 162D Serial Number _____

CALIBRATION

Model 162D is suited for calibration over all or part of the operating temperature range of -269°C to +250°C. We offer several calibration options traceable to the NIST.

Alternatively, the thermometer may be submitted directly to the NIST or similar standards laboratory.

STORAGE CASE

Model 162D is supplied with an attractive storage case to protect the instrument when not in use, and should be retained for possible future transportation.



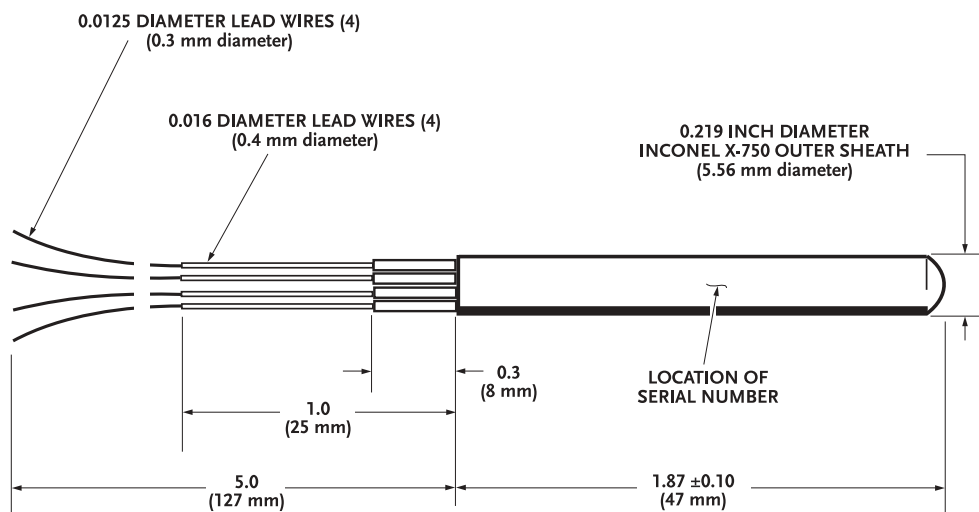
PRODUCT INFORMATION

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.

FOR ADDITIONAL INFORMATION

To learn more about the Model 162D Capsule Standard Platinum Resistance Thermometer, call Goodrich at 651 681 8900.

CONFIGURATION DRAWING



All dimensions in inches



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