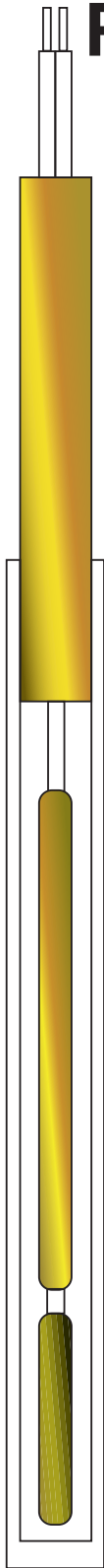


RTD Resistance Temperature Detectors



The Probe

A probe is an assembly composed of an element, a sheath, a lead wire, and a termination or connection.

The Termination

Probes may be terminated in a connection head, quick disconnect, terminal block, or extension wire. OMEGA's standard terminations are pictured on product pages. Other termination styles are available upon special request. For something other than standard products, please contact our sales team to submit a full description and/or sketch of your desired version.

The Lead Wire

Lead styles are offered in one of four configurations (see diagrams at the side of this page). Style 2 is OMEGA's standard. Be sure to select the configuration that is compatible with your instrumentation.

The Sheath

The sheath, a closed end tube, immobilizes the element, protecting it against moisture and the environment to be measured. The sheath also provides protection and stability to the transition lead wires from the fragile element wires. OMEGA's standard sheaths are 3 mm (1/8") and 6 mm (1/4") O. D. 304 stainless steel tubes. Other O.D.'s and materials are available upon request.

The Element

The standard OMEGA® RTD probe is made with a 100 ohm platinum European curve element ($\alpha = 0.00385$).

Temperature Rating

OMEGA's "PR" style RTD probe assemblies are rated for use in temperatures up to 600°C

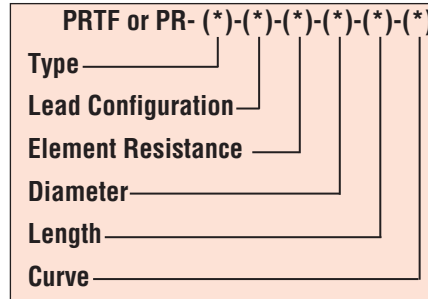
(1110°F). The "PRTF" style probes are rated up to 260 or 500°C depending on construction (see product handbook page).

Temperature limitations may be placed on termination styles due to the wire insulation used. The maximum temperature rating available on special order is 750°C (1380°F). If the probe is intended for high temperature use, please request a quotation.

OMEGA stocks a broad line of RTD probes for immediate delivery. Many special assembly probes are available for shipment within two weeks of receipt of your order. Please consult Sales Department for further details on your special needs.

Definition of RTD Probe Part Number

Type: Select style PR- or PRTF-10, -11, -12, -13, -14, -15, -16, -17, -18, -19.



Lead Configuration: Specify 1, 2, 3, or 4. Style 2 is standard.

Resistance: 100 Ω is standard. 50, 200, 500, 1000, or 2000 Ω are available, usually with two-week delivery.

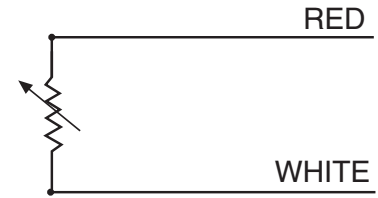
Sheath Diameter: 1.5 mm (1/16"), 3 mm (1/8"), 4.5 mm (3/16") and 6.0 mm (1/4") are available. 3 mm (1/8") and 6 mm (1/4") O.D. probes are stocked for off-the-shelf delivery.

Sheath Length: There is no upper limit on sheath length. The minimum practical length is 2 inches.

Curve: European (E): $\alpha = 0.00385$ ohms/ohm/°C, American (A): $\alpha = 0.00392$ ohms/ohm/°C

Lead Configurations of RTD Probes

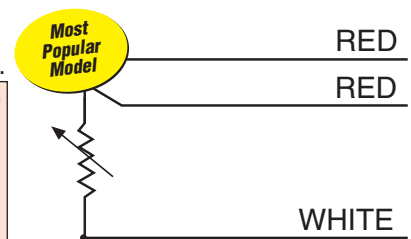
STYLE 1



ELEMENT

Lead configuration 1 provides one connection to each end of the sensor. This construction is suitable where the resistance of the run of lead wire may be considered as an additive constant in the circuit, and particularly where the changes in lead resistance due to ambient temperature changes can be ignored. **Note:** The resistance of probe and extension is added to the sensor resistance and will increase the measured value.

STYLE 2 (STANDARD)



ELEMENT

Lead configuration 2 provides one connection to one end and two to the other end of the sensor. Connected to an instrument designed to accept three-wire input, compensation is achieved for lead resistance and temperature change in lead resistance. This is the most commonly used configuration.

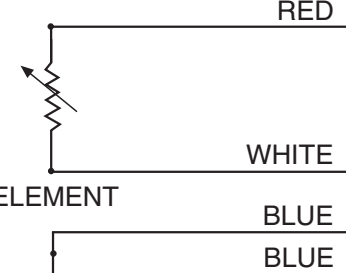
STYLE 3



ELEMENT

Lead configuration 3 provides two connections to each end of the sensor. This construction is used for measurements of the highest precision.

STYLE 4



ELEMENT

LEAD RESISTANCE LOOP

Lead configuration 4 is similar to Lead Configuration 3 except that a separate pair of wires is provided as a loop to provide compensation for lead resistance and ambient temperature changes in lead resistance.

PR-17-2-100-1/16-6-E, \$115.
See page C-61 for details.

PR-11-2-100-1/16-12-E, \$97.
See page C-61 for details.

PR-12-2-100-1/4-6-E, \$90.
See page C-65 for details.

C-13

OMEGAFILM® Thin Film RTD Elements

When accuracy over a wide temperature range is a crucial factor in industry, OMEGA's platinum Resistance Temperature Detectors (RTD's) are unequalled in performance. Stability over long periods of continued use makes them unmatched for reliability. Precision materials and workmanship make them highly interchangeable for easy replacement without calibration.

Definition

A resistance temperature detector operates on the principle of the change in electrical resistance in wire as a function of temperature.

Element or Probe?

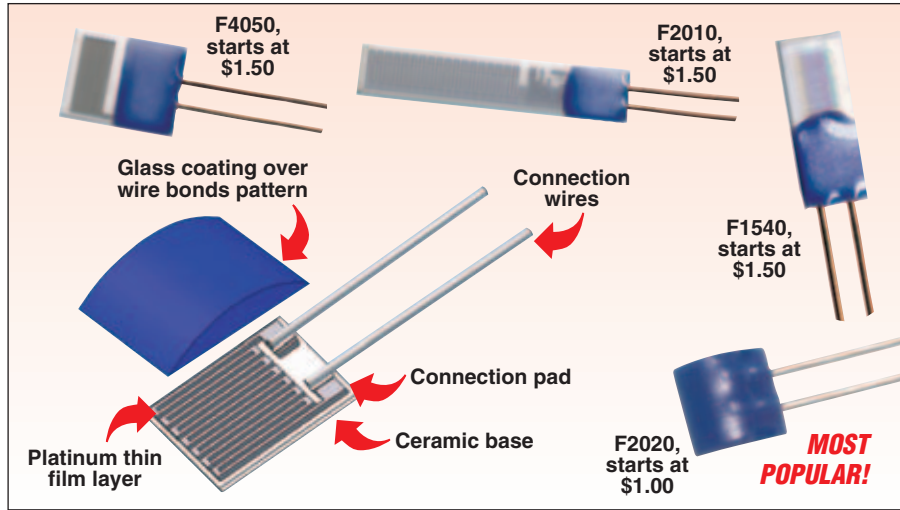
A common source of confusion is the distinction between an element and a probe.

The Element

An element is the actual temperature sensing unit. OMEGA features two styles of elements: wire wound and thin film.

Wire Wound

Wire wound RTD elements used are made of 99.99% pure platinum wire wound about a ceramic or glass core and hermetically sealed within a ceramic or glass capsule. Platinum wire was chosen because it best meets the needs of precision thermometry. It resists contamination and is mechanically and electrically stable. Extension leads are attached by welding at OMEGA or by the end user. These RTD's provide close interchangeability between elements with negligible drift and error with age. On special request, OMEGA can make RTD probes with other wire materials. The probes are available conforming to the following two curves: European (E) or IEC60751 $\alpha = 0.00385 \text{ ohms/ohm}^\circ\text{C}$ or American (A) $\alpha = 0.00392 \text{ ohms/ohm}^\circ\text{C}$.

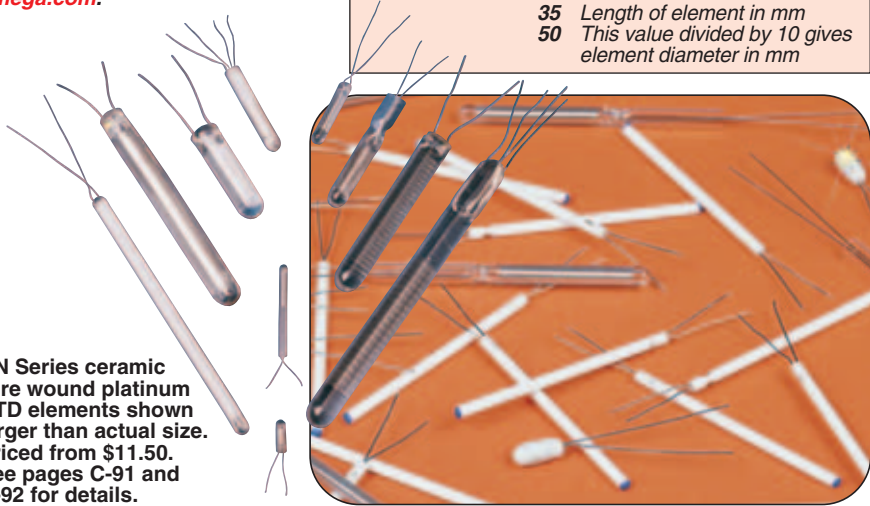


Elements are included as part of a probe assembly here in the OMEGA Complete Temperature Measurement Handbook and Encyclopedia®, or they can be purchased separately online at omega.com.

Wire Wound Element Model Numbers

Example: 2PT100G3550

- 2 2 windings (double resistance element)
- PT Platinum wire
- 100 Resistance in ohms at 0°C
- G Glass core
- 35 Length of element in mm
- 50 This value divided by 10 gives element diameter in mm



KN Series ceramic wire wound platinum RTD elements shown larger than actual size. Priced from \$11.50. See pages C-91 and C-92 for details.

Standard OMEGA® probes conform to the European (E) curve. When you order, specify an "A" suffix instead of "E" if the American curve is desired. The calibration of "E" elements conforms to the IEC60751 standard, shown in the table.

Thin Film

Made by depositing platinum as a film on a substrate and then encapsulating both. This method allows for the production of small, fast response, accurate sensors. Thin film elements also conform to the IEC60751 curve.

Recommended Temperature Application Ranges-Platinum RTD Elements

Series	Construction	-200	-100	-60	0	100	200	300	400	500	600	700°C
A	Tight spaces, leads perpendicular											
F	Small, flat response											
FR	Ceramic											
KN	Ceramic for temperatures up to 600°C											
G	Glass											
GN	Glass with glazed coating											
GX	Glass with silicone-glazed coating											
W	Special shapes											