Custom Engineered Sensors

Solving the Industries Most Difficult Application Problems

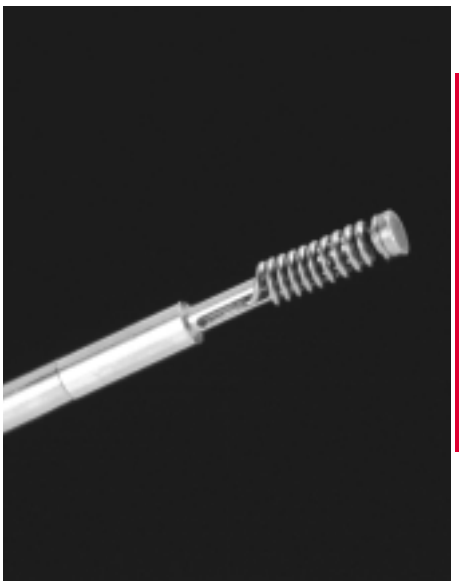
Watlow has been servicing the demands of the temperature measurement market since 1914. Over 85 years of experience has propelled us to become a leader in the design and manufacturing of custom temperature sensors. We bring a long history of innovation, technical experience and the dedicated need to solve the industries most difficult and demanding applications.

Our staff of engineers, along with our in-house testing, calibration and manufacturing capabilities is prepared to design the most accurate and reliable sensor possible.

Accurate sensing in radio frequency environments.

High temperature ribbon surface sensing.

Durable engine exhaust gas probes.



Fast responding small mass sensors.

Use Form 434 on page 37 to fax us your sensor application information.

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Technical Data

Quality Assurance

Watlow's Quality Assurance System for sensor products is ISO 9001 certified. Our process begins at the very source of our raw materials.

With your order we can provide documentation certifiying the traceability of the materials used and attesting to their quality.

In-process inspection and testing is performed throughout the manufacturing cycle and verified by our technicians' system of "checks and balances."

While observing the most rigid specifications and quality surveillance criteria. we retain the flexibility and capability to supply our customers with considerable economy.

Watlow adheres to the many standard specifications that govern the manufacture of high-grade thermocouples and mineral insulated, metal-sheathed cable. Additional customer requirements often call for compliance with one or more of the following specifications:

Number	Title
ASTM E 2	Metallurgical examination
ASTM E 3 **E 112**	Procedures and requirements
ASTM E 94 **E 142** **E 165**	Non-destructive testing procedures and requirements
ASTM E 207 **E 220** **E 230**	Calibration of thermocouples
ASTM E 585-88	Standard specification for sheathed base-metal thermocouple material
ASTM E 839-89	Standard test methods for sheathed thermocouples and sheathed thermocouple material
ASTM E 235	Nuclear grade thermocouple materials and assemblies

Manufacturing Capabilities

- Special tube cleaning facilities.
- Insulation baking to 2000°F (1090°C).
- A controlled near-clean room environment for the assembly of tubes, insulators and wire.
- Swaging machines to reduce materials to various diameters.
- Draw machines for effective sheath reductions from 0.500 to 0.010 inches O.D.
- Special constructions—dual element and dual diameter thermocouples.
- Annealing furnaces for heat treating and quenching in reducing or inert atmospheres.
- Induction brazing and annealing.
- A controlled environment for assembly and other fabricating processes. Highlights of these operations include:
  - TIG and plasma welding of "G" grounded or Class 1 and 3 junctions; "U" ungrounded or Class 2 and 4 junctions; "E" exposed junctions; plus numerous variations of these: caps, seals and special weldments such as pads, ferrules, etc. Watlow welders are qualified to perform special welding procedures required for aerospace thermocouples.
  - End seals of various types and techniques, with time-cycled auto-curing of epoxies, etc.
  - In-process testing, including polarity, continuity, insulation resistance, wire resistance, visual and metallurgical examination, dimensional checks, etc.
  - Miscellaneous fitting and adapter applications.
- Special storage and in-process facilities to prevent moisture and contaminants from entering the insulation.
- Straightening and coiling machines and complete packaging equipment.

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Form 434

Customer (Name, Address, Phone)			**Dimensioned Sketch**	**Number PR**
Application				
Qty.	Date	Annual Usage		
Territory	Item CL	Product Code		

Thermocouple (Circle one)	**RTD**	**Thermistor–Other**
B E J K N R S T	100 200 Ohms @ 0°C	Ohms @ 25°C
Junction: Grounded Ungrounded Exposed	0.00385 0.003916 Ohm/Ohm/°C	
Error Limits: Standard Special	Class: Spec:	Tolerance and Curve:
Wall Thickness / Wire Diam. / Single Dual	2 3 4 Leadwire / Single Dual	

Wire Watlow Code No (if any):	Length: Feet	Gauge:	# Conductors:
Insulation: Singles:	Overall:		
Solid Stranded	Special Requirements:		
Color Code: ASTM Other			

Sheath Material: 316SS Inc 600 Other:		# Conductors:
Insulation: MgO Al_2O_3 Other:	Compacted Loosepack Wire	O.D.: In.

Testing

Terminations/Hardware (Fittings, Tubes, Wells, Plugs, etc.)	**Additional Information**
Environment Pressure: psi / Vibration / Shock	
Temperature: Low °F °C / High °F °C / Continuous °F °C	
Atmosphere: Inert Oxidizing Reducing Vacuum	Please attach drawings, specifications

Office Use	Product Mgr: ☐ Approved ☐ Disapproved	Engineer:
	Customer RFQ: / Gordon Quote:	M.O. G.O.

Comments: