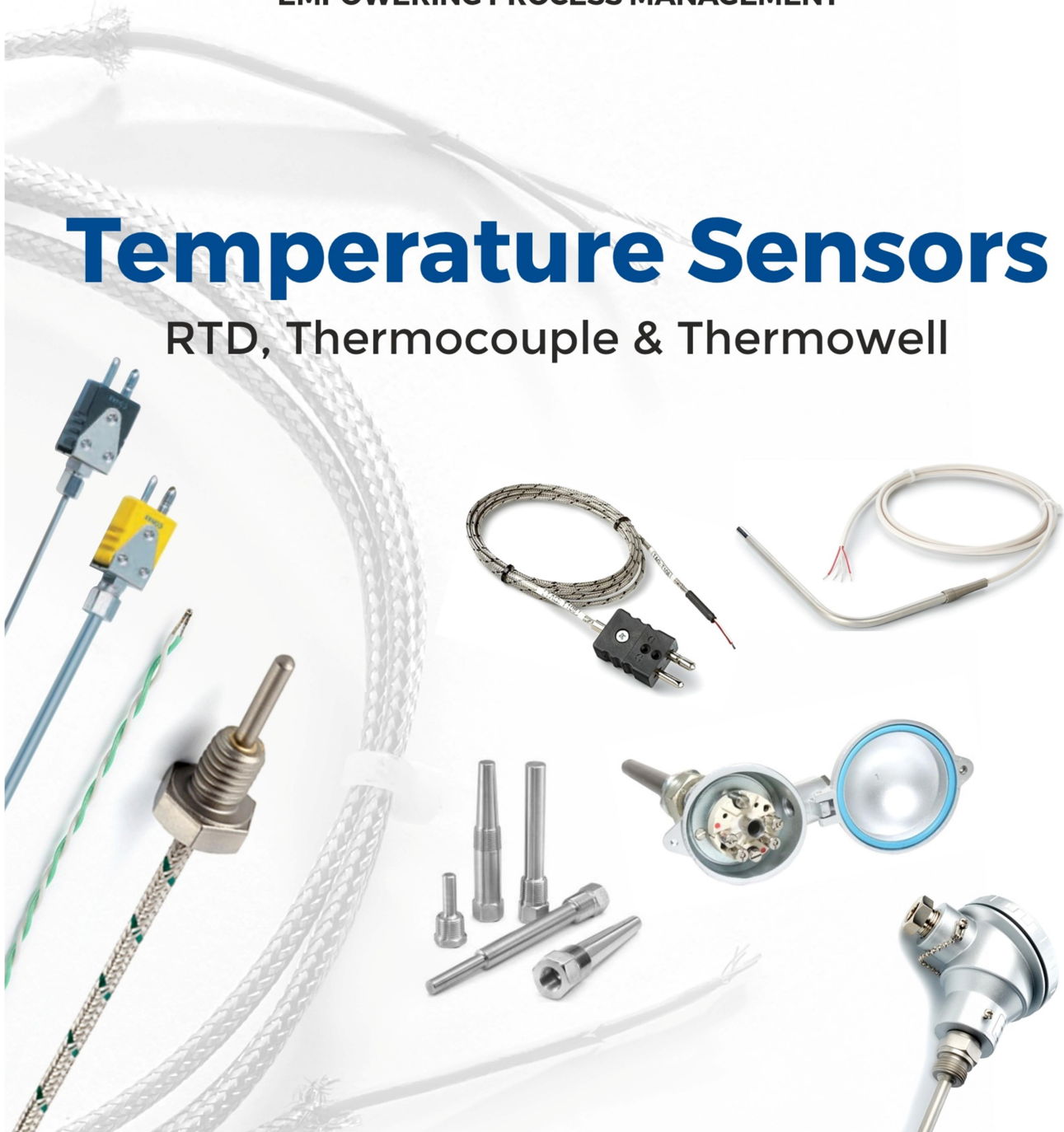




EMPOWERING PROCESS MANAGEMENT

Temperature Sensors

RTD, Thermocouple & Thermowell





EMPOWERING PROCESS MANAGEMENT



RTD (RESISTANCE TEMPERATURE DETECTORS)



RTDs are based on principles that the measuring RTD element produces Ohms (Ω) when heated in proportional to its change in temperature. RTD elements have a predictable and repeatable relationship between temperature and Ohms. Many type of RTD Elements are available such as **PT 100**, **PT 500**, **PT 1000**. The most commonly used is **RTD PT 100**.

RTD PT 100 has **100 Ohms (Ω) at 0 °C** and when heated it produces Ohms in proportion to change in temperature. Resistance Temperature Detectors (RTDs) are used for industrial temperature measurements where high accuracy and long-term stability are required.

TOLERANCE of RTD ELEMENT:

Tolerance of an RTD is a measure of its conformity to the ITS-90 Temperature-Resistance curve, and is normally expressed as an **allowable deviation from the normal resistance at 0 °C**. It consists of a manufacturing tolerance on the reference point (eg: how close is the resistance to 100 Ω at 0 °C) and a materials tolerance on the Temperature Coefficient of Resistance (eg: how close does the wire conform to an alpha of 0.00385).

At the reference temperature, only the manufacturing tolerance applies (since this is where the RTD element is “adjusted” to 100 Ω). At other temperatures, the materials tolerance must be added. As the temperature increases or decreases, the tolerance becomes wider. At higher temperatures, the material tolerance has the larger influence.

DIN/IEC 60751 (replaces DIN 43760) defines Class B and Class A tolerances.

Temperature °C	Resistance Ω (Ohms)	Class A		Class B	
		Ω (Ohms)	°C	Ω (Ohms)	°C
-200	18.52	±0.24	±0.55	±0.56	±1.30
-100	60.26	±0.14	±0.35	±0.32	±0.80
0	100.00	±0.06	±0.15	±0.12	±0.30
100	138.51	±0.13	±0.35	±0.30	±0.80
200	176.86	±0.20	±0.55	±0.48	±1.30
300	212.05	±0.27	±0.75	±0.64	±1.80
400	247.09	±0.33	±0.95	±0.79	±2.30
500	280.98	±0.38	±1.15	±0.93	±2.80
600	313.71	±0.43	±1.35	±1.06	±3.30
650	329.64	±0.46	±1.45	±1.13	±3.60
700	345.28	---	---	±1.17	±3.80
800	375.70	---	---	±1.28	±4.30
850	39048	---	---	±1.34	±4.60

Elements with narrower tolerances are available (eg: 1/3 B, 1/5 B, etc). No standard exists for these fractional tolerance elements; it depends on the manufacturer of the element. For example, a 1/10 B element would normally have a manufacturing tolerance of 0.03 °C, but the material tolerance would depend on the manufacturer’s choice of wire (class B, class A or other).

Accuracy is dependent on the tolerance of the RTD, the measurement temperature, the accuracy of the readout device, the effects of the interconnecting lead wire and the installation.

Platinum elements with other temperature-resistance curves are available (eg: JIS). Copper and Nickel elements are also available as replacements to match existing instrumentation.



ELTEC CABLES & INSTRUMENTS

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RTD LEAD WIRE CONFIGURATION

Two Wire :

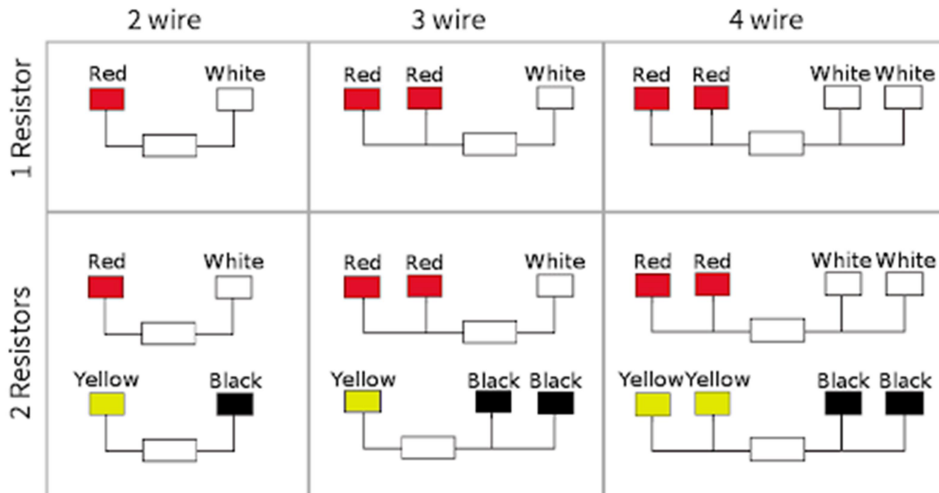
Provides one connection to each end of the element. This construction is suitable where the resistance of the lead wire may be considered as an additive constant in the circuit, and particularly where the changes in lead resistance due to ambient temperature changes may be ignored.

Three Wire :

Provides one connection to one end of the element and two to the other end of the element. Connected to an instrument designed to accept three wire input, sufficient compensation is usually achieved for lead wire resistance and temperature change in leadwire resistance. This is the most commonly used configuration.

Four Wire :

Provides two connections to each end of the element to completely compensate for lead wire resistance and temperature changes in the leadwire. This configuration is used where highly accurate temperature measurement is vital.



PRODUCT FEATURES

- RTD Elements such as PT 100 / PT 500 / PT 1000.
- Highly accurate & Stable Probes.
- Rugged Construction.
- Wide Temperature Range from -200 °C to 850 °C.
- 2 wire, 3 wire & 4 wire Simplex & Duplex Configuration.
- Probes & Assemblies in various sizes & configuration.
- Various mounting options like Adaptors, Adj. Ferrule fittings, flanged connection, Nipple – Union – Nipple.
- Lead styles include miniature jack, miniature plug, pin leads, standard plugs, stripped lengths, and high and ultra-high temperature plugs.
- Custom Configuration.
- Industrial Safety Enclosure like Die Cast Aluminium Head or SS Head confirming to IP 65, IP 67 & IS Protection.
- Head Mount Transmitter Options.



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EMPOWERING PROCESS MANAGEMENT



BAYONET & FLEXIBLE RTD CABLE PROBES



Bayonet RTD have a compressible spring and locking cap for quick insertion and detachment. Other probes connections like washer, button, plate, ribbons, ball, nozzles, bolts etc are beings used to manufacture flexible RTD Probes to suit various critical temperature measuring applications.

They are available with no protection tube (insulation only), armour clad flexible tube, or stainless steel over braid. All are light weight for easy connection to an instrument or a distant junction box.

APPLICATIONS

PRODUCT FEATURES

<ul style="list-style-type: none"> • Plastic Extrusion Machines, Diversified Plastic & Packing Machinery • Automobiles & Engine Testing, Gen set • Medical & Scientific Equipments • Food, Pharma & Beverages • Various Industrial Machineries • Measuring Bearing Temperature in Motors, Turbines etc. 	<ul style="list-style-type: none"> • Locking cap / spring / screwed bolts / bayonet adaptors for quick & easy attachment & detachment • Fixed & Adjustable lengths • Wide Industrial applications • Higher Accuracy & Stability. • 2 wire, 3 wire, 4 wire configuration • Customized probes for measuring temperature for critical industrial applications
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PRODUCT TECHNICAL SPECIFICATIONS:

Element	RTD PT 100 (100 Ohms) at 0 °C RTD PT 200 (200 Ohms) at 0 °C RTD PT 500 (500 Ohms) at 0 °C RTD PT 1000 (1000 Ohms) at 0 °C
No. of Element	Simplex / Duplex
Wire Configuration	2 wire, 3 wire, 4 wire for SIMPLEX and 4 wire, 6 wire for Duplex
Sensor Wire Insulation	Fiber Glass, High Temperature Ceramic Yarn, PTFE, PFA, ETFE, SILICONE RUBBER, KAPTON, PVC etc.
Sheath OD	3mm to 8mm
Sheath Material	SS Tubes / Brass Tubes
Mounting	Bayonet Adaptor or Probe itself becomes suitable to be fixed at temperature measuring position
Termination / Enclosure	Seal Pot with flying leads Seal Pot with Male Female Connectors Flying leads fitted with cable lugs

RTD Probes can be custom configured depending upon its environmental conditions & its probe can be designed as per demanding applications within the above TECHNICAL CONSTRUCTIONAL SPECIFICATIONS.



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