SENSOR CODING



TC... = Thermocouple type

TRT... = Resistance Thermometer type

S = Sheath material (Mineral insulated to Furnace types only-all others stainless steel 316)

A = Probe shape/construction (Straight, angled, grounded or ungrounded types)

P = Probe length and diameter, insertion size (imperial or metric)

 Lead length and flexible lead style (armoured, braided, glass fibre, PVC or PTFE)

T = Cold end termination (100mm tails, plug, socket or terminal head)

M = Mounting method (bayonet cap, compression fitting or mounting flange)

SENSOR TYPES, OPERATING TEMPERATURES, ACCURACIES AND APPLICATIONS

TYPE N (BS4937) NICROSIL/NISIL

The best general purpose thermocouple with wide temperature range and good stability. Has a long working life even at high temperatures and provides a low cost alternative to types R & S for up to 1300°C. In all respects, it is superior to Type K. Good resistance to oxidising atmospheres, although it must be protected from sulphurous atmospheres. The most suitable thermocouple for use in nuclear environments.

Operating range - 200°C to 1300°C.

TYPE K (BS4937) Ni-Cr/Ni-A

Good general purpose thermocouple with wide measurement range. Good resistance to oxidising atmospheres, but not recommended for sulphurous or reducing atmospheres. Suitable for use in nuclear environments.

Operating range - 200°C to 1100°C.

TYPE T (BS4937) Cu/Cu-Ni

May be used in oxidising, reducing or inert atmospheres and vacuums. Particularly suitable for measurement of low and subzero temperatures, and in atmospheres with a high moisture content. Limited upper temperature because of oxidation of the copper element.

Operating Range - 200°C to +400°C.

TYPE J (BS4937) Fe/Cu-Ni

Suitable for use in oxidising, reducing or inert atmospheres. Should not be used in sulphurous atmospheres above 500°C. Not recommended for use below ice point because of rusting and embrittlement of the iron conductor.

Operating Range - 0°C to +750°C.

TYPE R (BS4937) Pt-13% Rh/Pt, TYPE S (BS4938) Pt-10% Rh/Pt AND TYPE B Pt-30% Rh/Pt-6%

Recommended for high temperature use in oxidising or inert atmospheres. Prone to contamination in the presence of metallic vapours, which cause calibration drift. Performance in reducing atmospheres is very poor.

Operating Range - 0°C to 1650°C.

TYPE W5 W-5% Re/W-26% Re

Recommended for use in vacuum, high purity hydrogen and high purity inert atmospheres only, 2800°C maximum.

PLATINUM RESISTANCE Pt100 (BS1904)

Platinum resistance sensors are used when measurements need to be highly accurate and repeatable. Particularly recommended for measurements of low and sub zero temperatures. Almost always used with a protective outer sheath, usually of stainless steel.

Operating range - 200°C to 500°C

THERMOCOUPLE COMPARISONS

TY	PE CONDUCTOR CHARACTERISTICS		STANDARD TEMP. RANGE	STANDARD LIMIT OF ERROR	
	POSITIVE	NEGATIVE	DEGREES C	DEGREES C	OTHER
J	Iron (Magnetic)	Constantan (Non-Magnetic)	0 to 750	2	± 0.75%
T	Copper (Yellow Metal)	Constantan (Silver Metal)	-200 to +350	4	± 1.5%
K	Chromel (Non-Magnetic)	Alumel (Magnetic)	0 to 1100	1	± 0.75%
E	Chromel	Constantan	0 to 900	1.5	± 0.5%
5	Platinum (10% Rodium)	Platinum	0 to 1450	1.4	± 0.25%
R	Platinum (13% Rodium)	Platinum	0 to 1450	1.4	± 0.25%
В	Platinum (30% Rodium)	Platinum (6% Rodium)	800 to 1700		± 0.5%
W5	Tungsten (5% Rodium)	Tungsten (26% Rodium)	430 to 2000	4	± 1%

THERMOCOUPLE SHEATH MATERIALS

Except where stated, we would normally use stainless steel 316 in the construction of their sensors. However, a wide range of material is available from stock. Please contact our sales office for advice for a particular application.

STAINLESS STEEL 304

A low carbon 18/8 Chromium-Nickel stainless steel. Max 500°C. Good corrosion resistance.

STAINLESS STEEL 310

A Chromium-Nickel 25/20 stainless steel. Superior corrosion resistance compared to 304 Max 1100°C.

STAINLESS STEEL 316

A Chromium-Nickel alloy 18/8/2 stainless steel with molybdenum. Better corrosion resistance than 304 or 310, improved oxidisation and higher hot temperature than 304.

STAINLESS STEEL 321

A Chromium-Nickel alloy 18/8/2 stainless steel with molybdenum. Max 1000°C. Good corrosion resistance.

ALLOY 600 (INCONEL)

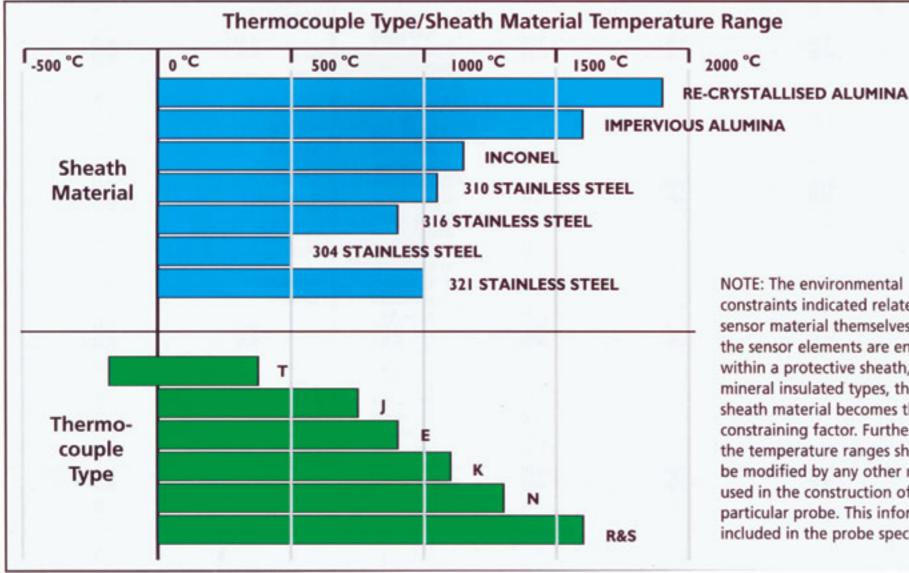
A Nickel-Chromium alloy 76/16/7 with excellent resistance to corrosion, oxidisation and scaling. Should not be used in the presence of sulphur above 870°C Max 1200°C.

IMPERVIOUS ALUMINA (REFRACTORY)

Between 60 and 70% pure Alumina. Max1600°C. High resistance to sulphur atmospheres and thermal shock. Specially suitable for Type R & S thermocouples.

RE-CRYSTALLISED ALUMINA

Greater than 90% plus pure Alumina. Max 1600 - 1900°C. Very high resistance to alkaline fluxes. Specially suitable for Type R & S Thermocouples.



NOTE: The environmental constraints indicated relate to the sensor material themselves. When the sensor elements are enclosed within a protective sheath, e.g, mineral insulated types, then the sheath material becomes the constraining factor. Furthermore, the temperature ranges shown will be modified by any other materials used in the construction of a particular probe. This information is included in the probe specification.

APPLICATION GUIDE

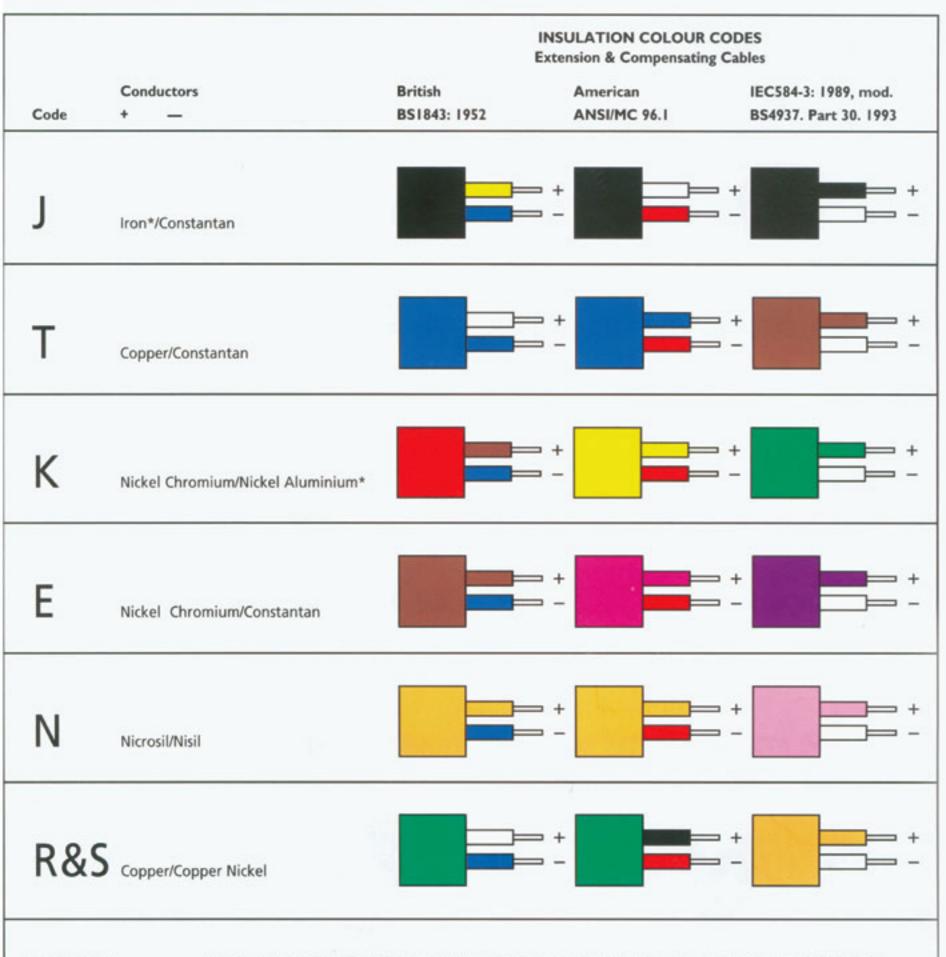
In recommending the below materials, consideration has been given to providing a good service life without undue cost. Where two or more materials are satisfactory, the least expensive is listed. Consult the factory for information on services for materials or services not given. Other factors which will influence corrosion rates include: degree and frequency of temperature fluctuation, concentration aeration of fluid, abrasives or cavitating conditions etc., therefore the data presented should be interpreted as one basis for material selection and not as a complete recommendation.

Acetates Solvents Crude or Pure Monel or Nickel Ethyl Acetate Monel Pictric Acid 70 Acetic Acid 10% - 70°F 304 Stainless Steel Ethyl Chloride 70°F 304 Stainless Steel Potassium Bromide 70 50% - 70°F 304 Stainless Steel Ethelene Glycol Steel (C1018) Potassium Carbonate 19 50% - 212°F 316 Stainless Steel Ethyl Sulphate 70°F Monel Potassium Chlorate 70	Conditions	Recommend
Acetic Acid 10% - 70°F 304 Stainless Steel Ethyl Chloride 70°F 304 Stainless Steel Potassium Bromide 70 Steel (C1018) Potassium Carbonate 19 S0% - 212°F 316 Stainless Steel Ethyl Sulphate 70°F Monel Potassium Chlorate 70 Steel (C1018) Potassium C		
Acetic Acid 10% - 70°F 304 Stainless Steel Ethyl Chloride 70°F 304 Stainless Steel Potassium Bromide 70 Steel (C1018) Potassium Carbonate 19 So% - 212°F 316 Stainless Steel Ethyl Sulphate 70°F Monel Potassium Chlorate 70	70*F	304 Stainless Steel
50% - 70°F 304 Stainless Steel Ethelene Glycol Steel (C1018) Potassium Carbonate 19 50% - 212°F 316 Stainless Steel Ethyl Sulphate 70°F Monel Potassium Chlorate 70	70°F	316 Stainless Steel
50% - 212°F 316 Stainless Steel Ethyl Sulphate 70°F Monel Potassium Chlorate 70		304 Stainless Steel
		304 Stainless Steel
	5% - 70°F	304 Stainless Steel
	5% - 212°F	304 Stainless Steel
Acetic Anhydride Monel 5% - Boiling Tantalum Potassium Hydroxide 59	5% - 70°F	304 Stainless Steel
Acetone 212°F 304 Stainless Steel Ferric Sulphate 5% - 70°F 304 Stainless Steel 25	25% - 212°F	304 Stainless Steel
Acetylene 304 Monel Nickel Ferrous Sulphate Dilute 70°F 304 Stainless Steel 50	50% - 212°F	316 Stainless Steel
	5% - 70°F	304 Stainless Steel
	5% - 212*F	304 Stainless Steel
	170 - 212 F	304 stairiless steel
Aluminium Molten Cast Iron Formic Acid 5% - 70°F 316 Stainless Steel Potassium		****
	5% - 70 ° F	304 Stainless Steel
	5% - 70°F	304 Stainless Steel
Saturated 70°F 304 Stainless Steel 5% - 150°F Monel 59	5% - 212*F	304 Stainless Steel
10% - 21270°F 316 Stainless Steel Gasoline 70°F 304 Stainless Steel Potassium Sulphide 70	70*F	304 Stainless Steel
Saturated 212°F 316 Stainless Steel Glucose 70°F 304 Stainless Steel Propane		304 Stainless Steel
Ammonia All concentrations 70°F 304 Stainless Steel Glycerine 70°F 304 Stainless Steel Pyrogallic Acid		304 Stainless Steel
	Dry	316 Stainless Steel
	Dry	304 Stainless Steel
All concentrations 212*F 304 Stainless Steel Hydrobromic Acid 48% - 212*F Hastelloy B Resin		304 Stainless Steel
Ammonium Sulphate 5% - 70°F 304 Stainless Steel Hydrochloric Acid 1% - 70°F Hastelloy C Resin Molten		304 Stainless Steel
10% - 212°F 316 Stainless Steel 1% - 212°F Hastelloy B Sea Water		Monel
Saturated 212*F 316 Stainless Steel 5% - 240*F Hastelloy B Salommoniac		Monel
Aniline All concentrations 70°F 304 Stainless Steel 25% - 70°F Hastelloy B Salicylic Acid		Nickel
Amylacetate Monel 25% - 212°F Hastelloy B Shellac		304 Stainless Steel
Asphalt Steel (C1018) Hydracyanic Acid 316 Stainless Steel Soap 70	70°F	304 Stainless Steel
	All concentrations 70°F	304 Stainless Steel
	5% - 150°F	304 Stainless Steel
	The state of the s	Monel
	5% - 70°F	304 Stainless Steel
Saturated 70°F Monel Iodine 70°F Tantalum 59	5% - 150°F	304 Stainless Steel
Aqueous-Hot 316 Stainless Steel Karosene 70°F 304 Stainless Steel Sodium Chloride 59	5% - 70°F	316 Stainless Steel
	5% - 150°F	316 Stainless Steel
	Saturated 70°F	316 Stainless Steel
	Saturated 212°F	316 Stainless Steel
Benzone 70°F 304 Stainless Steel Lacquer 70°F 316 Stainless Steel Sodium Fluoride 59	5% - 70°F	Monel
Benzine Steel (C1018) Latex Steel (C1018) Sodium Hydroxide		304 Stainless Steel
Monel Inconel Lime Sulphur Steel (C1018), 304 Sodium Hyperchlorite 59	5% still	316 Stainless Steel
	Fused	317 Stainless Steel
Beracic Acid 5% Hot or Cold 304 Stainless Steel Linseed Oil 70*F 304 Stainless Steel Sodium Peroxide	uneu .	304 Stainless Steel
Bremine 70°F Tantalum Magnesium Chloride 5% - 70°F Monel Sodium Phosphate		Steel (C1018)
Butadiane Brass 304 5% - 212*F Nickel Sodium Silicate		Steel (C1018)
Butane 70°F 304 Stainless Steel Magnesium Sulphate Cold and Hot Monel Sodium Sulphate 70	70°F	304 Stainless Steel
Butylacetate Monel Malic Acid Cold and Hot 316 Stainless Steel Sodium Sulphide 70	70°F	316 Stainless Steel
	150*F	304 Stainless Steel
		304 Stainless Steel
Phosphor Bronze Methane 70°F Steel (1020) Stearic Acid		304 Stainless Steel
Butyric Acid 5% - 70°F 304 Stainless Steel Milk 304 Nickel Sulphur Dioxide M	Moist Gas - 70°F	316 Stainless Steel
5% - 150°F 304 Stainless Steel Mixed Acids Carpenter 20 Gi	Gas - 575*F	304 Stainless Steel
	Dry - Molten	304 Stainless Steel
	Wet	316 Stainless Steel
	5% - 70°F	Carp. 20.Hastelloy
	5% - 212°F	Carp. 20.Hastelloy
20% - 212°F 304 Stainless Steel Naphthe 70°F 304 Stainless Steel 10	10% - 70°F	Carp. 20.Hastelloy
	10% - 212°F	Carp. 20.Hastelloy
	50% - 70°F	Carp. 20.Hastelloy
	50% - 70 F 50% - 212°F	
		Carp. 20.Hastelloy
	90% - 70°F	Carp. 20.Hastelloy
	90% - 212°F	Hastelloy D
Carbon Tetrachloride 10% - 70°F Monel 20% - 70°F 304 Stainless Steel Tannic Acid 70	70°F	304 Stainless Stee
Chlorex Caustic 31655.31755 50% - 70°F 304 Stainless Steel Tar		Steel (C1018), 304
Chlorine Gas Dry 70°F 317 Stainless Steel 50% - 212°F 304 Stainless Steel		Monel Nickel
	70°F	304 Stainless Steel
	1.700	
	150°F	316 Stainless Stee
	Molten	Cast Iron
50% - 212°F 316 Stainless Steel Nitrobenzene 70°F 304 Stainless Steel Tolyene		Aluminium Phosp
Citric Acid 15% - 70°F 304 Stainless Steel Nitrous Acid 304 Stainless Steel		Bronze. Monel
15% - 212°F 316 Stainless Steel Olsic Acid 70°F 315 Stainless Steel Trichloretbylene		Steel (C1018)
Concentrated 212°F 317 Stainless Steel Olsum 70°F 316 Stainless Steel Turpentine		304 Stainless Stee
Coal Tar Hot 304 Stainless Steel Oxalic Acid 5% - Hot and Cold 304 Stainless Steel Varnish		304 Stainless Stee
Coke Oven Gas Aluminium 10% - 212°F Monel Vegetable Oils		Steel (C1018), 304
Copper Nitrate 304, 316 Oxygen 70*F Steel (1018)		Monel
Copper Sulphate 304, 316 Oxygen Liquid 304 Stainless Steel Vinegar		304 Stainless Stee
	frach	
	fresh	copper steel
Cottonseed Oil Steel (C1018) Petroleum Ether 304 Stainless Steel		(c1018) Monel
Monel Nickel Phenol 304 Stainless Steel Whiskey, Wine		304 Nickel
Creosols 304 Stainless Steel Pentane 304 Stainless Steel Xylene		Copper
	Molten	Cast Iron
	renombers	
Nickel 5% - 70°F 304 Stainless Steel Zinc Chloride	max max	Monel
	5% - 70°F	304 Stainless Stee
Dowtherm Steel (C1018) 10% - 212*F Hastelloy C S	Saturated - 70°F	304 Stainless Stee
The state of the s	25% - 212°F	304 Stainless Stee
Epsom Salt Hot and Cold 304 Stainless Steel 30% - 70°F Hastelloy B 2	MENTAL MARKET	100 Per C 10 PH 100 PM
Epsom Salt Hot and Cold 304 Stainless Steel 30% - 70°F Hastelloy B 2 Ether 70°F 304 Stainless Steel 30% - 212°F Hastelloy B		

Hastelloy B

Hastellov B

85% - 70°F 85% - 212°F

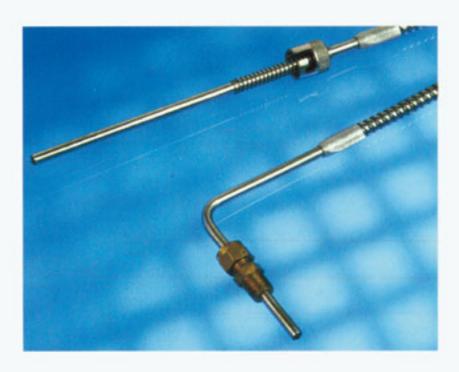


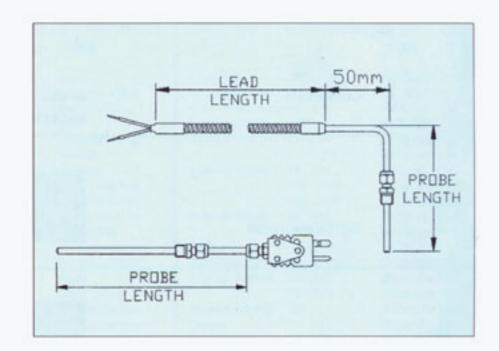
* MAGNETIC

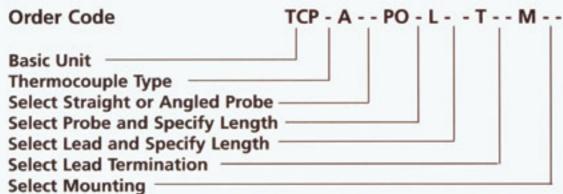
NOTE: THE MARLIN RANGE OF THERMOCOUPLES SUPPLIED BY WEST USE THE AMERICAN (ANSI/MC96.I) BODY COLOURS.

For Thermocouple Connectors - Body Colours are the same as outer sheath colours shown above

PROTECTED LEAD & CONNECTOR TYPE THERMOCOUPLES

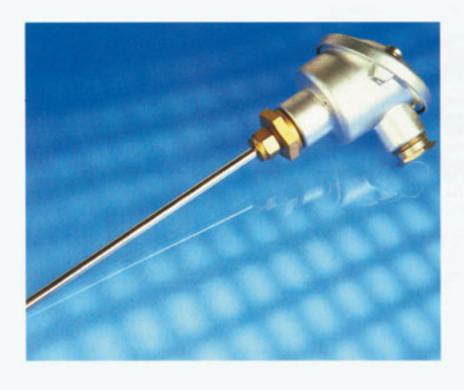


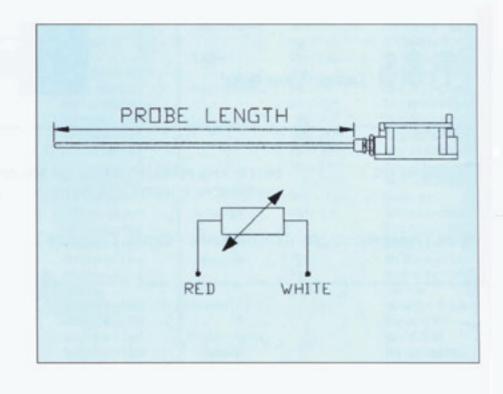


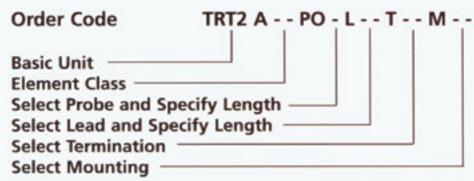


NOTE: Max working temperature 350°C

2 WIRE PLATINUM RESISTANCE THERMOMETERS







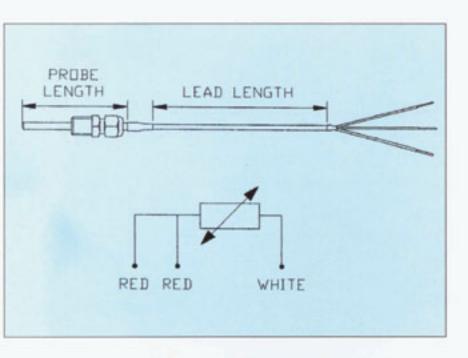
NOTE: Max working temperature 250°C. For higher temperatures refer to Office.

These 2-wire, 100 Ohm RTD's are supplied with a 316 stainless steel sheath which is available in six diameters. Sensor elements of the two most common tolerance classes can be fitted depending on the requirement.

The standard leads are PTFE insulated.

- · High accuracy with almost linear output
- · No deterioration with age no drift
- Ideal for low temperature measurement (-200 °C)
- · Less susceptible to electric noise pick up

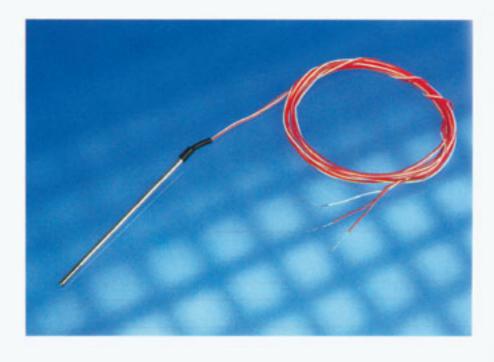
3 WIRE PLATINUM RESISTANCE THERMOMETERS

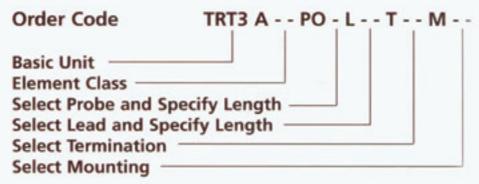


These 3-wire, 100 Ohm RTD's are supplied with a 316 stainless steel sheath which is available in six diameters. Sensor elements of the two most common tolerance classes can be fitted depending on the requirement.

The standard leads are PTFE insulated.

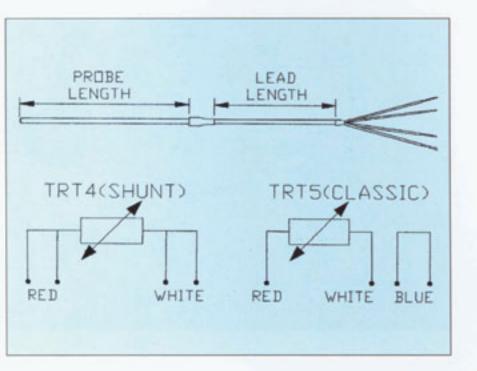
- High accuracy with almost linear output
- · No deterioration with age no drift
- Ideal for low temperature measurement (-200 °C)
- Less susceptible to electric noise pick up





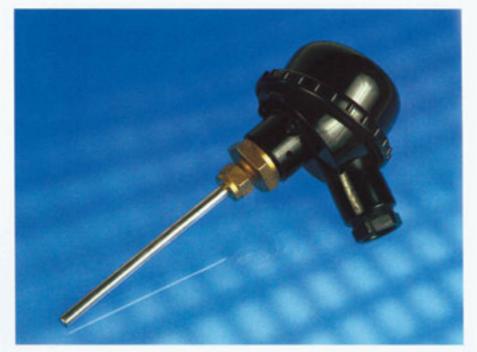
NOTE: Max working temperature 250°C. For higher temperatures refer to Office.

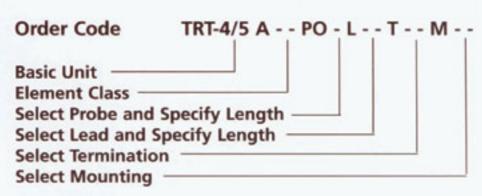
4 WIRE PLATINUM RESISTANCE THERMOMETERS



These 4-wire, 100 Ohm RTD's are supplied with a 316 stainless steel sheath which is available in six diameters. Sensor elements of the two most common tolerance classes can be fitted. The assemblies can be configured in either Shunt (Connected) or Classic (Looped) form depending on the requirement. The standard leads are PTFE insulated.

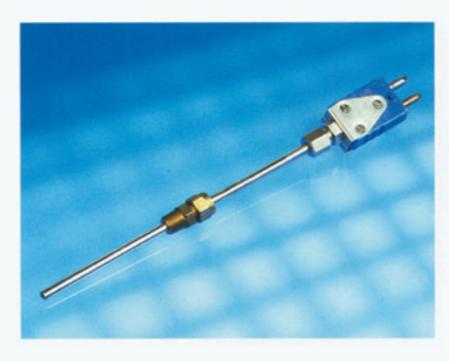
- High accuracy with almost linear output
- No deterioration with age no drift
- Ideal for low temperature measurement (-200 °C)
- Less susceptible to electric noise pick up

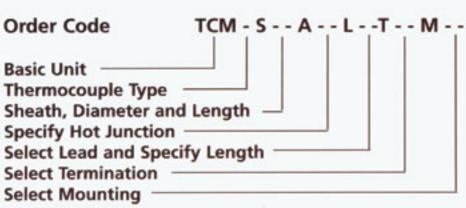


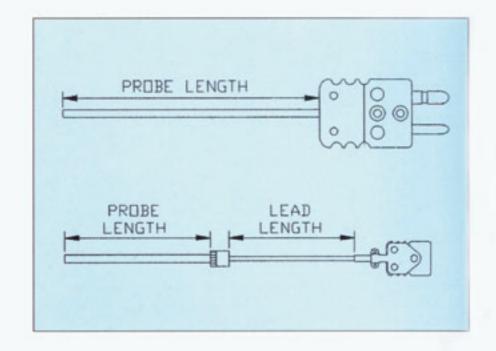


NOTE: Max working temperature 250°C. For higher temperatures refer to Office.

MINERAL INSULATED THERMOCOUPLES





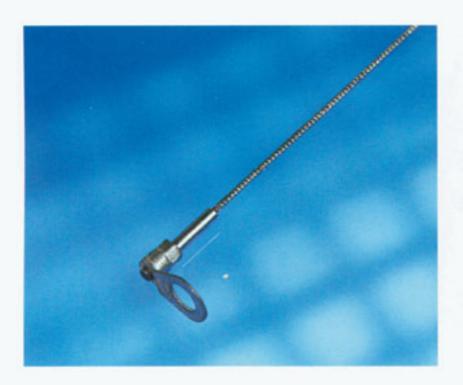


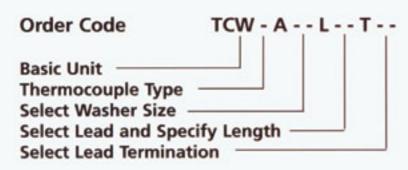
Mineral insulated thermocouples are able to withstand higher temperatures and have better stability than conventional thermocouple designs. They can be bent to shape without affecting performance. These mineral insulated thermocouples can be supplied with sheath material of 310 stainless steel, 321 stainless steel or Inconel 600 Nicrobell B. Sheath diameters of between 1mm and 6mm are available, they can be supplied with a variety of leads, terminations and mountings or just fitted with an ISO. pot seal.

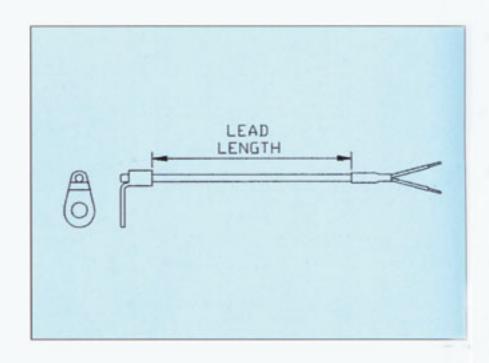
APPLICATIONS

These probes are suited to a wide variety of industrial applications but especially where high temperatures and/or severe conditions are prevalent.

WASHER THERMOCOUPLES



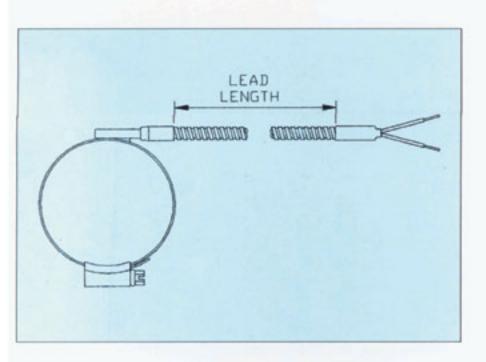




This thermocouple has a probe with a grounded construction fitted to a crimp terminal with an M10 size hole (other sizes are available). A selection of leads and terminations can be specified to suit your applications.

APPLICATIONS

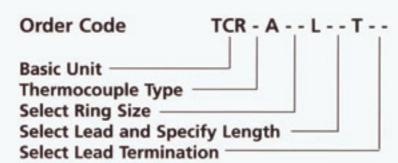
Used to measure surface temperature.



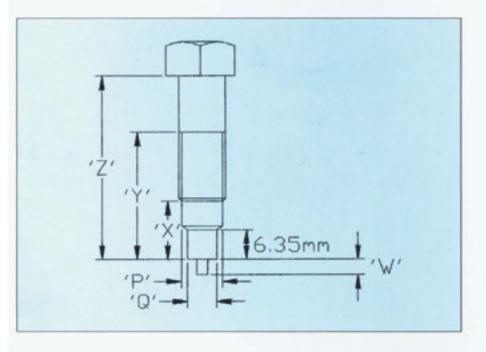
Designed to monitor pipework temperatures in a variety of industrial applications. Supplied with a grounded junction as standard.

Stainless steel construction.





MELT TEMPERATURE THERMOCOUPLES



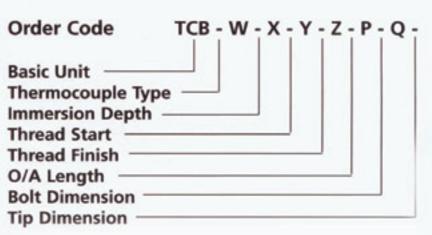
The melt thermocouple has been designed to measure the true melt temperature of a plastic extruder without being influenced by the temperature of the surrounding barrel.

The duplex version is supplied with two insulated elements - one for melt measurement and control the other for a recorder or temperature indicator.

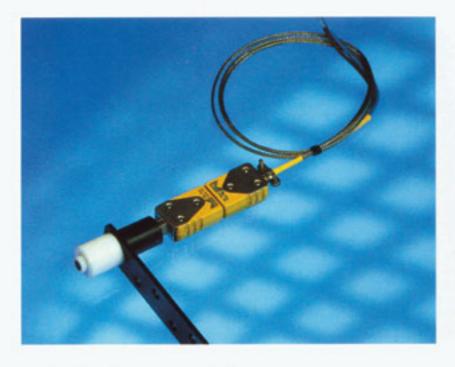
P Standard Bolt diameter: (0.420"/0.415" 10.67mm/10.54mm) Q Standard Tip diameter: (0.3119"/0.3113" 7.92mm/7.91mm)

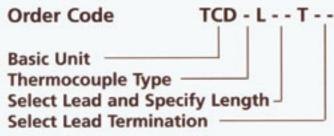
P Non Standard Specify Q Non Standard Specify



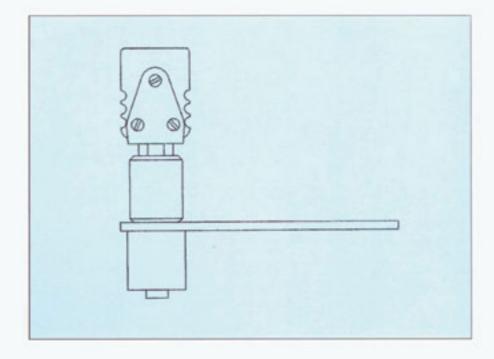


DRUM TEMPERATURE THERMOCOUPLES





NOTE: Max working temperature 250°C

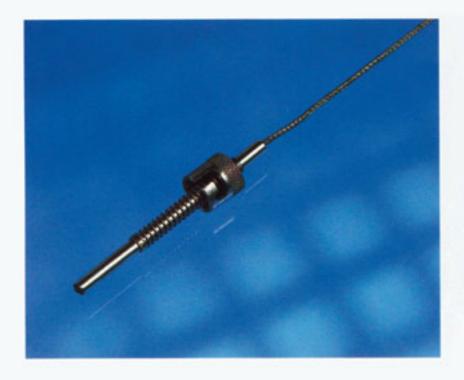


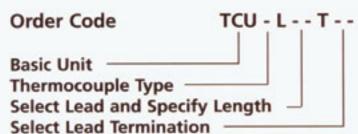
This thermocouple has the hot junction on the brass sensor shoe which is held in contact with the rotating surface by a strong spring.

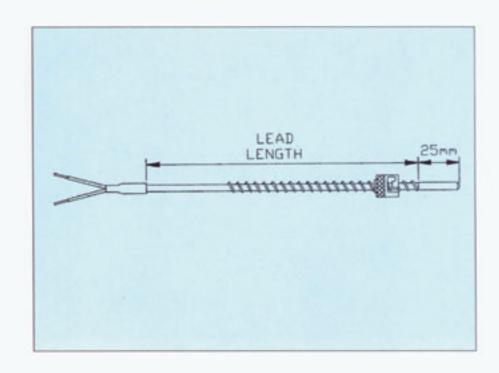
APPLICATIONS

This thermocouple is specifically used for measuring the surface temperature of moving bodies. Its maximum temperature rating is 250° C.

Universal Bayonet Thermocouples





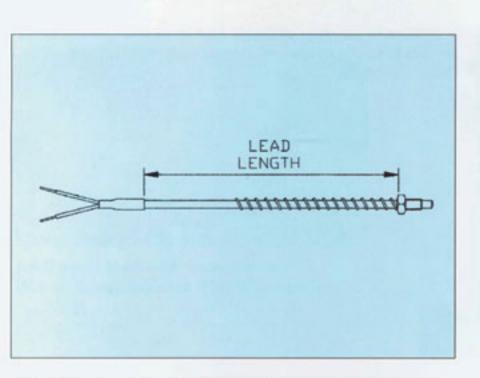


This thermocouple is manufactured with a grounded junction as standard. The sheath is made from 316 stainless steel 25mm long, and fitted with a 300mm long spring (both are 3/16" [4.76mm] in outside diameter). A selection of leads and terminations can be specified to suit your needs.

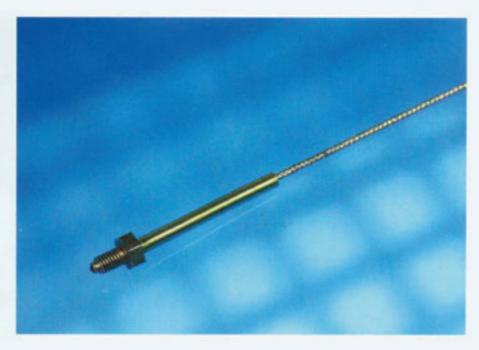
APPLICATIONS

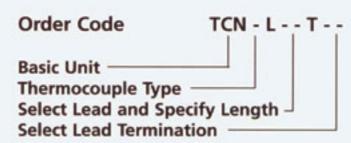
Normally used in the plastic's industry, the bayonet cap allows the immersion depth to be varied as required.

NOZZLE TYPE THERMOCOUPLES

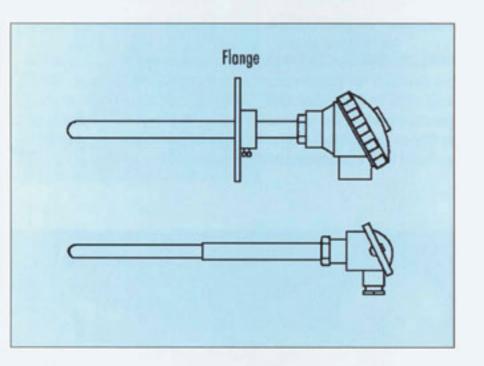


Normally used to measure the ram temperature in plastic moulding machines. This thermocouple is made with a grounded junction, a 316 stainless steel sheath and a 1/4" BSF adaptor.





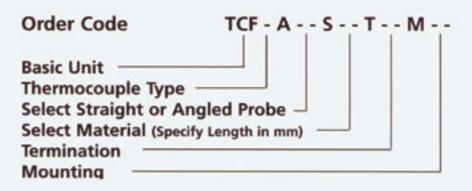
FURNACE THERMOCOUPLES



The Wide range of Furnace Thermocouples are particularly suited for applications which by their nature demand a more rugged sensor construction. Environments such as Exit flues, Ceramic kilns, Annealing baths and incinerators all require sensors which are chemically resistant and mechanically strong.

We will gladly advise on other element and sheath materials not shown in the selection.

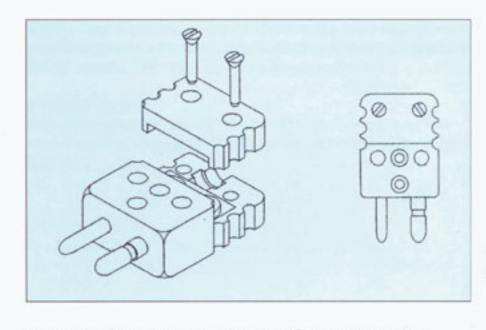


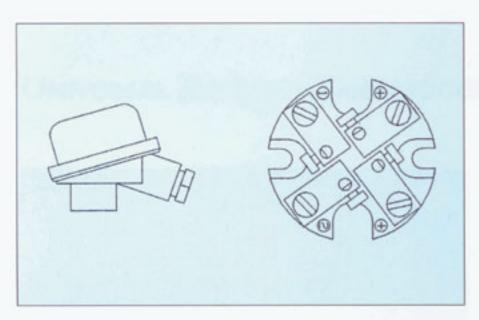


SENSOR ACCESSORIES



In addition to our range of Sensor Accessories and Connectors we are able to supply a variety of Thermocouple and Compensating Cables from stock.





We can supply a comprehensive range of Sensor Accessories including:

Thermocouple Heads Mounting Flanges

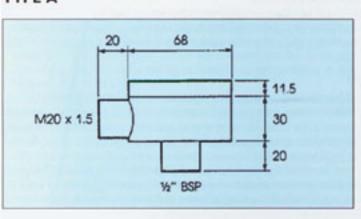
Bayonet Adaptors Thermocouple Cable Terminal Blocks
Compression Fittings
(Brass & Stainless Steel)
Termination Glands
Compensating Cable

NOTE: BS 4937 Part 30:1993 has now superseded BS 1843:1952 as the standard for thermocouple colour coding, BS 1843 can still be used until 1st December 1998. Currently only certain cables are manufactured in the new colours, our sales staff will be pleased to advise on availability and delivery. A colour coding chart is included in the beginning of this section of the catalogue.

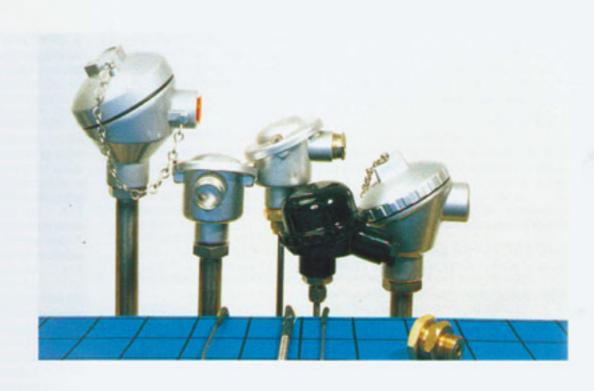


THERMOCOUPLE HEADS

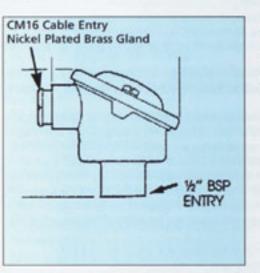
TYPE A



A.B.S. plastic head, with removable cover (4 screw fixing). Sealed to IP 54. 90°C maximum.

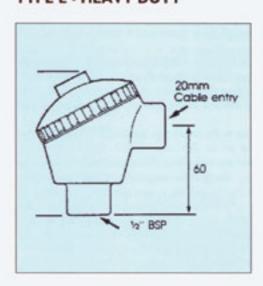


TYPE B - DIN



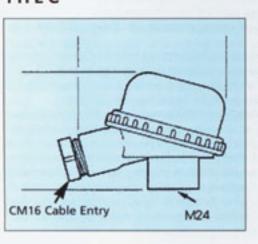
Aluminium head with removable steel cover (2 screw fixing). Sealed to IP 54.

TYPE E - HEAVY DUTY



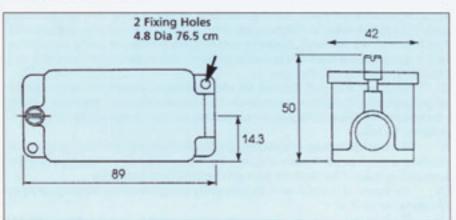
Heavy duty aluminium head, with screw cover and retaining chain. Sealed to IP 65.

TYPE C



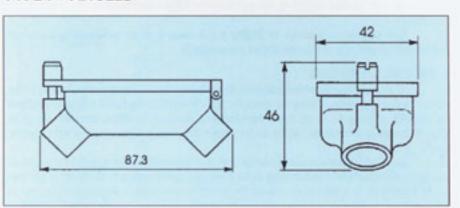
Nylon plastic head 120° C maximum, with screw cover. Sealed to IP 65 - will accept transmitter.

TYPE P - STRAIGHT



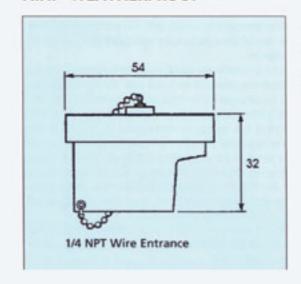
Die-cast aluminium terminal head (straight) with hinged cover and gasket. Sealed to IP 54.

TYPE P - ANGLED



Die-cast aluminium terminal head (angled) with hinged cover and gasket. Sealed to IP 54.

MINI - WEATHERPROOF



Glass-filled nylon plastic head, with screw cover and retaining chain. 175° C maximum.