



THERMOCOUPLE, RTD & M.I. SENSOR'S

INTRODUCTION :-

A Thermocouple consists of two dissimilar metallic wires, the positive and the negative wire, which have a common junction at one end (i.e. Hot Junction). A difference of temperature, between hot junction and cold junction (i.e. free ends) of thermocouple legs produces thermoelectric voltage, the value of which depends upon the temperature difference between the hot junction and the cold junction.

TYPE'S OF THERMOCOUPLE SENSOR'S

- Flexible Thermocouple Sensor
- General Purpose Protection Head Thermocouple Sensor
- Mineral Insulated Thermocouple Sensor

MAXIMUM RECOMMENDED TEMPERATURES OF THERMOCOUPLES

BASE METALS	ANSI SYMBOL	DEGREES °C
Copper / Constantan	T	300
Iron /Constantan	J	600
Chromel / Alumel	K	1200
Chromel / Constantan	E	800
Platinum 10% Rhodium / Platinum	S	1600
Platinum 13% Rhodium / Platinum	R	1600
Platinum 30% Rhodium / Platinum 6% RH	B	1750
Iridium / Iridium 60% Rhodium 40%		1800
Tungsten / Rhodium		2300
Tungsten / Tungsten 26% Rhenium	G*	2700
Tungsten 5% Rhenium / Tungsten 26% Rhenium	C*	2700

* Not ANSI Symbol.

SHEATH MATERIAL TEMPERATURE CHARACTERISTICS

METAL	RECOMMENDED MAXIMUM OPERATING TEMPERATURE	MELTING TEMPERATURE
Monel	538	1343
Low Carbon Steel	649	1525
Cupro - Nickel 30%	760	1238
430 Stainless Steel	843	1427
347 Stainless Steel	899	1399
316 Stainless Steel	899	1371
304 Stainless Steel	899	1427
446 Stainless Steel	1093	1399
310 Stainless Steel	1093	1399
309 Stainless Steel	1093	1399
Inconel	1149	1427
Hastelloy X	1260	1288
Inconel 702	1316	1410
Molybdenum	2200	2622
Silicon Carbide	1500	1600

HK TEMPSSENSORS (INDIA)

Website : www.hktempsensorsindia.com

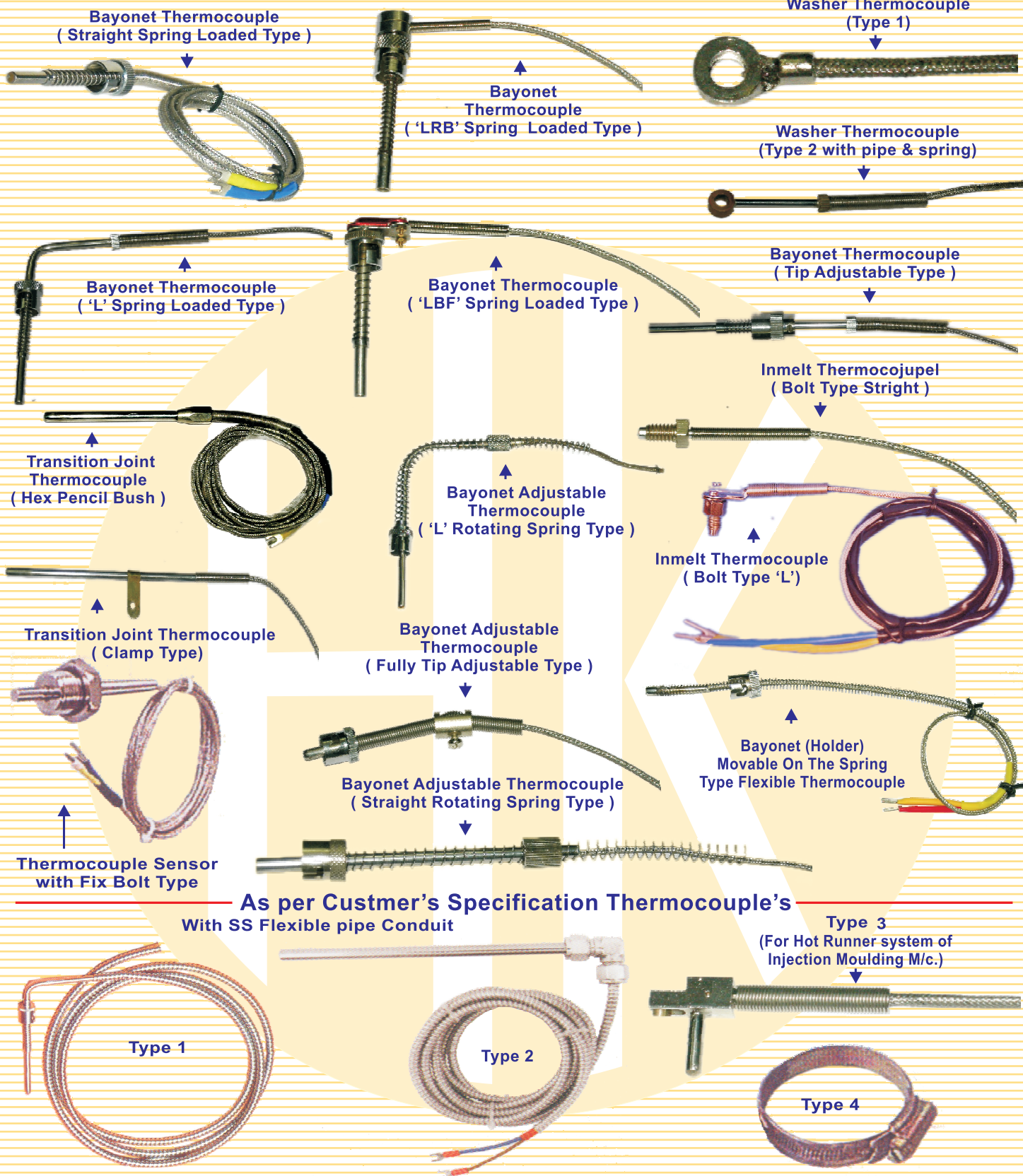
E-Mail : hktempsensorsindia@yahoo.in

hktempsensorsindia@gmail.com

Mobile : +91-9967642914

+91-9920297769

FLEXIBLE THERMOCOUPLE SENSOR'S



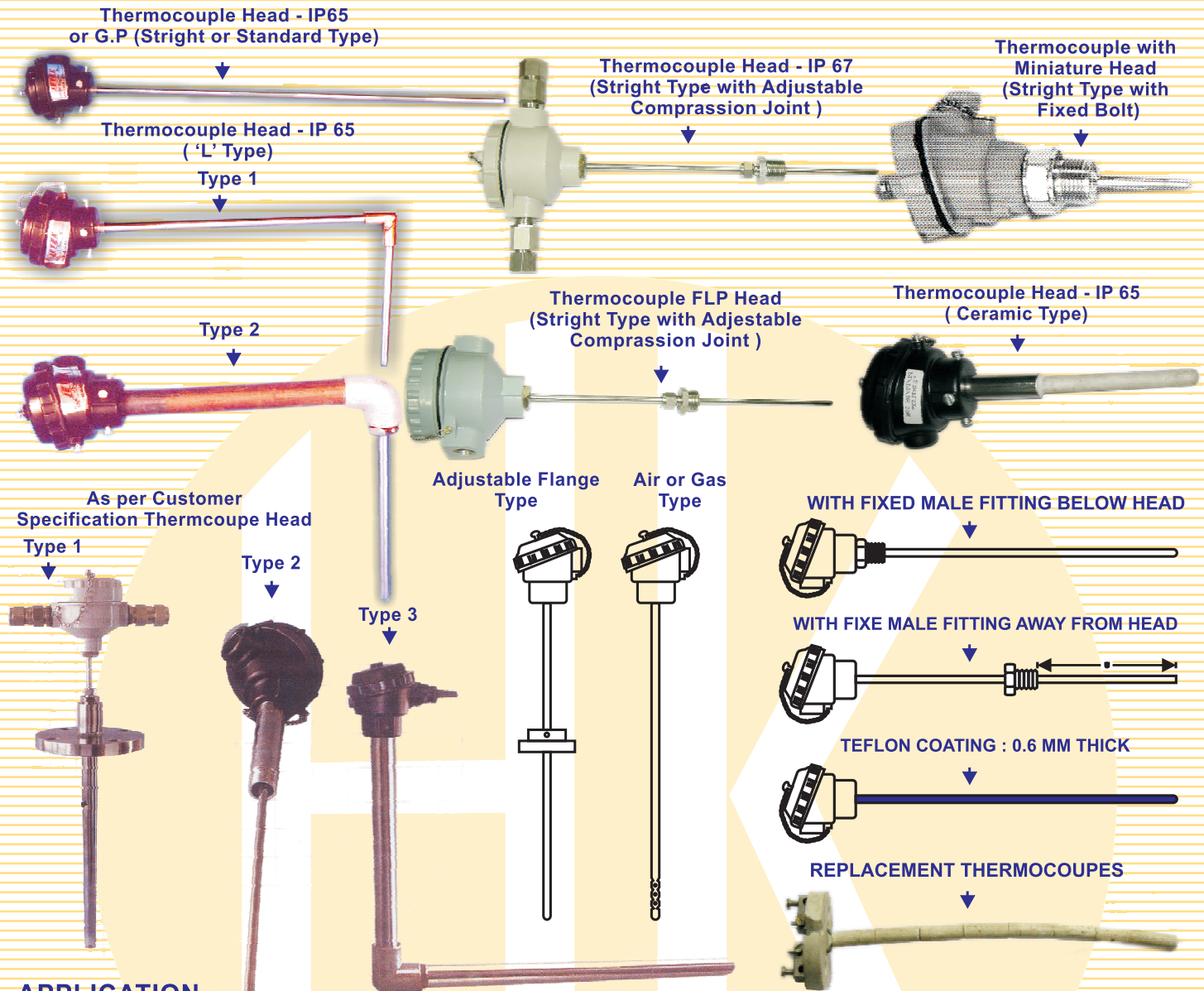
APPLICATION

Bayonet Thermocouple : Fixed & Adjustable Bayonet Thermocouple are Most suitable for measuring Barrel & Die Temperature in injection moulding machine, Blow moulding machine, Extruder etc. Spring loaded sensor ensures tip contact with surface for accurate temperature measurement.

Washer Thermocouple : Most Suitable for continuous measurement of flat-surface temperature up to 400°C. Ideal for applications like packaging machines, Rubber moulding machines, Hot Plates / Platones etc.

Transition Joint Thermocouple : General Purpose J, K, T, Type Industrial Thermocouple With Integral Cable For Low Temperature Measurement.

GENERAL PURPOSE PROTECTION HEAD THERMOCOUPLE SENSOR'S



APPLICATION

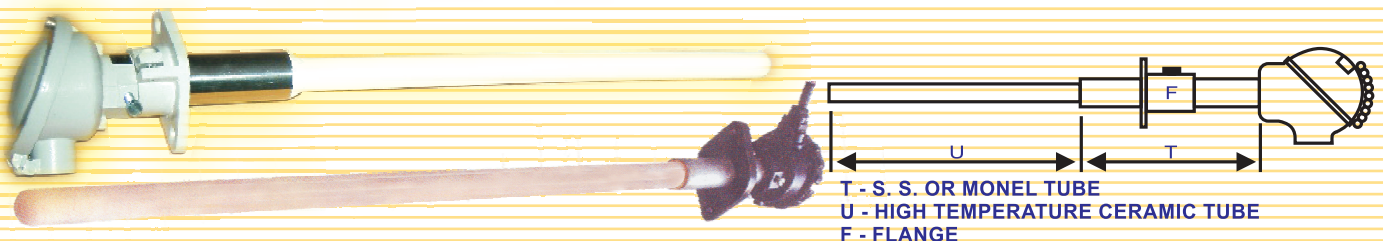
Thermocouples are used as sensing device for measuring, controlling and recording temperature in the range -200°C ~ 1200°C . Thermocouples are being widely used in various industrial fields such as Chemicals, Fertilizers, Iron & Steel, Non-Ferrous metal, Glass, Cement and Refractory factories, Nuclear & Thermal Power Generating Plants etc.

STRAIGHT TYPE THERMOCOUPLE ASSEMBLIES : with metallic or ceramic protection tubes are used in furnaces of all kind and for sensing the temperature of flue gases etc.

ANGLE TYPE THERMOCOUPLE ASSEMBLIES : are generally used for temperature measurement in liquids, salt baths or Molten metal where the thermocouple head is desired to be away from direct vapour coming out from the hot bath.

TYPE 'R' (Pt.Rh.13%/Pt) & TYPE 'S' (Pt.Rh.10%/Pt)

These thermocouples are recommended for continuous use in Oxidizing or inert atmosphere at temperature up to 1400°C intermittently up to 1600°C . They should not be used in reducing atmosphere. These are available in standard wire diameters of 0.33 or 0.45mm.



MINERAL-INSULATED (M.I.) THERMOCOUPLE SENSOR'S

APPLICATION

Mineral insulated (M.I.) thermocouples are used for temperature measurement in nuclear plants, on reactors and pressure vessels in the chemical industry, on test beds for rocket and jet engine systems, on turbines and in industrial plants. Because of their flexibility they are particularly suitable for measurements at inaccessible points. They are also unaffected by severe vibrations.

CONSTRUCTION

Mineral insulated thermocouples consist of a protective metal casing surrounding the thermocouple wires which are embedded in magnesium oxide. The casing may be stainless steel (Inbox), high-temperature steel (Refractaire) and high-temperature steel (Inconel). "Refractaire" is resistant to an oxidising atmosphere and "Inconel" to a reducing atmosphere at high temperatures. The small diameter together with the compressed insulation ensure good electrical insulation, rapid response and relatively good flexibility. The influence of the medium temperature in small Casings for m.i. thermocouple are available in different materials so that it can also be Used for measurements in aggressive media. The thermocouple junction may be either insulated from the casing or welded to the casing, as shown in the diagram. The casing has a gas - tight seal. The cold end is sealed with a suitable material and is times with a terminal head or a plug depending on requirements.

MEASURING JUNCTIONS

An **exposed junction** is recommended for the measurement of static or flowing non-corrosive gas temperatures where fast response time is require. The junction extends beyond the protective metallic sheath to give accurate fast response. The sheath insulation is sealed where the junction extends to prevent penetration of moisture or gas which could cause errors.

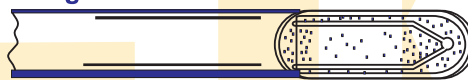
An **Ungrounded junction** is recommended for measurements in corrosive environments where is is desirable to have the thermocouple electronically **isolated** from and shielded by the sheath. The welded wire thermocouple is physically insulated from the thermocouple sheath by MgO powder (soft).

The **grounded junction** is recommended for the measurement of static or flowing corrosive gas and liquid temperatures and for high pressure application. The junction of a grounded thermocouple is welded to the protective sheath giving faster response than the ungrounded junction type

Exposed Junction



Ungrounded Junction



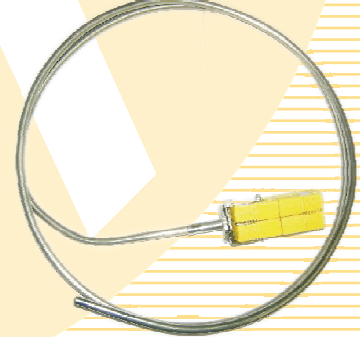
Grounded Junction



FLEXIBLE WIRE
M.I. THERMOCOUPLE (POTSEAL)

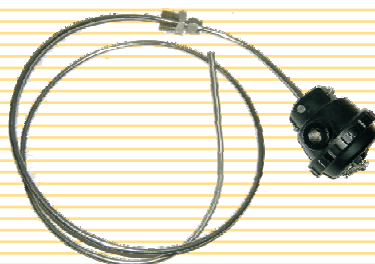


M.I. THERMOCOUPLE WITH PLUG & SOCKET
SIMPLEX DUPLEX

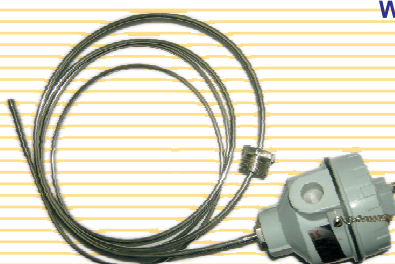


M.I. THERMOCOUPLE
HEAD WITH ADJUSTABLE COMPRESSION FITTING

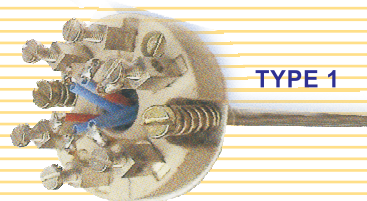
IP 65 HEAD



FLP HEAD

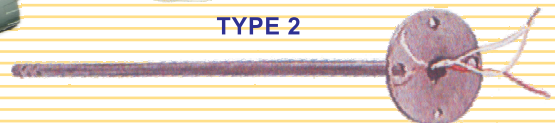


M.I. THERMOCOUPLE
WITH SPRING LOADED S.S PLATE



TYPE 1

TYPE 2



THIN DIAMETER
M.I. WITH PLUG
(POTSEALED)



RTD SENSOR'S AND ASSEMBLIES

DEFINITION

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

PROBE

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

ELEMENT

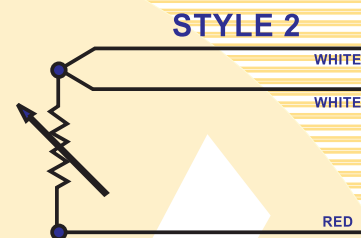
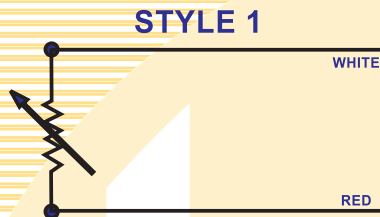
An element is the actual temperature sensing unit. There are two Types of element, wire wound and thin film.

TERMINATION

Probes may be terminated in a connector head, quick- disconnect, terminal block, or extension wire.

LEAD WIRE

Lead styles are offered in one of Two configurations. Style 2 is standard. Be sure to select the configuration that is compatible with your instrumentation.



TEMPERATURE RATING

Standard RTD probe are rated for use in temperatures -50°C to $+400^{\circ}\text{C}$. The maximum temperature rating available is 600°C .

RESISTANCE

100 ohms is standard. 50, 200, 500, 1000 ohms are available, on request.

SHEATH DIAMETER

The Sheath, a Closed end tube, immobilizes the element protecting it against moisture and the environment to be measured. The Sheath also provide protection and stability to the transition lead wires from the fragile elements wires. Standard Sheath Diameters. are 3mm, 4mm, 5mm, 6mm, 8mm, O.D. others available on request.

TRANSITION TYPE RTD SENSOR
(PENCIL) TEFLON / TEFLON WIRE



BAYONET TYPE RTD SENSOR
(SPRING LOADED) TEFLON / TEFLON WIRE



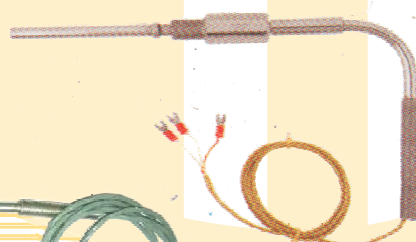
ADJUSTABLE BOLT TYPE
RTD SENSOR TEF / TEF WIRE



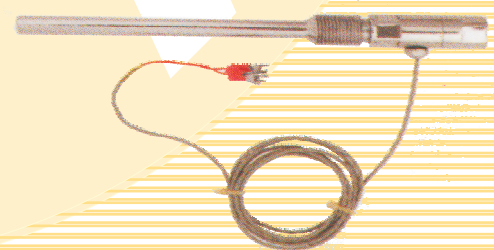
TRANSITION JOINT RTD
SENSOR TEF / FG / SS WIRE
(CLAMP TYPE)



PIPE BENT (L) SCREW TYPE RTD
SENSOR TEF / FG / SS WIRE



BENT SCREW TYPE RTD
SENSOR TEF / FG / SS WIRE



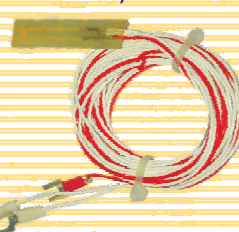
RTD (AIR TYPE) SENSOR



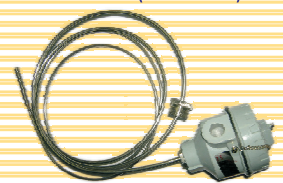
SLOT (FG) RTD SENSOR
(MOTOR WINDING)



ALUMINIUM DIE CAST HEAD RTD SENSOR



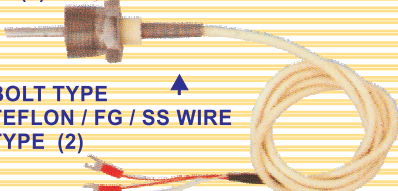
M.I TYPE WITH ADJUSTABLE
COMPRASOR FITTING (FLP HEAD)



AUTO CLAVE RTD SENSOR
TRANSITION (PENCIL) TYPE
TEFLON / SILICON WIRE TYPE (1)



BOLT TYPE
TEFLON / FG / SS WIRE
TYPE (2)



STANDARD TYPE
(IP 65 WHEATHER PROOF HEAD)



ORDERING INFORMATION

For Flexible Thermocouple sensor's

- > Name of flexible Thermocouple sensor's : Refer Page (2)
- > Type of Thermocouple : J, K, T, E
- > Sheath (Stem) Material : SS 304 or SS 316
- > Junction : Grounded or Ungrounded
- > Lead wire : FG / FG / SS or TEF / FG / SS or TEF / TEF
- > Configuration of Lead Wire : 7 / 36 or 1 / 24 or 3 / 24
- > Length of Lead Wire (L): 1mtr.or 2mtr.or 3mtr.or 4mtr.or 5mtr.....etc.
- > Grade of Lead Wire : Original (Extension) or Compensating.
- > Construction : Simplex or Duplex.
- > Sheath (Stem) Diameter (D): 4.7mm or 6mm or 8mm....others.
- > Immersion (Tip) Length : (A)
- > Quantity :
- > Special Comments :



For Thermocouple Head Sensor's

- > Name of Thermocouple Head : Refer Page (3)
- > Type of Thermocouple : J, K, R, S
- > Temperature Range : 400°C or 600°C or 800°C or 1190°C or 1400°C or 1600°C.
- > Sheath (Stem) Material : SS 304 or SS 316 or SS 310 or Inconel or Ceramic or KER 610 or KER 710
- > Sheath (Stem) Diameter (D): 6mm or 8mm or 10mm or 12mm or 19mm or 25mm.....others.
- > Sheath (Stem) Length (L):
- > Junction : Simple or Duplex
- > Quantity :
- > Special Comments :



For Mineral Insulated (M.I) Sensor's

- > Name of M. I Sensor : Refer Page (4)
- > Type : J,K, RTD
- > Sheath (Stem) Material : SS316 or SS310 or Inconel
- > Sheath (Stem) Diameter : 1.5mm or 3mm or 4.5mm or 6mm or 8mm.
- > Sheath (Stem) Length : We Can Provide Continues Length upto 80mtrs.
- > Construction : Simplex or Duplex.
- > Junction : Grounded or Ungrounded

For RTD Sensor's

- > Name of RTD Sensor's : Refer Page (5)
- > Ohms at 0 C : 50ohms or 100ohms or 500ohms or 1000ohms.
- > Sheath (Stem) Material : SS 304 or SS316
- > Sheath (Stem) Diameter (D): 3mm or 4mm or 5mm or 6mm or 8mm....others.
- > Immersion Length : (A)
- > Lead Wire : TEF / TEF or TEF / FG/ SS
- > Lead Wire Length (L):
- > Wire Per Element : 2 or 3 or 4 or 6.
- > Construction : Simplex or Duplex
- > Quantity :
- > Special Comment :



- > In Case of Diecast Aluminium Head : G.P Weather Proof or IP 65 Weather Proof or IP 67
Double Cable Entry or FLP Head.

In addition to all these our mfg. product range, we can provide following products Details Below,

- Molten aluminium or molten zinc or molten brass thermocouple head sensor.
- Molten Metal Pyrometer.
- Temperature Transmitter.
- One time or repeat use foundry thermo tip.
- Proximity switches (Inductive, Capacitive, Optical, Magnetic)

Mobile : +91-9967642914 / +91-9920297769