THERMOCOUPLES & RTDS

TEGUSSA

TEMPERATURE SENSOR

THERMOCOUPLE

Thermocouple is a temperature sensor that make use of the difference in voltage of two junctions as a result of temperature change in the junction.

Type	Material		Temperature Range		Application
	Leg +	Leg -	Continuous °C	Short Term	
K	Nickel - Chromium	Nickel - Aluminum	0 to +1100	-180 to +1350	Suitable in oxidizing atmosphere, most commonly used type of thermocouple
T	Copper	Copper - Nickel	-185 to +300	-250 to +400	Suitable for low temperature applications
J	Iron	Copper - Nickel	+20 to +700	-180 to +750	Usually used in plastic molding industry
N	Nickel - Chromium - Silicon	Nickel - Silicon - Magnesium	0 to +1100	-270 to +1300	Has a stable output on high temperature as high as 1300 °C and good oxidation resistance
E	Nickel - Chromium	Copper - Nickel	0 to +800	-40 to +900	Suitable for application in vacuum or oxidizing atmosphere
R	Platinum - 13% Rhodium	Platinum	0 to +1600	-50 to +1700	For very high temperature usage, has a high resistance to oxidation and corrosion
S	Platinum - 10% Rhodium	Platinum	0 to +1550	-50 to +1750	For very high temperature usage, has a high resistance to oxidation and corrosion
B	Platinum - 30% Rhodium	Platinum - 6% Rhodium	+100 to +1600	+100 to +1820	For very high temperature usage, has a high resistance to oxidation and corrosion, usually used in glass industry

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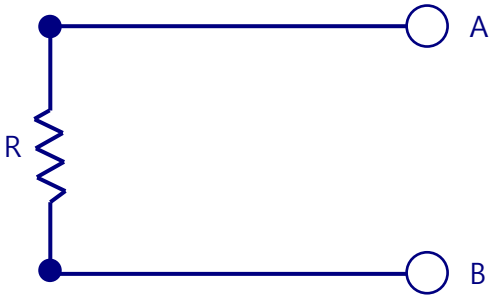
TEMPERATURE SENSOR

RTD (Resistance Bulb)

RTD is a temperature sensor that make use of the change in electrical resistance as a result of temperature change in a metallic conductor

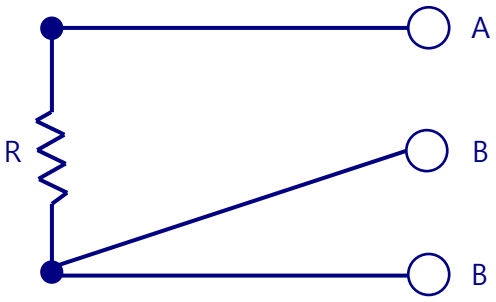
RTDs offer several advantages, such as high accuracy, repeatability, and long-term stability. They also have a relatively wide temperature range, typically from -200°C to 650°C (-328°F to 1202°F), making them suitable for various applications. RTDs are commonly used in industrial processes, laboratories, HVAC systems, and scientific research where precise and reliable temperature measurements are required.

Measuring Methods



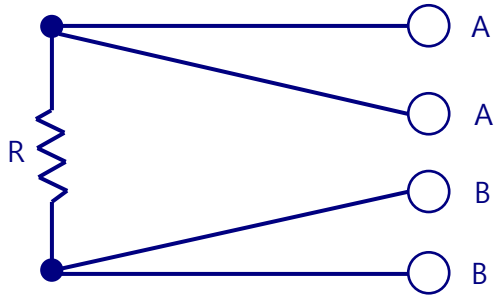
2-Wires Connection

The ends of the RTD element are connected to separate terminals. This type is relatively less expensive compared to other types, but it is not recommended for high-precision applications.



3-Wires Connection

One end of the RTD element is connected to a terminal while the other end is connected to two terminals in order to eliminate errors caused by lead resistance. This type is typically used in industrial applications



4-Wires Connection

Each end of the RTD element is connected to two terminals while the other end is connected to two terminals. This type is recommended for high-precision applications but it is relatively more expensive compared to other types

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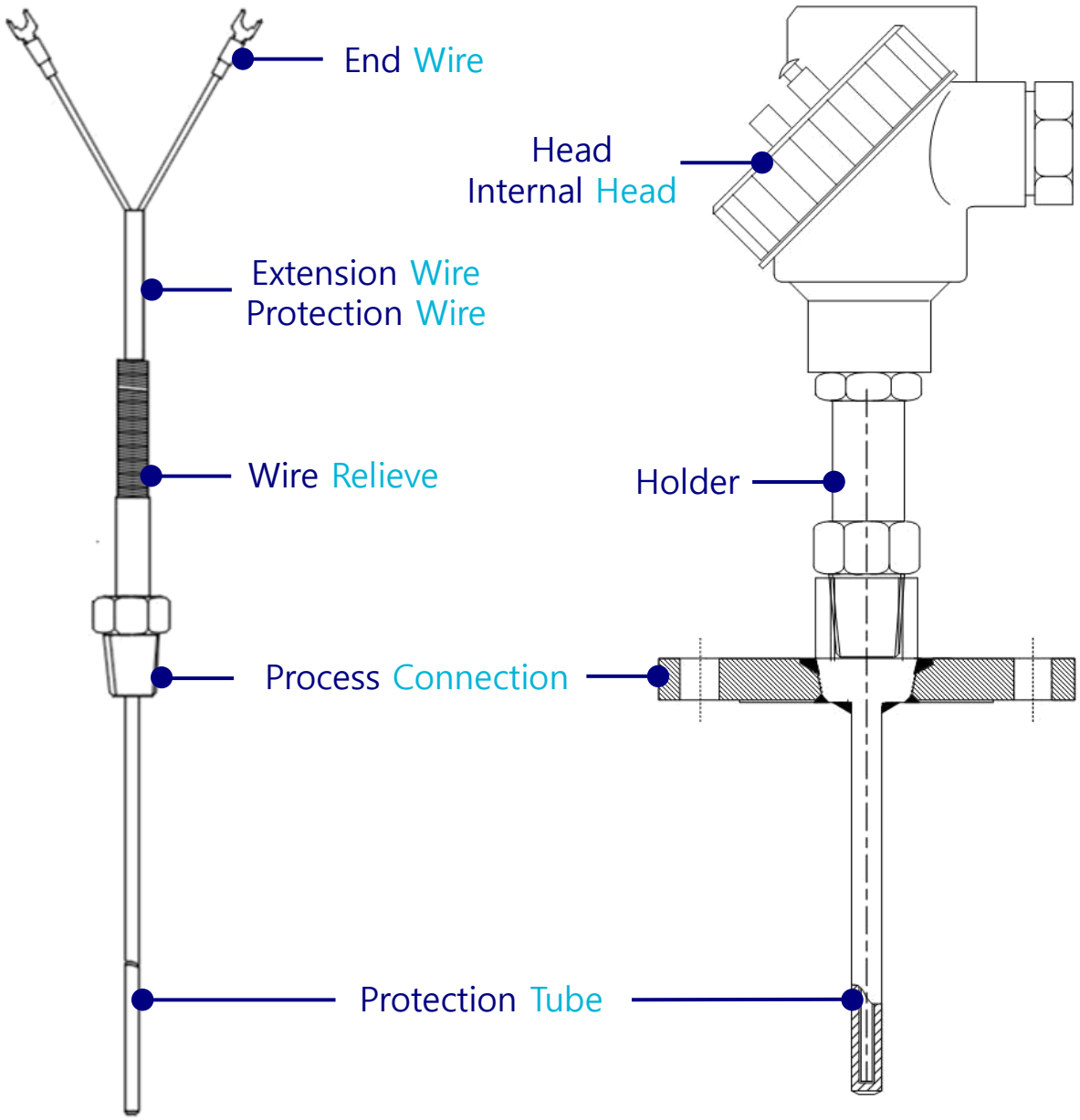
PARTS OF TEMPERATURE SENSOR

Temperature sensors can be in two forms: sensor wire (SW) and sensor head (SH). These two forms are used based on the application where the sensor is installed.



SENSOR WIRE **SENSOR HEAD**

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THERMOCOUPLE / RTD

PROCESS CONNECTION

Process Connection determines the connection between the temperature sensor and the process location where the temperature is installed

Compression Fitting

Can be adjusted according to the installation of the sensor

Fixed Weld Fitting

Cannot be adjusted as the fitting has been welded

Bayonet Cap

Uses a fastening mechanism consisting of pins and slots that matches the pins

SS Plate/Holder

Used to connect sensor element with extension cable

Sanitary/Ferrule/Tri-clamp

Suitable for food and beverage

Flange Type

Suitable for installation of sensor on flange connection

Customized Connection

You can contact us for more details if customized process connection is needed

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WIRE RELIEVE

Wire relieves are often found on wire temperature sensors to protect the connection between the sensor body and the sensor wire.

Spring Type

Uses spring for protecting the connection between the sensor body and the wire

Shrinkable Tube

Uses shrinkable tube for protecting the connection between the sensor body and the wire

Customized Wire Relieve

You can contact us for more details if customized wire relieve is needed

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EXTENSION WIRE

Extension wires are wires used to extend the temperature sensor and have the same material corresponding to the sensor. These wire are often insulated in order to withstand the surrounding temperature.

WIRE INSULATION

Maximum Temperature for Different Types of Material Wire Insulation ▶

PVC
105 ^{0}C

FG (Fiber Glass)
200 ^{0}C

Silicon
180 ^{0}C

Teflon
210 ^{0}C

It is important to choose the appropriate wire insulation based on the specific requirements of the application, such as temperature range, environmental conditions, and chemical exposure.

PROTECTION WIRE

Flexible Conduit

Stainless Braided

Customized Extension Wire

You can contact us for recommendations of insulation and protection wire that can withstand temperatures aside from the above graph

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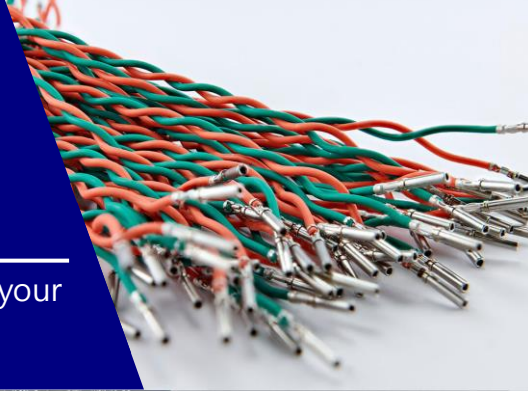
END WIRE

End Wire determines the connection of your sensor to your system



Lug

Y Lug/Fork Lug

Pin Lug

Other Design

You can contact us for more details if other design of lug is required

Connector

Material	Thermoplastic	220 °C
	Heavy Duty Plastic Body	425 °C
	Ceramic	650 °C

Pin	2 Pin
	3 Pin
	4 Pin

Standard

Miniature

Customized Connector

You can contact us for more details if customized connector is needed

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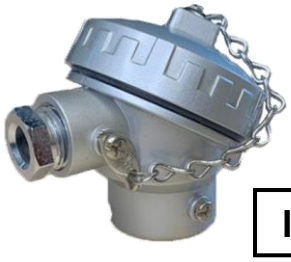
HEAD

Temperature sensors head are used to protect the connection of the sensor. It is also used to house transmitters or ceramic poles where external cables are connected.

TYPES OF HEAD

KNE

Material: Alloy Aluminum



KSE

Material: Alloy Aluminum

KD

Material: Alloy Aluminum

XDA

Material: Alloy Aluminum

KBS

Material: Bakelite

LS

Material: 316 Stainless Steel

MA

Material: Alloy Aluminum

TL-2PA

Material: Alloy Aluminum

TS-2PB

Material: Alloy Aluminum

Other Heads

You can contact us for more details if other types of head from above is needed for your application

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INTERNAL HEAD

Internal head are installed inside the temperature sensor's head. They are typically used for processing signal received from the sensor or for where external cables are connected.

Transmitter

Transmitters are used to convert readings from the temperature sensor into analog signals that can be processed further in a system. There are types of transmitter that are suitable for explosive environments.

Display Type

Display type can provide local display of the readings from the temperature sensor. It can also convert the readings of the temperature sensor into analog signals. There are also certain types of display type internal head that are suitable for explosive environments.

Ceramic Pole

Ceramic poles are typically used as terminal blocks for the connection of external wires to the temperature sensors.

Customized Internal Head

You can contact us for more details if customized internal head is needed

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