Temperature Sensor

It is a device, used to measure the temperature through an electrical signal. it requires a thermocouple or RTD (Resistance Temperature Detectors).

Working

The measurement of the temperature sensor is about the hotness or coolness of an object. The working base of the sensors is the voltage that read across the diode. If the voltage increases, then the temperature rises and there is a voltage drop between the transistor terminals of base & emitter, they are recorded by the sensors.

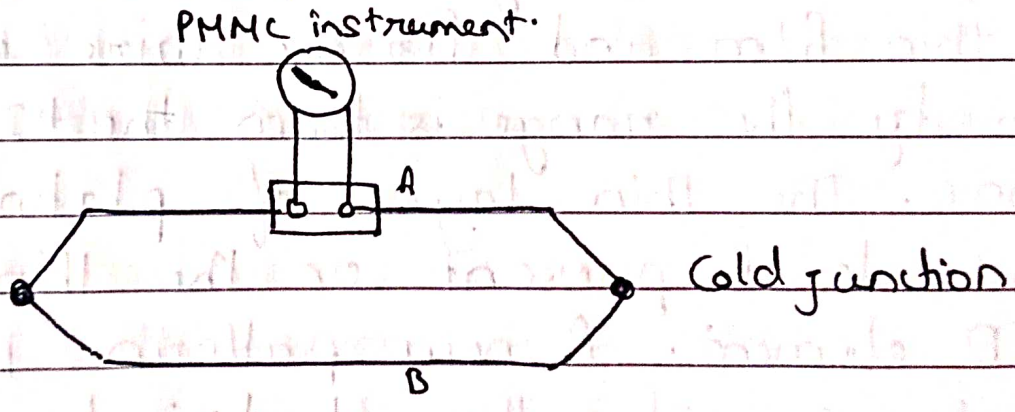
If the difference in voltage is amplified, the analogue signal is generated by the device and it is directly proportional to the temperature.

Types of T.S

There are many different types of T.S

- **Thermocouple Sensor**

~~A temperature Sensor is the instrumentation~~
A thermocouple is a temperature-measuring device consisting of two dissimilar conductors that contact each other at one or more points. It produces a voltage when the temperature of one of the points differs from the reference temperature at other parts of the circuits.



- **Thermistor Sensor.**

This type of sensors is used mostly in the human thermometers. If there is a change in the temperature, then the electrical current or resistance also changes. The thermistor is prepared by using the semiconductor

materials with a resistivity which is especially sensitive to temperature. The resistance of a thermistor decreases with increasing temperature so that when the temperature changes, the resistance change is predictable.

- **Resistance Temperature Detector**

These are the temperature sensors with a ~~sensor~~ resister that changes the resistive value simultaneously with temperature changes. The RTDs are used in a wide temperature range from -500C to 5000C for thin film and for the wire wound variety the range is from the +2000C to 8500C. The thin layer of platinum on a substrate is present on the thin film RTD element. A new pattern is created which provide the electrical circuit and it is trimmed to give a specific resistance.

- **Thermometer**

It is a device which is used to measure the temperature of any glass solids, or liquids. In this type or alcohol is used in a tube whose volume is changed by

changing the temperature. Its volume is directly proportional to temperature.

- **IR Temperature Sensor**

These are an electronic and non-contacting sensor which have a certain characteristics such that it can detects the IR radiations. Two types of IR T.S. used in market are IR s and Quantum IR.S. It detects the surface temperature by emitting radiations. Thus its cost depends on its working capabilities. ~~meas~~ means its accuracy level depends upon its cost in other words low cost - low accuracy level and high cost - high accuracy level.

- **Semiconductor based Sensor / ICs T.S.**

It operate with reverse bias, have a small capacitance and a low leakage current. They are formed on thin wafers of silicon. They are compact, produce linear outputs, and have a small range of temperature. They also have low cost and are accurate following calibration.

Types:- 1) Voltage output
2) Current Output

3) Digital output
4) Resistance output
5) Simple diodes.

Applications of T.S

1) These are used in electric motors for measuring the motor winding temp., bearing temp., brushes temperature.

2) These are used in electric cables for measuring the cable internal temperature.

3) In mechanical engines for measuring engine oil temp & engine bearing temp.

4) In rubber, plastic, biomedical industries.