

1. **Temperature Sensor**
2. **Proximity Sensor**
3. **Pressure Sensor**
4. **Water Quality Sensor**
5. **Chemical/Smoke & Gas Sensor**
6. **Level Sensor**
7. **IR Sensor**
8. **Ultrasonic Sensor**
9. **Image sensors**
10. **Motion Detection Sensors**
11. **Accelerometer Sensors**
12. **Gyrometer Sensors**
13. **Humidity Sensors**
14. **Optical Sensors**

### 1) Temperature Sensor

A Temperature Sensor is a device which is used to measure heat or temperature on the operating machine part. Temperature sensing is performed by gadget called Thermocouple. 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 circuit.

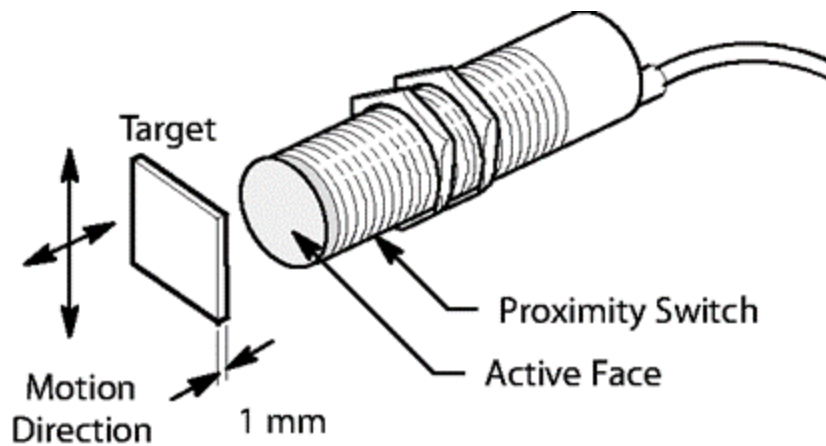


Sub-types of the Temperature Sensors are:

- a. Thermocouples: These are voltage devices that indicate temperature measuring with a change in voltage. As temperature goes up, the output voltage of the thermocouple rises.
  
- b. Resistor temperature detectors (RTD): The resistance of the device is directly proportional to the temperature, increase in a positive direction when the temperature rises resistance going up.
  
- c. Thermistors: It is a temperature sensitive resistor that changes its physical resistance with the change in temperature.
  
- d. IC (Semiconductor): They are linear devices where the conductivity of the semiconductor increases linearly and it takes advantage of the variable resistance properties of semiconductor materials. It can provide a direct temperature reading in digital form, especially at low temperatures.
  
- e. Infrared sensors: It detects temperature by intercepting a portion of emitted infrared energy of the object or substance, and sensing its intensity, can be used to measure temperature of solids and liquids only, Not possible to use it on gases because of their transparent nature.

## 2) Proximity Sensor

Proximity sensor is using to detect the motion and very common to use in retail shop, through this device retailer will use customer's proximity to any product and same time they can sent the coupons and deals to the customer's mobile or on email. Now a days proximity sensor are using to check the availability or free spaces like parking space, sitting spaces in sports stadium, mall and airports.



a. Inductive Sensors: Inductive proximity sensors are used for non-contact detection to find out the presence of metallic objects using electromagnetic field or a beam of electromagnetic radiation. It can operate at higher speeds than mechanical switches and also seems more reliable because of its robustness.

b. Capacitive Sensors : Capacitive proximity sensors can detect both metallic as well as non-metallic targets. Nearly all other materials are dielectric different from air. It can be used to sense very small objects through a large portion of target. So, generally used in difficult and complicated applications.

c. Photoelectric Sensors : Photoelectric sensor is made up of light-sensitive parts and uses a beam of light to detect the presence or absence of an object. It is an ideal alternative of inductive sensors. And used for long distance sensing or to sense non-metal object.

d. Ultrasonic Sensors: Ultrasonic sensors are also used to detect the presence or to measure the distance of targets similar to radar or sonar. This makes a reliable solution for harsh and demanding conditions.

### 3) Pressure Sensor

A pressure sensor is a gadget equipped with a pressure-sensitive element that's used to measure the pressure of a liquid or a gas against a diaphragm made of silicon, stainless steel, etc., and converts the measured value into an electrical signal as an output. It's also use to measure the water flow through pipes or tank and notify the concern person when something need to be fixed. Now a days pressure sensor is used in aircraft and vehicles to determine the altitude and force, continuously.



#### 4) Water Quality Sensor

Water quality sensors are mainly used to measure a dozen of the most relevant water quality parameters. Wasp-mote Smart Water is the first water quality-sensing platform to feature autonomous nodes that connect to the Cloud for real-time water control. It's used to measure quality of sea water, river water and etc.



a. Chlorine Residual Sensor: It measures chlorine residual (i.e. free chlorine, monochloramine & total chlorine) in water and most widely used as disinfectant because of its efficiency.

b. Total organic carbon Sensor: TOC sensor is used to measure organic element in water.

c. Turbidity Sensor: Turbidity sensors measure suspended solids in water, typically it is used in river and stream gaging, wastewater and effluent measurement.

d. Conductivity Sensor: Conductivity measurements are carried out in industrial processes primarily to obtain information on total ionic concentrations (i.e. dissolved compounds) in water solutions.

e. pH Sensor: It is used to measure the pH level in the dissolved water, which indicates how acidic or basic (alkaline) it is.

f. Oxygen-Reduction Potential Sensor : The ORP measurement provides insights into the level of oxidation/reduction reactions occurring in the solution.

## 5) Chemical/Smoke and Gas Sensor

smoke and gas detector is a gadget that sense gas, smoke and typically it's an indicator of fire. Now a days all security devices using this sensor to passing signal to fire alarm to control panel. Household smoke detector is also known as smoke alarm, most of the device manufacturer using audible or visual alarm system in security devices that detect automatically.



**1 = Output**  
**2 = Vcc (positive voltage)**  
**3 = Gnd**

Following are most common kind of chemical sensors in use:

Chemical field-effect transistor

Chemiresistor

Electrochemical gas sensor

Fluorescent chloride sensors

Hydrogen sulfide sensor