FACULTY OF ENGINEERING & TECHNOLOGY

Dileep Kumar
Assistant Prof. EE Deptt

Disadvantage of thermocouples

- They have a lower accuracy and hence cannot be used for precision work.
- It require open or closed end metal protecting tube or well.
- Thermocouple is placed remote from measuring devices so it is expensive due to the connection of long wires.
- It has very complex circuit.

What is Pressure?

Pressure is the ratio between the force acting on a surface and the area of that surface. SI units of Pressure is Pascal (N/m^2).

Units of Pressure

As pressure is force acting over an area, its units are of force per area. Some of the common units for pressure that you will find in process systems are:

- psi (pounds per square inch)
- bar, 1 bar = 14.5 psi, common for pump ratings
- In H20 (inches of water), 27.680 in H20 = 1 psi, common for vacuum systems and tank levels
- mmHg (millimeters of mercury), 760 mmHg = 14.7 psi, common for vacuum systems

Gauge pressure

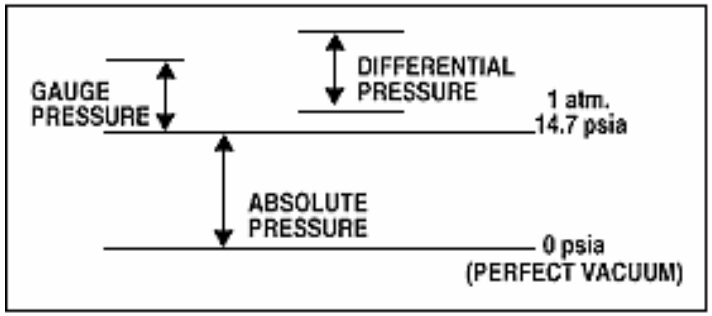
Gauge pressure is defined relative to atmospheric conditions, that is, it does not measure the current atmospheric pressure. The units of gauge pressure are psig; however gauge pressure is often denoted by psi as well.

Absolute pressure

Absolute pressure is defined as the pressure relative to an absolute vacuum. The units of absolute pressure are psi.

Differential pressure

Differential pressure uses a reference point other than full vacuum or atmospheric pressure



The type of pressure sensor is defined by its reference point

Pressure Instruments

Types of Pressure Instruments

Pressure Gauges (Vacuum, Compound, Absolute, Gauge)

Differential Pressure Gauge

Pressure Switch (Vacuum, Absolute, Gauge) Differential Pressure Switch

Pressure Transmitter (Vacuum, Absolute, Gauge) Differential Pressure Transmitter

PROCESS INSTRUMENTATION

PRESSURE GAUGE

PRESSURE SWITCH

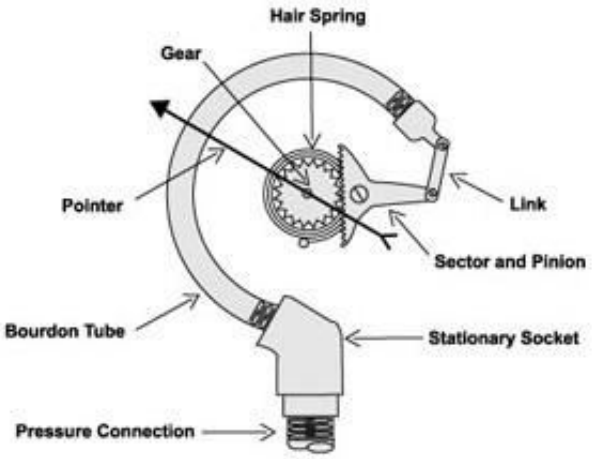
DIFFERENTIAL PRESSURE TRANSMITTER

Pressure Gauge

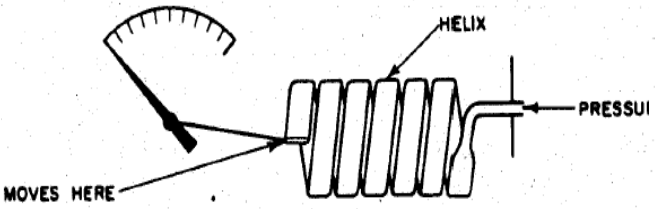
- A Pressure Gauge is used for measuring the pressure of a gas or liquid.
- A Vacuum Gauge is used to measure the pressure in a vacuum.
- A Compound Gauge is used for measuring both Vacuum and Pressure.
- Pressure Gauges are used for Indication only

Measuring Principle

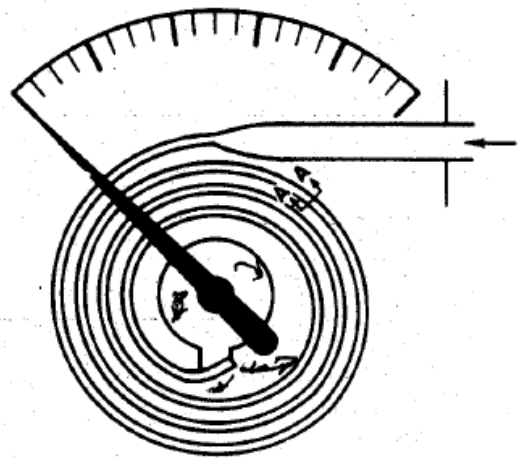
Bourdon tube measuring element is made of a thin-walled C-shape tube or spirally wound helical or coiled tube. When pressure is applied to the measuring system through the pressure port (socket), the pressure causes the Bourdon tube to straighten itself, thus causing the tip to move. The motion of the tip is transmitted via the link to the movement which converts the linear motion of the bourdon tube to a rotational motion that in turn causes the pointer to indicate the measured pressure.



"C" Type Bourdon



Helical Bourdon



Coiled Bourdon