

# Transducer Elements

Device when activated from one form of energy & converting to another quantity.

or

Device which converts one physical quantity or condition to another usable form.

Physical quantity – heat , intensity of light, flow rate, liquid level, humidity etc

Sensor : sense physical quantity

# Classification of transducers

1. Based on principle of transduction
2. Active & passive
3. Analog & digital
4. Inverse transducer

## Based on principle used

- Thermo electric
- Magneto resistive
- Electro kinetic
- Optical

## Passive transducer

- Device which derive power reqd. for transduction from auxiliary power source
- externally powered
- Without power they will not work
- Eg : resistive, inductive, capacitive

## Active transducer

- No extra power reqd. to produce output
- Self generating
- Draw power from input applied
- Eg. Piezo electric transducer used for accelartion measurement

# Analog transducer

- convert I/p quantity into an analog o/p
- Analog o/p- a continuous fn. Of time
- Eg. Strain gauge, L VDT, thermocouple

# Digital transducer

- Converts I/p into an electrical o/p in the form of pulses

# Inverse transducer

- Which converts electrical signal to physical quantity

## Types of Analog Transducers :

- Electromechanical types – Potentiometric resistance type, Electromagnetic, Electrodynamic, Eddy Current, Magnetostrictive, Variable Inductance, Linearly Variable Differential Transformer, Variable Capacitance, Piezo-Electric Transducer, Resistance Strain Gauges, Ionisation Transducers, Mechano Electronic Transducers.
- Opto-electrical types- Photo-Conductive Transducers, Photo-Volatic Transducers

## Types of Analog Transducers :

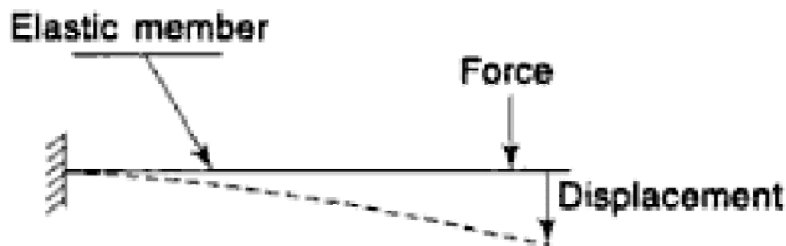
- Frequency Generating Transducers
- Digital Encoders

# Electromechanical Transducer

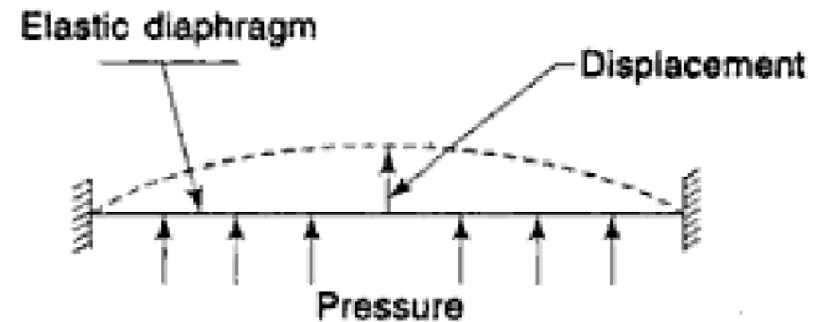
- In such transducer , an electrical output is produced due to an input of mechanical displacement or strain(Produced by primary sensor due to input physical variable like pressure, flow etc)



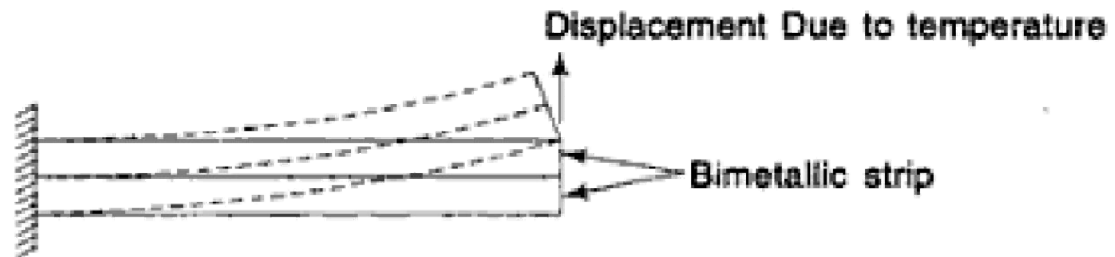
# Conversion of input parameter to mechanical displacement



(a) Primary sensor for force input



(b) Primary sensor for pressure input



(c) Primary Sensor for Temperature Input

# Advantages of electromechanical transducers

- Less power consumption & less loading on system to be measured
- Friction & mass inertia effect minimum.
- More compact instrumentation.
- Possibility of noncontact measurement.
- Good frequency & transient response
- feasibility of remote indication & recording
- Amplification greater than that produced by mechanical contrivance
- Possibility of mathematical processing of signals like summation, integration etc.