SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A+' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

IIYEAR/ III SEMESTER

19ECT201 Electrical Engineering and Instrumentation

TOPIC – TRANSDUCER

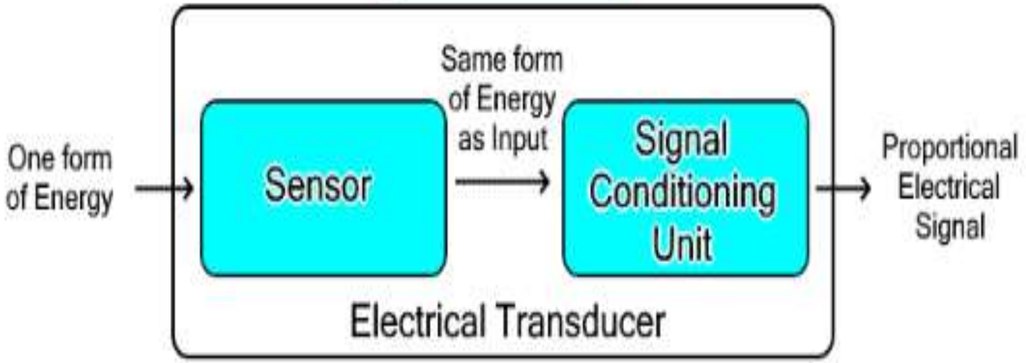
TRANSDUCER

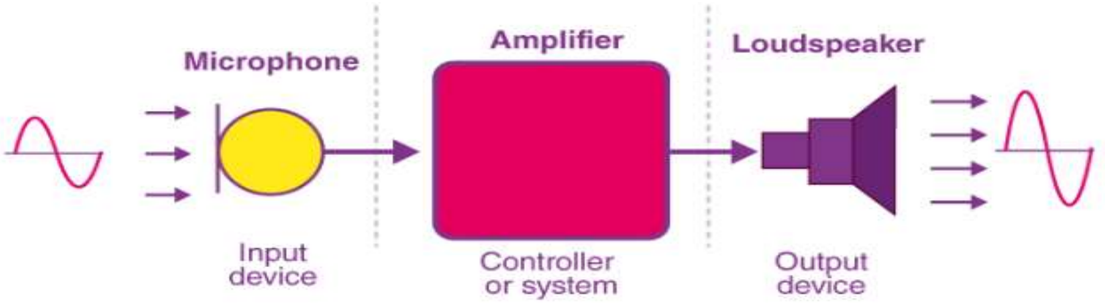
A transducer is a device that converts one form of energy into another form of energy.
While **an electrical transducer converts one form of energy into an electrical signal**.
A **speaker is said to be a transducer** as it can change an electrical signal into sound energy.
But a microphone is an electrical transducer because it converts sound energy into an electrical signal.

For instance, consider a mic we use in daily life in telephones, mobile phones, that converts the sound into electrical signals and then amplifies it into the preferred range. Then, alters the electrical signals into audio signals at the o/p of the loudspeaker. Nowadays, fluorescent bulbs are used for lighting, change electrical energy into light energy.
The best **transducer examples** are loudspeakers, microphones etc


One form of Energy
Transducer
Another form of Energy


One form of Energy
Electrical Transducer
Electrical Signal


One form of Energy
Same form of Energy as Input
Sensor
Signal Conditioning Unit
Proportional Electrical Signal
Electrical Transducer


Microphone
Amplifier
Loudspeaker
Input device
Controller or system
Output device

VARIABLE RESISTIVE TRANSDUCER

VARIABLE RESISTANCE TRANSDUCERS

- These are one of the most commonly used types of transducers, also called as resistive **transducers or resistive sensors**.
- It used for measuring various physical quantities like **temperature, pressure, displacement, force, vibrations etc**.
- These transducers are usually used as the secondary transducers, where the output from the primary mechanical transducer acts as the input for the variable resistance transducer.
- The output obtained from it is calibrated against the input quantity and it directly gives the value of the input.

PRINCIPLE OF WORKING

- The variable resistance transducer elements work on the principle that the resistance of the conductor is directly proportional to the length of the conductor and inversely proportional to the area of the conductor.
- Thus if **L** is the **length of the conductor (in m)** and **A** is its **area (in m square)**, **R** its **resistance (in ohms)** is given by:

$$R = \rho L/A$$

- where **ρ** is called as **resistivity of the material** and it is constant for the materials and is measured in **ohm-m**
- The resistance of some materials also changes with the change in their temperature. This principle is primarily used for the measurement of temperature.