



FACULTY OF ENGINEERING & TECHNOLOGY

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TRANSDUCERS

Classification based on Source of Energy

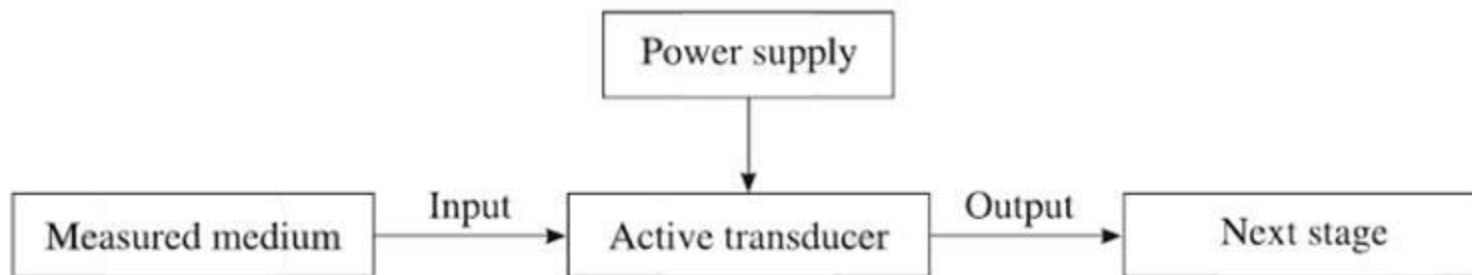
Transducers are also classified based on the source of energy. Under this category, there usually two types of transducers:

- Active Transducers
- Passive Transducers

Active Transducers

In Active Transducers, the energy from the input is used as a control signal in the process of transferring energy from power supply to proportional output.

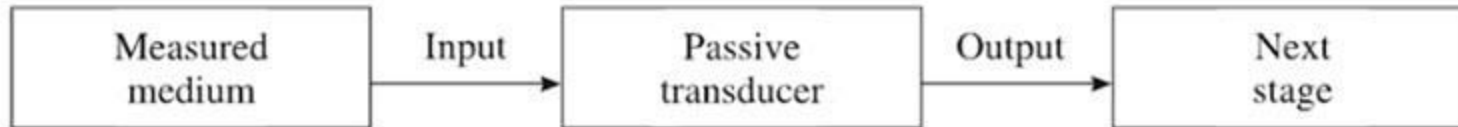
For example, a Strain Gauge is an Active Transducer, in which the strain is converted into resistance. But since the energy from the strained element is very small, the energy for the output is provided by an external power supply.



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Passive Transducers

In Passive Transducers, the energy from the input is directly converted into the output. For example, a Thermocouple is a passive transducer, where the heat energy, which is absorbed from input, is converted into electrical signals (voltage)



Characteristics of Transducers

The performance characteristics of a Transducer are key in selecting the best suitable transducer for a particular design. So, it is very important to know the characteristics of transducers for proper selection.

Performance characteristics of transducers can be further classified into two types:

1. Static Characteristics
2. Dynamic Characteristics

1. Static Characteristics

The static characteristics of a transducer is a set of performance criteria that are established through static calibration i.e. description of the quality of measurement by essentially maintaining the measured quantities as constant values of varying very slowly.

The important static characteristics of transducers.

- Sensitivity
- Linearity
- Resolution
- Precision (Accuracy)
- Span and Range
- Threshold
- Drift
- Stability
- Responsiveness
- Repeatability
- Input Impedance and Output Impedance

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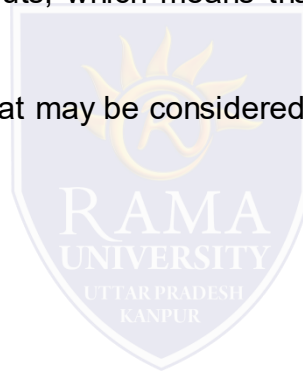
2. Dynamic Characteristics

The dynamic characteristics of transducers relate to its performance when the measured quantity is a function of time i.e. it varies rapidly with respect to time.

While static characteristics relate to the performance of a transducer when the measured quantity is essentially constant, the dynamic characteristics relate to dynamic inputs, which means that they are dependent on its own parameters as well as the nature of the input signal.

The following are some dynamic characteristics that may be considered in selection of a transducer.

- Dynamic Error
- Fidelity
- Speed of Response
- Bandwidth



Different Types of Transducers

Basically, the two different types of Transducers are

1. Mechanical Transducers
2. Electrical Transducers

Mechanical Transducers are those which responds to changes in physical quantities or condition with mechanical quantity. If the physical quantity is converted to an electrical quantity, then the transducers are Electrical Transducers.