


Classification of Transducers

On the basis of method used for Transduction:

- ▶ Active and Passive
 - ▶ Analog and digital transducer
 - ▶ Transducer and inverse transducer
 - ▶ Primary and secondary transducer
 - ▶ On the basis of transduction form
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Classification of transducer

- ▶ **Active or Self generating type** – do not require an external power, and produce an analog voltage or current when stimulated by some physical form of energy
 - Thermocouple
 - Photovoltaic cell
 - Tachogenerators
 - Piezoelectric crystals

Classification of transducer

- ▶ **Passive transducers** – require an external power, and the output is a measure of some variation (resistance or capacitance)
 - Slide–wire resistor
 - Resistance strain gauge
 - Differential transformer

Classification of transducer

- ▶ **Analog Transducers**–These transducers convert the input quantity into an analog output which is a continuous function of time.
 - Strain Gauge
 - LVDT
 - Thermocouple
 - Thermistor

Classification of transducer

- ▶ **Digital Transducers**–These transducers convert the input quantity into an electrical output which is in the form of pulses.
 - Glass Scale can be read optically by means of a light source,an optical system and photocells.

Classification of transducer

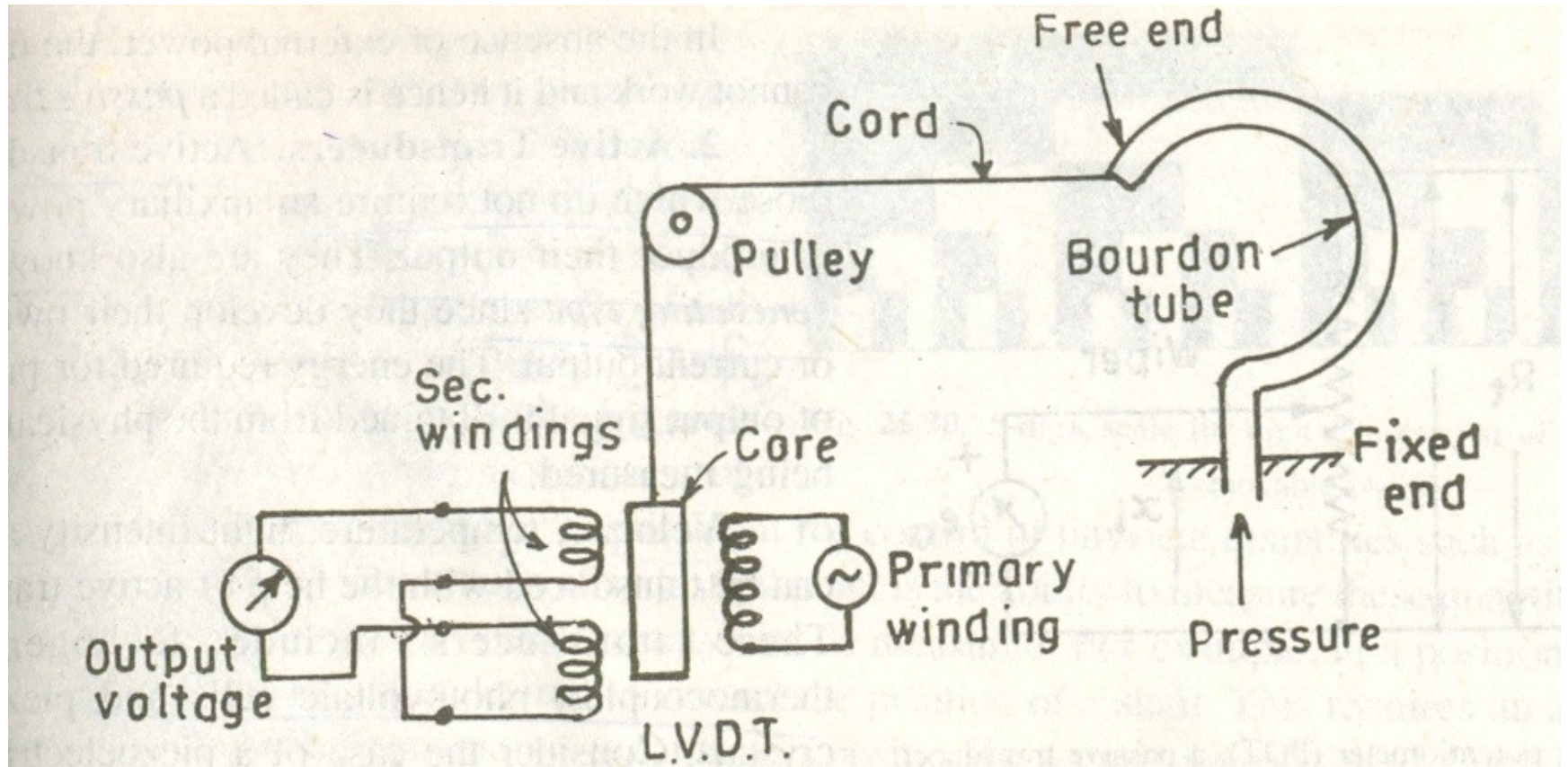
- ▶ Transducers and Inverse Transducers–
 - A Transducer can be broadly defined as a device which converts a non–electrical quantity into an electrical quantity.
Ex:–Resistive, inductive and capacitive transducers
 - An inverse transducer is defined as a device which converts an electrical quantity into a non–electrical quantity.
Ex:–Piezoelectric crystals

Classification of transducer


- ▶ **Primary Transducers and Secondary Transducers–**

Bourden tube acting as a primary detector senses the pressure and converts the pressure into a displacement of its free end. The displacement of the free end moves the core of a linear variable differential transformer (LVDT) which produces an output voltage.


Classification of transducer




Characteristics of Transducers

- ▶ Input characteristics
 - Type of input and operating range
 - Loading effects
 - ▶ Transfer characteristics
 - Transfer function
 - Error
 - Response of transducer to environmental influences
 - ▶ Output characteristics
 - ▶ Environmental response
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Factors affecting choice of transducer

- ▶ Operating Principle
 - ▶ Sensitivity
 - ▶ Operating Range
 - ▶ Accuracy
 - ▶ Cross sensitivity
 - ▶ Errors
 - ▶ Transient and Frequency response
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Characteristics of a transducer

- ▶ Ruggedness
 - ▶ Linearity
 - ▶ Repeatability
 - ▶ Accuracy
 - ▶ High stability and reliability
 - ▶ Speed of response
 - ▶ Sensitivity
 - ▶ Small size
 - ▶ Dynamic Range
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Factors affecting choice of transducer

- ▶ Loading Effects
 - ▶ Environmental Compatibility
 - ▶ Insensitivity to Unwanted Signals
 - ▶ Usage and Ruggedness
 - ▶ Electrical Aspects
 - ▶ Stability and Reliability
 - ▶ Static Characteristics
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