Electrical Science-2

Transducers

Introduction

- Responds to some physical condition
- Develops magn. Related o/p
- Electrical: Develops electrical Signal o/p
- Mechanical: Mechanical o/p
- Transducer – Physical contact
- Sensor – without physical contact
- Interchangeable terms

Introduction

- Input transducers
  - Converts non-electrical to electrical
- Output transducers
  - Vice versa

Electrical Measuring Systems

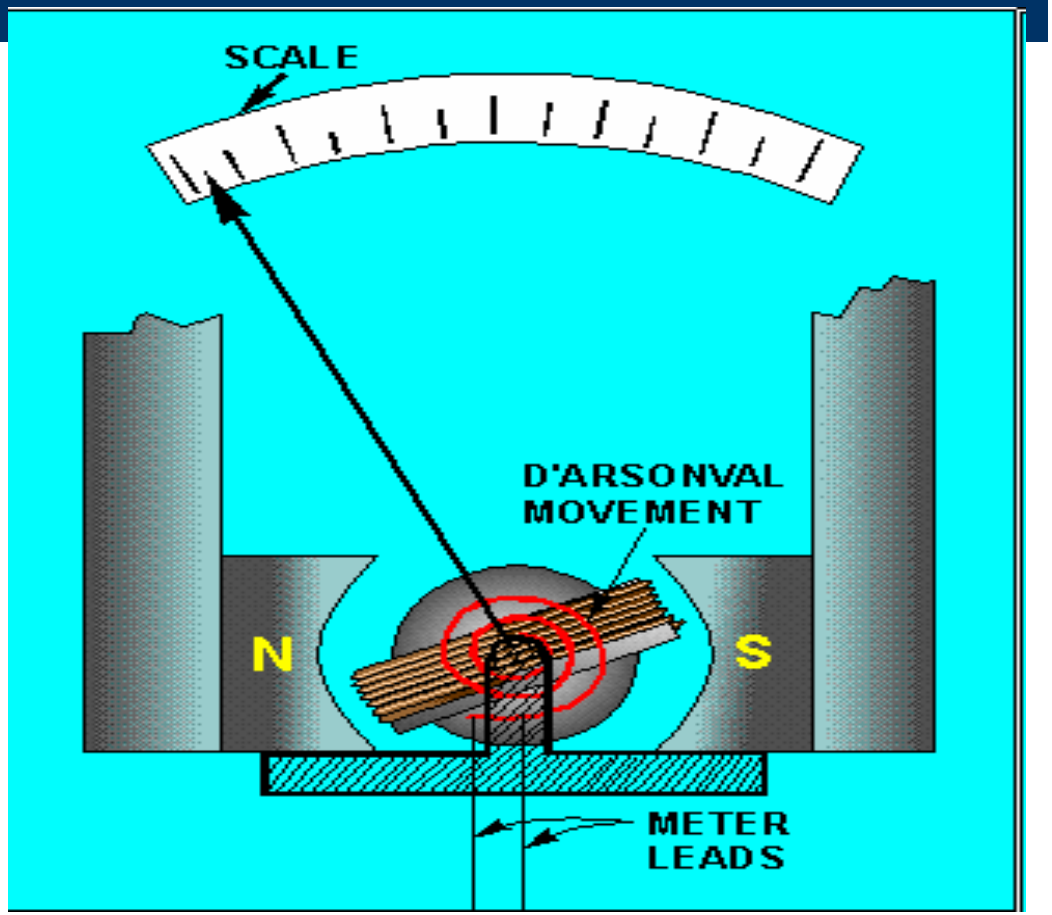
- Measurement of variety of physical quan
- Signal can be generated by
  - Change in elctrical para. Of transducers
  - Generation of emf
  - Generation of current
- Processing in suitable form
- Indication
- Display

Measurement of Current

- PMMC –
  - most widely used
  - Consists of circular coil
  - Permanent magnets
  - Also known as d'Arsonval galvanometer
  - I in coil produces torque
  - Due to T, coil rotates
  - Controlling springs
  - Sensitivity

Measurement of Current

- Types of PMMC
  - Vibration Galvanometer
  - Electromagnetic oscillograph
  - Ballistic galvanometer
  - Fluxmeter
- Thermo couple type milliammeter
  - Thermocouple, heater coil in glass bulb


SCALE
D'ARSONVAL
MOVEMENT
N
S
METER
LEADS

Measurement of Voltage

- Voltage - Potential difference
- One terminal zero – earth terminal
- Other terminal potential – voltage
- Sensitive to current act as voltmeters
- Connect R in series with ammeter
- Calibrate in volts

Electrostatic voltmeter

- Voltage sensitive
- Variable plate capacitor
- Plate moves S.T E static F of attraction
- No energy & I drawn in case of DC
- No energy but I drawn in case of AC
- Hence perfect
- Torque produced is same in AC and DC

Measurement of Voltage

- E static voltemeter good for
  - 100 V and above
  - Up to 50 Hz
- Potentiometers
  - Low voltage measurements
- Electronics voltmeters
  - Analog
  - Digital

Measurement of Resistance

- Ohmmeters
  - Not suitable
  - Less accuracy and precision
- Cross coil PMMC
- Wheatstone bridge networks