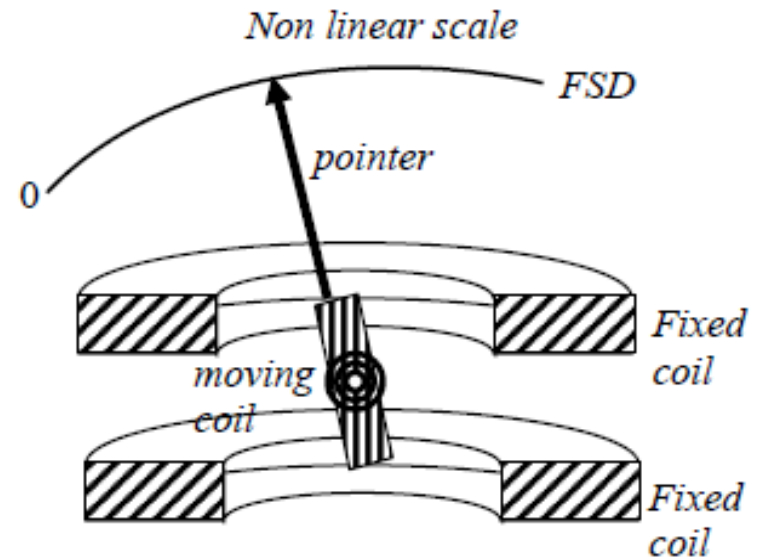
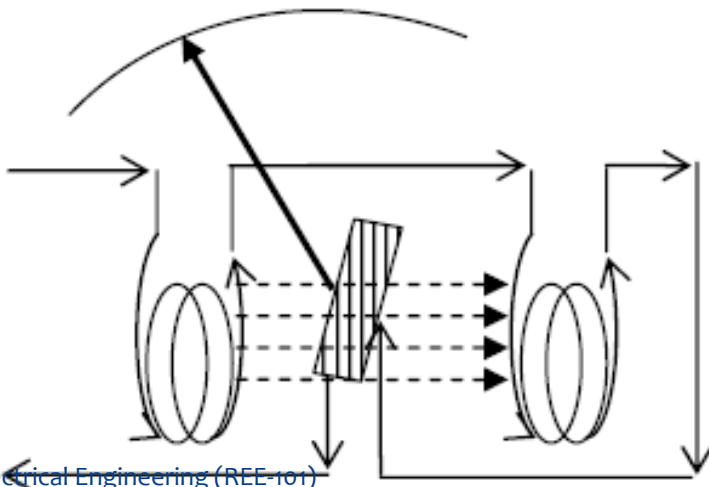
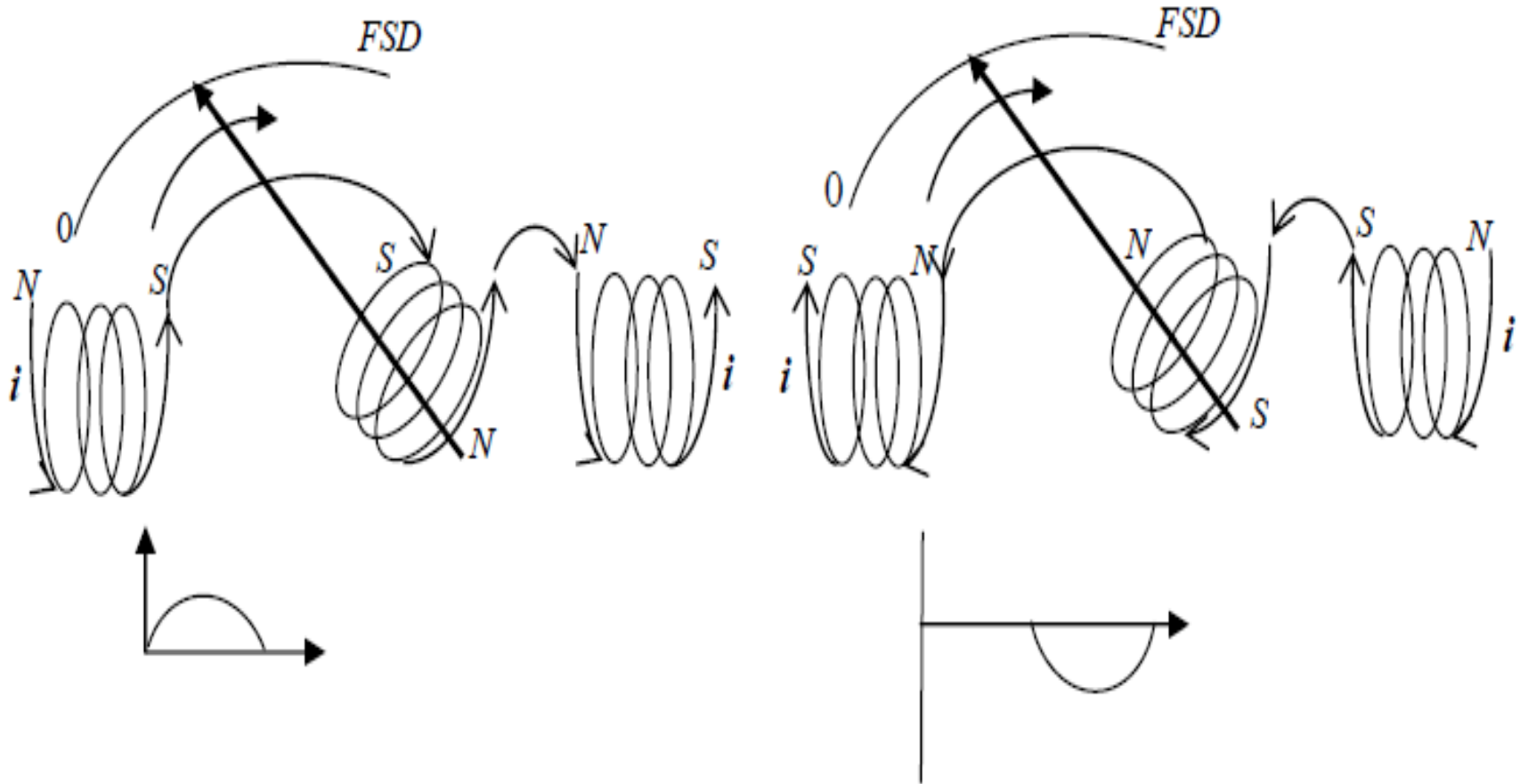


# DYNAMOMETER

- \* This instrument is suitable for the measurement of direct and alternating current, voltage and power.
- \* The deflecting torque in dynamometer is relies by the interaction of magnetic field produced by a pair of fixed air cored coils and a third air cored coil capable of angular movement and suspended within the fixed coil.



# DYNAMOMETER



# HOT WIRE TYPE

- \* It is based on the heating effect of current.
- \* It consist of platinum-iridium (it can withstand oxidation at high temperatures) wire.
- \* When current is through wire, it expands according to  $I^2R$  formula.
- \* This produces sag in the wire and pointer is attached with this wire which in result deflects.

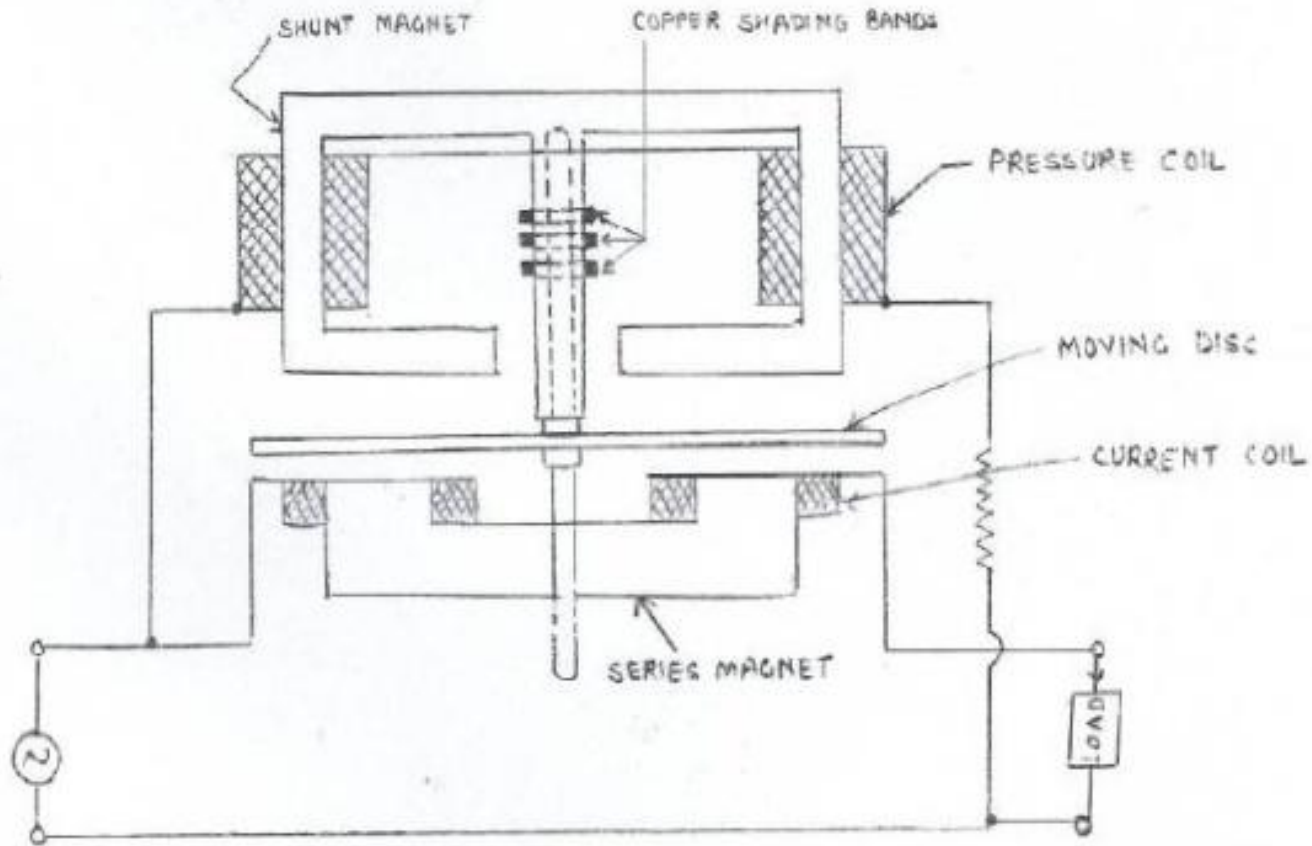
# INDUCTION TYPE INSTRUMENT

- \* Such instruments are suitable for ac measurements only in these instruments the deflecting torque is produced by the eddy currents induced in an aluminum or copper disc or drum by the flux created by an electro-magnet.
  
- \* The main advantages of such instruments are that
  - (i) a full scale deflection can be obtained giving long and open scale
  - (ii) the effect of stray magnetic field is small;
  - (iii) damping is easier and effective.

# INDUCTION TYPE INSTRUMENT

- \* These instruments have got some serious disadvantages
  - (i) The greater deflection causes more stresses in the control springs.
  - (ii) Variation in supply frequency and temperature may cause serious errors unless compensating device is employed.
  - (iii) These instruments are costlier and consume more power
  
- \* Such instruments are mostly used as watt-meters or energy meters.

# INDUCTION TYPE INSTRUMENT



Induction type Wattmeter

# INDUCTION TYPE INSTRUMENT

- \* Induction type wattmeter consists of two laminate electromagnets known as shunt electromagnet and series electromagnet respectively.
- \* Shunt magnet is excited by the current proportional to the voltage across load flowing through the pressure coil and series magnet is excited by the load current flowing through the current coil.
- \* A thin disc made of Cu or Al, pivoted at its centre, is placed between the shunt and series magnets so that it cuts the flux from both of the magnets.

# INDUCTION TYPE INSTRUMENT

- \* The deflection torque is produced by interaction of eddy current induced in the disc and the inducing flux in order to cause the resultant flux in shunt magnet to lag in phase by exactly  $90^\circ$  behind the applied voltage.
- \* One or more copper rings, known as copper shading bond are provided on one limb at the shunt magnet.
- \* Correct disappointed between shunt and series magnet fluxes may be attained by adjusting the position of copper shading bonds.  
The pressure coil circuit of induction type instrument is made as inductive as possible so that the flux of the shunt magnet may lag by  $90^\circ$  behind the applied voltage.