ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

UNIT 2

Instrument Transformers

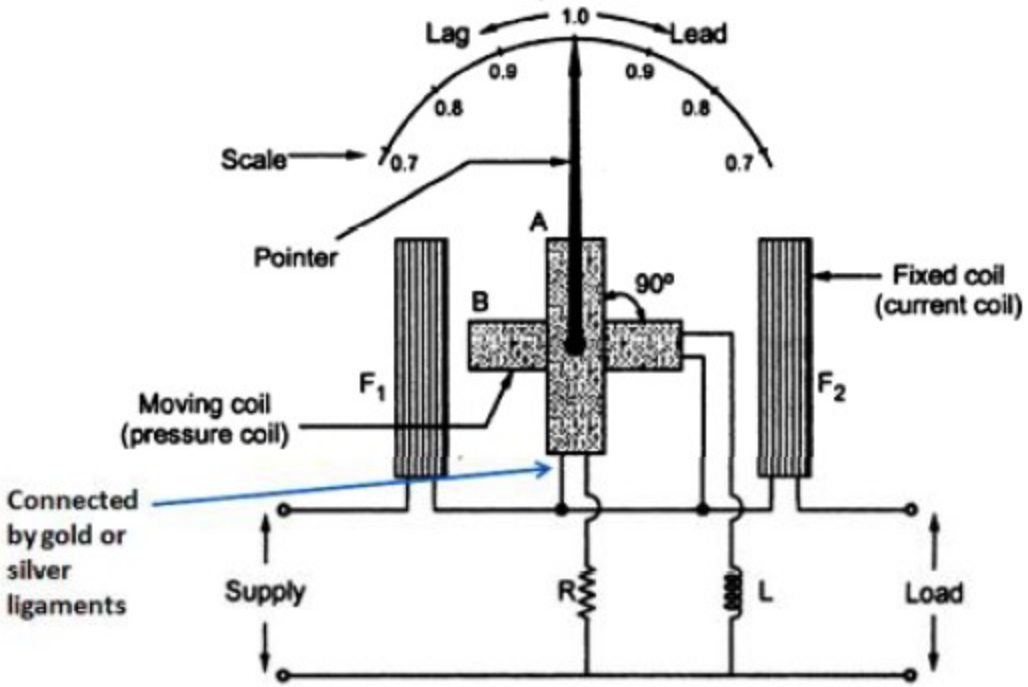
Power factor meter

Types of Power Factor Meter:

1. Electrodynamometer type
    a) Single phase
    b) *Three phase*
2. Moving iron type
    a) *Rotating field type moving iron power factor meter*
    b) *Alternating field type moving iron power factor meter*

Single phase electrodynamometer type power factor meter

The pressure coil is spitted into two parts one is purely inductive another is purely resistive as shown in the diagram by resistor and inductor.



Working

$$T_B = K\,VI \sin\phi \cos\theta$$

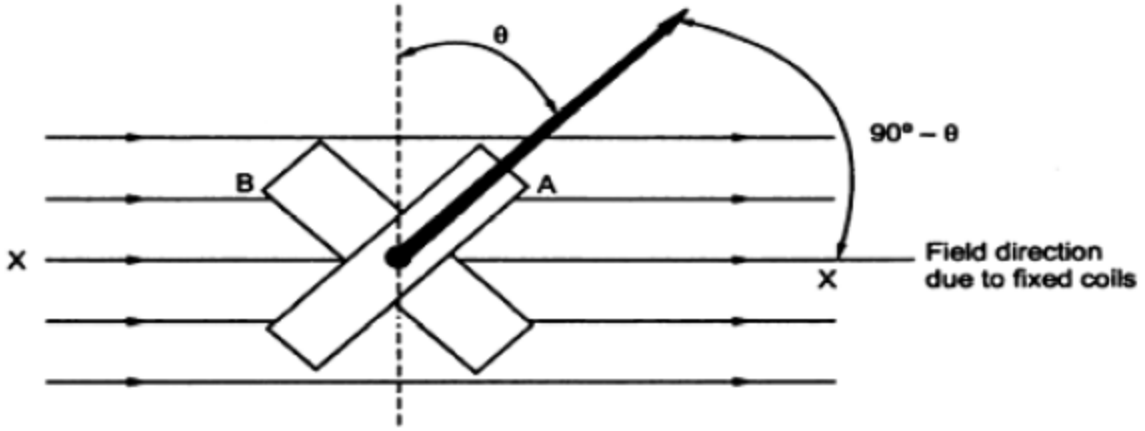
In equilibrium position, $T_A = T_B$

$$\therefore \cos\phi \cos(90° - \theta) = \sin\phi \cos\theta$$

$$\therefore \sin\theta = \tan\phi \cos\theta$$

$$\therefore \tan\theta = \tan\phi$$

$$\therefore \boxed{\theta = \phi}$$



Advantages of Electrodynamic Type Power Factor Meters:

- Losses are less because of minimum use of iron parts and also give less error over a small range of frequency as compared to moving iron type instruments.
- They high torque is to weight ratio.

Disadvantages of Electrodynamic Type Power Factor Meters

- Working forces are small as compared to moving iron type instruments.
- Scale is not extended over 360°.
- Calibration of electrodynamometer type instruments are highly affected by the changing the supply voltage frequency.
- They are quite costly as compared to other instruments.