Chapter-12

(Operation of Energy Meter)

Lecture-2

Principle of Operation of Induction Energy Meter:

- The basic working of Single phase induction type Energy Meter is only focused on two mechanisms:
- 1.Mechanism of rotation of an aluminum disc which is made to rotate at a speed proportional to the power.
- 2.Mechanism of counting and displaying the amount of energy transferred. Mechanism of rotation of an aluminum disc.

- The metallic disc is acted upon by two coils. One coil is connected 0r arranged in such a way that it produces a magnetic flux in proportion to the voltage and the other produces a magnetic flux in proportion to the current. The field of the voltage coil is delayed by 90 degrees using a lag coil.
- This produces eddy currents in the disc and the effect is such that a force is exerted on the disc in proportion to the product of the instantaneous current and voltage.
- A permanent magnet exerts an opposing force proportional to the speed of rotation of the disc
- – this acts as a brake which causes the disc to stop spinning when power stops being drawn rather than allowing it to spin faster and faster. This causes the disc to rotate at a speed proportional to the power being used.

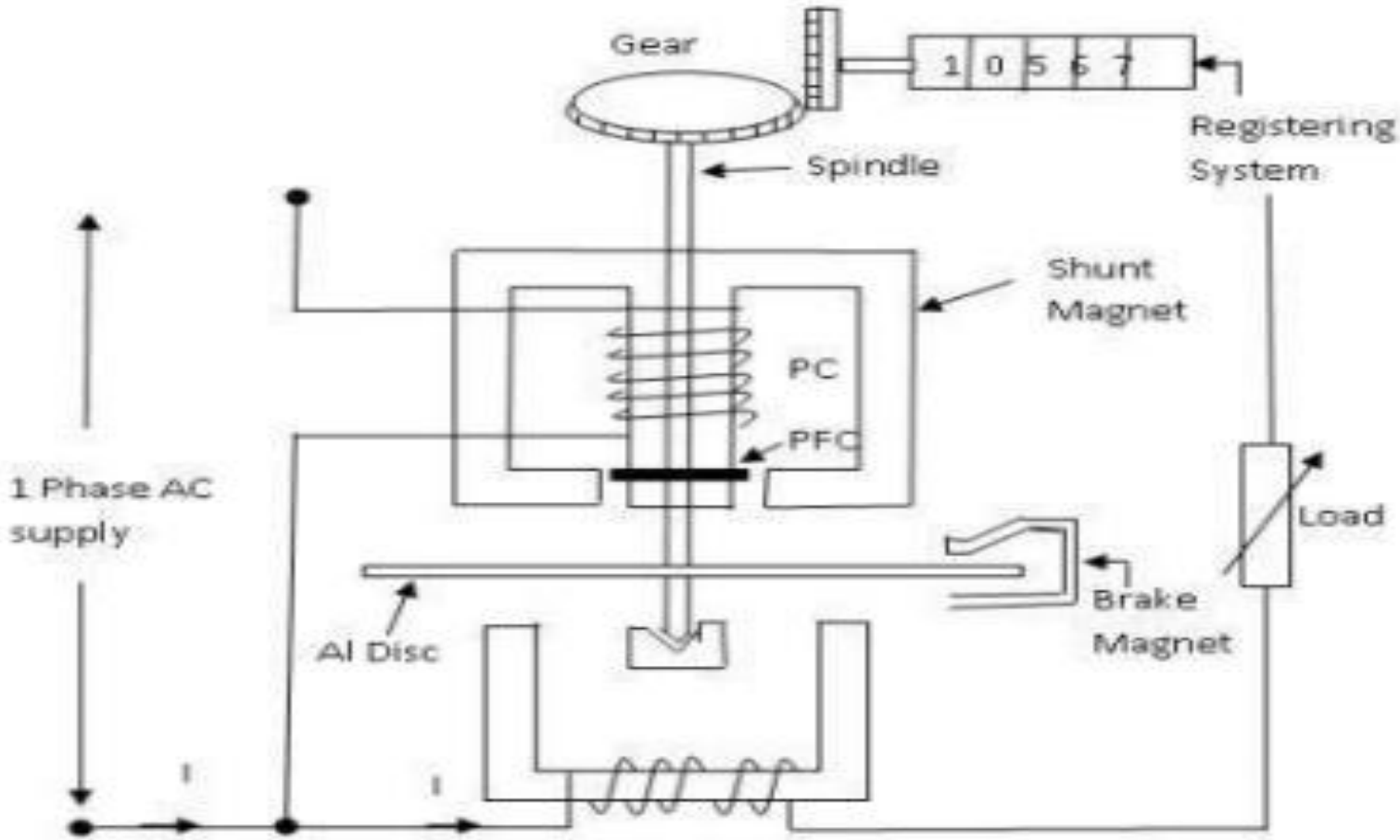

kW - h
00000
KILOWATT-HOUR METER
SINGLE PHASE 220V
50Hz 10A 600r/kW-h

Mechanism of displaying the amount of energy transferred:

1.The aluminum disc is supported by a spindle which has a worm gear which drives the register. The register is a series of dials which record the amount of energy used.

2.The dials may be of the cyclometer type, an odometer-like display that is easy to read where for each dial a single digit is shown through a window in the face of the meter, or of the pointer type where a pointer indicates each digit.

3. It should be noted that with the dial pointer type, adjacent pointers generally rotate in opposite directions due to the gearing mechanism.


Gear
1 0 5 6 7
Registering System
Spindle
Shunt Magnet
PC
PFC
1 Phase AC supply
Load
Brake Magnet
Al Disc
I
I