Expt. No. 9 Page No. Date

Aim:- Study the following things about Single Phase Induction Machine:

9.1 Why is a single phase motor not self-starting?

9.2 Voltage - speed characteristics.

Required Apparatus:-

S.No	Material Required	Specification / Rating	Quantity
1.	Induction Motor	1-Phase	1
2.	Connecting leads	1 mm square	As per requirement

Theory:

Single phase Induction motors perform a great variety of useful services at home, office, farm, and factory and in business establishments.

A single phase induction motor is similar in construction to that of a poly-phase induction motor with difference that its stator has only one winding. If such a stator is supplied with single phase alternating current, the field produced by

Teacher's Signature _____

it changes in magnitude and direction sinusoidally. Thus the magnetic field produced in the air gap is alternating one but not rotating as a result these kind of motors are NOT SELF STARTING.

Methods of Starting

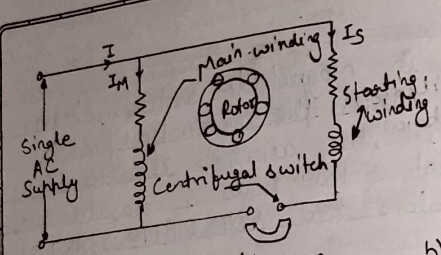
To make it a self-starting anyone of the following can be adopted.

1. Split phase starting.
2. Shaded pole starting.

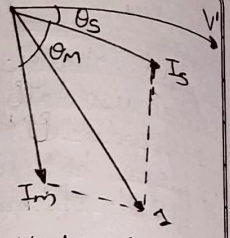
1. Split phase starting.

For self-starting, in split phase motor two windings named as main winding and starting winding are provided, At the time of starting, both the main and starting windings should be connected across the supply to produce the rotating magnetic field.

Once the rotor starts rotating winding can be disconnected from the supply by some mechanical means as the rotor and stator fields from a revolving magnetic field. There are several types of split phase motors.

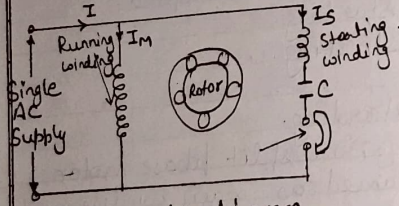


a) Schamatic diagram

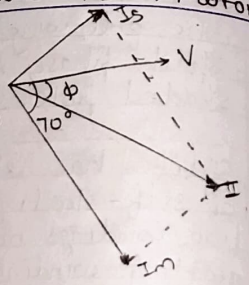


b) Vector diagram

Resistance-start, induction-run motors

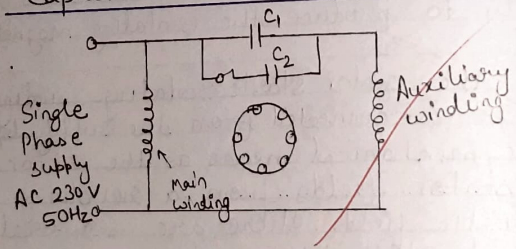


a) Schamatic diagram



(b) Vector diagram

Capacitor-start, induction-run motors.



Capacitor-start, capacitor-run motors

Expt. No. | Page No. | Date

1. Resistance-start, induction-run motors
2. Capacitor-start, induction-run motors
3. Capacitor-start, capacitor-run motors

- A shaded pole made of laminated sheets has a slot cut across the lamination at about one third the distance from the edge of the pole.

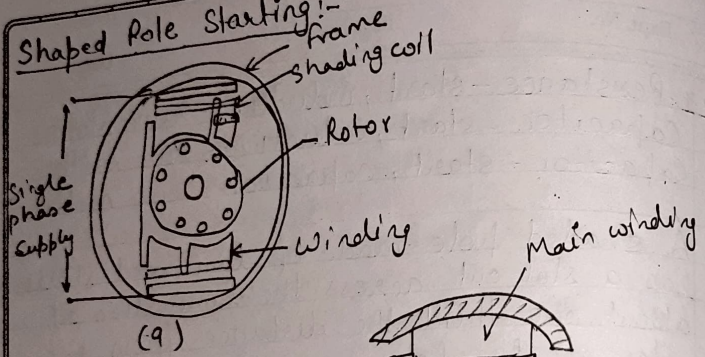
- Around the smaller portion of the pole, a short-circuited copper ring is placed which is called the shading coil, and thus part of the pole is known as the shaded part of the pole. The remaining part of the pole is called the un-shaded part which is clearly shown in fig.

- When the flux passes through shaded region, then in shading coil an emf is induced and also a current will flow. This current opposes the flux. Therefore the strength of flux will get reduce in shaded part and increase in un-shaded part. This concentration gradient will force the rotor from un-shaded to shaded part. Hence the motor get self-start.

Magic

Teacher's Signature _____

Shaped Pole Starting:-



Expt. No. Page No. Date

Result:

We have successful studied single phase induction motor.