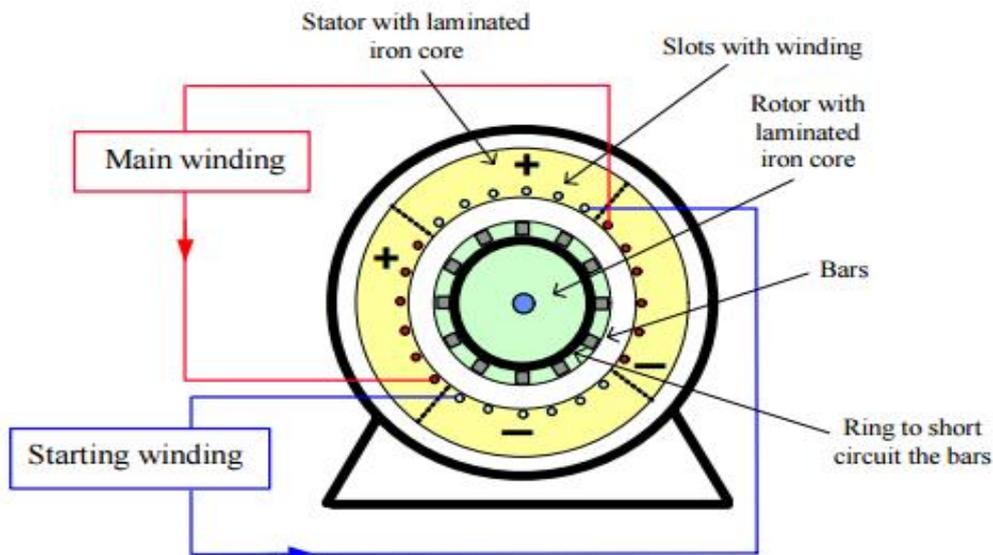




Single Phase Induction Motor



Construction of a single phase induction motor is having squirrel cage rotor, except that the stator is wound for single phase supply. Stator is also provided with a 'starting winding' which is used only for starting purpose.

Working Principle Of Single Phase Induction Motor

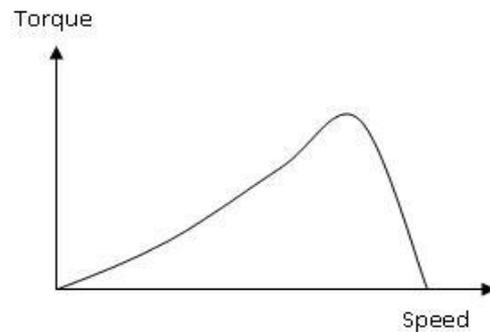
When the stator of a single phase motor is fed with single phase supply, it produces alternating flux in the stator winding. The alternating current flowing through stator winding causes induced current in the rotor bars (of the squirrel cage rotor) according to *Faraday's law of electromagnetic induction*. This induced current in the rotor will also produce alternating flux. Even after both alternating fluxes are set up, the motor fails to start. However, if the rotor is given an initial start by external force in either direction, then motor accelerates to its final speed and keeps running with its rated speed. This behaviour of a single phase motor can be explained by double-field revolving theory.

Synchronous Speed

- As in the case of three-phase motors, the synchronous speed of all single-phase induction motors is given by the equation

$$n_s = \frac{120f}{p}$$

Speed-Torque Characteristic-→



Types of Induction motor:

1. Split phase induction motor
2. Capacitor start inductor motor
3. Capacitor start capacitor run induction motor
4. Shaded pole induction motor.

Advantage:

1. Induction motors are cheaper in cost.
2. The construction is simple
3. Low Maintenance.
4. It does not require any complex circuit for starting

Disadvantage:

1. Speed control in induction motors is difficult
2. At low loads, the power factor drops to very low values
3. Efficiency drops at low loads.
4. Poor starting torque.

Application:

1. Home Appliance (Fan, Pump)
2. Industry Applications

Comparison between Single Phase and Three Phase Induction Motors

- Single phase induction motors are simple in construction, reliable and economical for small power rating as compared to three phase induction motors.
- The electrical power factor of single phase induction motors is low as compared to three phase induction motors.
- For same size, the single phase induction motors develop about 50% of the output as that of three phase induction motors.
- The starting torque is also low for asynchronous motors.
- The efficiency of single phase induction motors is less as compare it to the three phase induction motors.

