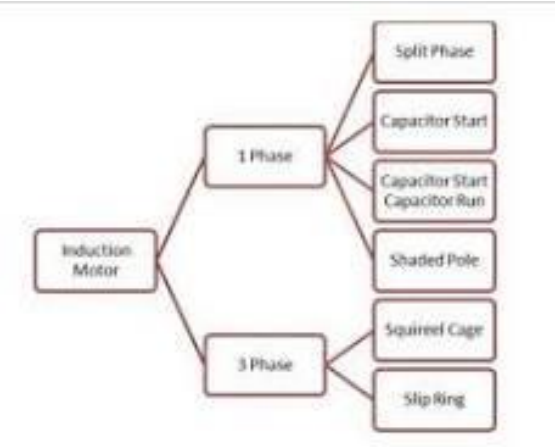
Types of Induction Motor:

There are three basic types of small induction motors: **split-phase single-phase, shaded-pole single-phase, and polyphase**. In two-pole single-phase motors, the torque goes to zero at 100% slip (zero speed), so these require alterations to the stator such as shaded-poles to provide starting torque.



The types of induction motors can be classified depending on whether they are a single phase or three phase induction motor.

Single Phase Induction Motor

The types of single phase induction motors include:

1. Split Phase Induction Motor
2. Capacitor Start Induction Motor
3. Capacitor Start and Capacitor Run Induction Motor
4. Shaded Pole Induction Motor

Three Phase Induction Motor

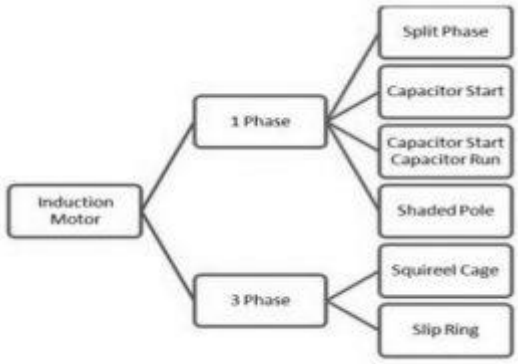
The types of three phase induction motors include:

1. Squirrel Cage Induction Motor
2. Slip Ring Induction Motor

Types of Induction Motor

Induction motors are classified into two types namely single phase induction motor and three-phase induction motor. As their name suggests, a 1-phase induction motor is connected to a single-phase AC power supply whereas the 3-phase induction motor can be connected to a three-phase AC power supply. Again these types of induction motor are classified into

some subcategories. Single-phase is classified into four types whereas 3-phase is classified into two types.



Types of Induction Motor

Single-phase Induction Motor

The single-phase induction motor is not self-starting. When the motor is connected to a single-phase power supply, the main winding carries an alternating current. It is logical that the least expensive, most reduced upkeep sort engine ought to be utilized most regularly. These are of different types based on their way of starting since these are not self-starting. Those are split phase, shaded pole, and capacitor motors. Again capacitor motors are capacitor start, capacitor run, and permanent capacitor motors. The permanent capacitor motor is shown below.
In these types of motors, the start winding can have a series capacitor and/or a centrifugal switch. When the supply voltage is applied, the current in the main winding lags the supply voltage because of the main winding impedance. And current in the start winding leads/lags the supply voltage depending on the starting mechanism impedance.

The angle between the two windings is sufficient to phase difference to provide a rotating magnitude field to produce a starting torque. At the point when the motor reaches 70% to 80% of synchronous speed, a centrifugal switch on the motor shaft opens and disconnects the starting winding.

Types of Single-Phase Induction Motor

Single-phase induction motor is classified into four types of induction motors like Split Phase, Capacitor Start, Capacitor Start & Capacitor Run, and Shaded Pole Induction Motor.

Split Phase Induction Motor

An alternate name of a split-phase induction motor is a Resistance Start Motor. This kind of motor includes a stator and single cage rotor where the

stator includes two windings called starting winding as well as main winding. These two windings are moved 90 degrees within space. The starting winding includes less inductive reactance and high resistance whereas the main winding includes extremely less resistance as well as a high inductive reactance.
This kind of motor is less cost and appropriate for loads that start very easily where the starting frequency can be restricted. This motor is not applicable for drives that need above 1 KW due to the less starting torque. The applications of split-phase inductor motor mainly include a washing machine, floor polishers, AC fans, mixer grinder, blowers, centrifugal pumps, drilling & lathe machine.

Capacitor Start Induction Motor

A capacitor start induction motor is a 1-phase motor that includes a stator as well as a rotor with a single cage. The stator of this motor mainly includes two windings namely main winding as well as an auxiliary winding. An alternate name of an auxiliary winding is starting winding. In motor construction, the arrangement of these two windings can be done 90 degrees separately in space.

- Capacitor start induction motor is used where frequent starts are needed like higher inertia loads.
- This kind of motor is used to drive compressors, pumps, machine tools, and conveyors.
- It is used in AC compressors & the refrigerators

Capacitor Start & Capacitor Run Induction Motor

The capacitor run induction motor working principle is the same as capacitor start induction motor. We know that a 1-phase induction motor is not self-starting as the magnetic field generated is not a rotary type. So for generating a rotary magnetic field, induction motors require phase difference. In a split-phase induction motor, the resistance must be there to create phase difference however in these motors; the capacitor will make a phase difference.

There is a truth that the current flowing throughout the capacitor guides the voltage. In capacitor start & capacitor start capacitor run type motor, there are two windings like the main & the starting.
In starting winding, there is a link within the capacitor thus the current supplying within the capacitor guides the applied voltage through some angle. These two motors include high starting torque so they are mainly used within grinders, conveyors, compressors, air conditioners, etc

Shaded Pole Induction Motor

This is a self-starting 1-phase induction motor where one of the poles of this can be shaded through the copper ring which is also called the shaded ring. The main function of this ring in the motor is like a secondary winding.

This kind of motor turns simply in one specific way & the motor's reverse movement cannot be possible. In this motor, the power losses are extremely high, the power factor is less & induced starting torque can also be extremely low. The efficiency of this motor is poor due to its small design and low power ratings. The applications of shaded pole induction motor include in small devices such as fans, relays because of its easy starting & low cost.

This motor is used in hairdryers, exhaust fans, table fans, air conditioning, cooling fans, refrigeration device, record players, projectors, tape recorders, machines for photocopying. These motors are also used for initiating electronic clocks as well as 1-phase synchronous timing motors.

Applications

The **applications of single phase induction motor** are; it is used in low-power applications and widely used in domestic applications as well as industrial. And some of those are mentioned below

- Pumps
- Compressors
- Small fans
- Mixers
- Toys
- High-speed vacuum cleaners
- Electric shavers
- Drilling machines

Three-Phase Induction Motor

These motors are self-starting and use no capacitor, start winding, centrifugal switch, or another starting device. Three-phase AC induction motors are widely used in industrial and commercial applications. These are of two types, squirrel cage, and slip ring motors. Squirrel cage motors are widely used due to their rugged construction and simple design. Slip ring motors require external resistors to have high starting torque.

Induction motors are used in industrial and domestic appliances because these are rugged in construction requiring hardly any maintenance, that they are comparatively cheap, and require supply only to the stator.