Introduction

- most used residential and light commercial motors
- use the concept of taking one phase and shifting the effects of the currents through the coils to create a moving magnetic field

Types:
- split-phase
- capacitor-start
  - disconnect the starting windings from the line after the motor is up to running speed
- Two-capacitor motors
  - use multiple capacitors or variations of two-value capacitors to create a starting and a running circuit
Starting of CAPACITOR-START, INDUCTION-RUN MOTOR

- A capacitor is connected in series with the starting windings.
- By placing a capacitor in series with one winding, the current in that winding will lead the current in the other winding, causing a split in the magnetic fields and causing the motor to rotate.
- When the motor reaches a value of 75 percent of its rated speed, the centrifugal switch opens and disconnects the starting winding and the capacitor from the line.
- Motor run using only the running winding.
- The capacitor provides a higher starting torque than is obtainable with the standard split-phase motor.
- Capacitor limits the starting surge of current.

Reversing Capacitor start Induction run motor

- The leads of the starting winding circuit are interchanged to reverse the direction of rotation of a capacitor-start motor.
- The direction of rotation of the magnetic field developed by stator windings reverses.
- So the rotation of the rotor is reversed.

- By simply closing one switch or the other, the capacitor will be in series with different windings, thus reversing the direction of motor rotation.
Starting TWO-VALUE CAPACITOR MOTOR

- Electrolytic capacitor for starting and oil-filled capacitor for running
- Electrolytic capacitor is disconnected using a centrifugal switch or thermostat or any other method.

- Using thermal bimetallic heater timer
  - Working refer book – pg. 160

- using a current relay and an autotransformer
  - Only one capacitor is used.
  - An autotransformer is used to increase the effective value of the capacitor
  - The current relay is designed to pick up at about three times the full-load current rating of the winding and to drop out at twice that value.
Dynamic Braking of Capacitor Motor

- disconnect the stator winding from the a-c lines
- substitute a suitable d-c power source, usually using a full-wave rectifier.
- rheostatic control is usually provided in the d-c circuit to adjust the timing of the stop.
- Working refer book Pg. 162

![Dynamic Braking Circuit Diagram]

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Speed control of split-phase motors

- Pole changing methods
- use special winding arrangements
- In a two-speed motor, for example, there will be two main and two auxiliary windings - each set wound to get different number of poles.
- Also, the centrifugally operated switch must be set to open at the lower of the two possible speeds, (In a 4-pole-6 pole 60-Hz motor, the centrifugal switch will be adjusted to open at about 1,100 rpm).
Speed Control Of Permanent-Split Capacitor Motors

- connect to a variable-voltage source – use autotransformer
- Used frequently for shaft-mounted fans and blowers

That’s All in EEET 221

Thank you