

ENGINEERING NOTE

MOTOR

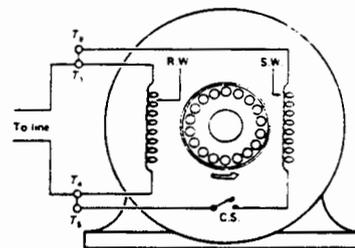
Single Phase Motors

Single phase AC motors come in several versions. The most common types are:

1. Split-Phase Motors
2. Permanent Split-Phase Motors
3. Repulsion Type Motors
4. Shaded Pole Motors
5. Capacitor Start - Induction Run Motors
6. Capacitor Start - Capacitor Run Motors

Split-Phase Motors are usually used for:

1. Air circulating fans
2. Small drill presses
3. Attic fans, etc.



Split-Phase Motor

The motors are used for applications where the motor is hard to reach or is run continuously. The motors are relatively simple and inexpensive.

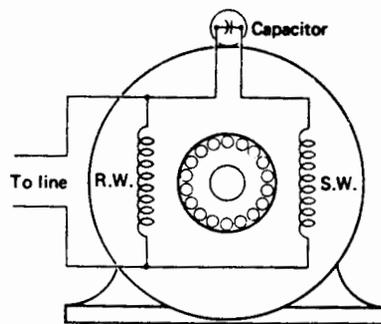
The split-phase motor has a main winding (run winding) and an auxiliary winding (start winding). The auxiliary winding is only in use during start-up of the motor. The start winding is disconnected, via a centrifugal switch, when the motor is at 80% of its synchronous speed.

The motors have a starting torque of approximately 150% to 200%, the motor horsepower ranges from 1/6 to 1/3, and voltage is 115/208/230V. The motors can be reversed from standstill only.

ENGINEERING NOTE

MOTOR

Permanent split-phase motors are frequently used in applications where frequent starts are necessary. The motors are designed with a main winding (run winding) and an auxiliary winding (start winding).



Permanent Split-Phase Motor

This type of motor has both windings operating during the start and run. The auxiliary winding (start winding) will not be disconnected during the run — it stays **permanently** connected. The motor is not equipped with a centrifugal switch.

The capacitor in the windings causes the current in auxiliary (start windings) to be out of phase with the current in the main winding. This causes a rotating magnetic field during the start and run of the motor.

The motor develops a low starting torque (approximately 100%) and can therefore only be used in **easy start** applications.

The motors are designed in the ranges of 1/20 to 1 horsepower and can be reversed from a stand still only.

Repulsion Type Motors/Shaded Pole Motors

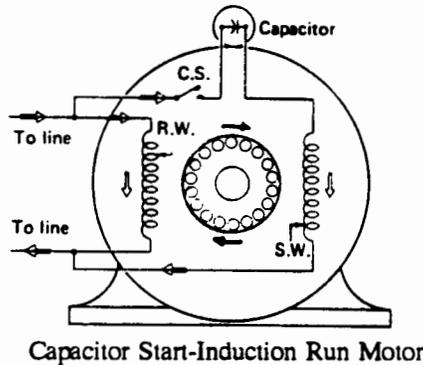
These motor types are mostly used in commercial/residential applications. They are used in household refrigerators, gas pumps, water pumps, air compressors, bathroom fans, blowers, etc. The motors are very small, simple and inexpensive.

The motors range in horsepower from 1/10 to 1/250 horsepower and produce a very low starting torque.

ENGINEERING NOTE

MOTOR

Capacitor Start - Induction Run motors are basically split-phase motors which have two (2) windings connected in parallel. They have a main or run winding and an auxiliary or start winding.

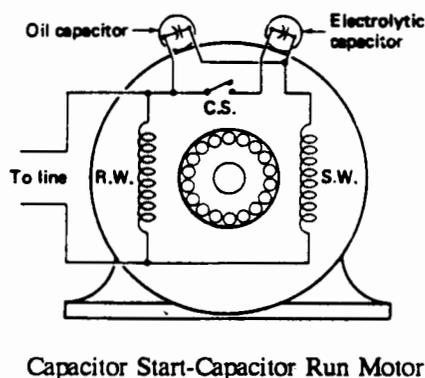


During the start, both windings are connected. When the motor reaches 80% of its synchronous speed the start winding will be disconnected via a centrifugal switch.

The motors develop a high starting torque of 250% to 350% and are used for driving compressors, pumps, conveyors, paper shredders, door openers, and other hard-to-start applications.

The motor horsepower ranges from 1/4 to 5 horsepower. Standard motors can be reversed from stand still only, however, **special motors** tailored to an application can be designed to reverse instantly.

Capacitor Start - Capacitor Run motors have an auxiliary winding (start winding) and an oil filled running capacitor in parallel with the main winding (run winding).



ENGINEERING NOTE

MOTOR

An electrolytic starting capacitor and a centrifugal switch are placed in parallel with the auxiliary winding and the running capacitor.

When the speed of the motor reaches approximately 80% of its synchronous speed, the starting capacitor will be disconnected by the centrifugal switch.

This type of design has a high starting torque, between 250% to 350%, depending on the size of the motor and the design. The motor horsepower ranges from 1 1/2 to 7 1/2.

The motors are used for hard-to-start applications and are used for industrial applications such as conveyors, stokers, hoists, etc.

The standard motors are reversible from standstill only, however, **special** designed motors can be made instantly reversible.