



FREQUENCY

The frequency rating of a power supply determines in part the speed at which the motor will run. Frequency controls the RPM of the rotating magnetic field which is what the rotor follows. The formula for calculating motor RPM is: $RPM = (120)(\text{Frequency})/\text{Number of poles in the motor}$. Note, 120 is a constant value.

MOTOR TYPES

The most commonly encountered air-moving motors are Permanent-Split Capacitor and Shaded-Pole types. On the outside, these two motor types look very much alike. Sometimes, it may be necessary to disassemble the motor to be replaced to properly identify its type. This is easily accomplished by removing the thru bolts or clips, and tapping the end shields off of the motor shell.



SHADED-POLE (SP)

FACT Used where low cost and low starting torques are required. They are used to drive blowers, bathroom ventilators, range hoods, attic ventilators, down draft blowers, fan coils, etc.

FACT A Shaded-Pole motor can be recognized by the readily identifiable individual stator coil windings and the single copper band (shaded coil) formed around one side of each stator pole.

FACT Shaded-Pole motors rotate toward the shading band.



CAPACITOR START

FACT A higher starting torque motor than the split phase motor. It is constructed similar to the split phase motor. The key exception is that the capacitor start motor has a capacitor in series with the start winding to increase the start torque. The capacitor is usually visible and mounted on motor frame. Used in hard-to-start applications such as compressors and pumps.

MOTOR TYPES (continued)

PERMANENT-SPLIT CAPACITOR (PSC)



FACT Used where higher starting torques are needed than what a shaded-pole motor will provide. They are also used where higher efficiency motors are required. Due to their efficiency, they have become the motor of choice versus a shaded-pole design. They are used to drive blowers and all the other air-moving applications where shaded-pole motors are found. They also are manufactured in higher horsepower ratings than what can be found in shaded-pole designs. Therefore, they get used in heavier duty applications such as outside condensers.

FACT A PSC motor can usually be recognized by the capacitor that is connected to it. Also, between the main pole windings in the motor, there are pole windings of finer wire. This is the auxiliary winding.

SPLIT PHASE



FACT Higher starting torque motors than a PSC. Suitable for belt drive furnace blowers and belt drive ventilators. They are more efficient than Shaded-Pole motors but not as efficient as a PSC motor. These motors have more defined RPM ratings. They are usually rated at 3450, 1725, and 1140. They are not constructed to provide the wide-range of multi-speeds as seen in shaded-pole and PSC motors. Multi-speed split phase motors are commonly built using separate windings to provide other speeds. This assures the speed sensitive start switch will operate correctly in the motor.

THREE PHASE



The most efficient general purpose motor. They are used in industrial or large commercial applications where three phase power is available.