



MOTOR SPEED

The base speed of a motor is determined by the number of poles. The number of wound coils in the motor equals the number of poles.

FACT Multi-speed motors will only indicate speed variations when loaded. When run without a load, all speeds will be virtually the same.

FACT PSC motors require auxiliary windings. These get positioned between the main windings, only the main windings should be counted for the speed calculation.

FACT It is important that a six pole motor be replaced with a six pole motor, a four pole be replaced by a four pole and so on, for two reasons.

FACT Replacing a four pole motor (1400 to 1650 RPM) with a lower speed six pole motor (900 to 1150 RPM) results in reduced air delivery and greatly reduced system efficiency can be enough to automatically shut down the system.

FACT If a six pole motor is replaced with a four pole as in a condenser, the motor will be seriously overloaded, causing cycling on the motor's overload protector.

FACT Modern multi-speed motors are really not multi-speed, but multi-horsepower. The speeds are simply taps at different points in the coil. The higher speeds are tapped at a point with fewer turns as compared to where the subsequent speeds are tapped in the same coil. The more turns that are wound before a tap is brought out, the lower the horsepower will be each time. Obviously, the lowest speed lead is connected to the end of the last turn on the coil. These added turns weaken the motor. This field weakening allows the load to slow the motor down each time a slower speed is selected. With no load mounted on the shaft, as with a bench test, no difference between speeds will be seen. If too strong a replacement motor is used on a unit, there may be no appreciable difference when the speed is changed in the unit. Remember, the motor relies on the load to slow it down between the speeds. As an example, if a 1/2 HP three speed motor is used instead of a 1/4 HP three speed, there might not be any noticeable difference between Hi, Med, and Low.

NOTE: A motor nameplate showing 1350 RPM is a special design and must be replaced with an OEM direct replacement. This is a high slip 4 pole motor, which is not generally available in a general line of motors. If one is available, it would be marketed as an OEM direct replacement motor for a specific piece of equipment. These motors are specially designed for a very specific load.

MOTOR SPEED (continued)

FACT Multi-speed motors can be used in single-speed applications. Looking at a typical multi-speed, 1/3 horsepower motor, we would find a 1/3 horsepower rating on high speed, 1/3 horsepower on medium, and 1/6 horsepower on low speed. By tapping the leads individually of the two speeds you do not need, you can have a single speed 1/6 HP, 1/4 HP or 1/3 HP motor.

FACT In replacing blower motors, air volume and direction must match the original installation. This air movement is a resultant of the motor speed and the blower size. Assuming only the motor will be replaced, it must have the same speed as the defective unit.

FACT Motors with nameplate speeds in the range of 1300-1400 RPM are high slip motors and need a direct OEM replacement motor.

FACT Multi-speed motors may be used to replace a single-speed motor. Leads not used should have the ends individually insulated.

Figure 1 is a Permanent-Split Capacitor motor with four wound coils and is a four-pole motor. Figure 2 is a Shaded-Pole motor also with four wound coils. It is also a four-pole motor. A Permanent Capacitor motor requires auxiliary windings positioned between the main windings—only the main windings are counted for speed calculation.

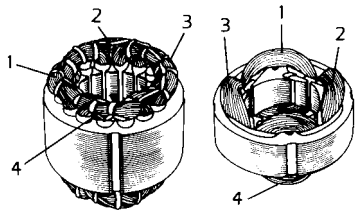


FIGURE 1
Permanent-Split
Capacitor Motor Coils

FIGURE 2
Shaded-Pole
Motor Coils

Number of Poles	Normal High Speed
2	2800 to 3200 RPM
4	1400 to 1650 RPM
6	900 to 1150 RPM
8	800 to 850 RPM