

Advantages and Disadvantages of Common Electric Motor Types

Many different variants of the basic motor types discussed below exist. These comments are of a general nature, and may not apply to all motor types.

AC Motors

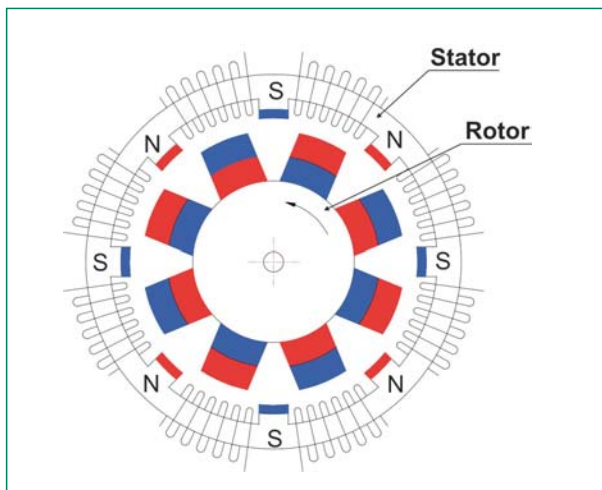
AC motors are simple and cheap to make and can be reliable. However, AC motors used in familiar appliances operate at a fixed speed. To achieve variable speeds requires the extra cost and complexity of control systems, multiple windings or gearboxes. Rough speed control can also be achieved by reducing the motor voltage, at the expense of a large increase in motor energy losses which cause the motor to run hot (sometimes dangerously hot) and increases the running costs of the appliance. The majority of all electrical appliance motors are AC motors.

Brushed DC Motors

Brushed DC motors are able to provide variable speeds. However, the brushes wear out and need replacement which is undesirable and can be expensive for the consumer. The process of brush wear also creates dust. Finally these motors are subject to 'arcing', which is both a safety hazard and also produces Radio Frequency Interference (RFI) that may interfere with the operation of electronic equipment.

Brushless DC Motors

Brushless DC motors provide the advantages of Brushed DC motors in terms of variable speed operation but without the drawbacks of brushes. An electronic controller is used to control the electrical currents flowing in the motor. Brushless DC (BLDC) motors are in widespread use in computer disc drives and are also used in high performance motion control products, such as machine tools. The general trend of falling costs of electronic products and the increased use of microprocessors to control the performance of machines and appliances is leading to increased interest in the use of brushless DC motors.



Some final definitions

The part of the electric motor that spins is called the Rotor, (rotates) while the part that remains fixed is called the Stator (remains static). Different motor designs will have the permanent magnets in the rotor or the stator and hence windings to generate the induced magnetic field in the stator or the rotor respectively. Motor designs also vary in that the fixed stator can be either the interior or exterior part. A traditional motor design usually has a fixed outside stator with permanent magnets and an internal spinning rotor with copper windings.