

## **What is the role of commutator in AC commutator motor and working of schrage motor.**

A **commutator** is a moving part of a rotary [electrical switch](#) in certain types of [electric motors](#) and [electrical generators](#) that periodically reverses the [current](#) direction between the rotor and the external circuit. It consists of a cylinder composed of multiple metal contact segments on the rotating [armature](#) of the machine. The commutator is one component of a motor; there are also two or more stationary [electrical contacts](#) called "[brushes](#)" made of a soft conductor like [carbon](#) that press against the commutator, making sliding contact with successive segments of the commutator as it rotates. The windings (coils of wire) on the [armature](#) are connected to the commutator segments.

Commutators are used in [direct current](#) (DC) machines: [dynamos](#) (DC generators) and many [DC motors](#) as well as [universal motors](#). In a motor the commutator applies [electric current](#) to the windings. By reversing the current direction in the rotating windings each half turn, a steady rotating force ([torque](#)) is produced. In a generator the commutator picks off the current generated in the windings, reversing the direction of the current with each half turn, serving as a mechanical [rectifier](#) to convert the [alternating current](#) from the windings to unidirectional [direct current](#) in the external load circuit

A commutator consists of a set of contact bars fixed to the rotating shaft of a machine, and connected to the armature windings. As the shaft rotates, the commutator reverses the flow of current in a winding. For a single armature winding, when the shaft has made one-half complete turn, the winding is now connected so that current flows through it in the opposite of the initial direction. In a motor, the armature current causes the fixed magnetic field to exert a rotational force, or a [torque](#), on the winding to make it turn. In a generator, the mechanical torque applied to the shaft maintains the motion of the armature winding through the stationary magnetic field, inducing a current in the winding. In both the motor and generator case, the commutator periodically reverses the direction of current flow through the winding so that current flow in the circuit external to the machine continues in only one direction.

The Schrage motor has a wound rotor. On the rotor, there is a three phase delta winding with the endpoints of the delta brought out on to slip rings. The three phase supply is connected to these slip rings. Also on the rotor, there is a second delta connected winding with tapings brought out to a commutator. On the stator, there are three discrete windings separated by 120 degrees. The ends of these windings are connected to the commutator by two sets of brushes such that one set of brushes connects to the starts of the stator windings and the other set connects to the ends of the stator windings. The two sets of brushes can be moved to connect to the same point on the commutator, or moved apart in either direction. When they are in alignment, the stator windings are shorted and the motor behaves like an induction motor with the rotor and stator swapped. As the brushes are separated, voltage from auxiliary rotor winding is coupled to the stator winding. The degree of separation and the direction of separation varies the voltage and polarity of the voltage. The frequency of the voltage applied to the stator is dependent on the slip.

In effect, the stator has an induced voltage from the slip, plus a driven voltage from the commutator. This causes the speed of the motor to change. Speed variations of up to 10 to one are possible and the

motor can provide a high torque at all speeds.

A Schrage motor is a polyphase commutator motor with shunt characteristic, in which the rotor carries two windings, of which one receives current from the supply by means of collector rings, while the other is connected to the commutator. The commutator carries two adjustable sets of brushes and supplies each of the separate phases on the stator with adjustable voltages, in order to obtain a variation of speed and of the reactive power taken from the supply.

Schrage motor is a type of alternating-current commutator motor whose speed is controlled by varying the position of sets of brushes on the commutator. It was used for spinning yarn and carpet although it is not being used for that purpose any more.