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Motors and generators work on the same principle and their constructions consist of almost the same elements: coil with wire windings, located between two poles of permanent magnet, split rings, commutator and brushes. The device to be a motor should have some power source to make the coil to rotate. Thus the current will flow from the power source and with magnet help will force the coil to move. To be the generator the device shouldn’t have any power sources, but should have some appliance to mechanically rotate the coil. Revolving coil and magnets poles produce the EMF (electromotive force) which create the current and hence electricity. So the key difference between motors and generators that the first ones transform electrical energy into mechanical, and the other ones vice versa.

Induction motors are the most commonly used in industrial drives. The general opinion is that Nikola Tesla is the one, who invented an induction motor, but many thinks, that Galileo Ferraris also contributed in induction motors developing. Construction of induction motors is very simple: stator with three-phase winding, short-circuited rotor (or squirrel cage rotor) and frame.

Synchronous motors are machines with high efficiency. In synchronous motors, stator produces revolving magnetic field, and rotor produces constant magnetic field. The rotor act like a permanent magnet, the field coil stator is excited by a three phase AC supply, so they rotate with synchronous speed. Synchronous motors help in improving overall power factor of the system.