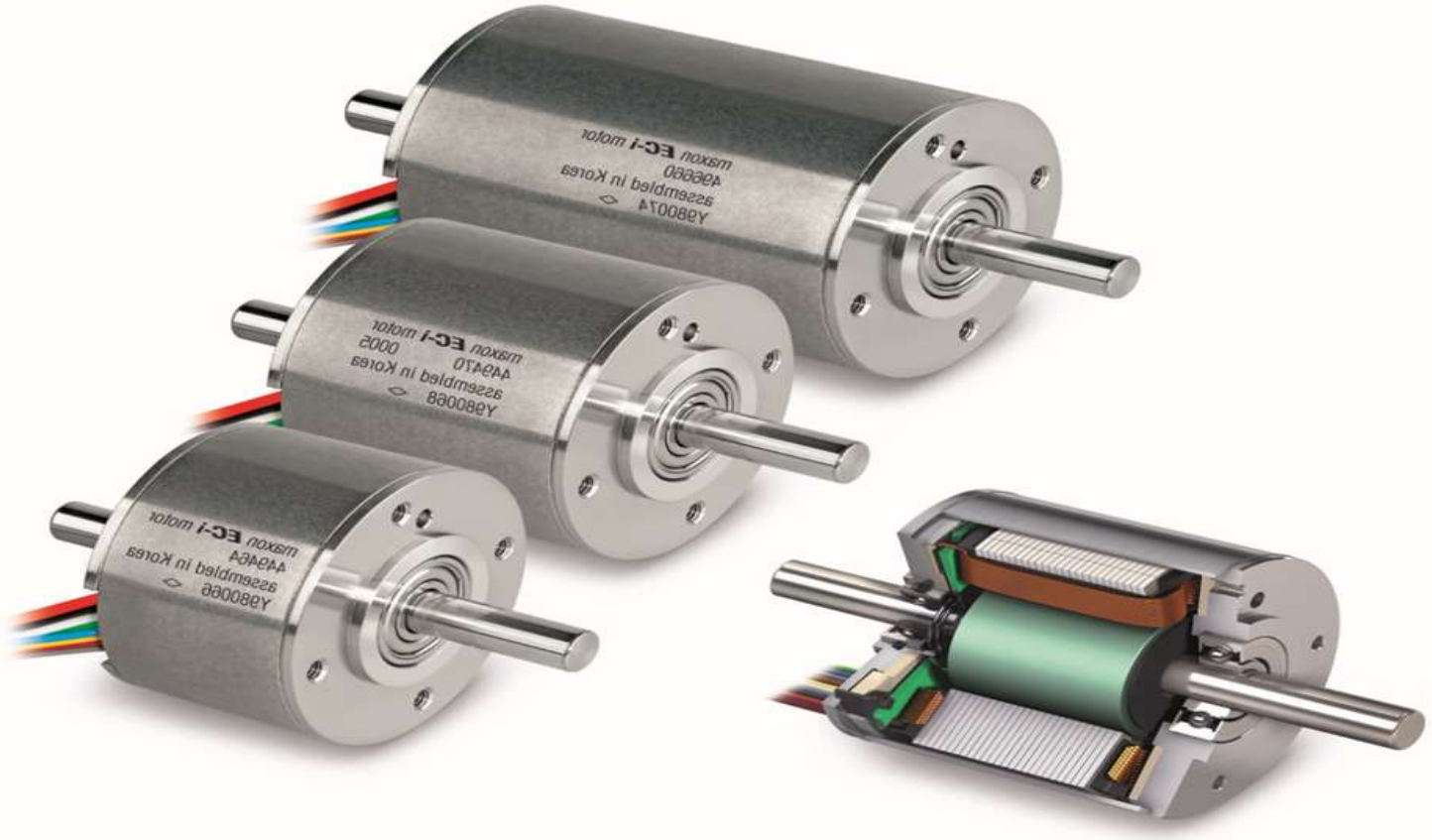
ELECTRIC MOTOR



Electric Motors

Introduction

DC Motors

AC Motors

Synchronous Motors

Induction Motors

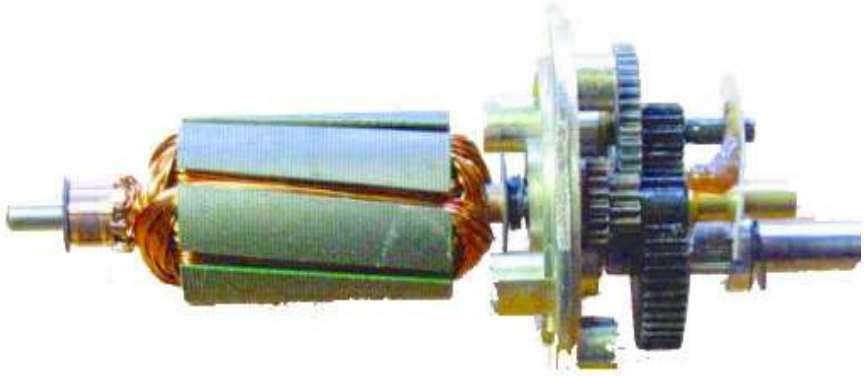
Conclusion

Introduction

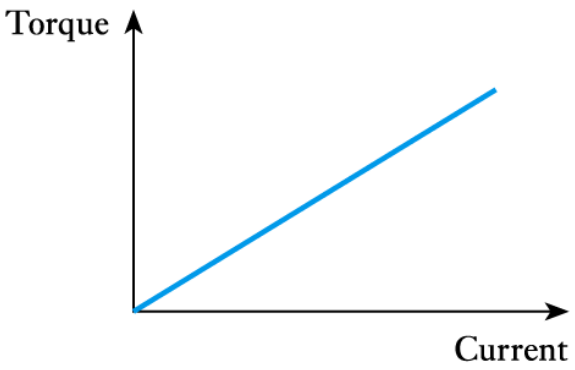
- In this lecture we consider various forms of rotating **electrical machines**
- These can be divided into:
  - **generators** – which convert mechanical energy into electrical energy
  - **motors** – which convert electrical energy into mechanical energy
- Both types operate through the interaction between a *magnetic field* and a set of *windings*

DC Motors

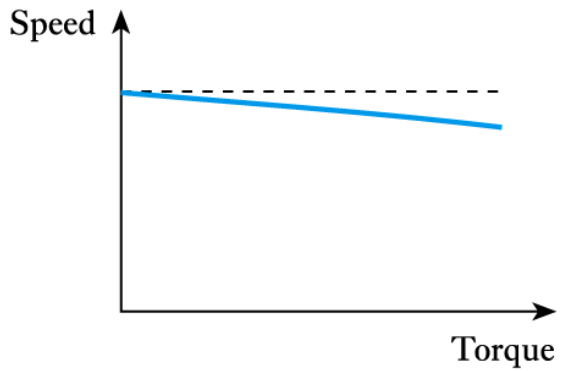
- A **DC Motor** is a very simple electric motor which is operated on direct current (DC). The **DC Motor** moves due to the torque generated by the electro-magnetic field. A simple **DC Motor** uses electric coil and magnets of opposite polarity. As the magnets with opposite poles attracts and repels one another, a **DC Motor** turns. The electric coil used in a **DC Motor** acts as an electromagnet



- **DC motor characteristics**
  - many forms – each with slightly different characteristics
  - again can be **permanent magnet**, or **series-wound**, **shunt-wound** or **compound wound**
  - figure below shows a shunt-wound DC motor



(a) Torque–current characteristic



(b) Speed–torque characteristic with a constant applied voltage

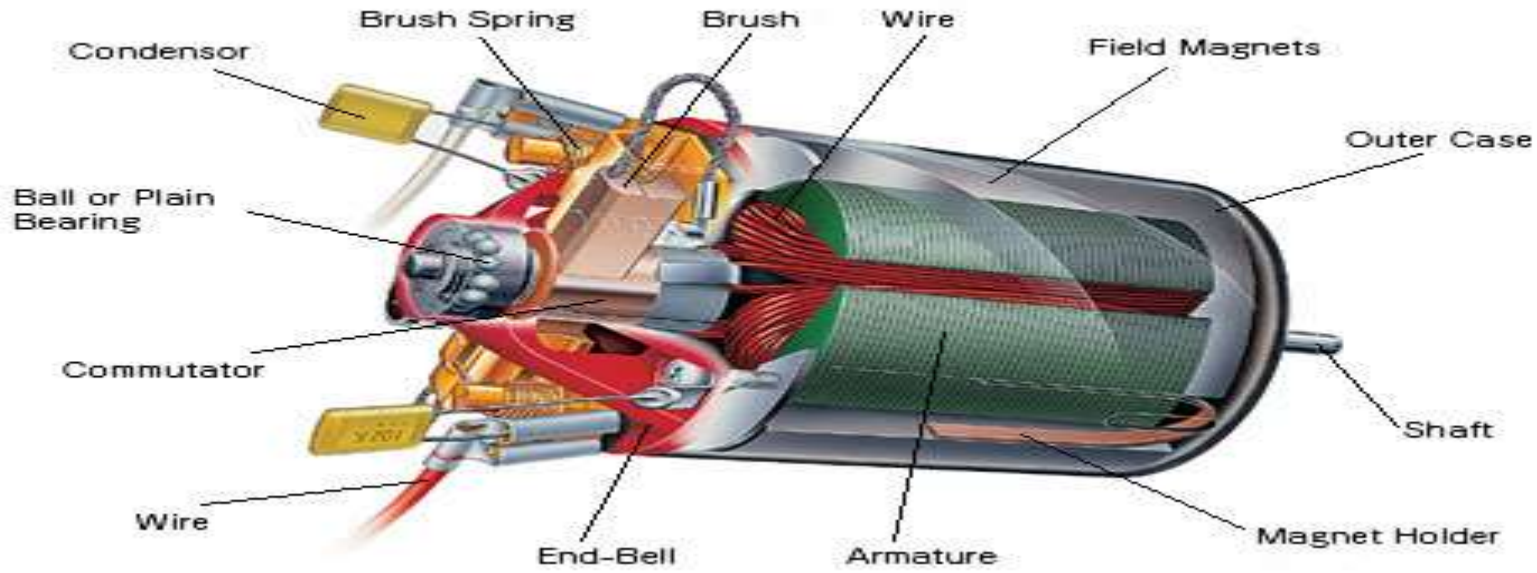
AC Motors

An AC motor is an electric motor driven by an alternating current (AC). The AC motor commonly consists of two basic parts, an outside stationary stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft producing a second rotating magnetic field.

- AC motors can be divided into two main forms:
  - **synchronous motors**
  - **induction motors**

Synchronous motors

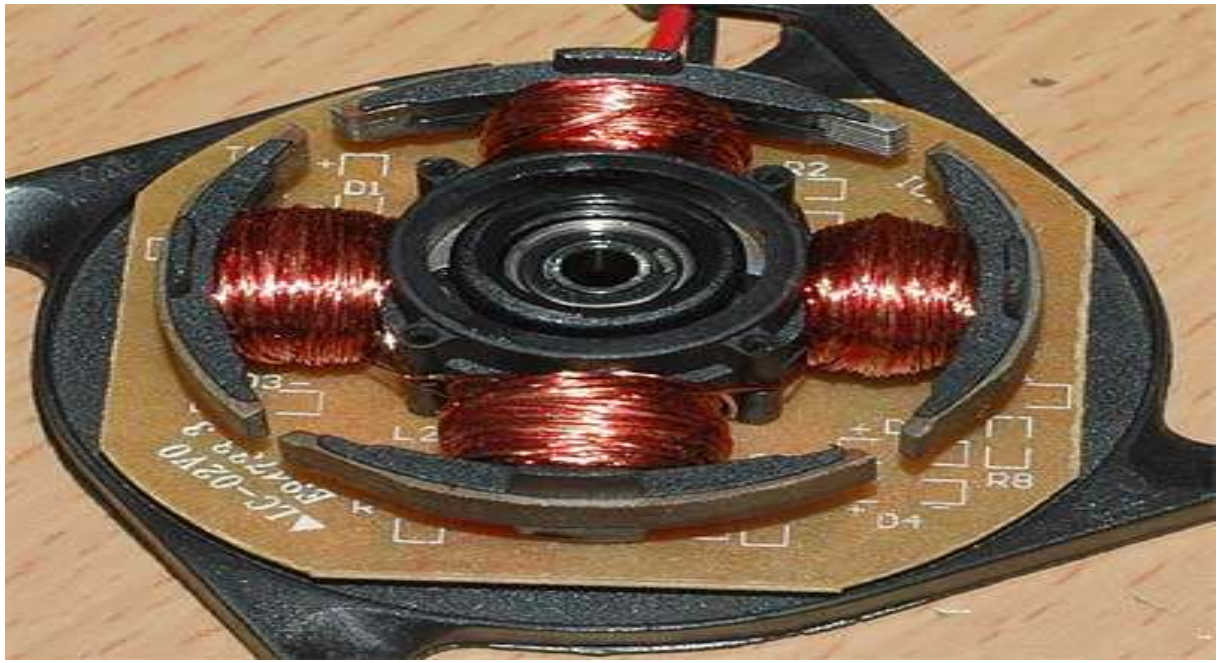
- just as a DC generator can be used as a DC motor, so AC generators (or alternators) can be used as **synchronous AC motors**
- **three phase motors** use three sets of stator coils
  - the rotating magnetic field drags the rotor around with it
- **single phase motors** require some starting mechanism
- torque is only produced when the rotor is in sync with the rotating magnetic field



- **Induction motors**
  - these are perhaps the most important form of AC motor
  - rather than use slip rings to pass current to the field coils in the rotor, current is *induced* in the rotor by transformer action
  - the stator is similar to that in a synchronous motor
  - the rotor is simply a set of parallel conductors shorted together at either end by two conducting rings

Both DC and AC motors are used

- high-power motors are usually AC, three-phase
- domestic applications often use single-phase induction motors
- DC motors are useful in control applications



Conclusion

- The advantages and disadvantages of DC and AC motor somehow depends on application used.
- The reference of DC and AC refers how the electrical current is transferred through and from the motor. Both the types of the motors have different functions and applications.
- However, AC motor is widely used in industry application that support AC source voltage.

THANK YOU