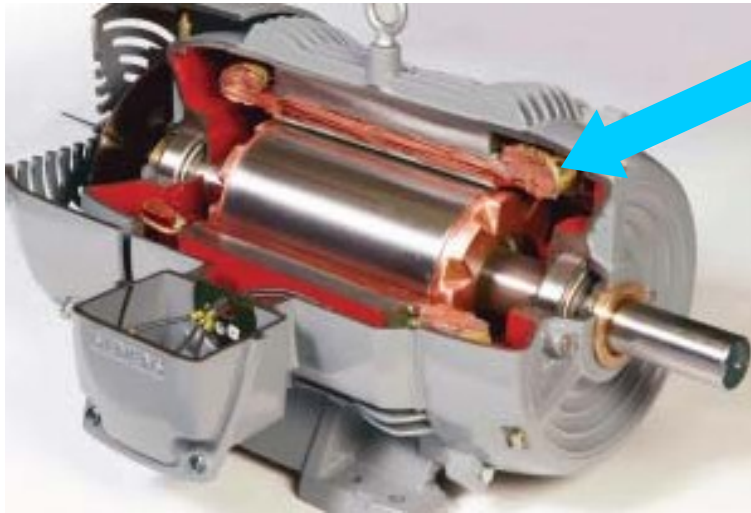


Special Electrical Machines

Construction

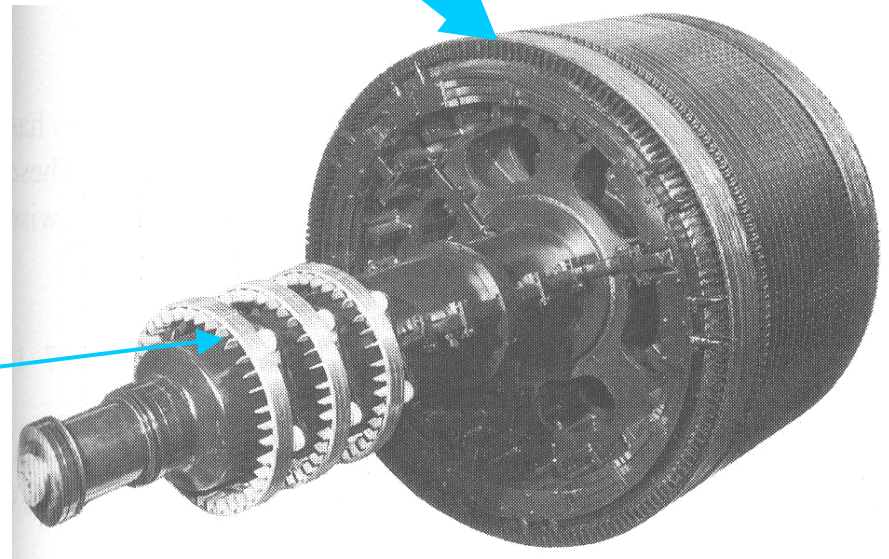
- a revolving rotor
 - composed of punched laminations, stacked to create a series of rotor slots, providing space for the rotor winding
 - one of two types of rotor windings
 - conventional 3-phase windings made of insulated wire (**wound-rotor**) » similar to the winding on the stator
 - aluminum bus bars shorted together at the ends by two aluminum rings, forming a squirrel-cage shaped circuit (**squirrel-cage**)
- Two basic design types depending on the rotor design
 - squirrel-cage: conducting bars laid into slots and shorted at both ends by shorting rings.
 - wound-rotor: complete set of three-phase windings exactly as the stator. Usually Y-connected, the ends of the three rotor wires are connected to 3 slip rings on the rotor shaft. In this way, the rotor circuit is accessible.

Construction



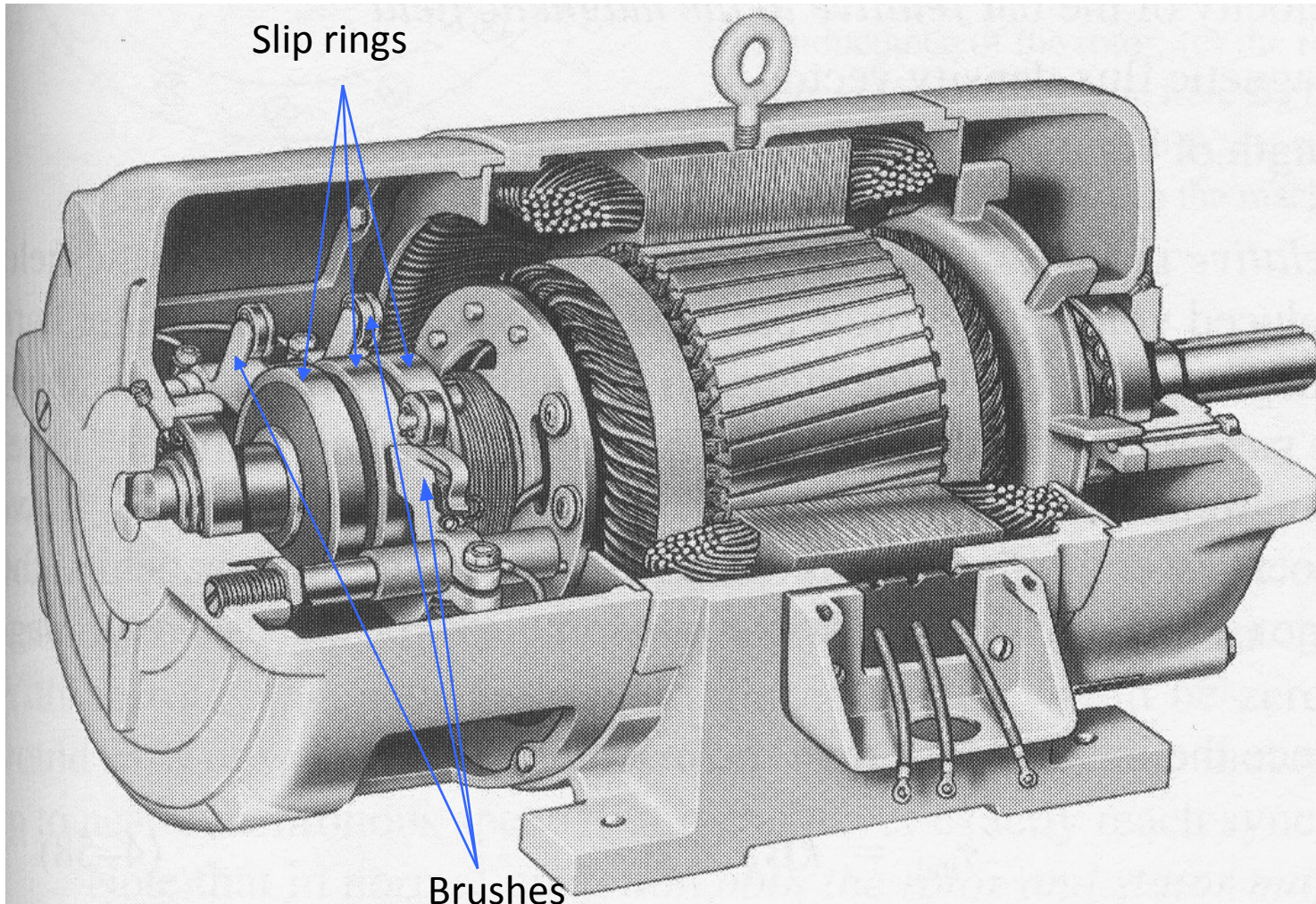
Squirrel cage rotor (copper)

Wound rotor



Notice the
slip rings

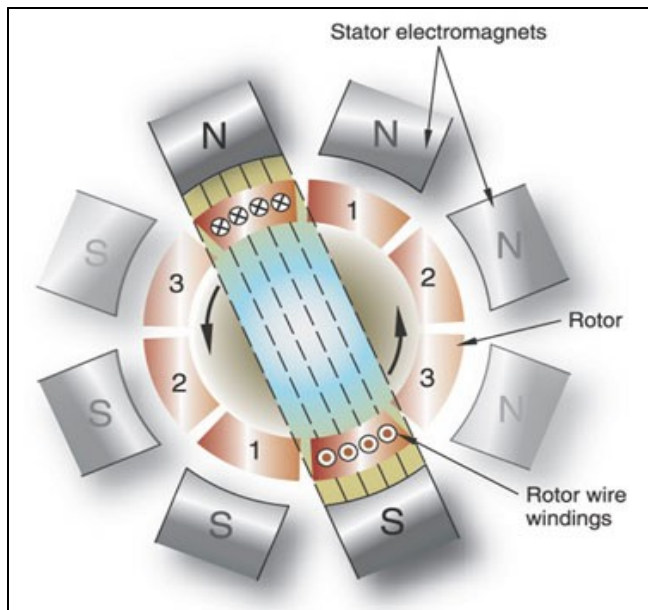
Construction



Cutaway in a typical wound-rotor IM. Notice the brushes and the slip rings

Principle of operation

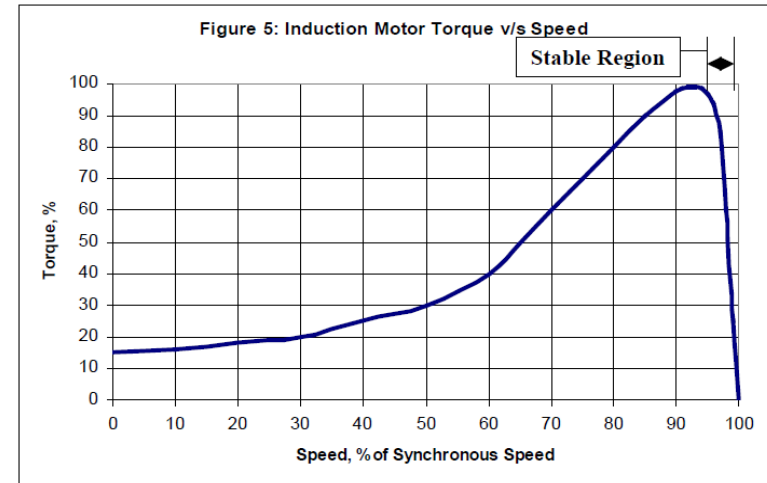
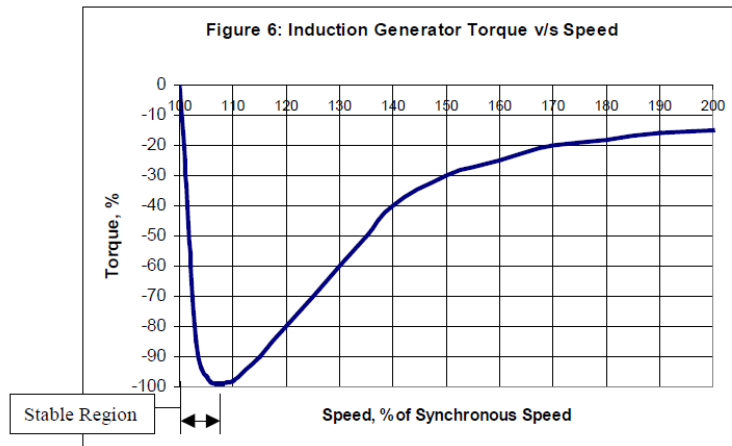
- The stator is usually connected to the grid and, thus, the stator is magnetized
- A rotating magnetic field with constant magnitude is produced, rotating with a speed



$$N_s = \frac{120 f}{P}$$

Principle of operation contd..

- In order to generate power the rotor speed must be slightly above the synchronous speed
- The harder the rotor is cranked, the more power will be fed into the electrical grid



THANKS....

Queries Please...