RAMA UNIVERSITY

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FACULTY OF ENGINEERING & TECHNOLOGY

Electrical Machine-ii

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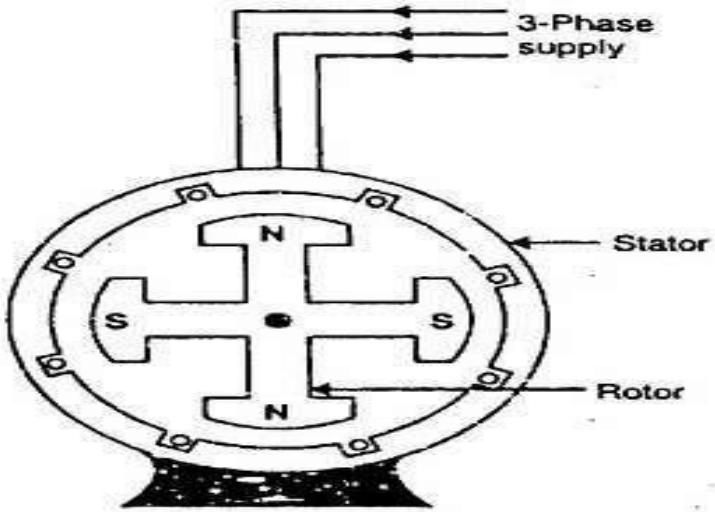
SYNCHRONOUS MOTOR

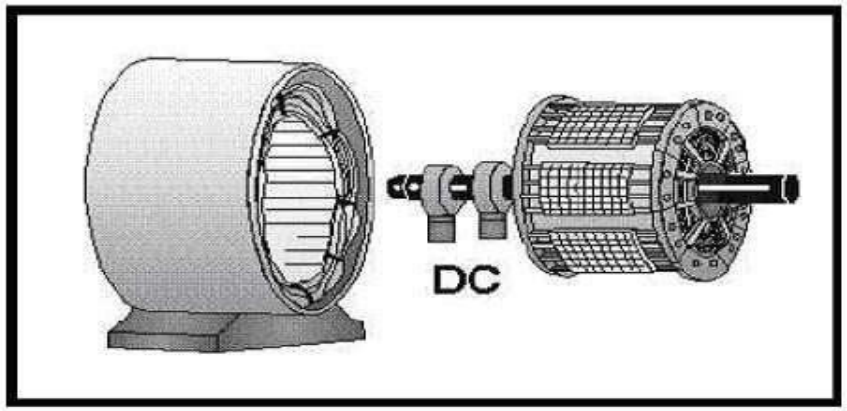
INTRODUCTION

- An alternator may operate as a motor by connecting its armature winding to a 3-phase supply. It is then called a synchronous motor.
- As the name implies, a synchronous motor runs at synchronous speed (Ns = 120f/P) i.e., in synchronism with the revolving field produced by the 3-phase supply.
- However, synchronous motors are not used so much because they run at constant speed (i.e., synchronous speed) but because they possess other unique electrical properties.
- A synchronous motor runs at synchronous speed or not at all. Its speed is constant (synchronous speed) at all loads.
- The only way to change its speed is to alter the supply frequency (Ns = 120 f/P).
- The outstanding characteristic of a synchronous motor is that it can be made to operate over a wide range of power factors (lagging, unity or leading) by adjustment of its field excitation.
- for this purpose Therefore, a synchronous motor can be made to carry the mechanical load at constant speed and at the same time improve the power factor of the system.
- Synchronous motors are generally of the salient pole type.
- A synchronous motor is not self-starting and an auxiliary means has to be used for starting it.
- We use either induction motor principle or a separate starting motor

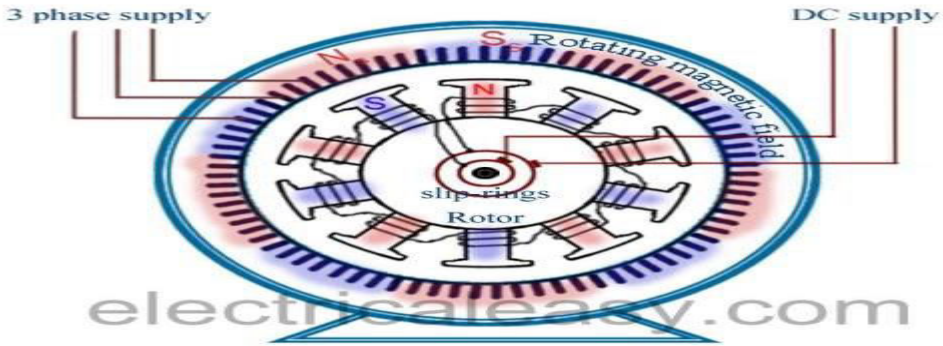
CONSTRUCTION

- It consists of a stator which houses 3-phase armature winding in the slots of the stator core and receives power from a 3-phase supply
- The stator is wound for the same number of poles as the rotor poles.
- A rotor that has a set of salient poles excited by direct current to form alternate N and S poles.
- The exciting coils are connected in series to two slip rings and direct current is fed into the winding from an external exciter mounted on the rotor shaft





Gambar 7. Motor Sinkron



TYPES OF ROTOR

The two types of rotor are:

- CYLINDRICAL ROTOR (ROUND ROTOR)
- SALIENT POLE ROTOR

CYLINDRICAL ROTOR (ROUND ROTOR)

It is constructed from solid – steel forging so as to withstand the large centrifugal stresses inherent in high – speed operation.

Cylindrical rotors cannot accelerate high – inertia loads. They are limited in application to pumps, fans, blowers, and other loads with similar low starting – torque requirements.