

School of Electrical Electronics and Communications

Course Code : BTEE3004

Course Name: Electrical Machine 2

Electrical Machine- II

UNIT – V **SYNCHRONOUS MACHINE-I**

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Source & References:

The materials presented in this lecture has been taken from internet sites and books. This can be used only for academic purpose only.

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AC Machines

1. Synchronous Machines

- Synchronous Generator
- Synchronous Motor

2. Asynchronous Machines/Induction Machine

- Induction Generator
- Induction Motor

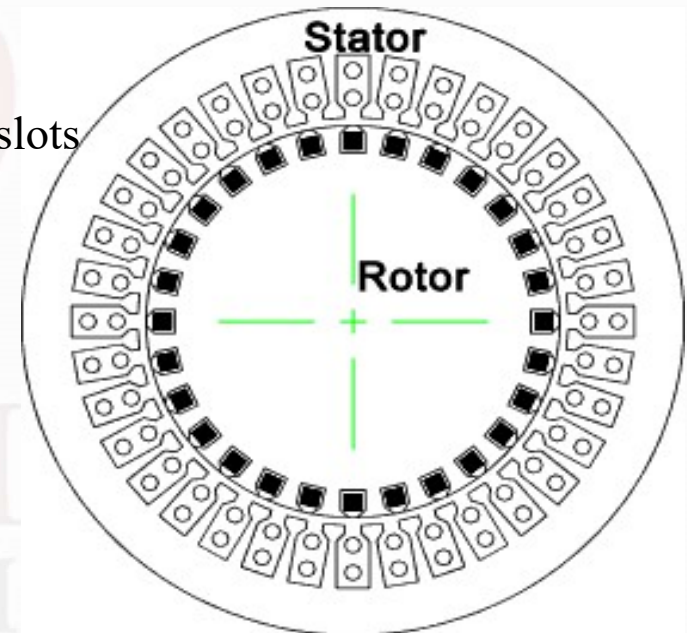
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CONSTRUCTION

An alternator has 3 phase winding on the stator and DC field winding on the rotor.

STATOR

1. Stationary part of the machine.
2. It is built up of Sheet-Steel Lamination Core (Stampings) with slots to hold the armature Conductor.
3. Armature winding is wound on stator.



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Stator

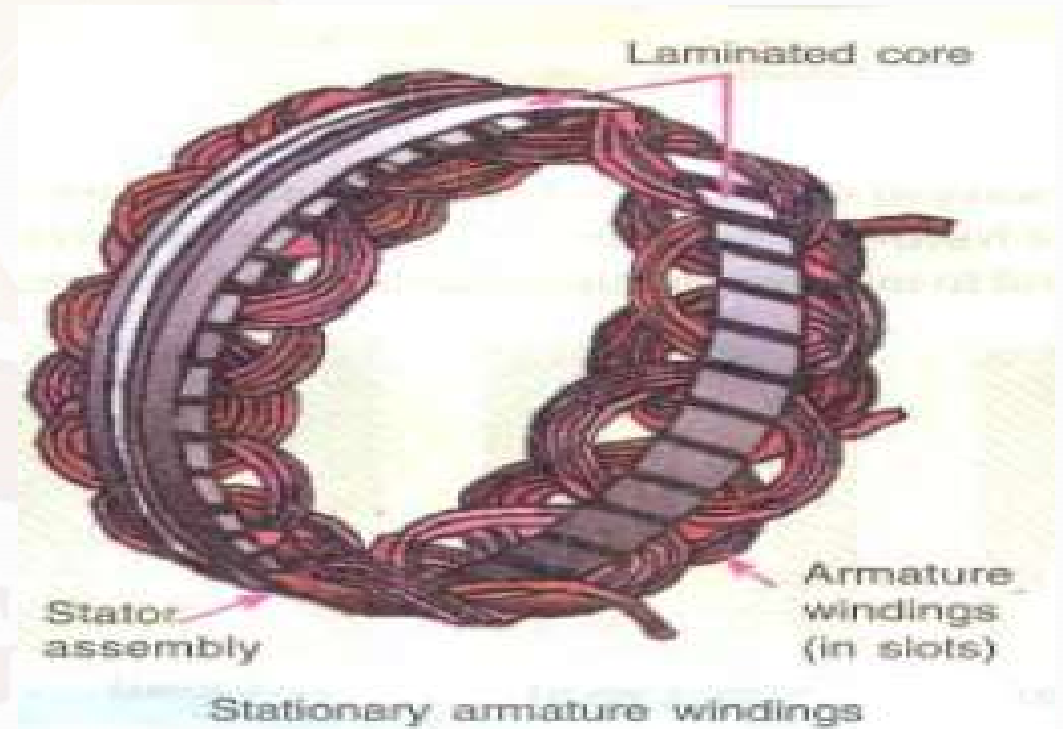
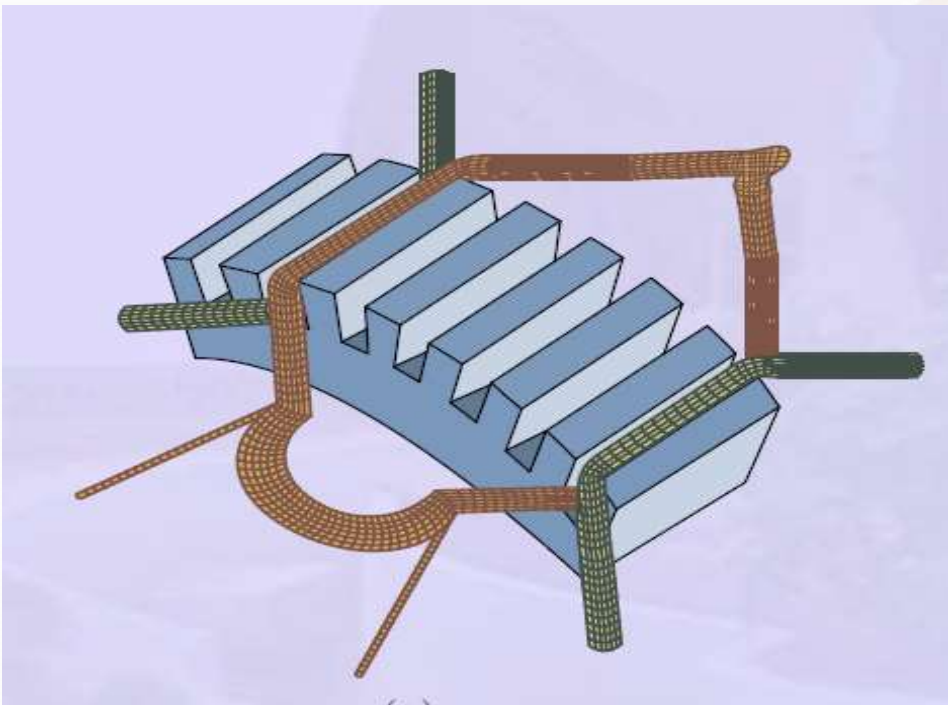
- Laminated iron core with slots
- Steel Housing



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ROTOR:

There are two types of rotor

- i) Salient Pole type {Projected Poles}
- ii) Non - Salient Pole type {Non – Projected Poles}
Smooth Cylindrical Type

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Salient Pole type {Projected Poles}



- 1.It is also called Projected Poles.
- 2.Poles are mounted on the larger circular frame.
- 3.Made up of Thick Steel Laminations.
- Field Winding are connected in series.
- 4.Ends of the field winding are connected to the DC Supply through Slip Rings

Features

- 1.Large Diameter and short Axial Length.
- 2.Poles are Laminated to reduced Eddy Current Losses

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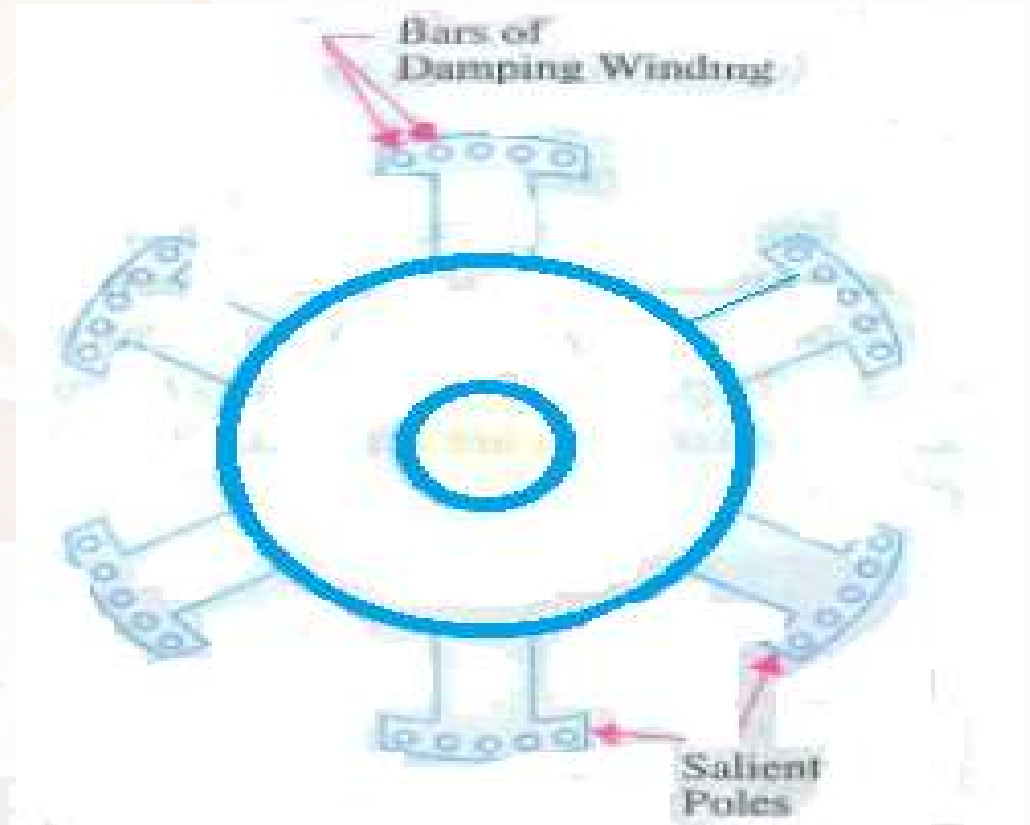
DAMPER WINDING

Pole faces are provided with damper winding

Damper winding is useful in preventing Hunting

EMF generated will be sinusoidal

Copper Bar

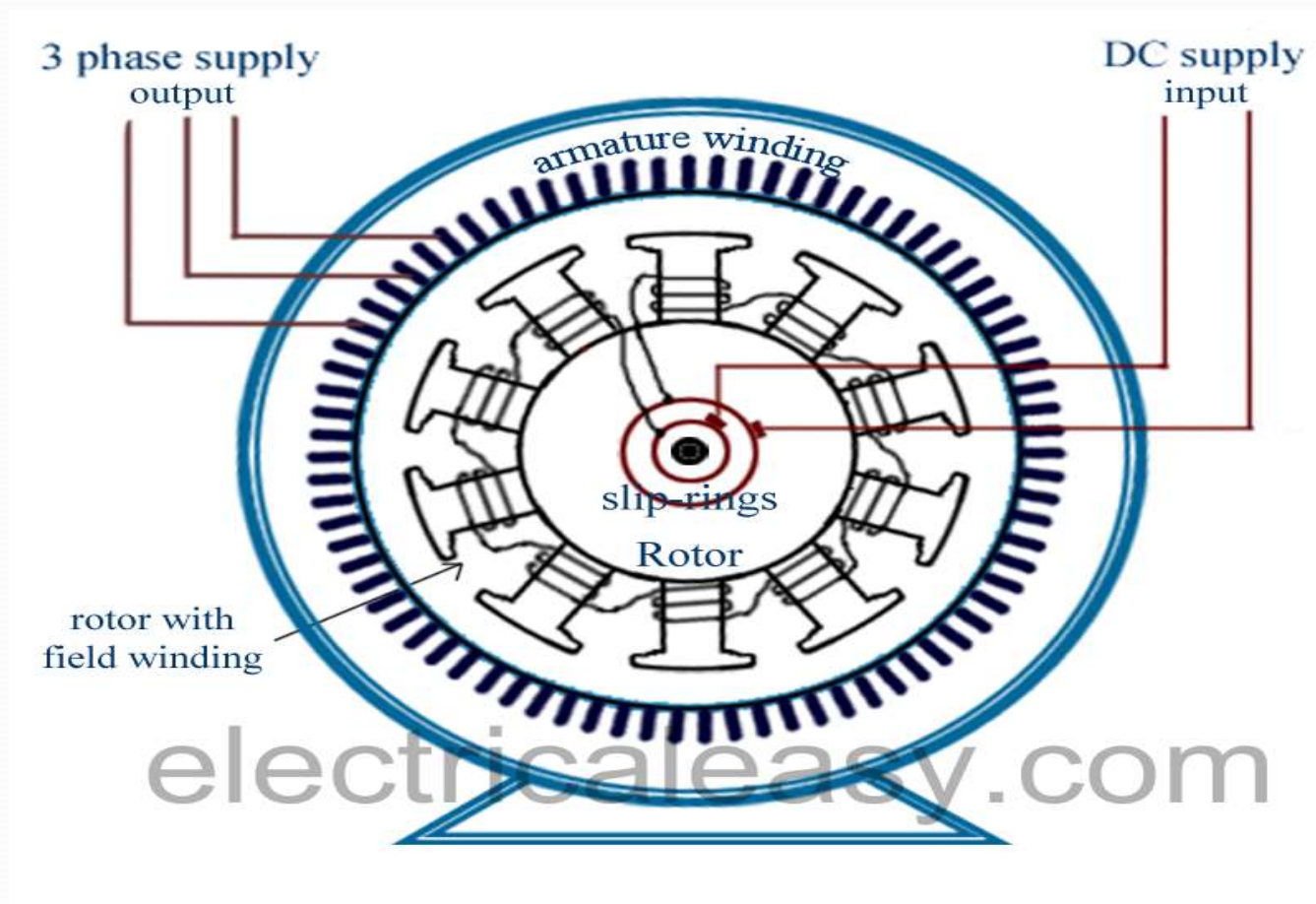


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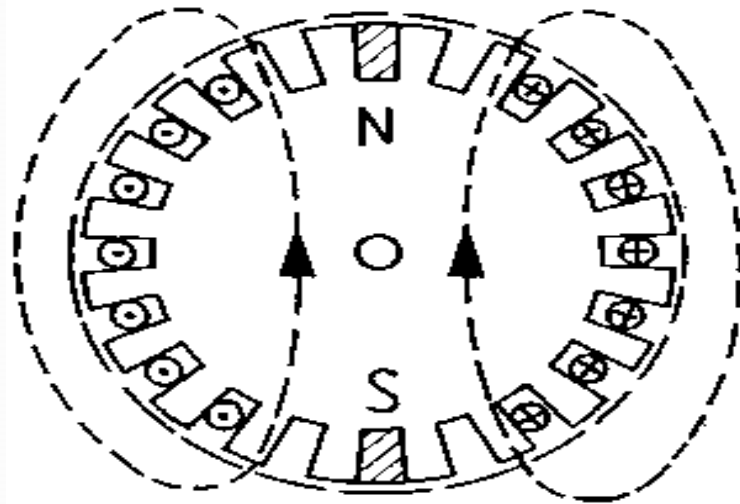
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II) NON SALIENT POLE TYPE

1. Smooth cylindrical rotor or TURBO ALTERNATOR
(field winding used in high speed alternators driven by steam turbines).

Features

1. Smaller diameter and larger axial length compared to salient pole type machines, of the same rating.
2. Less Windage loss.
3. Speed 1200 RPM to 3000 RPM.



1. Noiseless Operation

2. Flux distribution nearly sine wave

3. Frequency 50 Hz

$$N_s = 120 F / P$$

Poles	2	4	6
Speed	3000	1500	1000

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