



# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19EC309 ELECTRICAL MACHINES AND POWER SYSTEMS

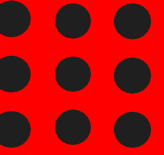
II YEAR / 03 SEMESTER MECH & MCT

Unit 1 – DC Machines

**DC Motor Starters**



# Can You Guess?





# Starting Methods

## Functions:

- To Limit the starting current
- Starting and stopping the motor quickly, safely & repeatable if required
- Automatic control of the motor
- Protection from the over load



➤ Since the armature in DC motor is stationary before starting, the  $E_b \propto N$  which is Zero. So  $E_b=0$ .

$$\begin{aligned} \text{➤ } I_a &= (V - E_b) / R_a \\ &= (V - 0) / R_a \quad \text{if } E_b = 0 \\ &= (200 - 0) / 0.5 \quad V = 200\text{v} \ \& \ R_a = 0.5\Omega \\ &= 400\text{A} \end{aligned}$$

➤ Hence at starting  $I_a$  is very large.

➤ This current will burn out the armature.

➤ So limiting the current to a safe value by inserting the resistance in series with armature.

➤ As the motor gains in speed,  $E_b$  is builds up and Starting resistance could be gradually cut off.



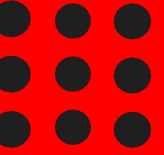
# Importance (or) Necessity

- It may damage the rotating parts of the motor and the load.
- Damage to the armature winding.
- Failure of insulation due to over heating.
- It produces high sparking in the commutator surface.
- Large amount of dips in supply voltage



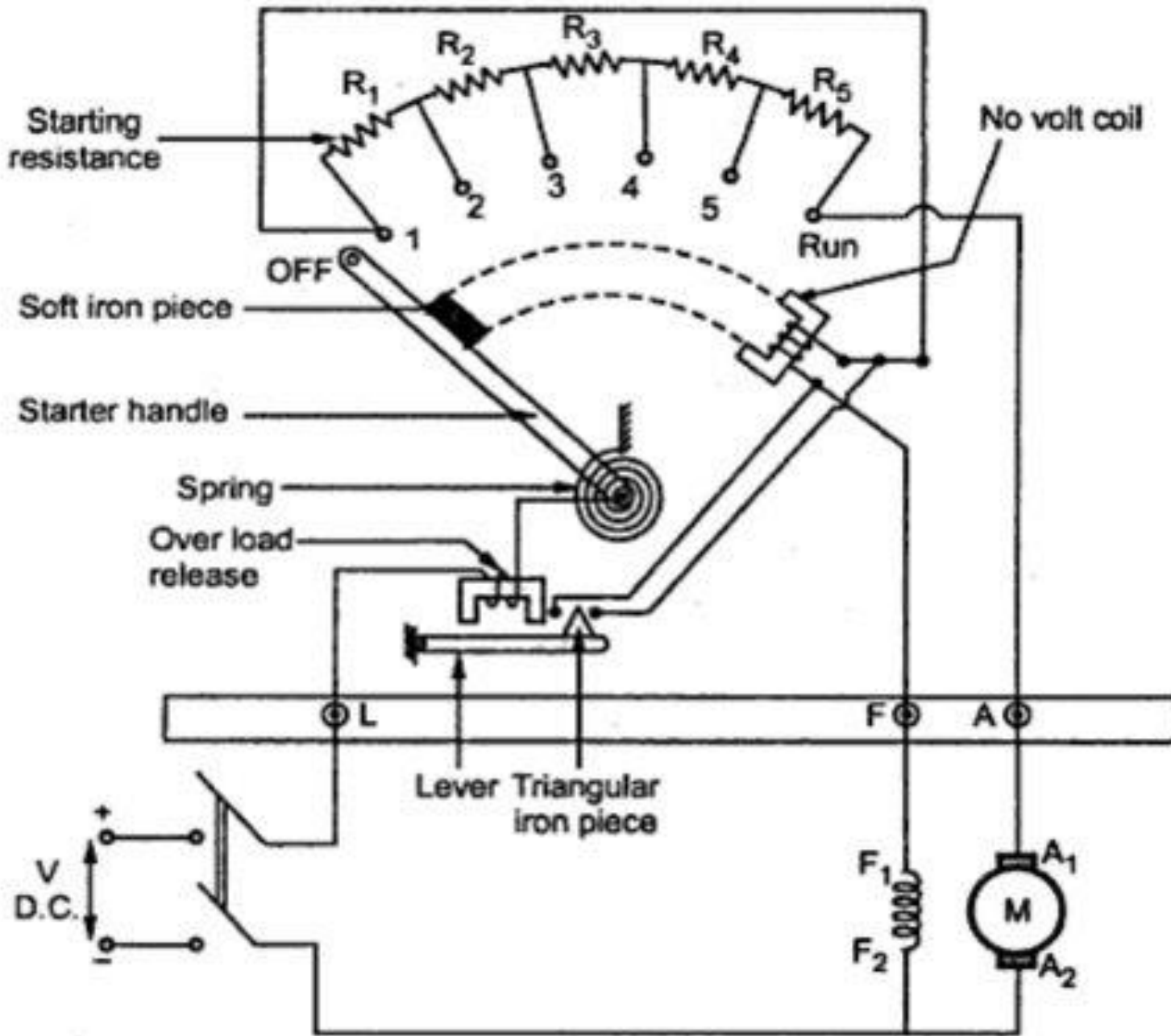
# TYPES OF STARTERS

- 2 Point starter
- 3 Point starter
- 4 Point starter





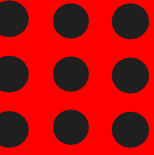
# 3 Point Starter





## Construction:

- Starting Resistance is connected in series with the armature
- NVR Coil is connected in series with the field winding.
- OLR Coil is connected in series with armature..



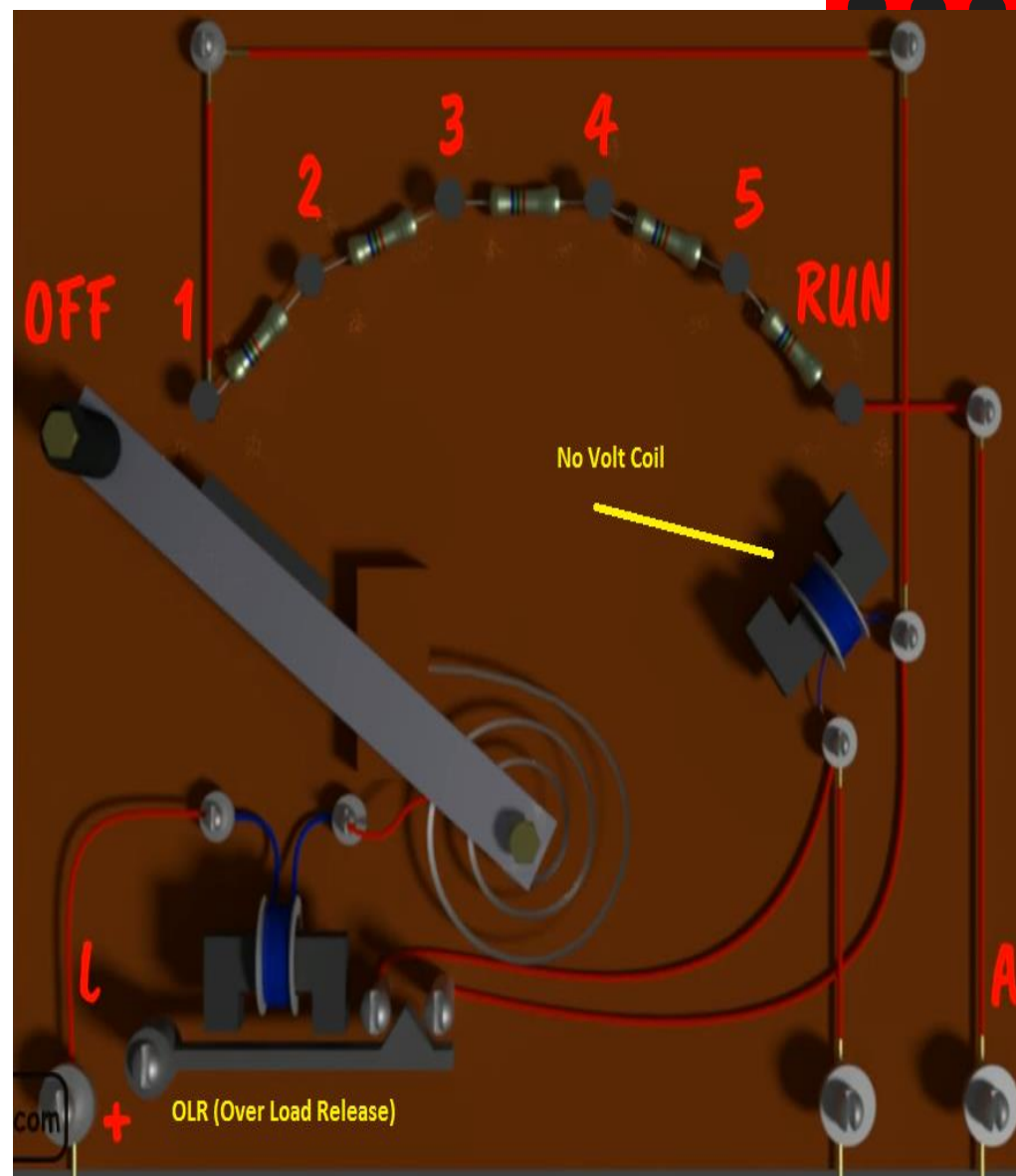




# Protective Devices

## No-Volt Release (NVR) Coil:

- Its an electromagnet.
- When the handle is in ON position, the NVR gets magnetized and attracts the soft iron.
- In case of failure (or) disconnection of the supply (or) break in the field circuit, the NVR coil is de-energised there by releasing the arm..
- Which is pulled back by the spring to the off position.





# REFERENCES

1. Murugesh Kumar K, "Electric Machines Vol I", Vikas Publishing Pvt Ltd , (2010)
2. Gupta J.B, " Theory and Performance of Electrical Machines", S.K.Kataria and Sons, (2002)
3. Kothari D.P and Nagrath I.J " Electric Machines", Tata McGraw Hill Publishers, (2002)
4. Bhimbhra P.S., "Electrical Machinery", Khanna Publishers, (2003)

**THANK YOU**