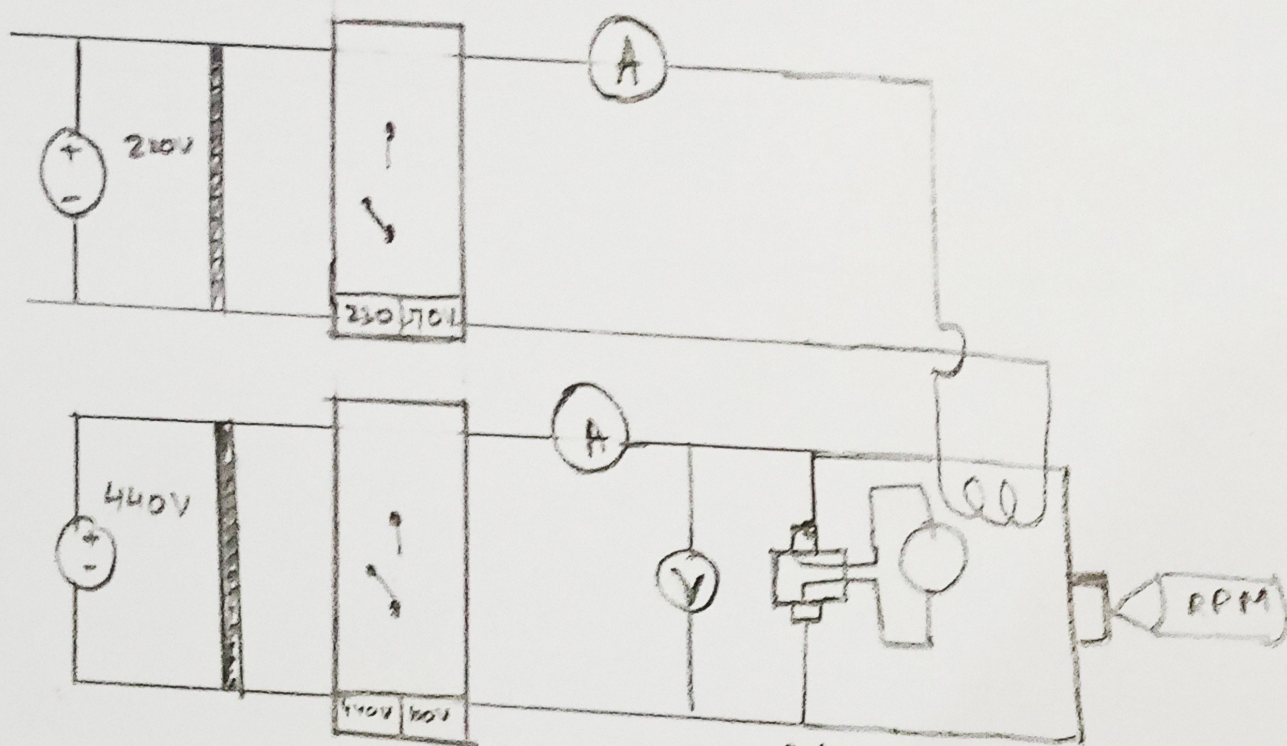




Separable
Fixed
DC Motor

Aim : Study the Speed control of Separately excited DC Motor

Apparatus

Separately Excited DC Motor • Load Resistor or Rheostat
DPST Switch • Generator
Tachometer • Connecting wires
Variable Voltage Source
Rectifier

Theory :

DC motors are highly adaptable to speed adjustment making them competitive in industrial drives. Their speed can be controlled using the following methods

⇒ Varying Field Excitation (Φ)

- Adjusting shunt field resistance changes motor speed
- lower field rheostat resistance results in low speed & vice-versa
- This method maintains constant horsepower and suits applications involving reduced torque at high speeds

⇒ Varying Armature Terminal Voltage

- Speed changes with varying armature voltage

while keeping excitation constant.

A rectifier is often required to control armature voltage in ac constant

Motor operates in constant torque mode, maintaining rated torque across speeds

$$\text{Torque} \Rightarrow T = K \phi I_a$$

Speed

Conclusion

Inverse relationship between field voltage and speed, along with the proportionality of armature voltage to speed, make DC motors suitable industrial applications requiring a variable speed drive