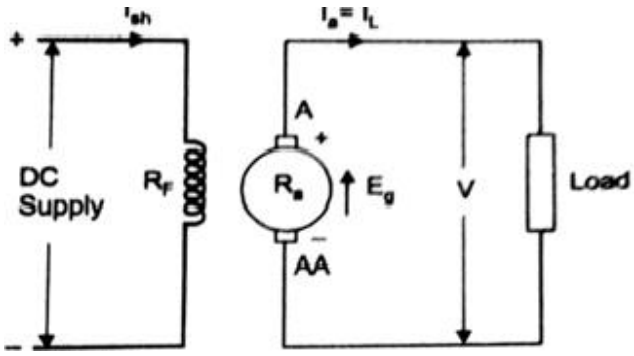
3.7 TYPES OF DC MOTOR:

1. Separately excited DC motor

2. Self-excited dc motor

- Series motor
- Shunt motor
- Compound motor
    1. Long shunt compound motor
    2. Short shunt compound motor

SEPARATELY EXCITED DC MOTOR:

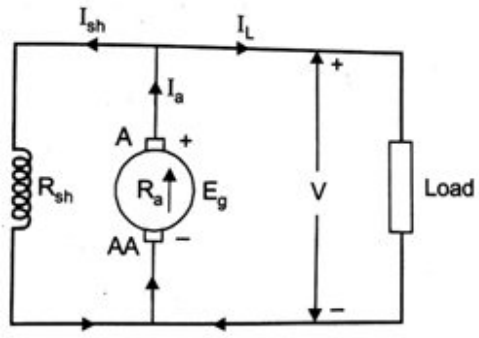


- Field winding and armature are separated.
- Field winding is excited by a separate DC source-separately excited dc motor.
- Ia=Il
- E_b =V-Ia Ra-Vbrush

DC SERIES MOTOR:

- Field winding is connected in series with armature.
- Less number of turns.
- Rse –resistance of series field winding-small.
- Il=line current
- Ia=series field
- V=E_b + Ia Ra +IscRsc+V brush.
- V= E_b+(Ra +Rse).
- Φ α Ise α Ia

DC SHUNT MOTOR:



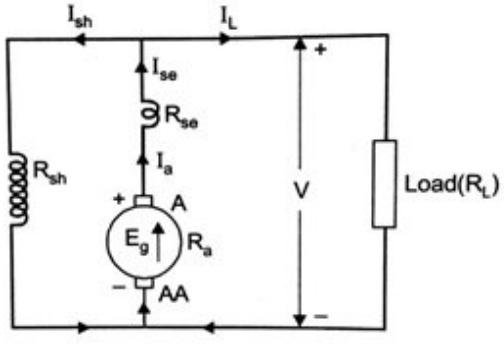
- Field winding is connected across the armature.
- More number of turns with less cross-sectional area.
- Rsh is the shunt field winding
- Ra is the armature resistance.
- Ra is small, Rsh is large.
- Voltage v=voltage across the armature and field winding.
- Il is the line current, divided into two paths

1. Field winding
2. Armature winding

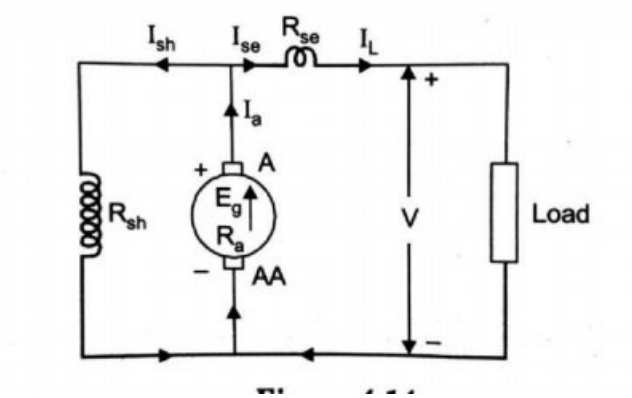
- Il = Ia + Ish
- Ia = armature current
- Ish =shunt field current
- Ish = V /Rsh
- V = E_b + Ia Ra + V brush
- Φ α Ish
- Input is constant, so flux is constant.
- Also known as constant flux motor.

DC COMPOUND MOTOR:

1. **LONG SHUNT:**
   - Shunt field winding is connected to both the armature and the field winding.
   - Il = Isc + Ish
   - Ise = Ia
   - Il =Ia + Ish
   - Ish = V/Rsh
   - Voltage equation V = E_b + Ia(Ra + Rse)+ V brush



2. SHORT SHUNT:



- Shunt field winding is connected across armature and series field winding is connected in series.
- Il = Ise
- Il = Ia + Ish
- Il = Ise=Ia + Ish
- Voltage drop= v –Il Rse
- V = E_b + Ia Ra + V brush
- Ish = V- IlRse/ Rsh.