

CIRCUIT DIAGRAM: SPEED CONTROL OF DC SHUNT MOTOR

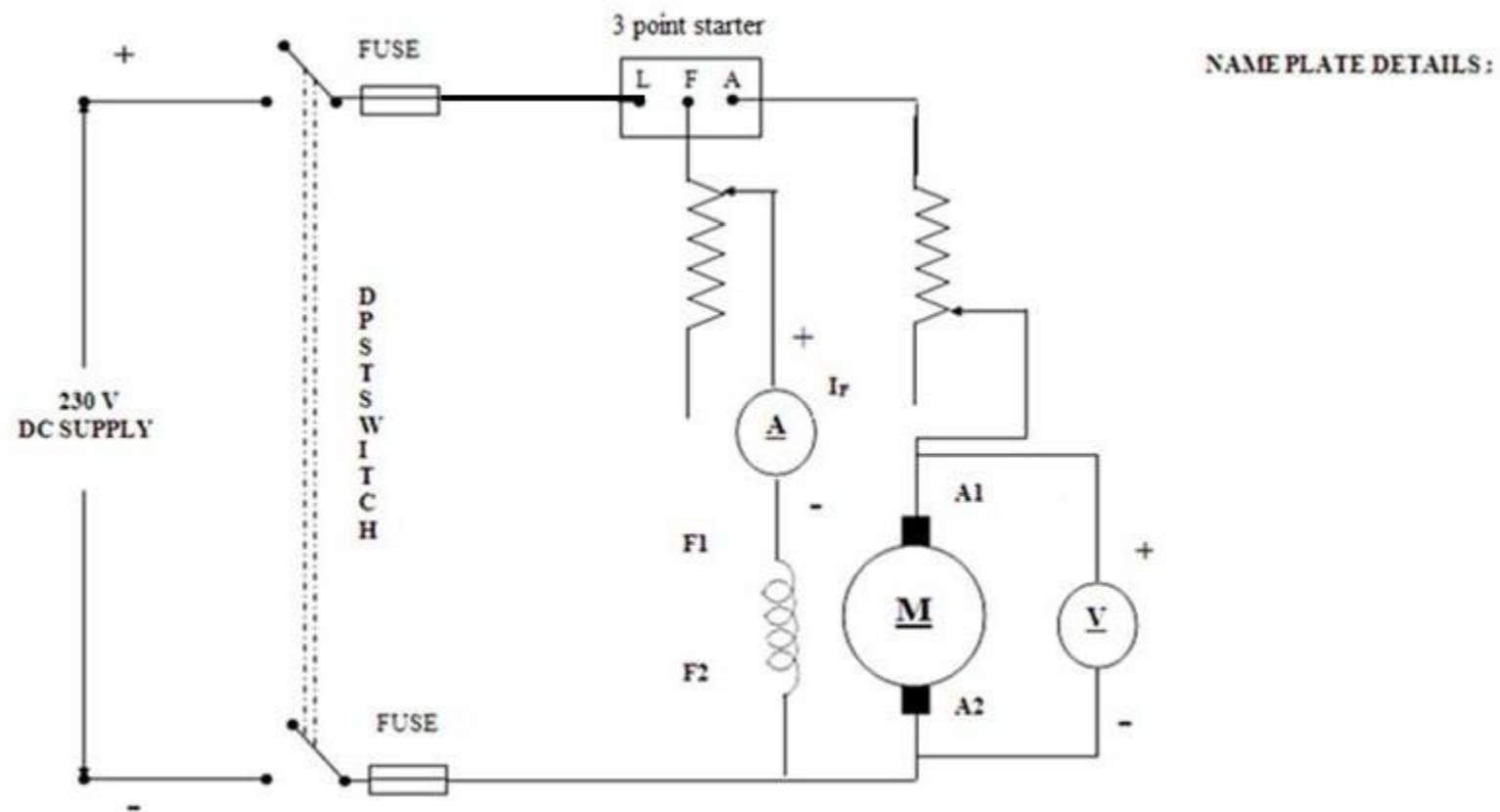


Figure 4.1 Speed control on DC Shunt Motor

Ex. No:	SPEED CONTROL OF DC SHUNT MOTOR
Date :	

AIM:

To study the speed control of the given dc shunt motor by field control method and armature control method.

OBJECTIVES:

1. To control the speed of DC shunt motor using armature control method.
2. To control the speed of DC shunt motor using field control method.
3. To find the armature resistance (R_a)
4. To obtain the characteristics of speed control by the above mentioned methods.

APPARATUS REQUIRED:

S.NO	APPARATUS NAME	RANGE	TYPE	QUANTITY
1.	Voltmeter			2
2.	Ammeter			1
				1
3.	Rheostat			1
				1
4.	Tachometer			1

FORMULA:

$$E_b = V_a - I_a R_a \quad (V)$$

Where

E_b – Back emf in volts.

V_a – Voltage across armature in volts.

I_a – Armature current in A.

R_a – Armature resistance in ohms = 1.5Ω (given).

Table 4.1 ARMATURE CONTROL METHOD

S.NO	$I_f =$	A	$I_f =$	A	$I_f =$	A
	V_a Volts	N rpm	V_a Volts	N rpm	V_a Volts	N rpm

Table 4.2 FIELD CONTROL METHOD

S.NO	$V_a =$	Volts	$V_a =$	Volts	$V_a =$	Volts
	I_f Amps	N rpm	I_f Amps	N rpm	I_f Amps	N rpm

PRECAUTION:

1. The fuse is selected in such way that its rating is 120% of the no load current.
2. The spring balance should be kept at zero position throughout the experiment.
3. Motor field rheostat should be kept at minimum position at the time of starting.

PROCEDURE:**FIELD CONTROL METHOD:**

1. Connections are made as per the circuit diagram.
2. DPST switch is closed & motor is started using three point starter.
3. The voltmeter connected parallel to armature should be kept at constant voltage (V_a) by not varying armature rheostat.
4. The field rheostat is varied and corresponding readings are noted down in tabular column. (I_f & N).
5. The same procedure is repeated for different armature voltages (V_a).
6. The required graph is plotted. (I_f & N).

ARMATURE CONTROL METHOD:

1. Connections are made as per the circuit diagram.
2. DPST switch is closed & motor is started using three point starters.
3. The ammeter is connected in series with the field rheostat. The field current (I_f) is maintained at constant value by adjusting the field rheostat.
4. The armature rheostat is varied and corresponding readings of E_b and N are noted down.
5. The same procedure is repeated for different field currents. (I_f).
6. The required graph is plotted (E_b Vs N).

MODEL GRAPH:

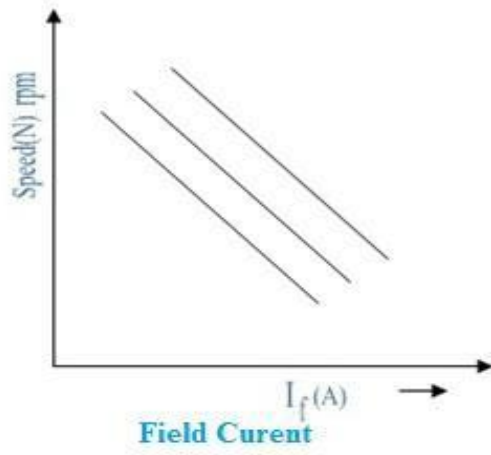


Figure 4.2 Field control method

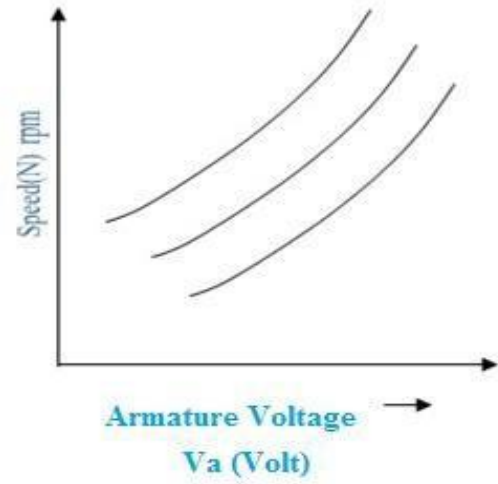


Figure 4.3 Armature control method

MODEL CALCULATION: