D.C. MOTOR CHARACTERISTICS

Objective:

To study the load characteristics of D.C shunt & compound motors.

Procedure:

a. D. C. Shunt Motor:

Connect as in FIG.1 (a). The armature resistance Ra is kept at its maximum position and Rf1 at its zero position. SW1 is closed. Ra is cut out step be step completely. Rf1 is adjusted so that the speed on no load is the rated speed. This field current is termed as If0 and is kept constant throughout the experiment. Load is applied on the motor through the generator step by step by adjusting Rf2 and the load resistance L. Note down Vt, Ia, T and N, checking each time that the field is constant at Ifo, where T is the torque read on the torque meter, and N is the speed in R.P.M read by the tachometer.

b. D.C Compound Motor

Cumulative operation is obtained when the direction of current through the series field is so as to aid he shunt field; differential operation is obtained when the series field opposes the shunt field. The series field is across S1-S2. The experiment is done for both differential and cumulative operation.

i) The machine is connected as in FIG.1 (b). The motor is started as before and Rf1 is adjusted so that the speed on no load is the rated speed; Ifo is kept constant as before at the value in Section 'a' above Switch SW2 is then closed and the load applied to the motor in steps by adjusting Rf2 and the loading resistor L. Note down Vt, T, and N each time checking that If0 is constant.

ii) If the connections in FIG 1 (b) give cumulative operation, reversal of S1-S2 will give differential operation, and vice versa. The experiment is carried out for both the operations. The motor may tend to race up during differential operation, so care should be taken not to exceed the rated current and to apply the load slowly in steps.

Report:

$\omega = 2\pi N/60$ = angular velocity
Express torque T in N-m.

1. Plot ω (Y-axis) against Ia for Tests I & II.
2. Plot T (Y-axis) against Ia for Tests I & II.
3. Plot ω (Y-axis) against T for Tests I & II.
4. Write down or derive the equations relating ω-Ia, T-Ia and ω- T for shunt, cumulative compound and differential compound operations. Justify the shapes of he curves obtained in each case.

Observations:

Sam e tables for all cases.

I. Shunt Motor
II. Compound Motor (Cumulative0
III. Compound Motor (Differential0

If0 = Amp. (Constant)

S.No.	Vt	Ia	N	T

FIG.1 (a) Connection Diagram for load characteristics of shunt motor

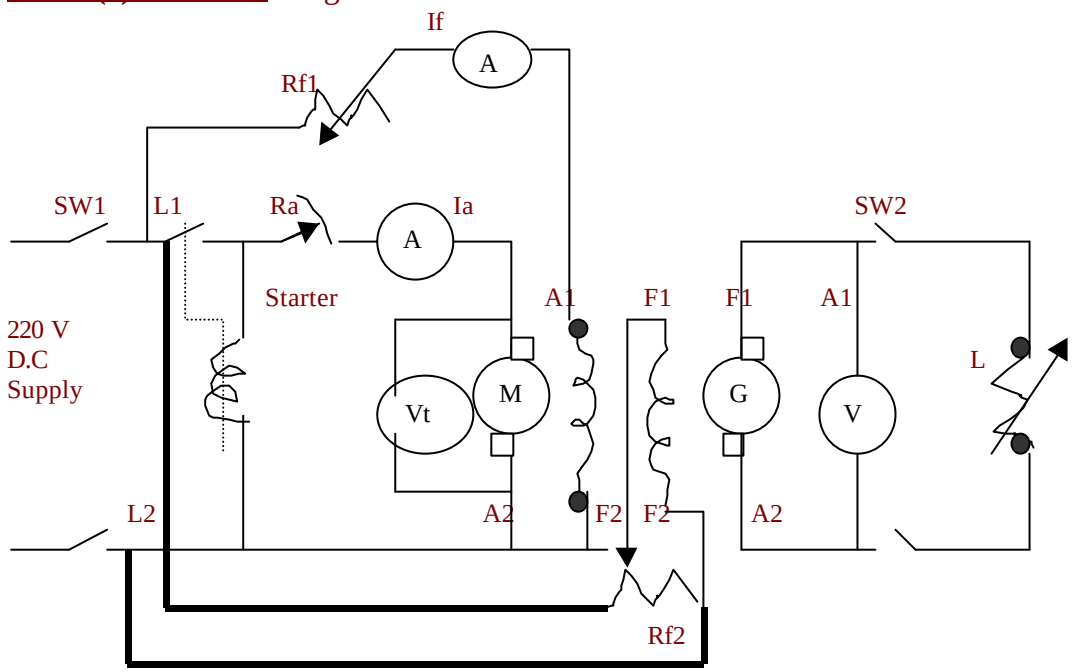

FIG.1 (b) Connection Diagram for load characteristics of compound motor