Parallel Operation of Alternators

Objective:

1. To study the transference of loasd between two alternators running in parrallele, keeping the load,frequency,and voltage constant.
2. To stiudy the variation of voltamperes with respect to alternator excitation, keeping input power , output load, voltage and frequency constant.

Theory:

The conditions for successful parallel operation of alternator are:
1. The alternators shall have the same frequency
2. The alternators shall have the same alternator induced voltage
3. The alternators shall have the same phase sequence
4. The alternator voltages shall be in phase.

The laod output of ther alterantor is governed by the input power from its prime -mover. Variation of excitation gives rise to a change in the kVar ouput; the kW output remins unchanged.

Procedure:

1. The alternators are conneted as shown in FIG.1 using two single-phase wattmeters
2. The d.c shunt motors are started and the alternators are brought up to speed.
3. By varying the alternator fields, the terminal voltages are brought up to the rated values(110V).
4. The speeds of the sets are adjusted by means of the motor field rheostat control until thealternators run at rated frequency
5. The synchronising switch is closed in the middle of a dark period of the lamps. (The alterantors should now be working in parallel, but they should not be delivering any load. Also , if the voltage and speed have been properly adjusted, there should be no interchange odf current between the alternators and the ammeters should read zero.
6. For a particular load output at consatnt frequency and voltage, input ot the d.c machine is varied and the outputs shared by each alternator are noted from the wattmeter readings. Inputs to the d.c side are also noted.
7. A graph is plotted between the input power and the load shared by each machine, as shown in FIG.2
8. Keeping the input power , outputload , terminal voltage an dfrequency constant, the current outut of each alternator is noted for different excitaitons.
9. A graph of output (in VA) versus excitation as shown in FIG.3 is plotted.

Observations:

Wattmeter constants = Frequency=

Voltage = Load Current=

LOAD SHARING

No.	W1 (watts)	A1 (amps)	Iac1 (amps)	Vdc1 (Volts)	W2 (watts)	A2 (amps)	Iac2 (amps)	Vdc2 (volts)

Voltage =
Load current =

Frequency =
W1 =
W2 =

No.	Machine I			Machine II		
	If1(amp)	Iac1(amp)	1.73VIac1(VA)	If2(amp)	Iac2(amp)	1.73Viac2(VA)

Results:

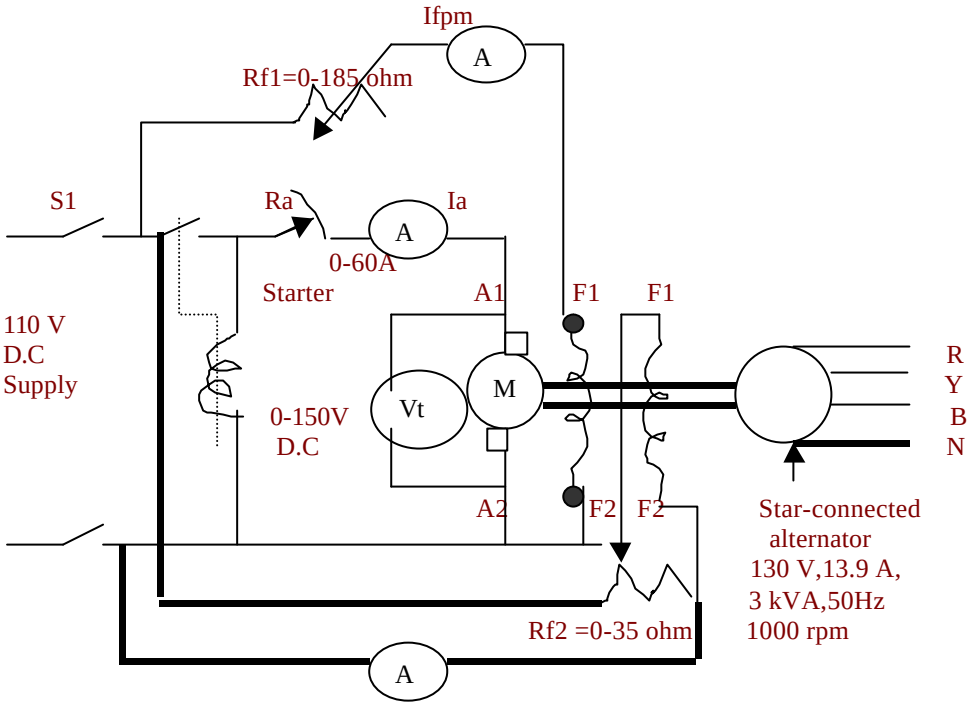
S.No.	Machine I		Machine II	
	A.C Output,Watts	D.C Input ,Watts	A.C Output,Watts	D.C Input ,Watts

Remark:

Variation of load angle with cahnge in the output load can be observed with a stroboflash arrangement

FIGS.1-3 are given on the following pages

FIG.1 Two D.C motor -alternator sets as follows are used.



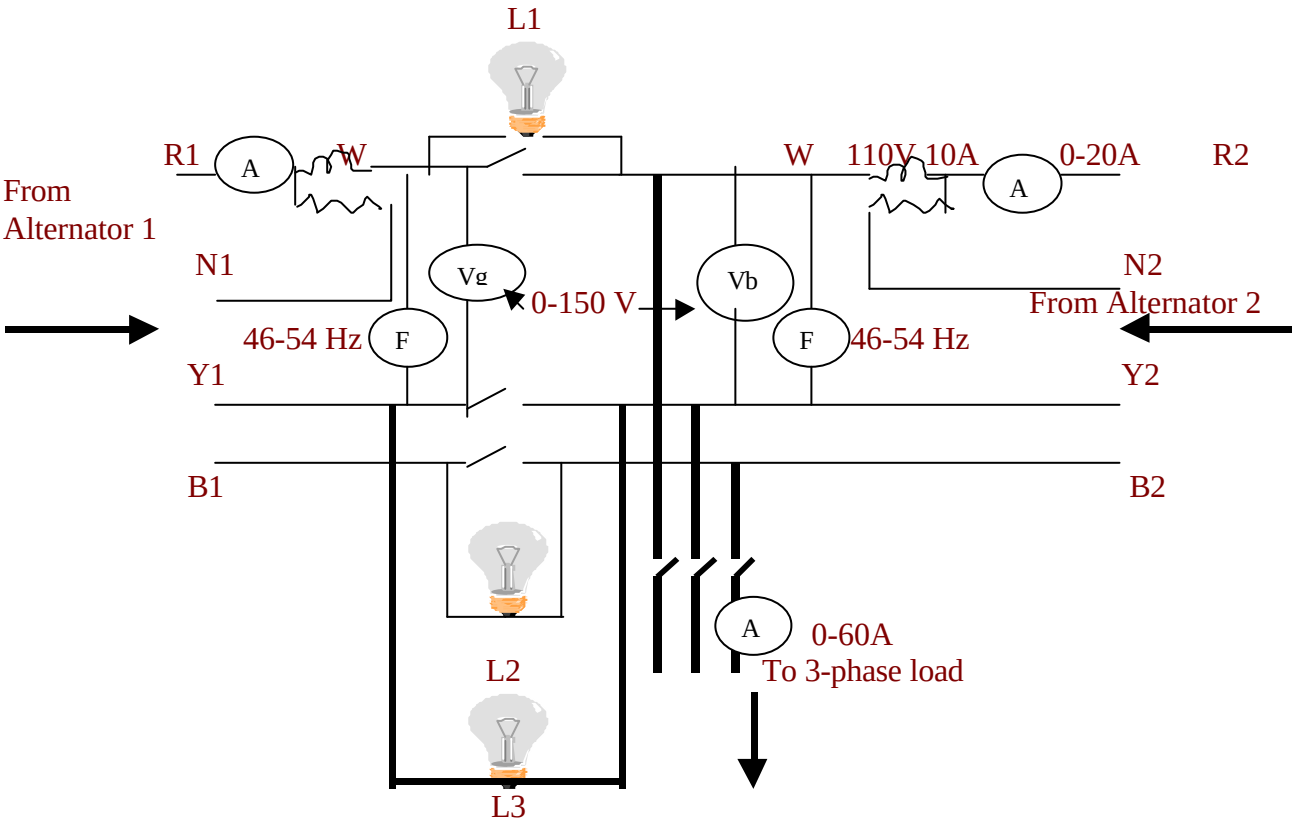


FIG.2

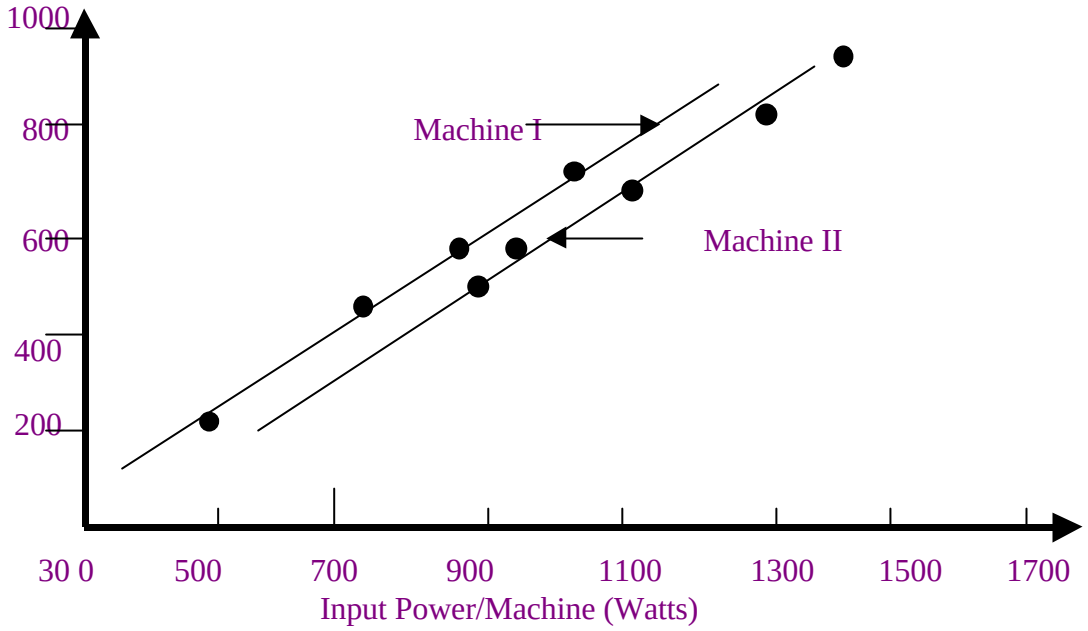
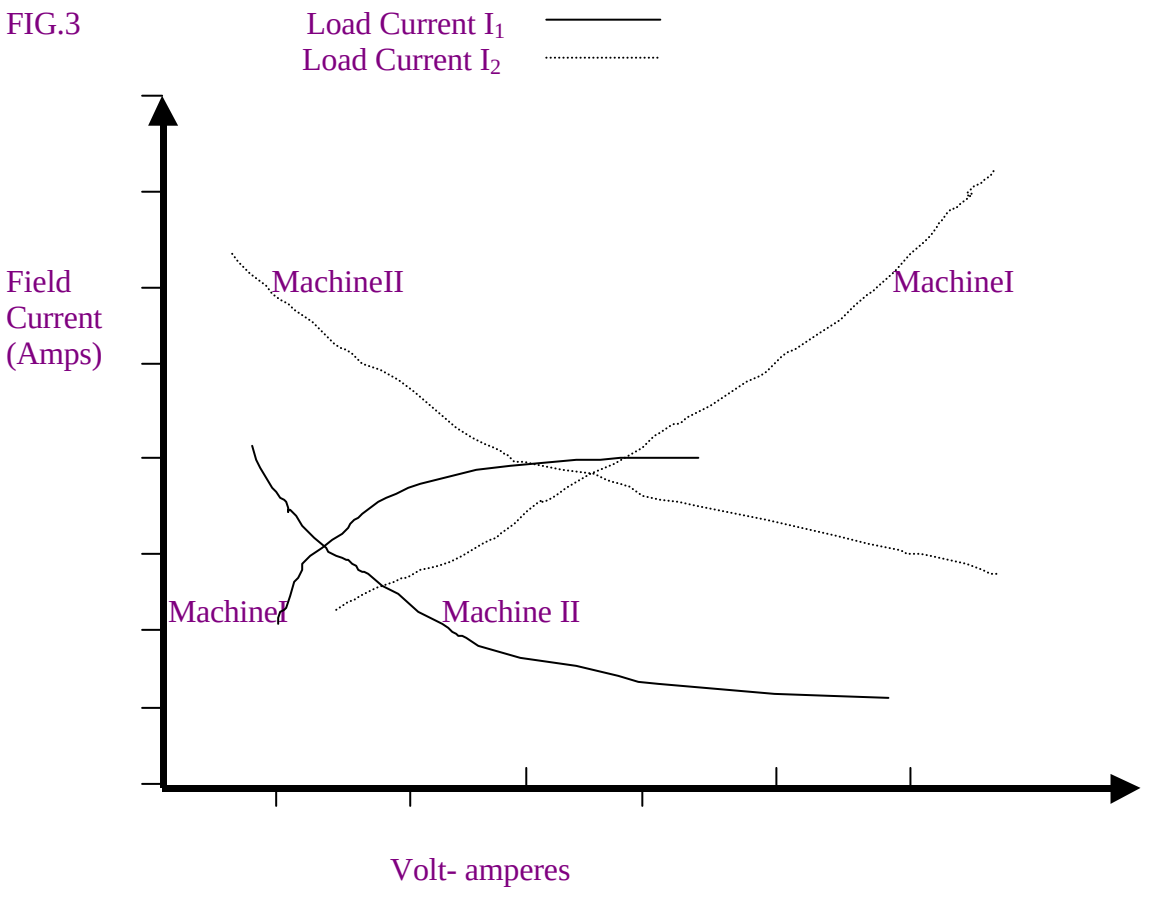

Output Power/Machine (Watts)
1000
800
600
400
200
Machine I
Machine II
30 0
500
700
900
1100
1300
1500
1700
Input Power/Machine (Watts)

FIG.3


Load Current I_1
Load Current I_2
Field Current (Amps)
MachineII
MachineI
MachineI
Machine II
Volt- amperes