

EET2233 - LABORATORY
Experiment #7

DC GENERATORS

The purpose of this experiment is:

1. To obtain the No-load saturation (Magnetization) curve of a separately excited DC-generator.
2. To obtain the external characteristics (output voltage vs load current) of a DC-Shunt Generator.
3. To obtain the external characteristics (output voltage vs load current) of a DC-Series Generator.

PROCEDURE:

1. A synchronous motor is being used to drive the DC generator. Figure 1 gives the circuit diagram for the 3-phase AC supply, AC Reduced Voltage Starter and the Synchronous machine. Connect the circuit in figure 1. When starting the machine, the toggle switch on top of the machine should be in the IND. START position. Once it has stopped accelerating, switch to the SYNC. RUN position and then energize the field with 95V DC from the DC Field Supply. You need not perform the start up procedure at this time; go on to procedure 2.
2. Connect the DC-separately excited generator as shown in figure 2. Begin with the field rheostat at maximum position (fully clockwise). Start the synchronous machine (as described in procedure 1) and record generator terminal voltage and field current as you adjust your field rheostat in the direction causing increased the field current. Continue taking measurements in 0.1A increments until you reach a field current of 1.5A. Next, decrease the field current by adjusting the field rheostat in the opposite direction and take measurements of generator terminal voltage for the same value of field currents. Record your measurements on the data sheet.
3. Connect the DC-Shunt Generator as shown in figure 3. The load cart should be configured with the A, B and C resistor banks paralleled together. Initially, set the field rheostat to the 9 o'clock position. Start the induction motor as described above and adjust the field rheostat to obtain a no load terminal voltage of 125V. Begin adding load and take measurements of terminal voltage (V_t) and load current (I_l) up to a total load of 20A. Record the measurements on the data sheet.
4. Connect the DC-Series Generator as shown in figure 4. Starting with zero load, (all resistors off) begin adding load and take measurements of terminal voltage (V_t) and load current (I_l). Record the measurements on the data sheet for load currents up to 20A. Note; to accomplish this you will have to parallel all the resistors from two load carts.

CALCULATIONS:

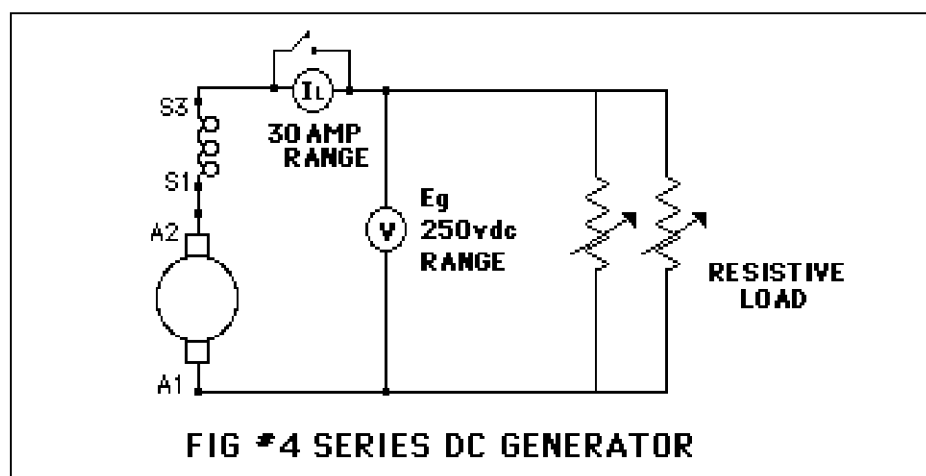
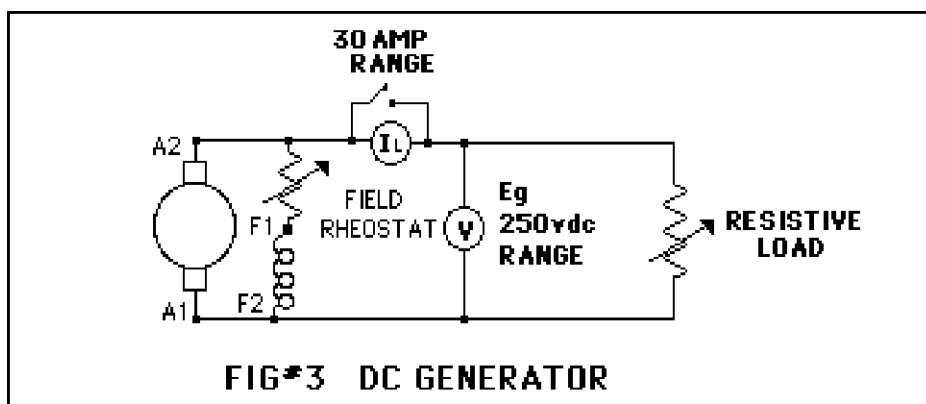
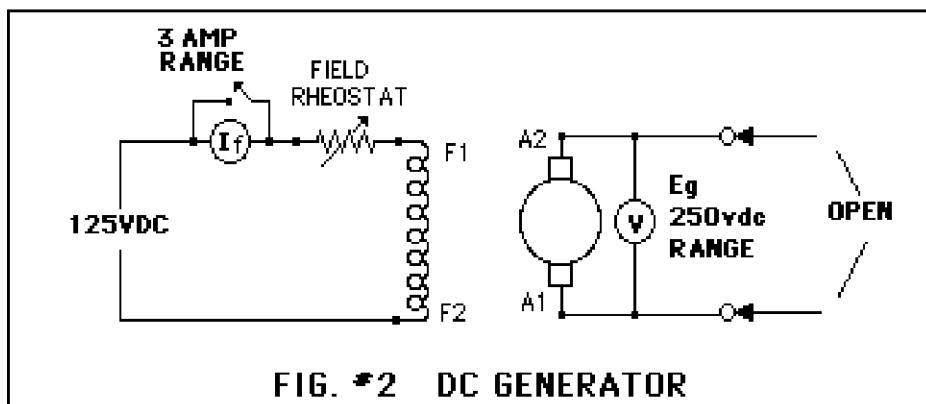
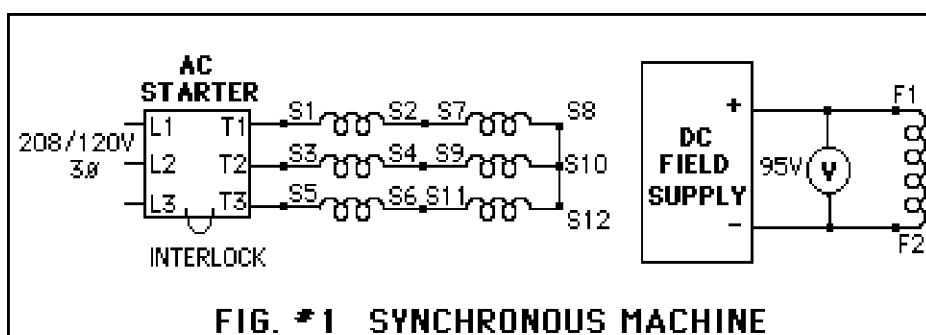
1. Plot the No-load saturation (magnetization) curve for V_t vs I_f
[open circuit voltage versus increasing and decreasing field current] NOTE: Field current (I_f) should be on the x-axis.
2. Plot the V_t vs I_l (I_l on the x-axis) for the DC-Shunt and DC-Series Generators on a single graph. Comment on the results.
3. Calculate the percent voltage regulation for the DC-Shunt and DC-Series Generators.

DATA SHEET

EET2223 - EXPERIMENT #7

DC - GENERATORS

[illegible]



Equipment for the Lab 4:

