

## EET 2233 - LABORATORY

### Experiment #8

#### COMPOUND DC GENERATORS

The purpose of this experiment is:

1. To obtain the characteristic curves of generator voltage vs. load current for overcompound, flat, undercompound and differential-compound DC generators.
2. To understand how the series and shunt field fluxes interact to produce the various compound generator terminal voltage vs. load current characteristics.

#### PROCEDURE

1. A synchronous motor is used to drive the DC generator throughout this experiment. Figure 1 gives the circuit diagram for the 3-phase AC supply, AC reduced starter and the synchronous machine. When starting the machine, place the switch in the IND START position, energize the three phase source by closing the triple switch and depress the start button on the AC reduced voltage starter. Once the motor has finished accelerating, move the switch to the SYNC RUN position and energize the field with the DC field supply to a level of 95V. When stopping the motor, de-energize the field by reducing the DC field supply voltage to zero volts, depress the stop button on the AC reduced starter and open the triple switch to de-energize the three phase supply. CAUTION - when restarting the motor be sure the DC field supply is OFF, the switch is in the IND START position and the generator is UNLOADED.
2. Begin the experiment by connecting the shunt generator as shown in figure 2. Add load while simultaneously adjusting the field rheostat until you obtain 15A of load current at a terminal voltage of 70V. **DO NOT move, adjust, or in any way alter the position of the rheostat for the rest of the experiment.** If the generator fails to come up to voltage during this part of the experiment, shut the motor down and interchange any two phases of the 3-phase supply. This will reverse the direction of synchronous motor rotation and the generator should now come up to voltage. No further measurements need to be taken at this time. (Question - why is this procedure necessary?)
3. Connect the compound generators as found in figures 3, 4. Record terminal voltage for load currents from 0 to 20A. Good characteristics are can be recorded by adding load in single switch increments and noting the resulting terminal voltage and load current.
4. Connect the compound generator as found in figures 5. Record terminal voltage for load currents from 0 to 20A.
5. Connect the compound generator as found in figures 6. Record terminal voltage for load currents from 0 to 20A..
6. Plot terminal voltage vs load current for all four configurations on a single graph. Also, identify the type of compound generator each figure represents and explain how the shunt and series fields interact to produce the different kinds of compound generators.

$I_1$																
$V_t$																

$I_1$																
$V_t$																

FIGURE #3 DATA

$I_1$																
$V_1$																

$I_1$																
$V_1$																

FIGURE #4 DATA

$I_1$																
$V_1$																

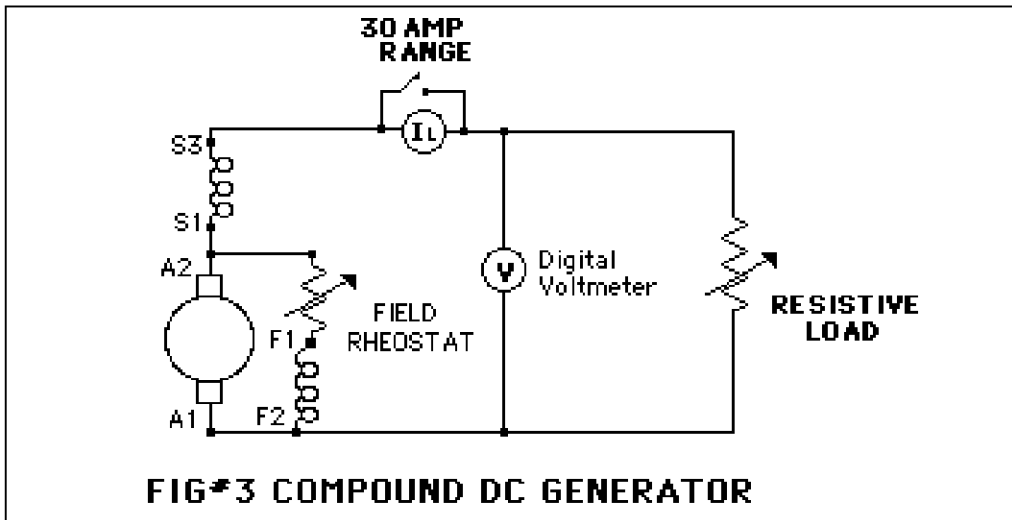
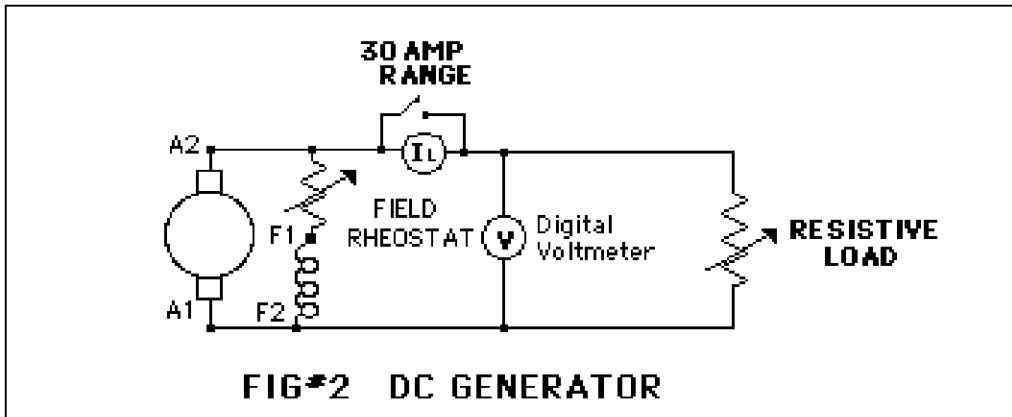
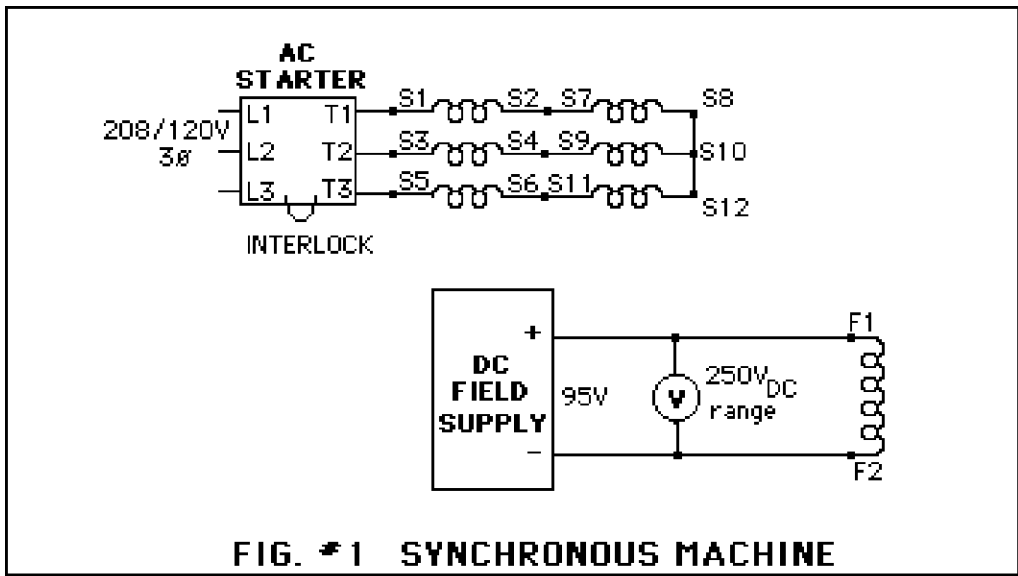
$I_1$																
$V_1$																

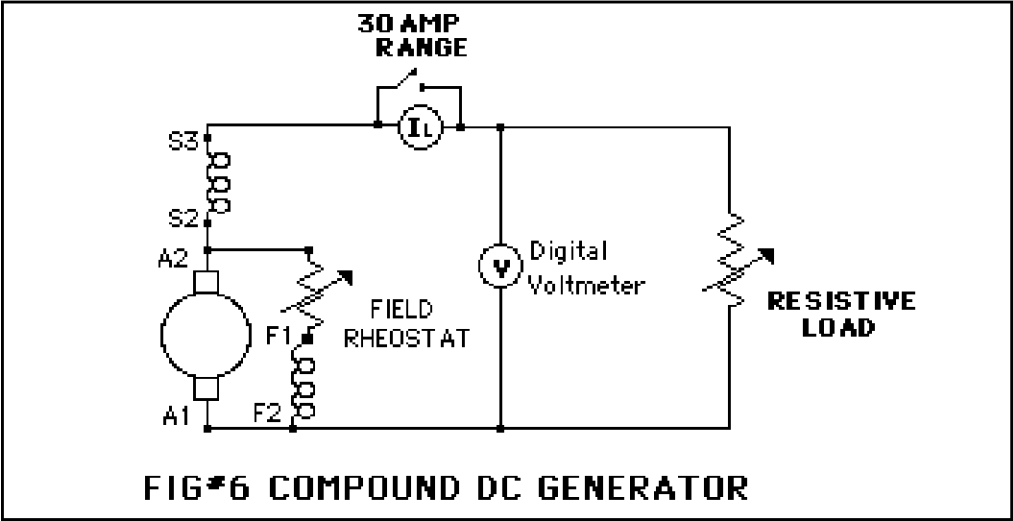
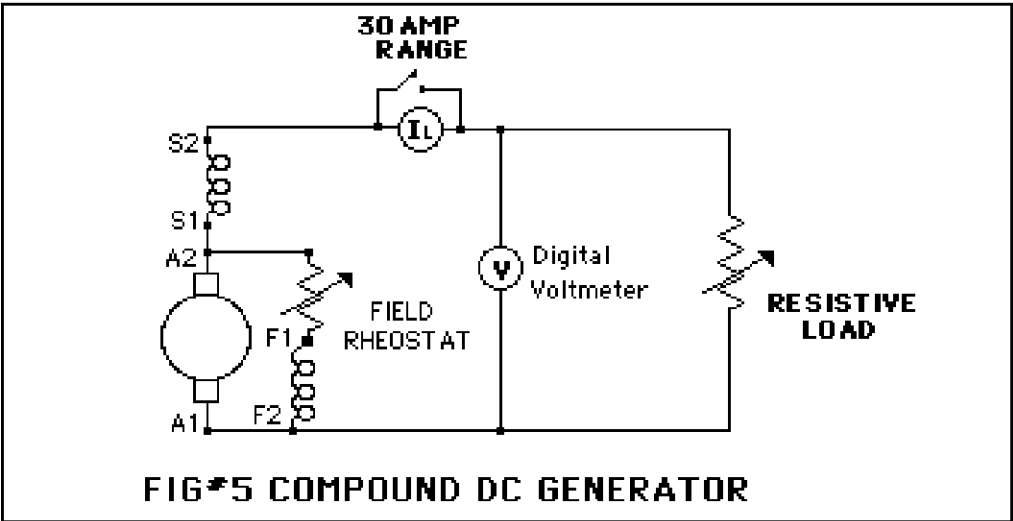
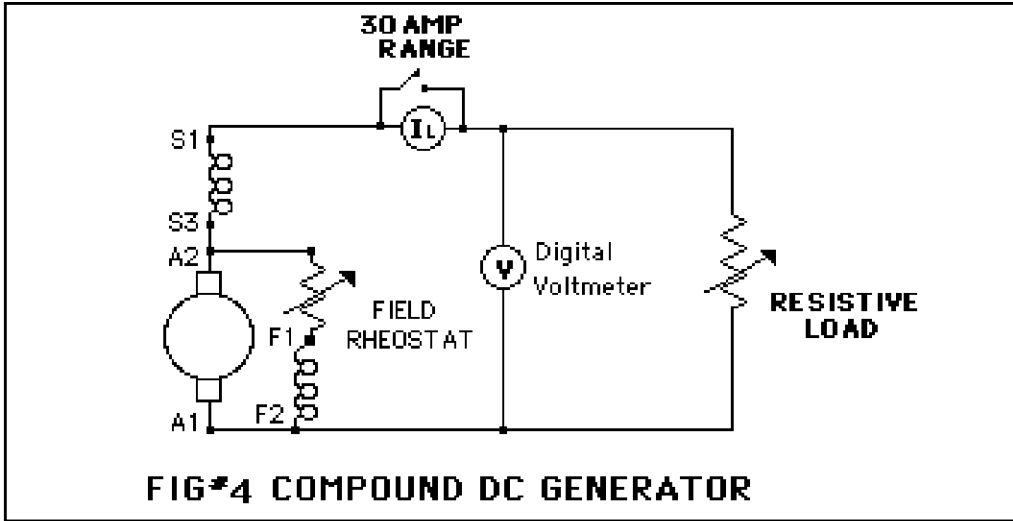
FIGURE #5 DATA

$I_1$																
$V_1$																

$I_1$																
$V_1$																

FIGURE #6 DATA





Equipment for the Lab 8:

