

## **Lab Info. -- SYNCHRONOUS MACHINE EXPERIMENTS**

### MODEL SM-100

### DESCRIPTION

The SM-100 is a three phase, four pole machine consisting of a WYE/Delta stator and a rotor having a DC field winding and a damper winding. It has a three pole circuit breaker and a IND start - SYN RUN switch which are provided in the terminal box.

#### SM-100 MOT and ALT Circuit Breakers

Speed = 1700 RPM No. of Poles = Three

Voltage = 208 V-30 Overload Type = Thermal

Temp = 40<sup>0</sup> C Trip Rating = 2.5 Amp.

#### Alternator Motor

Power = 120 V.A. Horsepower = 1/3 HP

Current = 0.35 Amps Current = 1.7 Amps

Field Excit. = Separate Frequency = 60 Hz

Field Voltage - 0-100 V - DC

## EXPERIMENT NO. 18

### SATURATION CURVE OF AN ALTERNATOR

#### PURPOSE:

To study the relationship between the no-load voltage and the DC field current of a separately-excited alternator.

#### APPARATUS REQUIRED:

1. One SPM-100 Split-Phase Motor
2. One SM-100-3 Synchronous Machine as Three Phase Alternator
3. One 0 to 300 Volt AC Voltmeter
4. One 0 to 1.0 Amp DC Ammeter
5. One 0 to 150 Volt/1 Amp DC Power Supply
6. One 120 Volt AC Power Supply

#### PROCEDURE:

1. Couple the alternator to the Split-Phase Motor (or other suitable prime mover) and make the connections shown in Figure 28.
2. Have the instructor check your connections and then start the motor. Adjust the output of the 150 Volt DC supply from zero to a maximum value of 1 amp field current to zero again. Record in Table 27 the outvoltage for about ten different values of field current for both the ascending and descending values.

Note: Always adjust current in the field in one direction only. Never reduce it and then increase it.

#### SUGGESTION FOR CONCLUSION:

Using the data in Table 27, plot the ascending and descending saturation curves.

#### QUESTIONS:

1. How is voltage generated in an alternator?
2. What is the relationship between the generated frequency, speed and number of poles?

Table 27:

<b>SPEED</b>	<b>2000 ---&gt;</b>						
<b>Armature Volts</b>							
<b>Load Amps</b>							
<b>Field Amps</b>							

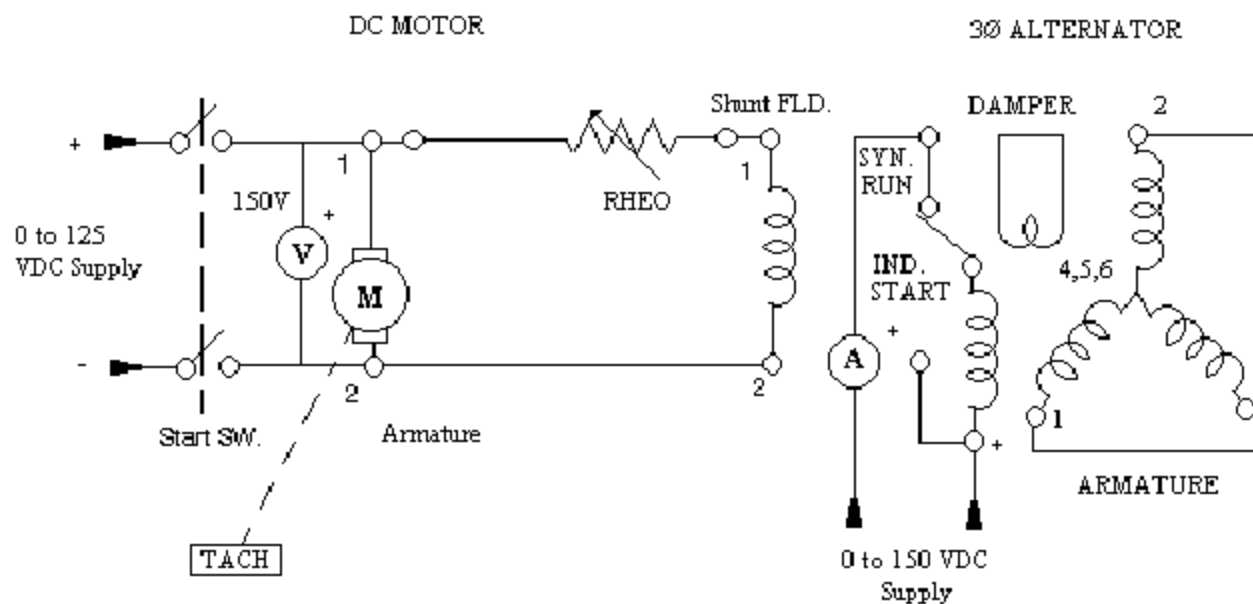


FIGURE 28