EET 2233 Experiment #3

Ideal (?) Single Phase Transformers

In this laboratory we will continue our power circuits explorations and investigate the behavior of the single phase transformer under no load and fully loaded conditions.

Procedure:

1. Locate a Hampden Type II, 1kVA transformer on your instrument cart and place it on your lab bench

2. Place the shorting strips across the top and bottom of the resistor bank placing all the resistances on the load cart in parallel

3. Locate the yellow (120/208) power cable and the 120V single phase power cable on the back of you instrument cart. Using the yellow cable connect the 120/208V 3-phase source from the power pedestal to circuit A on the experiment bench. Connect the 120V 1-phase cable from the receptacle below the blue tubes on the power pedestal to the 120V input on the experiment bench.

4. Lift the (heavy) three phase variable power supply from the load cart and place it next to the circuit A terminals on the left hand side of the experiment bench.

5. Construct the circuit of figure 1.

6. Have your instructor check your circuit.

7. Energize your circuit and record the output voltages that result as the input voltage is increased from 20V to 220V in 20V increments

8. Plot Vp/Vs vs. Vp. How do your experimental turns ratios compare to the name plate data?

9. Construct the circuit of figure 2 and have your instructor check the circuit before energizing it.

10. Carefully adjust the input voltage **and** the resistive load until the output measures 120V and as close to 8.33A as possible.

11. Record output voltage, output current and input current as the load is removed one switch at a time.

12. Plot Is/Ip vs. Is. How does the turns ratio as defined by the currents compare to the name plate data?

13. Also, from the data obtained in procedure 10 plot Vs vs. Is and determine the voltage regulation for your transformer.

14. Construct the circuit of figure 3. The load will be 500Ω power resistor provided by your lab instructor.

15. Increase the variable supply until an input voltage of 150V is achieved. Measure and record the input current.

16. De-energize the circuit and turn off the power pedestal. Dismantle your circuit but before leaving, measure the actual resistance of the 500Ω power resistor with the digital VOM.

17. From the data obtained in procedure 14 deduce an equivalent load that could replace the transformer and power resistor combination. Does the equivalent load conform to with load transformation characteristics of a single phase transformer?

Data

Procedure #6

V_{in}	20V	40V	60V	80V	100V	120V	140V	160V	180V	200V	220V
V_{out}											

Procedure #10

V_{out}											
I_{out}											
I_{in}											

Procedure #14 and #15

V_{in} = _____ I_{in} = _____ $R_{(measured)}$ = _____

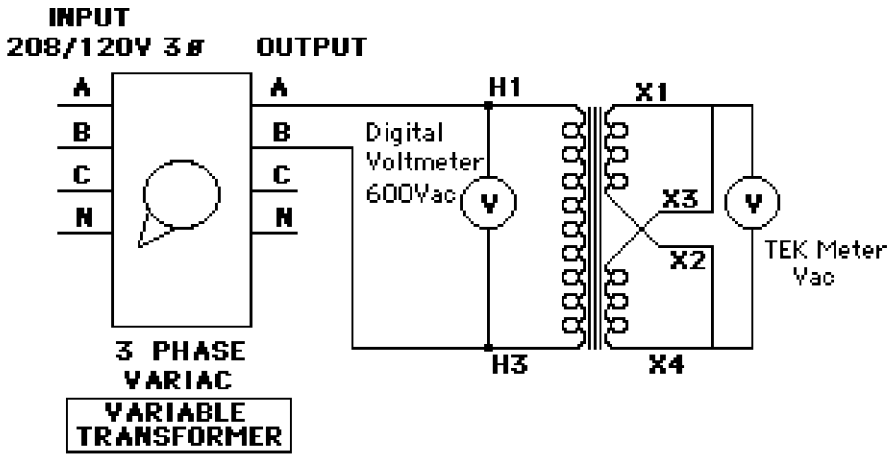

Figure 1

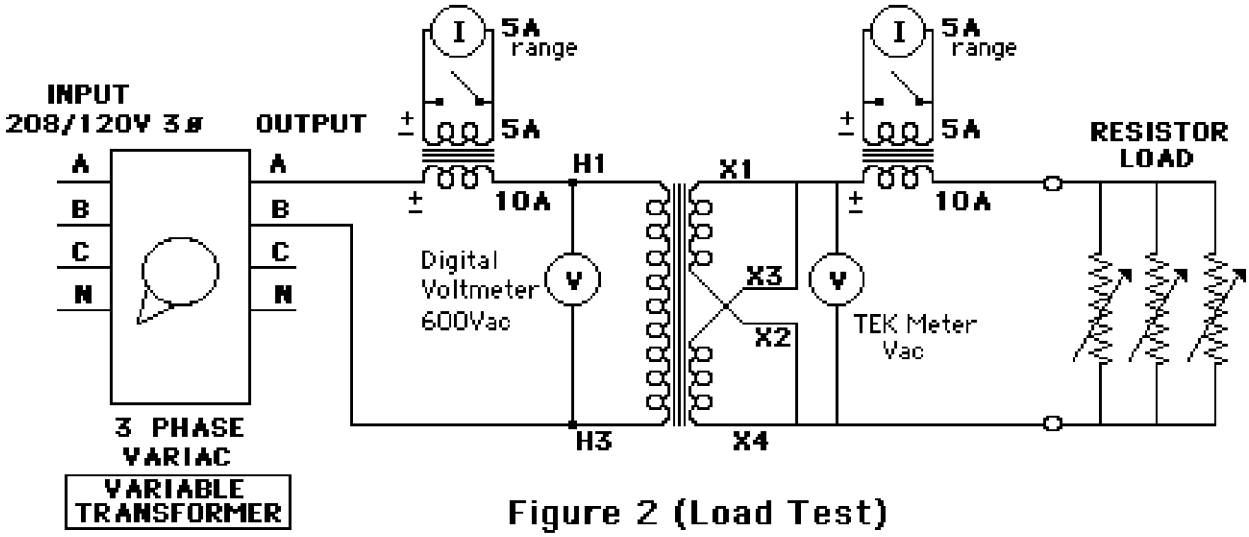

Figure 2 (Load Test)

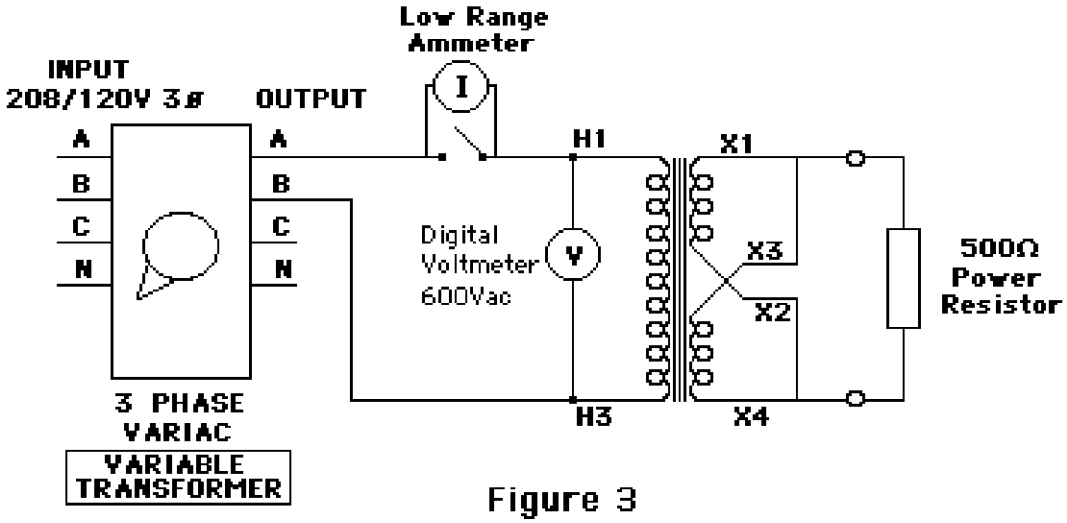

Figure 3

Equipment for the Lab 3: