# Estimate the Secondary Voltage Transformer Lab

**Program:** Electrician Technician

**Course:** EL150 – Commercial Applications

**Objectives:** Under the supervision of your instructor, you should be able to do the following:

- Describe transformer operation.
- Describe the operating characteristics of various types of transformers.
- Connect a control transformer for a given application
- Sketch or physically connect a dual-voltage transformer showing a high primary and a low secondary, including proper bonding

**Lab Equipment:**

- 1 – Control transformer, 480-volt primary, 120-volt secondary
- 1 – 120-volt pigtail with cap (plug)

**Required Tools:**

- 1 – Flat Head Screwdriver
- 1 – Phillips Head Screwdriver
- 1 – Pair of Wire cutters
- 1 – Pair of Wire strippers
- 1 – Digital multimeter

**Materials:** N/A

**Safety (PPE):**

- Safety glasses

**Resources:** N/A

**Required Time:** 60 Minutes

**Shop Maintenance:**

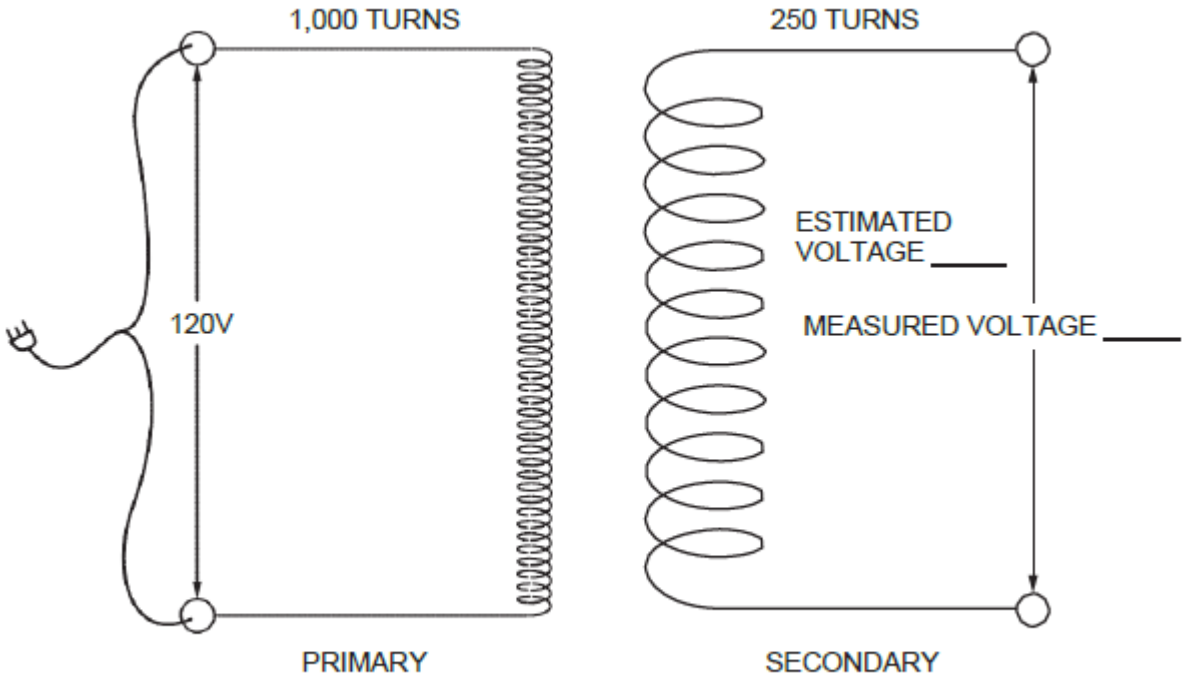
- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are the student's responsibility

**Procedures:**

This performance project requires the trainee to connect and measure the secondary voltage of a 480V/120V (4:1 ratio) control transformer that is connected to a 120-volt supply instead of a 480-volt supply.

1. Verify that no power is connected to the control transformer.
2. Set your digital multimeter to measure ohms and measure the resistance of both windings.
3. The winding with the higher resistance is the primary side and will be connected (not yet!) to the 120-volt supply.
4. The winding with the lower resistance is the secondary side and will not be connected to anything.
5. Notice that the resistance is not directly proportional to the ratio of the windings. The ratio of the windings for this transformer should be 4:1, but the ratio of the two resistance values is greater than 4:1. Many factors such as load, heat, current flow and others affect the resistance ratio.
6. Connect the terminal end of an unplugged 120-volt pigtail to the primary side of the transformer.
7. Estimate the voltage on the secondary side of the transformer, based on the ratio, and write your answer in the space provided on Figure 1.
8. Make sure your safety glasses are in place. Plug the 120-volt pigtail into a standard 120- volt receptacle.
9. Set your digital multimeter to measure AC voltage, put on your voltage-rated gloves, and measure the secondary voltage.
10. Write the actual voltage in the space provided on Figure 1.
11. Have your instructor check your work.
12. De-energize your transformer.

**Figure 1**


1,000 TURNS
250 TURNS
120V
ESTIMATED VOLTAGE ____
MEASURED VOLTAGE ____
PRIMARY
SECONDARY