

PLC121 LAB 1.1: VOLTAGE DIVIDER CIRCUITS WITH RESISTORS

Student Name: _____

Student ID: _____

LAB OUTCOMES:

Upon completion of this lab procedure, the student should be able to:

1. Wire a voltage divider circuit with a switch and two resistors.
2. Calculate and measure the voltage drop across any resistor in a voltage divider circuit.
3. Wire a voltage divider circuit with a switch and three resistors.
4. Calculate and measure the voltage drop across any of the three resistors.
5. Compare the voltage drops in a series circuit with the supply voltage

LAB PROCESS:

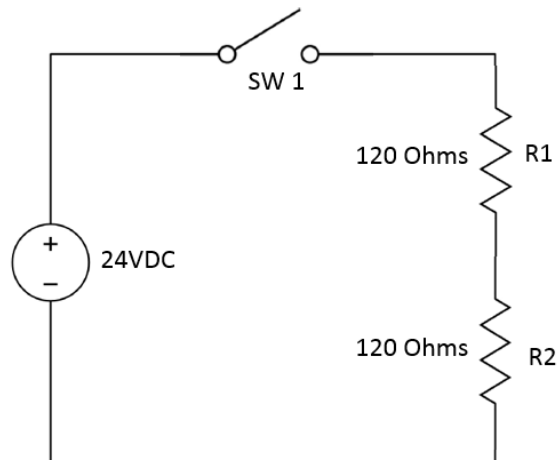
Open the AC/DC Training Unit. Setup the unit on its base, or lay flat on the work table.

Make sure all fault switches are in the 0 position.

Connect the power cord and turn off the power input switch to make sure the unit is not powered.

Part 1

Wire the following circuit on the AC/DC training system:



1. Calculate the resistance of the two 120 Ohm resistors in series.

What is the calculated value? _____

2. Calculate the current flow in the circuit once the switch is closed.

What is the calculated value? _____

3. Calculate the voltage drop across each resistor. What are the calculated values?

VR1 (120 Ohms): _____

VR2 (120 Ohms): _____

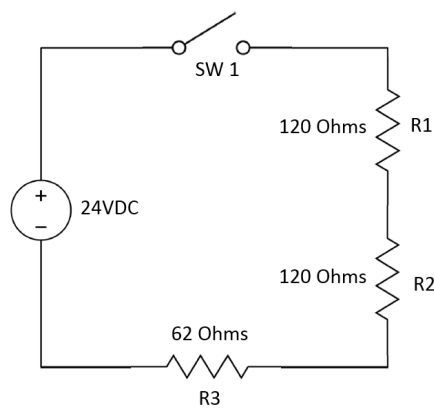
4. Use the DMM as a voltmeter to measure the voltage across each resistor. What are the measured values?

VR1 (120 Ohms): _____

VR2 (120 Ohms): _____

Part 2

Wire the following circuit on the AC/DC training system:



1. Calculate the resistance of the three resistors in series.

What is the calculated value? _____

2. Calculate the current flow in the circuit once the switch is closed.

What is the calculated value? _____

- Calculate the voltage drop across each resistor. What are the calculated values?

VR1 (120 Ohms) = _____

VR2 (120 Ohms) = _____

VR3 (62 Ohms) = _____

- Use the DMM as a voltmeter to measure the voltage drop across each resistor.

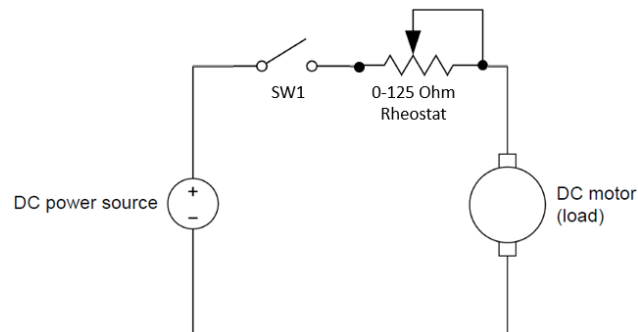
VR1 (120 Ohms) = _____

VR2 (120 Ohms) = _____

VR3 (62 Ohms) = _____

Part 3

Wire the following circuit on the AC/DC training system:



- Power on the training unit.
- Close SW1. The motor should be turning.
- Rotate the knob of the rheostat back and forth. A change of speed should be noticeable.
- Rotate the knob so the motor is running full speed.

Measure the voltage across the DC motor. Measured voltage = _____

Measure the voltage across the rheostat. Measured voltage = _____

- Rotate the rheostat knob so the motor is running the slowest it will allow.

Measure the voltage across the DC motor. Measured voltage = _____

Measure the voltage across the rheostat. Measured voltage = _____

Questions:

1. In Part 1 of this lab, if the switch is open, what is the voltage drop across the following?
 - a. Voltage across Power Supply = _____
 - b. Voltage across the Switch = _____
 - c. Voltage across R1 = _____
 - d. Voltage across R2 = _____
2. In Part 1 of this lab, if the switch is closed, what is the voltage drop across the following?
 - a. Voltage across Power Supply = _____
 - b. Voltage across the Switch = _____
 - c. Voltage across R1 = _____
 - d. Voltage across R2 = _____
3. In Part 2 of this lab, if the switch is closed, what is the voltage drop across the following?
 - a. Voltage across Power Supply = _____
 - b. Voltage across the Switch = _____
 - c. Voltage across R1 = _____
 - d. Voltage across R2 = _____
 - e. Voltage across R3 = _____
4. In Part 3 of this lab, if the switch is closed, what is the voltage measured across the rheostat when the motor was running the slowest? _____

What should the voltage be across the DC motor? _____

The outcomes of this exercise (listed on page 1) specifies the skills that the Student must demonstrate to the Instructor. Once the Instructor is satisfied with the demonstration of Knowledge & Skills by the individual student, they will sign this document (for the student), then enter a 100% into the Hands-On Lab grade in Sakai.

I verify that this student has completed all of the requirements of this Hands-On Assessment:

Student Name: _____

Faculty Signature: _____ Date: _____

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