

PLC122 LAB 1.1: TROUBLESHOOTING I

Student Name: _____

Student ID: _____

LAB OUTCOMES:

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

1. Interpret the operation of basic electrical circuits.
2. Explain the purpose of various devices in an electrical circuit.
3. Insert faults into circuits through manual fault switches on the unit.
4. Test voltages on electrical nodes in a circuit.
5. Test the continuity of potentially faulty input and output devices.
6. Troubleshoot electrical circuits that have faults.
7. Trace down where the fault switches are wired in a circuit.

Lab Process:

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

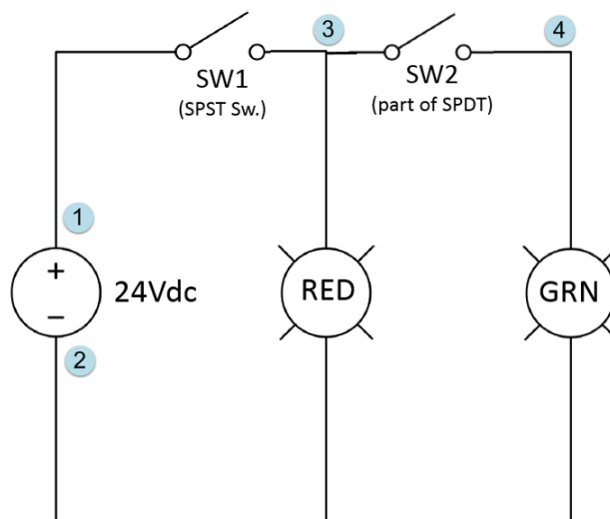
Make sure all fault switches are in the 0 position.

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

Change the color covers (globes) on the pilot lights to have the following sequence: 1st indicator light is green, 2nd indicator light is yellow, and the 3rd indicator light is red.

Part 1

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

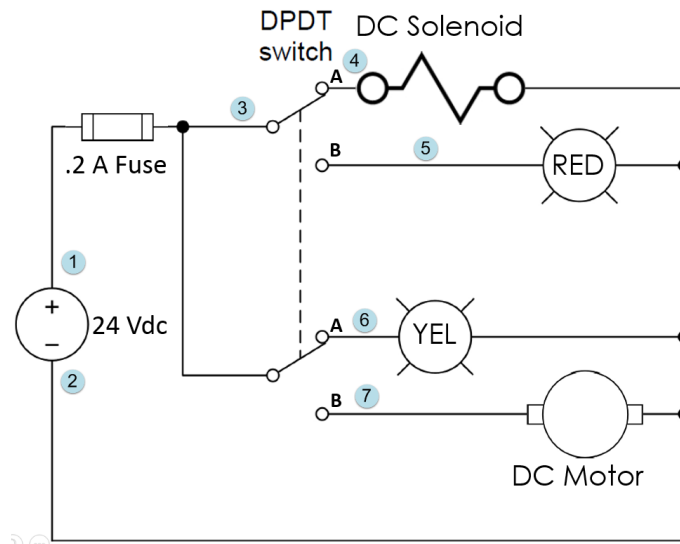


1. Power on the "Power Input" switch (lower right) to power the training unit.
2. Turn SW1 on, and SW2 off. What indicator light(s) are on?
3. What are the voltages between the following electrical nodes:
 - a. 1 to 2 = _____
 - b. 3 to 2 = _____
 - c. 4 to 2 = _____
 - d. 3 to 4 = _____
4. Turn SW1 and SW2 both on. What indicator light(s) are on?
5. What are the voltages between the following electrical nodes?
 - a. 1 to 2 = _____
 - b. 3 to 2 = _____
 - c. 4 to 2 = _____
6. Turn on **Fault switch #3**. What effect does this have on the circuit?
7. Remove power from the circuit, and check the affected components with an ohmmeter to determine how Fault switch #3 affected the circuit.
8. What component does Fault switch #3 affect?

9. Power down the training unit. Set all Fault switches back to the zero position, and disconnect the circuit.

Part 2

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

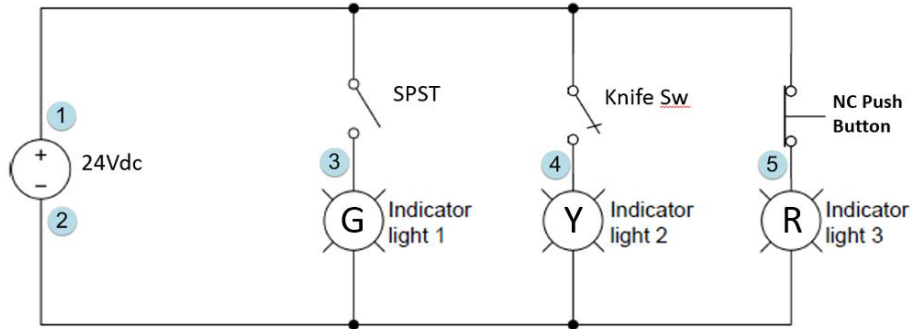


1. Power on the "Power Input" switch (lower right) to power the training unit.
2. Make sure all the Fault switches at the bottom of the trainer is in the off position.
3. Toggle the DPDT switch between the up and down position.
 - a. When the DPDT switch bat is up, what output(s) are on?
 - b. When the DPDT switch bat is down, which output(s) are on?
4. Flip the DPDT switch bat to the up position, and measure the voltages between the following electrical nodes:
 - a. 2 to 3 = _____
 - b. 2 to 4 = _____
 - c. 2 to 5 = _____

- d. 2 to 6 = _____
 - e. 2 to 7 = _____
5. Flip the DPDT switch bat to the down position, and measure the voltages between the following electrical nodes:
- a. 2 to 3 = _____
 - b. 2 to 4 = _____
 - c. 2 to 5 = _____
 - d. 2 to 6 = _____
 - e. 2 to 7 = _____
6. Turn on **Fault switch #2**. How does this affect the operation of the circuit?
7. Is the lower portion or the upper portion of the DPDT switch affected?
8. Remove power from the circuit, and test the continuity of the DPDT switch.
9. Where is Fault switch #2 wired into the circuit?
10. Restore the circuit back to normal operation.
11. Turn off the power to the training unit. Reset the fault switches back to their off state, and unwire the circuit.

Part 3

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



1. Set all the fault switches to the “0” (or off) position.
2. Power on the “Power Input” switch (lower right) to power the training unit.
3. Set the switches to the following states:
SPST switch is open, Knife switch is open, NC PB is not actuated
 - a. Are any indicator lights on? Explain!
4. What are the voltages between the following electrical nodes:
 - a. 1 to 2 = _____
 - b. 3 to 2 = _____
 - c. 4 to 2 = _____
 - d. 5 to 2 = _____
5. Close the SPST switch.
 - a. Does the Green Indicator light come on?
 - b. What is the voltage between wires 3 & 2 = _____
 - c. What is the voltage between wires 1 & 3 = _____
6. Close the Knife switch.
 - a. Does the Yellow Indicator light come on?
 - b. What is the voltage between nodes 4 & 2 = _____

- c. What is the voltage between nodes 1 & 4 = _____
7. Power off the AC/DC training unit. Toggle all the fault switches to the “1” (or On) position. Power on the AC/DC training unit.
 8. Does anything change with the Indicator lights?
 9. Toggle each of the fault switches individually to determine which one created a fault.
 10. Which of the Fault switches created the fault?
 11. Power off the training unit, disconnect the wires to the indicator light and the switch controlling it.
 12. Use the Ohmmeter to determine which of the two devices, switch or pilot light that the fault switch affects.
 13. Turn off all the fault switches to take the circuit back to normal operation.
 14. Power off the “Power Input” switch to power off the training unit

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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