

PLC120 LAB 2.2: BASIC SERIES & PARALLEL SWITCH CIRCUITS

Student Name: _____

Student ID: _____

LAB OUTCOMES:

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

1. Connect a circuit with series and parallel switches.
2. Measure voltages at electrical nodes using a DMM.
3. Measure the voltage across a powered load using a DMM.
4. Connect a 3-way switch circuit using SPDT switches.

LAB PROCESS:

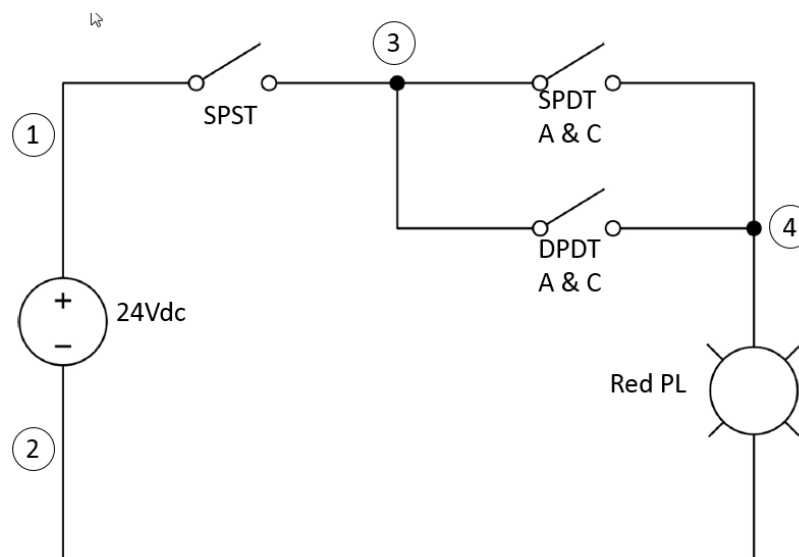
Open the AC/DC Training Unit. Setup the unit on its base, or lay flat on the work table.

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.

Circuit 1

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



Notice in this circuit, the SPST, one pole (sw) of the SPDT, and one pole (sw) of the DPDT switches are used in a series/parallel configuration.

Also notice that each electrical node has a number (circled) assigned to it. A node is defined as a point in the circuit that will always be at the same potential (voltage). A switch or load could change that potential (voltage), so a different node number is assigned.

1. Power on the "Power Input" switch (lower right) to power the training unit.
2. Make sure all switches are in their open state.

What voltage is measured between nodes 1 & 2? _____

What voltage is measured between nodes 3 & 2? _____

What voltage is measured between nodes 4 & 2? _____

3. Close the SPST switch.

What voltage is measured between nodes 1 & 2? _____

What voltage is measured between nodes 3 & 2? _____

What voltage is measured between nodes 4 & 2? _____

4. Close the SPDT switch. Does the Red PL come on?

What voltage is measured between nodes 1 & 2? _____

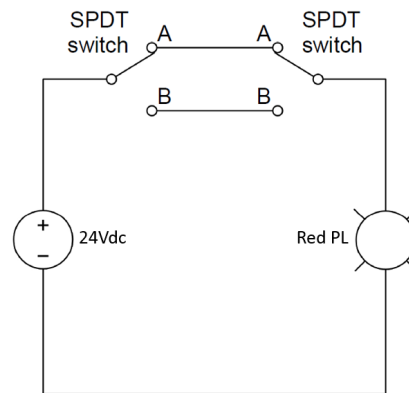
What voltage is measured between nodes 3 & 2? _____

What voltage is measured between nodes 4 & 2? _____

5. Turn off the "Power Input" switch to the training unit.

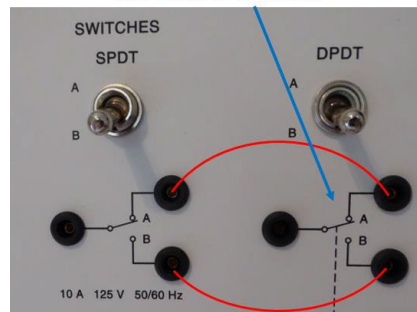
Circuit 2

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



In this circuit use one half (one pole) of the DPDT switch, as shown in the following illustration. A SPDT switch works like a 3-way switch in a residential lighting circuit. Two 3-way switches are used to turn a light on from two different doorways in a room. This circuit should also work this way. Either switch should be able to turn the PL on or off.

For this circuit, use the SPDT switch and one half of the DPDT switch.



1. Power on the "Power Input" switch (lower right) to power the training unit. Does the Red PL turn on?
2. Change the position of the SPDT switch. Does the light change state?
3. Change the position of the DPDT switch. Does the light change state?
4. Go between the two switches, toggling the switches. If toggling a switch changes the on/off state of the PL, toggling the other switch will change the PL to the previous state.

Questions

1. In the Part 1 circuit, if the SPST switch is closed, what voltage will be measured between nodes 2 & 3?

2. In the Part 1 circuit, is the SPST switch is closed, and the SPDT switch is closed, what voltage will be measured between nodes 2 & 4?
3. True or False: In the Part 2 circuit, either switch will change the state of the pilot light.
4. True or False: A SPDT switch works the same as a 3-way switch in a residential lighting circuit.

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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