

# PLC124 LAB 3.2: WIRING AND TROUBLESHOOTING A DUAL START/STOP CONTROL CIRCUIT

Student Name: \_\_\_\_\_

Student ID: \_\_\_\_\_

## LAB OUTCOMES:

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

1. Identify all parts of an Allen Bradley IEC motor starter
2. Measure the continuity of all the switches mounted behind the pushbutton heads
3. Measure the resistance of the coil and contacts of an Allen Bradley IEC Starter
4. Wire a 120VAC start/stop/jog, 3-wire control circuit with a motor starter
5. Wire a circuit using the proper wire colors and wire numbers.
6. Troubleshoot a faulty start/stop/jog control circuit

## LAB PROCESS:

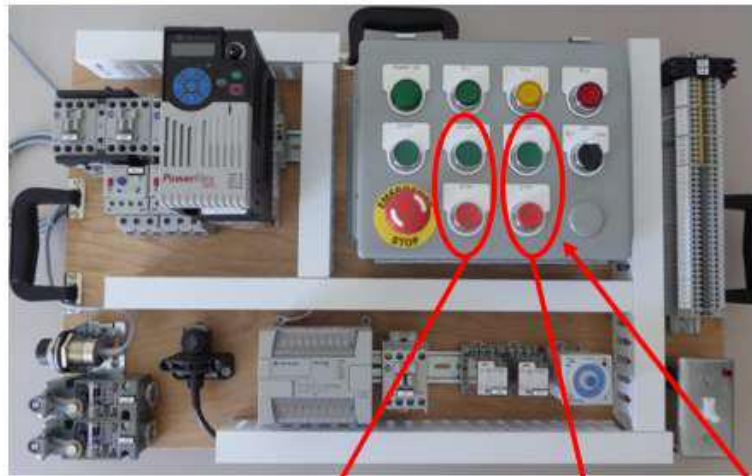
Set up NSCC 120VAC wiring board. Setup the unit on its base, or lay flat on the work table.

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

### Part 1:

1. Make sure power is removed from the wiring board. Identify the IEC motor starter that will be used in this lab, as well as all the pushbutton components. This lab will involve wiring only the control circuit.

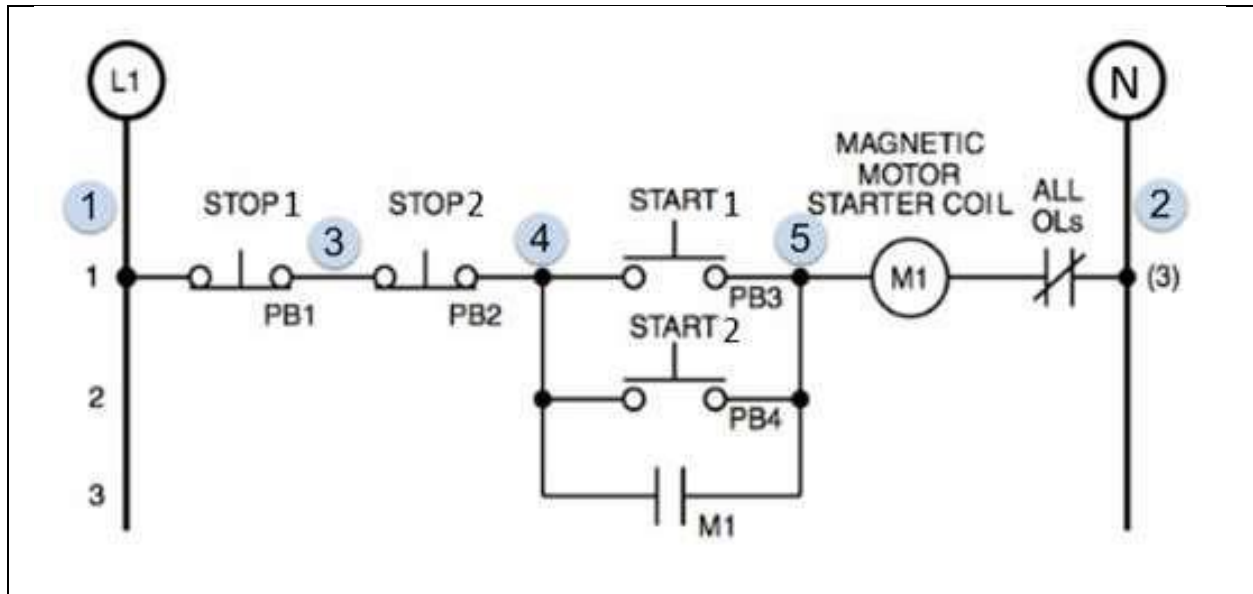
- Wire the following circuit on the NSCC wiring board. Use the wire numbers and red MTW wire to construct the following circuit. Apply 120VAC power to the board.



A dual stop/start circuit will allow an operator to start or stop a machine/motor from two locations.



Use these four Pushbuttons on the wiring board to simulate two pushbutton stations



- Measure the voltage between electrical nodes 1 & 2 on the terminal strip.

What is the measured value? \_\_\_\_\_

4. With the motor starter off, what is the voltage that is measure between the following electrical nodes:
  - a. Voltage between 3 & 2? \_\_\_\_\_
  - b. Voltage between 4 & 2? \_\_\_\_\_
  - c. Voltage between 5 & 2? \_\_\_\_\_
  - d. Voltage between 4 & 5? \_\_\_\_\_
5. Press the startSTART1 pushbutton and release. Does the motor starter pull in and stay pulled in?
6. With the motor starter on, what is the voltage that is measured between the following electrical nodes:
  - a. Voltage between 3 & 2? \_\_\_\_\_
  - b. Voltage between 4 & 2? \_\_\_\_\_
  - c. Voltage between 5 & 2? \_\_\_\_\_
  - d. Voltage between 4 & 5? \_\_\_\_\_
7. Press and release either stop pushbutton to shut off the motor starter. Manually push in the contact block of the motor starter. The electrical circuit should engage.  
  
Does it remain pulled in when release the contact block? \_\_\_\_\_
8. Go back and forth between either start pushbutton to turn on, and either stop pushbutton to shut off. Try all the pushbuttons to verify that either start will pull the starter in, and either stop pushbutton will drop it out.

**Questions:**

1. If Stop pushbuttons are added to this circuit, how would they be wired with the other stop buttons? (Series or Parallel)
  
2. If Start pushbuttons are added to this circuit, how would they be wired with the other start buttons (Series or Parallel)?
  
3. If the user manually engages the motor starter, without pressing a pushbutton, should the coil stay energized?

Explain.

4. If the motor starter is pulled in, in this circuit, what could cause the motor starter to drop out if no one hits a stop button.

*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: \_\_\_\_\_

**DOL DISCLAIMER:**

This product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).