

Introduction:

This experiment introduces several of the devices that are commonly utilized within simple motor-control circuits.

Procedure:

WARNING – Switch OFF the power supply before making modifications to any circuit or if the controller appears to be operating in an uncontrolled/unsafe manner.

1. Construct the circuit shown below in Figure 1.1:

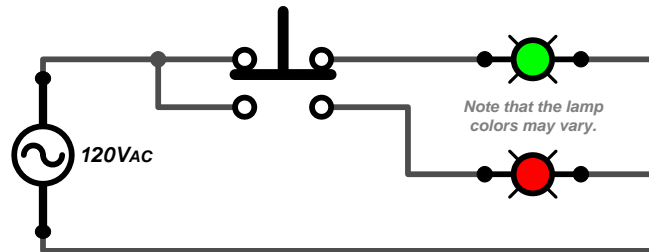


Figure 1.1a – Pushbutton Operation (Schematic Diagram)

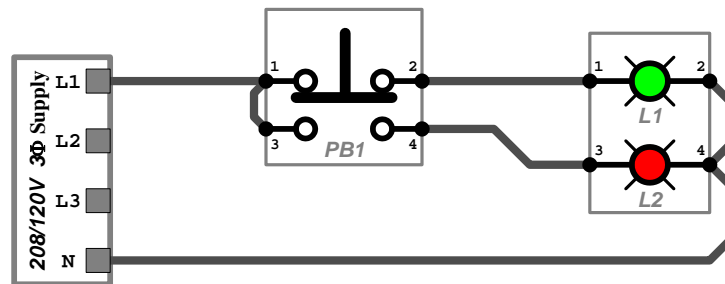


Figure 1.1b – Pushbutton Operation (Wiring Diagram)

2. Verify proper operation of the pushbutton and determine the order in which the NO and NC contacts change position when the button is pressed and by slowly pressing and then releasing the pushbutton while watching the indicator lamps.

a) State the order in which the contacts actuate when the button is pressed:

b) State the order in which the contacts drop-out (return to normal) when the button is released:

3. Analyze the circuit shown in Figure 1.2 in order to predict its operation.

State the operation of the circuit:

4. Construct the motor control circuit shown below in Figure 1.2:

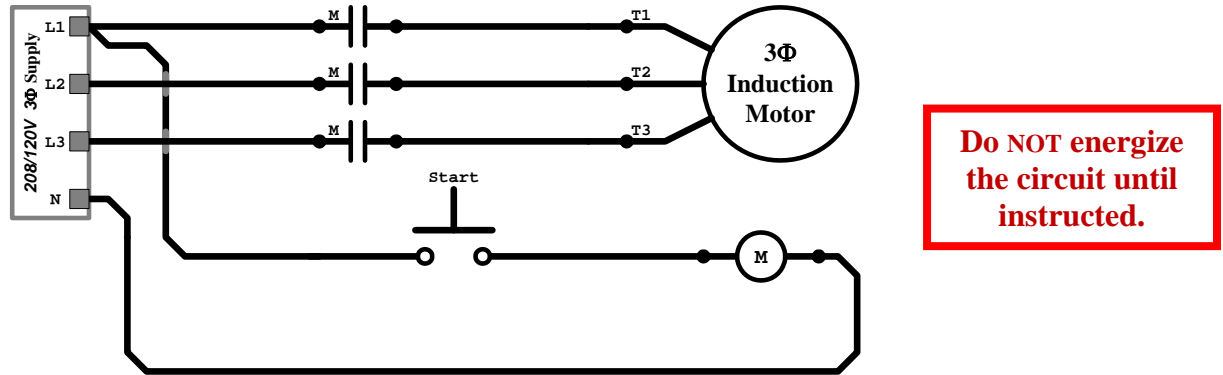


Figure 1.2a – Initial Motor Control Circuit (Schematic Diagram)

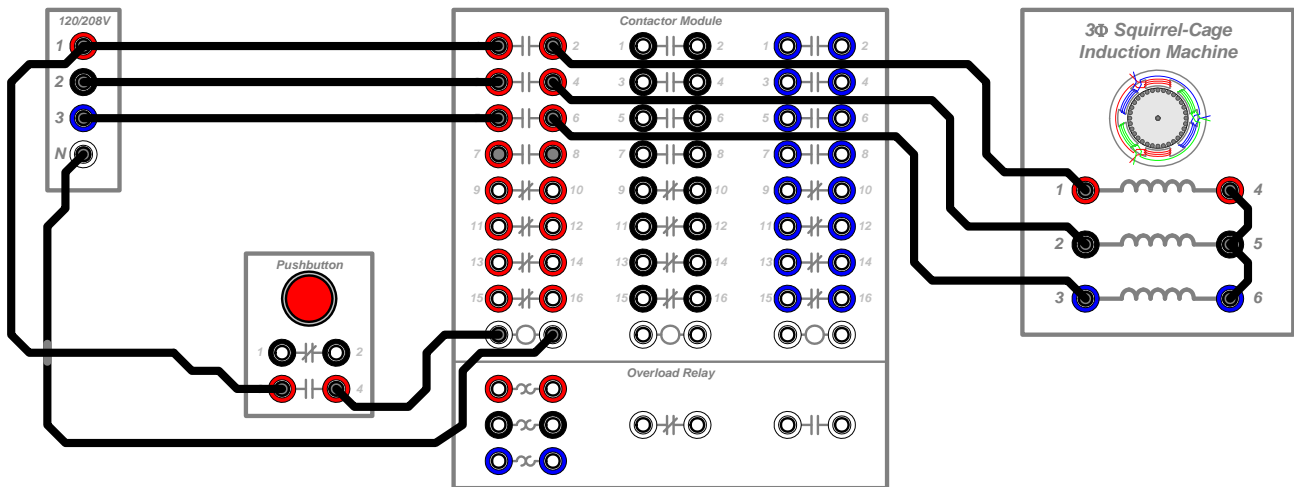
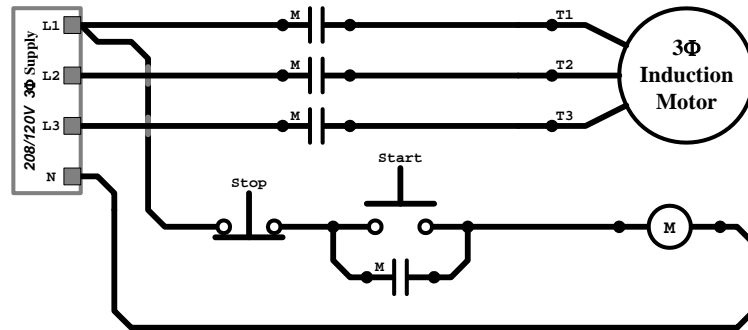


Figure 1.2b – Initial Motor Control Circuit (Wiring Diagram)

5. When instructed, verify the operation of the motor control circuit shown in Figure 1.2.

Note – do NOT repeatedly press and release the pushbutton in a short amount of time as doing such may cause excessive heating of the motor due to the large currents drawn into the motor during startup.

6. Modify the previously-constructed motor control circuit to include a “Stop” button and a “hold-in” contact in order to form a basic “stop-start” motor controller as shown below in Figure 1.3:



Do NOT energize the circuit until instructed.

Figure 1.3a – Basic “Start-Stop” Motor Controller (Schematic Diagram)

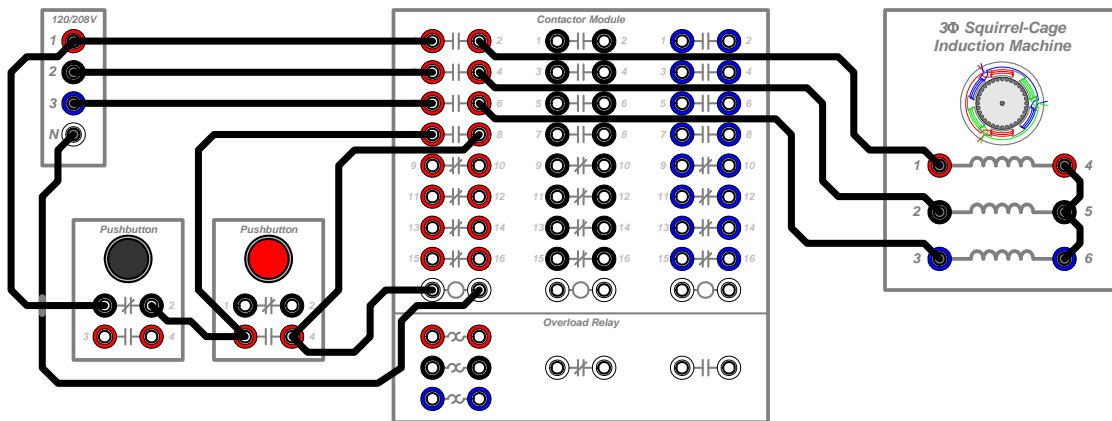
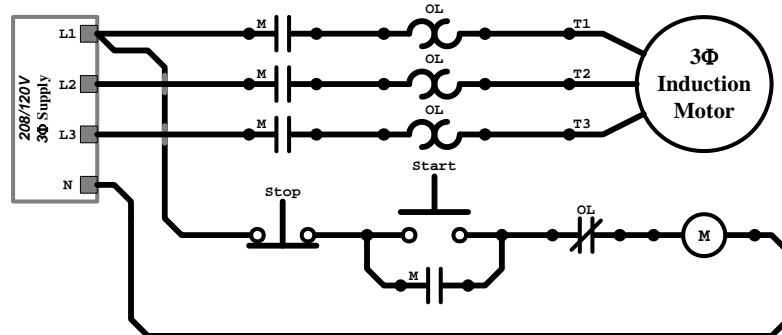


Figure 1.3b – Basic “Start-Stop” Motor Controller (Wiring Diagram)

7. When instructed, verify the operation of the basic Stop-Start Motor Controller.

State the operation of the circuit:

8. Add Overload Protection into the basic “start-stop” controller as shown below in Figure 1.4:



Do NOT energize the circuit.

Figure 1.4 – “Start-Stop” Motor Controller w/ Overload Protection (Schematic Diagram)

9. Your instructor will utilize the dynamometer to overload the motor in order to experimentally verify the operation of the Overload Relay.