Title: **Forward-Reverse using 3 Position Switch for a 1P Mtr** Hands On: 3

Course: Introduction to Automation Unit: Introduction of PLC CLO: 2, 4

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Station \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall demonstrate their knowledge of a forward/reverse motor control circuit.
2. Student shall convey their knowledge of how to create forward/reverse motor circuit using a three-position selector switch.
3. Student shall construct this circuit in a single-phase motor control scenario.

**Assessment**

Students shall demonstrate a comprehension of the objectives listed above by scoring a minimum of 75% on this Hands On. Grading shall be based on the Introduction to PLC rubric.

**Instructions**

Design a forward/reverse motor control circuit using two momentary pushbuttons and a three-position selector switch. The circuit will also utilize a latching mushroom head pushbutton to act as an “ESTOP” as well. If the ESTOP is pressed, the motor shall stop and not be able to be restarted in either direction until the “ESTOP” is disengaged. One pushbutton shall be traditional stop. When this button is pressed, the motor shall stop running regardless of direction. The second pushbutton shall function as a “start” button. When this button is pressed, the motor shall start and run in the commanded direction. even if the button is no longer pressed. The three-position selector switch shall function as a directional selector. When the switch is in the “A” position, the motor shall run counter-clockwise (CCW) when the start button is pressed. When the switch is in the “B” position, the motor shall run clockwise (CW) when the start button is pressed. If the motor is running and the selector switch is changed, the motor shall stop. Reversing a single-phase motor has an inherent issue in that it must be stopped long enough for the start switch to re-engage before a direction change will take hold. Ensure the design forces the operator to wait 7 seconds anytime the motor relay is de-energized before pressing “start” energizes the motor relay again. Whenever the motor is running in the forward (CCW) direction, the green light shall illuminate. Whenever the motor is running in the reverse (CW) direction, the blue light shall illuminate. A yellow light shall indicate to the operator that the motor has been commanded to stop and is within “stopping” time-delay period. Whenever the motor is not running, the red light shall illuminate. No two lights shall be on at the same time.

You **must** follow this sequence;

Design a hand drawing of your proposed circuit. Review with instructor. Initials \_\_\_\_\_\_

After review, then you may get out **a computer assigned to you for the test**.

Compose your program and review with your instructor **before** getting your panel. \_\_\_\_

Download and test logic **without** motor connection. Review with instructor \_\_\_\_\_

Wire motor to circuit. Have instructor review wiring **before** energizing motor. \_\_\_\_\_

Final test of complete circuit. \_\_\_\_\_

Failure to follow the above sequence shall result in a 10-25 point deduction depending on severity.

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| Input | Description | Output | Desc | CR1 8-Pin Relay | CR2 11-Pin Relay |
| I/0 | ESTOP | O/0 | Green |  |  |
| I/1 | 3P SS, Position A | O/1 | Yellow |
| I/2 | 3P SS, Position B | O/2 | Red |
| I/3 | 2P SS, Pos. A =ON | O/3 | Blue |
| I/4 | PB1, NC | O/4 | CR1 Coil |
| I/5 | PB2, NO | O/5 | CR2 Coil |
| I/6 | PB3, NO |  |  |
| I/7 | CR1 NO (Pins 1 & 3) |  |  |
| I/8 | CR2 NO (Pins 1 & 3) |  |  |
| I/9 |  |  |  |

