Title: **Forward-Reverse using 3 Position Switch for a 1P Mtr** Job: 12

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

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade \_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Objectives**

1. Student shall reinforce their knowledge of a forward/reverse motor control circuit.
2. Student shall develop a knowledge of how to create forward/reverse motor circuit using a three-position selector switch.
3. Student shall apply 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 shop job. Grading shall be based on the Introduction to PLC rubric.

**Devices**

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| Inputs | | |
| *Device* | *Description* | *Symbol* |
| NC Mushroom Head Pushbutton (ESTOP) | Emergency Stop | ESTOP |
| Three-position Selector Switch | Direction: Forward-Off-Reverse | DIRECTION |
| NC Pushbutton (PB1) | Stop Motor | STOP |
| NO Pushbutton (PB2) | Start Motor | START |
| Outputs | | |
| *Device* | *Description* | *Symbol* |
| Green Pilot Light | Motor Running | FORWARD |
| Red Pilot Light | Motor Stopped | STOPPED |
| Blue Pilot Light | Motor Jogging | REVERSE |
| 8-Pin, 24VDC Relay | Motor Control Relay | CR1 |
| 11-Pin, 24VDC Relay | Direction Control Relay | CR2 |
| Reversible, 120VAC Motor | Reversible Motor | M1 |

**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. 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. Whenever the motor is not running, the red light shall illuminate. No two lights shall be on at the same time. Use the space on the opposite side of this page to design the circuit. Once complete, review the design with the instructor. After obtaining approval, configure the program in RSLogix 500. Have the instructor review the program before downloading. Once the program has been reviewed, verify and download.

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1. Discuss the hand drawing with the instructor. Instructor Initials \_\_\_\_\_\_\_
2. Have instructor review the program before downloading. Initials \_\_\_\_\_\_\_
3. Instructor witnesses final working circuit. Initials \_\_\_\_\_\_\_

**Part II** Reversing a single-phase motor has one inherent issue in that it must be stopped long enough for the start switch to re-engage before a direction change will take hold. Amend the above design to force the operator to wait for the start switch to re-engage before pressing “start” energizes the motor relay. A yellow light shall indicate to the operator that the motor has been commanded to stop and is within “stopping” time-delay sequence. Again, no two lights shall be on at the same time.

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Discussed design \_\_\_\_\_\_\_, Test logic without motor \_\_\_\_\_\_\_, With motor \_\_\_\_\_\_\_

