Title: **Fwd/Rev using Three Pushbuttons for a Three-Phase Mtr** Job: 23

Course: Introduction to Automation Unit: Introduction of PLC CLO: 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 counters and their use.
3. Student shall apply this circuit in a three-phase motor control scenario.

**Assessment**

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

**Devices**

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| Inputs | | |
| *Device* | *Description* | *Symbol* |
| NC Mushroom Head PB (ESTOP) | Emergency Stop | ESTOP |
| Two-position Selector Switch | Counter Reset | RESET |
| NC Pushbutton (PB1) | Stop Motor | STOP |
| NO Pushbutton (PB2) | Start Forward | FWD |
| NO Pushbutton (PB3) | Start Reverse | REV |
| NO Contacts (MS-F-AUX) | Motor Forward Status | MSF\_STAT |
| NO Contacts (MS-R-AUX) | Motor Reverse Status | MSR\_STAT |
| NO Contacts (MS-OL) | Motor Overload Contacts | MS\_OL |
| Outputs | | |
| *Device* | *Description* | *Symbol* |
| Green Pilot Light | Motor Running Forward | FORWARD |
| Red Pilot Light | Motor Stopped | STOPPED |
| Yellow Pilot Light | Motor Overload | OVERLOAD |
| Blue Pilot Light | Motor Running Reverse | REVERSE |
| 24VDC Three-Phase Motor Starter | Forward Motor Contactor | MSF |
| 24VDC Three-Phase Motor Contactor | Reverse Motor Contactor | MSR |

**Instructions**

Design a forward/reverse motor control circuit using the devices listed above One pushbutton shall be a “forward” button, and the other a “reverse” button. “Forward” is defined by the motor rotating counter-clockwise (CCW). “Reverse” is defined by the motor to rotating clockwise (CW). If the motor is running and the operator wants to change direction, the “stop” pushbutton shall be pressed. The operator may then press the opposite direction’s pushbutton but the circuit shall not re-engage the motor for eight seconds. Once the timer delay is complete, the motor shall automatically start in the newly commanded direction. The operator should not have to wait for the timer to complete and then press the desired direction. If the operator pressed the “stop” pushbutton and then commanded the motor to rotate in the same direction as before, no time delay is required. Additionally, the program shall keep track of the number of starts in the forward direction and the number of starts in the reverse direction. The counts shall be resettable by the use of the two-position selector switch. The green light shall indicate “forward”, the blue light shall indicate “reverse”, the red light shall indicate “stopped”. If the motor was stopped but is still within the motor wait period, the red light shall flash. If period has expired, the red light shall be on solid. If an overload occurs, the yellow light shall illuminate. During overload, it is permissible for both the yellow and red lights to be on simultaneously. Once complete, review the design with the instructor.

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