Title: **Fwd/Rev using 1 Pushbutton and a SS for a Three-Phase Mtr** Job: 24

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

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

**Objectives**

1. Student shall reinforce their knowledge of a forward/reverse motor control circuit.
2. Student shall develop a knowledge of a one-shot and the PLC scan sequence.
3. Student shall display their knowledge of decimal to binary number conversion.
4. 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 of PLC rubric.

**Devices**

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| Inputs | | |
| *Device* | *Description* | *Symbol* |
| NC Mushroom Head PB (ESTOP) | Emergency Stop | ESTOP |
| Three-position Selector Switch | Direction: Forward or Reverse | FWD, REV |
| NO Pushbutton (PB2) | Start/Stop Motor | START\_STOP |
| NO Pushbutton (PB3) | Reset Start Counters | RESET |
| NO Contacts (MS-F-AUX) | Motor Starter Status | MSF\_STAT |
| NO Contacts (MS-R-AUX) | Motor Starter 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 | MS\_F |
| 24VDC Three-Phase Motor Contactor | Reverse Motor Contactor | MS\_R |

**Instructions**

Design a forward/reverse motor control circuit using the devices listed above. The one momentary pushbutton shall be used to both start and stop the motor. The direction change shall be determined by the three-position selector switch. If the motor is running and the operator changes direction, the circuit shall not re-engage the motor in the opposite direction 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 start pushbutton. If the operator presses stop, the motor then restarts the motor without a direction change, 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 using the second momentary pushbutton. The green light shall indicate forward, the blue light shall indicate reverse, the red light shall indicate stopped. 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. If the motor is in the direction change time period, the new direction’s light should flash until the time has expired. When expired, that direction’s light shall remain on solid while the motor is running in that direction.

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