Title: **Fwd-Rev-Jog using 2 PBs & 2 SS for a 3P Motor** Hands On: 5

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

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

**Objectives**

1. Student shall demonstrate their knowledge of a Fwd/Rev/Jog motor control circuit.
2. Student shall convey their knowledge of how to create Fwd/Rev/Jog motor circuit using two pushbuttons with both two-position and three position selector switches.
3. Student shall construct 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 Hands On. Grading shall be based on the Introduction to PLC rubric.

**Instructions**

Design a forward/reverse/jog motor control circuit using two momentary pushbuttons, a two-position selector switch and a three-position selector switch. The circuit will also utilize a latching mushroom head pushbutton to act as an “ESTOP”. One pushbutton shall perform a “stop” function. 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 in the commanded direction. If the two-position selector switch is in the “run” position, when the “start” button is press the motor shall continue to run even if the button is no longer pressed. If the two-position selector switch is in the “jog” position, when the “start” button is press the motor shall only run while the button is 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 or jog button is pressed. When the switch is in the “B” position, the motor shall run clockwise (CW) when the start or jog button is pressed. If the motor is running and the selector switch is changed, the motor shall stop. Reversing any motor immediately can damage mechanical equipment. The design shall include protection logic through the use of a time delay. Ensure the design includes a protection period that forces the operator to wait 7 seconds anytime the motor is **within the protection period AND a direction change is commanded**. Once the motor has been off for the duration of the protection period, the motor may be started in either direction immediately. Whenever the motor is running in forward, the green light shall illuminate. Whenever the motor is running in reverse direction, the blue light shall illuminate. The yellow shall indicate an overload condition. Whenever the motor is not running, the red light shall illuminate. If the direction has been changed while the motor is running and the circuit is within the protection period, the red light shall flash. Once the protection period expires, the red light shall be light solid. A motor will be wired to the circuit. You **must** follow the following 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 \_\_\_\_\_

Final test with the three-phase motor. Instructor Initials \_\_\_\_\_

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 | Three-Phase Motor Starters |
| 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 | FWD Coil |
| I/5 | PB2, NO | O/5 | REV Coil |
| I/6 | PB3, NO |  |  |
| I/7 | Forward NO Contacts |  |  |
| I/8 | Overload NC Contacts |  |  |
| I/9 | Reverse NO Contacts |  |  |

