Title: **Fwd-Rev using a Selector Switch for 1P Motor** Hands-On: 4

Course: Intro to Automation Unit: Manual Motor Control CLO: 1, 2

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

**Objectives**

1. Student shall demonstrate how to change directional rotation of a single-phase motor.
2. Student shall define the function of start windings within a single-phase motor.
3. Student shall explain the purpose for a start switch within a single-phase motor.

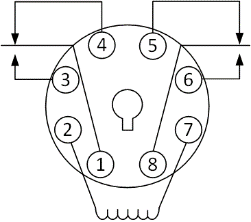
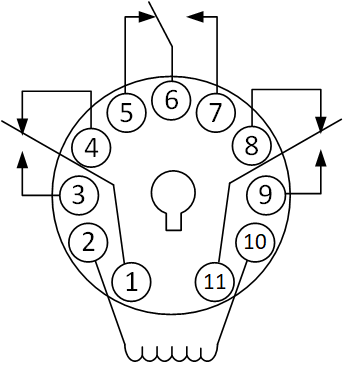
**Assessment**

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 Manual Motor Control rubric.

**Devices**

|  |  |  |
| --- | --- | --- |
| Inputs | | |
| *Device* | *Description* | *Symbol* |
| Three-position Selector Switch | Direction, Forward-Off-Reverse | DIRECTION |
| Normally Closed Pushbutton | Stop Motor | STOP |
| Normally Open Pushbutton | Start Motor | START |
| Outputs | | |
| *Device* | *Description* | *Symbol* |
| Green Pilot Light | Motor Running | RUNNING |
| Red Pilot Light | Motor Stopped | STOPPED |
| Blue Pilot Light | Reverse Indication | REVERSE |
| Eleven-Pin Relay | Direction Control | DIR |
| Eight-Pin Relay | Motor Control | CR3 |
| 120VAC Motor | Reversible ½HP AC Motor | M3 |

**Instructions**

Design a forward/reverse motor control circuit using the devices listed above. When the START button is pressed, the motor shall start and continue to run even if the START button is no longer pressed. If the STOP button is pressed, the motor shall stop. The selector switch shall determine if the motor is to rotate “forward” (CCW) or “reverse” (CW). If the motor is running and the selector switch is changed, the motor shall stop running. If the selector switch is in the OFF position, the motor cannot be started. If a direction is selected, the operator shall have to press the START button to engage the motor in the newly selected direction. While the motor is running, the green light shall illuminate, and the red light shall be off. When the motor is not running, the green light shall be off, and the red light shall illuminate. If the reverse option is selected, the blue light shall be illuminated only when the motor is running. Use the space on the opposite side of this page to design the circuit. Once complete, it is not necessary to review the design with the instructor. Any instructor assistance during the design of the circuit shall be a points deduction based on the Manual Motor Control rubric. After completing the design, the circuit may be wired. Have the instructor review all wiring before energizing the circuit. Render the schematic using a CAD type software package. Post the schematic to the *student share* folder using filename   
*MMC Hands-On 4 – name.ext.*

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Black | Red |
| Forward | Counter Clockwise (CCW) | A | 5 |
| Reverse | Clockwise (CW) | 5 | A |

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Discussed design \_\_\_\_\_\_\_\_ Checked wiring \_\_\_\_\_\_\_\_ Energized Test \_\_\_\_\_\_\_\_