Title: **Stop/Start/HOA of a Three-Phase Motor Circuit** Job: 30

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

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

**Objectives**

1. Student shall reinforce their knowledge of a stop/start motor control circuit.
2. Student shall develop a knowledge of hand-off-auto circuits 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 shop job. Grading shall be based on the Introduction of PLC rubric.

**Devices**

Auto (PLC) Circuit

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| Inputs | | |
| *Device* | *Description* | *Symbol* |
| Three-position Selector Switch | Automatic Mode (B Position) | AUTO |
| NC Pushbutton (PB1) | Stop Motor | STOP |
| NO Pushbutton (PB2) | Start Motor | START |
| NO Auxiliary Contacts (53-54) | Motor Starter Status | MS\_STAT |
| NO Overload Contacts (97-98) | Motor Overload Contacts | MS\_OL |
| Outputs | | |
| *Device* | *Description* | *Symbol* |
| Green Pilot Light | Motor Running Forward | RUNNING |
| Red Pilot Light | Motor Stopped/Overload | STOP\_OL |
| 24VDC Three-Phase Motor Starter | Forward Motor Contactor | MS |

Hand (MMC) Circuit

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| Inputs | | |
| *Device* | *Description* | *Symbol* |
| NC Mushroom Head PB (ESTOP) | Emergency Stop | ESTOP |
| Three-position Selector Switch | Automatic Mode (A Position) | HAND |
| NC Pushbutton (PB1) | Stop Motor | STOP |
| NO Pushbutton (PB2) | Start Motor | START |
| NO Contacts (13-14) | Motor Starter Status | MSF\_STAT |
| NO Contacts (MS-OL) | Motor Overload Contacts | MSF\_OL |
| Outputs | | |
| *Device* | *Description* | *Symbol* |
| Green Pilot Light | Motor Running Forward | FORWARD |
| Red Pilot Light | Motor Stopped | STOPPED |
| Yellow Pilot Light | Motor Overload | OVERLOAD |
| 24VDC Three-Phase Motor Starter | Motor Starter | MSF |

**Instructions**

Design a stop/start motor control circuit using the devices listed above. The circuit will utilize a hand-off-auto (HOA) selector switch to select modes and one ESTOP on the manual motor control (MMC) circuit. Whenever the HOA switch is in the “hand” position, the circuit will operate without the use of the PLC. Whenever the HOA switch is in the “auto” position, the circuit will operate through the PLC. Each mode, *hand* for MMC, and *auto* for PLC, shall have their own stop and start pushbuttons and green and red lights. The manual motor control circuit shall also have a yellow light for the overload. Whenever the motor is running, both green lights shall come on and both red lights shall be off. When the motor is not running, both green lights shall be off and both red lights shall be on. Whenever an overload occurs, the yellow light shall illuminate on the manual motor control lights and the red light shall flash on the PLC lights. If an overload occurs, both circuits shall de-energize the control circuit. If the ESTOP is pressed, both circuits shall de-energize the motor as well. Use the space on the opposite side of this page to design the manual motor control circuit and PLC program. 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 the program.

Manual Motor Controls (DC)

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3-Phase Motor Wiring

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PLC Program

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



