Add Time-Delay Relays to an Existing Circuit

Program: Electrician Technician

Course: EL170 – Motor and Industrial Motor Controls

Objectives: Under the supervision of your instructor, you should be able to do the following:

- Describe the operating principles of contactors and relays.
- Select contactors and relays for use in specific electrical systems.
- Install contactors and relays according to the *NEC®* requirements.
- Select and install contactors and relays for lighting control.
- Read wiring diagrams involving contactors and relays.
- Connect a simple control circuit.
- Test control circuits.
- Mount and connect a 120V lighting contactor with a three-wire pushbutton control

Lab Equipment:

- 1 – Completed project Install a Lighting Contactor
- 1 – Time-delay ON 8-pin control relay with a 24V coil (0 to 60 sec. or equivalent)
- 1 – Time-delay OFF 8-pin control relay with a 24V coil (0 to 60 sec. or equivalent)

Required Tools:

- 1 – Screwdriver set
- 1 – Pair of Wire Cutters
- 1 – Pair of Wire Strippers

Materials:

- 8’ - Red or black 14 AWG THHN stranded copper wire
- 4’ - White 14 AWG THHN stranded wire
- 1 - Book of wire numbering tags
- 6 - Sheet metal or wood screw for mounting relay base

Safety (PPE):

- Safety glasses

Resources: N/A

Instructor Notes:

- The trainee will use the previously completed lighting control project to begin this project.
- Connect the primary side of the 120V/24V control transformer, or have the trainee perform this task under your supervision.
- Check for lost or wild strands at terminals on the relay base.
- You may substitute time delays with different time ranges than those specified based on availability, but there should be one 8-pin time-delay ON relay and one 8-pin time delay OFF relay.

- Pushing the stop button, then the start button on the lighting contactor control circuit will reset the timing cycle.

Time Required: 240 Minutes

Shop Maintenance:

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are student's responsibility

Procedures: (Eye protection must always be worn)

This performance project requires the trainee to interconnect a time-delay ON relay into the previously built lighting contactor control circuit, then replace the relay with a time-delay OFF relay to observe the difference between the two functions.

1. Start with replicating the previously completed lighting contactor control project.
2. Install an 8-pin relay base on the project board near the keyless lighting fixture.
3. Refer to *Figure 1* for the wiring schematic.
4. Cut the necessary lengths of red or black wire and wire the relay base according to the schematic in *Figure 1*.
5. Cut the necessary length of white wire and connect it between the neutral power supply lead and the relay base.
6. Plug the time-delay ON relay into the base.
7. Adjust the timer for 5-10 seconds ON delay.
8. Energize the control circuit and push the start button.
9. The light should illuminate after the ON timing sequence elapses.
10. De-energize the power supply and replace the time-delay ON relay with the time-delay OFF relay and repeat steps 7 and 8.
11. The light should immediately illuminate when the start button is pushed.
12. Push the STOP button. The light should remain on until the OFF-timing sequence elapses.
13. De-energize the circuit and troubleshoot any problems.

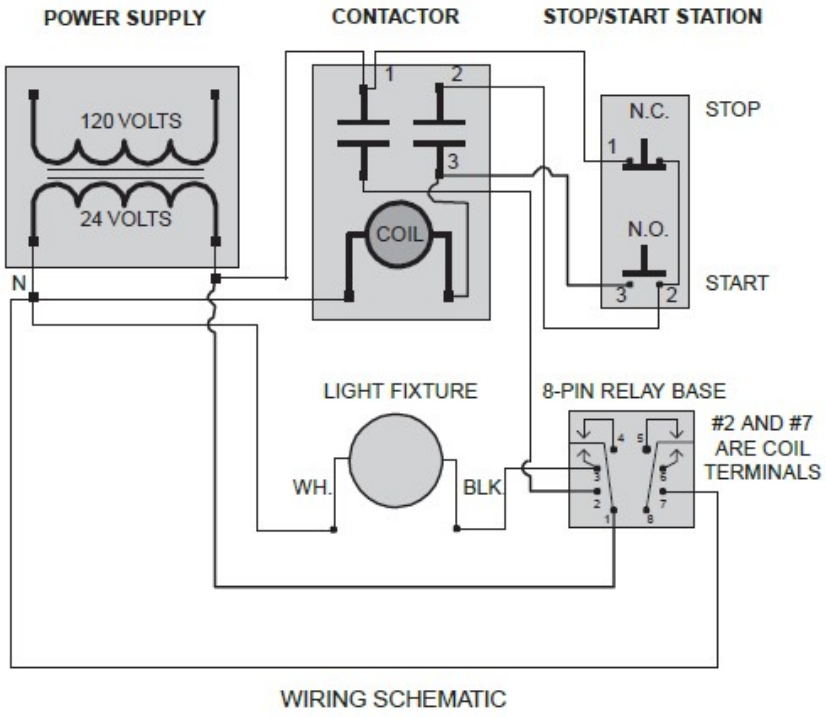

Figure 1 ■ Wiring Schematic for Adding an 8-Pin Relay to a Lighting Contactor Control Circuit