

Laboratory Application Assignment

In this lab application assignment you will examine the operating characteristics of a dc actuated relay. You will also construct two different relay circuits that control which of two incandescent lamps are being lit.

Equipment: Obtain the following items from your instructor.

- Dual output variable dc power supply
- DMM
- 12-Vdc actuated relay with SPDT switching contacts
- Two 6.3-V and two 12-V incandescent lamps
- Normally open (NO) and normally closed (NC) push-button switches
- SPST switch

Relay Specifications

Examine the dc relay assigned to you. By inspection, locate the connecting terminals for the relay coil. Next, determine which terminal connects to the armature and which contact terminals are normally open (NO) and normally closed (NC). If the relay is in an enclosure, you will probably need to use an ohmmeter to

determine this information. If the relay enclosure shows a diagram and has its terminal connections numbered, transfer these numbers to the relay circuits shown Figs. 14–24, 14–25, and 14–26.

Figure 14–24

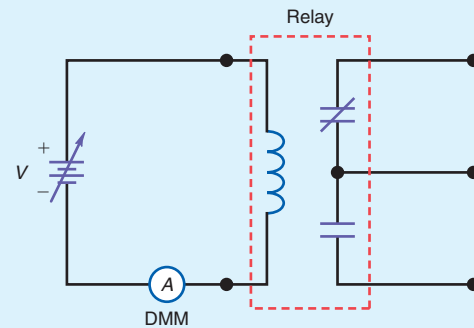


Figure 14–25

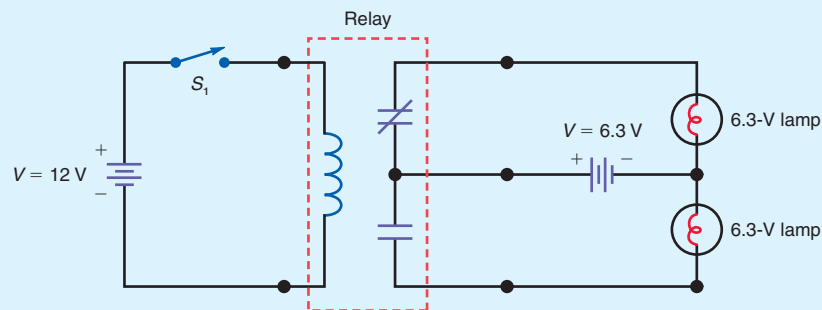
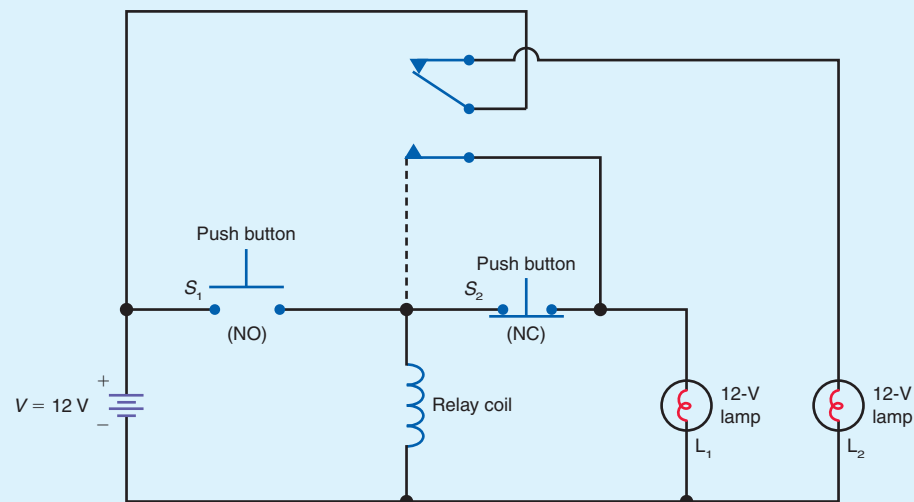


Figure 14–26



In this part of the lab we will experimentally determine the pickup current and the holding current for your relay. Recall that the pickup current is defined as the minimum amount of relay coil current required to energize or operate a relay. The holding current is defined as the minimum amount of current required to keep a relay energized or operating.

Before connecting the relay to the circuit of Fig. 14–24, measure and record the resistance of the relay coil. $R_{\text{Coil}} =$ _____

Connect the relay circuit shown in Fig. 14–24. Reduce the output from the dc power supply to 0 V. Slowly increase the voltage while monitoring the relay coil current indicated by the DMM. Carefully watch (or listen) for the relay contacts to open and close. When this happens, the relay is energized. Measure and record the minimum current that energizes the relay. This current is the relay's pickup current. $I_{\text{Pickup}} =$ _____

With the relay still energized, slowly decrease the output from the dc power supply while watching (or listening) for the relay contacts to open and close. Measure and record the minimum current that is still able to keep the relay energized or operating. This current is the relay's holding current, $I_{\text{Holding}} =$ _____

Which current is larger, the pickup current or the holding current? _____
Is this what you expected? _____

Relay Circuit 1

Construct the relay circuit shown in Fig. 14–25. Depending on the position of the switch S_1 , one of the two 6.3-V bulbs should be on and the other should be off. Open and close S_1 several times to verify that the circuit is operating properly. Have an instructor check your circuit.

Relay Circuit 2

Examine the latching relay circuit in Fig. 14–26. When the relay is not energized, lamp L_2 will be lit and lamp L_1 will be off. Pressing the push-button switch S_1 energizes the relay. This turns lamp L_2 off and lamp L_1 on. To turn lamp L_2 on again and turn lamp L_1 off, press the push-button switch S_2 to deenergize the relay.

Construct the circuit in Fig. 14–26. (The relay switching contacts are shown in their deenergized state.) Press S_1 and S_2 in succession to verify that the circuit is operating normally. Have an instructor check your circuit.