



**WORKSHEET 1-1**  
*Using a Digital Multimeter: Voltage Measurement*

**Worksheet Objectives**

In this worksheet, you will work with the type of digital multimeter typically used by automotive technicians. When you have completed this worksheet, you will be able to use a DMM to make voltage measurements.

**Tools and Equipment**

For this exercise you will need the following:

- Electrical simulator
- Digital multimeter

**Exercise 1: Measuring Voltage**

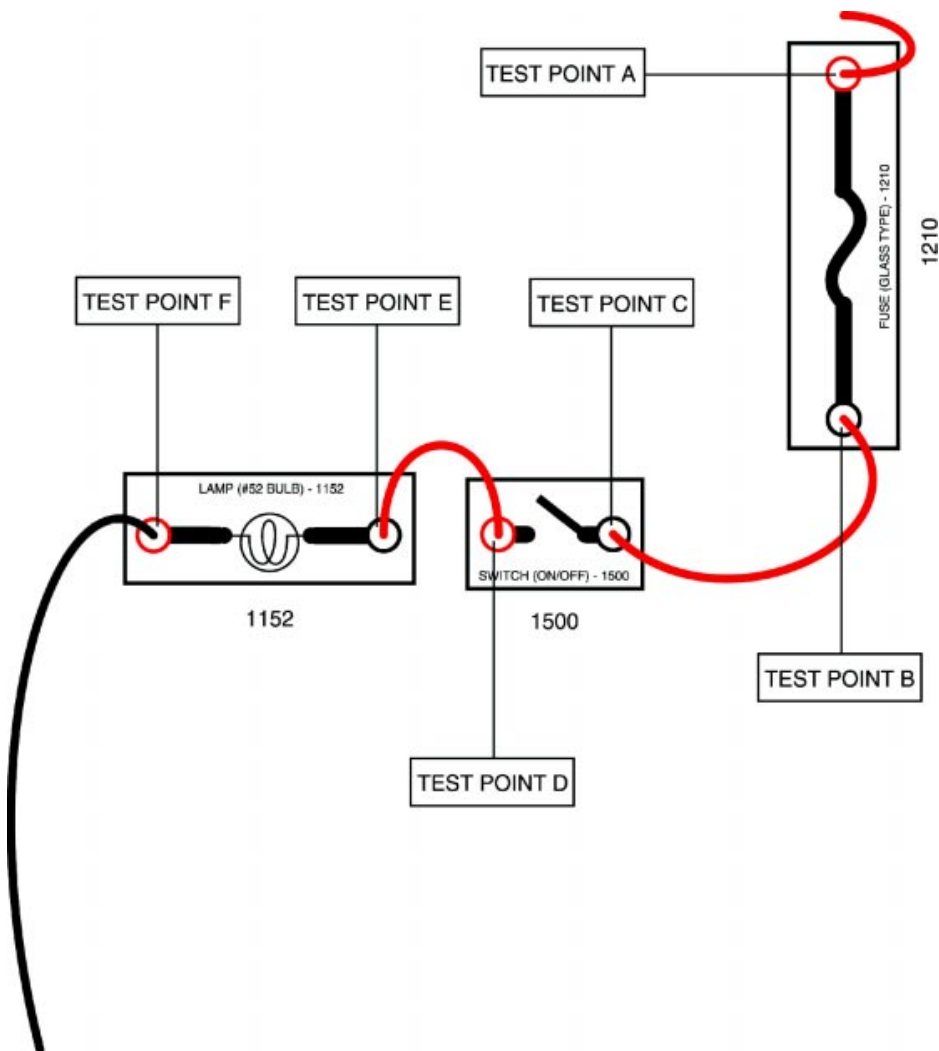


Fig. 1W1-1  
 TL623f001c-1W1

1. Build the circuit shown above on the electrical simulator.
2. Set up your DMM to measure the voltage in this circuit:
  - Mode selector to DC Volts
  - Auto-range on
  - Black lead plugged into COM input jack
  - Red lead plugged into Volt/Ohm/Diode input jack
3. Turn on the electrical simulator power supply and close the switch (light bulb should come on).
4. Measure source voltage:
  - Place the red lead on the positive side of the voltage source (power supply).
  - Place the black lead on the ground (negative) side of the power source.
  - What is the source voltage? \_\_\_\_\_
5. Measure available voltage:
  - Keep the black lead touching the ground portion of the circuit.
  - Apply the red lead to each of the six test points.

Write the values in the blank spaces below.

TEST POINT A    \_\_\_\_\_ volts

TEST POINT B    \_\_\_\_\_ volts

TEST POINT C    \_\_\_\_\_ volts

TEST POINT D    \_\_\_\_\_ volts

TEST POINT E    \_\_\_\_\_ volts

TEST POINT F    \_\_\_\_\_ volts

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### 6. Measure voltage drop:

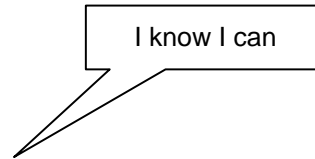
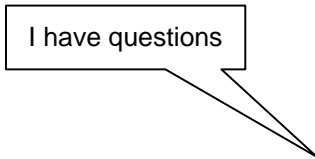
- Place the red lead on the most positive side of the circuit component being tested.
- Place the black lead on the most negative (closest to ground) side of the circuit component being tested.
- The circuit must be on in order to measure the voltage drops.
- Write the values for the voltage drops of the following components:
  - Jumper wire from source to fuse: \_\_\_\_\_
  - Fuse: \_\_\_\_\_
  - Jumper wire from fuse to switch: \_\_\_\_\_
  - Switch: \_\_\_\_\_
  - Jumper wire from switch to the lamp: \_\_\_\_\_
  - Lamp: \_\_\_\_\_
  - Jumper wire from lamp to ground: \_\_\_\_\_

### 7. Leave Circuit 1-1 on the electrical simulator for use in the next worksheet.

# Voltage Measurement

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Review this sheet as you are doing the Voltage Measurement worksheet. Check each category after viewing the instructor's presentation and completing the worksheet. Ask the instructor if you have questions regarding the topics provided below. Additional space is provided under topic for you to list any other concerns that you would like you instructor to address. The comments section is provided for your personal comments, information, questions, etc.



Topic	Comment		
Measure Source Voltage			
Measure Available Voltage			
Measure Voltage Drop			