EXPERIMENT 3E1: Measuring Current

Objectives

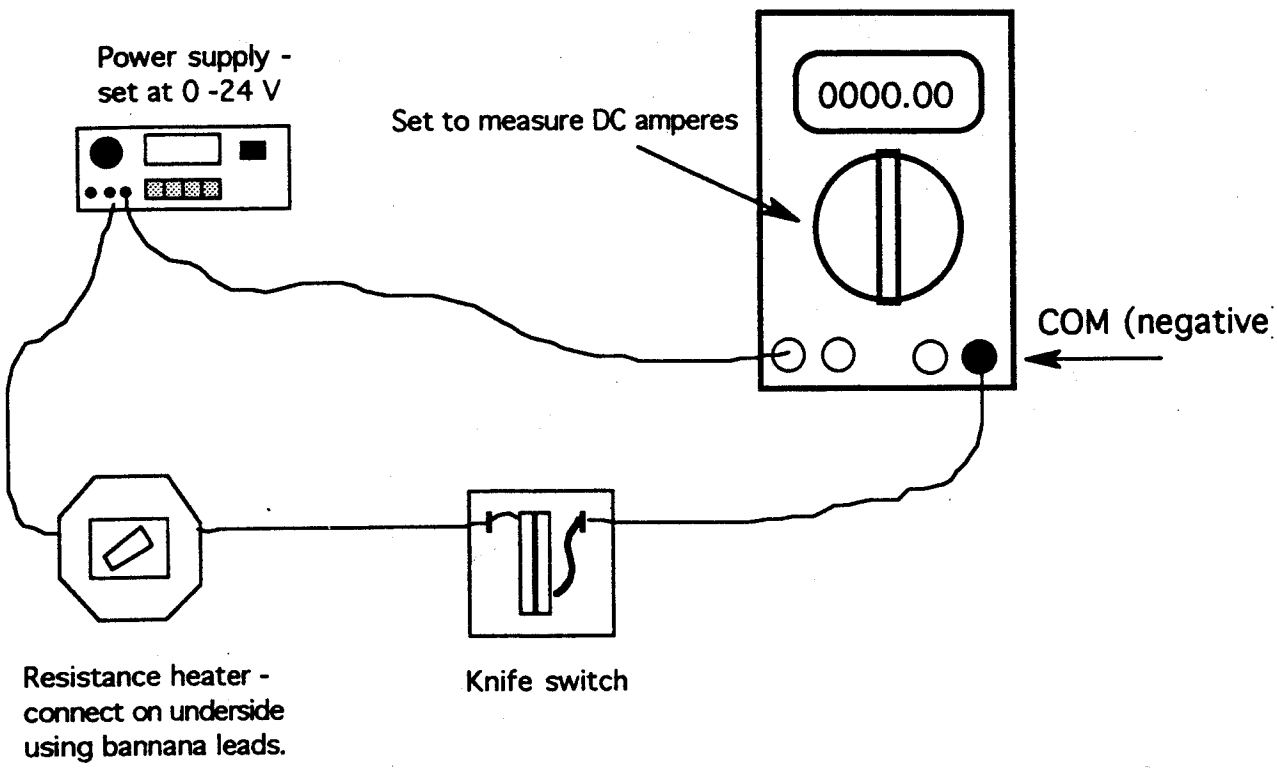
A. Correctly use analog and digital multimeters to measure DC current.

Key Concepts

1. Ampere -- standard unit of measure for current in electric circuits.
2. Direct current (DC) -- current in which the electrons flow in one direction. DC current is often supplied by a battery or a power supply that converts alternating current (AC) to DC.
3. Alternating current (AC) -- Current in which the electron flow changes direction. AC current in the United States cycles 60 times each second.
4. Resistance heater -- a device that restricts the flow of electrons. Electrical energy is then converted to heat energy.

Procedure

Set up the equipment as indicated in the diagram. Be sure the power button and voltage control nob are set to off.



Caution: The power supply should remain on only during multimeter measurements. If the power is left on the heat resister will become extremely hot. Use the knife switch to turn the power on and off.

Measuring amperes with a digital multimeter

1. Be sure the function switch is set to the highest level for measuring DC amperes. Turn on the multimeter.
2. Turn on the power supply and set at 6 Volts. Close the knife switch to complete the circuit.
3. Toggle the voltage/ampere switch on the power supply to read amperes. Record in Data Table 1 the **power supply current**.
4. Turn the multimeter function switch to a lower setting until a reading is obtained. Record in Data Table 1 as **load current**. Open the knife switch to turn off the current.
5. Replace the digital multimeter with the analog multimeter. Set the function switch to the highest level of DC amperes.
6. Close the knife switch.
7. Turn the analog multimeter function switch to a lower setting until a reading is obtained. Record in Data Table 1 as **load current**. Also record the **power supply** current reading. Open the knife switch to turn off the current.
8. Repeat the above for the voltages indicated in Data Table 1.

Data Table 1: Measuring Amperes with a Multimeter

Type of meter	Voltage Setting	Power Supply Current	Load Current
Digital	6V		
Analog	6V		
Digital	8V		
Analog	8V		
Digital	10V		
Analog	10V		

1. When using a multimeter to measure current, why is the range switch initially set to the highest level.

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2. Draw a schematic diagram of the circuit you constructed. Use your text book as a guide.