Knowledge Domain: Power Supply
Unit: Fuse
Skill: Identifying a Blown Fuse

Tools and Parts Required:

1) **Assorted Fuses, functional and non-functional**
2) **Continuity Tester or Multimeter**

Introduction

An electrical fuse protects electrical systems from excess current. Fuses are commonly found in the power supply of a device. Delicate medical equipment may have more than one fuse.

Example

Below is a picture of a fast acting fuse. This fuse is nonfunctional, but there is no visible damage.

Identification and Diagnosis

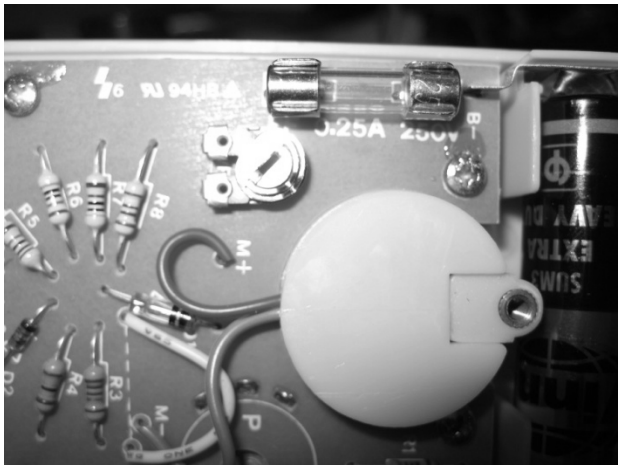
A fuse protects against excess current. Intact fuses are considered 'closed' and will allow current to flow at zero resistance. Excess current will cause a fuse to blow. A blown fuse is no longer functional. A blown fuse is called 'open.' An open fuse will not allow current to flow at all. A blown fuse has infinite resistance.

There are two types of fuses. Fast acting fuses have very thin wires that will melt or vaporize with excess current. Excess current for a very short time (milliseconds) will open a fast acting fuse. A slow blow fuse has a coiled wire inside. The slow blow fuse will only open when excess current is applied for a long time.

Sometimes a fuse will appear burnt. A burnt appearance indicates that the fuse blew very quickly. You may want to check for shorts in the device. Fuses may blow because of age or gradual overload of power. Sometimes a fuse will not appear different even if it blows.

Procedure

If you suspect a device has a blown fuse, first disconnect the power. Second, locate the fuse. There may be more than one fuse in the device. The power supply may have a fuse built in. Fuses may extend out of the back of the machine, often with small black lids. Look for fuses inside the circuitry, too.



Use your continuity tester or multimeter to test the fuse. To use the continuity tester, place one lead on either end of the fuse. The LED will illuminate if the fuse is still functional.

To use a multimeter, you will need to set the multimeter to resistance/ohms (Ω). This may also be a diode or buzzer setting.

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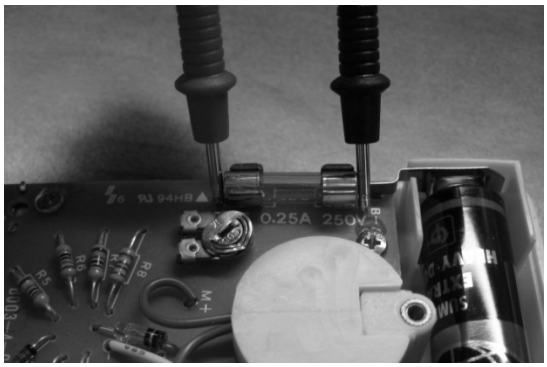
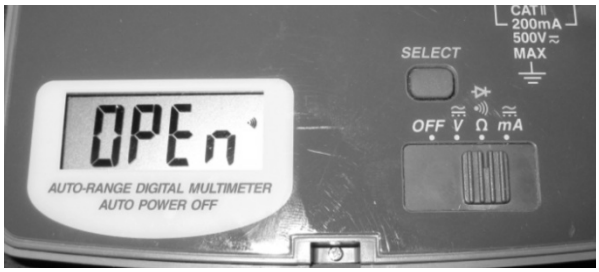


If the fuse is intact, the resistance will be 0 ohms, the buzzer will sound, or the screen will read ‘short.’ A nonfunctional fuse will have a very high resistance or the reading ‘open.’



Immediately replace a nonfunctional fuse. Most devices will not function with a nonfunctional fuse. Remove the old fuse, and check the amperage rating, voltage rating, and type.

Replace the old fuse with an identical, functional fuse. The new fuse must match the amperage, voltage, and type of the previous fuse.

If the new fuse blows immediately then there is a problem with the machine. Replacing the fuse will not fix the problem.

See the skill *“Power Supply: Fuse Substitution”* for other fuse replacement strategies.

Exercise

Your instructor will provide you with an assortment of fuses. Use your continuity tester or multimeter to determine if each fuse is functioning or non-functioning. Your instructor must verify your work before you continue.

Preventative Maintenance and Calibration

Whenever possible, keep a stock of frequently used fuses in your workshop. Some equipment cannot withstand rapid changes in current. This delicate equipment may blow fuses frequently. Be prepared with replacement fuses for emergency situations.

Some equipment comes with replacement fuses. Check the packaging and any compartments in the device for replacements.

Always calibrate every medical device before returning it to use.