How to Measure Resistance with a Multimeter

What is a Multimeter?

A multimeter (sometimes called a digital multimeter or DMM) is a device used to measure different electrical measurements. Multimeters can generally measure current (or amperage), resistance (or conductivity), and voltage. In this lesson you will be using multimeters to measure resistance.

Multimeters can either be auto-ranging or manual-ranging. If a multimeter is manual-ranging, then the user must set the multimeter to the right place value for a reading. For instance, if what you are measuring is known to be under 200 ohms, set the multimeter to the 200 Ω (ohms) setting. If it is closer to 20,000 ohms, set it to the 20k Ω setting. In order to use a manual-ranging multimeter, you must know the approximate resistance value you are measuring. If you are using an auto ranging multimeter, you will only need to set the multimeter reading to “ohms (Ω)”, and the multimeter will determine the correct place value.

The probes for the multimeter (the wires with sharp metal tips) plug into the three red holes on the right side. The black probe always plugs into the hole labeled “COM” – this is the ground probe. The red probe can either plug into the middle or the top red hole depending on what functionality is wanted. The top hole is for measuring high alternating currents, the middle hole is for measuring small currents, resistance and volts. We will use the middle red hole for the entirety of flight academy.

Although you will only use the resistance measuring function of the multimeter, you should be familiar with the other measurements the multimeter can make, in case you are curious. On the device above the “DCV” section is for measuring “direct current voltages”. “ACV” is for measuring “alternating current voltages”. The section next to ACV is for capacitance measurements. Next to that is DCA for measuring “direct current amperage”. The setting labeled 10A is for measuring high alternating currents. Next to that hFE is for measuring the gain of a transistor. Then, finally, the diode symbol (the triangle with a vertical line at the end) is for measuring the forward voltage of a diode. The blue circle with holes in it is used to determine the leads of a transistor (whether they are base, emitters, or collectors).

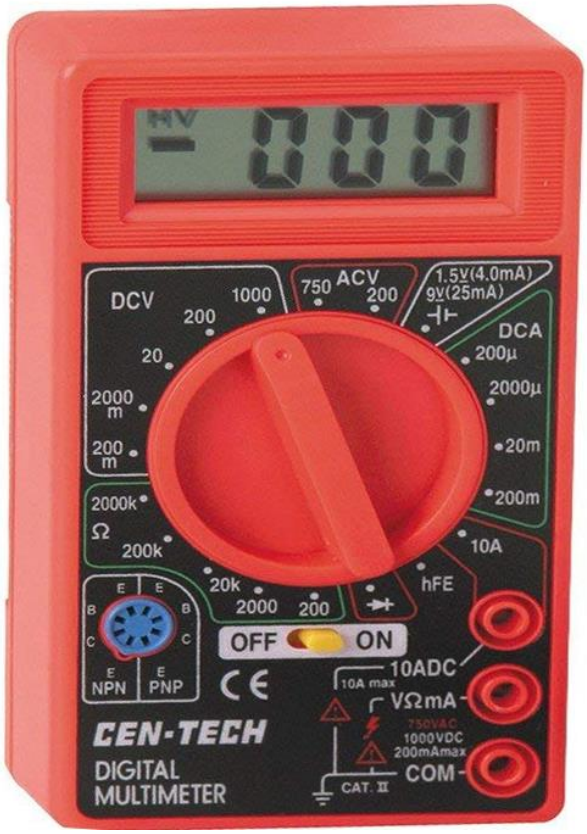
How Does It Work?

The multimeter reads resistance by sending a small constant current through your circuit, this causes a voltage drop. The multimeter reads the voltage drop and is able to calculate the amount resistance using ohms law!

Using Your Multimeter

To measure resistance with your multimeter:

1. Set the multimeter to the resistance measuring settings.
2. If you have an auto-ranging multimeter you can skip this step. If not, make sure you set the multimeter to the correct place value. In your case, 200 will suffice.
3. Make sure the probes are properly plugged into the correct holes in the multimeter.
4. Take a probe (either red or black it doesn't matter) and touch it to the end of one of the lines whose resistance you are measuring.
5. Take the other probe and touch it to the other end of the line whose resistance you are measuring.
6. Take note of the measurement.



Troubleshooting/Tips:

- Make sure your probe is making contact with the surface whose resistance you are attempting to measure.
- Make sure you are on the correct place value setting.
- Make sure your probes are plugged in all the way.
- Try turning the multimeter on and back off.
- Try measuring the resistance of something known (i.e. a resistor), if you believe your multimeter is not accurately reading measurements.
- Check and make sure your batteries are plugged in correctly.
- Make sure you are measuring from the ends of your surface you will not get the whole resistance measurement otherwise.