

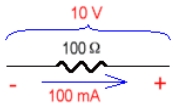
Ohms Law

Why its important to you

If your going to be doing anything with stage lighting, Ohms law is one of the most important things you can learn.

The three most basic units in electricity are voltage (V), current (I) and resistance (R). Voltage is measured in volts, current is measured in amps and resistance is measured in

$$V = I \times R \quad I = \frac{V}{R} \quad R = \frac{V}{I}$$



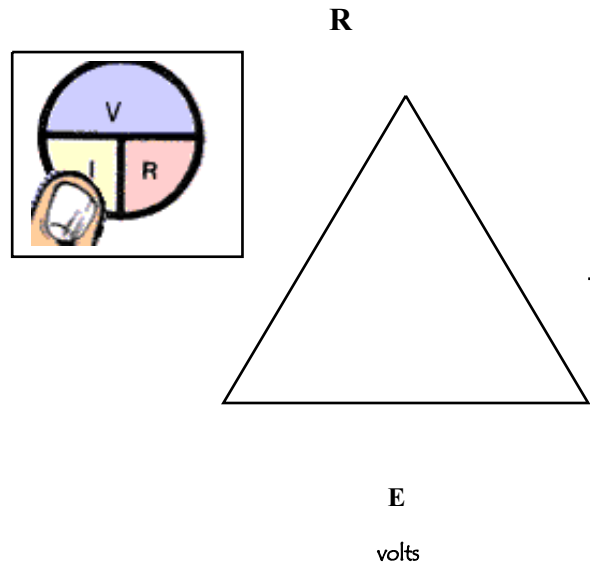
V = volts I = current in amperes R = resistance in ohms

ohms.

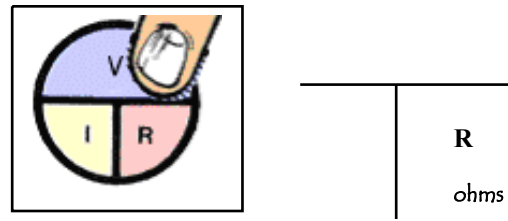
A neat analogy to help understand these terms is a system of plumbing pipes. The voltage is equivalent to the water pressure, the current is equivalent to the flow rate, and the resistance is like the pipe size.

There are three different notations of *Ohm's law*

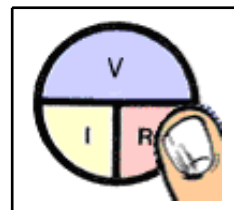
1. Unknown current $I = \frac{V}{R}$



2. Unknown voltage $V = IR$



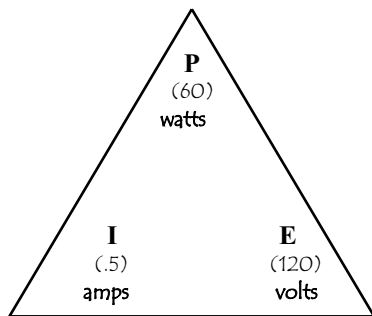
3. Unknown resistance $R = \frac{V}{I}$



(Most people can remember a picture easier than a mathematical formula. By knowing any two values you can figure out the third. Simply put your finger over the portion of the symbol you are trying to figure out and you have your formula)

Now all you need to remember is the unit of measure that goes into each part of the triangle:

Sometimes in stage lighting a designer needs to figure out how many spotlights can be controlled by a particular dimmer without overloading it. To figure this out you will use something called the **PIE formula**: $P = IE$ (P stands for power, measured in watts) The PIE formula tells us that power is equal to intensity of current multiplied by electromotive force (watts equals amps times volts) This means that a 60-watt bulb, used in a standard 120-volt household electrical circuit, requires a flow of .5 amps of electricity. ($60 / 120 = .5$) The best news is that the triangle works for the PIE formula just as it does for Ohms Law.



Of course the arithmetic is not always so simple. Not many spotlights use a 60-watt lamp (we call it a bulb at home, but it is called a lamp in the theater)