OHM'S LAW

The rate of the flow of the current is equal to electromotive force divided by resistance.

I = Intensity of Current = Amperes

E = Electromotive Force = Volts

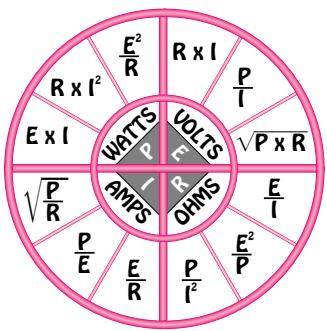
R = Resistance = Ohms

P = Power = Watts

The three basic Ohm's law formulas are:

$$I = \frac{E}{R} \qquad R = \frac{E}{I} \qquad E = I \times R$$

Below is a chart containing the formulas related to Ohm's law.
To use the chart, from the center circle, select the value you need to find, I (Amps), R (Ohms), E (Volts) or P (Watts). Then select the formula containing the values you know from the corresponding chart quadrant.



Example:
An electric appliance is rated at 1200 Watts, and is connected to 120 Volts. How much current will it draw?

$$\textbf{Amperes} = \frac{\textbf{Watts}}{\textbf{Volts}} \qquad I = \frac{P}{E} \qquad I = \frac{1200}{120} = 10 \text{ A}$$

What is the Resistance of the same appliance?

$$\textbf{Ohms} = \frac{\textbf{Volts}}{\textbf{Amperes}} \qquad R = \frac{E}{I} \qquad R = \frac{120}{10} = 12\ \Omega$$

OHM'S LAW

In the preceding example, we know the following values:

I = amps = 10 R = ohms = 12Ω

E = volts = 120 P = watts = 1200

We can now see how the twelve formulas in the Ohm's Law chart can be applied.

$$\text{AMPS} = \sqrt{\frac{\text{WATTS}}{\text{OHMS}}} \qquad I = \sqrt{\frac{P}{R}} = \sqrt{\frac{1200}{12}} = \sqrt{100} = 10\text{A}$$

$$\text{AMPS} = \frac{\text{WATTS}}{\text{VOLTS}} \qquad I = \frac{P}{E} = \frac{1200}{120} = 10\text{A}$$

$$\text{AMPS} = \frac{\text{VOLTS}}{\text{OHMS}} \qquad I = \frac{E}{R} = \frac{120}{12} = 10\text{A}$$

$$\text{WATTS} = \frac{\text{VOLTS}^2}{\text{OHMS}} \qquad P = \frac{E^2}{R} = \frac{120^2}{12} = \frac{14{,}400}{12} = 1200\text{W}$$

$$\text{WATTS} = \text{VOLTS} \times \text{AMPS} \qquad P = E \times I = 120 \times 10 = 1200\text{W}$$

$$\text{WATTS} = \text{AMPS}^2 \times \text{OHMS} \qquad P = I^2 \times R = 100 \times 12 = 1200\text{W}$$

$$\text{VOLTS} = \sqrt{\text{WATTS} \times \text{OHMS}} \qquad E = \sqrt{P \times R} = \sqrt{1200 \times 12} = \sqrt{14{,}400} = 120\text{V}$$

$$\text{VOLTS} = \text{AMPS} \times \text{OHMS} \qquad E = I \times R = 10 \times 12 = 120\text{V}$$

$$\text{VOLTS} = \frac{\text{WATTS}}{\text{AMPS}} \qquad E = \frac{P}{I} = \frac{1200}{10} = 120\text{V}$$

$$\text{OHMS} = \frac{\text{VOLTS}^2}{\text{WATTS}} \qquad R = \frac{E^2}{P} = \frac{120^2}{1{,}200} = \frac{14{,}400}{1{,}200} = 12\Omega$$

$$\text{OHMS} = \frac{\text{WATTS}}{\text{AMPS}^2} \qquad R = \frac{P}{I^2} = \frac{1200}{100} = 12\Omega$$

$$\text{OHMS} = \frac{\text{VOLTS}}{\text{AMPS}} \qquad R = \frac{E}{I} = \frac{120}{10} = 12\Omega$$