

How to Easily Calculate the Conversion of Volts – Amps & Watts

Basic electric theory states that:

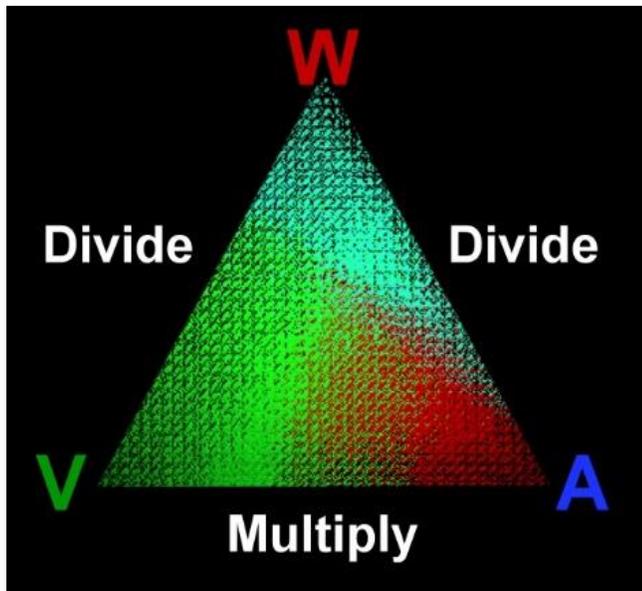
Volts are a measure of the force or pressure under which electricity flows.

Amps are a measurement of the current flow rate of electrons.

Watts is a measurement of electrical power created. 1 watt is equal to one joule of energy per second.

In the solar Industry, the ability to easily convert volts, watts and amps is necessary for every part of the business from system sizing to procurement of solar panels, inverters, and balance of system components like connectors and wiring.

To use this conversion chart, you will need at least two of the three desired electric values from a specific load requirement. From there, you can calculate the third. Simply draw a triangle, then place a W for watts at the top. Then place a V for volts at one of the bottom corners and an A for amps at the remaining corner.



For an example of how the conversion chart works, let's assume a solar panel rated at 60Watts, 12Volts and 5Amps.

The formula for **Watts is Volts times Amps**. To use the chart, cover the **W** in the chart with a finger and use the remaining visible chart calculation of **V** multiplied by **A**. Using our sample panel data, 12 Volts multiplied by 5 Amps equals 60 Watts.

The formula for **Volts is Watts divided by Amps**. To use the chart, cover up the **V** with your finger and use the remaining chart calculation of **W** divided by **A**. Using our sample panel data, 60 watts divided 5 Amps equals 12 Volts.

The formula for Amps is **Watts divided by Volts**. To use the chart, cover up the **A** with your finger and use the remaining chart calculation of **W** divided by **V**. Using our sample panel data, 60 watts divided by 12 volts equals 5 amps.

1 - Determine the voltage. North American wall outlets operate at 110 to 120 volts.

2 - Convert watts to amps using the proper equation: Amps equals watts divided by volts. For example, a typical 60-watt light bulb on a standard 110-volt circuit operates at 0.55 amp (60/110).

3 - Convert amps to watts by reversing the equation: Amps multiplied by volts equals' watts. A device operating on 3 amps at 110 volts consumes 330 watts (3 x 110).

Instructions

1 - Multiply the number of watts by the number of hours to calculate watt-hours. As an example, if you know your laptop computer uses 30 watts of power and you want a battery to power it for four hours, you need 120 watt-hours of stored energy.

2 - Divide this figure by the energy efficiency of the battery to compensate for the lost energy. The battery's efficiency is listed in its specifications. In the example, if the battery has an 85 percent efficiency, you divide 120 by 0.85 to derive a required 141 watt-hours. If you wish to calculate only theoretical values, you can skip this step.

3 - Divide this figure by the voltage to calculate amp-hours. Voltage is also listed in the battery's specifications. In the example, if the battery is rated at 19 volts, divide 141 watt-hours by 19 volts. This tells you your new battery needs at least 7.42 amp-hours to run your laptop for four hours.

A Simple Layout of a Solar Setup

