Basic 12v solar setup

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The Process on How to Connect a Solar Panel to a 12 Volt Battery

There are three components to a basic 12-volt solar-charged setup:

If you’re having trouble finding information about vehicle-based solar power, you’re not alone. Most of the information available is for commercial or residential structure applications. In this post, we will go over some solar panel and 12-volt system basics. Hopefully, this will help make you informed and confident in building out your dream solar system on your rig.

Note: If you’re uncomfortable with this type of work, it’s always a great idea to have an electrician either check your work or do it for you!

“DC Power” stands for direct current. It is the power that runs vehicles, boats, computers, etc. What comes from a standard power pole is AC (alternating current) power. AC power won’t be relevant in this post unless we are talking about power inverters. All you need to know is that AC is very good at sending power long distances, which is why they use it on the power poles.

I won’t bore you with all the math details, but DC power is governed by one basic equation:

It basically means that as you increase the power draw on a given system, the voltage and the current (amps) increase at the same rate. In a 12-volt system, the voltage always has to remain around 12 volts within a 1-2 volt variance. This means that for more power-demanding equipment, the amps have to increase since voltage can’t.

Amps are what can cause wires to melt or worse, cause fires. It’s important to always use a DC wire size calculator so you can make sure you don’t cause damage to your vehicle or the loved ones inside it! Here is a handy calculator to determine how many amps your accessories will draw.

Unless you’ve been living under a rock for the past decade, you know that solar panels essentially convert sunlight into electricity. Pretty neat, huh?

In more technical terms, they are actually small semiconductors sandwiched between different types of protective layers and are called photovoltaic cells. One cell only produces about 1-2 Watts of electricity. Solar panel manufacturers string many of these cells together and sell you an entire panel rated for a certain amount of watt generation. A common rating such as the one I installed on my roof rack is for 100 Watts.

When the sun hits the solar panels, the amount of power generated is based on how intense and direct the sun

is shining. If the sun isn’t shining directly 90 degrees onto the panel, the amount of power that is produced drops off fairly quickly. This is why when you see pictures of big solar farms, they are all positioned at an angle.

In a mounting application such as a roof rack, you will generate a fraction of the panel’s rating unless it’s high-noon.

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