Lithium battery 48v solar application

Lithium battery 48v solar application

While most RVers can easily and inexpensively build a 12V solar panel and battery system that meets their basic DC and AC needs, folks with greater energy demands may find that a 24V system can help them run more powerful AC appliances. Going further, those who invest in a 48V system with enough solar panels and battery storage capacity, can even run electric heating and air conditioning more efficiently and at a lower cost installation!

Using a 12V system, running a heavy load means having more panels, larger capacity charge controllers, huge battery banks, and a lot of heavy duty wiring. Now, many solar consumers with higher energy demands are moving away from 12V and toward 24V or 48V systems for overall cost-space-benefit.

Looking at the basic Volts (V) x Amps (A) = Watts (W) equation, you can see how to achieve the same wattage by doubling the voltage of your overall system, thereby reducing the amperage by 50% at each step up in voltage.

Each example provides the same amount of power (W), but by increasing the voltage we reduce the amperage. The resulting reduction of amperage means that we can use smaller, and less expensive cabling to deliver the same power. This chart provides a great example.

Looking at this chart, we can see that an electrical load of 100A for 15ft (4.6 Meters)in a "critical" circuit (voltage drop of less than 3%), the circuit needs a wire size of 2 AWG (35 metric). At 50A going the same distance, the circuit needs a wire size of 6 AWG (16 Metric), and at 25A, you can save a significant amount of money with 8 AWG (10 Metric). For those new to wire sizing, the AWG scale is not necessarily intuitive. The higher the number, the smaller the wire; and the smaller the wire, the less the cost per linear length.

Sizing your wires and fuses appropriately for the amperage they carry means that you are less likely to overload a wire which could cause a fire, burn out a fuse, trip a breaker, or damage an electrical appliance.

In this example, you can see how higher voltage systems are not only safer, they are more cost effective, more efficient, weigh less, can be easier to build, and experience less transmission loss.

The first step in planning any off-grid solar system is to calculate your daily Total Watt Hours. This is the average daily power (measured in Watt Hours) you will consume through electrical appliances; we like to call it your "Magic Number." Our Solar 101 video will explain in greater detail and our Solar System Sizing Worksheet will walk you through it step-by-step. Once you"ve calculated your Magic Number, you can begin to size your system accordingly.

Using either 200Ah AGM or Gel batteries (both lead acid chemistry), let"s connect 4 x 12V-200Ah batteries in

series to create a 48V-200Ah battery bank. Using a safe DoD of 50% for lead acid, this battery bank capacity provides 4.8kWh (or 4800WH) of energy and weighs in at 512 lbs.

As more people go off-grid and still want to be able to power their lives as they would in a traditional dwelling, we believe 48V systems are the future of solar power. The safety, efficiency, and cost savings of Renogy battery products are leading the way to a more sustainable future.