



How to Wire 12V Batteries in Series and Parallel with Photos

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In this tutorial, I'll show you step-by-step how to wire batteries in series and parallel, as well as how to combine the two to create series-parallel combinations. I'll also cover when to use series or parallel wiring.

Wiring batteries in series sums their voltages and keeps their amp hours the same. It's particularly useful for wiring two 6V lead acid batteries, or four 3.2V lithium cells, to make a 12V battery.

Series connections can also be used to wire multiple 12V lead acid or lithium batteries together to make a 24V, 36V, or 48V battery bank, which is useful in DIY and off-grid solar applications.

Connect the battery cable to the negative terminal of one battery. To do so, use a ratchet or screwdriver to unscrew the terminal's bolt. Thread the cable's ring terminal through the bolt, then screw the bolt back on the terminal.

That's it! Your batteries are now wired in series. You'll often hear connected batteries referred to as a "string" of batteries. So now you have a series string of 2 batteries.

If you want, check your battery bank's voltage with a multimeter. Because I wired two 12V batteries in series, I expect to measure a voltage of around 24 volts. (In reality, a 12V LiFePO4 battery's resting voltage will usually be closer to 13-13.5 volts, so I'd expect a voltage of around 26-27 volts.) I got 26.4 volts, which is exactly in line with expectations.

You can wire three 12V batteries in series to create a 36V battery bank. Once again, just connect the negative terminal of your 2-battery series string to the positive terminal of the third battery.

Done! Like I said, you can wire as many in series as your batteries allow for. LiFePO4 batteries are often limited to 4 batteries in series to protect the BMS. However, there are some that can't be wired in series, such as the Renogy 12V 100Ah Smart Lithium Iron Phosphate Battery. Be sure to check!

Parallel wiring is useful when you want to keep your battery voltage the same; such as when you're powering 12V devices directly off a 12V battery; while increasing runtime and current limits.

Your 2 batteries are now wired in parallel. This is what people mean when they say you wire batteries in parallel by connecting positive to positive and negative to negative.

In this example, I wired two 12V 100Ah batteries in parallel to get a 12V 200Ah battery bank. Because

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parallel connections don't affect voltage, there's no way to use a multimeter to check the connection.

You can use a combination of series and parallel connections to make a battery bank with your desired voltage and capacity. There are many different series-parallel wiring configurations you can choose from. I'll cover the simplest in this tutorial.

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