Diy lifepo4 battery

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In the last couple of months I’ve installed two of the three main types of lithium iron phosphate (LiFePO4) batteries. In March I installed Mastervolt’s system integrated MLi batteries on Have Another Day and just last week I finished up the installation of Battle Born’s 8D drop-in batteries on another boat. With two out of three types covered I figured it was time to get my hands dirty with the third type, a do-it-yourself build of a 12-volt LiFePO4 battery.

For my DIY LiFePO4 battery, I picked four, 3.2-volt, 280-amp hour cells direct from China via Aliexpress. The batteries took about two months to arrive, which isn’t surprising for heavy items with the current international shipping challenges. The seller says these are brand new cells and they look it, though I’m not sure I’d know if they weren’t. I selected an Overkill Solar 4S, 12-volt, 120-amp BMS paired with my batteries. Although the BMS was back-ordered, it arrived a few weeks later and well ahead of the batteries.

The batteries’ specs aren’t overly clear but they appear to be able to sustain 1C continual load or 280 amps. I don’t have a specific application for this battery yet and felt that 120 amps was likely to be enough for any use I dream up for the batteries, so I stuck with the 120-amp BMS.

The first step of my build is to get all four batteries balanced at the same voltage. In the picture above all four batteries are connected in parallel and a 3.65-volt charge is being applied. As you can see on the multi-meter, the batteries are about 0.3 volts below that charge so it will take a while for them to reach top balance with all four fully charged and balanced with each other. Once that’s done it will be time to move on to connecting the BMS and physically connecting the four cells into a single battery.

I’m a rookie, so I’m taking it slow and being as careful as I can. If any of you who have done this before have words of wisdom to share, I’m all ears. Otherwise, I’ll just be here waiting for my meter to edge up to 3.65 volts.

2,5 A per battery, sure, that is going to take a long time. Lithium cells have a pronounced hockey-stick charge – voltage diagram, so you will find that they remain stable in voltage until they are _almost_ full then the voltage starts rising quickly.

Ben, please don’t be casual with units when batteries and electricity are involved. It is hard enough for readers to keep their heads around this without you writing “amps” when you mean “amp-hours”. You meant to write “1,120 Ah of 3.2 V cells”. “Yes but it is hard” is IMO no excuse when you are a journalist writing about this.

Also, indeed as you mention, given the very stable voltage of LiFePO4 chemistry batteries I don’t

expect much fluctuation in voltage until the cells get very close to 100 % state of charge. I’m at about 18 hours of charging right now, which means I’ve probably replaced about 180 amp-hours of energy, perhaps another day or two to go.

Yes, you’re correct. The 1,120 Ah figure is only relevant while top-balancing the cells in parallel. So, once this step is done I can charge at 12v nominal (higher actual voltage from the charger) which will cut charge times by four.

I don’t know of a way to assess the quality of the cells. I think you could contact the seller and ask if they have any reports on the cells. But, overall, you’re likely placing your trust in the reputation of the seller. In this case, I know nothing about the seller, so you may have a leap of faith involved.

You’re definitely paying for the top balancing, US warehousing, and kitting the seller has done. My total cost for the 280 Ah batteries and BMS was around $600. There are additional components included from this seller that might add another $100 or so. But, I also have all the tools, wire, and connectors needed on hand which makes the build easier for me.

The one question I’m left with is how the seller can ship these batteries top balanced. My procedure for top balancing will have me connecting to the BMS fully charged. My understanding of U.S. shipping regulations limit batteries to 30% SOC for shipping.

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Web: https://hollanddutchtours.nl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346