

#34_2022_January_Newsletter

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Mon 1/10/2022 8:01 PM

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Thank you for signing up to receive my newsletters. I hope you've found the previous editions informative and helpful for your vehicle-supported adventures. I trust you will enjoy this month's newsletter. If you have comments, please email me: Bob.Wohlers@discoveroffroading.com. You can access, download, and read previous newsletters on my website by clicking [HERE](#). Look through the Newsletter Reference for a topic that may interest you, or download them all!



Say Goodbye to Low-Energy Camping - PART TWO

**Building a
Dedicated
Lithium Iron
Phosphate
Battery Camping
System**

In my last newsletter, I

began my overview of how I upgraded my dedicated 12-volt camping "house battery" system. If you've not read that newsletter completely, click [HERE](#) to download.

In this Part Two we continue with the listing of the pieces/parts you need to build your redesigned LiFePO4 battery box and complete 12-volt system.



The 6-gauge positive and negative cables routed back to my camper's battery box begin in my truck's engine compartment. The cables are connected to the positive and negative terminals on the starter battery. Visible is the 80-amp circuit breaker connected to the positive cable.

Six Gauge Welding Cable and Circuit Breakers

Electron flow is somewhat like water, and electrical wire is somewhat analogous to water pipes. The larger the pipes, the more water flow. The larger the wires (lower gauge numbers), the more electrons that can be moved. Most

(Also pictured is a breaker and set of 6-gauge cables dedicated for my high-amp compressor tucked under my truck.)

camper companies, like Four Wheel Campers, put a pitifully small size wire

(10-gauge) between the engine's battery/alternator and the house batteries. For our needs, a 10-gauge wire doesn't carry enough electrons. You need a larger size wire to carry the current that most house batteries desire, particularly LiFePO4 batteries. For the 12-volt systems in my camper and Jeep, I'm using 6-gauge (smaller the gauge number the larger the wire) welding cable to take the energy from the front of the vehicles (where my alternator is), all the way back to my house battery boxes. You need a positive cable AND a negative cable. Don't rely on a vehicle's frame grounding for your house battery charging. Be extra careful if you are routing these cables under your vehicle on your own. You must route the cable carefully so NOTHING will rub the insulation off the cable and cause a short. You also need to protect the cable against offending underbody terrain. To minimize the chances of a short, you MUST use manually resettable 80 amp circuit breakers in the wiring – on the positive cable. I use two breakers in my system – one in the engine compartment and one at the LiFePO4 battery. Each breaker is located next to where the positive cable hooks up to the starter and LiFePO4 house batteries. If you are unsure how to safely accomplish the task of routing your 6-gauge cable under your vehicle and installing your breakers, please let an expert do this. By the way, I added 6-gauge cable to my charging system even when I was using my AGM house batteries. For most truck and camper combos, you'll need approximately 20 feet of cable (measure liberally; give yourself some slack).



Pictured are my 6-gauge cables routed between my truck cab and bed holding my camper. The cable comes from the engine compartment, carefully routed under the cab's frame and up and over the top of the bed. The cable lays in the space between the camper and truck's bed, all the way to the camper's battery box. Obviously, I had to drill a hole into my camper's battery box to route the cable.

Intelligent Battery System

To build a completely redesigned LiFePO₄ house battery system, you should install an intelligent battery “minder.” The primary purpose of this item is to isolate/protect your starter battery from being accidentally drained when the house batteries are low or dead. Also, the best intelligent battery systems have in-cab voltage monitors for both your starter and house batteries. Further, I would choose one that allows you START your vehicle's engine with your house batteries, when your starter battery is dead. In my vehicles, I use the Swiss-made IBS Intelligent Dual Battery System since it is matched with the same manufacturer's DC-to-DC charger. IBS equipment was built for off-roaders, by an off-roader. The USA distributor for the IBS is Extreme Outback Products. Click [HERE](#) to see this component on their website. To allow the IBS product to start your vehicle's engine with the IBS, you also need the IBS Relay Booster Module. Click [HERE](#) to see this component. It's my opinion that all overlanders should be able to use their camping house batteries to start their engine if their starter battery is dead. With my IBS controller, I can also manually “link” my starter and house batteries when I winch – should I need the extra 12-volt capacity if my engine isn't working. Another dual battery “minder” is one made by National Luna and

sold in the USA by Ekipt Expedition Outfitters. See this product [HERE](#). I have also owned this product and found it to be very good.



Unboxing of my IBS battery minder, starter battery isolator, and 12-volt monitor.



Cab mounted IBS 12-volt monitor.

Pieces/Parts Note

Just because I've decided to use the excellent Swiss-made Intelligent Battery System and Victron devices doesn't mean that there aren't other choices. Many LiFePO4 battery system installers use Australian-made REDARC products. REDARC makes and sells batteries, solar panels, DC-to-DC chargers, and Inverters. I've heard nothing but good things about REDARC equipment. As mentioned previously, National Luna from Equipt Expedition Outfitters also makes great equipment for 12-volt systems.

Constructing a DIY Battery Box

There are many ways you can design and built a LiFePO4 battery box from

scratch. Do some research online and you'll see what I mean. As I mentioned earlier, building your own LiFePO₄ battery box is a LOT of work compared to simply purchasing Battle Born or Lion Energy batteries.

Explaining step-by-step how I built my LiFePO₄ battery box would take many pages. The good news for me is, I don't need to make this newsletter any longer. I'd prefer you watch some of the great YouTube videos I used to build my battery box.

Basically, I built my battery box much like YouTuber "Freely Roaming." This YouTuber and his family live fulltime in their Sprinter Van, so his 12-volt system must function reliably. I like his videos and found his LiFePO₄ battery box build series very helpful. You can begin to watch his build video series [HERE](#). Included with each video, Freely Roaming lists all the pieces/parts he used to build his LiFePO₄ battery box. He also provides internet links for the components used. If you are going to build your own battery box, watch all five parts of his videos prior to making pieces/parts purchases.

I did a few things different from Freely Roaming when I built my battery box. First, I used a standard plastic battery box I purchased at Walmart. My battery box is much like this one: [HERE](#). Freely Roaming built his own wooden box – I'm not that fancy. Here's an important note: Before you build or purchase the actual box for your batteries, measure the area in your vehicle or camper cabinet your battery box must fit.

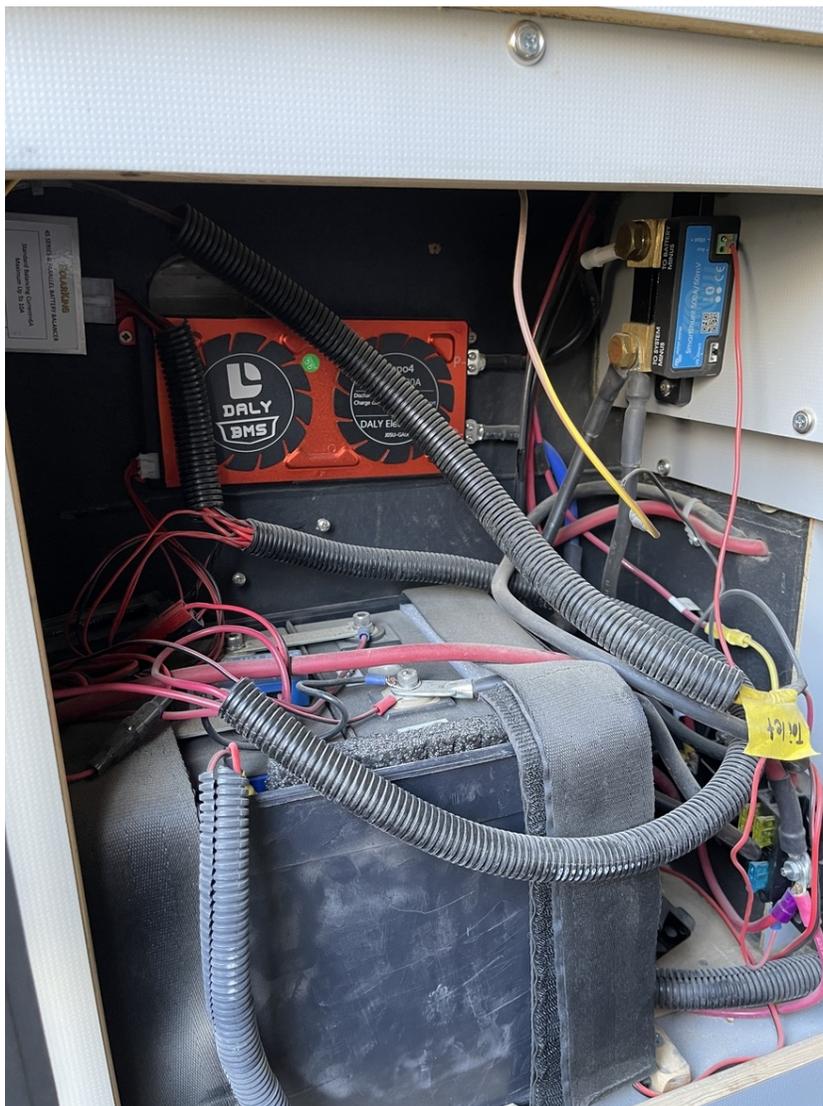
If you really want to dig into the various aspects of LiFePO₄ batteries, solar panels, and 12-systems watch YouTuber Will Prowse. I'd start with this video [HERE](#). This YouTuber's approach to building LiFePO₄ systems is a bit different from Freely Roaming.



Pictured is the beginning of my battery box build.



To conduct tests on my battery box set up, I simply connected all the pieces parts and put a load on the battery prior to placing the box in my camper.



Pictured is my LiFePO4 battery box in my camper's battery cabinet.

Wrap-Up

Do yourself a huge favor by upgrading your 12-volt house battery system. If you've ever had your refrigerator or furnace fan quit while camping or had to start your vehicle in the morning to recharge your house batteries while camping, you need to perform a 12-volt system upgrade using LiFePO4 batteries.

Relative to my remote electrical needs, the peace of mind I now have while camping in the backcountry is priceless. If you have specific questions for me after watching all the suggested videos, write me an email at bob.wohlers@discoveroffroading.com. I'll try to answer each inquiry. Be well; travel safe.

Author's Note: Many thanks to KP Pauley of Zero Declination for allowing me to

use some of his original content, plus his professional review of this newsletter's material. Another thank you to Freely Roaming for his fine battery box build.



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