HOW MUCH BATTERY POWER IS ENOUGH?

This age old question is answered with some real life experience

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Growing up in my house, it was quite common to hear, "Turn the lights off when you leave the room" or, "Who left the lights on? Do you think we are made of money?" Now that I have my own house, I get it. But what about on the boat? Many marinas have replaced the flat cost per day or cost per month with metered power so it makes sense to know how much your boat draws when you are not there. Are you using an efficient fan or a heater with a thermostat that turns off when the weather warms up? These are easy things to do and don't affect the way you use your boat, however, what about when you are at anchor or tied up at an outstation without power? How much power is enough?

Many evenings I have been visiting friends on their boat and find myself chatting by the light of a single candle or a small, yellowish lightbulb in an older bulkhead fixture. It's not flattering and it's not right. Since working with Jeff at Pacific Yacht Systems, I have learned a few things about electrical systems. I never really understood amps (A), amp-hours (Ah) or volts (V) and I couldn't figure out the battery monitor to save my life. After sitting through many presentations, editing articles and listening to Jeff speak with hundreds of clients, there are three simple things I would tell my younger boater self.

First thing is to decide what is "electrically" important to you and your crew. How much energy or amp hours do you use per day? The biggest draw on my boat is an older Nova Kool fridge, no way around it, that beast sucks up 40 to 50 amp-hours per day. I try to reduce the number of times I open and close the fridge so that the compressor does not have to come on, which saves energy. A great tip is to keep all your beverages in a cooler and just use the fridge for food. I make ice blocks in Tupperware containers while the boat is plugged into shore power and then drop them in the cooler for the weekend.

I have an older Bayliner and the galley was dark

1

V = Volts

Voltage is used to assess the approximate state-of-charge and to check for proper charging. For example, an at-rest, fully charged 12V battery bank will show about 12.6V to 12.8V. A 12V battery is 100 percent discharged when it reaches 10.5V under load. A 12V battery that is being charged with appropriate size charger or alternator will read above 13 VDC V to 14.6 VDC.

2

A = Amps

Amps is the flow of current in or out of the battery. Current is analogous to speed, it's the rate at which electricity is flowing. While driving a boat, you would say I'm doing 10 knots, and you would cover 10 miles if you travelled for one hour. Amps are similar to boat speed. For example, I am drawing 10 amps and, if the current was constant for one hour, you would say I used 10 amp-hours (more info on amp-hours below). Your fridge may draw six amps of current and this is displayed as -6.0A. Discharge is shown as a negative number and shows the number of amps that are being consumed. This is an important function to teach your crew as it serves as a good reminder to turn off unused lights, navigation equipment, etc. If you had no loads on your batteries, any charge going into the batteries (e.g. solar, alternator, charger) would show up as a positive number.

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and dingy before I installed Lunasea LED lights, so I want to use them. I have a tablet but prefer a keyboard so I want to use my laptop whenever I have the urge to google. I try to charge it completely when the generator is running and use the laptop battery for the rest of the day. I was surprised to learn that my older Xantrex Freedom 2500W inverter/charger onboard still draws two to three amps even when I am not using it so I have made a conscious effort to turn it off. Ironically, now I hear, "Who left the inverter on?" Turning the inverter off at night will save eight hours X 3A = 24 Ah for doing nothing! However, the cell phones have to stay charged so I installed a cigarette lighter / USB charger on the dash, this draws directly from the battery and I can keep the main inverter off.

The dinner hour, on my boat, is much later in the summer so I installed a dimmable LED light on the back deck. I also like to play my music for a few hours a day and during the evening. Add this to the 50 Ah my fridge draws and my total usage is 80 Ah per day.

I enjoy boating and openly admit that I am not a camper. It is nice to wake up in the morning to a good cup of coffee. On a rainy night, it is fun to watch a movie on a real TV, with popcorn. And yes, I dry my hair. Add in a warm crab dip with toasted pita at happy hour and my daily usage can be as high as 200 Ah.

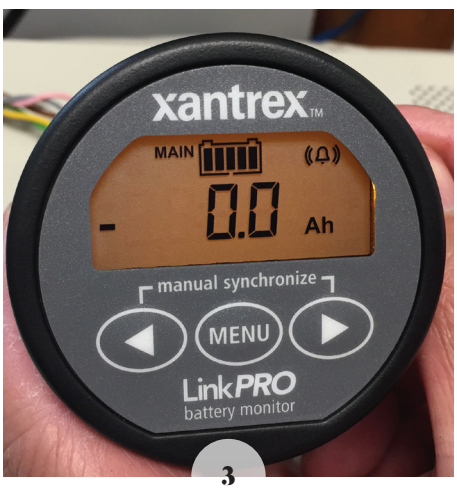
That brings us to the second thing I would tell my younger self, figure out how much battery power you have on board. My house bank has six flooded, lead acid golf cart batteries that store 660 Ah of battery power at 12 VDC. Remember, to extend the life of your lead acid batteries you should only deplete them to 50 percent, which means I have 330 usable amp-hours. Therefore, 330 Ah divided by 200Ah = 1.65 days of power. This means that I have to run my generator every two days.

I don't have room to add more batteries so I decided to add a 100W solar panel. On a sunny day in Howe Sound, the panel starts working at 06:00 and is still putting in power until the sun goes down at 21:00. That's 15 hours of sunlight. The panel I installed averages three amps per hour X 10 hours = 30 Ah/day. This helps offset my fridge, which uses 40 to 50Ah/day and I get an extra day without running the generator. Game changer.

Once you know how much power you use and how much power you have available, the third thing is to install a battery monitor or learn how to use the one you have installed. It truly is a gas gauge for your batteries. There are typically four screens (refer to images one to four) and two and three are the most important ones to look at.

ANOTHER NOTE TO remember, your hot water tank should not run off your batteries. On my boat, the hot water tank stays warm enough for two days of showers and dishes then I have to run the generator. If you plan on being in a busy anchorage and don't want to run the generator, one option is to buy a solar shower bag for quick rinses on the back deck. Also, I have a small electric kettle in the galley that I use to boil water for a single sink of dishes.

I did not understand the electrical on my boat when I started boating and I didn't know where to start or what questions to ask. When I did start asking questions, the answers were way over my head and, in many cases, the people I was asking did not have a complete understanding either. Don't be afraid to raise your hand. Knowledge is 12V or 110V power.



3

Ah = Amp-Hours

This shows the amount of energy stored or removed from the battery. If you run a 10A load for one hour then 10 Ah are consumed. The battery monitor will show -10 in the Ah display. During charging, the battery monitor will compensate for charging efficiency and count back up toward zero. A full battery is displayed as zero amp-hours or 0 Ah. Any draw from the battery is reflected as negative amp-hours or -47.9Ah and recharging will bring the number back to 0Ah.

4

H or t = Time

Don't worry about this one as hours left is calculated on the last four minutes of use, which doesn't give you any practical information. If this screen reads CCC then you know that the batteries are charging (generator is running).