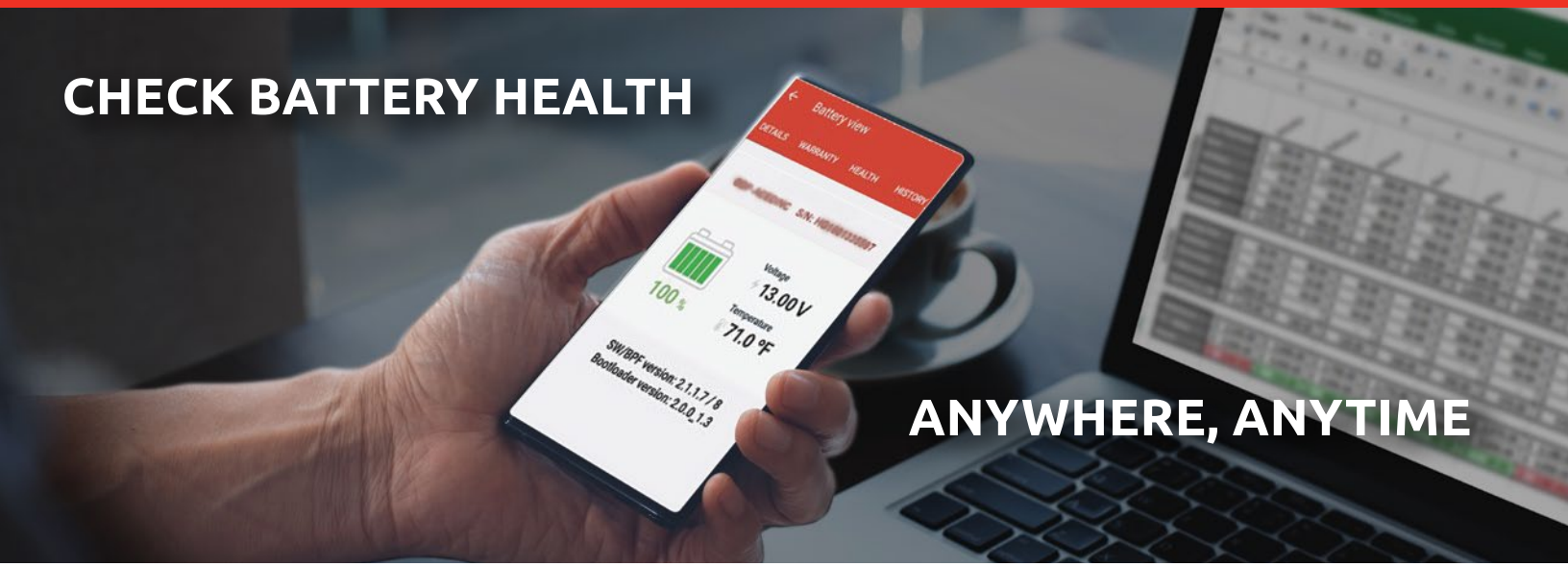
POWERING YOUR VESSEL FORWARD

Helpful tips and useful information to help get the most from your marine battery

- Check Battery Health Anywhere, Anytime
- Charging Ahead with Confidence
- Battery Design and Installation
- Five Tips for Optimal Power Performance
- Marine Maintenance Matters
- Key Signs it's Time for a Replacement
- Frequently Asked Battery Questions

ODYSSEY® BATTERY

www.odysseybattery.com



Not knowing a battery's true state of health can be trouble and may lead to unnecessary downtime. Thankfully, innovative monitoring software is now available to end-users that can actively track a range of battery health and performance data and then communicate that information directly to the customer via their cell phone or smart device.

With the ability to review battery trends on a 24/7 basis, additional benefits of a battery monitoring system include:

- State of Charge (SOC), battery voltage and temperature data tracking over a six-day period
- Access to battery operator parameter history from the first day of operation to analyze overall performance and spot anomalies that need correction
- Real-time access to battery State of Health (SOH) data

When it comes to powering your motorboat or luxury yacht, don't take any chances – consider investing in a battery monitoring solution and take control of the performance of your battery from anywhere, anytime. ■

CHARGING AHEAD WITH CONFIDENCE

As a rule of thumb, a digital voltmeter is usually the first step in determining the battery's State of Charge (SOC) as it measures its Open Circuit Voltage (OCV) to indicate the charge current required to provide a full charge. The battery manufacturer's specifications will ultimately determine what OCV corresponds to 100 percent SOC, as well as what type of charger is needed for that specific make and model. Using a marine battery charger with an AGM setting can help properly charge a variety of battery chemistries including flooded lead acid and Absorbed Glass Mat (AGM) batteries.

Generally, proper charging amperage requirements for a standard, dual-purpose AGM marine battery are as follows:

- Minimum recommended – 10 percent of the amp hour capacity
- Optimum recommended – 40 percent of the amp hour capacity
- Maximum recommended – 100 percent of the amp hour capacity

When it comes to giving your marine battery that extra jolt of energy, it's important to recharge with confidence. Do the necessary back-end research to ensure you're using the proper type of charging equipment based on the battery chemistry, make and model, and that you're performing the correct techniques per the battery manufacturer's guidelines.

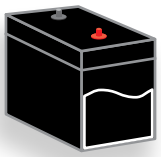
Just a few simple added steps in preparation prior to the actual purchase and operation of your marine battery and charger system can go a long way in overall investment. ■

BATTERY DESIGN AND INSTALLATION

Maritime enthusiasts now have a multitude of battery designs to choose from to power their vessel forward. Inadvertently investing in the wrong chemistry could be the difference between a fun day out on the water or costly equipment downtime that results in a delay in the excitement.

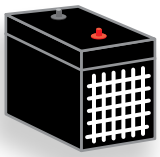
Here's a general overview of the current battery chemistries available for marine applications:

Flooded Lead Acid Batteries



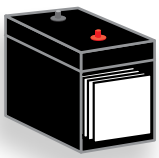
Flooded lead acid batteries generally have a higher rate of self-discharge. Extremes in temperature can also dramatically affect the battery's performance. Physical maintenance and human intervention are mandatory for proper operation, such as monitoring the battery's fluid levels and topping it off as directed by the manufacturer. This type of battery is not the most robust, with cases and covers not built to withstand the severe shock and vibration dished out during an exhilarating ride out on the water. If the battery case cracks, acid could leak from the battery. Excessive vibration can damage the battery's internal components.

AGM Batteries



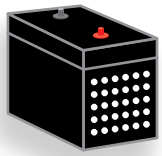
Absorbed Glass Mat (AGM) batteries are engineered to withstand extreme temperatures, making them an excellent option for seasonal marine applications. They feature rugged construction, they're non-spillable and are shock and vibration resistant. However, not all AGM batteries are the same. It's beneficial to choose an AGM battery with an appropriate Cold Cranking Amperage (CCA) to give you adequate power to start your engine.

AGM Thin Plate Pure Lead Batteries



AGM Thin Plate Pure Lead (TPPL) technology takes the benefits of AGM batteries a step further with pure lead electrode plates that can be made thinner than standard AGM engineering so that more plates will fit than in a comparably sized conventional lead acid battery. The additional plates provide as much as 15 percent greater surface area, increasing the electrochemical reactions with the electrolyte. The result is significantly higher cranking power.

Lithium-ion Batteries



Lithium-ion batteries are also an option for boat owners, but they come with some inherent safety concerns due to thermal runaway and off-gas generation. They also require a very specific charging algorithm.

The way you install the battery into the marine application can also greatly affect its performance and longevity. As always, be sure to follow the manufacturer's guidelines for proper handling and care and direct any questions to your battery professional. A few general steps to take when installing a new battery into your vessel once the old one is removed are as follows:

- Make sure the battery is seated properly in the compartment and the battery's posts are in the right orientation.
- Attach the positive cable terminal to the positive terminal post on the battery. Tighten the nut with care.
- Replace the negative cable terminal to the negative terminal post on the battery. Again, tighten the nut with care.
- Reinstall the lid and hold-down if necessary and make sure it is secure. If you had to access your battery through a compartment, make sure the cables are secure inside, then close the lid. If your battery had an ON/OFF switch, switch it to the ON position.
- Switch on an electronic device to test the battery. If the device works, the battery is properly connected.

Depending on the location, weather conditions and the roughness of the water, boats can move through some serious turbulence, which can cause the onboard battery to bounce around. That's why proper installation is important so the battery cannot shift out of place once mounted. It's also a good practice to check them regularly after you experience irregular seas to help ensure nothing was damaged along the voyage.

FIVE TIPS FOR
OPTIMAL POWER PERFORMANCE

1

Use the Correct Charger

Make sure that your charger is designed for your type of marine battery. Conventional flooded lead acid batteries frequently require different charger systems and algorithms than AGM or lithium-ion batteries.

2

Practice Proper Storage

During the off-season, keep marine batteries stored in a cool, dry and well-ventilated place to help prevent corrosion and failure.

3

Conduct Routine Servicing and Maintenance

On a seasonal basis, or at least two times a year, check in on the battery to help ensure it's clean and in optimal condition, with no signs of a leak or cracks on the lid. Conventional lead acid batteries need topping up from time to time so check the electrolyte level and replenish as needed.

4

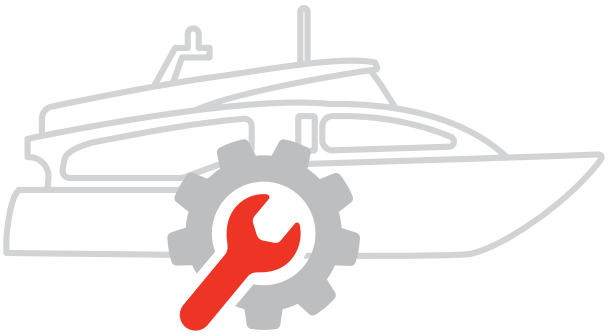
Stick to One Battery Type

Mixing different types of battery chemistries together into one application could lead to overcharging or undercharging, which can shorten the life expectancy of your battery bank.

5

Proper Installation

When installing a new battery, connect the terminals the correct way to minimize the chance of damage to the onboard electrical components.



MARINE MAINTENANCE MATTERS

When handling batteries, always use protective gloves and eyewear, as well as insulated tools. Be sure to follow the manufacturer's guidelines for proper battery maintenance and care and direct any questions to your battery professional.

- Check the battery's State of Charge (SOC)
- If the battery is a conventional flooded lead acid battery, check the electrolyte and replenish as needed
- Inspect the case, terminals, cables and clamps for damage, wear and dirt
- Check the battery for corrosion
- To clean the battery, disconnect it and wash dirt from the cables and connectors with ammonia or a paste of one part baking soda and three parts water
- Use an emery cloth for the battery terminals and use water to clean the case and clamps
- Rinse, dry and reconnect the battery, then coat the terminals with dielectric grease, anti-corrosion spray or petroleum jelly
- If the battery needs replacement, be sure to disconnect all cables from the battery before removing it from the vehicle

KEY SIGNS IT'S TIME FOR A **BATTERY REPLACEMENT**

A marine battery, however well maintained, will eventually run its course of life. When that time comes, how will you recognize the signs for replacement? Here are some tell-tale indicators to look out for during the battery's lifespan that point to poor health:

Onboard accessories start operating slowly

This may include a lot of today's technologically advanced onboard accessories such as the radio, navigation system and cabin lights.

The battery has difficulty holding a charge

For example, if you recharge your battery and notice it's depleting rapidly and the battery is unable to hold a steady charge.

The battery loses voltage quickly after recharge

Although it varies between battery chemistries and size, when a battery is fully charged it should have a voltage between 12-13.

The battery has shorter run times on the water

For example, if your boat begins to perform unusually and/or you notice your onboard accessories not working or slowing down.

The battery is leaking or cracked

Your battery can unexpectedly crack or start to leak for a variety of reasons including physical trauma, overcharging, acid build-up or extreme shock and vibration caused by rough terrain out on the water.

The battery's terminals are corroding

Over time, corrosion on battery terminals can cause sulfation or a build-up of sulfate crystals, which will drain the battery's life.

The boat feels slow-moving while accelerating

If a battery is in good condition and fully charged, the boat should be able to accelerate immediately upon ignition.

The engine won't turn over

If it takes more than a couple of seconds for the engine to do its job, there may be an issue with the battery.

FREQUENTLY ASKED QUESTIONS

Q: What is the best battery to use for my boat?

A: When choosing a battery, it is always important to be aware of any of the manufacturer's recommendation on sizing, whether it be physical size, typically denoted by a battery group size, or a specific cranking amp requirement for a motor. Your requirement could be only for starting, or it could be for back-up power. ODYSSEY® batteries from EnerSys do both extremely well. So, you can't go wrong with whatever you choose. TPPL technology is literally designed with boaters in mind.

Q: Is it possible to oversize (the battery for) my motorboat?

A: When it comes to motorboat batteries – the bigger the better. The larger the battery, the more power you will get out of it. But you do still have to take into consideration how much space you have available, and how much weight makes sense. You can run into a situation where you have more battery than you might feasibly need.

Q: Is there such a thing as a universal marine battery charger?

A: Battery chargers come in different varieties. They are made with different voltages, different amperages, on-board components, bench top, etc. Once you determine the voltage and amperage that you need, the next most important thing to consider is the battery type or chemistry. Chargers are indeed uniquely different if you have a conventional lead acid, a GEL, an AGM or even a lithium-ion battery. That said, make sure you choose a charger that fits your specific needs. They are not "one size fits all".

Q: What should I do if my marine battery fails while out on the water?

A: Battery failures also come in different scenarios. Is it a situation where your starting battery no longer starts? Or did you run out of power for your trolling motor? Maybe something else?

In any case, having a jump pack, or other source of portable power could be of great help. Chargers won't be of help if you don't have a source of electricity to power the charger. Solar chargers are always a good option but may take a while to generate enough power to get you back up and running. Unfortunately radio or phone communication may be your only option, so always go out on your boat prepared.

Q: What should I do if my marine battery fails while out on the water?

A: As mentioned above, the need for emergency battery power can be something very critical, especially when you're already out on the water. Having an additional battery or batteries available (if you have space) is not a bad idea. The only thing to remember is to properly maintain these batteries as well. A spare battery that is not charged will not be of much help if it doesn't work when you go to use it.

Contact your ODYSSEY® battery representative for more information by visiting our website at: **www.odysseybattery.com.**

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