

Par Caddy Tech Bulletin – Prolonging Battery Life

Please read this - it is very important! Charge your battery before 1st use and every 18 holes – the closer it is kept to full charge the longer it will last.

The subject of battery life is very complicated and there are many variables involved. Life of sealed lead acid and any other battery is dependent on a variety of factors including but not limited to: time between charges, duration of charge, level of discharge, idle time, storage conditions and duration and overall shelf time. The following is useful information and some tips to improve battery life and performance.

The Par Caddy uses a Deep-Cycle sealed lead-acid AGM (Absorbed Glass Mat) type battery. This type of battery is designed to deliver maximum capacity through hundreds of charge cycles. It can be operated in any position and will not leak. Due to the wide range of operating conditions, frequency of use, and variable discharge states after playing, golf carts are a very demanding application for a battery.

Some variables affecting battery life, performance and discharge state are:

1. Weight of load to be transported - if you have a large, heavy golf bag your battery will discharge more quickly and to a higher state of discharge.
2. Operation on hilly courses - the more hilly the course the harder it is on your battery
3. Friction - operating on rough surfaces requires more power, so like your golf ball, keep it in the fairway as much as possible, and out of the heavy rough.

The Par Caddy charger has a 3A output which is correct for a 33 - 40 AH battery to prevent overcharging and permanent battery damage. The discharge state determines how long it will take to fully recharge your battery. A 10-1 ratio is about right - $3A \times 10 = 30A$. According to the experts, a 12V AGM battery should never be discharged to a point where it only reads 10.5 V on a multimeter. At that point it is considered to be fully discharged. A 3A charger should recharge the battery at a rate of 3 amps per hour - therefore a fully discharged battery should take approx 10 hours to bring it back to 30AH - 11 hours to 33AH etc. This is the reason it is so important to recharge your battery after every use. If you don't, it will never get back to full capacity - and the effect is cumulative. If you recharge to 90% capacity, then discharge, your battery will be in a higher discharge state after the next use. This time it may only recharge to 80%, next time 70% etc. This is why after a few incomplete charge cycles, your battery may become sluggish or die after 13-14 holes - because it never achieved full charge. There is nothing wrong with the battery, it just isn't being completely charged every time.

Knowing the exact voltage of your battery can help determine it's exact state of health. Here's how to check it accurately. You will need a digital voltmeter or multimeter available at Canadian Tire or Walmart for about 10-15 dollars.

1. Leave the battery on the charger until the green light comes on - if the green light doesn't come on, take it off the charger after about 10 hours. The voltage immediately after charging should be about 13.5 V.
2. Let the battery "rest" off the charger for about 12 hours then test the voltage again. The following chart indicates the level of charge achieved:

12.6 - 12.8 V = 100% charged

12.4 - 12.6 V = 75-100% charged

12.2 - 12.4 V = 50-75% charged

12.0 - 12.2 V = 25-50% charged

11.7 - 12.0 V = 0-25% charged

If you're reading less than 12.4 V after the rest period, put the battery back on the charger for another few hours to try to get it into the 75-100% range.

Charger issues:

The slower you charge a battery the longer it will last.

Minimizing plate sulphation build-up by keeping your battery fully charged at all times, can extend its life by 300%.

Do not use a charger that does not completely shut off automatically or you risk overcharging and ruining your battery.

Do not use a charger with a rating of more than 10% of your battery's amp/hr rating. For a 40AH battery, charger should be no more than 4A output.

Keep your battery fully charged at all times without ever overcharging it. By doing so you will always have maximum power, eliminate additional sulphation build-up and extend the useful life.

Battery Warranty

Your Par Caddy battery is warranted for 6 months and the warranty is pro-rated as Par Caddy Canada Inc. has no control over your battery storage and maintenance practices. If you only get three months life out of your battery, you would receive a credit for half the value and could purchase a replacement battery from Par Caddy for half price.

We hope this clarifies some battery issues and stresses the importance of proper care and maintenance.

Battery Storage during the off-season

Your battery should be stored in a cool, dry environment during the winter months. As long it is kept close to full charge it should not freeze. Ideal storage temperature would be right around 32°F or 0°C.

It is a good idea to charge your battery for 8-10 hours every 4-6 weeks, especially if you are storing the battery in a warm environment. Warm conditions promote self-discharge more than cool conditions.

We do not recommend leaving the battery connected to the charger all winter long.

How to test your battery charger

Whenever there is a battery related problem, the question arises whether the battery is at fault or was it that the battery charger did not charge the battery properly. I spoke to my battery supplier technical guru about this and he advised me of the proper procedure for testing the output of the charger as follows.

1. You will require a digital multimeter or voltmeter - available at Canadian Tire or Walmart for about \$15.00 - sometimes on sale for under \$10.00
2. First test and note the uncharged battery voltage while not connected to the charger.
3. Now connect the charger to the battery and plug the charger into the outlet. Wait a few minutes for the charge to build.
4. Peel back the top of the battery bag to expose the terminals and test the voltage at the terminals. In effect you are testing the charger output, which should be greater than the uncharged battery voltage noted in the previous step.

The charger output should be anywhere from 12.5V to 14.8V depending on the depth of discharge of the battery it is connected to. The more discharged the battery is, the more power it will draw from the charger. If you are getting this reading your charger is OK.

Weak Cells

Your battery is comprised of several cells. Over time cells can become weak due to a variety of factors. The problem is that a battery with a weak cell or two will give normal voltage readings when tested with a multimeter. When placed under load (on the golf cart), it can cause erratic performance, such as incorrect responses to remote control commands, or running out of power after 13-14 holes. Generally you will see a low battery indicator light on the golf cart, depending on model. If your battery has weak cells it should be replaced.

Battery Specifications

Batteries are heavy and therefore expensive to ship. Par Caddy Canada Inc. will be happy to sell you a new battery, but with shipping costs it may be to your advantage to acquire your new battery locally. Here is what you need to get for your Par Caddy:

12V deep cycle SLA (sealed lead acid) rechargeable battery. For manual models 24-26 amp hours is adequate. For remote control models you will need 33-40 amp hour capacity.

This type of battery is readily available from any specialty battery retailer, or any handicap scooter dealer, as these use the same type of battery. You will need to connect your existing wiring harness to the new battery. **DO NOT** use a car battery . it will not work properly.

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