

# Batteries and Charging in Today's World

Battery Technology has remained unchanged for many years until it took a dramatic turn a few years back with the development of the AGM (Absorbed Glass Mat) Battery. Automobile manufacturers noted the need for increased battery capacity due to the heavy demands of today's cars.

Traditionally, battery plates have been suspended in a bath of acid, which limited the number of plates and the battery capacity. AGM Batteries use a higher number of plates with separators between the plates. More plates translate to higher capacity.

However, this also resulted in a few notable quirks. Once the voltage level approaches zero volts, they don't want to accept a charge. Adding to this problem is the fact that most modern battery chargers have some smarts integrated into them, and when they see zero volts, they think no one is home and they won't initiate a charge. Just to complicate things further, we have the problem of sulfation, most notable in cars that sit for long periods of time without being charged. This is a natural occurring process in all batteries; however, if a battery is not fully charged, the process accelerates. Sulfation results in reduced battery capacity and leads to total battery failure. A simple standing voltage test can confirm sulfation (below 12.6 volts for AGM batteries and 12.4 volts for standard batteries).

Fortunately, the folks who build the battery chargers have been hard at work building the next generation of smart chargers. There is a lot going on in these new chargers. They can determine if you are charging a six or twelve-volt battery, accommodate various types of batteries (standard, AGM, or lithium), charge a battery with a zero voltage output, and even reverse some of the sulfation in your battery.

For example, recently I had a problem with an AGM battery in a hotrod. I really did not wish to take the car apart to replace a battery that I recently spent a lot of money on. Tried as I would, I just couldn't get it to charge. I went out and purchased a little charger that was AGM compatible. I hooked it up, and several days later, the green light came on indicating that it was fully charged, problem resolved! Our old Buick lives on a Battery Tender during the winter months. Recently I noticed the green light had gone out and was only blinking occasionally; this was an indication that the battery was not at full charge. I connected one of these little chargers, and about three days later, the green light came on, success once again! Evidently, we were experiencing the effects of sulfation, and since it was in the early stages, the little charger was able to correct the problem.

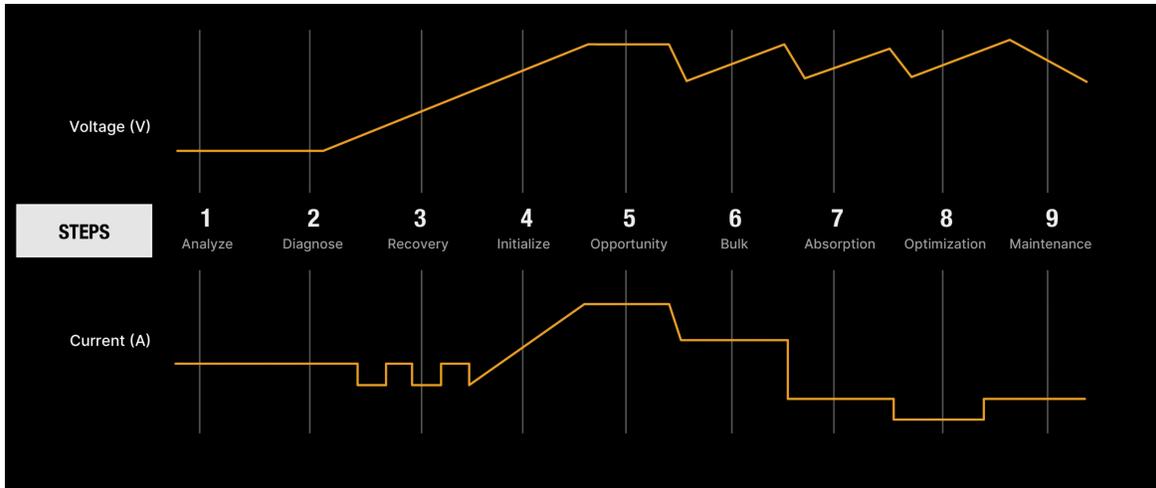
I am not here to promote any particular product or item; however, I will post an example of one I have found that works well. These come in various amperages and prices and are available through Amazon.



\$29.00

Just to give you an idea of what is happening when these little chargers are working. I have borrowed some information from the internet. I find it quite amazing to see what all is going on in that little charger.

JB



#### **STEP 1 & 2: ANALYZE & DIAGNOSE**

Checks the battery's initial condition, including voltage, state-of-charge, and health, to determine if the battery is stable before charging.

#### **STEP 3: RECOVERY**

Initializes the Recovery desulfation process (if needed) for deeply discharged or sulfated batteries by pulsing small amounts of current.

#### **STEP 4: INITIALIZE**

Starts the charging process with a gentle (soft) charge.

#### **STEP 5 & 6: OPPORTUNITY & BULK**

Begins with opportunity charging at a high current, then steps down to the Bulk charging process based on the condition of the battery and returns 80% of the battery's capacity.

#### **STEP 7: ABSORPTION**

Brings the charge level to 90% by delivering small amounts of current to provide a safe, efficient charge. This limits battery gassing and is essential to prolonging battery life.

#### **STEP 8: OPTIMIZATION**

Finalizes the charging process and brings the battery to maximum capacity. In this step, the charger utilizes multilayered charging profiles to fully recapture capacity and optimize the specific gravity of the battery for increased run time and performance. The charger will switch to Maintenance if the battery tells the charger that more current is needed.

#### **STEP 9: MAINTENANCE**

Continuously monitors the battery to determine when a maintenance charge should be initiated. If the battery voltage falls below its target threshold, the charger will restart the Maintenance cycle until voltage reaches its optimal state and then discontinue the charge cycle. The cycle between Optimization and Maintenance is repeated indefinitely to keep the battery at full charge. The battery charger can be safely left connected indefinitely without the risk of overcharging.