

Frequently Asked Questions

1. How should a battery be maintained?

Good battery maintenance allows you to get the maximum power and life from your battery:

- a). Always keep the Batteries in charged condition, charge them immediately after every discharge.
- b) Never deep discharge the batteries below the recommended end cell voltage.
- c) Do not try to add distilled water to the maintenance free batteries.
- d) Keep the terminal connection and vent plug in tight condition always.
- e) Give equalization charge periodically as per the recommendation.
- f) Never expose the batteries to direct sunlight and rain.

2. What is an AGM battery?

AGM is an abbreviation for "absorbed glass mat". In this battery design, the acid is completely absorbed into glass mat separators which are sandwiched between the lead plates. It's a totally sealed and maintenance free design. There are no discharge tubes or fillers caps, which eliminates the need to maintain water levels.

AGM batteries offer the following advantages over conventional batteries because:

- a) Their sealed, maintenance-free design means you never have to worry about checking nor maintaining their electrolyte levels.
- b) AGM batteries, unless physically damaged, will not leak or corrode the Module/container.
- c) Their lower self-discharge rate means they can sit for extended periods of time without constant monitoring. A conventional wet battery discharges 15% a month, where our AGM batteries discharge only 3% a month.
- d) You can expect a longer service life be expected from an AGM battery, the main reason conventional wet batteries fail is due to water levels that are not properly monitored and maintained.

3. What is a "maintenance-free" battery?

Maintenance-free batteries do not require the addition of Distilled water/ De-mineralized water after their initial fill of their water/acid electrolytic solution. It means that it is a "sealed" battery, with no filler caps.

Note that AGM batteries are always of this sealed, maintenance-free type.

4) What is a conventional (or "wet" or "flooded") battery?

These are the standard automotive type design battery, with individual push-in or screw-in battery cell access caps, and normally need the periodic addition of distilled water to "top up" the electrolyte level.

5. What is a Battery?

A battery or cell, can be any device that stores electrical energy in the form of chemical energy for later use. The word battery, is limited to an electrochemical device that converts chemical energy into electricity, by use of a galvanic cell. A galvanic cell is a fairly simple device consisting of two electrodes (an anode and a cathode) and an electrolyte solution. Batteries consist of one or more galvanic cells. A battery is an electrical storage device. Batteries do not make electricity, they store it. As chemicals in the battery change, electrical energy is stored or released

6. What are some of the major types of lead acid batteries?

Batteries are divided in two ways, by application (what they are used for) and construction (how they are built). The major applications are automotive, marine, and deep-cycle. Deep-cycle includes solar electric (PV), backup power, and RV and boat "house" batteries. The major construction types are flooded (wet), gelled, and AGM (Absorbed Glass Mat). AGM batteries are also sometimes called "starved electrolyte" or "dry", because the Absorbent Glass Mat is only 95% saturated with Sulfuric acid and there is no excess liquid. Flooded may be standard, with removable caps, All gel cells are sealed and a few are "valve regulated", which means that a tiny valve keeps a slight positive pressure. Nearly all AGM batteries are sealed valve regulated (commonly referred to as "VRLA" – Valve Regulated Lead-Acid).

7. How long will my battery last?

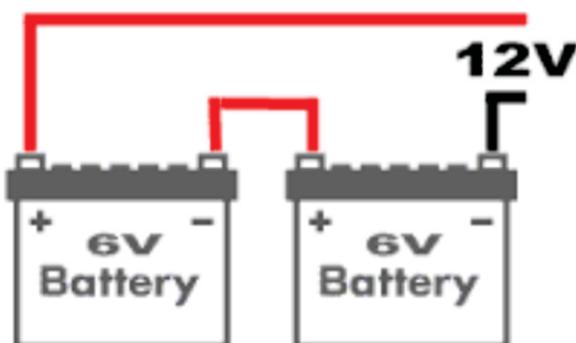
The lifespan of a battery will vary considerably with how it is used, how it is maintained and charged, temperature, and other factors.

8. What is a Sealed Maintenance Free Battery?

Sealed maintenance free batteries are made with vents that (usually) cannot be removed. No distilled water top up is required unlike that of a conventional batteries. Sealed batteries are not totally sealed since all batteries must allow gas to vent during abnormal charging condition. They can used in vertical and horizontal orientation as they are non spill-able.

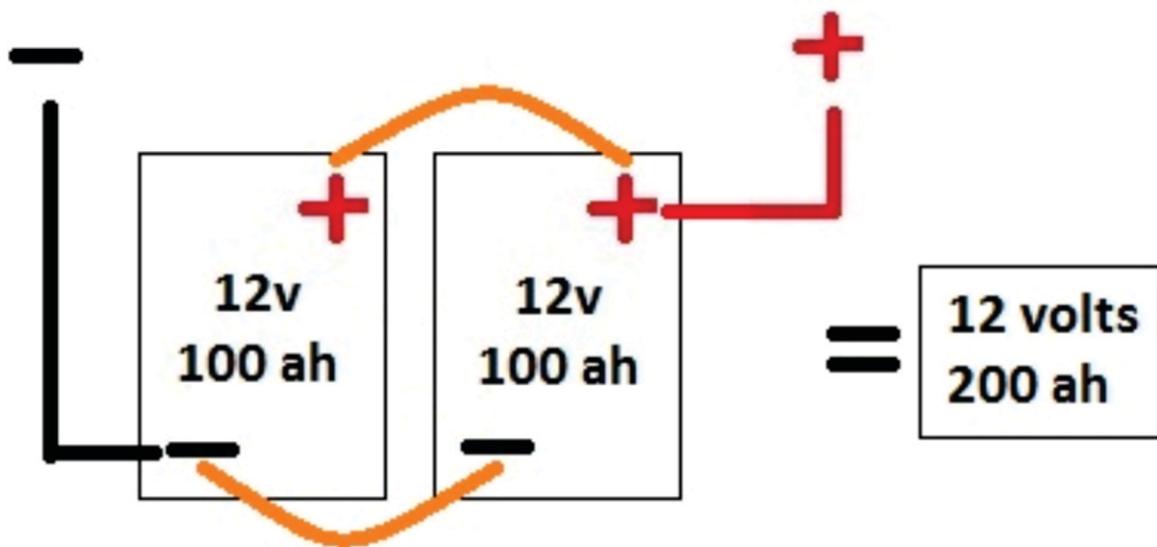
9. How to connect a battery in Series?

The positive terminal of the first battery is connected to the negative terminal of the second battery, the positive terminal of the second is connected to the negative of the third, etc. The voltage of the assembled battery is the sum of the cell voltages of the individual cells. So the batteries are connected: + to - to + to - to + to -, etc. The capacity of the battery is unchanged.



10. How to connect a battery in Parallel?

The positive terminal of the first battery is connected to the positive terminal of the second battery, the positive terminal of the second is connected to the positive of the third, etc. and The negative terminal of the first battery is connected to the negative terminal of the second battery, the negative terminal of the second is connected to the negative of the third, etc. So the batteries are connected: + to + to + and - to - to -. In this configuration, the capacity is the sum of the capacities of the individual batteries and voltage is unchanged. For example, if you take 6 nos of 2 V 100AH batteries and connect the batteries in series, you would end up with a battery array that is 12 Volts and 100AH. If you connect the batteries in parallel, you would end up with a battery array that is 2 Volts and 600AH.



11. Are lead acid batteries recyclable?

Lead acid batteries are 100% recyclable. Lead is the most recycled metal in the world today. The plastic containers and covers of old batteries are neutralized, reground and used in the manufacture of new battery cases. The electrolyte can be processed for recycled waste water uses. In some cases, the electrolyte is cleaned and reprocessed and sold as battery grade electrolyte. In other instances, the sulfate content is removed as Ammonia Sulfate and used in fertilizers. The separators are often used as a fuel source for the recycling process.

12. Where do I recycle my old batteries?

Lead, the most critical raw material in a lead acid storage battery is recyclable. Recycling an old battery to reclaim its lead content is not only socially and environmentally desirable. Old batteries may be returned to the HBL, we buy back old batteries as a part of our commitment to help protect the environment.

13. What is battery cycle life?

One cycle of a battery is a discharge from full charge to a desired depth of discharge and a return to full charge again. The total number of cycles a battery can perform before failure is called its Cycle Life.

14. Does overcharging damage batteries?

OVERCHARGING is the most destructive element in battery service. When the charger malfunction it tend to charge the batteries with more than the recommended voltage or current, overcharging begins to effect the batteries. During overcharging, excessive current causes the oxides on the plates of the battery to "shed" and precipitate to the bottom of the cell and also heat the battery, thus removing water from the electrolyte. Once removed, this material (which represents capacity) is no longer active in the battery. In addition, the loss of water from the electrolyte may expose portions of the plates and cause the exposed areas to oxidize and become inactive, thus reducing additional capacity. Sealed batteries are not immune from the same internal results when overcharged. In fact, sealed recombination absorption and gel batteries are particularly sensitive to overcharging. Once moisture is removed from the battery, it cannot be replaced. Portions of the battery damaged due to overcharging are irretrievable. However, if detected early, corrective adjustments to the charging device will save the undamaged portion of the battery. Initial signs of overcharging are excessive usage of water in the battery, continuously warm batteries, or higher than normal battery voltages while under the influence of the charger. If overcharging is suspected, correct immediately.

15. How are batteries rated and what do the ratings mean in battery selection?

The most common battery rating is the AMP-HOUR (AH) RATING. This is a unit of measurement for battery capacity, obtained by multiplying a current flow in amperes by the time in hours of discharge. (Example: A battery which delivers 50 amperes for 10 hours delivers 50 amperes times 10 hours, or 500 ampere-hours.)

16. Why freshening charge is required for VRLA battery?

A VRLA battery comes in fully charged condition. For any battery Shelf discharge is common observed phenomenon. During self-discharge the active material on the plates gets a converted into sulphate. This is called "sulphation" which means the formation of lead sulphate on the surface and in the pores of the active material of the plates. The reason for this is as follows.

Lead sulphation is formed as a result of local action or self-discharge of the plates. This happens by the action of the acid solution on the active material of the plates. Sulphation is a necessary part of the operation of battery and is not a source of trouble. The rate of sulphation depends on the concentration of the electrolyte and the ambient temperature.

This sulphation of plates will reduce performance of the battery drastically during service if it is not treated properly. This can easily be reduced/removed by charging the batteries at a low rate of current (say 2% of Ah capacity) for a prolonged duration of 60 hrs. If the batteries are stored for more than the specified period, it is strongly recommended that they should be charged as per the above before putting in to service.

Henceforth it is recommended that once in six months the battery shall be given freshening charge if they are connected to Load.

17. What is Depth Of Discharge(DOD) ?

DOD (depth of discharge): The depth of discharge can be described as “The amount of Ah drawn from the battery as a percentage of the rated capacity”. For e.g. from a fully charged 400Ah battery if we draw 320Ah i.e. 40Amps for 8 hrs discharge, it indicates that the DOD is 80%.

Further, depending on the DOD, the required quantity of active material only takes part in the chemical reaction and the remaining material will not participate in the chemical reaction. Hence lower the DOD higher the life in cycles, and higher the DOD lowers the life in cycles

18. What is Ripple content and what is its effect on the batteries?

Ripple content is defined as the AC component present in DC. If the ripple content in charging voltage & current is more than the specified level (voltage : $<3\%_{rms}$), it results in increase of temperature leading to dry out of the cell. This also causes increased rate of grid corrosion resulting in reduced life.

19. What is the effect of temperature on the life of batteries?

Normally the battery is designed to give a certain performance at a particular temperature 27°C . So, the battery gives its optimum life when operated at that temperature. But when the battery operated at elevated temperatures, like any other lead acid battery, the life will get adversely affected while the discharge performance improves, and vice versa. As a rule of thumb for every 10°C raise in average ambient temperature from the designed temperature the life of the battery gets reduced by half.