TECHNOLOGY • INNOVATION • DESIGN

BATTERY INFORMATION

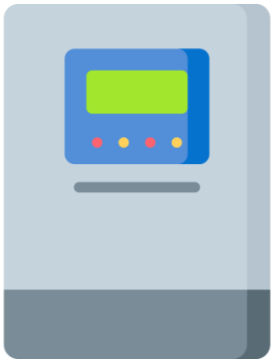
An inverter is a piece of standalone equipment that converts a direct current (DC) voltage to an alternating current (AC) voltage. The inverter's batteries store energy as direct current, and when the power goes out, the inverter converts the stored energy into alternating current to power our home appliances.

Ah (also known as ampere hours or amp hours) is the amount of energy charge in a battery that enables one ampere of current to flow for one hour. Simply put, 1 Ah is the rating which indicates how much amperage a battery can provide for one hour. The unit is a useful metric to determine the capacity of an energy storage device, such as a rechargeable battery or deep-cycle battery.

When a solar inverter uses a battery, there are multiple factors to consider before deciding how the battery is to be used. They can be used for self-consumption, backup for both, but the type and capacity of a battery is important. ("Self-consumption" refers to the constant cycling/use of batteries when solar power is insufficient to power the loads.)

Lithium Iron phosphate (LiFePO4) batteries are a type of lithium ion (Li-Ion) rechargeable battery. Their benefits over the more traditional cobalt-based Li-Ion batteries include increased power output, faster charging and longer lifetime. They are also smaller and lighter than the same capacity lead-acid batteries. (LiFePO4 batteries should not be discharged completely - it is recommended to keep at least 20% capacity after a discharge cycle, thus only 80% of the battery capacity should be used to ensure optimal life cycles)

Lead-Acid and gel batteries are generally used for backup (grid failure and load-shedding), as they have significantly less lifetime than lithium-ion batteries. Using them often would mean replacing them sooner. The rate at which the battery is charged/discharged will also influence its lifespan.



INVERTER BATTERY LIFE

- Average battery life has become shorter as energy requirements have increased. Lifespan depends on usage and depth of discharge - usually 6-48 months - yet only 30% of all batteries reach the 48-month mark.
- Lead acid and gel batteries are designed for occasional or infrequent (stage 1 and 2) load shedding.
- High loadshedding schedules have resulted in reduced run-time on the batteries, as these types of batteries require a minimum of 48-72 hours of uninterrupted charging after each discharge, to ensure they perform at optimum levels.
- The advent of stage 4 to stage 6 load shedding significantly reduces this indicative lifespan of the battery, as the batteries are not able to recharge for the minimum uninterrupted charging cycle.
- It is important to note that premature damage to a battery due to improper use, impact from load shedding or anything other than factory default, is not covered by the manufacturer's warranty.

NUMBER OF DISCHARGES AND RECHARGES

- Current loadshedding schedules of proposed daily blackouts are in a range of up to four hours per day per week. The reality is that it could be shorter, longer and with frequencies from twice a day up to every three days or more.
- This daily load shedding condition represents a cycle (recurring) application for batteries that are meant for application as a standby. Therefore, early capacity loss of your battery can be expected, leading to earlier battery replacement as you go through the number of cycles of a battery sooner than expected.
- NB: If an inverter unit is used within capacity, the life of the battery will be prolonged and give extended charging cycles.

INSUFFICIENT RECHARGE

In normal conditions, a battery needs to be overcharged in a range of 5 to 10 percent and an inverter application requires around 72 hours after a deep discharge. Therefore, under high load shedding conditions with daily discharge (if the battery bank is exposed to deep discharges) the battery bank will not be fully recharged at the next load shedding event. This leads to a faster capacity loss due to insufficient recharge, as well as plate crystallization which may damage the battery prematurely.

BATTERY TEMPERATURE

Battery life will be reduced by half for each 10C above the designated temperature. A high temperature environment will impact battery life and as a consequence, an early battery replacement can be expected. The hotter a battery, the faster chemical reactions will occur. Although high temperatures sometimes lead to increased performance, this will result in faster discharge and a corresponding loss of battery life.

- Keep your batteries away from direct sunlight or sources of heat.
- Install your batteries in a well-ventilated area for optimum performance.

RECOMMENDATIONS

- We recommend you take your inverter batteries to be charged and/or reconditioned should you have a situation where you do not have power for an extended period.
- Leaving batteries flat without charge is detrimental to their lifespan.
- Lead acid batteries are not like your cell phone battery where it can stand partially charged and still recover fully
- We recommend that during high stages of load shedding (stage 3 to stage 8), the inverter power switch is turned off and only used within the safety parameters of your inverter, as stated in the user manual.
- If you have a hybrid unit that charges through electrical mains and solar, we recommend you acquire a portable solar panel to recharge your unit during load shedding.
- Once batteries have reached their maximum cycle, the warranty is void as they will have reached their end-of-life. Therefore, during constant load shedding - stage 2 upwards we recommend the inverter's power switch be kept off. Then, only switch it on when the need for backup power is crucial.