

SOUTH AFRICAN INTRUDER DETECTION SERVICES ASSOCIATION (SAIDSA) NPC

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BATTERIES – LEAD ACID / GEL vs. LITHIUM

Intruder alarms have traditionally made use of Sealed Lead Acid or Gel batteries over the years with reasonable success.

However, since the introduction of loadshedding due to the unreliable electricity grid, these batteries can no longer be considered 'fit for purpose' under all conditions.

After much consultation with industry experts and battery manufacturers, as well as numerous tests, SAIDSA has concluded that Lead Acid and Gel batteries cannot perform reliably during higher loadshedding stages or multiple power cuts in a single day and battery failure is inevitable. As these batteries require up to 10 hours of charging, there is insufficient time to fully charge the battery before the next loadshedding stage.

The lifetime is vastly reduced due to the constant charge and discharge cycles. (Only 300 cycles before the battery loses its capacity). This means that your customers will have to replace their batteries more often. Most manufacturers are no longer providing guarantees on these batteries.

LITHIUM BATTERIES – THE WAY FORWARD

Lithium-Ion Phosphate Batteries (LifePO4) are proving to be the viable alternative when powering intruder alarms.

Unlike Lead Acid and Gel batteries, they can deliver 2000-3000 charge / discharge cycles and, if using the correct Lithium charger, they can charge up to 5 times faster.

While the cost is far higher, their efficiency outweighs the cost by far.

What Is a Lithium Battery Charger?

Like the lead-acid charging system, a lithium battery charger is a voltage-limiting device that aids in batteries' safe charging. The two battery types have different chemistry for creating energy, so they need corresponding chargers to meet those chemistry needs. Lithium battery chargers can safely charge lithium batteries at a much higher voltage. At the same time, they give the chemical interactions within, a longer lifespan.

Can You Charge a Lithium Battery with a Regular Charger?

If you used a regular charger, the lithium battery would charge. However, it would charge far more slowly. Lead-acid chargers use a lower voltage by design. If they didn't limit voltage significantly, batteries would overheat, leading to fire or even an explosion! Because lead-acid chargers must use a lower voltage to charge batteries, they can only fill around 80% of a lithium battery, which is not good for the battery. It stresses lithium chemistry and reduces the battery's lifespan. So, not only will you need many more hours of charging time with a regular lead-acid charger, but you'll also be damaging your lithium batteries in the process.

Are Lithium Batteries Safe?

LifePO4 are the safest type of Lithium battery as they are not prone to overheating. Even if they are punctured, they won't catch on fire.

The Cathode material is also non-hazardous and therefore poses no environmental or negative health hazards.

PROs and CONs of Lithium Batteries

PROs

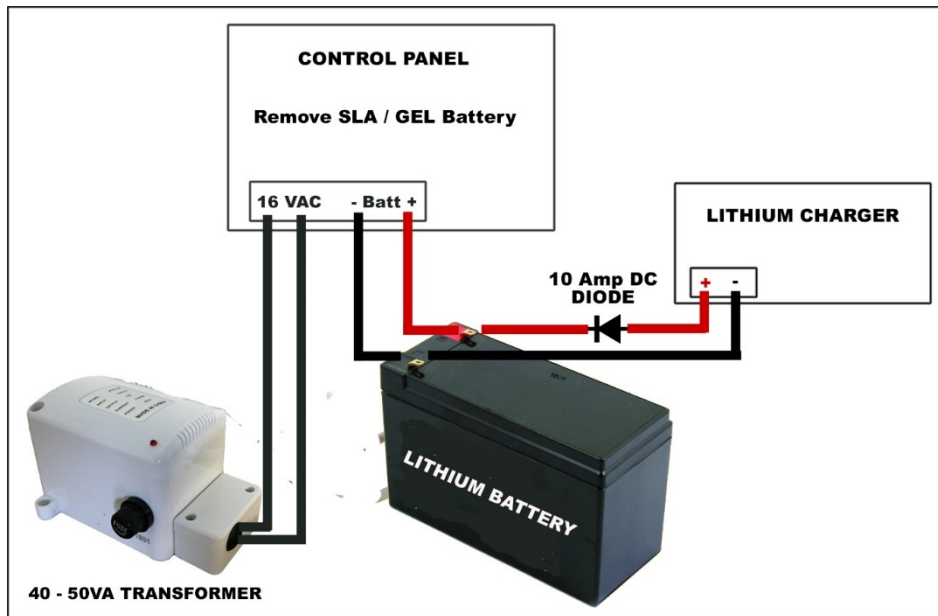
- Longer lifespan.
- Faster charging
- Capable of 2000-3000 charge / Discharge cycles
- Long run costs cheaper than Lead Acid or Gel

CONs

- Higher initial cost
- Discharge curve is steep, allowing no warning before total discharge.

IMPORTANT things to remember.

- Where it is possible to perform parallel connections with Lead Acid or Gel batteries, this should **NOT** be done with Lithium batteries unless specified by the Lithium battery supplier.
- Where Lead Acid / Gel batteries are connected in Series or parallel, Lithium batteries of the same type and condition must be used for series connection and only when permitted by BMS of the specific lithium battery.
- Lithium batteries are **NOT** a drop-in replacement for Lead Acid / Gel in an alarm control panel. A Lithium battery requires a higher charge current.
- ***(See the recommended connection diagram below).***



The following clauses have been added to Bylaw 5:

5.2.4 All batteries should be used in accordance with manufacturers specifications in terms of Series/Parallel connections, size and type of charging circuit as well as housing and ventilation requirements.

5.2.6 Where lead acid or gel batteries are added, batteries of the same type and condition must be used and be switched over using a relay on AC fail.

5.2.7 Where a security system is connected via solar or inverter, it must be installed in accordance with SANS 10142/1/2 where applicable.

5.2.8 Where Lithium technology is used, the following cable diameters are recommended: (7-17A/H batteries only)

- *Up to 3 metres – 1mm core diameter.*
- *3 to 10 metres – 1.5mm core diameter.*

5.2.9 Cable distance should not exceed 10 metres.

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