

## WILL LEAD ACID TO LI-ION BATTERY CONVERSION REQUIRE SPECIAL END-USER FRIENDLY SOLUTIONS?

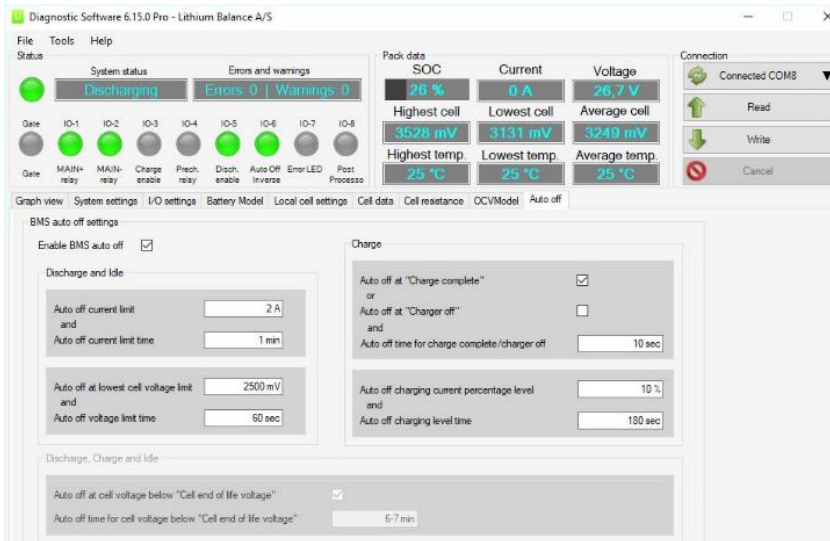
Most of the articles and discussion related to conversions from LA to LI-ION technology in Light Electric vehicles or industrial machines, such as forklifts, deal with hard-core business case and Total Cost of Ownership calculations, which now is showing a favorable advantage of Li-ION.

### But what about the End-user – the truck fleet owner and his staff operating the forklifts?

In many cases the Li-ION battery need to be handled in a different way, than the Lead-Acid battery.

Most of the pre-cautions are handled by an advanced BMS, which ensure the safe operation of the vehicle. However, it would also be an advantage if the Li-ION battery would better support the operational habits of the staff, who are used to drive a forklift – but maybe not acquainted with the possibilities with Li-ION.

Normally it is not a good idea just to leave the forklift in the charger, if it is LA battery, but for Li-ION it is not a problem – if the charge process can be stopped automatically when the battery balancing has ended.



In addition, it is not a problem to just leave a LA battery plugged into a vehicle, whereas the Li-ION BMS will require some energy to preserve operation. Energy that gradually consumes the battery capacity, which means that after a vacation period, the battery could be drained completely.

The BMS should ensure, that the operators will have an equally good experience, whatever they work with LA battery or Li-ION batteries.

The above is the example from Lithium Balance s-BMS configuration tool, where it is possible to freely configure AUTO-OFF settings:

1. Decide if the auto-off function should be enabled
2. Decide how long time the idle time should be before the auto-off function is engaged
3. Decide how much (low) current should be flowing before it is considered as idle.
4. Decide how balanced the pack should be before the BMS engage the auto-off function

The parameters can be configured by the battery designer and thus, he can ensure that the operator of the forklift, will experience a user-friendly system, without high maintenance or special bill boards saying, “**NEVER LEAVE THE FORKLIFT PLUGGED IN!**” etc. The new function is part of Lithium Balance s-BMS v6.15 which is released 16<sup>th</sup> March 2018 in both the **SERVICE** tool and in the full **PRO** version for battery configuration.

The c-BPU Battery protection unit is delivered with the engage “KEY”, which will wake-up the system after an auto-off.

