NomoStor

CalBatt™
premium charging technology

The problem

A crucial question arises in dealing with batteries:

How to control the charging power to achieve maximum efficiency while meeting power availability and charging time constraints?

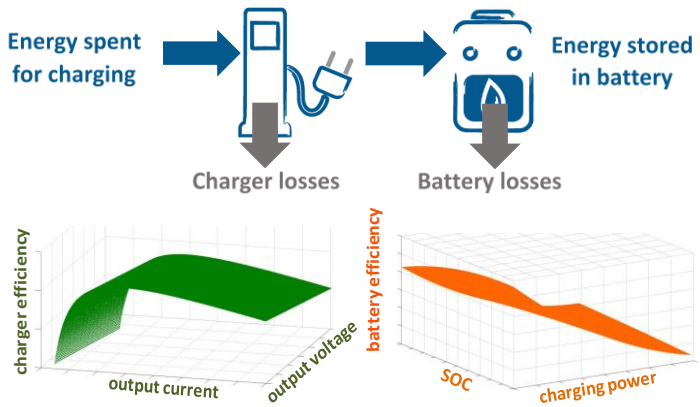
Being able to manage effectively this dilemma is the enabling factor to win competition in the development of a large series of devices: EV chargers, UPS, storage systems, gensets.

Efficient battery charging is, in fact, not just a matter of hardware, since a poor control of the charging power can make the real efficiency achieved on the field remarkably lower than the peak efficiency attainable, jeopardizing in part the effort of introducing more efficient chargers and batteries. This is because charging efficiency actually depends on the mutual interaction between the efficiency performance of the battery and the charger, which show a complex dependence on:

- charging parameters (current and voltage);
- specific characteristics of the two devices, which vary during the life of the vehicle because of components aging and even every day during the charging process, because of the continuous variation of the battery state of charge.

Traditional technology

Traditional charging management technologies are based on constant-current/constant-voltage charging profiles using pre-defined thresholds which do not take into account actual efficiency characteristics of the specific battery/charger set. This makes traditional charging resulting in energy waste, poor battery care and poor quality of service.



NomoStor technology

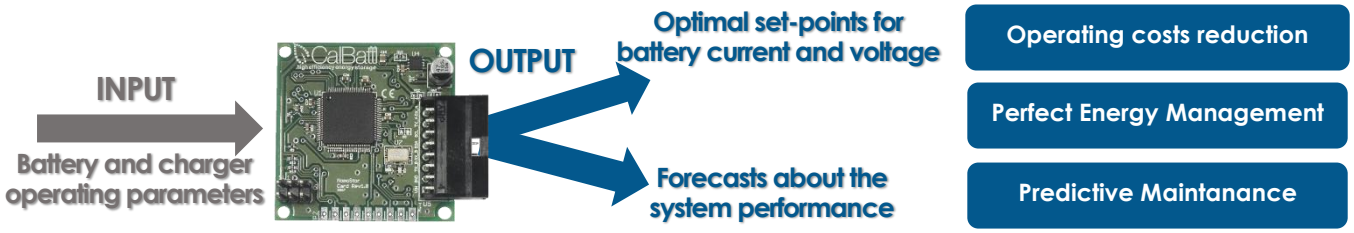
NomoStor is the **patented** innovative technology developed by CalBatt for the **real-time characterization and forecast of efficiency performance** of both the charger and the battery during the charge.

Thanks to this unique feature, NomoStor technology allows to perform a **"what-if"** analysis to know which would be the instantaneous charging efficiency related to each possible charging power, and perform accordingly an optimized **dynamic modulation of the charging power**.

Unique benefits

- ✓**Maximum energy saving**, increasing the real charging efficiency by up to **15%**
- ✓**Maximum battery life** , reducing battery temperature by up to 4°C and increasing battery life by up to **25%**
- ✓**Maximum money saving**, thanks to a perfectly coordinated charging management allowing to spread the charge intelligently in a demand response scenario
- ✓**Forecast**, allowing to predict the efficiency performance of both the charger and the battery for predictive maintenance and smart Energy Management Systems implementation

Synthetizing complex information into simple answers



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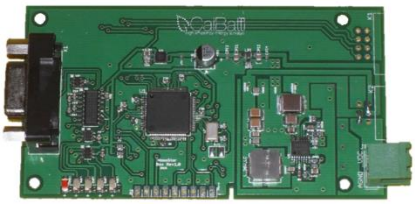
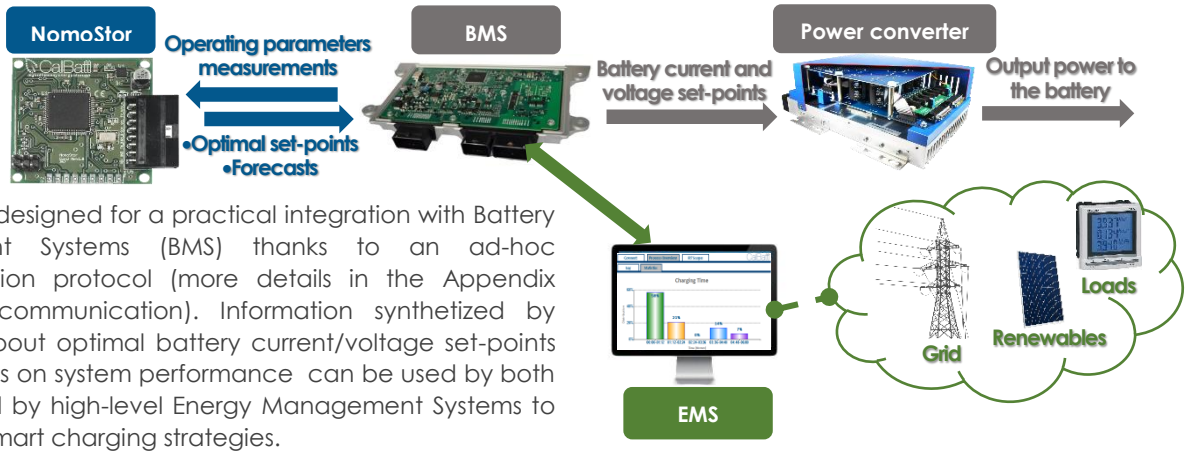
Two versions for maximum versatility

Compact

Flexible



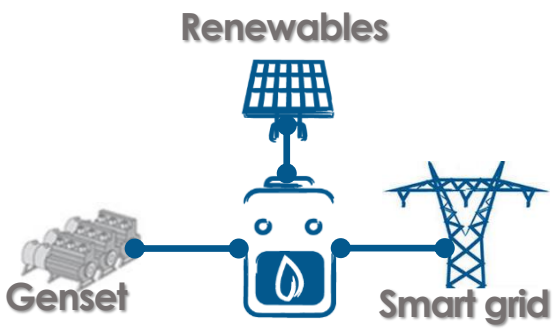
Compact	Flexible
Supply Voltage: 3,3 V; 5V (Two options)	**Supply Voltage:** 7-36 V (Wide range)
Communication protocols: I2C, UART	**Communication protocols:** RS232



NomoStor is designed for a practical integration with Battery Management Systems (BMS) thanks to an ad-hoc communication protocol (more details in the Appendix "NomoStor communication). Information synthetized by NomoStor about optimal battery current/voltage set-points and forecasts on system performance can be used by both the BMS and by high-level Energy Management Systems to implement smart charging strategies.

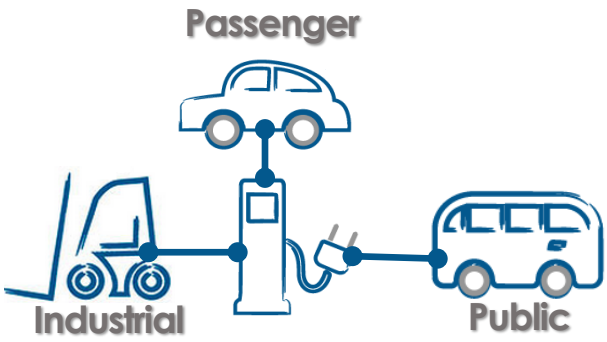
A broad application range

Stationary storage



- ✓ **Efficient Hybrid Gensets:** operation costs reduction for diesel gensets using batteries
- ✓ **Perfect Renewable Integration:** maximum self-consumption of renewables sources
- ✓ **Smart-grid ready UPS:** maximum PUE of UPS used also to provide ancillary grid services

E-mobility



- ✓ **Industrial energy efficiency:** minimum energy costs for industrial electric fleets
- ✓ **Tailor-made EV charging:** optimal daily charging of EVs according to charging time constraints
- ✓ **Efficient public transportation:** perfectly coordinated charging of public EV fleets