

# Types of lithium ion batteries used in electric vehicles

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BAT512132410 - The Victron Lithium-iron-phosphate ( $\text{LiFePO}_4$  or LFP) battery is the safest of the mainstream li-ion battery types. With Bluetooth cell voltages, temperature and alarm status can be monitored. Very useful to localize a (potential) problem, such as cell imbalance.

Lithium-iron-phosphate ( $\text{LiFePO}_4$  or LFP) is the safest of the mainstream li-ion battery types. The nominal voltage of a LFP cell is 3,2V (lead-acid: 2V/cell). A 12,8V LFP battery therefore consists of 4 cells connected in series; and a 25,6V battery consists of 8 cells connected in series.

A LFP battery does not need to be fully charged. Service life even slightly improves in case of partial charge instead of a full charge. This is a major advantage of LFP compared to lead-acid. Other advantages are the wide operating temperature range, excellent cycling performance, low internal resistance and high efficiency (see below).

The charge process of lead-acid batteries becomes particularly inefficient when the 80% state of charge has been reached, resulting in efficiencies of 50% or even less in solar systems where several days of reserve energy is required (battery operating in 70% to 100% charged state). In contrast, a LFP battery will still achieve 90% efficiency under shallow discharge conditions.

LFP batteries are expensive when compared to lead-acid. But in demanding applications, the high initial cost will be more than compensated by longer service life, superior reliability and excellent efficiency.

Our LFP batteries have integrated cell balancing and cell monitoring. Up to 5 batteries can be paralleled and up to four 12V batteries or two 24V batteries can be series connected, so that a 48V battery bank of up to 1500Ah can be assembled. The cell balancing/monitoring cables can be daisy-chained and must be connected to a Battery Management System (BMS).

Our aim is to become the UK's preferred online retailer of quality renewable energy products and accessories. Our ethos is one of outstanding customer service and competitive pricing.

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