

# 12,8 & 25,6 Volt Lithium-Iron-Phosphate Batteries Smart With Bluetooth

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## Why lithium-iron-phosphate?

Lithium-iron-phosphate (LiFePO<sub>4</sub> 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.

### Rugged

A lead-acid battery will fail prematurely due to sulfation:

- If it operates in deficit mode during long periods of time (i.e. if the battery is rarely, or never at all, fully charged).
- If it is left partially charged or worse, fully discharged (yacht or mobile home during wintertime).

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).

LFP is therefore the chemistry of choice for demanding applications.

### Efficient

In several applications (especially off-grid solar and/or wind), energy efficiency can be of crucial importance. The round-trip energy efficiency (discharge from 100% to 0% and back to 100% charged) of the average lead-acid battery is 80%.

The round-trip energy efficiency of a LFP battery is 92%.

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.

### Size and weight

Saves up to 70% in space

Saves up to 70% in weight

### Expensive?

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.

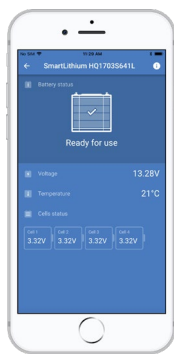
### Bluetooth

With Bluetooth cell voltages, temperature and alarm status can be monitored.

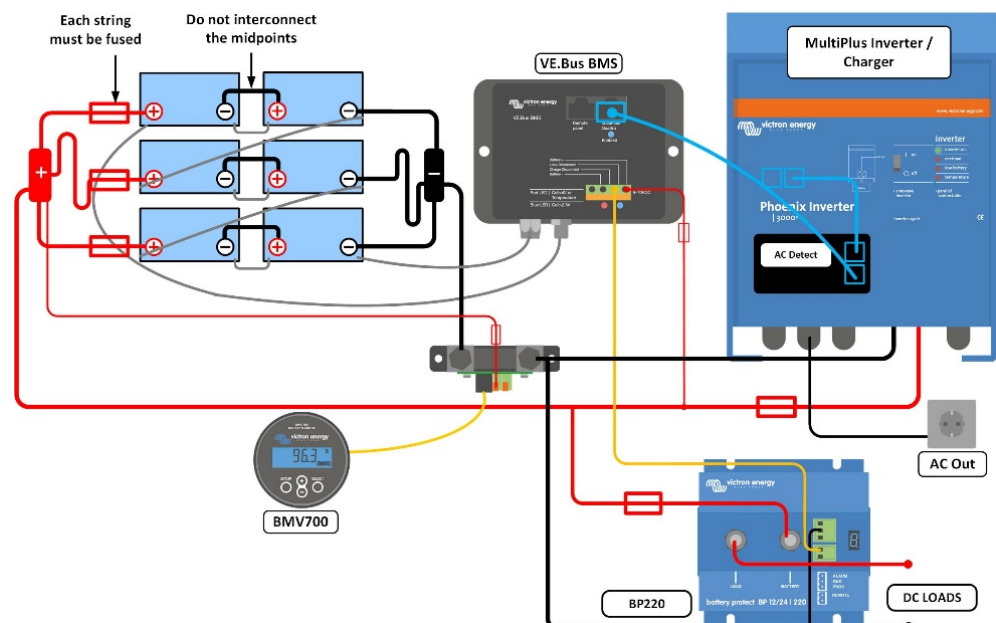
Very useful to localize a (potential) problem, such as cell imbalance.



12,8V 300Ah LiFePO<sub>4</sub> Battery



Li-ion app



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).

### Battery Management System (BMS)

The BMS will:

1. Generate a pre-alarm whenever the voltage of a battery cell decreases to less than 3,1V (adjustable 2,85-3,15V).
2. Disconnect or shut down the load whenever the voltage of a battery cell decreases to less than 2,8V (adjustable 2,6V-2,8V).
3. Stop the charging process whenever the voltage of a battery cell increases to more than 4,2V.
4. Shut down the system whenever the temperature of a cell exceeds 50°C.

See the BMS datasheets for more features

| Battery specification                    |   |                       |                       |                         |                         |                       |                       |
|--|---|-----------------------|-----------------------|-------------------------|-------------------------|-----------------------|-----------------------|
| VOLTAGE AND CAPACITY                     | LFP-Smart<br>12,8/60  | LFP-Smart<br>12,8/100 | LFP-Smart<br>12,8/150 | LFP-Smart<br>12,8/160-a | LFP-Smart<br>12,8/200-a | LFP-Smart<br>12,8/300 | LFP-Smart<br>25,6/200 |
| Nominal voltage                          | 12,8V   | 12,8V                 | 12,8V                 | 12,8V                   | 12,8V                   | 12,8V                 | 25,6V                 |
| Nominal capacity @ 25°C*                 | 60Ah  | 100Ah                 | 150Ah                 | 160Ah                   | 200Ah                   | 300Ah                 | 200Ah                 |
| Nominal capacity @ 0°C*                  | 48Ah  | 80Ah                  | 125Ah                 | 130Ah                   | 160Ah                   | 240Ah                 | 160Ah                 |
| Nominal capacity @ -20°C*                | 30Ah  | 50Ah                  | 75Ah                  | 80Ah                    | 100Ah                   | 150Ah                 | 100Ah                 |
| Nominal energy @ 25°C*                   | 768Wh   | 1280Wh                | 1920Wh                | 2048Wh                  | 2560Wh                  | 3840Wh                | 5120Wh                |
| *Discharge current ≤1C                   |   |                       |                       |                         |                         |                       |                       |
| CYCLE LIFE (capacity ≥ 80% of nominal)   |   |                       |                       |                         |                         |                       |                       |
| 80% DoD                                  | 2500 cycles   |                       |                       |                         |                         |                       |                       |
| 70% DoD                                  | 3000 cycles   |                       |                       |                         |                         |                       |                       |
| 50% DoD                                  | 5000 cycles   |                       |                       |                         |                         |                       |                       |
| DISCHARGE                                |   |                       |                       |                         |                         |                       |                       |
| Maximum continuous discharge current     | 120A  | 200A                  | 300A                  | 320A                    | 400A                    | 600A                  | 400A                  |
| Recommended continuous discharge current | ≤60A  | ≤100A                 | ≤150A                 | ≤160A                   | ≤200A                   | ≤300A                 | ≤200A                 |
| End of discharge voltage                 | 11,2V   | 11,2V                 | 11,2V                 | 11,2V                   | 11,2V                   | 11,2V                 | 22,4V                 |
| OPERATING CONDITIONS                     |   |                       |                       |                         |                         |                       |                       |
| Operating temperature                    | Discharge: -20°C to +50°C    Charge: +5°C to +50°C          |                       |                       |                         |                         |                       |                       |
| Storage temperature                      | -45°C to +70°C  |                       |                       |                         |                         |                       |                       |
| Humidity (non-condensing)                | Max. 95%  |                       |                       |                         |                         |                       |                       |
| Protection class                         | IP 22   |                       |                       |                         |                         |                       |                       |
| CHARGE                                   |   |                       |                       |                         |                         |                       |                       |
| Charge voltage                           | Between 14V/28V and 14,4V/28,8V (14,2V/28,4V recommended)   |                       |                       |                         |                         |                       |                       |
| Float voltage                            | 13,5V/27V   |                       |                       |                         |                         |                       |                       |
| Maximum charge current                   | 120A  | 200A                  | 300A                  | 320A                    | 400A                    | 600A                  | 400A                  |
| Recommended charge current               | ≤30A  | ≤50A                  | ≤75A                  | ≤80A                    | ≤100A                   | ≤150A                 | ≤100A                 |
| OTHER                                    |   |                       |                       |                         |                         |                       |                       |
| Max storage time @ 25°C*                 | 1 year  |                       |                       |                         |                         |                       |                       |
| BMS connection                           | Male + female cable with M8 circular connector, length 50cm |                       |                       |                         |                         |                       |                       |
| Power connection (threaded inserts)      | M8  | M8                    | M8                    | M8                      | M8                      | M10                   | M8                    |
| Dimensions (hwxwd) mm                    | 240 x 285 x 132   | 197 x 321 x 152       | 237 x 321 x 152       | 237 x 321 x 152         | 237 x 321 x 152         | 347 x 425 x 274       | 317 x 631 x 208       |
| Weight                                   | 12kg  | 15kg                  | 20kg                  | 20kg                    | 22kg                    | 51kg                  | 56kg                  |
| *When fully charged                      |   |                       |                       |                         |                         |                       |                       |