

# 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.

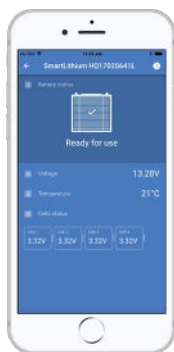
### Bluetooth

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

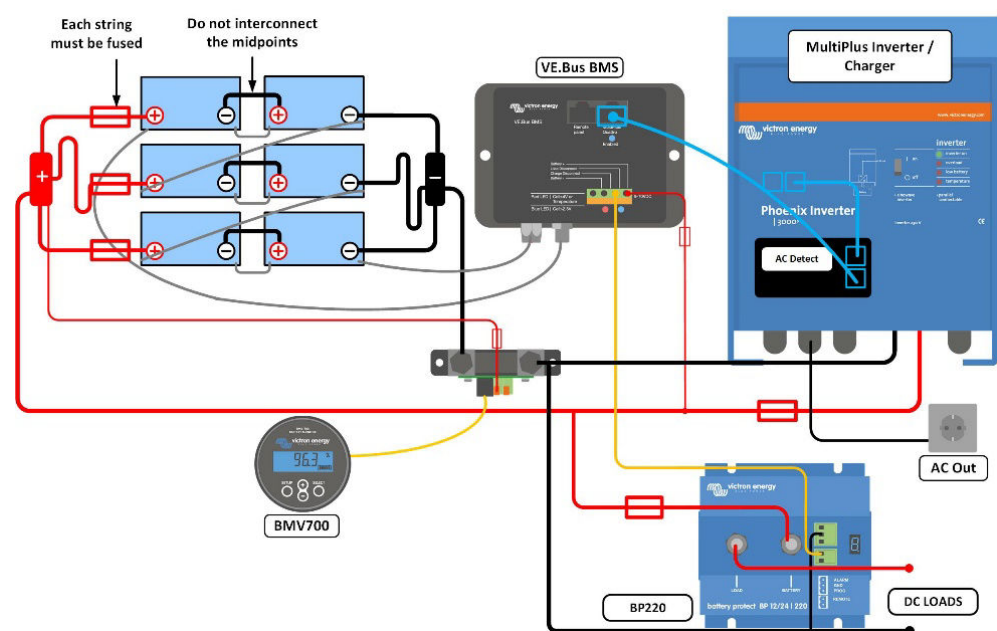
Very useful to localize a (potential) problem, such as cell imbalance.



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 - 3,15 V).
2. Disconnect or shut down the load whenever the voltage of a battery cell decreases to less than 2,8V (adjustable 2,6 V - 2,8 V).
3. Stop the charging process whenever the voltage of a battery cell increases to more than 3,75 V or when the temperature becomes too high.

See the BMS datasheets for more features

| Battery specification                    |   |                      |                       |                       |                       |                       |                       |                       |                         |
|--|---|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|
| VOLTAGE AND CAPACITY                     | LFP-Smart<br>12,8/50  | LFP-Smart<br>12,8/60 | LFP-Smart<br>12,8/100 | LFP-Smart<br>12,8/160 | LFP-Smart<br>12,8/200 | LFP-Smart<br>12,8/300 | LFP-Smart<br>12,8/330 | LFP-Smart<br>25,6/100 | LFP-Smart<br>25,6/200-a |
| Nominal voltage                          | 12,8V   | 12,8V                | 12,8V                 | 12,8V                 | 12,8V                 | 12,8V                 | 12,8V                 | 25,6V                 | 25,6V                   |
| Nominal capacity @ 25°C*                 | 50Ah  | 60Ah                 | 100Ah                 | 160Ah                 | 200Ah                 | 300Ah                 | 330Ah                 | 100Ah                 | 200Ah                   |
| Nominal capacity @ 0°C*                  | 40Ah  | 48Ah                 | 80Ah                  | 130Ah                 | 160Ah                 | 240Ah                 | 260Ah                 | 80Ah                  | 160Ah                   |
| Nominal capacity @ -20°C*                | 25Ah  | 30Ah                 | 50Ah                  | 80Ah                  | 100Ah                 | 150Ah                 | 160Ah                 | 50Ah                  | 100Ah                   |
| Nominal energy @ 25°C*                   | 640Wh   | 768Wh                | 1280Wh                | 2048Wh                | 2560Wh                | 3840Wh                | 4220Wh                | 2560Wh                | 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     | 100A  | 120A                 | 200A                  | 320A                  | 400A                  | 600A                  | 400A                  | 200A                  | 400A                    |
| Recommended continuous discharge current | ≤50A  | ≤60A                 | ≤100A                 | ≤160A                 | ≤200A                 | ≤300A                 | ≤300A                 | ≤100A                 | ≤200A                   |
| End of discharge voltage                 | 11,2V   | 11,2V                | 11,2V                 | 11,2V                 | 11,2V                 | 11,2V                 | 11,2V                 | 22,4V                 | 22,4V                   |
| Internal resistance                      | 2mΩ   | 2mΩ                  | 0,8mΩ                 | 0,9mΩ                 | 0,8mΩ                 | 0,8mΩ                 | 0,8mΩ                 | 1,6mΩ                 | 1,5mΩ                   |
| 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                   | 100A  | 120A                 | 200A                  | 320A                  | 400A                  | 600A                  | 400A                  | 200A                  | 400A                    |
| Recommended charge current               | ≤30A  | ≤30A                 | ≤50A                  | ≤80A                  | ≤100A                 | ≤150A                 | ≤150A                 | ≤50A                  | ≤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                   | M10                   | M8                    | M8                      |
| Dimensions (hxxwxd) mm                   | 199 x 188 x 147   | 239 x 286 x 132      | 197 x 321 x 152       | 237 x 321 x 152       | 237 x 321 x 152       | 347 x 425 x 274       | 265 x 359 x 206       | 197 x 650 x 163       | 237 x 650 x 163         |
| Weight                                   | 7kg   | 12kg                 | 14kg                  | 18kg                  | 20kg                  | 51kg                  | 30kg                  | 28kg                  | 39kg                    |
| *When fully charged                      |   |                      |                       |                       |                       |                       |                       |                       |                         |