

## Why lithium-iron-phosphate?

Lithium iron phosphate batteries (LiFePO<sub>4</sub> or LFP) offer lots of benefits compared to lead-acid batteries and other lithium batteries. Longer life span, no maintenance, extremely safe, lightweight, improved discharge and charge efficiency, just to name a few. LiFePO<sub>4</sub> batteries are not the cheapest in the market, but due to a long life span and zero maintenance, it's the best investment you can make over time.



### 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.

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 85%. The round-trip energy efficiency of a LFP battery is over 95%.

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.



Coulee LFP batteries have integrated cell balancing and cell monitoring. Up to five batteries can be paralleled and up to four 12V batteries or two 24V batteries can be series connected. CouleeLFP batteries are at the height of lithium-ion technology, they outperform and outlast all other batteries in their class and below their class.

### Battery Management System

A Battery Management System (BMS) is an intelligent component of a battery pack responsible for advanced monitoring and management. It is the brain behind the battery and plays a critical role in its levels of safety, performance, charge rates, and longevity.

Our BMS is designed to be a long-term solution for our customers with the highest level of safety in mind. Advanced algorithms and electronics ensure high precision measurements.

The BMS will:

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



**Battery Specification**

VOLTAGE AND CAPACITY	CLL12100	CLL24100	CLL24200	CLL48100
Nominal Voltage	12V	24V	24V	48V
Nominal Capacity @ 25°C*	100Ah	100Ah	200Ah	100Ah
Nominal Capacity @ 0°C*	80Ah	80Ah	160Ah	80Ah
Nominal Capacity @ -20°C*	50Ah	50Ah	100Ah	50Ah
Nominal Energy @ 25°C*	1200Wh	2400Wh	4800Wh	4800Wh

\*Discharge Current ≤1C

**CYCLE LIFE (Capacity ≥ 80% of Nominal)**

80% DoD	4500 cycles
70% DoD	5200 cycles
Average Lifespan	12 to 15 Years

**DISCHARGE**

Maximum Continuous Discharge Current (15S)	200A	200A	400A	200A
Recommended Continuous Discharge Current	≤100A	≤100A	≤200A	≤100A
End of Discharge Voltage	11.2V	11.2V	11.2V	11.2V

**OPERATING CONDITIONS**

Operating Temperature	Discharge: -20°C to +70°C    Charge: +5°C to +55°C
Storage Temperature	-20°C to +50°C
Humidity (non-condensing)	15% to 85%
Protection Class	IP 54

**CHARGE**

Charge Voltage	Between 14V/28V/56V and 14.4V/28.8V/57.6V (14.2V/28.4V/56.8V Recommended)			
Float Voltage	13.5V/27V/54V			
Maximum Charge Current	200A	200A	400A	200A
Recommended Charge Current	≤50A	≤50A	≤100A	≤50A

**OTHER**

Max Storage Time @ 25°C*	1 year			
BMS Connection	Male + Female Cable with M8 Circular Connector, Length 50cm			
Terminal	M8	M8	M12	M12
Communication Port	CAN and RS-485 / RS-232 Compatible			
Dimensions (H x W x D) mm	450 x 195 x 135	443 x 443 x 177	482 x 400 x 178	482 x 400 x 178
Weight	12.6kg	30kg	45kg	45kg

**WARRANTY**

5 Years for Product and 10 Years for Performance

\*When fully charged