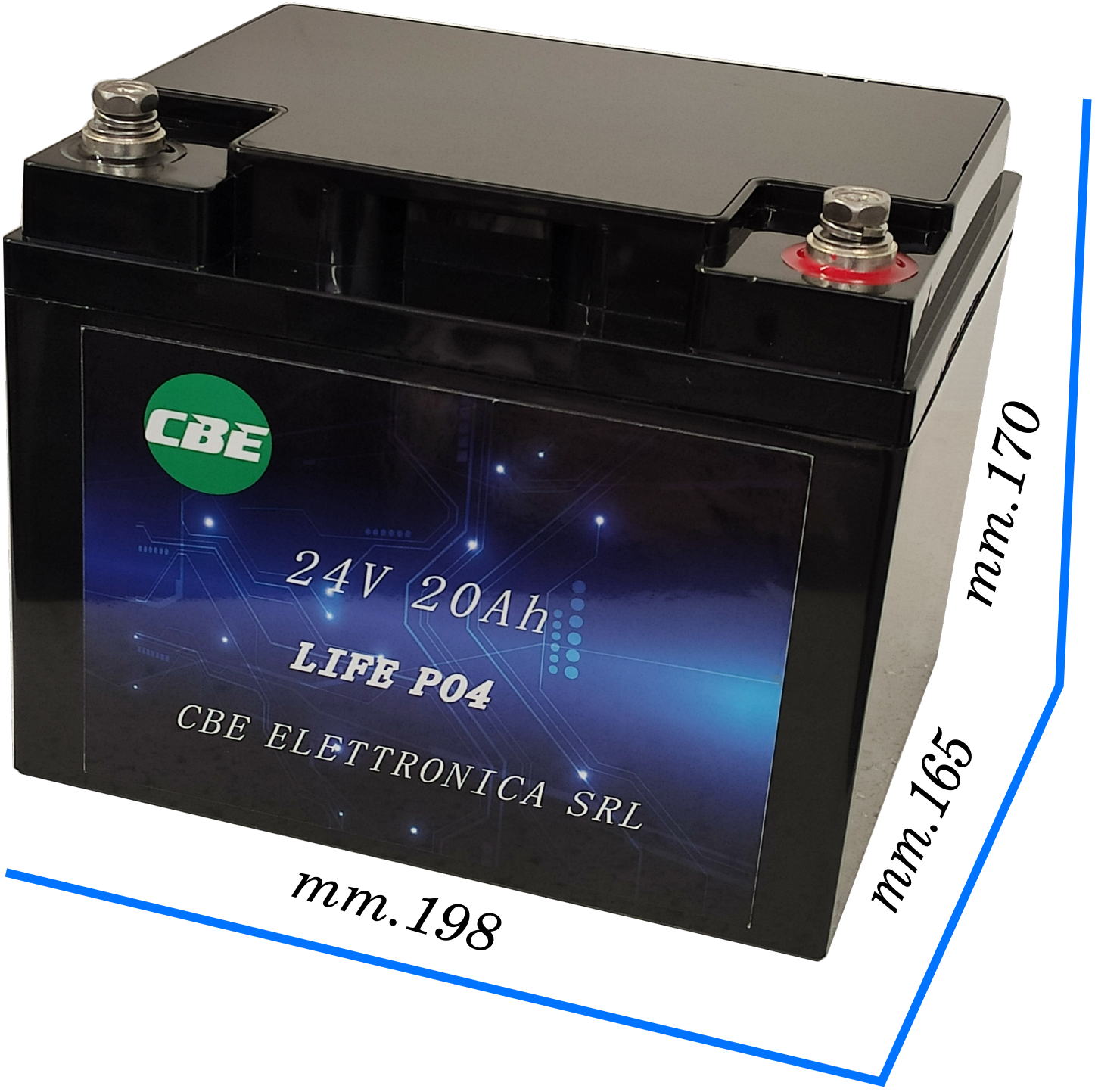
# LIFE P04 HIGH EFFICIENCY BATTERY




# AVAILABLE MODELS 12-24-48V

CBE Elettronica s.r.l
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## 1. Scope

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## 2. Rating

| Item | | Rating | Note |
|---|---|---|---|
| Cell | Type | LiFePO4 Battery | |
| | Cell Model | LF26700-4.0AH | |
| | Nominal Capacity | 4.0Ah | Discharge : 0.2C<br>Cut-off Voltage: 2.25V |
| | Minimum Capacity | 4.0 Ah | Discharge : 0.2C<br>Cut-off Voltage: 2.25V |
| | Nominal voltage | 3.2V | |
| | Internal Impedance | 60 mΩ | |
| | Dimension | Dia 26x70mm | |
| | Weight | 95g | |
| Battery pack | Pack Method | 8S5P | |
| | Nominal Capacity | 20.25 Ah | Discharge : 0.2C<br>Cut-off Voltage:9.20V |
| | Minmium Capacity | 20.00 Ah | Discharge : 0.2C<br>Cut-off Voltage: 9.20V |
| | Nominal Voltage | 25.6V | |
| | Energy | 512.00Wh | |
| | Charge Voltage | 29.20V | |
| | Discharge cut-off voltage | 20.00V | |
| | Charge Method | CC/CV | |
| | Standard Charge Current | 4.0A | |
| | Max. Charge Current | 20.0A | |
| | Standard Discharge Current | 4.0 A | 0.2C |
| | Max. Discharge current | 80 A | < 10s |
| | Cycle Life | 2000 Cycles | |
| | Internal Impedance | 100mΩ | |
| | Dimension | L198.0XW166.50XH170.0mm | (adjustable) |
| | Output Wire | | Red/Black |
| | Output Connector | M5 | |

| | | | |
|---|---|---|---|
| | Weight | Approx.3.85 kgs | Without Case weight |
| | Working Temperature Range | Charge: 0℃--45℃<br>Discharge: -20℃--60℃ | |
| | Storage Temperature | -10℃—45℃ | |

3. Protection Circuit

3.1 BMS Parameter

| No. | Item | | Standard |
|---|---|---|---|
| 1 | Charge Current | | 20A |
| 2 | Discharge Current | | 50A |
| 3 | Balance Voltage | | 3.65V±0.05V |
| 4 | Balance Current | | |
| 5 | Overcharge | Over-Charge Detect Voltage | 3.65±0.05V |
| | | Over-Charge Delay Time | 1-3S |
| | | Over-Charge Reset Voltage | 3.55±0.05V |
| 6 | Over-discharge | Over-Discharge Detect Voltage | 2.5±0.1V |
| | | Over-Discharge Delay Time | 1-3S |
| | | Over-Discharge Reset Voltage | 2.7±0.01V |
| 7 | Over-current | Over-Current Detect Current | 60A |
| | | Over-Current Delay Time | 500ms |
| | | Reset | Release load |
| 8 | Short Circuit | Detect Status | External Short Circuit |
| | | Delay Time | 100us |
| | | Reset | Release load |
| 9 | Standby Current | | 25uA type, max.32uA |
| 10 | Resistance | | ≤15mΩ |

4. Appearance

It shall be free from any defects such as remarkable scratches, breaks, cracks, discoloration, leakage, or deformation, and it shall be clean and have equality and product value.

## 5. Performance

5.1 Standard Test Condition

The battery shall be evaluated within 1 month from the arrival date.

Unless otherwise stated in these specifications, the following test shall be carried out in an ambient temperature of 20±5℃, relative humidity of 65±20%

Discharge capacity when the battery is discharged at 0.2C to 19.25V after being standard charged. Five cycles are permitted for this test. The test shall be terminated at the end of the first cycle which meets the requirement.

5.2 Testing Instrument or Apparatus

5.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm specified.

5.2.2 Voltmeter and Ammeter

Voltmeters and ammeters shall be equal or more precision instruments of 10KΩ/V and 0.01Ω.

5.2.3 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method (1kHz LCR meter)

5.3 Standard Charge

Standard charge means charging for 6hours using 27.20V/4A charger

5.4 Standard Discharge

Standard discharge means discharging at 0.2C down to 20.00V

5.5 Electrical Performance

| Item | Condition | Specification |
|---|---|---|
| Open-Circuit Voltage | The open-circuit voltage shall be measured within 24hours after standard charge | ≥27.20V |
| Internal Impedance | The impedance shall be measure in an alternating current method (1kHz LCR meter) after standard charge at 20±5℃ | ≤100mΩ |
| Battery Capacity 1 | The discharge time at 0.2C shall be measured after standard charge at 20±5℃ and rest 25mins | ≥250min |
| Battery Capacity 2 | The discharge time at 30A shall be measured after standard charge at 20±5℃ and rest 25mins | ≥48min |
| Cycle Life | The discharge time on standard discharge shall be measured after 500 cycles of standard charge and discharge at 20±5℃ | ≥240min |
| Charge(capacity) retention | The discharge time at 0.2C shall be measured after standard charge and then storage at 20±5℃ for 28days | ≥240min |
| Temperature Characteristic1 | After standard charging at 20±5℃, laying the battery at 55℃ for 4hour, then discharge at 0.2C to 19.25V, record the discharge time | ≥240min |
| Temperature Characteristic2 | After standard charging at 20±5℃, laying the battery at -10℃ for 4hour, then discharge at 0.2C to 19.25V, record the discharge time | ≥210min |

## 6. Mechanical Performance

| Item | Condition | Specification |
|---|---|---|
| Crush Test | A battery is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram with a 32mm diameter piston. The crushing is to be continued until a pressure reading of 17.2mmPa is reached on the hydraulic ram, applied force of 13kN. Once the maximum pressure has been obtained it is to be released. | No fire, No explosion |
| Drop Test | The battery has only two axes of symmetry in which case only two directions shall be tested. The battery is to be dropped from a height of 1 meter twice onto concrete ground. | No explosion, No fire, No smoke |
| Vibration | A full-charged battery is to be subjected to simple harmonic motion with an amplitude of 1.6mm total maximum excursion. The frequency is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz. The cell shall be vibrated for 25 minutes per axis o XYZ axes. | No leakage, No Fire, No explosion |

## 7. Safety Performance

| Item | Condition | Specification |
|---|---|---|
| Over charge | At 20±5℃, charging battery with constant current 1C to voltage 35V, then with constant voltage 35V till current decline to 0. | No explosion, No fire |
| Over discharge | At 20±5℃, the cell are fully charged with standard charging method and standby at least 1hour. The cell should be dischaged at a current of 1C for 2.5h. | No explosion, No fire |
| Short-circuit | At 20±5℃, The cells are fully charged with standard charging method and standby at least 1hour. Positive and negative terminal connect with wire (maximum load of 50mΩ) to cause short circuit until its voltage is lower than 0.1V or cell temperature on the surface is back to room temperature ±10℃. | No explosion, No fire The temperature of the surface of the cell are lower than 150℃ |
| Heating | Battery is heated in a circulating air oven at a rate of 5±2℃ per mins to 125℃, an then placed 25 mins at 125℃ | No explosion, no fire |

## 8. Delivery Conditon

Approx. **50% charged**

## 11. Period of Warranty

The period of warranty is one year from the date of shipment. CBE ELETTRONICA guarantees to give a replacement in case of battery with defects proven due to manufacturing process instead of the customer abuse and misuse.

## 12. Warnings

To prevent the possibility of the battery from leaking, heating, fire, Please READ this specification carefully before usage and observe the following precautions:

◎When recharging, use the LiFePO4 battery charger specifically for that purpose

◎Do not strike battery with any sharp edge parts, such as Ni-tabs, pins and needles

◎Do not immerse the battery in water and seawater

◎Do not use and leave the battery near a heat source as fire or heater

◎Do not reverse the position and negative terminals

◎Do not connect the battery to an electrical outlet

◎Do not discard the battery in fire or heat it

◎The battery tabs are not so stubborn especially for aluminum tab. Do not bend tab.

◎Do not short-circuit the battery by directly connecting the positive and negative terminal with metal object.

◎Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.

◎Do not directly solder the battery and pierce the battery with a nail or other sharp object.

## 13. Battery operation instruction

13.1 Charging

Charging current：Do not surpass the biggest charging current which in this specification。

Charging voltage：Do not surpass the highest voltage which in this specification。

Charge temperature：The charge temperature is in according to this specification。

13.2 Discharging

Discharge current: Do not surpass the biggest discharge current which in this specification.

Discharge voltage: Do not be less than the lowest voltage which is in this specification.

Discharge temperature: The discharge temperature is in according to this specification,

13.3 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

13.4 Storing the Batteries

***The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery.***

13.5 Please do not continuously charge the battery over 8hours.