



1. General Information

This specification defines the performance of rechargeable LiFePO4 battery pack UE-48Li200 manufactured by UPOWER, S.L., describes the type, performance, technical characteristics, warning and caution of the battery pack.

2. Specification (@Battery initial Temp25±5°C)

NO.	Items	Criteria
1	Rated Capacity	200Ah
	Minimum Capacity	190Ah
2	Energy	10.24KWh
3	Nominal Voltage	51.2V
4	Outgoing Voltage	≥51.2V
5	Internal resistance	\leq 30m Ω
6	Limited charge voltage	58.4±0.2V
7	Floating charge voltage	55.2±0.2V
8	Standard charge current	60A
9	Maximum charge current	100A
10	Standard discharge current	100A
11	Maximum discharge current	150A/Continuous for 1 hour
12	Pulse discharge current	200A/Continuous for 15 min
13	Discharge cut-off voltage	40.0V



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NO.	Items	Criteria
14	Dimension	Length: 552±3mm
		Width: 400±3mm
		Height: 400±3mm
15	Weight	Approx: 125±5Kg
16	Operating Temperature	Charging: 0~45°C
		Discharging: -20~60°C
		Recommended operating temperature: $15^{\circ}C \sim 35^{\circ}C$
17	Self-discharge rate	Residual capacity: \leq 3%/month; \leq 15%/years
		Reversible capacity: $\leq 1.5\%$ /month; $\leq 8\%$ /years
18	Storage Temperature & Humidity Range	Less than 1 month: -20°C \sim 35°C, 45% RH \sim 75% RH
		Less than 3 months: -10°C \sim 35°C, 45% RH \sim 75% RH
		Recommended storage environment: 15°C~35°C, 45% RH~75% RH

Long time storage:

If the battery need be stored for a long time, the voltage should be 52.8V (50% SOC), and stored in the condition as storage proposal. It need at least one charge & discharge cycle every six months

3. Test Condition

3.1 Standard Test Conditions

- 3.1.1 Unless otherwise specified, all performance tests is required conducted at temperature 25°C±2°C, Humidity less than 45% ~ 75% RH.
- 3.1.2 Unless otherwise specified, the tested product is required unused within two month after outgoing.



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4. Product Performance

NO.	Items	Criteria		Testing Method	
1	Rated Capacity	200Ah 190Ah		Rest for 1 hour after fully charged, then discharge with 0.33C current until the battery reaches the	
2	Minimum Capacity			discharge cutoff voltage. Repeat above process for three times, if the discharge time is not less than 120 minutes, you can stop and define the Discharging current*time value (Ah) as battery capacity.	
3	Internal resistance	≤25mΩ		50% battery SOC state frequency of 1 KHZ ac resistance tester.	
4	Cycle life (DOD%100)	≥2000 cycles		Discharge with the current of 0.33C until it can't discharge, and then rest it for 1h. Charge the battery following CC (0.33C)/CV (14.6V) mode to full capacity, and then rest it for 1h. Repeat above process until full charged capacity is no more than 80% of normal value. Accumulated times is defined as cycle life.	
	Discharge Temperature Characteristics	-20°C	≥70%	At $25\pm5^{\circ}$ C discharge the battery with the current of	
5		0°C	≥80%	0.33C to the cut-off voltage and record charge capacity. Store the battery at various temperatures	
		25°C	≥100%	for 2h and discharge the battery with 0.33C to the	
		55°C	≥95%	cut-off voltage.	
6	Charge Retention ability	Residual capacity ≥80%		Charge the battery to full capacity and store it for 28 days, and then discharge it with 0.33C to the cut-off voltage.	
		Recovery capacity \geq 90%			

5. Protective Circuit Specification

The batteries are supplied with a LiFePO4 Battery Management System (BMS) that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.



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Items	Content	Specification		
	Over-charge protection for each cell	3.80±0.03V		
Over charge	Over-charge release for each cell	3.60±0.05V		
	Over-charge release method	Under the release voltage		
	Over-discharge protection for each cell	2.50±0.1V		
Over discharge	Over-discharge release for each cell	3.00±0.1V		
	Over-discharge release method	Charging recovery		
	Discharge over current protection	650~100A		
Over current	Protection delay time	14 - 26ms		
	Over current release method	Release after cutoff the load		
Short	Do not short-circuit the electrodes	Designed For1000A /500us		
	Charge over temperature	Protection @55±5°C		
	Charge over lemperature	Release $@45\pm5^{\circ}C$		
		Protection @65±5°C		
	Discharge over remperature	Release $@55\pm5^{\circ}C$		
Battery	Charge low temperature	Protection @0±5°C		
temperature	Charge low lemperature	Release @10±5°C		
	Disabaraa law tamparatura	Protection @-20±5°C		
	Discharge low left perdiate	Release @-10±5°C		
		Protection @100±5°C		
		Release @70±5°C		
LCD Screen	Short press a switch, light and display screen: voltage temperature residual capacity current, light up after waiting for screen to go out, after 60s into power saving state (buzzer open state, the buzzer alarm detection background), short press it again to light up the screen.			
	Buzzer open state: SOC 10% or less, buzzer alarm, long press switch 3s, buzzer close and screen OFF buzzer hints.			
Buzz	Buzzer is turned off, when the SOC 50% or less, need to manually by 3s starting buzzer long (SOC testing and determine whether the alarm).			
	Buzzer is turned off, charging when the battery pack is SOC $>$ 50%, the buzzer closed automatic reset, in an open position.			



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6. Dimensional Drawing





1. The motherboard socket: Pin1 to 12V+, Pin2 to B, Pin2 to A and Pin4 to GND.

2. The LCD panel socket: Pin1 to 12V+, Pin2 to B, Pin2 to A and Pin4 to GND.



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8. Transportation

- Based on the character of cell, proper environment for transportation of LiFePO4 battery pack need to be created to protect the battery.
- Battery should be stayed in the warehouse 15°C \sim 35°C where it's dry, clean, shade and well-ventilated.
- The battery should be stored in 50% SOC during transportation (the suggest method: Charge the battery fully 58.4V, and discharge the battery until reaches the discharge cutoff voltage 36.8V, then charge the battery up to 50% SOC _Vand storage in proper circumstance according specification).
- The battery need to be charged every 6 months if out of use.
- Keep the battery against dropping, turning over and serious stacking during loading.

9. Warning & Tips

Please read and follow the specification and caution remarks on battery surface before use the battery. Improper use may cause heat, fire, rupture, damage or capacity deterioration of the battery. UPOWER, S.L. describes is not responsible for any accidents caused by the usage without following our specification.

- The battery must be far away from heat source, high voltage, and avoid to be exposed in sunshine for long time.
- Never throw the battery into water.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Never connect the positive and negative of battery with metal.
- Avoid excessive physical shock or vibration. don't hit, fall, stamp on the battery.
- Without the permission of the manufacturer and guidance, forbidden to remove or to assemble the battery.
- Do not use the battery mixed with other different manufacturer, type, or model batteries.
- Keep the battery against high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life.
- When battery run out of power, please charge your battery timely (≤15day).
- Please use the matched or suggested charger for this battery.
- If battery emit peculiar smell, heating, distortion or appear any abnormity during working or storage, please stop using and take it out from device.
- If the battery leaks and get into the eyes or skin, do not wipe, instead, rinse it with clean water and see doctor immediately.
- Please far away from children or pets.
- Do not put disuse battery into a fire or water.
- It is strictly prohibited any series between the battery packs. Any requirements on serials connection, please contact UPOWER, S.L. for details.



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10. Battery Operation Instruction

10.1 Charge and discharge

- 10.1.1 Charging current: Do not surpass the largest charging current that specification stipulated.
- 10.1.2 Charging voltage: Do not surpass the highest limited voltage that specification stipulated.
- 10.1.3 Charging temperature: within temperature scope that specification stipulated.
- 10.1.4 Charge with constant current, then with the constant voltage, no reverse charge, which is dangerous.
- 10.1.5 Special note:

Short time doesn't affect the use of the battery overcharge too, but for a long period of time over discharge or over charge can affect the function of the battery failure, or the battery can't use permanent, appear serious safety hazards, need long time floating please use the recommended floating model specification. Battery when not in use for a long time, because of its own self-discharge characteristics can also cause discharge, to prevent the occurrence of a discharge, battery should maintain a certain capacity, maintain the voltage at 50% state of SOC.

11. Other Chemical Reaction

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges, the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the discharge time is much shorter than the normal after full charged, even battery is charged correctly, and this may indicate it is time to change the battery.



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