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File Number:

LPA/1

**12V 180Ah LiFePO4
Battery Specification
Sheet**

Model: L 12-180

Customer Name: _____

Customer Confirmation: _____

Date: 2020.08.18

Formulate

Proof

Verify

Authorize



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1. Scope

This specification describes the property indexes and technical requirements of the 12V 180Ah rechargeable Lifepo4 lithium ion battery manufactured .

2. Product

2.1 Product Name: LiFePO4 Battery Pack

2.2 Model: LP 12-180

3. Product Parameters

No.	Item	Parameters	Remark
3.1	Rated Capacity	180Ah	Standard discharge after standard charge
3.2	Nominal Voltage	12.8V	Operating voltage
3.3	Charge Method	CC/CV	Constant current, constant voltage
3.4	Charge Voltage	14.6V	
3.5	Discharge Cut-off Voltage	10.0V	Voltage at end of discharge
3.6	Standard Charge Current	30A	
3.7	Max Continuous Discharge Current	150A	
3.9	Weight (approx.)	20kg	
3.10	Battery Dimension (L×W×H)	480*170*240mm	
3.11	Operation Temperature Range	Charge	0~45℃
		Discharge	-20~60℃
3.12	Storage Temperature Range	One Month	-20~60℃
		3 Months	-20~45℃
		6 Months	-20~25℃
	Atmospheric Pressure	86~106kPa	
	Relative Humidity	25%~85%RH	

4. Battery Picture



Description	Dimension
Length	480mm ±1mm
Width	170mm±1mm
Height	240mm±1mm

5. Test Conditions

5.1 Standard Test Conditions

All the tests mentioned in this specification should be conducted under standard temperature of $23\pm 3^{\circ}\text{C}$ and relative humidity of of 45~85% and atmospheric pressure 86~106kpa.

5.2 Measuring Instrument or Apparatus

All of the measuring instruments and facilities (include the equipment which monitor the test parameters) should be verified and calibrated qualified by relevant Chinese Calibration Regulation or certain standards within the valid date. All the test instruments and equipment should have the properties of adequate precision and stability, and the precision should be an order higher than the tested indicators or the tolerance should be less than one third of the tested parameters.

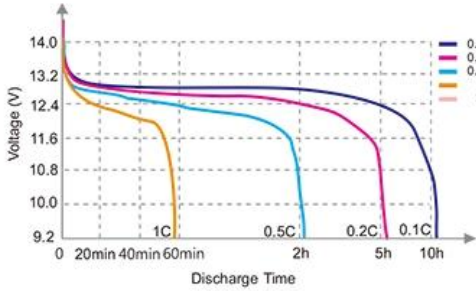
5.3 Standard Charging

Charging shall consist of charging at a $0.2C_5A$ constant current rate until the battery reaches 14.6V. The battery shall then be charged at constant voltage of 14.6 volts while tapering the charge current. Charging shall be terminated when the charging current has tapered to 0.01 C. Charge time: Approx 5.5h, The battery shall demonstrate no permanent degradation when charged between 0 °C and 45 °C.

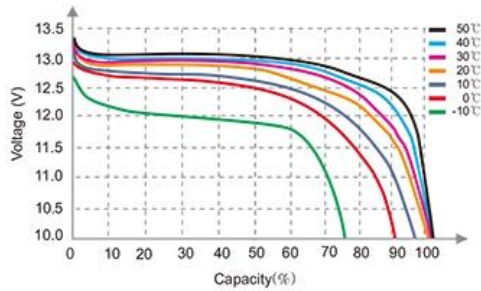
5.4 Standard Discharging

The battery should be discharged at a constant current of $0.2C_5A$ to 10.0 volts @ 23° 3C

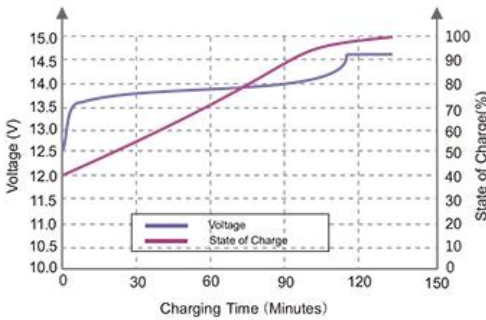
Different Rate Discharge Curve(25°C)



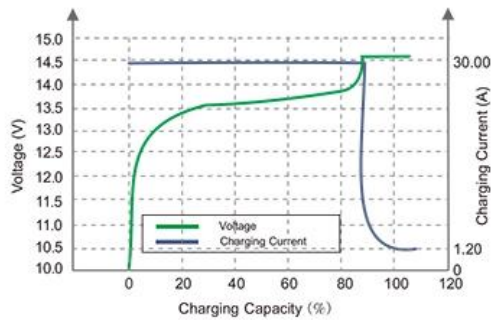
Different Temperature Discharge Curve(0.5C)



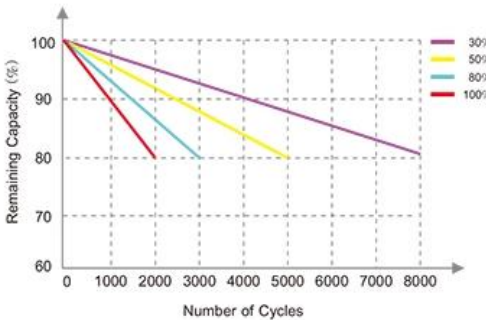
State of Charge Curve(0.5C, 25°C)



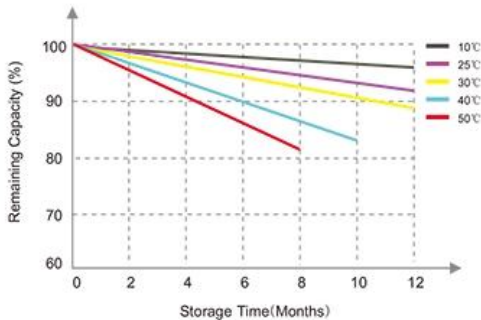
Charging Characteristics(0.5C, 25°C)



Different DOD Discharge Cycle Life Curve(1C)



Different Temperature Self Discharge Curve





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5.5 Others

If no otherwise specified, the rest time between Charge and Discharge amount to 30min.

6. Battery Cell Performance

6.1 Electrical Characteristics

NO	Item	Technical Requirements	Test Method
1	Appearance	The battery should be no damage, leakage, oil contamination and should be legibly marked.	Visual Inspection
2	Discharging Characteristics Under Nominal temperature	Discharging Capacity/Nominal Capacity×100% A) 0.3CA ≥100% B) 0.5CA ≥98% C) 1CA ≥95%	After the process of standard charging, the battery should be set aside for 1 hour, afterwards, discharging it at the current of 0.3C(A)、0.5C(A)、1C(A) separately until it reaches to minimum voltage of 2.5V, the test is allowed to be repeat 3 times if the discharging capacity can't reach to the nominal one.





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7. Safety

NO Item Technical Requirements Test Method

7.1 Over-charge

Test No explosion, No fire

After the process of standard charging, shelving the battery for 1 hour at the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$. Afterwards, charging the battery at the current of 1C(A) until it reaches to 5V which should be conducted under the same temperature.

7.2 Over-discharge

Test No Explosion, No Fire After the process of standard charging, shelving the battery for 1 hour at the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$. Afterwards, charging the battery at the current of 0.3C(A) until it reaches to 0V at the same temperature.

7.3 Short-Circuit

Test No Explosion, No Fire After the process of standard charging, shelving the battery for 1 hour at the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$. Afterwards, shorting circuit it for 10mins, and make sure the resistance of outside line should be less than 10m Ω .

7.4 Nail Penetration

Test No Explosion, No Fire After the process of standard charging, shelving the battery for 1 hour at the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$. Afterwards, penetrating the battery rapidly with a steel spike of $\phi 3\text{mm} \sim \phi 8\text{mm}$ which should be perpendicular to the accumulator electroplating (the steel spike should stay inside of the accumulator).

7.5 Extrusion Test No explosion, No Fire

After the process of standard charging, shelving the battery for 1 hour at the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$.

Afterwards, conducting the experiment in line with the conditions as listed below:

- a) Extrusion Direction: Pressing the battery perpendicularly to the accumulator electroplating.
- b) Extrusion Extent: Stop until the shell cracks or short circuit inside (the voltage of battery turns to be 0(V))

7.6 Drop Test No explosion, no fire

After the process of standard charging, shelving the battery for 1 hour under the ambient temperature of $20^{\circ} \text{C} \pm 5^{\circ} \text{C}$. Afterwards, dropping the battery to the ground from a height of 1.5M, and it is required that the drop should be repeat 2 times on each face of the battery.



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8. CAUTIONS IN USE

To ensure proper use of the battery please read the manual carefully before using it.

8.1 Handling

- * Do not expose to, dispose of the battery in fire.
- * Do not put the battery in a charger or equipment with wrong terminals connected. § Avoid shorting

8.2 the battery

- * Avoid excessive physical shock or vibration.
- * Do not disassemble or deform the battery.
- * Do not immerse in water.
- * Do not use the battery mixed with other different make, type, or model batteries. § Keep out of the reach of children.

8.3 Charge and discharge

- * Battery must be charged in appropriate charger only.
- * Never use a modified or damaged charger.
- * Do not leave battery in charger over 12 hours.

8.4 Storage

- * Store the battery in a cool, dry and well-ventilated area.

8.5 Disposal

- * Regulations vary for different countries. Dispose of in accordance with local regulations.
- * Charging current: Cannot surpass the biggest charging current which in this specification book stipulated.
- * Charging voltage: Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage.
- * Temperature: The battery must carry on the charge in the ambient temperature scope which this specification book stipulated. Uses the constant electric current, and the constant voltage way charge, the prohibition reverse charges. If the battery positive electrode and the cathode meet instead, can damage the battery.

8.6 Discharging current:

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversize electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat .

8.7 Discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated.

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



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8.8 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 flash over characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

8.9 Storing the Batteries

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

8.10 Period of Warranty

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

8.11 Other The 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 batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.



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