

Shenzhen Heyuxin Technology Co., LTD  
深圳市赫宇鑫科技有限公司

## Lithium BATTERY SPECIFICATION

### 锂离子电池规格书

Model 产品型号	4S2P-IFRTLDT-12V-200Ah
Specification 规格书编号	4S2P-IFRTLDT-12V-200Ah
Version 版本	A0
Revision 发行日期	10-5-2019

Website: [www.hyxinbattery.com](http://www.hyxinbattery.com)  
Email: [contact@hyxinbattery.com](mailto:contact@hyxinbattery.com)

## 1. Scope (使用范围)

This specification is applied to the reference battery in this Specification and manufactured by Shenzhen Heyuxin Technology Co., LTD

本规格书适用于本书中所提及的深圳市赫宇鑫科技有限公司制造的电池。

## 2. Description and Model (定义)

2.1 Description(类型)	Lithium iron phosphate battery (磷酸铁锂电池)
2.2 Model(型号)	4S2P-IFRTLDT- 12V-200Ah

## 3. Product Specification (产品技术规格)

No. (序号)	Item (项目)	General Parameter (常规参数)	Remark (备注)
1	Rated Capacity (额定容量)	标称容量(Typ.) 200Ah	Standard charge and Standard discharge(标准充 放电)(充电电流 120A)
		最小容量(Min.) 198Ah	
2	Nominal Voltage (标称电压)	12V	/
3	End of Charge Voltage (充电最高电压)	14.6V	/
4	Charge mode 充电方式	CC , CV	Constant current, constant pressure 恒流、恒压
5	Charging cut-off current 充电截止电流	0.02C	/
6	Charging time 充电时间	3-5h	/
7	Over- Charge Voltage Protection (cell) 充电单体电池保护	3.65V	/
8	Max continuous charge current 最大持续充电电流	150A	/
9	Maximum Continuous Discharging Current 持续最大工作电流	240A	/

Continuous the table 1 (续表 1)

No. (序号)	Item (项目)	General Parameter (常规参数)	Remark (备注)
10	Over-discharge Voltage Protection (cell) 放电单体电池保护	2.5V	/
12	Short circuit protection 短路保护	With BMS Protection 有保护	BMS Protection
13	Short circuit protection Release 短路保护恢复	Disconnect the load 断开负载	/
14	Cell Dimension (尺寸)	Long (长) =MAX: 522mm	522*238*222cm
		Wide (宽) =MAX:238mm	
		High (高) =MAX:222mm	
15	Weight (重量)	≈25±0.3Kg	25KG
16	Operation Temperature Range (工作温度范围)	Charge (充电) : 0~45℃	60±25%R.H. Bare Cell (单体电池储存湿度范围)
		Discharge (放电) : - 10~60℃	
17	Storage Temperature Range (储存温度范围)	1 month (一个月) : -20℃ ~ 45℃ 3 month (三个月) : -20℃ ~ 45℃ 1 year (一年) : -20℃ ~ 25℃	60±25%R.H. at the shipment state (出货状态时的湿度范围)
18	Cycle Life (循环寿命)	1.Charge:120A to 14.6V 2. Constant voltage to 0.02C Rest time : 10 min 3. Discharge:150A to 9.6V 4. Rest Time between Charge and Discharge: 10min 5. Temperature:25±5℃ 1.充电:120A 充至 14.6V 2.恒压至 0.02C,搁置 10min 3.放电:150A 放至 9.6V 4.搁置:10min 5.温度:25±5℃	Higher than 70% of the Initial Capacities of the Cells 2000 次≥初始容量 70%
19	Battery Case 电池池壳	ABS Case (ABS 池壳)	/

20	Charge and discharge port 充放电接口	Shared/ Customized 通用或定制	/
21	Cooling Method (冷却方式)	Natural Cooling (自然冷却)	/
22	Charge and discharge wire length (充放电线长)	Customized (定做)	/
23	Cycle Life (循环寿命)	1.Charge:25A to 14.6V 2. Constant voltage to 0.02C Rest time : 10 min 3. Discharge: 50A to 9.6V 4. Rest Time between Charge and Discharge: 10min 5. Temperature:25±5℃ 1.充电:25A 充至 14.6V 2. 恒压至 0.02C,搁置 10min 3. 放电:50A 放至 9.6V 4. 搁置:10min 5.温度:25±5℃	Higher than 80% of the Initial Capacities of the Cells 2000 次≥初始容量 80%

#### 4. Battery BMS Protect Spec (电池管理系统保护参数)

Items (描述)	Details (详情)	Standard (标准参数数)
Over charge protection function 过充电保护功能	Over charge detection voltage 过充电电压保护	3.75±0.025V
	Over charge detection delay time 过充电保护延迟时间	Typical:1.0s
	Overcharge release voltage 过充电释放电压	3.45±0.02V

Over discharge protection function 过放电保护功能	Over-discharge detection voltage 过放电电压保护	2.75±0.02V
	Over discharge detection delay time 过放电保护延迟时间	Typical: 1.0s
	Over discharge release voltage 过放电释放电压	3.05±0.02V or charge release

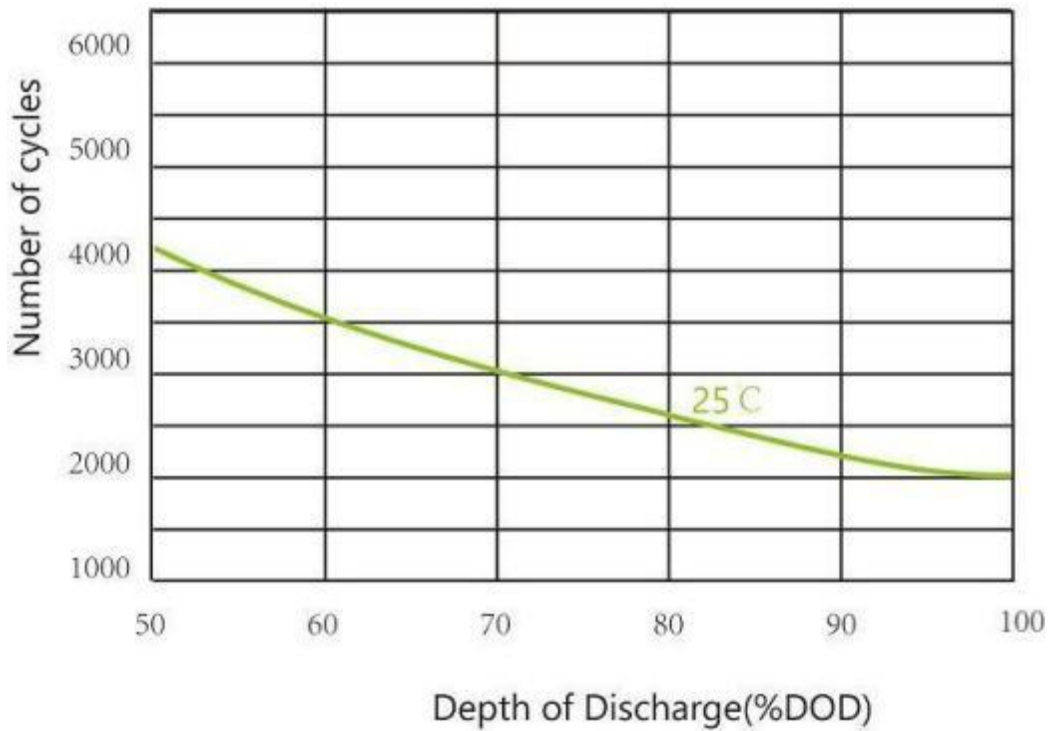
Over-current protection 过电流保护	discharge Over-current protection current1 放电过流保护电流1	15±20A
	discharge Over-current detection delay time 1 放电过电流保护延时1	1S
	discharge Over-current protection current2 放电过流保护电流2	22±20A
	discharge Over-current detection delay time2 放电过电流保护延时2	≤ 100ms
	Charge OC protection current 充电电流保护	15± 10A

Short protection 短路保护	Short protection current 电流短路保护	50± 10A
	Protection condition 保护状态	Load short 负载短路
	Detection delay time 保护延时	≤800us
	Protection release condition 保护解除条件	Charging release 充电释放

Temperature (T) detection protection 温度保护功能	Charge high T protection 充电高温保护	65±2℃
	Charge high T recover 充电高温恢复	60±5℃
	Discharge high T protection 放电高温保护	65±2℃
	Discharge high T recover 放电高温恢复	60±5℃
	Charge low T protection 充电低温保护	-5±2℃
	Charge low T recover 充电低温恢复	0±2℃
	Discharge low T protection 放电低温保护	-20±5℃
	Discharge low T recover 放电低温恢复	- 15±5℃

Balance function 均衡功能	Balance threshold voltage 平衡阈值电压	3.45V
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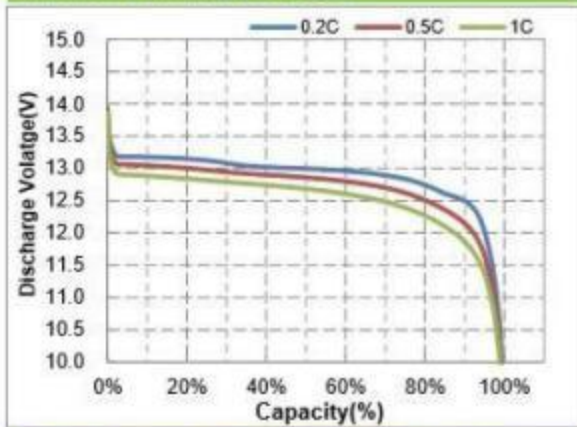
Cycle life versus DOD and temperature at 0.2C



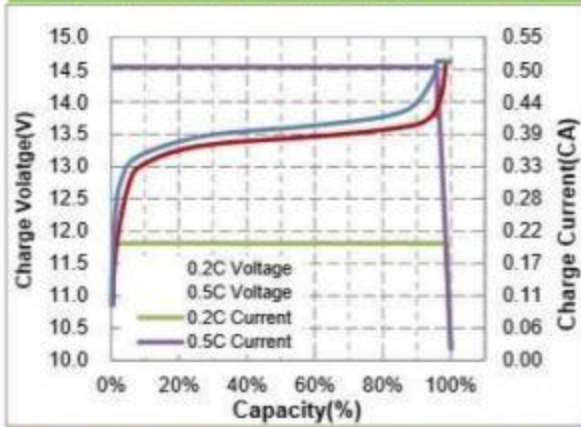
# Lithium Iron Phosphate (LiFePO4) Battery

A Reliable Power Solution Provider

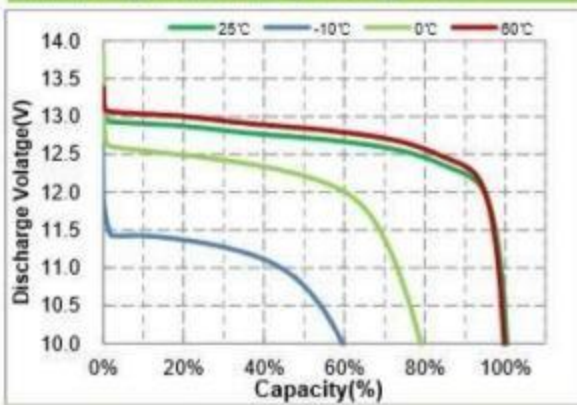
Different Rate Discharge Curve @25°C



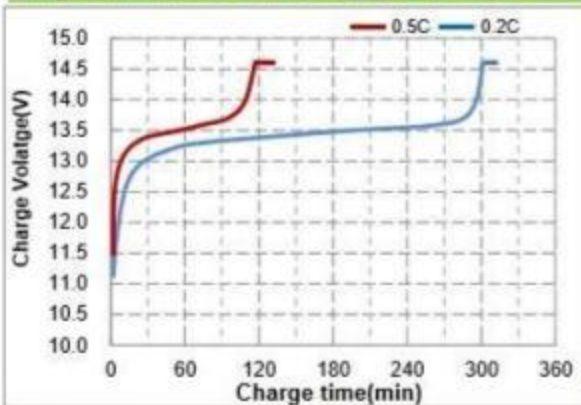
Charge Characteristics of capacity-voltage@0.2C&0.5C, 25°C



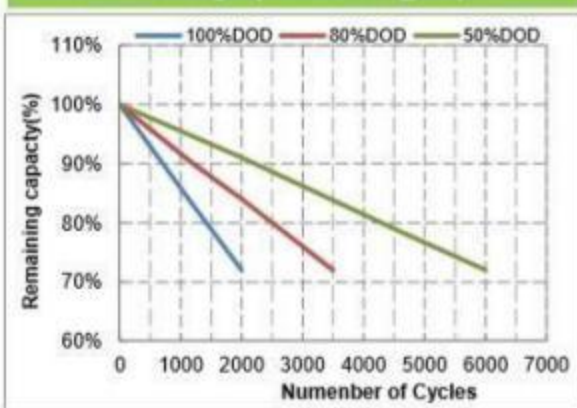
Different Temperature Discharge Curve @0.5C, 25°C



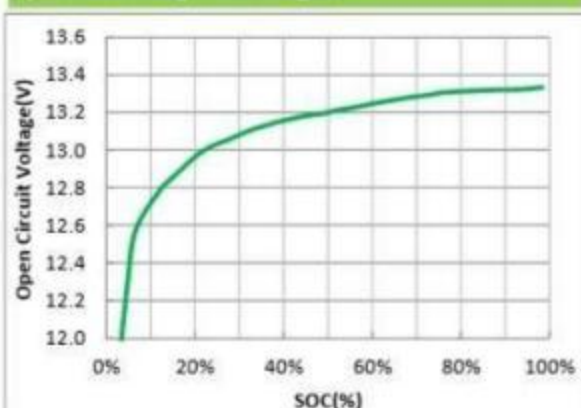
Charge Characteristics of time-voltage@0.2C&0.5C, 25°C



Different DOD Discharge Cycle Life Curve @0.2C, 25°C



Open circuit voltage VS SOC%@25°C



## 5. Performance And Test Conditions (电池性能及测试条件)

### ● Standard Test Conditions (标准测试条件)

test and measurement shall be done under temperature of  $25 \pm 5^\circ\text{C}$  and relative humidity of 45~48%.  
测试会在温度  $25 \pm 5^\circ\text{C}$ ，相对湿度在 45~85%的条件下进行。

### ● Standard Charge/Discharge (标准充放电)

① Standard charge: Test procedure and its criteria are referred as follows:

标准充电：测试过程即标准如下：

120A=Charging shall consist of charging at 120A constant current rate until the cell reaches 14.6V The cell shall then be charged at constant voltage of 14.6V when the charging current has tapered to 0.02 C. Charge time :  
Approx 3-5h,

电池先 120A 恒流充至 14.6V，再以 14.6V 恒压充至电流减小到 0.02 C，充电时间大约为 3-5 个小时

② Standard Discharge (标准放电)

150A=Cells shall be discharged at a constant current of 150A to 9.6volts @25°C±5°C .

电池以 150A 恒流放电至欠压保护 9.6V，@25°C±5°C。

③If no otherwise specified, the rest time between Charge and Discharge amount to 30min.

如果没有特别说明，电池充放电间隔时间为 30 分钟。

● Appearance (外观)

There shall be no such defect as flaw, crack, rust, leakage, which may adversely affect commercial value of battery.

电池外观应没有划痕、破裂、污迹、生锈、漏液等影响市场的缺陷存在。

6. **Warning** (电池注意事项)

● Prohibition short circuit (禁止电池短路)

● Notice for Designing Battery Pack (电池外壳设计注意事项)

Pack toughness (外壳坚韧度)

Battery pack should have sufficient strength and the Li-Fe cell inside should be protected from mechanical shocks.

电池外壳应该有足够的机械强度，使锂电池免受机械撞击。

Cell fixing (电池的固定)

The Li-Fe cell should be fixed to the battery pack by its large surface area.

No cell movement in the battery pack should be allowed.

电池最大面积的一面应该固定在外壳上，安装后电池不能有松动。

Tab connection (极片连接)

Spot welding is recommended for Li-Fe tab connection method.

Battery pack should be designed that shear force are not applied to the Li-Fe tabs.

锂电池的极片采用点焊的方式。

电池组在设计时，锂电池极片不能承受剪切力。

● Prohibition of disassemble (禁止拆卸)

1) Never disassemble the cells

The disassembling may generate internal short circuit in the cell, which may cause gassing, firing, explosion, or other problems.

不要拆卸电池。

拆卸电池会发生电池内部短路，会引起起火、爆炸、有害气体或其它问题。

2) Electrolyte is harmful (电解液是有害的)

Li-Fe battery should not have liquid from electrolyte flowing, but in case the electrolyte come into contact with the skin, or eyes, physicians shall slush the electrolyte immediately with fresh water and medical advice is to be sought.

锂电池不能有电解液流出,但在电解液接触皮肤,或眼睛时,应当立即用淡水冲洗,并且遵循医疗建议。

● Prohibition of dumping of cells into fire (不要把电池浸泡于火中)

Never incinerate nor dispose the cells in fire. These may cause explosion of the cells, which is very dangerous and is prohibition.

不要把电池浸泡在液体当中，像清水、海水及非酒精饮料、果汁、咖啡或其它的饮料中。

● Battery cells replacement (更换电池)

The battery replacement shall be done only by either cells supplier or device supplier and never be done by the user.



更换电池应由电池生产商或设备供应商完成，用户不用自行更换。

● **Prohibition of use of damaged cells** (禁止使用损坏的电池)

The cells might be damaged during shipping by shock. If any abnormal features of the cells are found such as damages in a plastic envelop of the cell, deformation of the cell package, smelling of an electrolyte ,an electrolyte leakage and others, the cells shall never be used any more.

The cells with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing or explosion.

电池可能在出货途中碰撞而受损。如果发现电池有异常，例如包装损坏、包装包裹变形，有电解液的味道、发现漏液等等，不要再使用这些电池如果有电解液的味道或出现漏液，电池放置应该远离火源避免起火爆炸。

● **Period of Warranty** (保质期)

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

电池的保质期从出货之日算起为二年。如果证明电池的缺陷是在制造过程中形成的而不是由于用户滥用及错误使用造成，本公司负责退换电池。

● **Storing the Batteries** (电池的存放)

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity.

We recommend that batteries be charged about once per half a year to or event over discharge.

电池应当在温室下存放，应充到 30%至 50%的电量。如长时间储存，建议每半年充一次电，以防止电池过放电。

● **Other The Chemical Reaction** (其它的化学反应)

Because batteries utilize a chemical reaction, battery performance over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, 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.

由于电池是利用化学反应的原理，所以随时间的增加电池的性能会降低，即使是存放很长一段时间而不使用。如果使用条件如充电、放电及周围环境温度等情形不在指定的使用范围内，会缩短电池的使用寿命，或者会产生漏液导致设备损坏。如果电池长时间不能充电，即使充电方法正确，就要更换电池了。

● **Note:** (注释)

Any other items which are not covered in this specification shall be agreed by both parties.

本说明书包括事项应由双方协议确定。