

深圳市萨伦科技有限公司
Shenzhen Cyclen Technology Co.,Ltd
产品开发协议书
Product Development Agreement

12V60Ah 电池产品规格书 A0 版

12V60Ah Battery Specification Version A0

型 号(Model): IFR 12V60Ah

客户名称(Customer): _____

日 期(Date): 2023-05-12

批 准 (Approval)	审 核 (Check)	拟 定 (Prepare)
客户确认 Customer Confirmation	客户签名 (Customer Signature) :	公司印章 (Corporate Seal:) :
	日期 (Date) :	
	客户代码 (Customer Code) :	

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深圳市萨伦科技有限公司 Shenzhen Cyclen Technology Co.,Ltd		协 议 编 号： Agreement No:		
技术协议变更说明 Description of technical change				
本协议历次版本的变更情况如下： Changes to previous versions of this agreement:				
序号 No.	版本号 version	变 更 内 容 描 述 Change description	更 改 时 间 Time	更 改 人 Respon sible
1	A0	初 始 版 本 Original	2023-05-12	

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一.供货清单 Supply list

序号 No.	名称 Detail	单位 Unit	数量 Quantity	备注 Remarks
1	12V60Ah Battery	PCS	1	
2				
3				

二.电池系统使用要求 Battery usage catalog

1.电池系统工作外部环境温度要求：充放电：-20℃～60℃；

1.Temperature requirements for battery operation: Charge and discharge temp: -20℃～60℃.

2.电池系统工作外部环境湿度要求：10%≤湿度≤90%RH；

2.Humidity requirements for the external environment of the battery :10%≤Humidity≤90%RH.

3.电池系统运营状态下尽量保持 20%以上的 SOC；

3.Please maintain more than 20% SOC when the battery is under operation.

4.电池系统短期不使用的状态下，要求保持 60%以上的 SOC，存储在 5℃～45℃干燥、清洁及通风良好的仓库内。

4.When the battery is not being used for a short period of time, please maintain more than 60% SOC and store it in a dry, clean and well-ventilated warehouse at the temperature between 5℃ to 45℃.

5.电池包装载过程中，要求轻搬轻放，严防摔掷、翻滚、撞击；

5.When packaging the battery, please move it gently to prevent it from being thrown, rolled or hit.

6.存储状态下不得倒置；严禁将电池包长期暴晒、淋雨、泡水；

6.Do not put it upside down in the storage state; it is strictly prohibited to expose the battery pack to long-term exposure, rain or water.

7.保证电池系统在运营或存储状态下远离易燃易爆物品、高温环境；

7.Ensure that the battery system is kept away from flammable and explosive materials and high temperature environment during operation or storage.

8.严禁在电池系统短路、过充、高温告警状态下强制运行；

8.It is not allowed to operate the battery under short circuit, overcharge, high temperature alarm state.

9.严禁客户在未经允许状态下对电池系统进行私自拆卸；

9.Customers are not allowed to disassemble the battery system without permission.

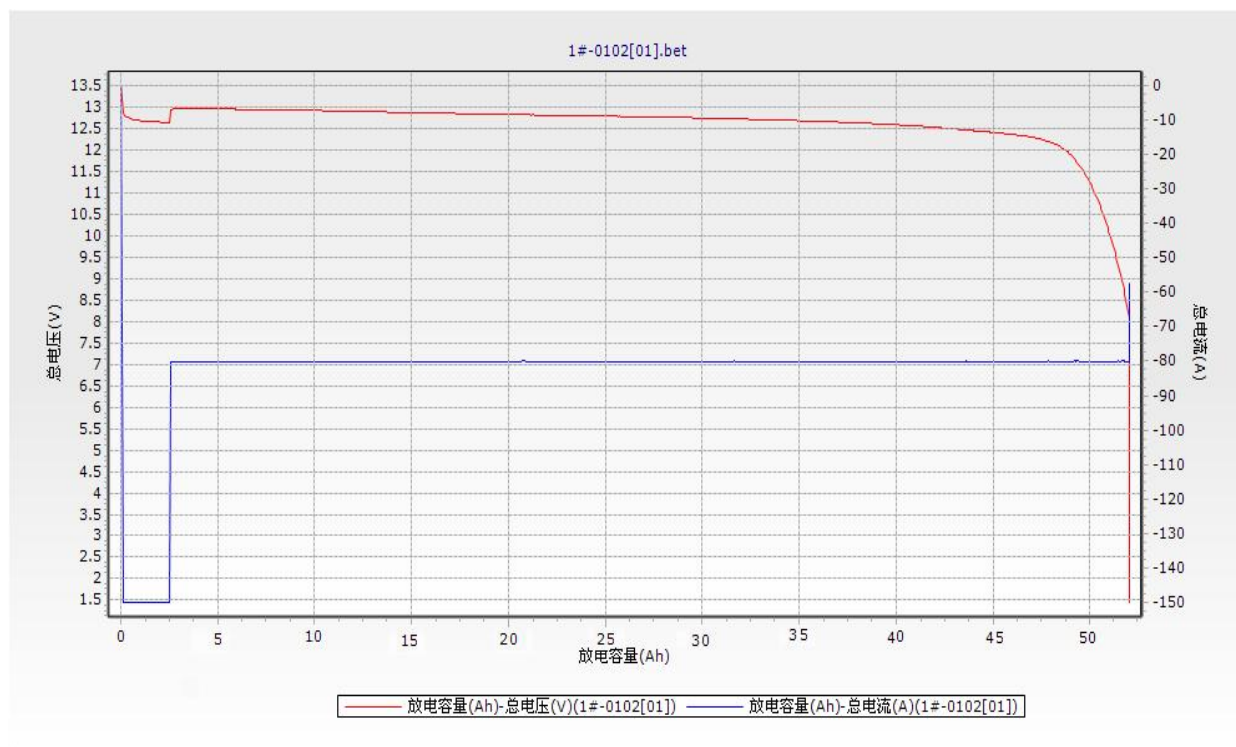
三.电池参数 Battery parameter

序号 NO.	项目 Subject	指标 Index	备注 Remarks
电池单芯参数 Single battery cell parameter			
1	电池类型 Battery type	磷酸铁锂动力电池 Lithium iron phosphate battery	
2	额定电压/容量 Rated voltage/capacity	3.2V 60Ah	
3	单体电池电压范围 Single cell voltage	2.5V-3.65V	
4	单体电池重量 Weight of the battery single cell	1.18kg±0.20kg	
5	尺寸 Dimension	140*24*160mm	
6	正极材料 Positive	橄榄石型磷酸铁锂材料 Peridot lithium iron phosphate material	
7	负极材料 Negative	人造石墨 Artificial graphite	
8	电解质成分 Electrolyte composition	LiPF ₆	
9	电解质形态 Electrolyte morphology	贫液 barren liquor	
10	工作温度 Working temperature	充放电-20℃-60℃ Charge and discharge at -20℃-60℃	
11	荷电保持能力	95% (25℃,30days)	

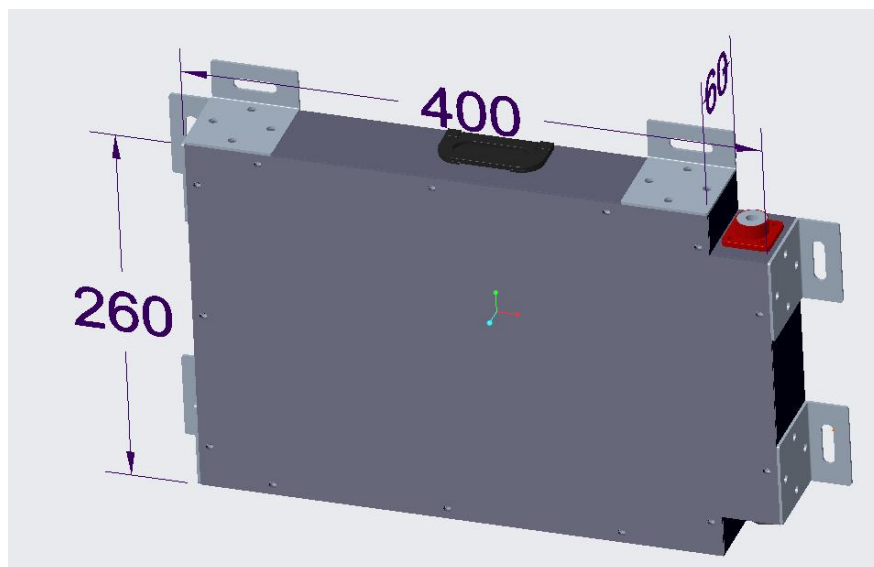
	Charge retention		
12	循环次数 Cycle life	More than 3000 cycle at 1C (Room temperature capacity retention rate: >90%)	
电池系统参数 Battery parameter			
1	额定电压 Rated voltage	12.8V	4S1P
2	电池组电压范围 Battery working voltage	10~14.6V	按单体电压: 2.5V-3.65V
3	额定容量 Rated capacity	60Ah	
4	总能量 Total Energy	0.768 KWh	
5	SOC 范围 SOC range	20%-100%	
6	充放电容量效率 Charge /discharge capacity efficiency	≥96%	
7	最大持续充电电流 (A) Max.Charge current	50	
8	瞬间放电电流(A) Peak discharge current	100	5S
9	最大持续放电电流 (A) Max Continuous discharge current	50	
10	电池组循环次数 Battery cycle life	More than 3000 cycle at 1C (Room temperature capacity retention rate: >90%)	
11	总重量 Battery weight	About:6.8kg	The weight is for reference only, the actual weight is subject to the actual weighing.
12	环境相对湿度 Relative ambient humidity	10%-90%	

13	防尘防护标准 Waterproof Rate	IP55	
14	电池包组成方式 Battery construction	4S1P	
15	电池系统充放电环境温度 Battery charging/discharging ambient temperature range	-20℃-60℃	

四.电池特征曲线图 charge and discharge curve



五.产品结构尺寸图 Product Structure Drawing



六、保护板规格参数 Battery Management System

1、保护板型号：SL-21COB700X4-FB4S70A(4S)

1.BMS model: SL-21COB700X4-FB4S70A(4S)

2.电气参数（室温 25℃ 湿度 55%）

2.Electrical parameters （Room temperature 25℃ Humidity 55%）

序号 NO.	检测内容 Subject		规格 Specification	单位 Unit	备注 Remarks
1	放电 Discharge	持续放电电流 Continuous discharge current	≤50A	A	
		瞬间放电电流 Peak discharge current	100	A	5S
2	充电 charge	充电电压 Charge voltage	DC: 14.4	V	CC/CV
		充电电流 Charge current	25	A	

3	过充电保护 Cell over charge protection	过充电检测电压 Overcharge detection voltage	3.70±0.02	V	
		过充电保护延时 Overcharge detection delay time	0.792~1.85S	S	
		过充电解除电压 Overcharge release voltage	3.55±0.03	V	
4	电量平衡 Cell balancing	电量平衡检测电压 Cell balance detection voltage	3.55±0.025	V	
		电量平衡解除电压 Cell balance release voltage	/		
		电量平衡电流 Cell balance current	36±5	mA	
5	过放电保护 Cell over-discharge protection	过放电检测电压 Over-discharge detection voltage	2.30±0.05	V	
		过放电检测延时 Over-discharge detection delay time	792~1410	mS	
		过放电解除电压 Over-discharge release voltage	2.70±0.10	V	
6	过电流保护 Over-current protection	放电过流保护值 discharge Over-current protection current	200±20	A	

		放电过流保护延时 discharge Over-current detection delay time	50~150	mS	
		充电过流保护 Charge over current protection current	51±6	A	
		充电过流检测延迟时间 charge Over-current detection delay time	768~1280	mS	
		放电过流保护解除条件 Discharge over current protection release condition	断开负载 Disconnect the load		
7	短路保护 Short circuit protection	短路保护条件 Protection condition	外部负载短路 Load short		
		短路电流 Short protection current	About 630	A	
		短路检测延时 Detection delay time	450~800	uS	
		短路保护解除条件 Protection release condition	断开负开 Charging release		
8	温度保护 Temperature protection	保护温度值 1 Protection temperature 1	65±5	℃	无 None
		保护温度值 2 Protection temperature 2	/		
		保护解除条件 Protection release condition	静置 30min，充电解除 Stand still for 30 mins, charge release		
9	弱电开关 Weak current switch	无 None			

10	内阻 Internal resistance	主回路导通内阻 Main circuit conduction internal resistance	≤ 10	mΩ	
11	自耗电 Self-consuming	工作电流 Operating current	≤ 60	uA	
		休眠电流（电池过放时） Sleep current (when the battery is over discharged)			
12	工作温度 Operating temperature	温度范围 Temperature range	-20~+80	℃	
13	存储温度 Storage temperature	温度范围 Temperature range	0~60	℃	

七、贮存与运输 Storage and Transportation

1.根据电池的特性，磷酸铁锂电池组在贮存运输过程应满足其贮存的环境条件，以最大的保护电池的性能。

1. Based on the character of cell, proper environment for transportation of LiFePO₄ battery pack need to be created to protect the battery.

2.磷酸铁锂电池存贮及运输过程中，应有适当的保护，保持 50%左右的 SOC 水平，确保不会短路及液体进入磷酸铁锂电池组或浸泡在液体中（如水、油等）

2. During transportation, 50% SOC must be kept to ensure that short circuit, appearance of liquid in the battery or immersion of battery in liquid never occur.

3.如果暂不使用，电池应贮存在-20℃~45℃干燥、清洁及通风良好的仓库内。

3. Battery should be kept at -20℃~45℃ in warehouse where it's dry, clean and well-ventilated.

4.电池在装卸过程中，应轻搬轻放，严防摔掷、翻滚、重压。

4. During loading of battery, attention must be paid against dropping, turning over and serious stacking.

八、电池使用时警告及注意事项 Warnings and Tips

为防止电池可能发生泄漏、发热、爆炸，请注意以下预防措施：

In order to prevent the battery leaking, getting hot and exploding, please pay attention to preventing measure as following:

警 告 ！ (Warning !)

- 严禁将电池浸入海水或水中,保存不用时,应放置于阴凉干燥的环境中；
- Never throw the battery into water, keep it under dry, shady and cool circumstance when not use.
- 严禁颠倒正负极使用电池；
- Never upside down the positive and negative.
- 禁止用金属直接连接电池正负极短路；
- Never connect the positive and negative of battery with metal.
- 禁止将电池与金属,如发夹、项链等一起运输或贮存；
- Never ship or store the battery together with metal.
- 禁止敲击或抛掷、踩踏电池等；
- Never knock, throw or trample the battery.
- 禁止直接焊接电池和用钉子或其它利器刺穿电池；
- Never cut through the battery with nail or other edge tool.

注 意 ！ (Notices!)

- 禁止在高温下使用或放置电池，否则可能会引起电池过热、起火或功能失效、寿命减短；电池长期储存建议最佳温度为 10-45℃。
- Never use or keep the battery under the high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life. The proposed temperature for long-term storage is 10-45℃.
- 禁止将电池丢于火或加热器中以防起火、爆炸及污染环境；报废电池应退回供应商或电池回收点处理。
- Never throw the battery into fire or heating machine to avoid fire, explosion and environment pollution; scrap battery should be returned to the supplier and handled by the recycle station.
- 禁止在强静电和强磁场的地方使用，否则易破坏电池安全保护装置，带来不安全的隐患。
- Never use the battery under strong static and strong magnetic field, otherwise it will destroy the

protecting device.

- 若电池发生泄露，电解液进入眼睛，千万不可揉擦，应立即用清水冲洗眼睛，并立即送医院治疗，否则会伤害眼睛。
- If battery leaked, the electrolyte get into eyes, please don't knead, please wash eyes by water and send to hospital. Otherwise it will hurt eyes.
- 如果电池发出异味，发热、变色、变形或使用、贮存、充电过程中出现任何异常，应立即将电池从装置或充电器中移离并停用。
- If battery emit peculiar smell, heating, distortion or appear any unconventionality during using, storage or charging process, please take it out from device or charge and stop using.
- 禁止将电池正负极直接插入电源插座中，必须选用锂离子电池专用充电器。
- Never cut the battery in socket directly; please use the stated charger when charging.
- 安装前需检查电池电压和连接件，一切正常后方可使用。
- Check the voltage of battery and relevant connectors before using the battery. It can't be used until everything turns out to be normal.
- 充电前需认真检查所有电线的绝缘性及破损和老化情况，所有导线决不能有破损和老化；另组合电池的电压必须大于等于 10V 为正常，若电压低于 10V 为异常，此时需要对此出现异常的箱子进行标识并与我司售后服务部联系，暂不充电，待我司派人检修后方可进行充电。
- Prior to charging, fully check the insulativity, physical condition and ageing status, since breakage and ageing are never allowed; the pack voltage must not be less than 10 V, if not, it's abnormal and that battery needs to be labeled. The user should contact our Customer Service Dept and It can't be charged until repaired by our staff.
- 电池半电存贮，若电池半年没有用过，需进行补充电一次。
- The battery should be stored in half SOC. It needs to be charged once if out of use for as long as half a year.
- 若电极弄脏，使用前应用干布抹净，否则可能会导致接触不良、功能失效。
- Clean the dirty electrode, if any, with a clean dry cloth, or poor contact or operation failure may occur.