314Ah 电芯产品规格书

Product Specification of 314Ah Cell

型号 Model: ZT314L

类别 Type： 磷酸铁锂/$LiFePO_4$

制定人 Prepared by	审核人 Checked by	批准人 Approved by
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客户确认 Customer Approval	签名 Signature:	公司印章 Corporate Seal:
	日期 Date：	
	客户代码 Customer Code：	

修订记录
Amendment records

版本 Revision	描述 Description	日期 Date
A0	首版发行（New release）	2024-06-05
A1	1. 增加极柱与 Busbar 焊接推荐参数（Add recommended welding parameters for cell terminal and busbar.） 2. 增加安全使用注意事项（Add notice & warning） 3. 增加应用须知 （Add application instruction）	2024-08-15

目录 Contents

0. 术语定义（Terms and Definitions）

术语 Terms	定义 Definition
智泰 ZTTEK	江苏智泰新能源科技有限公司及其子公司 Jiangsu Zhitai New Energy Tech, Co., Ltd(ZTTEK) and its subsidiaries.
产 品 Product	本规格书中的产品是指智泰生产的 314Ah 可充电磷酸铁锂电池 The term product in this specification refers to the 314Ah rechargeable lithium iron phosphate batteries produced by ZTTEK.
客 户 Customer	指购买本规格书所述产品的公司、企业或个人。 Refers to the companies, enterprises or individuals who purchase the products described in this specification.
室 温 Room temperature	指 25±2℃室内温度 Refers to 25±2℃ room temperature (RT)
电池温度 Cell temperature	由接入电池的温度传感器测量的电芯的温度，温度传感器和测量线路的选择由智泰和客户共同商定。 The temperature measured by the sensor connected to cell, the choice of the temperature sensor and the measurement circuit is discussed by ZTTEK and the customer jointly.
环境温度 Ambient Temperature	电池所处的周围环境温度。 The ambient temperature of the environment which the products are exposed.
健康度 State of healthy	电池健康度，在数据上等于当前状态下实际容量与电池额定容量的比值。 State of healthy (SOH)，the ratio of the actual capacity to the rated capacity in the current state
充电倍率 Charge rate	电池在规定的时间内放出其实际容量时所需要的电流值，它在数据值上等于电池 SOH 的倍数，通常以字母 C/P 表示（1C 最大不超过 314A/1P 最大不超过 1004.8W）。 The value of the current required for a battery to discharge its test capacity within a specified period of time, which is a multiple of the SOH of the battery in the data value, usually denoted by the letter C/P.（Max current of 1C is equal to 314A max power of 1P is equal to 1004.8W.）
循环寿命 Cycle life	电池在反复充放电的使用下，电池的容量会逐渐下降，通常以该电池的额定容量作为标准，电池容量降到其指定 SOH 的充放电次数，称循环寿命。 Under repeated charge and discharge using of the battery, the capacity of the battery will gradually decline. Cycle life means the cycle numbers that cell battery aged when the remaining capacity rate getting to the specified SOH.
开路电压 OCV	开路电压是指外电路没有电流流过时电池正负极柱之间的电位差。 Open circuit voltage (OCV) is the potential difference between the positive and negative poles of the battery when there is no current flowing through the external circuit.
恒功率充放电 CP/DP	用恒定功率进行充放电 Charge or discharge by constant power
新鲜电池状态	电芯下线 30 天以内的状态

Fresh cell	The state within 30 days after products off the production line.
标准充电 Standard charge	本规格书第 4.1 条所述的充电模式。 Means the default charging method set out in paragraph 4.1 titled standard charging method.
标准放电 Standard discharge	本规格书第 5.1 条所述的放电模式。 Means the default discharging method set out in paragraph 5.1 titled standard discharging method.
荷电状态 SOC	电池实际充电量与满充充电量的比值，表征电池的充电状态。100%SOC 的充电状态表示电池满充到 3.65V，0%SOC 的充电状态表示电池完全放电到 2.5V。 Means the ratio of the actual battery charge to the full charge, characterizing the state of charge of the battery. The state of charge of 100% SOC indicates that the battery is fully charged to 3.65V, and the state of charge of 0% SOC indicates that the battery is completely discharged to 2.5V.
电池管理系统 BMS	客户用于监测和记录产品在整个服务期限内的运行参数的一种有效的追踪和控制系统。其追踪和记录的参数包括但不限于电压、电流、温度等，以控制产品的运行并确保产品运行环境及运行条件符合本技术协议的规定。 An active tracking and control system to be developed and implemented to monitor and record the operating parameters, including but not limited to voltage, current and temperature, of each product in its entire service life, and to control the operation of each product to ensure a safe operation of product.
测量单位 Units of measurement	V (Volt) 伏特，电压单位 V (Volt), Unit of voltage
	A (Ampere) 安培，电流单位 A (Ampere) Unit of current
	Ah（Ampere-Hour）安培-小时，电荷单位 Ah（Ampere-Hour）,Unit of electric charge
	Wh（Watt-Hour）瓦特-小时，能量单位 Wh（Watt-Hour）,Unit of energy
	mΩ（MilliOhm）毫欧姆，电阻单位 mΩ（MilliOhm）,Unit of resistance
	℃（degree Celsius）摄氏度，温度单位 ℃（degree Celsius）,Unit of temperature
	mm（millimeter）毫米，长度单位 mm（millimeter）,Unit of length
	s（second）秒，时间单位 s（second）,Unit of time
	Hz（Hertz）赫兹，频率单位 Hz（Hertz）,Unit of frequency

1. 适用范围（Scope）

本产品规格文件适用于江苏智泰新能源科技有限公司制造的可充电式锂离子电池。若对测试项目或测试方法有异议，请与我们联系解决。

This product specification defines the characteristics of the rechargeable lithium-ion battery supplied by Jiangsu Zhitai New Energy Tech, Co., Ltd. Should there be any questions about test items and method, please contact us for a solution.

2. 产品型号 （Product Model）

ZT314L

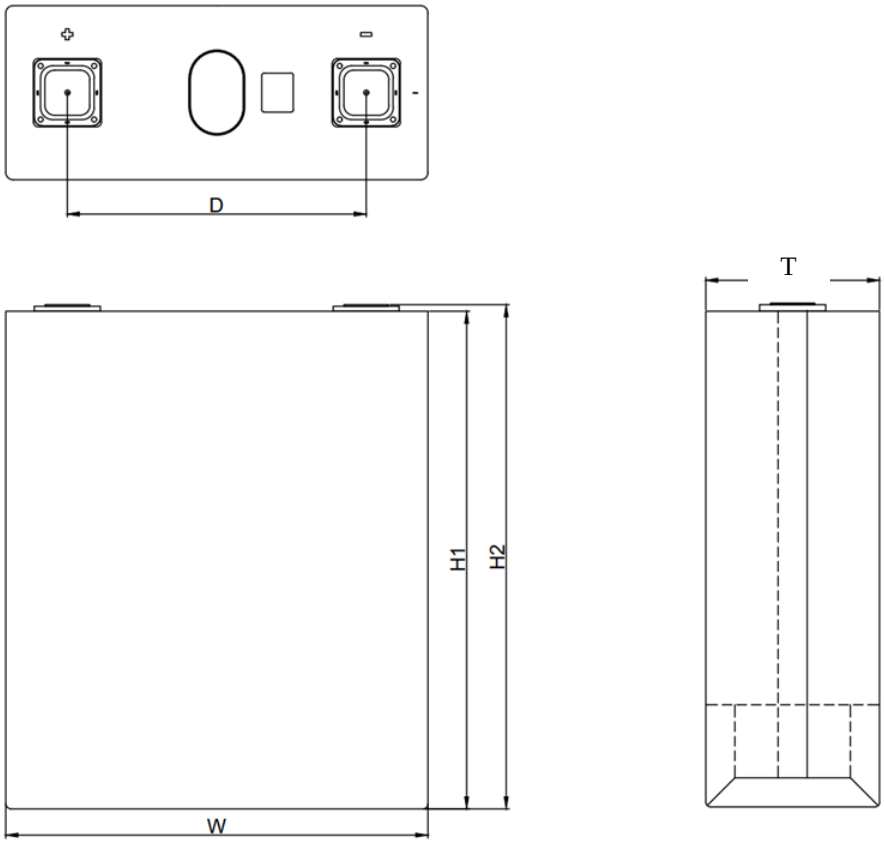
3. 产品技术参数 （Technical Information）

序号 No.	项目 Item	性能指标 Specification	备注 Remark
3.1	标称容量 Nominal Capacity	314Ah	标准充放电模式测试 Standard charge and discharge procedure
3.2	标称能量 Nominal Energy	1004.8Wh	标准充放电模式测试 Standard charge and discharge procedure
3.3	标称电压 Nominal Voltage	3.2V	
3.4	交流内阻 AC Impedance	0.190±0.025	新鲜电池 25±2℃ (30%SOC), @1kHz Fresh cell 25±2℃ (30%SOC), @1kHz
3.5	工作电压范围 Voltage Range	3.65~2.5V	0℃<T≤55℃
		3.65~2.0V	-20℃≤T≤0℃
3.6	工作温度 Working Temperature	0~55℃	充电 Charge
		-20~55℃	放电 Discharge
3.7	存储温度 Storage Temperature	-20~55℃	环境湿度≤85%ROH，无凝露 Ambient humidity < 85% ROH, no condensation
3.8	建议 SOC 使用范围 Recommend SOC Range	0~100%SOC	
3.9	电芯重量 Cell Weight	5.60±0.15kg	

3.10	自放电 Self Discharge	≤3%/月 ≤3%/month	25±2℃, 30%SOC，新电池，恒功率模式测试
3.11	单体充放电保护温度(℃)	60	停止充放电
3.12	电池出厂电量比(SOC)	30%±2%	
3.13	直流内阻(mΩ)	≤0.5	25℃ 新鲜电池 30%SOC 1C 10s
3.14	内阻极差(ACIR)	0.05mΩ	

3.11 外形尺寸 Dimension

项目 **Item**	**代码** **Code**	**规格** **Specification**	**备注** **Remark**
厚度 Thickness	T	71.7±0.5 mm	含绝缘膜，300±20kgf 压力 w/ insulating film, 300±20kgf Pressure
宽度 Width	W	174.0±0.5 mm	含绝缘膜 w/ insulating film
高度-1 Height-1	H1	204.2±0.5 mm	不含极柱 w/o terminal pole
高度-2 Height-2	H2	207.2±0.5 mm	含极柱 w/ terminal pole
极柱中心距 Tab Center Distance	D	123.0±0.3 mm	



4. 充电模式 (Charging method)

4.1 标准充电模式 Standard charging method

1、在 25±2℃测试温度下，以 0.5P(502.4W)恒功率充电至 3.65V,

2、静置 10min,

3、Under the 25±2℃ test condition，charging the cell with constant power at 0.5P(502.4W) to 3.65V,

4、rest 10min.

4.2 其他充电模式 Other charging method

4.2.1 不同温度下恒功率充电模式 Constant power charging method at different temperatures

电芯温度/℃ Cell temperature/℃		0	5	10	15	20	25	45	50	55	60
最大充电功率(P) Max. charging power (P)	0%~100% SOC	0	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0

4.2.2 不同温度下阶梯功率充电模式 Step power charging method at different temperature

电芯温度/℃ Cell temperature/℃		0	5	10	15	20	25	45	50	55	60
最大充电功率（P） Max. charging power (P)	0%~70% SOC	0	0.2	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0
	70%~100% SOC	0	0.1	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0

5. 放电模式 (Discharging method)

5.1 标准放电模式 Standard discharging method

在 25±2℃测试温度下，以 0.5P(502.4W)恒功率放电至 2.5V，静置 10min。

Under the 25±2℃ test condition，discharging the cell with constant power at 0.5P(502.4W) to 2.5V, rest 10min.

5.2 其他放电模式 Other discharging method

5.2.1 不同温度下恒功率放电模式 Constant power discharge method at different temperatures

电芯温度/℃ Cell temperature/℃		-30	-20	-10	-5	0	5	45	50	55	60
最大放电功率(P) Max. charging power (P)	0%~100% SOC	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0

6. 电性能测试（Electric Performance）

6.1 极柱与 Busbar 焊接推荐参数 Recommended welding parameters for cell terminal and busbar

序号 No	项目 Items	标准 Standard
1	焊接输出能量 Welding output energy	≤2200J
2	焊接功率 Wielding power	4000~4200W
3	焊接速度 Welding speed	70~80mm/s
4	熔深 Depth of fusion	0.5mm~2.0mm
5	极柱承受最大温度（塑胶垫不发生变形） Max temperature on poles (the plastic pads do not deform)	130℃
6	极柱承受压力 Overwhelming force of the terminal	≤700N

6.2 循环性能 Cycle performance

项目 **Items**	**测试方法和测试条件** **Test Method and Condition**	**判断标准** **Criteria**
常温循环寿命 RT Cycle Life (25±2℃)	测试条件： 电芯在 300±50kgf 的初始夹具力下开始测试 充电：0.5 P 充电到 3.65V 搁置时间：10min 放电：0.5 P 放电到 2.50V 搁置时间：10min 当放电容量降至标称容量的 70%时，测试结束。 备注：0.5 P = 502.4W	≥8000 次

	Test condition： 300±50kgf preload Charge:0.5 P to 3.65V Standby time: 10min Discharge:0.5 P to 2.50V Standby time: 10min When capacity declines to 70% of the nominal capacity, stop the test. Remark: 0.5 P = 502.4W	
45℃循环寿命 45℃ Cycle Life (45±2℃)	测试条件： 电芯在 300±50kgf 的初始夹具力下开始测试 充电：0.5 P 充电到 3.65V 搁置时间：10min 放电：0.5 P 放电到 2.50V 搁置时间：10min 当放电容量降至标称容量的 70%时，测试结束。 备注：0.5 P = 502.4W Test condition： 300±50kgf preload Charge:0.5 P to 3.65V Standby time: 10min Discharge:0.5 P to 2.50V Standby time: 10min When capacity declines to 70% of the nominal capacity, stop the test. Remark: 0.5 P = 502.4W	≥3000 次

6.3 高低温容量 High/Low temperature discharging capacity

项目 **Items**	**测试方法和测试条件** **Test Method and Condition**	**判断标准** **Criteria**
25℃放电容量 Capacity@25℃	在 25±2℃温度下，以 0.5P 恒功率充电至 3.65V，静置 10min，以 0.5P 恒功率放电至 2.5V。 Temperature 25±2℃ 0.5P CP to 3.65V, Rest 10min, 0.5P DP to 2.5V.	≥314Ah
55℃放电容量	在 25±2℃温度下，以 0.5P 恒功率充电至 3.65V，静置	≥314Ah

Capacity@55℃	10min， 在 55±2℃温度下搁置 5h 然后以 0.5P 恒功率放电至 2.5V。 Temperature 25±2℃, 0.5P CP to 3.65V, Rest 10min, Temperature 55±2℃ , rest 5h，then 0.5P DP to 2.5V.	
-20℃放电容量 Capacity@-20℃	在 25±2℃温度下，以 0.5P 恒功率充电至 3.65V，静置 10min， 在-20±2℃温度下搁置 5h 然后以 0.5P 恒功率放电至 2.0V。 Temperature 25±2℃， 0.5P CP to 3.65V, Rest 10min, Temperature -20±2℃ ，rest 5h，then 0.5P DP to 2.0V.	≥251Ah

6.4 存储性能 Storage performance

项目 **Items**	**测试方法和测试条件** **Test Method and Condition**	**判断标准** **Criteria**
室温荷电保持与恢复能力 25℃ retention & recovery capability	电芯标准充电后，室温条件下开路放置 28 天；以 0.5P 放电至 2.5V，放出的容量记为剩余容量；再次标准充电后，以 0.5P 放电至 2.5V，放出的容量记为恢复容量。 After standard charge, rest for 28 days at (25±2)℃ without external circuit connection. Discharge the cell with 0.5P to 2.5V, record the value as the retention capacity. Charge the cell with standard charge process, discharge the cell with 0.5P to 2.5V, record the value as the recovery capacity.	剩余容量≥95%标称容量 恢复容量≥97%标称容量 Retention rate ≥95% nominal capacity Recovery rate ≥97% nominal capacity.
高温荷电保持与恢复能力 55℃ retention & recovery capability	电芯标准充电后，高温（55±2）℃条件下开路放置 7 天；室温搁置 5h 后，以 0.5P 放电至 2.5V，放出的容量记为剩余容量；再次标准充电后，以 0.5P 放电至 2.5V，放出的容量记为恢复容量 After standard charge, rest for 7 days at (55±2)℃ without external circuit connection. Then rest for 5h at (25±2)℃, discharge the cell with 0.5P to 2.5V, record the value as the retention capacity. Charge the cell with standard charge process, discharge the cell with 0.5P to 2.5V, record the value as the recovery capacity.	剩余容量≥95%标称容量 恢复容量≥97%标称容量 Retention rate ≥95% nominal capacity Recovery rate ≥97% nominal capacity

6.5 安全和可靠性 Safety and Reliability

项目	**判断标准**	**备注**

Items	Criteria	Remark
过放电 Overdischarge	电池单体初始化放电后以 P_{rc} /U_{nom} 恒流放电至电压达到 0V 或时间达到 1h，不应漏液，不应冒烟，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 Battery monoblocs initialized discharged with P_{rc} /U_{nom} constant current discharge until the voltage reaches 0V or the time reaches 1h, should not leak, should not smoke, should not catch fire, should not explode, and should not rupture at a location other than the explosion-proof valve or the pressure relief point.	参考：GB/T 36276-2023《电力储能用锂离子电池》 Refer to：GB/T 36276-2023《Lithium ion battery for electrical energy storage》
过充电 Overcharge	电池单体初始化充电后以 P_{rc} /U_{nom} 恒流充电至电压达到其充电截止电压的 1.5 倍或时间达到 1h，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 The battery shall not catch fire, explode, or rupture at a location other than the explosion-proof valve or pressure relief point after initial charging of the battery unit at constant current with P_{rc} /U_{nom} until the voltage reaches 1.5 times its charging cut-off voltage or the time reaches 1h.	
外部短路 External short	电池单体初始化充电后以 1 mΩ 外部线路短路 10 min，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 A short circuit of the battery with a 1 mΩ external line for 10 min after initial charging shall not cause a fire, an explosion, or a rupture at a location other than an explosion-proof valve or pressure relief point.	
过载 Over load	电池单体在 4P_{rc}、4P_{rd} 条件下充放电，不应漏液，不应冒烟，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 Battery cells charged and discharged under 4P_{rc}, 4P_{rd} conditions shall not leak, smoke, catch fire, explode, or rupture at a location other than the explosion-proof valve or pressure relief point.	
挤压 Crush	电池单体初始化充电后在 50 kN 的挤压力下保持 10 min，不应漏液，不应冒烟，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 Battery cells held for 10 min at a squeeze pressure of 50 kN after initial charging shall not leak, smoke, catch fire,	

	explode, or rupture at a location other than the explosion-proof valve or pressure relief point.	
跌落 Drop	电池单体初始化充电后由 1.5m 高度处自由跌落到水泥地面，不应冒烟，不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂。 Battery monobloc after initial charging from a height of 1.5m free fall to the concrete floor, should not smoke, should not fire, should not explode, should not rupture at a location other than the explosion-proof valve or pressure relief point.	
绝热温升 Adiabatic temperature rise	电池单体绝热温升特性应满足下列要求 ： a) 表面温度小于或等于电池单体高温一级报警温度时，温升速率小于 0.02℃ / min； b) 不起火，不爆炸，不在防爆阀或泄压点之外的位置发生破裂。 Battery adiabatic temperature rise characteristics should meet the following requirements : a) When the surface temperature is less than or equal to the high-temperature alarm temperature of the battery monomer, the temperature rise rate is less than 0.02℃ /min; b) No fire, no explosion, no rupture at a location other than the explosion-proof valve or pressure relief point.	
热失控 Thermal runaway	电池单体在全寿命周期内，热失控时表面温度应大于 90℃，热失控后不应起火，不应爆炸，不应在防爆阀或泄压点之外的位置发生破裂 。 In the whole life cycle of the battery monomer, the surface temperature should be more than 90℃ during thermal runaway, and it should not catch fire after thermal runaway, should not explode, and should not rupture at the location other than the explosion-proof valve or pressure relief point.	

7. 电芯贮存 (Cell storage)

长期贮存的电池（超过 3 个月）须置于干燥、凉爽处。贮存 SOC 建议 10%~50%范围内。

Batteries stored for a long period of time (more than 3 months) should be kept in a dry and cool place. Storage SOC is recommended to be within 10%~50%.

8. 安全使用注意事项（Notice & Warning）

8.1 禁止拆装、破坏、短路、加热、弄湿、焚烧电池；

Don’t disassemble, damage, short-circuit, heat, wet or cremate batteries.

8.2 使用专用充电器，并正确与专用设备连接使用；

Use specified charger, and connect the battery to the appliance correctly.

8.3 严禁将电池直接接在电源插座，禁止与其它电池混用；严禁使用不正常电池。

Don’t plug the battery directly in electrical outlet. Don’t use the cell together with other types of batteries. If the battery is abnormal in shape or performance, reject it.

8.4 废弃电池请安全妥当处理（如回收）。不可将电池作为生活垃圾处理。

Don’t treat rejected battery as regular living garbage. Collect them in certain place for recycle.

8.5 禁止将电芯投入火中或长时间暴露在超过本规格书规定的温度条件的高温环境中，否则可能会导致火灾。在任何正常的使用情况下，电芯温度不能超过 60℃，如果电芯温度超过 60℃，电池管理系统需关闭电芯，停止电芯运行。

Do not drop the cell into fire or expose it to any high temperature environment exceeding operation temperature, otherwise it may cause fire. At all use time, cell temperature should not exceed 60℃, shut down system by BMS when it occurs.

8.6 勿擅自以任何方式拆解、拆卸或修整电芯。

Do not disassemble or repair the cell in any way without authorization.

8.7 如果电芯发出异味、发热、变形、变色或出现其它任何异常现象时不得使用并将电芯转移到安全的位置。

If the cell occurs peculiar smell, heat, deformation, discoloration or any other abnormal phenomenon, do not use it and move the cell to a safe location.

8.8 禁止电芯正负极短接，否则强电流和高温可能导致人身伤害或者火灾。

Do not short circuit cell terminals. Otherwise, the strong current and high temperature may cause personal injuries or fire.

8.9 客户应将电芯安全地固定在固体平面上，并将电源线安全地束缚在合适的位置、以避免摩擦而引起电弧和火花。

Products should be securely fixed to solid platform, and power cables should be securely attached by fastener to avoid intermittent contact which may cause arcing and sparks.

8.10 当电解液泄露时，应避免皮肤和眼睛接触电解液。如有接触，应使用大量的清水清洗接触到的区域并向医生寻求帮助。禁止任何人或动物吞食电芯的任何部件或电芯所含物质。

When the electrolyte leaks, skin and eye contact with the electrolyte should be avoided. In case of contact, a large amount of clean water should be used to clean the contact area and seek help from the doctor. It is forbidden for any person or animal to swallow any part or substance contained in the battery.

9. 应用须知 （Application Instruction）

客户应当严格遵守以下电池的应用条件，以保证电池正常和安全使用。

The customer should follow the following application instructions for safety application of batteries.

9.1 客户应当配置电池管理系统，跟踪、监测并记录每个使用期限内电池的电压，温度等参数，用于管理和保护电池。

The customer should configure the BMS to track, monitor and record the battery voltage, temperature and other parameters during each service life for the management and protection of the battery.

9.2 电压，温度等参数的测量方式需要客户与智泰商议，共同决定。

The measurement methods of voltage, temperature and other parameters need to be discussed by customer and ZTTEK jointly.

9.3 客户应向智泰提供电池管理系统详细的设计方案、系统特点、框架、系统数据、格式等相关信息，以供智泰对该系统进行设计评估，并建立电池管理档案。

The customer should provide ZTTEK with detailed system design characteristics, framework, system data, and other relevant information of the battery management system, so as to enable ZTTEK to evaluate of the system design and establish battery management system file.

9.4 未经智泰同意，客户不可擅自修改或者改变电池管理系统的设计和框架，以免影响电池

的使用性能。

Without the consent of ZTTEK, the customer should not modify or change the design and framework of the battery management system to avoid affecting the performance of the battery.

9.5 客户应保存完整的电池运转的监测数据，用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，智泰不承担产品质量保证责任，且不予赔偿。

The customer should keep complete monitoring data of battery operation for the reference of product quality. If the battery system does not have complete monitoring data during the service life, ZTTEK will not undertake the responsibility of product quality assurance and will not compensate for the loss.

9.6 电池管理系统需满足以下最基本的检测和控制要求。

The BMS should meet the following basic detection and control requirements.

No.	项目 Item	参数 Parameter	保护动作 Protection action
9.6.1	充电终止 Stop charging	3.65V	当电芯的电压达到 3.65V 时电池管理系统申请终止充电 Stop charging when cell voltage reaches 3.65V
9.6.2	第一级过充电保护 First overcharge protection	≥3.7V	BMS系统报警 BMS alarms
9.6.3	第二级过充电保护 Second level of overcharge protection	≥3.75V	降低电池放电电流或者功率 Reduce cell discharging current or power
9.6.4	第三级过充电保护 Second level of overcharge protection	≥3.8V	当电芯的电压达到3.8V 时电池管理系统强制终止充电，并锁定电池管理系统直到解决问题 BMS is forced to stop charging when the cell voltage reaches 3.8V, BMS should be locked until technicians solve the problem.

9.6.5	放电终止 Stop discharging	2.5V(T＞0℃) 2.0V(T≤0℃)	当电芯的电压达到 2.5V(T>0℃)或 2.0V(T≤0℃)时，电池管理系统申请终止放电 Stop discharging when cell voltage reaches 2.5V (T>0℃) or 2.0V (T≤0℃).
9.6.6	第一级过放保护 First level of over discharge protection	2.4V(T＞0℃) 1.8V(T≤0℃)	当电芯的电压达到 2.4V(T>0℃)或 1.8V(T≤0℃)时，电池管理系统强制终止放电 BMS is forced to stop discharging when cell voltage reaches 2.4V (T>0℃) or 1.8V (T≤0℃).
9.6.7	第二级过放保护 Second level of over discharge protection	2.0V(T＞0℃) 1.6V(T≤0℃)	当电芯电压低于2.0V(T＞0℃)或 1.6V(T≤0℃) 时，电池管理系统强制终止放电。然后及时用 30A 的电流将电池充电至 50% SOC。且电池管理系统应锁定直到技术人员解决问题 BMS is forced to stop discharging when the cell voltage is less than 2.0V(T>0℃) or 1.6V(T≤0℃). Then the cell should be charged to 50% SOC with 30A in time. BMS should be locked until technicians solve the problem.
9.6.8	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时由继电器断开回路 When a short circuit occurs, the cell should be disconnected by the overcurrent protection device.
9.6.9	过流保护 Overcurrent protection	电流≤402.0A Current≤402.0A	电池管理系统控制充放电电流符合规格 BMS controls the charge and discharge current to meet the specification.
9.6.10	过热保护 Overheat protection	电芯温度≤60℃ Cell temperature≤60℃	当温度超过规定时，终止充电/放电 Stop charging and discharging when temperature exceeds specification.

9.6.11	低温保护 Low temperature protection	充电：温度＞0℃； 放电：温度≥-30℃ Charging: T＞0℃; Discharge: T≥-30℃	当温度低于规定时，终止充电/放电 Stop charging and discharging when temperature exceeds specification.

9.7 客户及第三方应避免在放电过程中电芯达到过放状态。当放电截止电压低于 2.5V 时，系统内部能耗降低到最小，并在重新充电之前延长休眠时间。客户需要培训使用者在最短的时间内重新充电，防止电芯进入过放状态。

The customer and the third party shall avoid cell overdischarge during the discharging process. After discharge cut-off, internal power consumption of the system should be reduced to a minimum to prolong the idle time before recharge. Customer shall educate the users of the products or other parties who may come to handle the products to recharge the cells at minimum time intervals to prevent reaching the over-discharge state

9.8 电芯存储 SOC 建议保持在 10～50%范围内。客户若预计在质保期开始后将电芯存放 1~6 个月，应提前做一次充放电，将 SOC 调整为 10～50%。

The storage SOC of the cell is recommended to keep at 10~50%. If the Customer expects to store the cell for 1~6 months after the warranty period starts, they shall charge and discharge once and adjust the SOC to 10~50% in advance.

9.9 客户在对电芯进行搬运及电池模组设计、组装的过程中，要做好防护措施，避免绝缘膜破损。

During the process of handling cells and designing and assembling battery modules, customers shall take protective measures to avoid damage to the insulation film.

9.10 电池模组设计中应保证电芯间最大接触面受力均匀，如果因为模组设计存在问题，可能导致电池失效的风险，客户可与智泰协商模组设计建议。

The battery module design shall ensure that the maximum contact surface between cells is evenly subjected to force. If there is any issue with the module design which may lead to the potential failure of the cell, the Customer may negotiate with ZTTEK about the advice of module design.

9.11 电池模组或系统设计应充分考虑电芯的散热问题，如果存在系统冷却设计问题导致电芯有损坏的风险，客户需与智泰协商系统冷却设计建议。

The design of battery module or system shall consider the heat dissipation of the cell. If there is issue on system cooling design which may lead the potential failure of cell, customer need to negotiate with ZTTEK about the design advice of system.

9.12 电池模组设计中应充分考虑电芯的防水、防尘、绝缘等问题，电池模组必须满足国家有关标准规定的防水、防尘、绝缘等等级。

The design of the module or system shall meet the waterproof 、dustproof and insulation grade required by relevant national standards.

9.13 电芯的使用期限是有限的，客户应该建立有效的跟踪系统监测并记录每个使用期限内电芯的容量。容量的测试方法可与智泰讨论沟通。当使用中的电芯容量小于等于标称容量70%(25℃)，应停止使用电芯。

The service life of cell is limited. Customer shall establish an effective tracking system to monitor and record the capacity of the cell during service life. The capacity calculation methods need to be discussed by two parties. When the capacity is less than or equal to 70% of the nominal capacity (25℃), the cell shall be stopped using.

10. 其他事项（Others）

本说明书中未提及的事项，须经双方协商确定。

Any matters that this specification does not cover should have a negotiation between two parties.