产品规格书 PRODUCT SPECIFICATION

可充电钠离子电池 Rechargeable Sodium Ion Battery

型号 Type：NaCR33140-M10

产品设计准备 Prepared by RD	产品设计审批 Approved by RD	工艺工程审批 Approved by PE	品质审批 Approved by QA	销售审批 Approved by MS

客户确认 Client Approval	签名 Signature：	公司印章 Company Stamp：
	日期 Date：	
	客户代码 Company Code：	

维科技术股份有限公司

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更新记录

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客户要求 Customer Inquiry

型号 Model: NaCR33140-M10

客户根据终端产品使用需求提出对电芯的需求并与维科沟通，如客户有一些特别的应用或者操作条件不同于此文件中所描述的，维科可以根据客户的特别要求进行产品的设计和生产。

The Customer is requested to write down your information and contact Veken in advance, if and when the Customer needs applications or operating conditions other than those described in this document. Veken could design and build such products according to your special request.

编号 No.	特殊要求 Special Request	标准 Criteria
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客户代码 Company code：_____ 签字 Signature：_____ 日期 Date：_____

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术语定义 Definition and Note

术语 Term	定义 Definition
产品 Product	本规格书中的“产品”是指维科生产的 10Ah、3.0V 可充电钠离子电池。 This product specification is just applied to the 3.0V/10Ah rechargeable sodium ion cell produced by Veken.
客户 Custom	指《维科产品销售合同》中的买方。 The buyer in the sale contract.
维科 Veken	指《维科产品销售合同》中的卖方 The seller in the sale contract.
环境温度 Ambient temperature	电池所处的周围环境温度。 The temperature of the air surrounding a cell.
电池管理系统 Battery manager system	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规格书的规定。 A tracking and controlling device integrating with hardware and software, which is used to monitor and record operating data in battery service life. The parameters consist of voltage, current, temperature and so on. The device can control the operating state of battery and keep the working surrounding and condition meeting the requirements of this specification.
电芯温度 Cell temperature	由接入电池的温度传感器测量的电芯的温度。 Surface temperature of a cell measured by temperature sensor.
新电池状态 Fresh cell status	指电池下线日期开始算起 7 天范围内的状态。 Within 7 days after being off-line.
充/放电倍率 C-Rate	充/放电功率与电池额定充/放电功率的比值。 The ratio of charge/discharge power to rated charge/discharge power

循环 Cycle	电池按规定的充放电制度充放一次为一个循环。 One sequence of charge and discharge as prescribed.
开路电压 Open-current voltage	没有接入任何负载和电路时测得的电池的电压。 The voltage between the battery terminals with no load applied.
额定功率 Rated power	在本规格书试验条件和试验方法下，电池可持续工作一定时间的功率，包括额定充电功率 P_{rc}、额定放电功率 P_{rd}。 Under the test conditions and test methods in this specification, the battery can work continuously for a certain period of time, including rated charge power（P_{rc}）, rated discharge power（P_{rd}）
能量效率 Energy efficiency	在本规格书试验条件和试验方法下，电池的放电能量与充电能量的比值，用百分数表示。 Under the test conditions and test methods in this specification, the ratio of discharge energy to charge energy of the battery is expressed as a percentage.
典型容量 Typical capacity	电池的典型容量是指有代表性的、能代表大多电池采用的容量。 The typical capacity of battery is a representative, can represent the majority of the battery adopted capacity
最小容量 Min capacity	电池的最小容量是指在一定的放电条件下，电池应该放出的最小容量。 The minimum capacity of battery is the minimum capacity under certain discharge conditions.
额定充/放电能量 Rated charging/ discharging energy	按照本规格书所列的充/放电条件下，初始化充/放电的电池以额定充/放电功率充/放电至终止电压时的充/放电能量。 Under the charge/discharge conditions in this specification, the charging/discharging energy of the battery is charged/discharged from nominal charging/discharging power to the termination voltage.
初始充/放电能量 Initial charging/	按照本规格书所列的充/放电条件下所测得的充/放电能量，循环 3 次，取平均值。 The energy measured according to the charge and discharge procedure

discharging energy	listed in this specification. The cell should be cycled 3 times, and select the averaged value as the initial capacity.
容量恢复率 Recovery rate of capacity	电池储存后，在本规格书试验条件和试验方法下测得的充电容量、放电容量分别与初始充电容量、初始放电容量的比值，用百分数表示。 After storage, the ratio of the charging capacity and discharging capacity of the battery to the initial charging capacity and initial discharging capacity is expressed as a percentage under the test conditions and test methods in this specification。
能量恢复率 Recovery rate of energy	电池储存后，在本规格书试验条件和试验方法下测得的充电能量、放电能量分别与初始充电能量、初始放电能量的比值，用百分数表示。 After storage, the ratio of the charging energy and discharging energy of the battery to the initial charging energy and initial discharging energy is expressed as a percentage under the test conditions and test methods in this specification。
供货协议 Supplier agreement	维科和客户共同签订的有关本规格书产品的交易条款。 The terms of the transaction between Veken and the customer regarding the products of this specification.
荷电状态（SOC） State of charge	任意状态下，电池荷电量与电池最大荷电能力的比值。如：若将容量为 10Ah 的状态视为 100% SOC，则容量为 0Ah 时，SOC 为 0%。 An expression of the present battery capacity as a percentage of maximum capacity. For example, if the SOC is defined as 100% when the remaining capacity is 10 Ah, the state of 0 Ah is regarded as 0% SOC.
温升 Temperature rising	规格书规定的条件下，充电或者放电前后电芯表面温度差。 The surface temperature difference between the cells before and after charging or discharging.
测量单位 Measurement unit	“V”（Volt）伏特（V），电压单位　voltage unit “A”（Ampere）安培（A），电流单位 current unit “W”（Ampere）瓦特（W），功率单位 power unit

	“Ah”（Ampere-hour）安培-小时（Ah），容量单位 capacity unit “Wh”（Watt-hour）瓦特-小时（Wh），能量单位 energy unit “Ω”（Ohm）欧姆（Ω），电阻单位　resistance unit “mΩ”（milliohm）毫欧（mΩ），电阻单位　resistance unit “ ℃”（degree Celsius）摄氏度（℃），温度单位 temperature unit “mm”（millimeter）毫米（mm），长度单位 length unit “s”（second）秒（s），时间单位 time unit “Hz”（Hertz）赫兹（Hz），频率单位 frequency unit

1. 适用范围 Scope

本规格书详细描述了维科生产的 10Ah 可充电钠离子电池的产品性能指标、产品使用条件及风险警示。

This specification describes in detail the performances, conditions of use and risk warnings for 10Ah rechargeable sodium ion battery produced by Veken.

2. 产品性能指标 Cell Performance

除非其它规定，测试应在到货之日起 1 个月内进行，并且符合以下测试条件:

Unless otherwise stated, tests should be carried out within one month of delivery under the following conditions:

相对湿度 Relative humidity: 70%±20%RH

环境温度 Ambient Temperature: 25±2℃

大气压力 Barometric pressure：86～106 kPa

2.1 概要 General

编号 No.	参数 Parameter	产品规格 Specification	条件 Condition
2.1.1	典型容量 Typical capacity	10Ah	25±2℃，0.2C 放电电流 25±2℃, 0.2C discharge current
2.1.2	最小容量 Min capacity	9.5Ah	25±2℃，0.2C 放电电流 25±2℃, 0.2C discharge current
2.1.3	工作电压 Operating voltage	2.0V~4.0V	
2.1.4	交流内阻 AC Impedance(1KHz)	≤5mΩ	25±2℃，新电池 20%SOC 状态 25±2℃, BOL,20%SOC
2.1.5	出货状态 Shipping status	20%的充电状态 20%SOC	N.A.
2.1.6	工作温度(充电) Operating temperature (charging)	-10℃ ≤ T <0℃	0.1C CC to 100%SOC
		0℃ < T ≤ 15℃	0.2C CC to 100%SOC
		15℃ < T ≤ 55℃	1.0C CC to 100%SOC
2.1.7	工作温度(放电) Operating temperature (discharge)	-40℃ ≤ T <-20℃	≤1C
		-20℃ ≤ T <0℃	≤3C
		0℃ ≤ T <60℃	≤5C
2.1.8	储存温度 Storage temperature	1 months 1 个月	-20~45℃
		3 months 3 个月	0~45℃

		1 year 1 年	0~25℃
2.1.9	储存湿度 Storage humidity	70%±20%RH	
2.1.10	电池重量 Weight	230±5.0g	N.A.
2.1.11	电池尺寸 Cell dimension	请参考本规格书第 10 条 Refer to section 10 of this specification	N.A.

2.2 充电模式/参数 Charging mode/Parameters

编号 No.	**参数 Parameter**	**产品规格 Specification**	**条件 Condition**
2.2.1	标准充电电流 Standard charge current	0.5C	25±2℃
2.2.2	标准充电电压 Standard charge voltage	单体电池最大电压 4.0±0.05V Cell max. voltage 4.0±0.05V	25±2℃
2.2.3	最大充电可持续电流 Maximum charge current (continuous)	1C	15～55℃,100%SOC
2.2.4	标准充电模式 Standard charge mode	CC-CV（cut-off current is 500mA） 恒流恒压（恒压截止电流为 500mA）	
2.2.5	标准充电温度 Standard charge temperature	25±2℃	N.A.
2.2.6	绝对充电温度 Absolute charge temperature	0~55℃	无论电芯处在何种充电模式，一旦发现电芯温度超过绝对充电温度范围即停止充电。 Stop charging

	（Cell temperature）		once cell temperature is out of this range regardless of the charging mode adopted.
2.2.7	绝对充电电压 Absolute charge voltage	最大 4.0V Max. voltage 4.0V	无论电芯处在何种充电模式包括再生充电状态，一旦发现电芯电压超过绝对充电电压范围即停止充电。 Stop charging once voltage exceeds this voltage regardless of the charging mode (including regeneration) adopted.

2.3 放电模式/参数 Discharging mode/Parameters

编号 No.	参数 Parameter	产品规格 Specification	条件 Condition /Note
2.3.1	标准放电电流 Standard discharge current	0.5C	25±2℃
2.3.2	最大持续放电电流 Maximum discharge current (not for cycle)	10C	N.A.
2.3.3	最大瞬间放电电流 Maxpulse discharge current	20C（5S pulse）	N.A.
2.3.5	放电截止电压 Discharge cut-off voltage	2.0V	
2.3.6	标准放电温度 Standard discharge temperature	25±2℃	N.A.
2.3.7	绝对放电温度 Absolute discharge temperature（Cell temperature）	-40~60℃	若电芯温度不在绝对放电温度区间范围，则停止放电。 Stop discharging once cell temperature is out of this range regardless of the discharging mode adopted.

2.4 倍率性能 Discharge performances at different discharge rates

编号 No.	参数 Parameter	产品规格 Specification	条件 Condition /Note
2.4.1	Rate discharge capacity （25℃±2℃） 倍率容量 （25℃±2℃）	0.2C=100% 0.5C≥97% 1.0C≥95% 2.0C≥93% 5.0C≥90% 10C≥85% 20C≥80%	新电池状态，25±2℃，电池标准充电后，搁置 30mins，分别以 0.2C、0.5C、1C、2C、5C、10C、20C 放电至 2.0V。 BOL, 25±2℃, After standard charged, rest for 30mins, then discharge at 0.2C/0.5C/1C/2C /5C/10C/20Cto 2.0V。.

2.5 不同温度放电性能 Discharge performances of different temperature

编号 No.	参数 Parameter	产品规格 Specification	条件 Condition /Note
2.5.1	25℃的容量 Capacity at 25℃	≥9.5Ah	新电池状态，25±2℃，标准充放电。 BOL, 25±2℃, standard charge and discharge。
2.5.2	60℃的容量 Capacity at 60℃	Discharge capacity/Initial capacity≥95% 放电容量/初始容量≥95%	新电池状态，25±2℃标准充电，60±2℃ 搁置 3h，1C 放电。 BOL, standard charge at 25±2℃, stored in the temperature of 60℃±2℃ for 3h, then 1.0C CC discharge to 2.0V.
2.5.3	0℃的容量	Discharge	新电池状态，25±2℃标准充电，0±2℃ 搁置 3h，1C 放电。

	Capacity at 0℃	capacity/Initial capacity≥90% 放电容量/初始容量≥90%	BOL, standard charge at 25±2℃, stored in the temperature of 0℃±2℃ for 3h, then 1.0C CC discharge to 2.0V.
2.5.4	-20℃的容量 Capacity at -20℃	Discharge capacity/Initial capacity≥85% 放电容量/初始容量≥85%	新电池状态，25±2℃标准充电，-20±2℃ 搁置 3h，1C 放电。 BOL, standard charge at 25±2℃, stored in the temperature of -20℃±2℃ for 3h, then 1.0C CC discharge to 2.0V.
2.5.5	-30℃的容量 Capacity at -30℃	Discharge capacity/Initial capacity≥80% 放电容量/初始容量≥80%	新电池状态，25±2℃标准充电，-30±2℃ 搁置 3h，1C 放电。 BOL, standard charge at 25±2℃, stored in the temperature of -30℃±2℃ for 3h, then 1.0C CC discharge to 2.0V.
2.5.6	-40℃的容量 Capacity at -40℃	Discharge capacity/Initial capacity≥70% 放电容量/初始容量≥70%	新电池状态，25±2℃标准充电，-40±2℃ 搁置 3h，1C 放电。 BOL, standard charge at 25±2℃, stored in the temperature of -40℃±2℃ for 3h, then 1.0C CC discharge to 2.0V.

3. 存储和循环性能 Storage and Cycle Performance

编号 No.	参数 Parameter	产品规格 Specification	条件 Condition
3.1	常温存储性能 Storage performance	剩余容量≥90% 可恢复容量≥95% Cap. Retention≥90% Cap. Recovery≥95%	标准充电到 100%SOC，25±2℃温度储存 28 天. 在 25±2℃环境下，0.5C 恒流放电至 2.0V，测量电池的剩余容量；然后标准充电，0.5C 恒流放电至 2.0V，测量电池的恢复容量。 Standard charge to 100% SOC, storage at 25±2℃ for 28 days, standard discharge at 25±2℃. At 25±2℃ ,discharge at 0.5C to 2.0V measuring retention capacity; Then standard charge,0.5C discharge to 2.0V measure recovery capacity.
3.2	高温存储性能 Storage performance	剩余容量≥90% 可恢复容量≥95% Cap. Retention≥90% Cap. Recovery≥95%	标准充电到 100%SOC ，55±2℃满电存储 7 天。在 25±2℃环境下，0.5C 恒流放电至 2.0V，测量电池的剩余容量；然后标准充电，0.5C 恒流放电至 2.0V，测量电池的恢复容量。 Standard charge to 100% SOC, storage at 55±2℃ for 7 days, At 25±2℃，discharge at 0.5C to 2.0V measuring retention capacity; Then standard charge,0.5C discharge to 2.0V measure recovery capacity.
3.3	循环寿命 Cycle life	0.5C charge/ 1C discharge 1500 cycles≥70% 0.5C 充电/ 1C 放电	Charge: 0.5C CC charge to 4.0V, then CV to 0.05C, rest for 10mins; Discharge 1C CC discharge to 2.0V rest for 10mins. 充电：0.5C 恒流充电至 4.0V，然后恒压至 0.05C 截止，搁

		1500 次≥70%	置 10mins。 放电：1C 放电到 2.0V，搁置 10mins。

4. 安全与可靠性 Safety and Reliability

4.1 安全性能 safety performance

编号 No.	项目 Item	标准 Standard	测试方法 Testing method
4.1.1	过放电 Over Discharge	不起火、不爆炸 No fire, no explosion	The battery to be charged with standard charging condition, 1C CC discharged for 90 mins , observed for 1 h after discharge. 标准充电后，1C 恒流放电 90min，放电后观察 1h.
4.1.2	过充电 Over Charge	不起火、不爆炸 No fire, no explosion	After standard charge, rest for 10mins; then overcharged with 0.5C to 4.4V or 115%SOC .then stop charge. Stop the test when observ 1h..... 标准充电后，搁置 10mins；以 0.5C 电流充电至电压达到 4.4V 或 115% SOC 停止充电。观察 1h 试验结束。

4.1.3	短路 Short Circuit	不起火、不爆炸 No fire, no explosion	After standard charged, and short the positive and negative terminals with wire, and the resistance of 5mΩ and maintain for 10min. Tests are to be conducted at 25℃±5℃ . At the temperature of the test environment, observation for 1h, then stop the test. 标准充电后，在 25℃±3℃环境下，正负极端 5mΩ电阻短接 10 分钟。在试验环境温度下观察 1h，试验结束。
4.1.4	热滥用测试 Heating test (130°C)	不起火、不爆炸 No fire, no explosion	After standard charged, and put into incubator with nature air or circulating air convecting, heat by velocity of 5°C ±2°C per minute to 130°C±2°C, and maintain for 30minutes, At the temperature of the room environment, observation for 1h, then stop the test. 标准充电后，放于自然或循环空气对流的恒温箱中，温度以 5℃±2℃每分钟的速率升至 130℃±2°C 并保持 30 分钟，在室温环境温度

			下观察 1h。
4.1.5	挤压 Crush	不起火、不爆炸 No fire, no explosion	After standard charged, and crushed between two flat surfaces, the applied force is 13 kN±1kN by hydrocylinder, once the maximum pressure has been obtained maintain10min then release pressure. 标准充电后，垂直于电池单体极板方向施压，由液压油缸施加 13 kN±1kN 的挤压力，到达挤压力后保持 10min。
4.1.6	跌落 Drop test	不起火、不爆炸 No fire, no explosion	The fully charged battery with its positive or negative terminals facing down falls freely from a height of 1.0 m to the concrete floor once. 充满电的电池正极或负极端子朝下，从 1.0m 高度处自由跌落到水泥地面上一次。
4.1.7	Temperature Cycling Test 温度循环试验	No fire, No explosion 不起火、不爆炸	Standard charged, and placed in a test chamber and subjected to the following cycles: a) temperature dropped to -40 ° C ± 2 ° C within 60 min and maintain in -40 ° C for 90 min; b) temperature rose to 25 ° C within 60 min and then to 85 ° C ± 2 ° C within 90 min and maintain in 85 ° C for 110 min; c) temperature dropped to 25 ° C ± 2 ° C within 70 min; d) the above steps were cycled 5 times

			and the cell was left in 25 °C ± 2 °C for 1 hour after the test was completed. 标准充电后电池放置在测试箱内并做如下处理： a) 60min 内温度降至-40°C±2°C，在-40℃环境下搁置 90min； b)60min 内温度升至 25℃，然后再 90min 内温度升至 85°C±2°C，在 85℃环境下搁置 110min； c)70min 内温度降至 25℃±2℃； d) 以上步骤循环 5 次，试验完成后将电芯在 25℃±2℃环境下搁置 1 小时。
4.1.8	Imapcat test 重物冲击测试	No fire and No explosion 不起火、不爆炸	After standard charged, test sample battery is to be placed on a flat surface. 15.8 ±0.1mm diameter bar is to be placed across the center of the sample. 9.1 ±0.46kg weight is to be dropped from a height of 610 ±25 mm onto the intersection of the steel bar and the sample. 标准充电后,将样品放置在平台,直径 15.8±0.1mm 的钢棒横穿样品中心放置,9.1±0.46 Kg 的重锤从 610±25mm 的高度跌落到钢棒和样品交叉处。
4.1.9	Altitude/Low pressure simulation test 高空低压模拟测试	No leakage, No fire, No explosion 不泄漏，不起火、不爆炸	Standard charged and stored for 6 hours in an vacuum environment with pressure of less than 11.6kPa and temperature of 20℃±5℃. 标准充电后，储存在 20℃±5℃、大气压≤11.6 kPa 的真空环境中储存 6 小时。
4.1.10	Vibration test 振动试验	No leakage, No fire, No explosion 不泄漏，不起火、不爆炸	Standard charged and fixed on the vibration table and subjected to vibration cycling that the frequency is to be varied at the rate of 1Hz per minute between 10Hz and 55Hz, battery is to be subjected to simple harmonic motion with an

			amplitude of 0.8 mm (0.03 in) [1.6mm (0.06 in) total maximum excursion]The cells shall be vibrated for 90 -100minutes per axis ofX,Yaxes. 标准充电后固定在振动台上，以振幅 0.8mm，总位移 1.6mm 的单谐振动，振动频率范围为 10Hz~55Hz ,频率变化速率 1Hz/min。沿 X、Y 两个方向振动 ,每个方向振动 90-100 分钟。

5. 应用条件 Application Conditions

客户应当确保严格遵守以下与电池相关的应用条件：

Client shall ensure that the following application conditions in connection with the Products are strictly observed:

5.1 客户应在使用中的每个产品附近安装合理数量的热传感器，以感应和测量电池温度。客户应使用该传感器在电池的整个使用寿命内监测和记录电池温度。电池温度是决定客户是否有权根据合同获得维科保证的关键参数。

5.1 A reasonable number of thermal sensors shall be installed by client in proximity each product in use to sense and measure cell temperature. Client shall make use of this sensor to monitor and record cell temperature throughout the entire service life of such cell. The cell temperature is a critical parameter for determining whether client shall be entitled to Veken’ s warranties under the contract.

5.2 客户应配置电池管理系统，严密监控、管理与保护每个电池。

5.2 Customers should configure battery management system to closely monitor, manage and protect each cell.

5.3 客户应向维科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，以供维科对该系统进行设计评估，并建立电池管理档案。

5.3 Customers should provide Veken with detailed design scheme, system characteristics, framework, system data, format and other relevant information of the battery management system, ensuring Veken can be evaluated of the system and establish battery management files.

5.4 未经维科同意，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。

5.4 Without Veken's consent, customers should not modify or change the design and framework of the battery management system to avoid affecting the performance of cells.

5.5 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，维科不承担产品质量保证责任。

5.5 Customers should keep complete battery operation monitoring data for the reference of product quality responsibility division. Veken does not assume responsibility for the design of a complete battery system without monitoring data during lifetime.

5.6 电芯储存必须在温度-20℃～45℃，相对湿度 70%±20%的环境条件下。长期贮存电压为 2.5V~3.0V。如果电池需要长期存储（超过 3 个月）须置于温度为 0℃～25℃、湿度为 70%±20%RH 的环境中。请每隔 3 个月激活一次电池，方法为：0.5C 电流充电至电压达到 3.0V。

5.6 The cell shall be stored at the environmental condition of -20℃～45℃ and 70%±20% RH. The voltage for long time storage shall be 2.5V-3.0V range. If the cell has to be storied for a long time (Over 3 months), the environmental condition should be: Temperature: 0℃～25℃　Humidity: 70%±20%RH；please activate the battery once every 3 months according to the following method: Charge with current 0.5C until the voltage

achieve to 3.0V.

5.7 电池避免在本规格书禁止的低温条件下充电(包括标准充电，快充，紧急情况充电和再生充电)，否则可能出现意外的容量降低现象。电池管理系统应依照最小的充电和再生充电温度进行控制。禁止在低于本规格书规定的温度条件下充电，否则，维科不承担质量保证责任。

5.7 Avoid charging under low temperature conditions in this specification (including standard charge, quick charge, emergency charge and regenerative charge), otherwise unexpected capacity reduction may occur. The battery management system should control charging according to the minimum charge and regenerative recharge temperature. It is forbidden to charge under this situation which the temperature is lower than the specified value in this specification. Otherwise, Veken will not be responsible for quality assurance.

5.8 电箱设计中应充分考虑电芯的散热问题，由于电箱散热设计问题导致的电芯或电池过热损坏，维科不承担质量保证责任。

5.8 In the design of the battery box, the heat dissipation of cell should be fully considered. For the damage of cell or battery due to the heat dissipation design problem of the battery box, Veken will not be responsible for quality assurance.

5.9 电箱设计中应充分考虑电芯的防水、防尘问题，电箱必须满足国家有关标准规定的防水、防尘等级。由于防水、防尘问题而导致的电芯或电池的损坏（如腐蚀、生锈等），维科不承担质量保证责任。

5.9The waterproof and dustproof protection should be fully considered in the design of the battery box. Battery box must meet the relevant national standards of waterproof and dustproof grade. For the damage of the cell or battery caused by the problems of waterproof and dustproof (such as corrosion, rust, etc.), Veken

will not be responsible for quality assurance.

5.10 禁止不同 P/N 料号电芯在同一电池系统（或整车）中混用，否则，维科不承担质量保护责任。

5.10 It is forbidden to mix different P/N products in the same battery system (or vehicle), otherwise Veken will not responsible for quality protection.

6. 安全防范 Safety Precautions

6.1 禁止将电池浸入水中。Do not immerse the cell into water.

6.2 禁止将电池投入火中或长时间暴露在超过本规格书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，存储情况下，电芯温度不能超过 55℃，如果电池中电芯温度超过 55℃，电池管理系统需关闭电池，停止电池运行。

6.2 It is prohibited to put the cell into fire or expose it for a long time to a high temperature environment beyond the temperature conditions specified in this specification, otherwise it may cause fire. In any normal use, the temperature of the cell in the battery should not exceed 55℃. If the temperature of cell in pack exceeds 55 ℃, the battery management system should shut down the battery and stop the operation of the battery.

6.3 禁止电池正负极短路，否则强电流和高温可能导致人身伤害或者火灾。由于电池的正负极暴露于塑料保护套中，在电池系统组装和连接时，应有足够的安全保护，以避免短路。

6.3 Do not short between the positive and negative terminal, otherwise the high current and high temperature may cause personal injury or fire. As the positive and negative of the cell are exposed to the plastic cover, safety protection should be provided when the battery system is assembled and connected to avoid short circuit.

6.4 严格按照标示和说明连接电池正负极，禁止反向充电。

6.4 Connect the positive and negative of the cell in strict accordance with the label and instructions. Reverse charging is prohibited.

6.5 禁止电池过充，否则，可能引起电池过热和火灾事故的发生。在电池安装和使用中，硬件和软件需实行多重过充失效安全保护。最低保护要求见本规格书第 5.6 条和第 6.11 条。

6.5 Do not overcharge, otherwise, it may cause overheating and fire accident. During cell installation and use, the hardware and software should be protected from multiple overcharge failures. Basic protective requirements are in 5.6 and 6.11.

6.6 客户应将电池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。

6.6 Customers should secure the cell to a solid surface and secure the power cord to an appropriate position to avoid friction that may cause arc and spark.

6.7 严禁用塑料封装电池或用塑料进行电气连接。不正确的电气连接方式可能会造成电池使用过程中发生过热现象。

6.7 It is strictly forbidden to use plastic to encapsulate or electrical connection of cell. Incorrect electrical connection may cause overheating during battery use.

6.8 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池的任何部件或电池所含物质。

6.8 Skin and eye contact should be avoided when electrolyte leakage occurs. If contact, wash the area with water and seek medical help. No person or animal is allowed to swallow any part or substance of the cell.

6.9 尽力保护电池，使其免受机械震动、碰撞及压力冲击,否则电池内部可能短路，产生高温和火灾。

6.9 Try to protect the cell from mechanical vibration, collision and mechanical shock, otherwise the cell may

short, causing high temperature and fire.

6.10 电池充电过程中可能发生不适当的终止充电现象。如：超出允许的充电时间充电，充电电压过高而终止充电或充电电流过强而终止充电。上述现象被定义为“不适当的终止充电”。当发生以上现象时，可能意味着电池系统出现漏电或某些部件出现故障。在没有找到根本原因并彻底解决之前继续对该电池充电可能会引起电池过热或发生火灾。当发生以上现象时，电池管理系统应该通过自动锁定功能，禁止后续的充电，并提醒使用者将装载有该电池的系统退回到经销商处进行系统维护。该电池只有经过有认证资格的技术人员全面检查，确定根本原因并彻底解决、改善后方可恢复充电。

6.10 Improper charge stopping may occur during cell charge process. Such as: beyond the allowed charge time, charge voltage is too high or charge current is too high. The phenomenon is defined as "Improper charge stopping". When the above phenomenon occurs, it may mean that there is leakage of electricity in the battery system or a failure of some components. Continuing to charge the battery before the root cause is found and completely resolved may cause the battery to overheat or fire. In the event of any of the above, the battery management system should disable subsequent charge through an automatic lock function and remind the user to return the battery system to the dealer for system maintenance. The battery can only be recharged after a thorough inspection by a qualified technician to determine the root cause and thoroughly solve and improve it.

6.11 电芯测试实验如操作不当可能会引起电池起火或者爆炸。该测试实验只能由配备适当的防护装备的专业人员在专业的实验室进行。否则，可能会导致严重的人身伤害和财产损失。

6.11 Improper operation of the cell test may cause fire or explosion. The test should only be carried out by professional personnel equipped with appropriate protective equipment in a professional laboratory. Otherwise, may result in serious injury and property damage.

6.12 严禁使用没有 BMS 或类似系统的电池。

6.12　It is strictly prohibited to operate the battery without a BMS or similar system.

7包装和运输 Package&Ship

7.1 电芯使用宁波维科电池有限公司标准的包装方式,每箱 60pcs.

7.1 The cells are packed with Ningbo Veken Battery CO., Ltd. standard carton box, which hold two inner boxes. There are 60pcs 33140 cells per case.7.2 产品在运输过程中可能因撞击等原因而损坏，若发现电芯有任何异常特征，如外壳破损，闻到电解液气味，电解液泄漏等，该电芯不要使用。有电解液泄漏或闻到异常味道的电池应远离火源以避免着火。

7.2 The product might be damaged during shipping by shock. If any abnormal features of the cells are found such as 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.

8 免责声明 Disclaimer

8.1 如果由于产品需要单位不按本规格书中的规定进行使用，造成社会性影响，并对维科的声誉造成影响的，维科将会追究需求单位的责任。根据对维科造成的影响程度，产品需求单位需向维科提供赔偿。

8.1 If product requesting units don’ t comply with the instructions in this specification, causing social impact and affecting the reputation of Veken, Veken will hold product requesting units responsible., Veken will hold the demander accountable. According to the degree of impact on Veken, product requesting units must provide compensation to Veken.

8.2 维科保留对产品的规格及性能参数修改的权利。买方在订购维科产品前 ,需要与维科提前确认产品的最新状态。

8.2 Veken reserves the right to modify the specifications and performance parameters of the product. The buyer needs to contact Veken to confirm the latest status in advance before ordering the product.

8.3 保质期是从包装日期开始起 12 个月.

8.3 Warranty period of this product is 12 months from date of packaging.

8.4 英文规格释义仅供参考，请以中文版技术规格要求为准。

8.4 English specifications are for reference only, please refer to the Chinese technical specifications.

9 风险警告 Warning and risks

警 告

电池存在潜在的危险，在操作和维护时必须采取适当的防护措施！不正确地操作本产品标准所描述的充放电测试实验，可能导致严重的人身伤害和财产损失！必须使用正确的工具和防护装备操作电池。电池的维护必须由具有电池专业知识并经过安全培训的人士执行。不遵守上述警告可能造成多种灾难。

Warning

The cell has potential dangerous, proper protection must be taken during operation and maintenance. Improper operation of the charge and discharge test described in this product standard may result in serious personal injury and property loss! Proper tools and protective equipment must be used to operate the cell. Cell maintenance must be performed by a person with battery expertise and safety training. Failure to comply with the above warnings can lead to multiple disasters.

9.1 警示声明 Warning statement

9.2 危险类型：Types of risks

客户知悉在电池使用和操作过程中存在以下潜在的危险：

Customers are aware of the following potential risks during battery use and operation:

9.2.1 操作者在操作时可能会受到化学品、电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

9.2.1 The operator may be injured by chemicals, electric shocks, or electric arcs during operation. Although the human body reacts differently to exposure to direct current and alternating current, damage to the human body from DC voltage higher than 50V is as serious as alternating current, so customers must adopt a conservative posture during operation to avoid current damage.

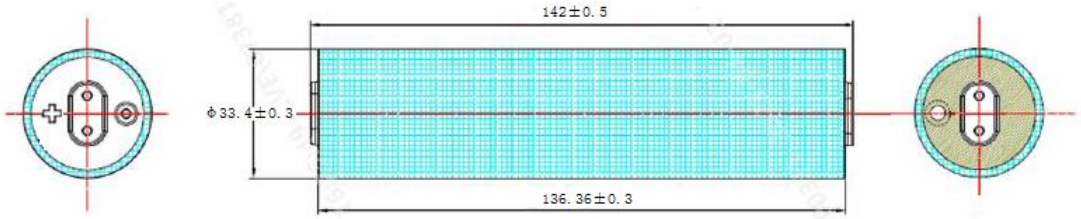
9.2.2 存在来自电池中的电解液的化学风险。

9.2.2 There is a chemical risk from the electrolyte in the cell.

9.2.3 在操作电池和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险，防止发生意外短路，造成电弧、爆炸或热失控。

9.2.3 When operating cell and selecting personal protective equipment, customers and their employees must consider the above potential risks in order to prevent accidental short circuit that could cause electric arc, explosion, or thermal runaway.

10. 电芯尺寸 Mechanical Drawing



序号 No.	项目 Item	标准 Value
1	电池直径 Cell diameter	Φ33.4±0.3mm（with PET film）
2	电池高度 Cell height	142±0.5mm