Cylindrical lithium-ion battery product specifications

model:CBMSA 26700 4500mAh

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Revision history

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A0	2020-11-20	Ma Pengfei	Original Issue

1.Scope of application

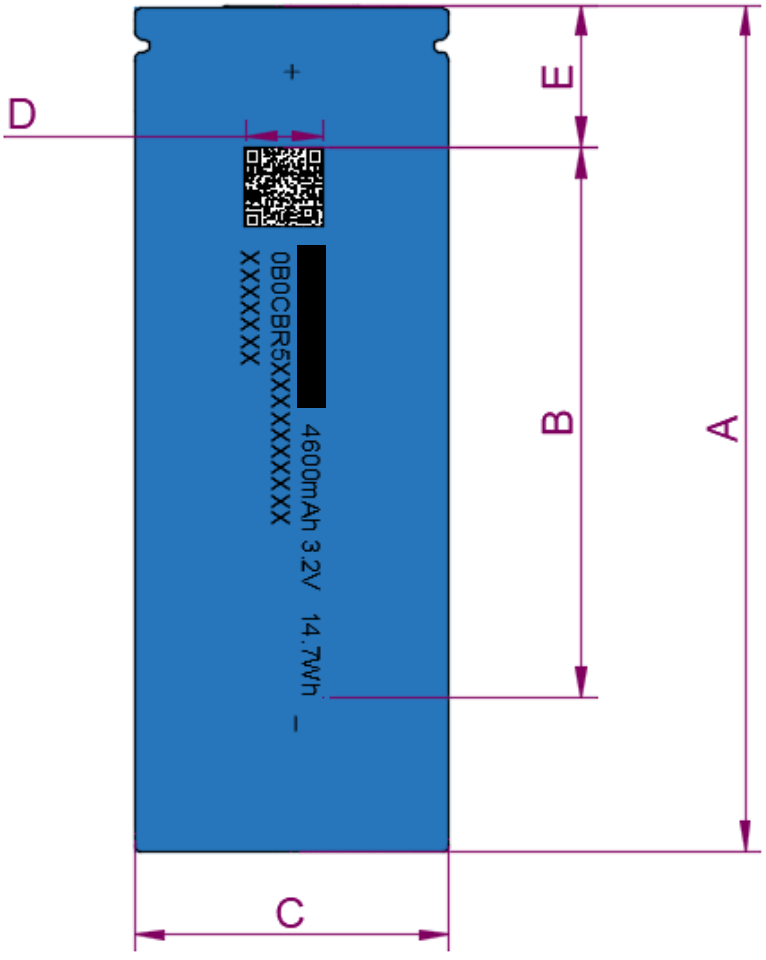
2.Model and description

2.1.Description: Cylindrical lithium-ion battery

2.3.Place of Origin: China

3.Cell size

3.1.Cell size chart



project		size		Remark
parts	**describe**	**unit**	**standard**	
A	total battery height	mm	71±0.2	
B	Coding area length	mm	60±1.5	
C	Battery diameter	mm	26.4±0.2	
D	Coding area width	mm	10±1	
E	The distance between the coding area and the top	mm	5±1.5	

4.Technical indicators

serial number	project	parameter	Remark
4.1	Nominal capacity	4.6Ah	0.5C@25℃±2℃
4.2	minimum capacity	4.5Ah	0.5C@25℃±2℃
4.3	Q	3.2V	Average for Std. discharge
4.4	Maximum charging voltage	3.65V	
4.5	Minimum discharge cut-off voltage	2.0V	
4.6	Standard charging method	25℃±2℃At ambient temperature, with0.5C(2.3A)Constant current charging until the voltage reaches3.65V,change3.65VConstant voltage charging until the charging current decreases to 0.05C(0.23A)Stop charging.	
4.7	Standard discharge method	25℃±2℃At ambient temperature, with0.5C(2.3A)Constant current discharge until the voltage drops to2.0Vto stop discharging.	
4.8	Standard charging current	0.5C(2.3A)	
4.9	Standard discharge current	0.5C(2.3A)	
4.10	Maximum continuous charging current	1C(4.6A)	
4.11	Maximum continuous discharge current	2C(9.2A)	
4.12	weight	<98g	
4.13	storage temperature	less than1Year:-20~25℃	40%-60%SOCstorage
		less than3Months:-20~45℃	
4.14	Operating temperature	Charge:0~55°C;	
		Discharge:-20~60°C	
4.15	internal resistance	≤20mΩ(comminicate)	1KHz
		≤40mΩ(DC)	25℃,50%SOC,2C(9.2A) discharge10s
4.16	shell material	steel shell	

5.Standard test conditions

5.1.Environmental test conditions

Unless otherwise specified, the environmental conditions for all tests are as follows, temperature:25±5℃;humidity:65±20%;Atmospheric pressure:86-106 KPa. The room temperature mentioned in this article refers to25℃±2℃.

5.2.Measuring instrument requirements

- Voltage measuring device: not less than0.5class
- Current measuring device: not less than0.5class
- Temperature measuring device:±0.5℃
- Time measuring device:±0.1%
- Dimensional measuring device:±0.1%
- Quality measuring device:±0.1%

6.Product Characteristics Testing

6.1.Basic electrical properties

serial number	project	Test Methods	standard requirement
6.1.1	initial capacity	Standard discharge repeats after standard charge3times, charging and discharging time interval10min, calculate3Average sub-discharge capacity.	3average sub-discharge capacity ≥100%×minimum capacity

Continue the table below

Continue the above table

serial number	project	Test Methods	standard requirement
6.1.2	Normal temperature magnification Discharge performance	The battery is charged according to the standard charging system, at room temperature, and left aside10minLater, respectively 1C(4.6A),2C(9.2A),3C(13.8A)Constant current discharge to2.0V.	Discharge capacity/initial capacity: 1C≥95% 2C≥90% 3C≥85%
6.1.3	Normal temperature magnification Charging performance	After the battery is discharged according to standard, respectively0.33C(1.518A),0.5C(2.3A), 1C(4.6A)Constant current charging to3.65V; put on hold10min;Standard discharge to2.0V.	Discharge capacity/initial capacity: 0.33CAfter charging≥98% 0.5CAfter charging≥97% 1CAfter charging≥95%
6.1.4	low temperature Discharge performance	After standard charging of the battery, place the battery into -10℃set aside in an environment24h, then the battery is in -10℃at ambient temperature0.5C(2.3A)Current constant current discharge, discharge cut-off voltage1.6V. (Discharge environment temperature control accuracy±2℃)	Discharge capacity/initial capacity: - 10℃ ≥65%
6.1.5	high temperature Discharge performance	After standard charging of the battery, place the battery into the55℃set aside in an environment5h, then the battery is55℃at ambient temperature0.5C(2.3A)Current constant current discharge, discharge cut-off voltage2.0V. (Discharge environment temperature control accuracy±2℃)	Discharge capacity/initial capacity: 55℃ ≥95%
6.1.6	Normal temperature charge retention and Capacity recovery	Standard charging of battery; left open circuit at room temperature28days; standard discharge to2.0V, the discharge capacity is recorded as the remaining capacity; let it stand at room temperature10min;Repeat standard discharge after standard charge3times, charging and discharging time interval10min, the discharge capacity is recorded as the recovery capacity. If the discharge capacity reaches the standard requirement at any time, it can be stopped.	The remaining capacity≥90%×initial capacity recovery capacity≥95%×initial capacity
6.1.7	55℃High temperature charge protection Sustainability and capacity recovery	Battery standard charge; place55℃environment, placed in an open circuit7days; let stand at room temperature8h; Discharge according to the standard discharge system, and the discharge capacity is recorded as the remaining capacity; Leave to stand at room temperature10min; Cycle according to standard charging and discharging system3times, charging and discharging time interval10min, the discharge capacity is recorded as the recovery capacity. If the discharge capacity reaches the standard requirement at any time, the test can be stopped.	The remaining capacity≥90%×initial capacity recovery capacity≥95%×initial capacity
6.1.8	cycle life (RT,2.0V-3.65V)	1,25±2℃Down0.5C(2.3A)Current constant current discharge to2.0V; put on hold10min; 2,25±2℃ Down0.5C(2.3A)Constant current charging until the voltage reaches3.65V,change 3.65VConstant voltage charging until the charging current decreases to0.05C(0.23A); put on hold 10min; 3,25±2℃Down1C(4.6A)Current constant current discharge to2.0V, record the discharge capacity; set aside10min; 4,2~3step loop1500Second-rate.	No.1500 Sub-discharge capacity /(forward10 average capacity value)≥80%
6.1.9	cycle life (HT,2.0V-3.65V)	1,55±2℃Down, let the battery rest5h; 2,55±2℃Down,1C(4.6A)The current discharges to2.0V; put on hold10min; 3,55±2℃ Down,0.5C(2.3A)Constant current charging until the voltage reaches3.65V,change 3.65VConstant voltage charging until the charging current decreases to0.05C(0.23A); put on hold 10min; 4,55±2℃Down,1C(4.6A)The current discharges to2.0V, record the discharge capacity; set aside10min; 5,3~4step loop800Second-rate	No.800Sub-discharge capacity/(front 10sub-capacity average)≥80%

Continue the table below

Continue the above table

serial number	project	Test Methods	standard requirement
6.1.10	Storage performance	battery in50%SOCunder conditions45℃store28Day after day, cycle according to the standard charging and discharging system3times, charge and discharge time interval10min, the discharge capacity is recorded as the recovery capacity. If the discharge capacity reaches the standard requirement at any time, the test can be stopped.	recovery capacity≥90%×initial capacity

7. Safety and environmental performance testing

7.1.Safety performance

The following tests should be conducted in devices with forced exhaust conditions and explosion-proof measures. (Note: Simulation can be used during the safety performance test process.PackGrouped fixture conditions)

Test items		Test Methods	standard test
7.1.1	squeeze test	The battery is charged as standard first, then placed flat on the extrusion platform, with the radius75mmThe semi-cylinder exerts pressure perpendicular to the direction of the battery plate; the length of the semi-cylinder (L)is greater than the length of the squeezed battery; the squeeze speed (5±1)mm/s;When squeezed to the voltage of0VOr the amount of deformation reaches30% Or the squeezing force reaches200kNThen stop squeezing. observe1h, stop testing.	No fire or explosion
7.1.2	Thermal shock test	After standard charging, the battery is placed in a thermostat and the temperature is5℃/minThe rate rises from room temperature to 130±2℃And kept30minThen stop heating and observe1h.	No fire or explosion
7.1.3	Overcharge test	After standard charging1C(4.6A)Constant current charging to5.475V,observe1h.	No fire or explosion
7.1.4	Short circuit test	After standard charging of the battery, the battery is short-circuited externally.10min, the external circuit resistance should be less than 5mΩ,observe1h.	No fire or explosion
7.1.5	Over discharge test	After standard charging of the battery, the1C(4.6A)discharge90min,observe1h.	No fire or explosion

7.2.environmental adaptability

serial number	Test items	Test Methods	standard requirement
7.2.1	high and low temperature cycle	After standard charging of the battery, the single battery is placed in the temperature box. The temperature of the temperature box is as shown in the table.1 Adjustment, number of cycles5times; observation1h;
7.2.2	Drop test	After standard charging of the battery, the1.5mFreely drop it to the concrete floor from a high height, with the positive and negative terminals connected once each. observe1h.	No fire or explosion
7.2.3	Low voltage performance (highly simulated)	The battery is charged according to the standard charging system; the battery is placed in a low pressure box and the air pressure in the test box is adjusted.11.6kPa, the temperature is room temperature, let stand6h;Stop the test, take out the battery, and observe1h.	No leakage, no fire, Doesn't explode
7.2.4	sea water immersion	After standard charging of the battery, immerse the single battery in3.5%NaClsolution (mass fraction, simulating the composition of seawater at room temperature)2h;The water depth should completely submerge the single battery.	No explosion or fire

surface1Temperature cycle experiment: temperature and time of a cycle

temperature℃	time incrementmin	Accumulated timemin	temperature change Rate℃/min
25	0	0	0
- 40	60	60	1
- 40	90	150	0
25	60	210	1
85	90	300	1
85	110	410	0
25	70	480	1

No leakage, no fire, Doesn't explode

8.Appearance

8.1.The barcode is clear and the cell barcode information can be scanned completely and correctly to ensure the reading success rate.≥99.5%.

8.2.The battery surface is smooth and has no bumps, wrinkles, scratches, bruises or other defects.

8.3.The battery has no damage such as breakage or corrosion, and the sealing is good and there is no leakage.

9.Product packaging

9.1.Product packaging strictly follows relevant national and industry standards.

9.2.Provide product supply list, factory inspection report, and qualification label.

9.3.per box40Only batteries, packed in each box2box.

10.Product transportation

10.1. Shockproof measures are taken inside the box to ensure safety during transportation, and emergency starting or braking is avoided during driving.

10.2. During transportation, it shall not be shipped in the same vehicle with flammable, explosive, or corrosive items, and it shall not be subject to rain, snow or liquid substances or mechanical damage.

10.3. When loading and unloading products, use lift trucks or special tools to load and unload the products. Handle them with care and do not throw or squeeze them to avoid battery damage or accidental injury to people. Do not put them together with corrosive items such as acids and alkalis.

11.Precautions for use

11.1.When the internal resistance of the battery exceeds the initial internal resistance of the battery during use150%, or the battery capacity is less than or equal to80%The initial capacity should be taken out of use.

11.2.If the battery is expected to be stored30for more than 10 days, the power should be adjusted to full capacity40%-60%.

11.3.The design of the electrical box should fully consider the heat dissipation, waterproofing and dustproofing issues of the battery, and meet the waterproofing and dustproofing levels specified by relevant national standards. The battery is overheated and damaged due to problems with the electrical box, or the battery is damaged (such as corrosion, rust, etc.) due to waterproofing and dustproof problems. Levinon power batteries have Co., Ltd. does not assume any responsibility for quality assurance.

11.4.Under any normal use conditions of the battery, the temperature of the battery should not exceed60° C, the battery avoids operating below0℃charge under the conditions, otherwise the capacity may appear The phenomenon of rapid depletion of quantity.

11.5.Do not charge or discharge the battery with a current exceeding the specification requirements.

11.6.Connect the positive and negative terminals of the battery strictly in accordance with the instructions and instructions, and reverse charging is prohibited.

11.7.Avoid mechanical vibration and pressure impact on the battery, otherwise the battery may be short-circuited internally, resulting in high temperature or fire.

11.8.Batteries should be stored in a cool, dry place.

11.9.Do not throw batteries into fire or attempt to disassemble them.

11.10.It is forbidden to short-circuit the positive and negative terminals of the battery and overcharge, otherwise strong current and high temperature may cause personal injury or fire.

11.11.Avoid the over-discharge state of the battery. If the battery is in the over-discharge state for a long time, the battery may be permanently damaged internally.

11.12.When the electrolyte leaks, avoid contact with the skin and eyes. If there is contact, rinse the contact area with plenty of water and seek help from a doctor. No one or animal is allowed to swallow any parts of the battery or the substances contained in the battery.

12.ensure

12.1.Within half a year of normal use of the battery core, any quality problems caused by the product itself that are confirmed to occur can be resolved by the manufacturer. Outside this period, Levi will not be responsible for battery core quality problems that are not caused by the product itself but caused by customer misuse. Free replacement is promised.

12.2.For safety reasons, if you have equipment design, lithium-ion battery system protection circuits or special applications in high current, fast charging and other aspects, please consult our company first.

12.3.The company does not assume any responsibility for problems caused by operations that violate safety regulations.

12.4.The company does not assume any responsibility for problems caused by the use of circuits, battery packs and chargers.

12.5.Our company does not guarantee the quality of defective cells produced by customers during the cell assembly process after shipment.

13.Long term storage

If the battery is stored for a long period of time, store40%~60%SOCstate, the battery should be4.13Conditional storage. Additionally, it is recommended to charge the battery every six months.

14.other

Matters not covered in the specification shall be resolved through negotiation between both parties.

appendix1:

Lithium-Ion Battery User Guide

Please refer to this document before using lithium-ion batteries.

1.generalize

This document is intended to provide customers with appropriate warnings and prohibitions when using lithium products produced and provided by Anhui Liweineng Power Battery Co., Ltd.

Get the best performance and safety when using ion batteries.

2.Charge

2.1.recharging current

The charging current should not be higher than the maximum charging current specified in the product specification.

2.2.Charging voltage

The charging voltage should not be higher than the voltage specified in the product specification.

2.3.Charging temperature

The battery should be charged within the temperature range specified in the product specification.

2.4.Reverse charging

When connecting the battery, make sure its poles are correctly aligned and reverse charging is strictly prohibited. If the battery is not connected properly, it may be damaged.

3.discharge

3.1.discharge

The discharge current should not be higher than the maximum discharge current specified in the product specification. .

3.2.Discharge temperature

3.2.1.The battery core should be discharged within the temperature range specified in the product manual.

3.2.2.Discharge of the battery core outside the specified temperature range will cause performance loss of the battery core.

3.3.Over discharge

3.3.1.The system should be equipped with a device to prevent further discharge after exceeding the discharge cut-off voltage specified in the product specification.

3.3.2.Over-discharge can result in loss of cell performance, characteristics and functionality.

3.3.3.If the battery core is not used for a long time, the self-discharge of the battery core may cause over-discharge.

3.3.4.The charger should be equipped with a device to detect the battery voltage and confirm the charging procedure.

4.storage

4.1.Storage conditions

4.1.1.Batteries should be stored within the temperature range specified in the product specification.

4.1.2.Storage of battery cores outside the specified temperature range may cause battery core performance loss and leakage.

4.2.long term storage

4.2.1.It should be used within a short period of time after charging. Long-term storage will cause capacity loss due to self-discharge of the battery core.

4.2.2.If long-term storage is required, batteries should be stored at a lower voltage within the range specified in the product specification, because higher voltage storage may cause

Loss of performance.

5.cycle life

5.1.Cycle life performance

5.1.1.The battery core can be repeatedly charged and discharged within the number of times specified in the product specification, and maintains the capacity specified in the product specification.

5.1.2.The cycle life of the battery cell is determined by charging, discharging, operating temperature and storage environment.

6.system design

6.1.Battery and cell connection

6.1.1.The battery core cannot be welded directly with wires. The wires should be soldered to the battery terminals first, and then soldered to the solder joints.

6.1.2.If welded directly with wires, the heat generated will cause damage to components such as diaphragms and insulation sheets.

6.2Locate the battery in the system

6.2.1.Batteries should be kept as far away from heat sources and high-temperature components as possible.

6.2.2.Batteries located close to heat sources and high-temperature components will cause performance losses.

6.3.Mechanical shock absorption protection for batteries

6.3.1.Batteries should be equipped with shock absorbers to minimize shock.

6.3.2.Batteries are not equipped with shock absorbers and may cause deformation, leakage, heating and/or rupture.

6.4.Connection between battery and charger/system

Batteries should be designed to be connected only to designated chargers and systems. Even in designated systems, special battery designs such as special batteries should be avoided.

Special terminals to prevent reverse battery connection.

7.Battery pack assembly

7.1.Do not use damaged batteries

7.1.1.The cells should be visually inspected before assembly.

7.1.2.Do not use if the case is deformed and/or the electrolyte smells bad.

7.2.transportation

Batteries need to be transported to the place of order and careful precautions should be taken to avoid battery damage.

8.other

8.1.Disassembly

8.1.1.It is strictly prohibited to remove cells from the battery pack.

8.1.2.Internal short circuits caused by disassembly may cause heating and/or deflation.

8.1.3.When electrolyte comes into contact with skin or eyes, rinse immediately with clean water and seek medical advice.

8.2.short circuit

8.2.1.A short circuit will generate huge currents and cause heat generation.

8.2.2.Suitable circuitry should be used to protect against accidental short circuits.

8.3.burn

It is strictly forbidden to burn or handle the battery cells in a fire as this may cause the battery cells to rupture.

8.4.soak

It is strictly forbidden to immerse the battery core in water as this will cause the components to melt and impair functionality.

8.5.Mixed use

8.5.1.Mixing different types of batteries or the same type of batteries from different manufacturers may cause the cells to rupture or cause damage to the system due to the different characteristics of the batteries.

Damage, although the battery does not contain environmentally harmful components such as lead or cadmium, the battery should still be disposed of in accordance with local regulations.

8.5.2.Batteries should be handled in a fully discharged state to avoid heat generation due to accidental short circuits.

8.6.warn

8.6.1If used improperly, batteries may present a risk of fire or chemical corrosion.

8.6.2It is prohibited to disassemble the battery, and it is prohibited to heat the battery beyond100℃or burned.

8.6.3Only use Levi Energy batteries when replacing batteries. Use of other batteries may create a risk of fire or explosion.

8.6.4Dispose of used batteries promptly. Do not disassemble it at will and do not dispose it in a fire.

8.6.5It is prohibited to drop, impact, or bend battery cells.

8.6.6The battery casing design and packaging must not damage the battery.

8.6.7Keep away from children.

appendix2:

Lithium-Ion Battery Handling Dos and Don’ts

Improper handling of lithium-ion and lithium-ion polymer batteries may cause leakage, heat, smoke, explosion, or fire. This may result in reduced or lost performance, so be sure to follow instructions carefully.

1.storage

Batteries should be stored at low temperatures (recommended-20~25℃), in an environment with low humidity, no dust and corrosive gases.

2.Safety precautions and prohibitions

To ensure product safety, please state the following precautions in the instruction manual.

3.Danger

3.1Battery abuse

3.1.1Use dedicated charging.

3.1.2Use or recharge the battery only in dedicated applications.

3.1.3Do not charge the battery directly with an outlet or cigarette lighter charger.

3.1.4Do not reverse charge the battery.

3.2environmental abuse

3.2.1Do not place batteries near fire or heat sources.

3.2.2Do not throw batteries into fire.

3.2.3Do not use it under conditions where the temperature may exceed the specified operating temperature range and storage temperature range, such as under direct sunlight or similar conditions.

3.2.4Do not immerse, throw, or soak the battery in water/sea water.

3.3other

3.3.1Do not fold with film (such as polymer plastic bags).

3.3.2Do not store batteries in pockets or bags with metal objects such as keys, necklaces, hairpins, coins, or screws.

3.3.3Do not intentionally connect the positive and negative terminals of the battery with metal objects.

3.3.4Do not pierce the battery with sharp objects such as needles or screwdrivers.

3.3.5Do not use heating objects such as a soldering iron to heat the battery.

3.3.6Do not hit the battery with heavy objects such as a hammer.

3.3.7Do not step on the battery, throw or drop the battery on a hard floor to avoid mechanical shock.

3.3.8Do not disassemble the battery or modify the battery design, including the circuit.

3.3.9Do not solder directly to the battery.

3.3.10Do not use severely damaged or deformed batteries.

3.3.11Do not place batteries in microwave ovens, dryers or high-pressure containers.

3.3.12Do not use or assemble the battery with batteries from other manufacturers, batteries of different types or models (such as dry batteries, nickel metal hydride batteries or nickel cadmium batteries).

3.3.13Do not mix or assemble old and new batteries.

4.warn

4.1If charging is not completed within the specified time, please stop charging.

4.2If you find that the battery is unusually hot, discolored, deformed or otherwise abnormal during use, charging or storage, please stop using the battery.

4.3If leakage or odor is detected, move away from the fire source immediately. If liquid leaks onto skin or clothing, rinse immediately with water.

4.4If battery leakage enters your eyes, do not rub your eyes. Rinse them with clean water and go to the hospital for treatment immediately.

4.5If the positive and negative terminals of the battery become dirty, wipe them with a dry cloth before use.

4.6The battery can be used within the following temperature ranges. Do not exceed these ranges.

Charging temperature:0°C ~ 55°C. Discharge temperature:-20°C ~60°C.

4.7Cover the positive and negative terminals with suitable insulating tape before handling the battery.

5.Use caution to prevent battery abuse

5.1The battery must be charged using constant current and constant voltage.

5.2The charging current must be controlled within the value specified in the battery specification sheet.

5.3The charging cut-off voltage must not exceed3.65V.

5.4The charger must stop charging when the charging time or current specified in the cell specifications is reached.

5.5The discharge current must be controlled within the value specified in the battery specification sheet.

5.6The discharge cut-off voltage shall not be less than2.0V.

6.Transportation safety operating procedures

6.1Packages that are crushed, punctured or torn must not be transported after inspection, and such packages should be isolated.

6.2If the packaging of a leaking product is damaged and leads to cell or battery leakage, the leaking product should be collected and isolated in a timely manner, and the consignor should be contacted for instructions.

6.3The battery pack is used to prevent the impact of high temperature on battery performance. The battery should be kept away from heat-generating areas during application and charging.

7.other

7.1Keep batteries away from infants and young children to avoid accidents such as swallowing.

7.2If children use batteries, their guardians should explain the correct usage and precautions before use.

7.3Before using the battery, be sure to read the instruction manual and precautions.

7.4Before using the charger, be sure to read the charger instruction manual.

7.5Always read the app's instruction manual before installing and removing the battery from the app.

7.6When the battery life is much shorter than before, please replace the battery in time.

7.7Cover the positive and negative battery terminals with electrical tape before handling the battery.

7.8If the battery needs to be stored for a long period of time, the battery should be removed from the application and stored in a cool, dry place.

7.9During charging, use and storage, the battery should be kept away from objects that generate static electricity.