# Specification Approval Sheet

**Name：Battery Lithium-Ion Battery**

**Model： AKYGA INR18650-1S2P-50M**

**SPEC：3.7V / 5000mAh**

**Specification Modification Records**

| Modification Time | Descriptions | Issued Date | Approved By |
|---|---|---|---|
| | Release 1 | 2022-09-24 | |
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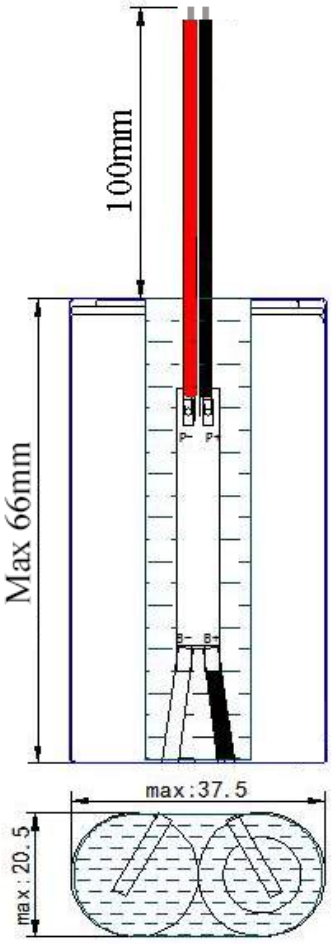
Content

**Any copies are invalid without our company's approval**

## 2 .Scope

This specification describes the basic performance, technical requirement, testing method, warning and caution of the Li- ion Cylindrical rechargeable battery .The specification only applies to Akyga Battery.

## 3. Initial Dimension

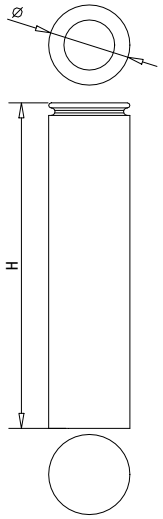


## 4.Battery pack Specifications

| NO. | Item | | Specifications |
|---|---|---|---|
| 4.1 | Typical Capacity | | 5000mAh @ 0.2C Discharge |
| | Minimum capacity | | 4960mAh @ 0.2C Discharge |
| 4.2 | Nominal voltage | | 3.7V |
| 4.3 | Charge | Max input voltage | 5V±0.05V |
| | | Max Charge voltage | 4.2V±0.05V |
| | | Standard charge current | 1000mA |
| | | Max Charge current | 2500mA |
| 4.4 | Discharge | Min Discharge voltage | 2.5±0.05V (PCB End-of-charge Voltage |
| | | Fast Discharge current | 2500mA |
| | | Max continuous discharge current | 5000mA |
| 4.5 | Initial Impedance | | Max: 120mΩ |
| 4.6 | Weight | | Approx( ):100g±2 |
| 4.7 | Operating temperature | | Charging( ): 0℃~45℃<br>Discharging( ): -20℃~60℃ |
| 4.8 | Storage temperature | | -40℃~85℃ |
| 4.9 | Storage Humidity | | ≤75% RH |
| 4.10 | Appearance | | Without scratch, distortion, contamination and leakage |
| 4.11 | Standard environmental condition | | Temperature : 25±2℃<br>Humidity : 45-75%RH<br>Atmospheric Pressure : 86-106 KPA |

## 5. Cell Dimensions

| | |
|---|---|
| Max(H) 65.2mm | Max (D)18.5 (mm) |



## 6.Cell Specifications

| NO. | Item | Specifications |
|---|---|---|
| 6.1 | Typical Capacity | 2500mAh @ 0.2C Discharge |
| | Minimum capacity | 2480mAh @ 0.2C Discharge |
| 6.2 | Nominal voltage | 3.70V |
| 6.3 | Standard Charge | CC/CV,0.2C5A, 4.20V |
| 6.4 | Standard Discharge | CC,0.2C5A, 3.00V |
| 6.5 | End-of-charge Voltage | 4.20V±0.05V |
| 6.6 | End-of-charge Current | 0.02C5A （At CV mode） |
| 6.7 | End-of-discharge Voltage | 3.00 V±0.05V |
| 6.8 | Charging Time | 8.0hours（standard charge） |
| 6.9 | Quick Charge Current | 2500mA （1.0C5rate） |
| 5.10 | Quick Discharge Current | 5000mA （2.0C5rate） |
| 6.11 | Maximum instantaneous pulse discharge current | 7500mA （3.0C5rate） |
| 6.12 | Initial Impedance | Max:50mΩ |
| 6.13 | Weight | Approx( )：45.5±2g |
| 6.14 | Operating temperature | Charging( )： 0℃~45℃<br>Discharging( )：-20℃~60℃ |
| 6.15 | Storage temperature | -40℃~85℃ |
| 6.16 | Storage Humidity | ≤75% RH |
| 6.17 | Appearance | Without scratch, distortion, contamination and leakage |
| 6.18 | Standard environmental condition | Temperature ： 25±2℃<br>Humidity ： 45-75%RH<br>Atmospheric Pressure ： 86-106 KPA |
| 6.19 | Temperature Dependence of Discharge Capacity @ 0.2C Discharge to 2.5V | |

| Charge temperature | Discharge temperature | | | | |
|---|---|---|---|---|---|
| 25℃ | -10℃ | 0℃ | 15℃ | 25℃ | 40℃ |
| Relative Capacity | 50% | 80% | 90% | 100% | 100% |

The discharge capacity and rate only applies to single electrical cores

## 7 Cell General Performance

| No. | Item | Test Methods and Condition | Criteria |
|---|---|---|---|
| 7.1 | 0.2C Capacity | After standard charging, rest battery for 10min, then discharging at 0.2C to voltage 3.0V, recording the discharging time. | ≥300min |
| 7.2 | Cycle Life | Constant current 0.5C charge to 4.2V, then constant voltage charge to current declines to 0.01C, rest 10min， constant current 0.5C discharge to 3.0V， rest 10min. Repeat above steps till continuously discharging capacity Higher than 80% of the Initial Capacities of the Cells | ≥300 times(次) |
| 7.3 | Capability of keeping electricity | 20±5℃, After standard charging, rest the battery 28days, discharging at 0.2C to voltage 3.0V, recording the discharging time. | ≥240min |

## 8 Cell Environment Performance

| No. | Item | Test Methods and Condition | Criteria |
|---|---|---|---|
| 8.1 | Discharge at high temperature | After standard charging, rest the cells 4h at 60 ± 2 ℃, then discharging at 1C to voltage 3.0V, recording the discharging time. | ≥54min |
| 8.2 | Thermal shock | Put the cells in the oven. The temperature of the oven is to be raised at 5±2℃ per minute to a temperature of 130±2℃ and remains 30 minutes. | No fire, no smoke |

## 9 Cell Safe Characteristic

| No. | Item | Test Methods and Condition | Criteria |
|---|---|---|---|
| 9.1 | Over charge testing | At 23±5℃, charging cells with constant current 2C to voltage 5.0V, Stop test till cells temperature 10℃ lower than max temperature. | No smoke or fire |

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|---|---|---|---|
| | | | |
| 9.2 | Over discharge testing | At 23 ± 5 ℃, According to the requirements of standard charge, the cells will be discharge to cut-off voltage, then connect with external load of 30 ohm for 24 hours. | No fire, no smoke, no leakage |
| 9.3 | Short-circuit testing | At 23 ± 5 ℃, After standard charging, connect cells anode and cathode by wire which impedance less than 80 ± 20mΩ, keep 6h. | No smoke or fire |

※ Above testing of safe characteristic must be with protective equipment.(

## 10. CAUTIONS IN USE

To ensure proper use of the battery please read the manual carefully before using it. Handling

- Do not expose to, dispose of the battery in fire.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Avoid shorting the battery
- Avoid excessive physical shock or vibration.
- Do not disassemble or deform the battery.
- Do not immerse in water.
- Do not use the battery mixed with other different make, type, or model batteries.
- Keep out of the reach of children.

charge and discharge

- Battery must be charged in appropriate charger only.
- Never use a modified or damaged charger.
- Do not leave battery in charger over 24 hours.

. storage

- Store the battery in a cool, dry and well-ventilated area.

. disposal

- Regulations vary for different countries. Dispose of in accordance with local regulations.

## 11. Battery operation instruction

11.1 Charging

Charging current：Cannot surpass the biggest charging current which in this specification book stipulated。

Charging voltage：Does not have to surpass the highest amount which in this specification book stipulated to decide the voltage。

Charge temperature： The battery must carry on the charge in the ambient temperature scope which this specification book stipulated。

Uses the constant electric current and the constant voltage way charge, the prohibition reverse charges. If the

battery positive electrode and the cathode meet instead, can damage the battery。

11.2 Discharging current

The discharging current does not have to surpass this specification book stipulation the biggest discharging current, the oversized electric current electric discharge can cause the battery capacity play to reduce and to cause the battery heat。

11.3 discharge temperature

The battery discharge must carry on in the ambient temperature scope which this specification book stipulated

11.4 Over-discharges

After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity。

11.5 Storing the Batteries

The battery should store in the product specification book stipulation temperature range. If has surpasses above for six months the long time storage, suggested you should carry on additional charge to the battery。

## 12. Period of Warranty

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

## 13. Other The Chemical Reaction

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

## 14.Note:

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