Specification Approval Sheet

Name : Rechargeable Cylindricall Cell (Ni-MH)

Model : AKYGA NM-AAA-0.7M-3S1P

SPEC : 3.6V / 700mAh

Specification Modification Records

Modification Time	Descriptions	Issued Date	Approved By
	Release 1	2023-05-28	

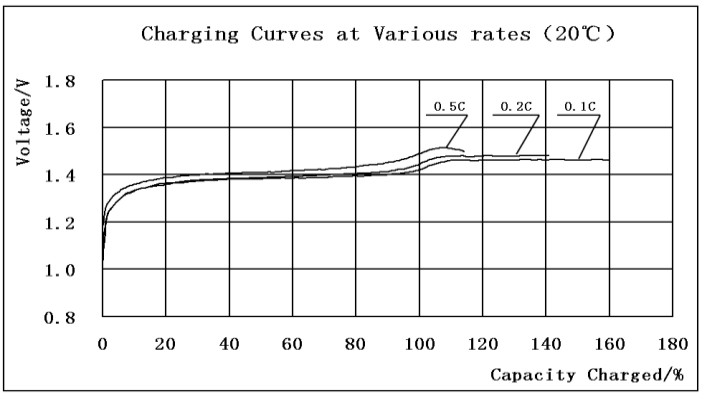
Content

Specification Approval sheet

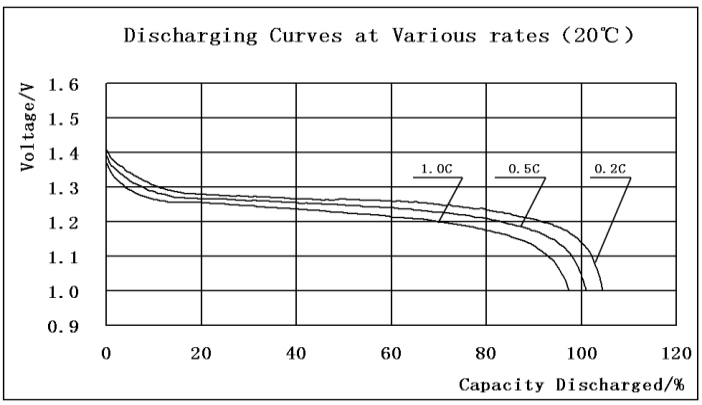
Signle specification data：

Type	: **Cylindrical Nickel-Metal Hydride Battery**
Standard size	: 52*30*30mm
Nominal capacity	: 700mAh （20ºC，0.2C discharge to 4.0V/pcs）
Nominal voltage	: 3.6V
Resistance	: ≤160mΩ (under1kHz，full charged，20ºC，average rate)
Application	: Suggest discharge current between 0.05C to 3.0C
Standard Charge	: 20℃，0.1charge16h
Life	: >500cycles (20 ºC，IEC Standard)
Average weight	: 45±3.0g
Max discharge current	: 1.0C(Continuous)
Fast charge	：0.5C to 1.0C current，and use charge cut-off control (20ºC，-ΔV=10mV)
Operation ambient temperature	：0 ºC to +45 ºC（Standard charge）
	+10 ºC to +45 ºC（fast charge）
	-20 ºC to +60 ºC（Discharge）
	-20 ºC to +35 ºC（Storage）

Single battery charge curves：



Single battery discharge curves：



Quality guarantee

1. Scale

This specification applies to the following cylindrical nickel-metal hydride battery

2. Assessment

The following are the basic indicators of battery evaluation. Battery testing can be proceed on basis of the exact need.

Item	Unit	Specification	Condition
Nominal Voltage	V	3.6	Battery pack
Nominal capacity	mAh	700	Standard discharge
Standard charge	mA	70（0.1C）	Temperature 0~45℃
	Min	960	
Fast charge	mA	210（0.3C）	Battery：-ΔV=10mV/pcs，Temprature0~45℃ Temperature can not be exceed 45~50℃， -dT/dt=1.0~3.0℃/min
	Min	260	
Rapid charge	mA	700（1.0C）	
	Min	80	
Resistance	mΩ	≤150	Full charge, test under20℃ (1KHz)
Cut-off voltage when battery discharge	V	4.0/pcs (Standard discharge)	High rate discharge means the rate should above 3rate（including 3 rate）
		3.2/pcs （High rate discharge）	
Max discharge current	mA	2.0C	Ambient temperature from -20 ºC to +60 ºC
Storage temperature	ºC	-20 ºC~35 ºC	Battery with charge 80%
Average weight	G	40±3.0	

3. Performance

Unless otherwise specified, the test shall be done within one month after delivery under following conditions

Ambient temperature: 20±5℃ Relative Humidity: 65±20%

Test tools must meet:

Voltmeter ：shall maintain 0.5 grade or above according to EC 51/IEC 485.Resistance shall more than 10KΩ/V

Ammeter ：shall maintain 0.5 grade or above according to IEC 51/IEC 485. And the total resistance of lead less shall lower than 0.01Ω

Resistance meter ：AC1Khz sine wave 4 terminal measurement equipment

Test	Unit	Specification	Condition	Remark
Circuit voltage	V	≥ 5.0	testing 1hrs after charge	
Battery capacity	mAh	≥ 90%	Nominal charge and discharge	Cycle 3 times allowed
Battery internal resistance	mΩ	≤160	testing under 20℃ when full charge	

High-current discharge	min	Discharge time≥54	Nominal charge，set aside 72 minutes， 1C discharge till 4.0V/pcs	Battery cycles allowed for 3 times
Low-temperature discharge	mAh	Discharge capacity≥ 60% of standard capacity	Nominal discharge under 20℃ 1.0C discharge till 4.0V/pcs under 0℃	
High-temperature charge	mAh	Discharge capacity≥ 80% of standard capacity	0.5C charge under 40℃， Standard discharge under 20℃	
Discharge Automatically	mAh	Discharge capacity≥ 60%standard capacity	Standard charge ， store 28days under 20℃ Standard discharge	
Constand humid and hot performance		Without damage	0.5C full charge, 33±3℃，80±5%R.H.， Store14 days	
Vibration		**Voltage changes: ≤ 0.02V/pcs** **Resistance changes: ≤ 5 mΩ/pcs**	0.1C charge 16hours，set aside for 24hours，Test battery before and after vibration Vibration condition: Amplitude 1.5mm,Frenqency 3000CPM,60 minutes of vibration in any direction	Single cell
Free fall		**Voltage changes: ≤ 0.02V** **Resistance changes: ≤ 5 mΩ/pcs**	0.1 C charge16 hours，set side for 24hours，and check the battery before and after falling Impact condition: 3 time free falling from any direction in 1.5 height down to the wood floor with thickness of 10mm	Without functional changes Without leakage
Over charge		**Without leakage in the whole process of charge**	0.1Ccharge 28 days, 0.2Cdischage to4.0V/pcs Can not less than 5 hours	
Security		**Without broken, explosion, leakage, package-damaged problem**	Short circuit the battery by using load with the biggest resistance of 100 mΩ after nominal charge	
Over discharge		Without explosion	Discharge from 0.2C to 0V, then fore to discharge 1C in 30 minutes	
IEC cycle life	Time	≥ 500	IEC61951-2（2001）4.4.1	Pls refer to remark point 1

4. **Combination and size of battery**

Pls refer to appendix。

5. Surface

Batteries shall be no cracks, fracture, dust, discoloration, leakage and deformation

6. Quality grantee standard（AQL）

All testing will be follow the below process（ref.MIL-STD-105E）

No.	**Checking Items**	Sampling standard	Quality Standard（AQL）
1.	Surface	Ⅰ	1.5
2.	Size	Ⅰ	0.65
3.	Performance*	Ⅰ	1.5

* Includes: capacity、1Ccharge、discharge performance、open circuit voltage、resistance and so on.

7. Quality Guarantee

One year guarantee for manufacturing and material defects

8. Notices:

8.1. The battery is with power of ≤30% when ex-factory. If power exceed 30%, it will be dangerous when transportation. The company will not assume any responsibility for safety problem if the power exceed 30%

8.2. Please do not put it in the fire and disassembly it.

8.3. Please do not use the battery with other types of battery or old battery

8.4. Please do not charge and discharge the battery excess the specification.

8.5. Please do not short-circuit the battery, or it will be destroyed.

8.6. Please do not weld the battery directly.

8.7. Please connect the battery according to polarity.

8.8. If battery is used in extreme condition such as extreme temperature, deep cycling, extreme overcharge and over discharge, it may shorten its life.

8.9. Battery should be stored under a cool and dry environment and in charge state. Battery must be discharged before big quantity of transport.

8.10. Please stop use the battery when face the abnormal problems. Then please send it to the local dealer for solutions.

8.11. Due to constraints of electro chemical system of the battery, it is suggested keep the battery with 80%~100% of electricity in the condition of battery under long time storage

8.12. To maintain the performance of battery, it is suggested to charge the battery with a small current, discharge cycle in a few week, and then use or storage if the battery storage over 6 months.

Remarks：

IEC61951-2（2001）4.4.1cycle life：

Cycles	Charge	Set aside	Discharge
1	0.1C×16hrs	0	0.25C×2hrs 20min
2~48	0.25C×3hrs 10min	0	0.25C×2hrs 20min
49	0.25C×3hrs 10min	0	0.25C to 4.0V/pcs
50	0.1C×16hrs	1~4hrs	0.20C to 4.0V/pcs
Repeat 1 to 50 cycles until the discharge time less than 30 hours			