

FILE NAME: SPECIFICATIONS OF
SEALED NICKEL CADMIUM
BATTERIES

MODEL: **KRMR 33/60 D5000mAh**

Specification No.: S/RONDA**1543-1**

EDITION: A0

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1. SCOPE

The specifications governs the performance of the following **RONDA** Nickel-Cadmium Cylindrical cell and its battery pack.(Refer to the attached figure 1)

Rated capacity: 5000mAh

Designation: KRMR 33/60 D ($D: 33.0_{-1.0}^0$ mm $H: 59.5_{-1.0}^0$ mm)

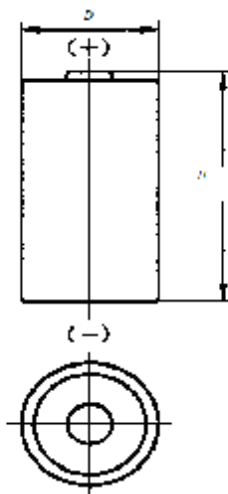


Figure 1- Jacketed cylindrical cells

2. DATA OF BATTERY PACK

The data of battery pack, including voltage and weight, is almost equivalent to the multiple numbers of the relevant single cells.

Example: Battery pack consisting three single cells

Nominal voltage of single cell = 1.2V

Nominal voltage of battery pack = 1.2V × 3 = 3.6V

3. RATINGS

Table 1 - Ratings of the cells

| Description | Unit | Specification | Conditions |
|-----------------|--------|---------------|---------------------------|
| Nominal Voltage | V/Cell | 1.2 | Single cell |
| Rated Capacity | mAh | 5000 | Standard Charge/Discharge |

4. PERFORMANCE

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

Ambient Temperature: $20 \pm 5^\circ\text{C}$

Relative Humidity: $65 \pm 20\%$

Standard Charge/Discharge Conditions:

Preparative: Prior to charging, the cell shall be discharged by 1000mA(0.2I_A) to 1.0V

Charge: 500mA(0.1I_A) × 16hours

Stand in charged condition: 1~4h

Discharge: 1000mA(0.2I_A) to 1.0V/Cell

Table 2 – Performance and test methods^b

| Test Item | Unit | Specification | Test Conditions | Remarks | |
|-----------------------------|-----------------------------------|---------------|--|---|---|
| Discharge performance | 20 °C ^a | h | ≥ 5 | Standard Charge/Discharge | / |
| | | min | ≥ 54 | After Standard Charge, stored for 1~4h, then discharged by 5000mA (1.0I _A) to 0.9V. | / |
| | -18 °C | h | ≥ 3 | After Standard Charge, stored for 16~24h in -18 ± 2 °C, then discharged by 1000mA (0.2I _A) to 1.0V in -18 ± 2 °C. | / |
| Charge (capacity) retention | h/min | ≥ 3h15min | After Standard Charge, stored on open circuit for a period of 28days, then discharged by 1000mA (0.2I _A) to 1.0V. | / | |
| Endurance in cycles | cycle | ≥ 500 | Appendix-table 3 | / | |
| Permanent charge endurance | h | ≥ 3 | Appendix-table 4 | / | |
| Over charge | h | ≥ 5 | Charge:500mA(0.1I _A) for 28d; Storage: 1~4h Discharge:1000mA(0.2I _A) to 1.0V | / | |
| Safety device operation | Not disrupt or burst | | Undergo a forced discharge at constant current 1000mA(0.2I _A) to 0V. Then discharged by 5000mA (1.0I _A) for 60min. | / | |
| Storage ^A | hour | ≥ 5 | Stored on open circuit for 12 months. Then standard charge/discharge. | / | |
| Internal resistance | mΩ | ≤ 9 | Within 1~4h after standard Charge (1000Hz) | / | |
| Weight | g | 127(approx) | / | Reference | |
| Vibration | No leakage, no fire, no explosion | | IEC 62133 2002 4.2.2 | / | |
| Free fall | No fire, no explosion | | IEC 62133 2002 4.3.3 | / | |

a) Five cycles is permitted b) Unless otherwise stated, the cell shall be discharged by 1000mA(0.2I_A) to 1.0V before test.

Notice: Test conditions is drawn according to IEC 61951-1 2006; Please refer to the related description of the standard.

5. CONFIGURATION, DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

6. EXTERNAL APPEARANCE

The cell/battery shall be free from cracks, scars, breakage, rust, discoloration, leakage nor deformation.

7. CAUTION

- (1) Reverse charging is not acceptable.
- (2) Charge before use. The cells/batteries are delivered in an uncharged state.
- (3) Do not charge/discharge with more than our specified current.
- (4) Prevent short circuit, do not incinerate or disassemble the cell/battery.
- (5) Do not solder directly to the cell/battery for a long time.

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(6) The life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.

(7) Store the cell/battery in a cool and dry place. Always discharge batteries before assemble or solder.

(8) Always discharge batteries before bulk storage or shipment.

(9) Do not mix batteries of different types and capacities.

Appendix

A) Endurance in cycles

Prior to the endurance on cycle test ,the cell shall be discharged at 1000mA(0.2I_rA) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 3.

Table 3 Endurance in cycles

| Cycle number | Charge | Stand in charged condition | Discharge |
|--------------|----------------------------------|----------------------------|---|
| 1 | 0.1I _r A for 16h | none | 0.25I _r A for 2h20min |
| 2~48 | 0.25I _r A for 3h10min | none | 0.25I _r A for 2h20min |
| 49 | 0.25I _r A for 3h10min | none | 0.25I _r A to 1.0V |
| 50 | 0.1I _r A for 16h | 1h~4h | 0.20I _r A to 1.0V ^a |

a) Cycles 1 to 50 shall be repeated until the discharge duration on any 50th Cycle becomes less than 3h or the cell voltage drops below 1.0V during 1~48th cycle.

B) Permanent charge endurance

Prior to the endurance on cycle test ,the cell shall be discharged at 1000mA(0.2I_rA) to 1.0V. The following test shall be carried out in accordance with the conditions specified in Table 4.

Table 4 Permanent charge endurance

| Cycle number | Charge | Discharge ^a |
|--------------|----------------------------------|-----------------------------|
| 1 | 0.051I _r A for 91days | 0.2I _r A to 1.0V |
| 2 | 0.051I _r A for 91days | 0.2I _r A to 1.0V |
| 3 | 0.051I _r A for 91days | 0.2I _r A to 1.0V |
| 4 | 0.051I _r A for 91days | 0.2I _r A to 1.0V |

a) The discharge is carried out immediately upon completion of discharge.

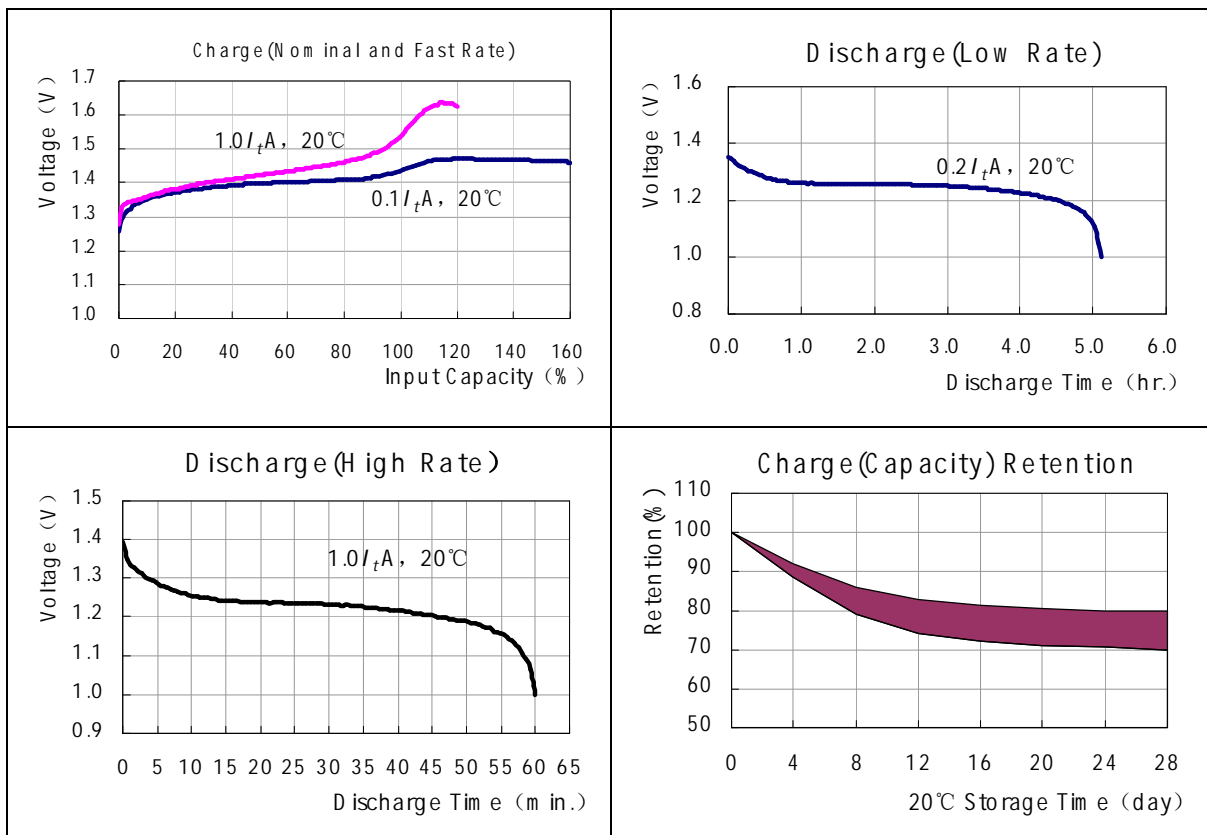
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Base Data:

| | |
|----------|--------------------------------------|
| | |
| D | 33.0 ⁰ _{-1.0} mm |
| H | 59.5 ⁰ _{-1.0} mm |
| / | / |
| / | / |

| | | | |
|---|-----------|---|-----------|
| Nominal voltage | | 1.2V | |
| Capacity comparison(mAh) | | 0.2I _t A 1.0I _t A | |
| | | 5000 4500 | |
| Weight(g) | | 127 | |
| Internal Impedance at 1000Hz (After Charge;mΩ) | | ≤9 | |
| Charge current | Standard | 500mA | |
| | Rapid | / | |
| Charge time | Standard | 16h | |
| | Rapid | / | |
| Ambient Temperature | charge | Standard | 0~+35°C |
| | | Rapid | +10~+35°C |
| | Discharge | | -20~+45°C |
| | Storage | | -20~+35°C |

Electrical Performance:



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1. 范围

本规格书适用于下述的朗达牌 Ni-Cd 圆柱型电池单体及电池组的全部性能指标。

额定容量: 5000mAh

电池型号: KRMR 33/60 D (D: $33.0^{0}_{-1.0}$ mm H: $59.5^{0}_{-1.0}$ mm)

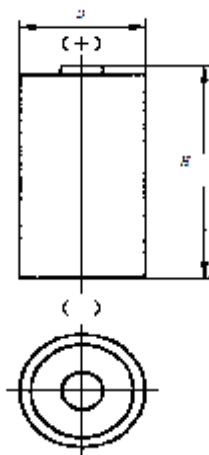


图 1 带防护外套的圆柱型密封镍镉可充单体电池

2. 组合电池的指标

组合电池的电压、重量等数据，近似等于单体电池数与对应值之乘积。

例如：组合电池包括三个单体电池

单体电池的额定电压=1.2V

则电池组的额定电压=1.2V×3=3.6V

3. 额定性能

表 1 电池的额定性能

| 项目 | 单位 | 指标 | 备注 |
|------|-----|------|------|
| 标称电压 | V | 1.2 | 单体 |
| 额定容量 | mAh | 5000 | 标准充放 |

4. 电池性能与测试方法

除非另有说明，测试须在发货后一个月内在下述条件下进行：

环境温度: $20 \pm 5^{\circ}\text{C}$

相对湿度: $65 \pm 20\%$

标准充放条件：

准备：充电前电池要以 $0.2I_A$ 恒流放电至终点电压 1.0V；

充电： 500mA ($0.1I_A$) 充 16 小时；

搁置：1~4 小时；

放电： 1000mA ($0.2I_A$) 至 1.0V。

电池性能和测试方法见表 2

表 2 电池性能及测试方法²⁾

| 测试项目 | 单位 | 标准 | 测试方法 | 备注 | |
|------------------|--------------------|----------|---|---|---|
| 放电性能 | 20°C ¹⁾ | h | ≥5 | 标准充放 | / |
| | | min | ≥54 | 标准充电后搁置 1~4 小时,以 5000mA(1.0I _A)放电至 0.9V。 | / |
| | -18°C | h | ≥3 | 标准充电后在-18°C±2°C 搁置 16~24 小时,以 1000mA(0.2I _A)放电至 1.0V。 | / |
| 荷电保持率 | h/min | ≥3h15min | 标准充电后,开路搁置 28 天(20 °C±2°C),随后标准放电(0.2I _A)至 1.0V。 | / | |
| 循环寿命 | Cycle | ≥500 | 见附录 表 3 | / | |
| 耐充电寿命 | h | ≥3 | 见附录 表 4 | / | |
| 过充测试 | h | ≥5 | 充电: 500mA(0.1I _A) 充电 28 天 搁置: 1~4 小时 放电: 1000mA(0.2I _A)至 1.0V | / | |
| 安全装置操作 | / | 无爆炸、无破裂 | 以 1000mA(0.2I _A) 放电至 0V 后再以 5000mA(1.0 I _A)强制放电 60 分钟。 | / | |
| 贮存 ¹⁾ | h | ≥5 | 以 1000mA(0.2I _A)放电至 1.0V 后搁置 12 个月,再进行标准充放。 | / | |
| 内阻 | mΩ | ≤9 | 电池应以 0.2I _A 放电至 1.0V,然后标准充电,搁置 1~4 小时;在频率为 1.0kHz±0.1kHz 的交流电流下测电池内阻。 | / | |
| 重量 | g | 127(大约) | / | 参考 | |
| 碰撞试验 | 不漏液、不着火、不爆炸 | | IEC 62133 2002 4.2.2 | / | |
| 自由落体 | 不着火、不爆炸 | | IEC 62133 2002 4.3.3 | / | |

 1) 允许最多测试五次 2) 如未特别说明电池在测试前必须以 0.2I_A 恒流放电至终点电压 1.0V。

注: 本规格书中的测试方法根据 IEC 61951-1 2003 制订,详细测试方法请参考该标准的相关条款。

5. 电池外观尺寸

参见附图

6. 外观

无裂缝、疤痕、破裂、锈蚀、脏污、漏液、变形

7. 使用注意事项

- 1) 勿将电池反极充电;
- 2) 如电池已带电,初次用前先放电后再充电;
- 3) 避免以高于指定的电流充放电;
- 4) 防止电池短路,不要拆解或焚烧电池;

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- 5) 勿在电池上直接锡焊焊接；
- 6) 如极端高温、大于规定的过充、过放电，电池的使用寿命可能会下降；
- 7) 电池应存放于凉爽阴凉处，电池在组装或焊接前应将电池放电；
- 8) 建议在运输或散装贮存时将电池放电；
- 9) 不要将不同类型或不同容量的电池组合使用。

附录
1) 循环寿命测试

循环寿命试验前，电池应以 $0.2I_A$ 放电至终止电压 1.0V，然后，在环境温度 $20^\circ\text{C} \pm 5^\circ\text{C}$ 下作循环寿命测试；测试循环见表 3。

表 3 循环寿命

| 循环次数 | 充电 | 充电态搁置 | 放电 |
|------|-------------------|-------|----------------------------------|
| 1 | $0.1I_A$ 16h | 无 | $0.25I_A$ 2h20min |
| 2~48 | $0.25I_A$ 3h10min | 无 | $0.25I_A$ 2h20min |
| 49 | $0.25I_A$ 3h10min | 无 | $0.25I_A$ 放电至 1.0V |
| 50 | $0.1I_A$ 16h | 1h~4h | $0.20I_A$ 放电至 1.0V ^{b)} |

循环至任何第 50 次放电时间不足 3 小时或在 1~48 个循环中电压降至 1.0V 以下为止。

2) 耐充电寿命测试

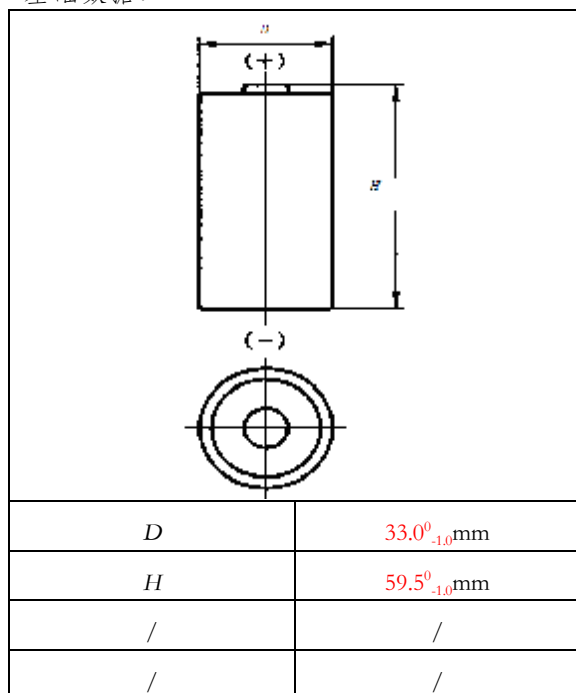
测试前以 $0.2I_A$ 放电至终止电压 1.0V，然后，在 $20^\circ\text{C} \pm 5^\circ\text{C}$ 的环境温度下根据表 4 做耐充电寿命测试。

表 4 耐充电寿命

| 循环次数 | 充电 | 放电 ^{a)} |
|------|---------------|-------------------|
| 1 | $0.05I_A$ 91d | $0.2I_A$ 放电至 1.0V |
| 2 | $0.05I_A$ 91d | $0.2I_A$ 放电至 1.0V |
| 3 | $0.05I_A$ 91d | $0.2I_A$ 放电至 1.0V |
| 4 | $0.05I_A$ 91d | $0.2I_A$ 放电至 1.0V |

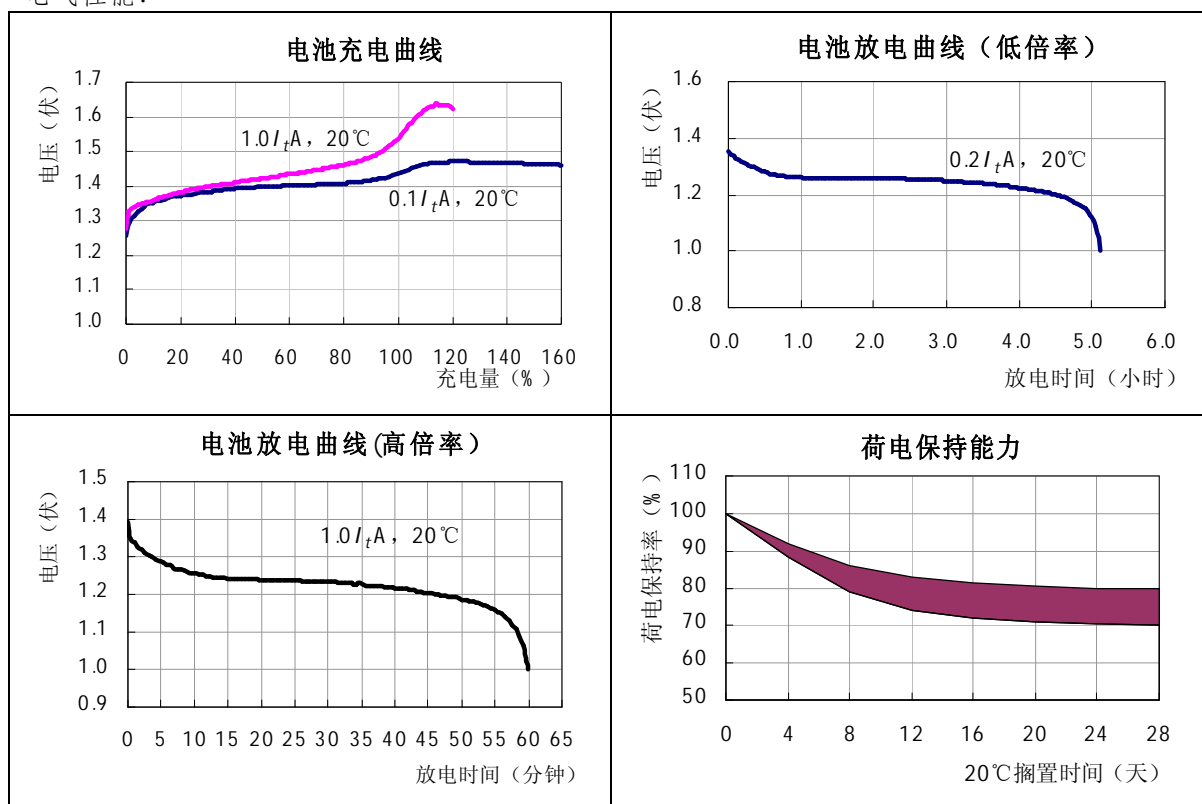
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基础数据:



| | | | |
|------------------------------|----|---------------------|---------------------|
| 标称电压 | | 1.2V | |
| 容量对比(mAh) | | 0.2I _t A | 1.0I _t A |
| | | 5000 | 4500 |
| 重量 (g) | | 127 | |
| 内阻 (在 1000Hz 下) (充电后; mΩ) | | ≤9 | |
| 充电电流 | 标准 | 500mA | |
| | 快速 | / | |
| 充电时间 | 标准 | 16 小时 | |
| | 快速 | / | |
| 使用温度 | 充电 | 标准 | 0~+35°C |
| | | 快速 | +10~+35°C |
| | 放电 | -20~+45°C | |
| | 贮存 | -20~+35°C | |

电气性能:



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