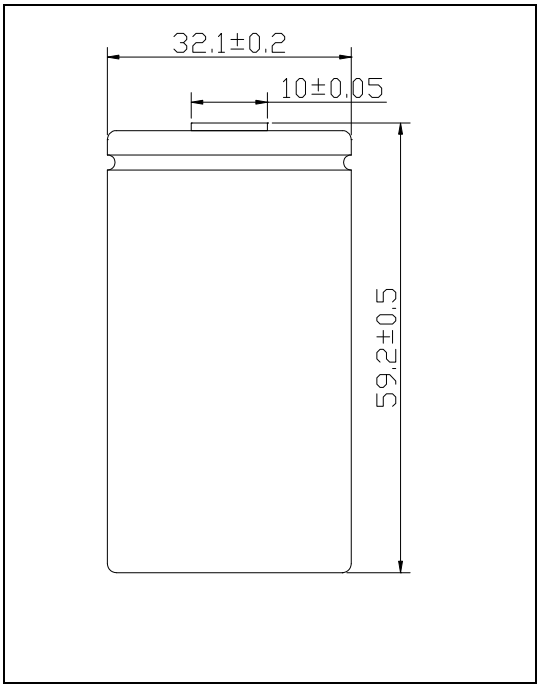
# Cyber-Power Electronic Corporation

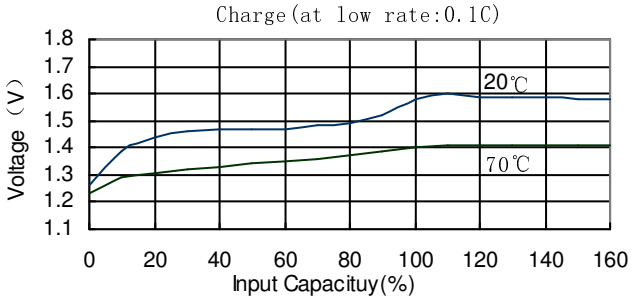
**BATTERY SPECIFICATION** **Model: CYK-60D4000H**



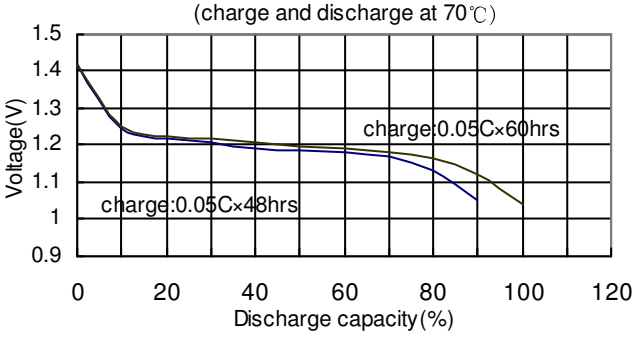

Specification

| | | |
|---|---|---|
| Nominal Capacity | | D4000mAh |
| Nominal Voltage | | 1.2 V |
| Charge current | Trickle | 200mA |
| | Standard | 400 mA |
| | Quick | 800 mA |
| Charge time | Trickle | 48Hrs~ |
| | Standard | 14~16 Hrs |
| | Quick | 6.50Hrs |
| Ambient Temperature charge | Trickle | 0~70℃ |
| | Standard | 0~70℃ |
| | Quick | 10~70℃ |
| Ambient Temperature Discharge | | -20~70℃ |
| Ambient Temperature Storage | | -20~70℃ |
| Internal Impedance(mΩ) (Upon fully charge) | | 18mΩ |
| weight | | 117.5g |

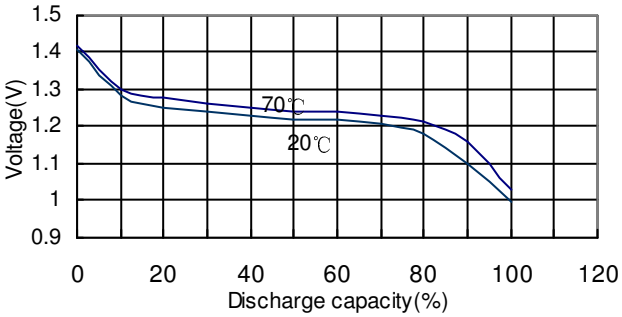
Charge(at low rate:0.1C)



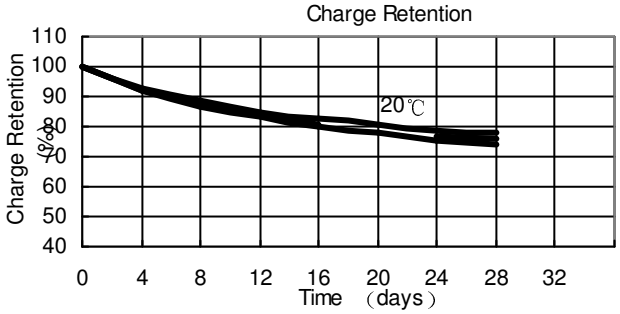

Discharge(at low rate: 0.2C)
(charge and discharge at 70℃)



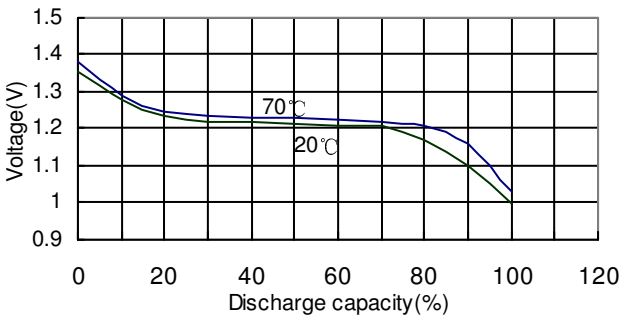

Discharge(at low rate: 0.1C; charge at 20℃)




Charge Retention




Discharge(at high rate:0.2C; charge at 20℃)



1、SCOPE

This specification governs the performance of the following Nickel-Cadmium Cylindrical cell.

Model： 4000D-H

Cell Size： D ( $\phi 32.1^{\pm 0.2} \times 59.2^{\pm 0.5}$)

All data involves voltage and weight to stack-up battery are equal to the value of unit cell time the number of unit cell which consisted in the stack-up batteries.

Example：Stack-up battery consisting three unit cells.

Nominal voltage of unit cell=1.2V

Nominal voltage of stack-up batteries=1.2V×3=3.6V

2、RATINGS

| Description | Unit | Specification | Conditions |
|---|---|---|---|
| Nominal Voltage | V/Cell | 1.2 | |
| Nominal Capacity | mAh | 4000 | Standard Charge/Discharge |
| Standard Charge | mA | 400(0.1C) | $T_1$=0~70℃(see Note1) |
| | Hour | 14~16 | |
| Quick Charge | mA | 800(0.2C) | -ΔV=0-5mV/Cell or Timer Cutoff=120 % nominal capacity or Temp. Cut-off=55℃. $T_1$=10~70℃ |
| | hour | 6.5approx. (see Note 2) | |
| Trickle Charge | mA | (0.03C)~(0.05C) | $T_1$= 0~70℃ |
| Standard discharge | mA | 800(0.2C) | $T_1$= -20~70℃ Humidity：Max.85% |
| Discharge Cut-off Voltage | V/Cell | 1.0 | |
| Storage Temperature | ℃ | -20~70 | Discharged state、Humidity、Max.85% |
| Typical Weight | Gram | 117.5 | |

3、PERFORMANCE

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

Ambient Temperature, $T_1$：20±5℃

Relative Humidity： 65±20%

Notes： Standard Charge/Discharge Conditions：

Charge： 400mA(0.1C)×14 hours

Discharge： 800mA(0.2C) to 1.0V/Cell

| Test | Unit | Specification | Conditions | Remarks |
|---|---|---|---|---|
| Capacity | mAh | ≥4000 | Standard Charge ／Discharge | up to 3 cycles are allowed |
| Open Circuit Voltage(OCV) | V/ Cell | ≥1.25 | Within l hour after standard Charge | |
| Internal Impedance | mΩ/ Cell | ≤18 | Upon fully charge(l K Hz) | |
| High Rate Discharge(1200mA) | minute | ≥180 | Standard Charge, l hour rest Before discharge by 1200mA to 1.0V/cell | up to 3 cycles are allowed |
| Charge Retention | mAh | ≥70% | Standard Charge, Storage：28 days, Standard Discharge | |
| IEC Cycle Life | Cycle | ≥150 | IEC61951-1(2003)7.4.1.1 | (see Note 3) |
| IEC Permanent Charge Test | | Specified at Note 4 | IEC61951-1(2003)7.4.2.3 | (see Note 4) |
| Leakage | | No leakage nor deformation | Fully charged at 1400mA(0.2C) for 6 hrs Stand for 14 days | |
| Vibration Resistance | | Change of voltage should be under 0.02V/ Cell, Change of impedance should be under 5 mΩ/ Cell | Charge the cell 0.1C 14hrs,then leave for 24hrs,check Cell before/after vibration, Amplitude 1.5mm Vibration 3000 CPM Any direction for 60mins. | |
| Impact Resistance | | Change of voltage should be under 0.02V/ Cell Change of impedance should be under 5 mΩ/ Cell | Charge the cell 0.1C 14hrs Then leave for 24hrs,check bat-before/after dropped, Height 50cm Wooden board(thickness 30mm) Direction not specified, 3 times. | |

CONFIGURATION DIMENSIONS AND MARKINGS

Please refer to the attached drawing.

4、EXTERNAL APPEARANCE

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

5、WARRANTY

One year limited warranty against workmanship and material defects.

6、CAUTION

⑴Reverse charging is not acceptable.

⑵Charge before use. The cells/batteries are delivered in an uncharged state.

⑶Do not charge/discharge with more than our specified current.

⑷Do not short circuit the cell/battery Permanent damage to the cell/battery may result.

⑸Do not incinerate or mutilate the cell/battery.

⑹Do not solder directly to the cell/battery.

⑺the life expectancy may be reduced if the cell/battery is subjected adverse conditions like: extreme temperature, deep cycling, excessive overcharge/ over-discharge.

⑻store the cell/battery uncharged in a cool dry place. Always discharge batteries before bulk storage or shipment.

Notes：

1. $T_1$: Ambient Temperature.
2. Approximate charge time from discharged state, for reference only.
3. IEC61951-1(2003)7.4.1.1Cycle Life:

| Cycle No. | Charge | Rest | Discharge |
|---|---|---|---|
| 1 | 0.1C×16h | None | 0.25C×2h20min |
| 2-48 | 0.25C×3h10min | None | 0.25×2h20min |
| 49 | 0.25C×3h10min | None | 0.25C to 1.0V/ cell |
| 50 | 0.1C×16h | 1-4h | 0.2C to 1.0V/ cell |
| Cycles l to so shall be repeated until the discharge duration on any 50th Cycle becomes less than 3 h. | | | |

4. IEC61951-1(2003)7.4.2.3 Cycle Life:

| Cycle No | Ambient temperature | Charge | Discharge | Minimum discharge duration |
|---|---|---|---|---|
| 1 | +40℃+/-2℃ | 0.05Cfor48h | 0.2Cto1.0V | No requirement |
| 2 | | 0.05Cfor24h | 0.2Cto1.0V | 3h45min |
| 3 | | 0.05Cfor24h | 0.2Cto1.0V | 3h45min |
| 4 | +70℃+/-2℃ | 0.05Cfor 60days | 0.2Cto1.0V | No requirement |
| 5 | | 0.05Cfor 60days | 0.2Cto1.0V | |
| 6 | | 0.05Cfor 60days | 0.2Cto1.0V | |
| 7 | +40℃+/-2℃ | 0.05Cfor 48h | 0.2Cto1.0V | No requirement |
| 8 | | 0.05Cfor 24h | 0.2Cto1.0V | 2h30min |
| 9 | | 0.05Cfor 24h | 0.2Cto1.0V | 2h30min |

**Note: All the above values subject to change without prior notice.**