



# Lithium Button-Cell Battery

VER:

DATE:

**3.0V**

## Lithium Button Battery Specification

**210 mAh**

**Model: [CR2032](#)**

| Prepared By/Date | Checked By/Date | Approved By/Date |
|------------------|-----------------|------------------|
|                  |                 |                  |

### Important Notice

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## PRODUCT SPECIFICATION

**1. Applicability:** This specification is applicable to **CR2032** coin type manganese dioxide lithium battery

### **2. Battery type and ratings:**

2.1 Battery type: **CR2032**

2.2 Nominal voltage: **3.0V**

2.3 Nominal capacity: **210mAh** (on continuous discharge at 20 °C under 15kΩ load to 2.0V end-voltage)

2.4 Outer dimensions: outer dimensions shall be as shown in **Fig1.** dimension drawing

2.5 Weight: **3.0 grams** (approx)

2.6 Terminals: **positive can** (BA stainless steel), **negative cap** (BA stainless steel)

2.7 Operating temperature range: **-20 °C ~ +60 °C**

2.8 Storage temperature range: **0 °C ~ +35 °C**

2.9 Storage humidity range: **45 % ~ 85 %**

### **3. Battery performance:**

#### 3.1 Dimensions:

Dimensions of batteries when tested in accordance with Subparagraph 4.4(1) shall be as shown in Fig1 dimensions drawing.

#### 3.2 Appearance:

Batteries shall have no deformation, dent, stain, leakage and camber or burr on their sealing members, which may adversely affect their appearance, performance and commercial value.

There shall be no coatings or other foreign objects on the surface of terminals which may adversely affect actual use or performance of batteries.

#### 3.3 Characteristics:

##### (1) Open-circuit Voltage:

Open-circuit voltage of batteries when tested in accordance with Subparagraph 4.4(3) shall meet the requirement set forth in Table 1.

##### (2) Closed-circuit Voltage:

Closed-circuit voltage of batteries when test in accordance with Subparagraph 4.4(4) shall meet the requirements set forth in Table 1.



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[Table 1]

| Test Items             | Temperature | Initial *    | After 12 Months | Remarks                         |
|------------------------|-------------|--------------|-----------------|---------------------------------|
| Open-Circuit Voltage   | 20 ± 2°C    | 3.1V To 3.4V | 3.1V To 3.4V    |                                 |
|                        | 0 ± 2°C     | 3.1V To 3.4V | 3.0V To 3.4V    |                                 |
| Closed-Circuit Voltage | 20 ± 2°C    | 3.1V To 3.4V | 3.1V To 3.4V    | Load Resistance<br>15kΩ, 8 Sec. |
|                        | 0 ± 2°C     | 3.1V To 3.4V | 3.0V To 3.4V    |                                 |

(Note) \* "Initial " Means Performance Values Measured Within One Month After Delivery.

(3) Service Life:

Service life of batteries when tested in accordance with Subparagraph 4.4(5) shall meet the requirements set forth in Table 2.

[Table 2]

| Test Items   | Temperature | Initial *          | After 12 Months    | Remarks  |
|--------------|-------------|--------------------|--------------------|--|
| Service Life | 20 ± 2°C    | 830 Hrs. or Longer | 780 Hrs. or Longer | Continuous Discharge Under<br>15kΩ Load to 2.0V<br>End-Voltage |
|              | 0 ± 2°C     | 740 Hrs. or Longer | 700 Hrs. or Longer |  |

(4) Service Life after storage at high temperature:

Service life of batteries when tested in accordance with Subparagraph 4.4(6) shall meet the requirements set forth in Table 3.

| Test Item                                      | Storage temperature | Storage Period | Requirement     | Remarks  |
|--|---------------------|----------------|-----------------|--|
| Service Life After Storage At High Temperature | 60 ± 2°C            | 20 Days        | 780 Hrs Minimum | Continuous Discharge At 20± 2°C Under 15kΩ Load To 2.0V End-Voltage After Storage. |

(5) Leakage Characteristics:

Batteries when tested in accordance with Subparagraph 4.5(1) shall have no leakage.

[Table 4]

| Test Item               | Requirement | Test Conditions   |
|-------------------------|-------------|---|
| Leakage Characteristics | No Leakage  | Temperature: 45 ± 2°C, Relative Humidity: 75%<br>Storage: 30 Days<br>Shall Be Inspected By Visual Means |



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## (6) Self-Discharge:

Self-discharge of batteries when tested in accordance with Subparagraph 4.5(2) shall be as set forth in Table 5.

[Table 5]

| Test Item      | Requirement | Test Conditions   |
|----------------|-------------|---|
| Self-discharge | 5% or Below | Continuous Discharge Under 15 kΩ Load To 2.0V End-voltage After 12 Months Storage At 20°C.<br>( To Obtain From The Mean Value Of The Same Lot ) |

## 4. Testing:

### 4.1 Temperature and Humidity:

Unless otherwise specified elsewhere, tests shall be conducted at ordinary temperature ( $20 \pm 2^\circ\text{C}$ ) and ordinary humidity ( $65 \pm 5\%RH$ ).

### 4.2 Storage of Test Specimen Batteries:

Specimen batteries to be tested shall be kept at the ambient temperature of  $25^\circ\text{C}$  or below and at the relative humidity of 75% or below.

### 4.3 Measuring Instruments and Devices:

(1) Outer micrometers specified in JJG26-95, dial gauges specified in JIS B 7503, and vernier calipers specified in JJG30-92 or those having equal or better accuracy shall be used.

#### (2) DC Voltmeters:

The tolerance shall be  $\pm 0.01V$  and the input resistance rating shall be  $10M\Omega$  or more.

#### (3) Load Resistance:

Load resistance shall include resistance throughout external circuits, and its tolerance shall be  $\pm 0.5\%$ .

### 4.4 Test Methods:

#### (1) Dimensions:

Dimension shall be measured with instruments specified in Subparagraph 4.3(1) above, provided that either one or both sides of such instruments shall be insulated in measuring the overall height of the batteries.

#### (2) Appearance:

Appearance of batteries shall be inspected by visual means.

#### (3) Open-circuit Voltage:

Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 1, and then the voltage between both terminals shall be measured at the same ambient temperature with a voltmeter as specified in Subparagraph 4.3(2).

#### (4) Closed-circuit Voltage:

Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 1. and then the voltage between both terminals shall be measured with a voltmeter as specified in



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subparagraph 4.3(2) while the specified load resistance is connected between both terminals at the same ambient temperature as specified above; provided that the measured value shall be based on meter reading taken 8 seconds after the circuit is closed.

### (5) Service Life:

Test specimen batteries shall be kept for 8 hours or longer at the ambient temperature specified in Table 2. and shall then be continuously discharged at the same ambient temperature and through the specified load resistance. The discharge shall be continued until the terminal voltage of the test specimens falls below the discharge end-point voltage of 2.0V, and the time during which the terminal voltage has been maintained equal to and above the discharge end-point voltage shall be taken as the service life.

### (6) Service Life after high-temperature storage:

Test specimen batteries, after having been stored at the temperature and period specified in Table 3, shall be kept for 12 hours or longer at ordinary temperature ( $20 \pm 15^{\circ}\text{C}$ ) and at ordinary humidity ( $65 \pm 20\%RH$ ) and shall then be continuously discharged through the specified load resistance at ambient temperature of  $20 \pm 2^{\circ}\text{C}$ . The discharge shall be continued until the terminal voltage falls below the discharge end-point voltage of 2.0V, and the time during which the terminal voltage has been maintained equal to and above the discharge end-point voltage shall be taken as the service life.

### 4.5 Other Tests:

Tests specified below shall be conducted as required. Except as specified in this paragraph.

Test methods be in accordance with the provisions of Paragraph 4.4.

#### (1) Electrolyte Leakage Test:

Test specimen batteries shall be examined for electrolyte leakage while they are kept at ordinary temperature and at ordinary humidity after having been stored at the temperature, humidity and period specified in Table 4.

#### (2) Self-Discharge:

Test specimen batteries which have been stored for 12 month at the ambient temperature of  $20 \pm 2^{\circ}\text{C}$  and at the relative humidity of  $65 \pm 20\%$  shall be tested for service life in accordance with the method specified in Subparagraph 4.4(5). Self-discharge shall be determined in the following manner:

$$\text{Self-discharge rate (\%)} = \frac{X1 - X2}{X1} \times 100\%$$

X1: Average initial discharge life of batteries of the same lot

X2: Average discharge life after storage



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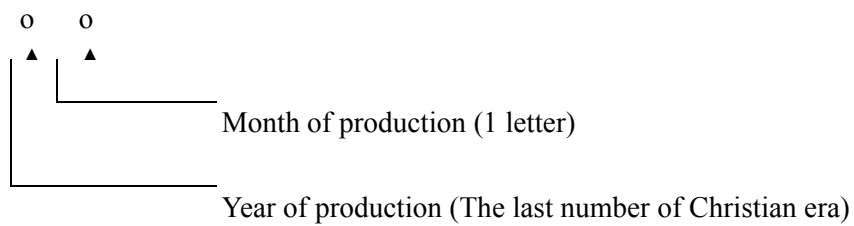
VER:

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## 5. Markings:

### 5.1 Markings on batteries:

- (1) Battery type: **CR2032**
- (2) Brand of battery: Xtra-Power
- (3) Polarity: + (- shall not be indicated)
- (4) Manufacturing marks: The year and month of production shall be marked on the negative (-) terminal side



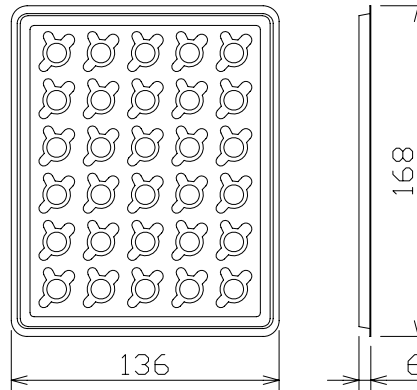
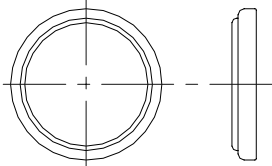
[Example] 18 ..... August 2001  
month of production.

- January to September ---- 1- 9
- Oct, Nov, Dec -----X, Y, Z

## 6. Packaging:

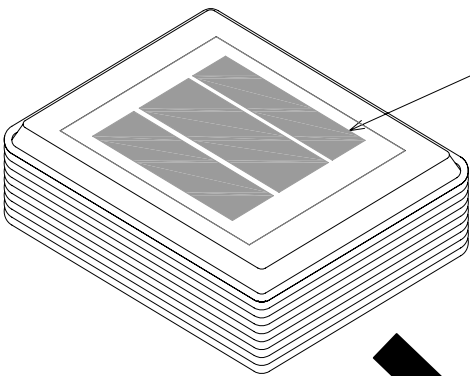
6.1 Product CR2032

6.2 20 pcs, tray

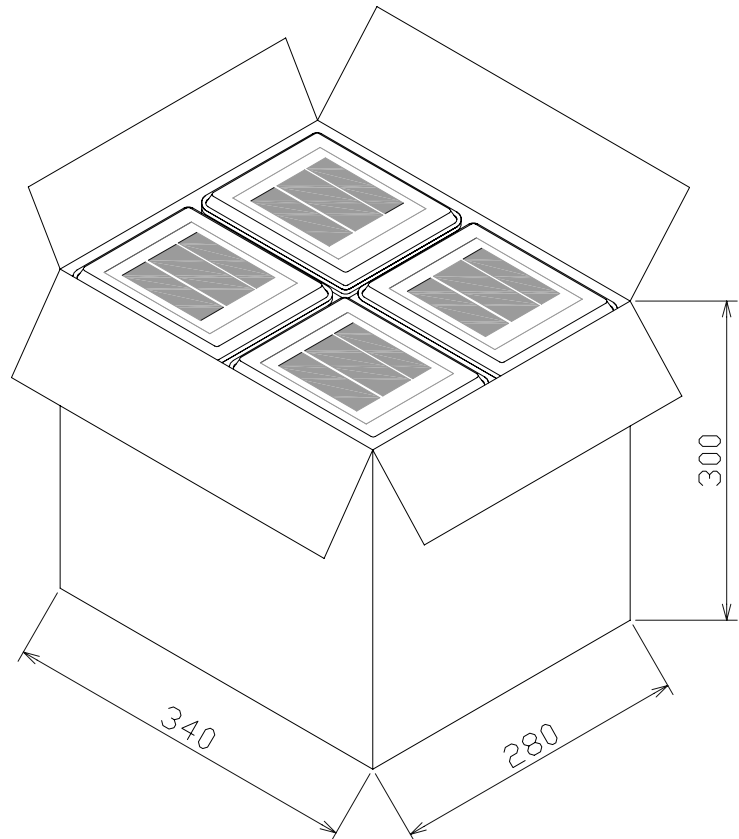


6.3 200 pcs, shrink packing

Inspection conformation



6.4 4000 pcs, corrugated board case



**Fig1. Dimension drawing of CR2032 lithium battery**

