

Control  
number

02018-5E-011

SPECIFICATION

Manganese dioxide Lithium Battery

Ordering Code : CR-2PE/BN

Model Code : CR2

Approved by

Division/Department

Name

Title

Signature/ date


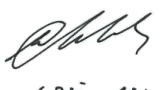

**ISSUED**

May,15,2018

PT. Panasonic Gobel Energy Indonesia

Date of Issued : May,15,2018

PT. Panasonic Gobel Energy Indonesia

Approved	Checked	Drafted
 K. Purnomo	 Ariswanto	 Daryono

Revision history		
No.	Date	Revision
1	May,15,2018	Issued
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## 1. Application Range

This specification applies to Manganese dioxide lithium batteries manufactured by PT. Panasonic Gobel Energy Indonesia.

## 2. Nominal Specification

2-1 Model Number	CR-2PE/BN (Bare cell: CR2)
2-2 Nominal Voltage	3V
2-3 Nominal Capacity	850mAh (Nominal capacity is based on the standard discharge current and cut-off voltage 1.8V at 20 °C.)
2-4 Standard Discharge Current	20mA
2-5 Maximum Continuous Discharge Current	1A at 20 degC
2-6 Dimensions	See attached drawing
2-7 Mass	Approximately 11g
2-8 Appearance	No noticeable deformation
2-9 Temperature	Operation -40 to +70 °C (Non condensing) Storage -40 to +70 °C (Non condensing) (Note: Contact Panasonic in case continuous high-temperature over +60 °C usage conditions.)
2-10 Recommendable Storage Condition	Temperature: 5 °C to 35 °C Humidity: Less than 70%RH
2-11 Battery Composition	Lithium primary battery composed of cathode from Manganese dioxide, anode from lithium, and electrolyte from organic solvent and lithium salt.

## 3. Characteristics

3-1 Open Circuit Voltage	
3-1-1 Initial	Between 3.0 and 3.5V (The measuring method described in item 5-4-1.)
3-1-2 After 1 year (storage at 25 ± 5 °C)	Between 3.0 and 3.5V (The measuring method described in item 5-4-1.)
3-2 Impedance	
3-2-1 Initial	Between 0.1 and 1.0 (The measuring method described in item 5-4-2.)
3-1-2 After 1 year (storage at 25 ± 5 °C)	Between 0.1 and 1.0 (The measuring method described in item 5-4-2.)
3-3 Duration (Pulse cycles)	
3-3-1 Initial	950cycles MIN. (20±3 °C) 500cycles MIN. (-20±3 °C) (The measuring method described in item 5-4-3.)
3-3-2 After 1 year (storage at 25 ± 5 °C)	950cycles MIN. (20±3 °C) 500cycles MIN. (-20±3 °C) (The measuring method described in item 5-4-3.)
3-4 Vibration Resistance	Deterioration of performance (3-1) shall not occur after the test described in item 5-4-4.
3-5 High Temperature Storage	The battery shall not show leakage or salting after the high temperature storage described in item 5-4-5.

#### 4. Test Condition

4-1 Test Condition	Unless otherwise specified the test shall be carried out at, Temperature : 20 ± 15 Humidity : 65 ± 20%RH
4-2 Test Timing	The test shall be started within a month from delivered day.
4-3 Measurement Instrument	
4-3-1 Voltage Meter	Input impedance : 10M
4-3-2 Battery Impedance Meter	Measurement error : 0.5% Sine-wave AC method (1kHz, 0.1mA) (As a general, Agilent Technologies LCR Meter [4338B] is recommended.)
4-3-3 Caliper	Class 1 of JIS B 7507:1993
4-3-4 Balance	Sensitivity : 100mg

#### 5. Measuring Method

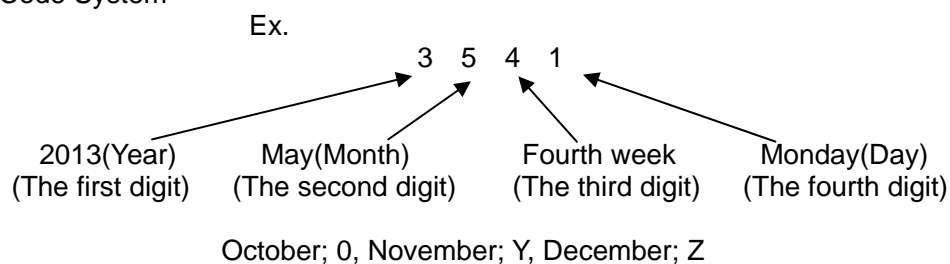
5-1 Dimensions	This shall be measured with the caliper described in item 4-3-3.
5-2 Mass	This shall be measured with the balance described in item 4-3-4.
5-3 Appearance	Deformation or tarnish shall be checked by visual observation method.
5-4 Characteristics	
5-4-1 Open Circuit Voltage	This shall be measured with the voltage meter described in item 4-3-1.
5-4-2 Impedance	This shall be measured with the impedance meter described in item 4-3-2.
5-4-3 Duration (Pulse cycles)	This shall be measured by pulse discharge method. The condition is Test temperature : 20 ± 3 -20 ± 3 Pulse pattern : 0.9A 3secON ⇔ 27secOFF End voltage : 1.55V (20 ± 3 ) 1.20V (-20 ± 3 )
5-4-4 Vibration Test	This test shall be carried out by the following condition according to UN Manual of Test and Criteria, Part , sub-section 38.3.4.5, Amplitude: 0.8mm Frequency: 7 ~ 200Hz Directions: X, Y, Z Duration: 15 minutes, 12 times (each direction)
5-4-5 High Temperature Storage	The battery shall be stored at 60 °C for 1 month. After the storage, the battery shall be kept in dry place at 25 ± 5 °C during 4 hours, then leakage and appearance shall be checked by visual observation method.

## 6. Indication

6.1 Below items are indicated on the battery or its package.  
(Design of indication can be changed without notice.)

Model code	CR2
Nominal voltage	3V
Manufacture or its brand	Panasonic
Production	Indonesia

### 6.2 Date Code System



### 6.3 UL Standard

This battery is certificated by UL and listed on the file number MH12210.

### 6.4 Production Site

PT. Panasonic Gobel Energy Indonesia  
Jl.Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia [Indonesia]

## 7. Operations and Modification of This Specification

Modification must be carried out under mutual agreement.

Any Accidents caused by non-described items in this specification must be discussed and solved mutually.

## 8. Important Notes (Warranty)

1) The batteries are warranted to conform to the description contained in this Specification for a period of twelve [12] months from the ex-factory date and any claim by you (customer) must be made within such period.

During that warranty period, if the Batteries are proved to become defective, non-defective and conforming Batteries will be supplied in due course at sole expense of Panasonic upon Panasonic's own determination that this is apparently caused by negligence of Panasonic.

Any further claims based on the delivery of defective Batteries shall be excluded. Such exclusion shall not affect the liability of Panasonic based on product liability for grossly negligence or intentional behavior of Panasonic.

2) Confirmation of the matching and reliability of Batteries into your actual sets or units is your own responsibility.

3) Panasonic shall not warrant or be responsible in any case where your fails to carry out proper handling, operating, installation, testing, service and checkout of the batteries and/or to follow the instructions, cautions, warnings, notes provided in this Specifications, or other Panasonic's reasonable instructions or advice.

4) Panasonic will not be held responsible for any issues caused by modifications to the battery taken place after that the battery is delivered to the customer end from Panasonic.  
The battery shall not be resold to any other parties.

## 9. Others

1) CR2 is originally designed for Film Cameras, and is requested to replace within two years after started to use where the battery is used for any applications other than film camera.

2 This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

3 This battery is classified as Lithium Metal Battery by transport regulations, and is needed to consider special handling may apply. Please refer the latest regulations e.g. IATA, IMDG or DOT where transport this battery or/and any articles contain or assembled with this battery.  
This battery complies with UN Recommendation on the Transport of Dangerous Goods (UN38.3)

4 This battery does not contain any toxic materials, such as mercury, cadmium or lead.

## 10. Precautions for use

1) The battery shall not be stored at temperatures in excess of 45 °C.

Storage at less than 35 °C is recommended. Storage at less than -20 °C can deform the plastic parts and may cause a leakage. To prevent self-discharge caused by corrosion or decrease of insulation, humidity during storage shall be less than 70%RH.

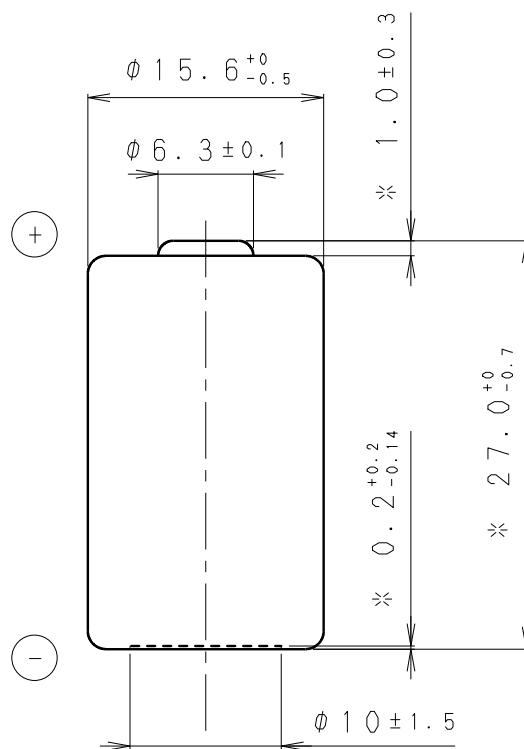
2) The battery has an explosion resistant construction. But the following cautions should be taken, because combustible materials such as lithium metal and organic electrolyte are contained in the battery.

- \* Do not use except in applicable model or equipment.
- \* Do not connect more than two cells in series.
- \* Do not mix new (fresh) and old (end of life) batteries.
- \* Do not force-discharge.
- \* Do not mix different types (chemistries) of batteries.
- \* Do not short circuit.
- \* Do not dispose in fire.
- \* Do not charge.
- \* Do not disassemble.
- \* Do not heat up more than 100 °C.
- \* Do not solder directly onto batteries.
- \* Do not soak in water.
- \* Do not deform.
- \* Do not inadequacy modify and remodel for installation.
- \* Insert the batteries in correct polarity position.

3 Keep away from heat source or flame.

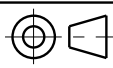
4 The battery shall not be washed by ultrasonic wave washer.

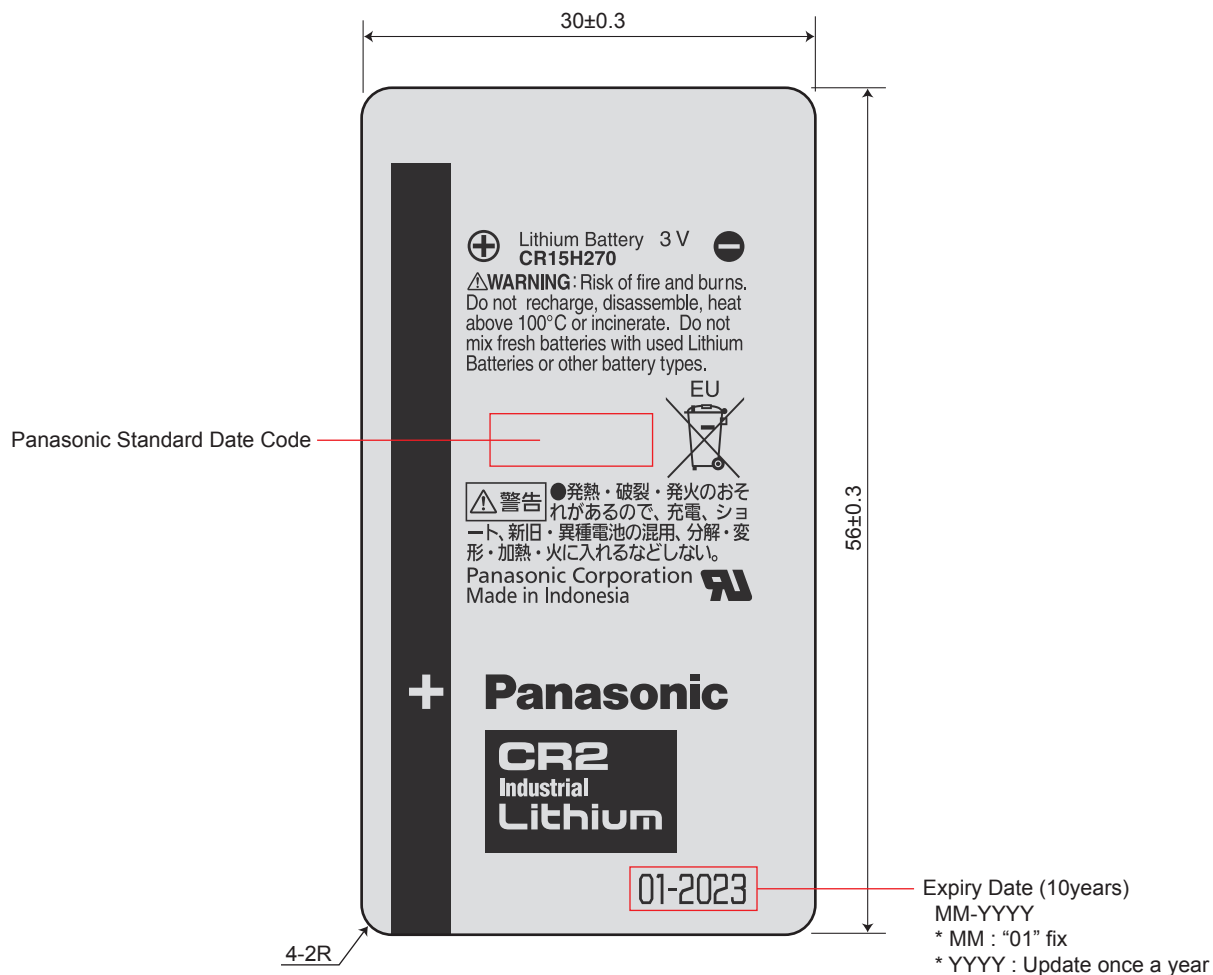
5) Keep away from children and infants to prevent the possibility of swallowing by mistake.



\* NOTE [注記]

1. \*: DIMENSIONS DO NOT INCLUDE DOUBLE SEAMS OF OUTER FILM LABEL.  
[\* : ラベルの合わせ目は除く寸法]
2. THE FOLLOWING ITEMS ARE INDICATED ON BATTERIES. [電池に下記の表記を行う]  
BATTERY NAME, BATTERY PN, NOMINAL VOLTAGE, CAUTIONS AND etc.  
[電池名称・素電池品番・公称電圧及び注意事項等]

MODEL NO.	CR2		SCALE
			2 : 1
DRAWING NO.	P_CR2	REV.	 UNIT: mm
		0	

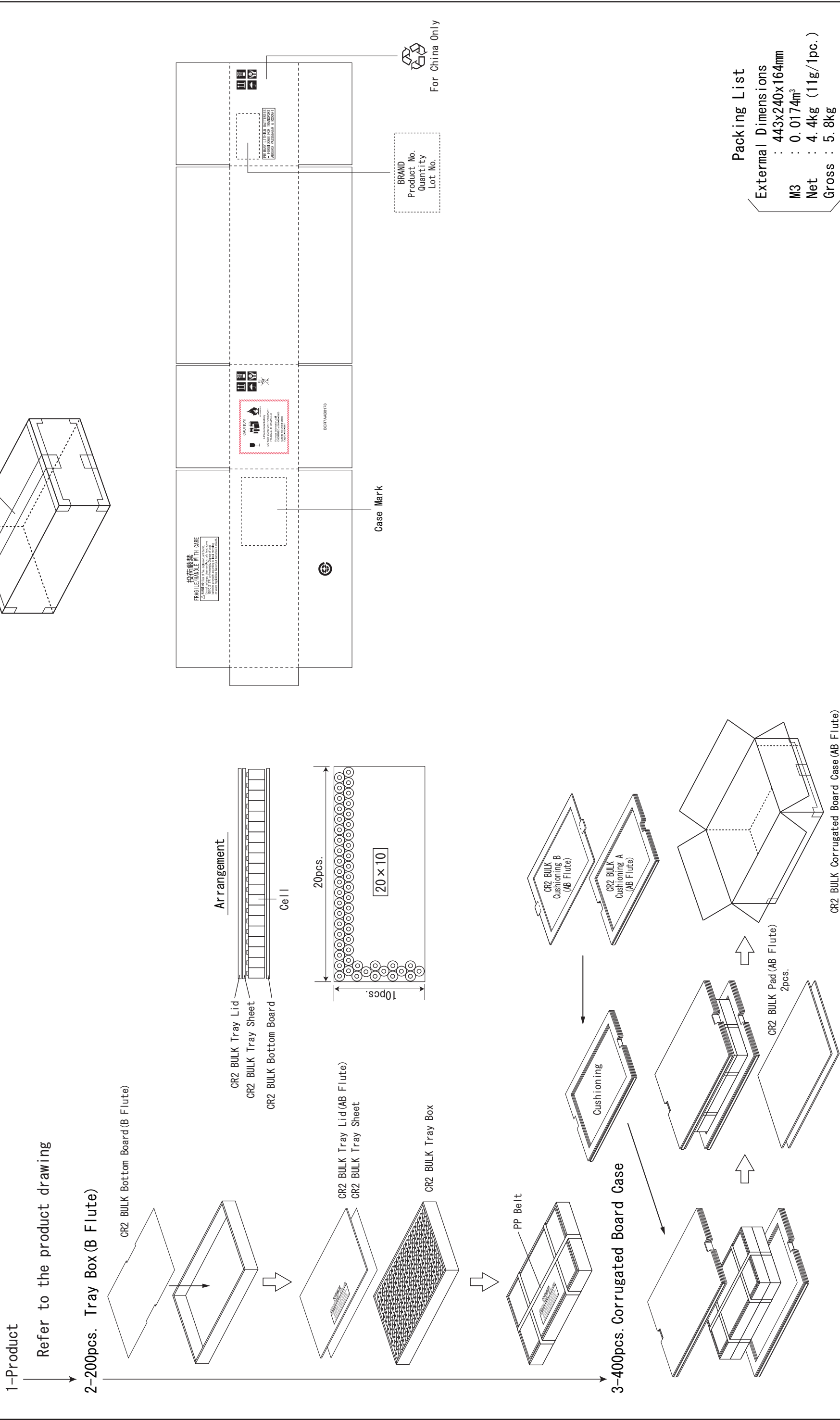


		PET		Color:Black,Varnish	
Symbol	Name	Material	Qty	Process & Finishing	Remark
Panasonic CR2 for Industry			Part Name		
			Drawing Name	CR2 Label	
			Drawing Number	13-720-A2	



## Packaging specification

Product No.	: CR2		
Product name	: Lithium battery		
SPEC	: 200pcs.Tray Box × 400pcs. Corrugated Board Case		
		Classification No.	232-CR2-901
		Constitution	Nov. 20. 2008
		Execution	Feb. 2009 ~



## Battery Safety Practices

### Avoiding hazards in lithium battery handling



#### Warning

Mishandling batteries can cause battery leakage, heat generation, rupture, ignition etc., that can lead to possible fire or injury.

Both of coin type and cylinder type of lithium batteries contain flammable materials such as lithium, organic solvent and other chemical ingredients. Improper handling of lithium batteries may result in heat generation, fire or explosion, with a risk of personal injury or damage. To prevent these accidents in battery handling, be sure to observe the following precautions.

#### 1. Do not Short circuit

Direct connection of plus(+) and minus(-) poles may result in leakage, heat generation, explosion and/or fire.  
Do not store and/or carry batteries with metallic product such as necklace. (Refer fig.1)

#### 2. Do not stack and/or jumble batteries

Stacked and/or jumbled batteries may cause short circuit and/or forced discharge by the contact of other batteries. This may result in leakage, heat generation, explosion and/or fire.

Especially, a connection with the 006P(9V) type batteries may have a high risk of leakage, heat generation, explosion and/or fire. (Refer fig.2 & 3)

#### 3. Do not make forced discharge batteries

Forced discharge by external power source, the battery voltage goes to negative and this cause gas generation in inside of the battery. This may result in leakage, heat generation, explosion and/or fire. (Refer fig.3)

\* In your disposal and/or storage of the batteries, please isolate plus and minus poles by adhesive tape. A connection with other metals and/or batteries may result in leakage, heat generation, explosion and/or fire.

\* When using the stored battery, please remove the tape perfectly to avoid high contact resistance problem. (Refer fig.4)

#### 4. Do not dispose of batteries in fire

Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

#### 5. Do not heat batteries

Heating batteries above 100 (212°F) may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

#### 6. Do not solder directly onto batteries

Direct soldering onto batteries may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

#### 7. Do not charge batteries

Charging of primary batteries may result internal gas generation, causing electrolyte leak, battery swelling, fire and explosion.

#### 8. Do not disassemble batteries

Disassembly batteries may cause gas generation that may irritate your throat. Lithium may also react with moisture to generate heat and fire.

#### 9. Do not deform batteries

Applying extreme pressure to batteries may cause deformation of the crimping and internal short circuit, causing electrolyte leak, battery swelling, fire and explosion.

#### 10. Do not mix different type batteries

For some applications, mixing of different type batteries, or new and old batteries, can cause over discharge due to differences in voltage and discharge capacities. This may lead to the risk of swelling and/or explosion.

#### 11. Do not insert batteries with opposite polarity

For some applications, battery insertion with opposite polarity (reverse insertion of plus and minus) may result in leakage, heat generation, explosion and/or fire.

Please ensure the above precautions are strictly observed by related divisions including production departments, sales departments and external subcontractors. For additional details and information, please contact our sales representatives.

Fig. 1 Short circuit

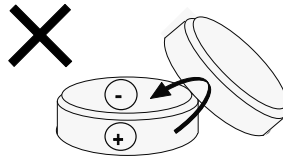
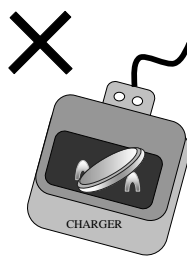


Fig. 2 stacked & jumble batteries



Connection with battery charger

**DANGER**

Fig. 3  
Examples of forced discharge

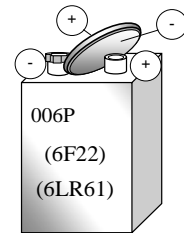


Fig. 4  
Examples of isolation in disposal and/or storage

