

Control
number

02014-4E-007

SPECIFICATION	
LITHIUM BATTERY	
Ordering Code :	CR-2032L/BE
Model Code :	CR2032

Approved by
Division/Department
Name
Title
Signature/date



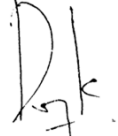
ISSUED

Apr,4,2014

PT. Panasonic Gobel Energy Indonesia

Date of Issued : Apr,4,2014

PT. Panasonic Gobel Energy Indonesia

Approved	Checked	Drafted
		

1. Applicable range

This specification applies to manganese dioxide lithium batteries which are delivered from PT. Panasonic Gobel Energy Indonesia

2. Nominal specification

- 2.1. Model code (bare cell) CR2032
- 2.2. Nominal voltage 3V
- 2.3. Nominal capacity 225 mAh
- 2.4. Operation temperature From -30 to 60 °C
(Please consult Panasonic in case continuous high-temperature usage conditions)
- 2.5. Storage Condition Temperature : 5°C to 35°C, Humidity : 45~85%RH
(Recommendable)
- 2.6. Mass Refer to drawing 1
- 2.7. Dimension Refer to drawing 1
- 2.8. Battery composition Lithium primary battery composed of cathode from manganese dioxide anode from lithium and electrolyte from organic solvent and lithium salt. Both cathode and anode outer shells are made of Stainless Steel with Ni plating on surface

3. Battery characteristics

Table 1. CR2032 characteristics

	Items	Test method	Temperature		initial	After 1 year in room temperature
1	Open circuit voltage	Voltage between terminals (Min)	20 +/- 2°C		3.1V	3.1V
2	Internal resistance	1kHz sine wave method (Max.)	20 +/- 2°C		20 Ω	-
3	Discharge duration	Continuous discharge (Std.)	20 +/- 2°C	Load : 15kΩ cut offV : 2.0V	1183h	1133h
		Continuous discharge (Min.)			1041h	1019h

4. Indication

4.1. Below items are indicated on battery or its package

Model code CR2032
Nominal voltage 3V
Plus polarity +
Manufacturer or its brand : Panasonic
Production country and Classification Made in Indonesia

(Design of indication can be changed without notice)

4.2. Production date

Stated on minus side of battery

First digit: End digit of dominical year; Second digit; Month (October=O, November=Y, December=Z)

Example : 3Z (December/2013)

4.3. UL

This battery is certificate by UL and listed on file number MH12210

4.4 Production Site

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

4.5 RoHS comply

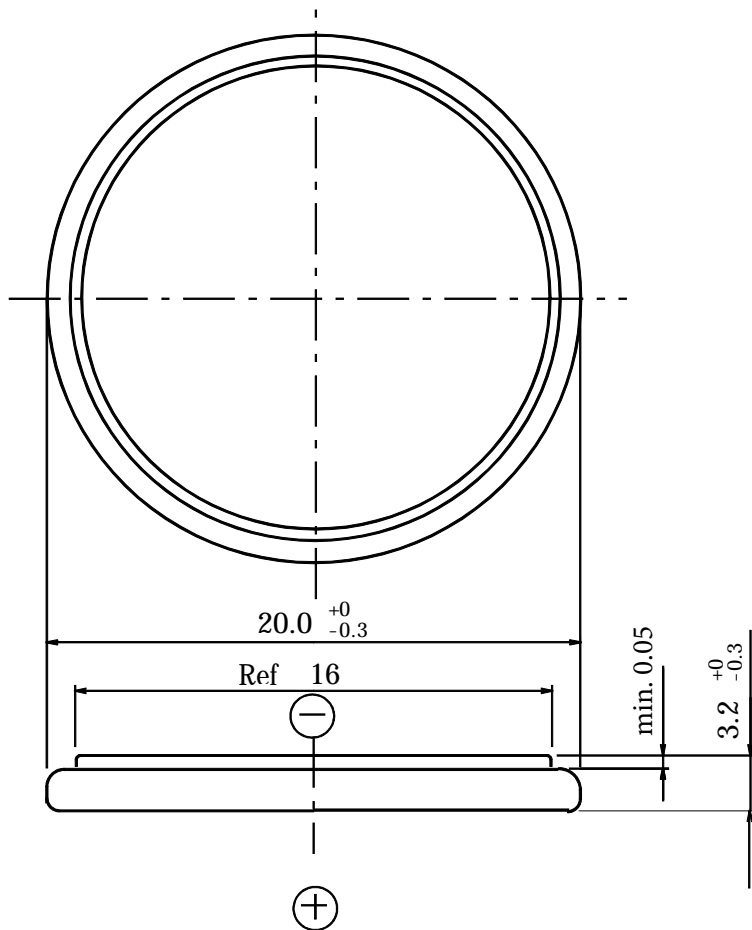
The battery herein complies with EU battery directive (2006/66/EC).

Since the batteries shall comply with EU battery directive (2006/66/EC), RoHS directive does not cover batteries. However, this battery does not use the Six substances restricted by RoHS directive.

Therefore, each content of Six restricted substances is less than the maximum amount regulated by RoHS.

Drawing 1. Dimensions

Ordering code : CR2032



Terminal : Plus terminal material : Nickel plated stainless steel
Minus terminal material : Nickel plated stainless steel

Mass : Approx. 2.9 g

5. Test condition and performance

5.1. External dimensions

Measure the battery dimensions with caliper described in item 6.3.(1) herein without making short-circuit.
Dimensions shall be confirmed with drawing 1 herein.

5.2. Open circuit voltage

Measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein after keeping the battery for 2 hours at least in measurement environment. Open circuit voltage shall conform to table 1 herein.

5.3 Internal resistance

Measure the internal resistance with the resistance meter described in item 6.3.(3) herein after keeping the battery for 2 hours at least in measurement environment. Internal resistance shall conform to table 1 herein.

5.4. Discharge duration

Discharge the battery with the load resistance specified in table 1 herein after keeping the battery in measurement environment for 8 hours at least. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.

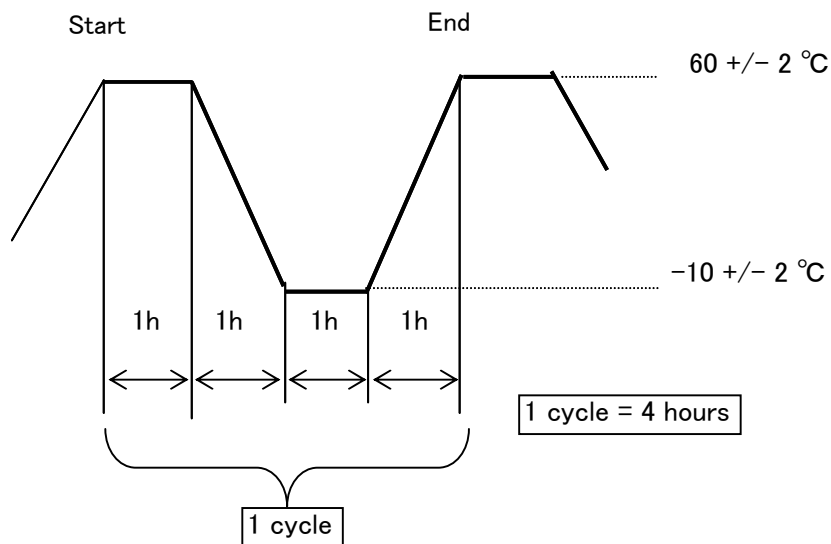
Discharge duration shall conform to table 1 herein.

5.5. Anti-leakage

Appearance check after 42 cycles of thermal cycle by the condition showing below. Battery shall not have deformation or leakage.

* This test shall be started from high temperature (60°C) position.

* No humidifying to ambient temperature and humidity.



5.6. Storage characteristics

(1) Open circuit voltage

After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein.

Open circuit voltage shall conform to table 1 herein.

(2) Internal resistance

After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the internal resistance with the resistance meter described in item 6.3.(3) herein. Internal resistance shall conform to table 1

(3) Discharge duration

After storage term described on table 1 herein, keep the battery for 8 hours at least in measurement environment, then discharge the battery with the load resistance specified in table 1 herein. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.

Discharge duration shall conform to values described in table 1 herein.

5.7. Appearance

No deformation, bruise and stain which cause practical interference.

6. Test conditions

- 6.1. Initial test Initial test must be started within 2 months from delivery.
- 6.2. Temperature and humidity Unless otherwise specified, test should be carried out in room temperature (20 +/- 15 °C) and room humidity (65 +/- 20%RH).

6.3. Measuring equipment's

(1) Dimension

Micrometer defined by JIS B7502 or equivalent or more accurate one must be used for dimension measurement.

For one digit decimals tolerance, caliper with 0.05mm accuracy which is defined JIS B7507 or higher accuracy equipment must be used.

(2) Voltage

Voltage meter defined by JIS C1102 class 0.2 or higher, and more than 10Mohm impedance must be used.

(3) Internal resistance

It should be measured by sinusoidal current method (1kHz). Measurement should be finished within 5 seconds.

(As a general rule, Agilent Technologies LCRmeter 4263B or equivalent should be used.)

(4) Load resistance includes all resistance of discharge circuit, and its tolerance shall be less than 0.5%.

(5) Appearance check is observed by visual evaluation.

7. Revision and modification of this specification

Revision and modification must be carried out after the prior mutual agreement.

All accidents or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

8. Important Notes (Warranty)

- 1) The batteries are warranted to conform to the description contained in this specifications for a period of twelve **【12】** months from the ex-factory date and any claim by customer (apparatus manufacturer or distributor) 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.
- 2) Confirm and assure the matching and reliability of batteries on actual set or unit application with customer's responsibility.
- 3) Panasonic shall not warrant or be responsible in any case where customer fails to carry out proper handling, operating, installation, testing, service and checkout of the batteries and/or to follow the instruction, cautions, warnings, notes provided in this specifications, or other Panasonic's reasonable instructions or advise.
- 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.
The battery shall not be resoled to any other parties.
- 5) This product specification will be validated assuming that it is accepted when it is not returned within six months from the date of issue.

9. Precautions for use

9.1 Cautions for storage

- Store the battery at a constant temperature of 35 degree C or less in order to prevent deteriorations from heat.
- Keep the battery away from high humidity such as 85% RH or higher in order to prevent dew condensations on the battery that may cause to electrical leakage,
- Keep the battery away from heat sources i.e., boiler, radiator and etc., and from direct sunlight.

9.2 Warning for safety

Following cautions should be taken into consideration in order to use this battery in safe, since the battery contains combustible materials such as Lithium metal and organic electrolyte.

- Do not use except in applicable model or equipment.
- Do not mix fresh and used batteries.
- Do not mix different types (chemistries) of batteries.
- Do not short circuit.
- Do not charge.
- If multiple batteries are kept in contact with each other. The (+) and (-) terminals may short-circuit, and/or the charging possibly happen by other adjacent batteries, which may cause of shorten service life, significant damages and catching fire.
- Do not dispose into fire.
- Do not heat up higher than 100 .
- Do not solder direct to battery.
- Do not disassemble.
- Do not soak in water.
- Do not deform.
- Do not apply inadequacy modifications or remodeling on the batteries.
- Insert the batteries in the correct polarity position.

Warning for prevention of ingestion accident

- Small-sized batteries can easily be swallowed. They must be kept out of the reach of small children.
- Also, in the design of equipment using batteries, the care should be taken to ensure that batteries are NOT easy removable for children.

9.3 Caution for better usage

- Use gold-plated or nickel-plated steel or stainless steel strips for terminals in order to keep good conductivity with the battery surface. Terminals made of gold-plated phosphor bronze will ensure stable conductivity.
- Apply and keep the contact pressure more than 2N for stable conductivity.
- Before inserting batteries, check the terminal contact surfaces on both the equipment and the batteries are clean, and also check that they are not deformed. If the contact surfaces are dirty, clean up and dry them thoroughly before inserting batteries.
- Even if batteries of the same size or same shape, they may differ in type or grade. When replacing batteries, confirm that they are correct type by checking the identification symbol (designated by I.E.C. standards) which is marked on the battery and its packages.
- Lithium primary batteries continuously indicate high voltage even toward the end of their service life. As such, they may be mistakenly judged as yet being strong. In case of multiple batteries are used in an application or equipment, all batteries should be replaced at the same time when the one of those batteries shows it has totally consumed even other batteries seems still operating, since the remaining capacity in other batteries must be also quite little at the time.
- When multiple batteries are used in series in applications or equipments, it may occur that the one battery has a polarity inversion at the end of operation life. That behavior happen when the battery had consumed its capacity earlier than other batteries. Therefore, that is not failure of battery.
- When the Lithium battery has short-circuit, even slightly. A certain amount of time is required for recovering its voltage completely. If the electrical characteristics of the battery are

measured at a time before a sufficient time has passed, it may indicate unstable values due to the battery was in recovering mode.

- If the battery touch with any antistatic conductive materials include packing bags, trays, mats, sheets, films and resin cases, sheets, for example, have a resistance of 10^3 to 10^6 , it may cause of short-circuit since both the positive and the negative terminal of the battery may contact with those materials. In order to prevent short circuit, special attention may apply when handle batteries or battery attached PCB in close to those materials.

Notice for equipment design

- Keep batteries away from heat source or flame, and water.
- Please contact us in case of using multiple batteries.

Case Marking of Lithium Battery

Model No :	: CR-2032L/BE(BN)	Drawing No.	:
Brand	: Panasonic	Date of stipulation	: Aug 27, 2019
Conutry of origin	: INDONESIA	Scale	: 4 : 1



1 : 1

According to IEC 60086-4

<div>3</div>					
<div>2</div>					
<div>1</div>					
Sym.	Date of Revision	Remarks			
Date of stipulation :		Approved	Checked	Checked	Drafted
		<div>WANG 2020.06.10 OSCAR</div>			

Date code marking

Model No :

CR2032L/BE(BN)

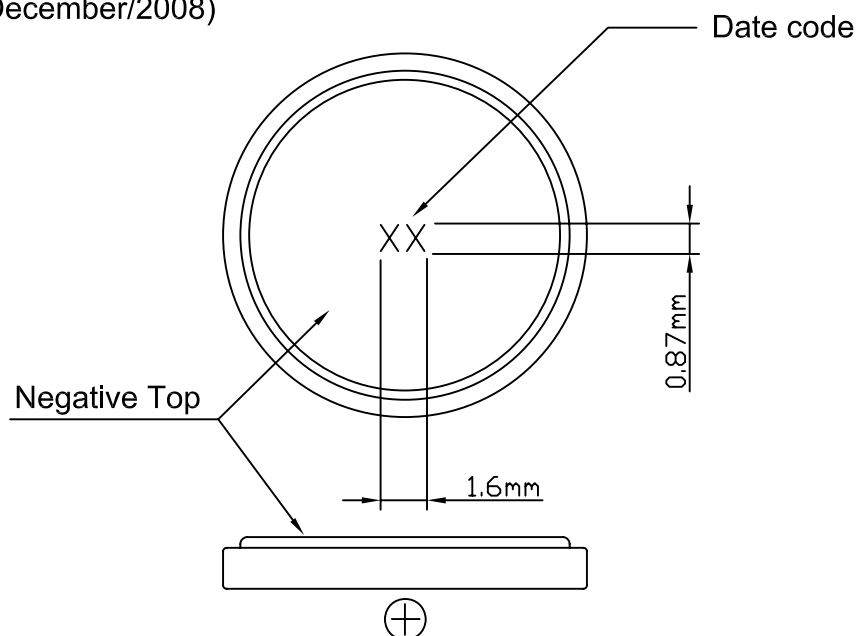
(Lithium Coin Battery)

Production date

Stated on minus side of battery


First digit: End digit of dominical year; Second digit; Month (October=O, November=Y, December=Z)

Example : 8Z (December/2008)



* Meaning of two - digit code.
(ONE 10 - YEAR CYCLE)

MONTH / YEAR		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
JAN	1	01	11	21	31	41	51	61	71	81	91
FEB	2	02	12	22	32	42	52	62	72	82	92
MAR	3	03	13	23	33	43	53	63	73	83	93
APR	4	04	14	24	34	44	54	64	74	84	94
MAY	5	05	15	25	35	45	55	65	75	85	95
JUN	6	06	16	26	36	46	56	66	76	86	96
JUL	7	07	17	27	37	47	57	67	77	87	97
AUG	8	08	18	28	38	48	58	68	78	88	98
SEP	9	09	19	29	39	49	59	69	79	89	99
OCT	10	00	10	20	30	40	50	60	70	80	90
NOV	11	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y
DEC	12	0Z	1Z	2Z	3Z	4Z	5Z	6Z	7Z	8Z	9Z

3					
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1					
Sym.	Date of Revision	Remarks			
Date of stipulation :			Approved	Checked	Checked
					

Packaging specification

Product No. : CR-2032L/BE

Drawing No.

232-BC-86

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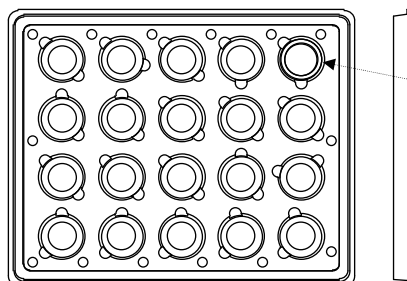
Product name : Lithium battery

SPEC : Tray for 20pcs. × Shrink Packing for 200pcs. × Outer Carton for 4000pcs.

1-Product

Refer to the product drawing

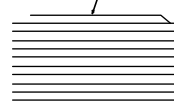
2-Tray for 20pcs.



Arrange cells negative side up

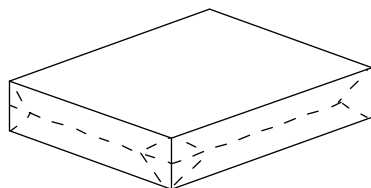
× 10

Empty tray as lid
(ϕ 20 type) 1pc.



10-stack piling

3-Shrink Packing for 200pcs.

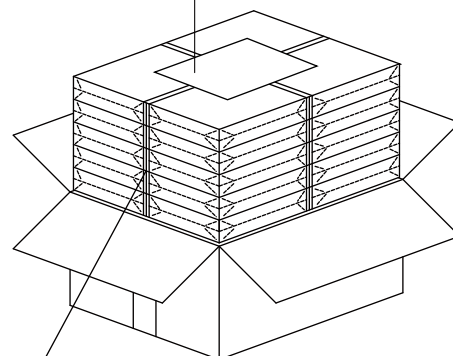


× 20

Alignment

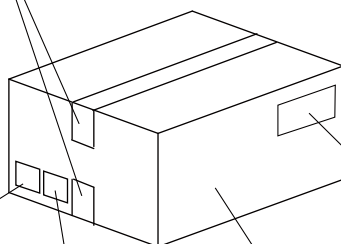
Product No.
Panasonic BRAND
200pcs. × 20
xxxx

Date of shrink packing
(4-digit)



4-Outer Carton for 4000pcs.

PP Tape (50mm)



VTCP Mark

"UL Mark"



"Dustbin Mark"



Case Mark

PT. Panasonic Gobel Energy Indonesia

Packing List

Dimension : 295 × 360 × 237mm
M3 : 0.0251m³
Net : 11.6kg 2.9g/1pc.
Gross : 13.5kg

unit: mm

Panasonic Corporation

S P E C I F I C A T I O N

. Precautions for Use

Please pay attention to the following points in order to maintain satisfactory operating conditions.

- * Use nickel plated (steel or stainless steel) for power terminal contacts.
- * To ensure stable contact, the contact pressure for power terminals must be at 20 to 10 N
- * When measuring battery voltage, use a meter with an internal resistance of 1 MΩ or greater. Correct voltage measurements cannot be obtained otherwise.
- * Batteries are extremely sensitive to the adverse effects of humidity. Be sure to store them in a place which is dry and subject to little temperature change.
- * Do not place near the boiler or radiator, nor expose to the direct sunlight.
- * If button-type batteries are kept in contact with each other, the (+) and (-) terminals may short-circuit, greatly shortening their serviceable life.
- * Button-type batteries may expand slightly during use. Therefore, sufficient space must be provided for this expansion when designing equipment.
- * Before inserting batteries, check to confirm that the terminal contact surfaces on both the equipment and the batteries are clean and that they are not deformed. If the contact surfaces are dirty, clean and dry them thoroughly before inserting batteries.
- * Batteries of the same size and shape may differ in type and grade. When exchanging batteries, confirm that they are the correct type by checking the identification symbol (designated by I.E.C. standards) provided on the battery.
- * Lithium primary batteries continue to register high voltage even toward the end of their serviceable life. As such, they may be mistakenly judged as yet being strong. If one of several batteries being used in a set is found to be exhausted, it can be assumed that there is very little life remaining in the others even though they may continue to register high voltage. It is therefore advisable to exchange all of the batteries at the same time.
- * The direction of polarity in a battery may reverse as it nears the end of its serviceable life. This occurs when it is the first among several batteries being used in a set to be exhausted. It is not due to an abnormality in the battery itself.
- * When a lithium battery is short-circuited, even slightly, a certain amount of time is required for its voltage output to recover completely. If the electrical characteristics of the battery are measured before a sufficient amount of time has passed, the battery may appear to be malfunctioning when actually it is merely in a state of recovery.

The batteries should be used correctly, otherwise the set may be damaged due to leakage trouble. Therefore, keep the following precautions in mind.

- * Do not charge, short-circuit, disassemble, heat or dispose the batteries in fire.
- * Insert the batteries in correct polarity position.
- * Do not directly solder to batteries.
- * Do not use spent batteries with new ones.

Small-sized batteries can easily be swallowed.
They must be kept out of the reach of small children.
Also, in the design of battery powered equipment, care should be taken to ensure that batteries cannot be easily removed by children.

3				
2				
1				
Sym.	Date of Revision	Remarks		
Date of stipulation	Stipulated			Described
May . 4. 1984				<i>H. Hattori</i>

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

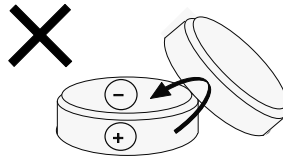
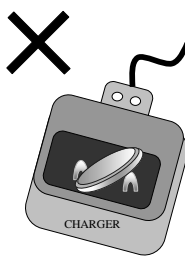


Fig. 2 stacked & jumble batteries



Connection with battery charger

DANGER

Fig. 3
Examples of forced discharge

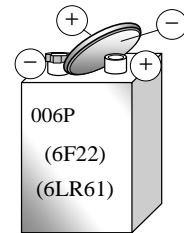
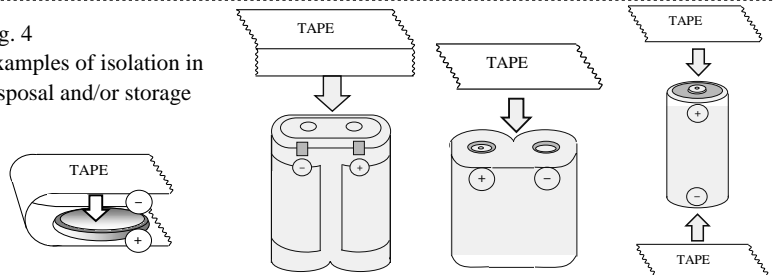


Fig. 4
Examples of isolation in disposal and/or storage



Beware of Antistatic Conductive Materials

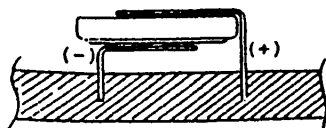
Whenever terminal-mounted backup batteries or coin-type lithium batteries contact conductive materials, they discharge. Measures to protect semiconductor parts from static damage have been implemented in plants that use such ICs and LSIs. A number of protective materials are presently being used, and all contain blends of carbon, aluminum and other metals that make them conduct.

Antistatic conductive materials include packing bags, trays, mats, sheets, film and resin cases. Sheets, for example, have a resistance of 10^3 to $10^6 \Omega$, which means that when they contact the positive and negative terminals of a battery, they will discharge the battery.

In a lithium battery, a current flow of several μA to several mA reduces its voltage and electrical capacity. We recommend constant attention when using batteries around protective materials.

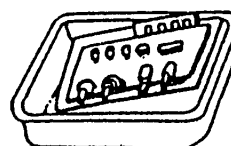
Examples

A terminal-mounted battery with its terminals inserted into a conductive mat is completely discharged after several days.



Conductive mat

A PCB-mounted battery is completely discharged by contact with the conductive resin case.

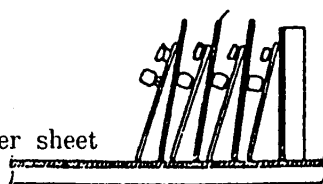


Conductive resin case

PCB-mounted batteries are discharged by contact with spacers and conductive rubber sheets.

Spacer

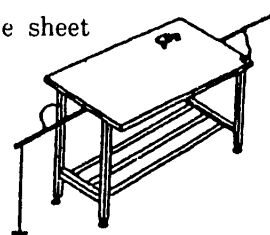
Conductive rubber sheet



Batteries left on a work bench with positive and negative terminals in direct contact with the grounded rubber sheet cover are completely discharged.

Ground wire

Conductive sheet



For more information, please make contact with your local dealer.

Preventing Accidental Memory Erasure

Coin-type Lithium batteries are widely used for memory backup purposes. However, there have been an increasing number of cases of accidental memory erasure due to inadequate battery contact.

To prevent unexpected memory erasure, consider the following tips for proper use.

< Long-term Continuous Battery Use >

- Use a battery with solderable tab terminals, so that the battery can be permanently soldered to terminal pads on the circuit board (Fig. 1).
- If the battery requires periodic replacement, use a battery holder (Fig. 2) or a battery with in-line lead connectors (Fig. 3).

The battery holder can be adjusted to suit any Panasonic lithium battery (Fig. 2).

< Batteries Requiring Short-Term Periodic Replacement --- Using batteries without solderable tab terminals or lead connectors >

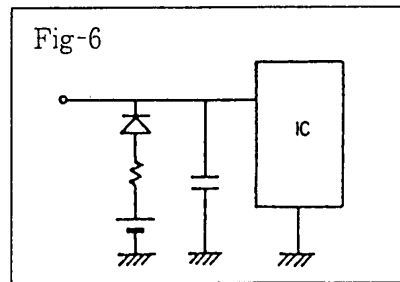
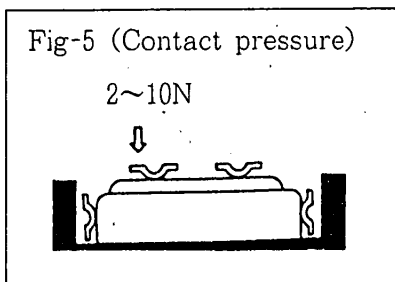
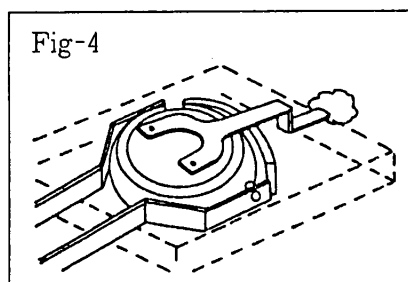
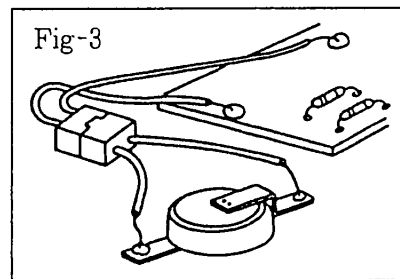
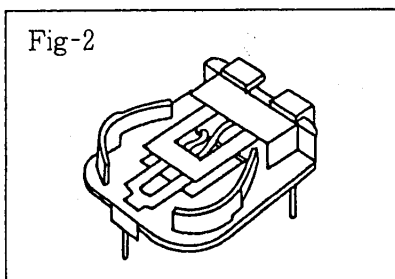
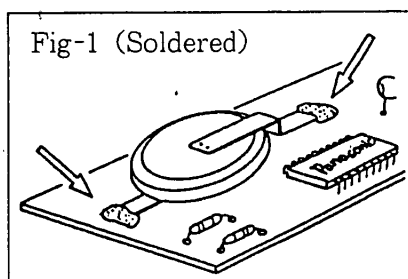
- Use gold- or nickel-plated steel or stainless-steel strips for battery terminal contacts. Terminals made of gold-plated phosphor bronze will ensure contact with long-term stability.
- Y-shaped terminals (double contacts) for both the anode and cathode offer very stable contact (Fig. 4).

Each contact on the Y-shaped terminals requires a minimum contact pressure of 2-10N {approximately 200~1000gf} (Fig. 5).

- To guard against momentary contact failures of a few milliseconds in duration, use the tantalum capacitor-diode-resistor circuit shown in Fig. 6.

* Do not touch the contact surfaces of the battery with bare hands, as this will increase the contact resistance and impair proper contact.

Figures 1 through 6 show examples of how to ensure proper battery contact.



For more information, please make contact with your local dealer.

This product is a consumer product which is used in a hermetically sealed state. So, it is not an object of the SDS system. This document is provided to customers as reference information for the safe handling of the product. The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Panasonic Corporation makes no warranty expressed or implied.

PRODUCT SAFETY DATA SHEET

1 Chemical product and company identification

Name of Product : Manganese dioxide lithium battery
Name of Company : Panasonic Corporation
Address : 1-1 Matsushita-cho, Moriguchi-city, Osaka, 570-8511, Japan
Emergency Contact : +81-6-6994-4560 (Working hours)
+81-6-6991-1141 (Holiday)

2 Hazards identification

GHS Classification : Not applicable
Toxicity : Vapor generated from burning batteries, may irritate eyes, skin and throat.
Hazard : Electrolyte and lithium metal are inflammable.
Risk of explosion by fire if batteries are disposed in fire or heated above 100 degrees C.
Stacking or jumbling batteries may cause external short circuits, heat generation, fire or explosion.

3 Composition/information of ingredients

Component	Material	CAS No.	Content (%)
Positive electrode	Manganese dioxide	1313-13-9	12 - 50
Negative electrode	Lithium metal	7439-93-2	0.5 - 6
Electrolyte	1,2-dimethoxyethane	110-71-4	1.5 - 3.5
	Lithium Perchlorate	7791-03-9	0.2 - 0.7
	Organic electrolyte	-	2.5 - 7
Others (Steel or Plastic parts)	Steel	7439-89-6, 7440-47-3	30 - 85
	Polypropylene	9003-07-0	0.5 - 10

Lithium content per cell

Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)	Model Number	Lithium content(g)
CR1025	0.008	CR2012	0.02	CR2330	0.08	CR2412	0.03
CR1216	0.008	CR2016	0.03	CR2354	0.17	CR2430	0.09
CR1220	0.01	CR2025	0.05			CR2450	0.18
CR1612	0.01	CR2032	0.07			CR2450A	0.16
CR1616	0.02	CR2032A	0.06			CR2477	0.29
CR1620	0.02	CR2032B	0.06			CR3032	0.15
CR1632	0.04	CR2050A	0.10				
CR1632A	0.04	CR2050B2	0.10				

4 First aid measures (in case of electrolyte leakage from the battery)

- Eye contact : Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Get immediate medical treatment. If appropriate procedures are not taken, this may cause eye injury.
- Skin contact : Wash the affected area under tepid running water using a mild soap. If appropriate procedures are not taken, this may cause sores on the skin. Get medical attention if irritation develops or persists.
- Inhalation : Remove to fresh air immediately. Get medical treatment immediately.

5 Firefighting measures

- Fire extinguishing agent : Alcohol-resistant foam and dry sand are effective.
- Extinguishing method : Be sure on the windward to extinguish the fire, since vapor may make eyes, nose and throat irritate, Wear the respiratory protection equipment in some cases.

6 Accidental release measures (in case of electrolyte leakage from the battery)

- Take up with absorbent cloth, treat cloth as inflammable.
- Move the battery away from the fire.

7 Handling and storage

- Handling :
 - ⌘ When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together.
 - ⌘ Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation.
 - ⌘ Do not short-circuit, recharge, deform, throw into fire or disassemble.
 - ⌘ Do not mix different type of batteries.
 - ⌘ Do not solder directly onto batteries.
 - ⌘ Insert the battery correctly in electrical equipment.
- Storage :
 - ⌘ Do not let water penetrate into packaging boxes during their storage and transportation.
 - ⌘ Do not store the battery in places of the high temperature or under direct sunlight.
 - ⌘ Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, rain or frozen condition

8. Exposure controls and personal protection

Acceptable concentration : Not specified about Lithium Battery.
Facilities : Nothing in particular.

Protective Equipment (in case of electrolyte leakage from the battery)

Respiratory Protection : For most condition no respiratory protection.
Hand Protection : Safety gloves.
Eye Protection : Safety goggle

9. Physical and chemical properties

Appearance : Coin shape
Nominal Voltage : 3 V

10. Stability and reactivity

Since batteries utilize a chemical reaction they are actually considered a chemical product.

As such, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, the various usage conditions such as discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. Toxicological information

Swallowing can lead to chemical burns, perforation of soft tissue, and death. Severe burns can occur within 2 hours of ingestion. Seek medical attention immediately.

12. Ecological information

In case of the worn out battery was disposed in land, the battery case may be corroded, and leak electrolyte. However, there is no environmental impact information.
Mercury (Hg), Cadmium (Cd) and Lead (Pb) are not used in cell.

13. Disposal considerations

When the battery is worn out, dispose of it under the ordinance of each local government.

14. Transport information

Handling

During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.

During the transportation do not allow packages to be dropped or damaged.

UN Number, UN Class : UN3090, Class9 (for the Air transport by PI968 Section IA or IB)
: Exemption (for the Marine transport and the Air transport by Section II of PI 968, 969 or 970)
Even though the cells are classified as lithium metal batteries (UN3090 or UN3091), they are not subject to some requirements of Dangerous Goods Regulations because they meet the following:

1. for cells, the lithium content is not more than 0.3g ;
2. each cell is of the type proven to meet the requirements of each test

in the UN Manual of Tests and Criteria, Part , sub-section 38.3 ;

3. each cell is manufactured in ISO9001 certified factory ;

4. the test summary is available from ;

<https://industrial.panasonic.com/ww/downloads/battery-test-summary>

Please refer to the following reference information about concrete ways of transportation. Actual content of packaging label and shipping documents varies by shipping companies. Make sure to confirm in advance with your shipping company.

Information of reference

	Reference	Packing Instruction(PI)/ Special provision(SP)	Note
Air transport	IATA DGR	PI 968 Section A	Cells, Cargo Aircraft only; Net quantity per package Max. 35kg
		PI 968 Section B	Cells, Cargo Aircraft only; net quantity per package Max. 2.5kg
		PI 968 Section	Cells, Cargo Aircraft only, not more than one package in any single consignment; net quantity per package Max. 2.5kg
		PI 969 Section	Cells packed with equipment
		PI 970 Section	Cells contained in equipment, button cell batteries
Marine transport	IMDG Code	SP 188	

15. Regulatory information

- IATA Dangerous Goods Regulations Edition 62 (IATA DGR)
- IMO International Maritime Dangerous Goods Code 2018 Edition (IMDG Code)
- UN Recommendations on the Transportation of Dangerous Goods, Model Regulations
- UN Recommendations on the Transportation of Dangerous Goods, Manual of Tests and Criteria
- EU Battery Directive (2006/66/EC, 2013/56/EU)
- Regulation (EC) No. 1907/2006 on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- State of California Regulations - Best management practices for Perchlorate Materials
- Act on Preventing Environmental Pollution of Mercury (Japan)

16. Other information

This PSDS is provided to customers as reference information in order to handle batteries safely.

It is necessary for the customer to take appropriate measures depending on the actual situation such as the individual handling, based on this information.

In California only, packages that contain CR lithium coin cells and the Owners/Operating Instructions of products that contain CR lithium coin cells must include the following statement:

"Perchlorate Material - special handling may apply,

See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>".

The effective date for this Perchlorate label is July 1, 2006 for non-consumer products and January 1, 2007 for consumer products.

August 29, 2017

Relationship between Batteries and the RoHS Directive and the EU Battery Directive

The RoHS directive (2002/95/EC), RoHS 2 directive (2011/65/EU), and Directive (EU) 2015/863 does not apply to batteries. Batteries are covered by the EU Battery Directive (2013/56/EU). While batteries and battery packs are exempt from the requirements of the RoHS directive, Panasonic has committed to eliminate the use of these RoHS substances from our products.

We, Panasonic Corporation, hereby declare that our products indicated below are currently in compliance with EU Directive 2002/95/EC, 2011/65/EU, and 2015/863, with respect to the following 10 substances:

- 1) Lead (Pb)
- 2) Cadmium (Cd)
- 3) Mercury (Hg)
- 4) Hexavalent chromium (Cr(VI))
- 5) Polybrominated biphenyls (PBB)
- 6) Polybrominated diphenyl ethers (PBDE)
- 7) Bis(2-ethylhexyl) phthalate (DEHP)
- 8) Benzyl butyl phthalate (BBP)
- 9) Dibutyl phthalate (DBP)
- 10) Diisobutyl phthalate (DIBP)

RoHS Compliance by Product Type:

BR Series – Poly-carbonmonofluoride Lithium Batteries
BR"A" Series – Extended Temperature Range Coin Cells
CR Series – Manganese Dioxide Lithium Batteries
CG Series – Lithium Ion Pin Cell
VL Series – Vanadium Rechargeable Lithium Batteries
ML Series – Manganese Rechargeable Lithium Batteries
ML-R Series – Reflow Solderable ML Lithium Batteries (discontinued)
NBL Series – Niobium Rechargeable Lithium Batteries (discontinued)
MT Series – Titanium Lithium Batteries
HHR & BK – Nickel Metal Hydride Rechargeable Cells - NiMH
LR – Alkaline Batteries
CGA, CGR, CG, NCA, NCR, UF, UFP, UR – Lithium Ion Cells

Exceptions

LC-R, LC-P, LC-X, LC-XC, UP-RW, UP-VW & UP-PW - Valve Regulated Lead Acid Batteries (VRLA)
P Series - Nickel Cadmium Cells - NiCd (discontinued)
Cadnica – Nickel Cadmium Cells - NiCd
UM Series, R1NW & 6F22NW - Carbon Zinc Batteries

Valve Regulated Lead Acid batteries, Nickel Cadmium batteries and Carbon Zinc batteries have lead or cadmium levels exceeding the agreed levels under the requirements of the ROHS Directive. They can, however, continue to be sold in the EU as long as they are sold in compliance with the EU Battery Directive.

Considerations

Batteries are specifically not covered by the RoHS Directive. The Technical Adaptation Committee (TAC) under the WEEE and RoHS Directives concluded in their December 17, 2003 meeting that batteries were not covered by either Directive.

Please refer to the EU Commission WEEE FAQ section 1.9 for reference.
http://ec.europa.eu/environment/waste/pdf/faq_www.pdf

February 26, 2016

EU Battery Directive (2013/56/EU)

We, Panasonic Industrial Devices Sales Company of America, hereby declare that our products indicated below are in compliance with EU Directive 2006/66/EC as amended by Directive 2008/12/EC, 2008/103/EC and 2013/56/EU. Please note that the NiMH, Li Ion, and some Alkaline cells are not compliant due to labeling.

Mercury and Cadmium

Panasonic's batteries listed below do not contain Mercury (Hg) greater than 5 ppm or Cadmium (Cd) greater than 20 ppm.

Ni-Cd can continue to be used in emergency and alarm systems, including emergency lighting.

Ni-Cd can continue to be used in medical equipment.

Ni-Cd are banned from the use of cordless tools effective December 31, 2016.

Labeling

The EU battery directive requires a crossed-out dustbin recycling mark on some product.

For cylindrical batteries, this symbol must be greater than 1.5% of the surface area. On batteries where the mark will be less than 0.5 cm x 0.5 cm, no marking is required on the battery, but still must be marked on the packaging with a minimum size of 1 cm x 1 cm. This size requirement would exclude all our Panasonic lithium coin cells and most of the lithium cylindrical cells.



Please see the specific cell type below for the description of the dustbin marking.

The following **lithium cylindrical cells** and their various tab configurations will have the dustbin marking on the battery.

BR Cylindrical Cells - Poly-carbonmonofluoride Lithium Batteries

BR-C, BR-A, BR-1/2AA, BR-2/3A, BR-AG, BR-2/3AG

CR Cylindrical Cells – Manganese Dioxide Lithium Batteries

CR-2PE, CR-123APA, CR-P2PA, 2CR-5MPA, CR-2/3A, CR-AG

The following **lithium coin cell** batteries and their various tab configurations will be marked on the packaging only, no marking will appear on the cell due to the size requirements listed above.

BR Coin Cells - Poly-carbonmonofluoride Lithium Batteries

BR1220, BR1225, BR1632, BR2032, BR2325, BR2330, BR3032

BR”A” Coin Cells – Extended Temperature Range Coin Cells

BR1225A, BR1632A, BR2330A, BR2450A, BR2477A

BR Pin-Type Cells - Poly-carbonmonofluoride Lithium Batteries

BR425, BR435

CR Coin Cells – Manganese Dioxide Lithium Batteries

CR1025, CR1216, CR1220, CR1612, CR1616, CR1620, CR1632, CR2012, CR2016, CR2025, CR2032, CR2330, CR2354, CR2412, CR2450, CR2477, CR3032

CG Pin-Type Cells – Lithium Ion Batteries

CG-320, CG-425, CG-435

VL Coin Cells – Vanadium Rechargeable Lithium Batteries

VL621, VL1220, VL2020, VL2320, VL2330, VL3032

ML Coin Cells – Manganese Rechargeable Lithium Batteries

ML421, ML614, ML621, ML920, ML1220, ML2020

MT Coin Cells – Titanium Lithium Batteries

MT516, MT616, MT621, MT920

Valve Regulated Lead Acid Batteries

Panasonic **Lead acid batteries** are marked with the crossed out dustbin with the lead (Pb) chemical symbol.

LC-R, LC-P, LC-X, LC-V & UP-VW - Valve Regulated Lead Acid Batteries (VRLA)

Nickel Metal Hydride and Lithium Ion cells

Panasonic **Nickel Metal Hydride** cells and **Lithium Ion** cells **will not** have the crossed out dustbin. These cells are intended to be used in battery pack assemblies and only the outer battery pack must be marked with the dustbin. The cells, however, are not compliant with the EU Battery Directive.

HHR and BK– Nickel Metal Hydride cells

CGA, CGR, NCA, NCR, UF, UFP, and UR – Li Ion cylindrical and prismatic cells

Nickel Metal Hydride cells compliant with the EU Battery Directive

BK-80AAAB9B and BK-200AAB9B

Alkaline Batteries

Panasonic **Alkaline Plus** product line **will not** have the crossed out dustbin. The new Panasonic Industrial label, effective May 2009, will have the crossed out dustbin.

Alkaline Product compliant with the EU Battery Directive

LR20XWA, LR14XWA, LR6XWA, LR03XWA, 6LR22XWA – Alkaline Industrial label

6LR61XWA – Old Alkaline 9 volt Industrial label

Please send any questions regarding this notice to oembatteries@us.panasonic.com.

Reference:

Original text of the amended EU Battery Directive

<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013L0056&from=EN>

EPBA Battery guideline for marking

<http://www.epbaeurope.net/batterymarking.html>

BBCV2.MH12210 - LITHIUM BATTERIES - COMPONENT

Lithium Batteries - Component

See General Information for Lithium Batteries - Component

PANASONIC CORPORATION OF NORTH AMERICA
Product Safety & Compliance Dept
Two Riverfront Plaza
9th Fl
Newark, NJ 07102-5490 USA

MH12210

Model No.	Primary Type ^[a]	Max Abnormal Charging Current mA	Max Abnormal Charging Voltage, V dc	Replacement ^{[b],[c]}
2CR5 (g), 2CR-5 (g)	Lithium/manganese dioxide (Cylindrical)	25	-	User
2CR5M*(g), 2CR-5M*(g)	Lithium/manganese dioxide (Cylindrical)	25	-	User
BR-1/2A*	Lithium/polycarbon monofluoride (Cylindrical)	5	-	User
BR-1/2AA*	Lithium/polycarbon monofluoride (Cylindrical)	5	-	User
BR-1/2AAK*	Lithium/polycarbon monofluoride (Cylindrical)	5	-	User
BR-2/3A*	Lithium/polycarbon monofluoride (Cylindrical)	10	-	User
BR-2/3AA*	Lithium/polycarbon monofluoride (Cylindrical)	5	-	User
BR-2/3AG*	Lithium/polycarbon monofluoride (Cylindrical)	10	-	User
BR-2/3AGCT4A	Lithium/polycarbon monofluoride (Pack)	20	-	Technician
BR-2/3AH*	Lithium/polycarbon monofluoride (Cylindrical)	10	3.3	User
BR-A*	Lithium/polycarbon monofluoride (Cylindrical)	15	-	Technician
BR-AA*	Lithium/polycarbon monofluoride (Cylindrical)	15	-	User

CR-2012/S8A*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2012/S8AE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2012/S8B*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2025*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2025/S7A*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2025/S7AE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2025/S7B*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2025/S7BE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S5L*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S5LE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S7A*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S7AE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S7F*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2032/S7K*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2330*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2330/S7B*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2330/S7BE*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2330/S7C*	Lithium/manganese dioxide (Coin)	10	-	User
CR-2330/S7CE*	Lithium/manganese dioxide (Coin)	10	-	User

VL1216*	Lithium alloy (Coin)	300	-	1
VL1220*	Lithium alloy (Coin)	300	-	1
VL1220/S55*	Lithium alloy (Coin)	300	-	1
VL2020*	Lithium alloy (Coin)	300	-	1
VL2320*	Lithium alloy (Coin)	300	-	1
VL2330*	Lithium alloy (Coin)	300	-	1
VL2330/SGA*	Lithium alloy (Coin)	300	-	1
VL3032*	Lithium alloy (Coin)	300	-	1
VL621*	Lithium alloy (Coin)	300	-	3

[a] These cells and batteries are not rechargeable. The circuit containing these cells or batteries is to contain a protective component that prevents charging. The circuitry is to include a current-limiting component intended to protect the cell or battery, in the event the protective component malfunctions, from a charging current in excess of the maximum abnormal charging current indicated.

[b] User - These primary cells and batteries are intended for use in applications subject to replacement by a user.

[c] Technician - These primary cells and batteries are intended for use in applications subject to replacement only by a trained service technician.

[d] These cells and batteries are rechargeable. The circuitry containing these cells or batteries is to contain protective components intended to protect the cells or batteries from currents in excess of the maximum charging current and voltage indicated.

[e] The Max Charging Voltage noted in the column is the maximum voltage employed during the abnormal charging test of the secondary lithium ion cell. However, the maximum recommended charging voltage for lithium ion cells is 4.2 V, unless indicated otherwise.

[f] Test Compliance - The cells comply with the tests in UL 1642 as noted:

1 - Complies with all single-cell tests

2 - Complies with all single-cell tests except the impact test

3 - Complies with all single-cell tests except the projectile test

4 - Complies with all single-cell tests except the crush test



(g) - These cells can be used in series with a maximum of three cells of the same model number.

(h) - These cells can be used in series with a maximum of two cells of the same model number or in parallel with a maximum of four cells of the model number.

(i) - Models are allowed to use temperature of 150 C (302 F) maximum.

* - Cell model numbers may be followed by an optional slash (/) and single or multiple alphanumeric characters (i.e. letters and/or numbers), which denote optional features such as various mounting tabs, connecting leads or plugs, packaging, etc.

Note - The VL, ML, MT, NBL, MS and CTL cell model prefix may or may not be followed by a "-" (i.e. VL-621 is identical to VL621).

Marking: Company name or tradename "MH12210", "Matsushita Electric", "Panasonic" or trademark  , Recognized Component Mark,  on the cell or smallest shipping package containing the cell.

Last Updated on 2020-01-03

Aug 27, 2019

Notice of accidental ingestion prevention mark to lithium coin battery

Thank you very much for your support to Panasonic battery. In accordance with the revision of the IEC international standards on the safety of lithium primary batteries (IEC 60086-4), the design of engraved mark will be changed in some part numbers, as below.

■ Background

Many accidents have occurred involving children swallowing button-type batteries. Serious cases have been reported, especially by accidental ingestion of "coin-type lithium batteries", and among them fatal accidents have also been reported. Considering such situations, consumer groups and industry groups in each global region have already established guidelines for sales to the consumer market. And each battery company including Panasonic has introduced safety packages in compliance with the guidelines. The accidental ingestion prevention alert icon design was approved as an international standard on March 22, 2019 in the international standard IEC 60086-4 Edition 5, and we would like to promote the changeover to the new design as follows:

■ Applicable part number

CR1612, CR1616, CR1620, CR1632, CR2012, CR2016, CR2025, CR2032, CR2330, CR2354,
CR2412, CR2450, CR2477, CR3032,
BR2032, BR2325, BR2330, BR3032

■ Our policy

We will change the current design to the new design with the ingestion prevention mark added for all sales routes (industrial use, consumer use). Subject products are listed above.

※We will change the design, but part numbers will not change.

※Products with a diameter less than 16mm and products with tabs will not change
(Exceptions: CR2016 and CR2025 with tabs will be changed)

■ Schedule

ETD Jakarta deliveries from April 2020

■ Drawing of the design change : See attached sheet





■ There is no change in the performance of battery.

Should you need any further information, please do not hesitate to contact us **by the end of Aug .**

If no reply by Sep 15th, we would regard that the change is approved by the customer.

Thank you for your kind understanding and cooperation.

Label design change image (typical example)

	Current	New
CR1616		
CR2032		
BR2032	