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PRODUKTSICHERHEITSDATENBLATT

1 Bezeichnung des Produkts und des Unternehmens

Produktbezeichnung: Lithium-Mangandioxid-Batterie
Name des Unternehmens: Panasonic Corporation, Automotive & Industrial Systems
Company Anschrift: 1-1 Matsushita-cho, Moriguchi City, Osaka, 570-8511, Japan
Geschäftsbereich: Energy Device Division
Abteilung: Engineering Department
Telefonnummer: +81 6 6994 4537

2 Mögliche Gefahren

GHS-Einstufung: Nicht zutreffend.

Gefahr: Elektrolyt und Lithiummetall sind entflammbar.
Es besteht Explosionsgefahr, wenn Batterien in Feuer geworfen oder über 100 °C erhitzt werden.
Wenn Batterien zusammen gelagert werden, kann es zu externen Kurzschlüssen, Hitzebildung, Brand oder Explosionen kommen.

Toxizität: Die bei der Verbrennung von Batterien freigesetzten Dämpfe können Augen, Haut und Atemwege reizen.

3 Zusammensetzung/Angaben zu Bestandteilen

Komponente	Material	CAS-Nr.	Inhalt
Positive Elektrode	Mangandioxid	1313-13-9	12~50 Gew%
Negative Elektrode	Lithiummetall	7439-93-2	0,5~6 Gew%
Elektrolyt	1,2-Dimethoxyethan	110-71-4	1,5~3,5 Gew%
	Lithiumperchlorat	7791-03-9	0,2~0,7 Gew%
	Organisches Elektrolyt	-	2,5~7 Gew%
Sonstige (Stahl- oder Kunststoffteile)	Stahl	7439-89-6, 7440-47-3	30~85 Gew%
	Polypropylen	9003-07-0	0,5~10 Gew%

Lithiumgehalt pro Zelle

Modell- nummer	Lithium -	Modell- nummer	Lithium -	Modell- nummer	Lithium -	Modell- nummer	Lithium -
CR1025	0,008	CR1620	0,02	CR2330	0,08	CR2412	0,03
CR1216	0,008	CR1632	0,04	CR2354	0,17	CR2430	0,09
CR1220	0,01	CR2012	0,02			CR2450	0,18
CR1612	0,01	CR2016	0,03			CR2450A	0,17
CR1616	0,02	CR2025	0,05			CR2477	0,29
		CR2032	0,07			CR3032	0,15
		CR2050B	0,10				

4 Erste-Hilfe-Maßnahmen

Das Produkt enthält organisches Elektrolyt. Im Fall eines Austritts von Elektrolyt aus der Batterie sind die nachstehend genannten Maßnahmen zu ergreifen.

- | | |
|---------------|--|
| Augenkontakt: | Augen sofort mindestens 15 Minuten lang mit sauberem Wasser spülen und keinesfalls reiben. Umgehende medizinische Behandlung einholen. Bei Unterlassung angemessener Maßnahmen kann es zu Augenschäden kommen. |
| Hautkontakt: | Betroffene Hautpartien sofort mit reichlich Wasser und Seife waschen. Bei Unterlassung angemessener Maßnahmen kann es zu Hautreizungen und Verätzungen kommen. |
| Inhalation: | Betroffene Person sofort an die frische Luft bringen. Umgehende medizinische Behandlung einholen. |

5 Maßnahmen zur Brandbekämpfung

- | | |
|-----------------|--|
| Löschverfahren: | Da beim Brand von Batterien Dämpfe freigesetzt werden, die Augen, Nase und Atemwege reizen, stets mit der Windrichtung löschen. Ggf. Atemschutz anlegen. |
| Löschmittel: | Geeignete Löschmittel sind alkoholbeständiger Schaum und Trockensand. |

6 Maßnahmen bei unbeabsichtigter Freisetzung (im Fall eines Austritts von Elektrolyt aus der Batterie)

- Mit einem saugfähigen Tuch aufnehmen; Tuch als entflammbar behandeln und ordnungsgemäß entsorgen.
- Die Batterie aus der Nähe des Feuers entfernen.

7 Handhabung und Lagerung

- Beim Verpacken der Batterien keinen Kontakt zwischen den Batterieanschlüssen oder den Batteriepolen und anderen Metallen zulassen. Batterien in unterteilte Kartons oder einzeln in Plastikbeutel packen, sodass keine Berührung zwischen den Batterien möglich ist.
- Robuste Kartons verwenden, damit die Batterien nicht durch Vibrationen, Stöße, Stürze oder Stapeln während des Transports beschädigt werden.
- Batterien nicht wiederaufladen. Batterien nicht verformen.
- Keinesfalls unterschiedliche Arten von Batterien gemeinsam verwenden.
- Keine Lötarbeiten direkt an Batterien vornehmen.
- Bei Lagerung und Transport kein Wasser in die Verpackung eindringen lassen.
- Batterien nicht bei hohen Temperaturen oder in direktem Sonnenlicht lagern.
- Bitte auch Orte mit hoher Luftfeuchtigkeit vermeiden. Batterien nicht Kondensation, Regen oder Minustemperaturen aussetzen.

8 Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstung

(im Fall eines Austritts von Elektrolyt aus der Batterie)

Zulässige Konzentration:	Keine Angaben in ACGIH-Richtlinien.
Anlagen:	Angemessene Belüftung, z. B. durch Ventilatoren in Lagerräumen.
Schutzkleidung:	Umgebungsluftunabhängiger Atemschutz gegen organische Gase, Augenschutz und Schutzhandschuhe.

9 Physikalische und chemische

Eigenschaften

Erscheinungsbild:	Knopfzelle
Spannung:	3 Volt

10 Stabilität und Reaktivität

Die Batteriefunktion beruht auf einer chemischen Reaktion, daher gelten Batterien als Chemieerzeugnisse. Die Leistung der Batterie lässt im Laufe der Zeit nach, selbst wenn sie gelagert und nicht verwendet wird. Darüber hinaus kann der Einsatz unter Missachtung der Bedingungen für Aspekte wie Entladung oder Umgebungstemperatur die Lebensdauer der Batterie verkürzen, oder das Gerät, in dem die Batterie verwendet wird, kann durch den Austritt von Elektrolyt beschädigt werden.

11 Toxikologische Angaben (im Fall eines Austritts von Elektrolyt aus der Batterie)

Akute Toxizität:	Oral (Ratte) LD50 > 2.000 mg/kg
Körpergewicht (Schätzwert)	
Reizwirkung:	Reizt die Augen und die Haut.
Mutagenität:	Keine
Angaben.	
Chronische Toxizität:	Keine
Angaben.	

12 Umweltbezogene Angaben

Bei einer Entsorgung von Altbatterien in Mülldeponien besteht die Gefahr der Gehäusekorrosion und des Austritts von Elektrolyt.

13 Hinweise zur Entsorgung

Altbatterien sind den örtlichen Vorschriften entsprechend zu entsorgen.

14 Angaben zum Transport

Beim Transport größerer Mengen von Batterien per Schiff, Lkw oder Bahn weder hohen Temperaturen noch Kondensation aussetzen.

Verpackungen während des Transports vor Stürzen und Schäden schützen.

Korrekte Versandbezeichnung: Lithium
Metall-Batterien

UN-Nummer, UN-Klasse: UN3090, Klasse 9 (für Luftfrachttransport gemäß PI968, Teil IA oder IB)

: Ausnahme (für Seefracht und Luftfracht gemäß Teil II von PI 968, 969 oder 970)

Obwohl die Zellen als Lithium-Metall-Batterien (UN3090 oder 3091) klassifiziert sind, finden einige Anforderungen der Gefahrgutverordnungen keine Anwendung, weil die folgenden Voraussetzungen erfüllt sind:

1. Der Lithiumgehalt der einzelnen Zellen überschreitet nicht 0,3 g.
2. Jede Zelle entspricht nachweislich den Prüfanforderungen laut Empfehlungen für die Beförderung gefährlicher Güter – Handbuch über Prüfungen und Kriterien der Vereinten Nationen, Teil III, Abschnitt 38.3.
3. Jede Zelle wurde in einem nach ISO9001 zertifizierten Werk hergestellt.

Beachten Sie die folgenden Referenzinformationen zu den Transportverfahren. Die konkreten Angaben auf den Verpackungsetiketten und Versandunterlagen variieren je nach Transportunternehmen. Überprüfen Sie im Vorfeld des Versands die Anforderungen Ihres Transportunternehmens.

Referenzinformationen

	Referenz	Verpackungsanweisung (PI)/	Hinweis
Luftfrachttransport	IATA (2)(5)	PI 968, Teil I A	Zellen, „Cargo Aircraft Only“ (nur für Frachtflugzeuge), Netto-Stückzahl pro Packung
		PI 968, Teil I B	Zellen, „Cargo Aircraft Only“ (nur für Frachtflugzeuge), Netto-Stückzahl pro Packung
		PI 968, Teil II	Zellen, „Cargo Aircraft Only“ (nur für Frachtflugzeuge), maximal ein Packstück pro Sendung; Netto-Stückzahl pro Packung
		PI 969, Teil II	Zellen mit Ausrüstung verpackt
		PI 970, Teil II	Zellen in Ausrüstungen, Knopfzellen
Seefrachttransport	IMDG (3)	SP 188	

15 Rechtsvorschriften

IATA Gefahrgutvorschriften

IMDG-Code – Gefahrgutkennzeichnung der Internationalen Seeschifffahrts-Organisation (IMO)

16 Sonstige Angaben

Dieses Sicherheitsdatenblatt dient Kunden lediglich als Anhaltspunkt für den sicheren Umgang mit Batterien.

Der Kunde muss auf Grundlage dieser Angaben die geeigneten Maßnahmen für die jeweiligen Umstände ergreifen.

Nur in Kalifornien müssen Packungen, die CR Lithium-Knopfzellen enthalten, sowie die Bedienungsanleitungen für Produkte, die CR Lithium-Knopfzellen enthalten, mit dem folgenden Vermerk versehen sein: „Material enthält Perchlorat. Unter Umständen müssen entsprechende Vorsichtsmaßnahmen getroffen werden. Siehe www.dtsc.ca.gov/hazardouswaste/perchlorate“

Dieser Perchlorat-Hinweis ist seit dem 1. Juli 2006 für Nicht-Konsumgüter und seit dem 1. Januar

2007 für Konsumgüter vorgeschrieben.

Referenzen

- (1) Modellvorschriften der Vereinten Nationen für den Gefahrguttransport
 - (2) IATA Gefahrgutvorschriften, 57. Ausgabe (2016)
 - (3) IMDG-Code – Gefahrgutkennzeichnung der Internationalen Seeschifffahrts-Organisation (IMO), 2014
 - (4) Empfehlungen für die Beförderung gefährlicher Güter – Handbuch über Prüfungen und Kriterien der Vereinten Nationen
 - (5) IATA Gefahrgutvorschriften, 57. Ausgabe, in Kraft seit 1. Januar 2016
- NACHTRAG

(ENDE)

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致 上海化工研究院检测中心

首先感谢贵院一直以来对我公司的大力支持！
当前我公司因下记客户的要求给予发行授权书；
日后，该客户到贵院申请『运输条件化工鉴定证书』的事项时请求给予受理此申请业务，再次拜托。

パナソニック株式会社
Panasonic Corporation
オートモーティブ&インダストリアルシステムズ社
Automotive & Industrial Systems Company
エナジーデバイス事業部
Energy Device Business Division
技術部
Engineering Department

長谷 洋志

2016-11-08

授权书

致 上海化工研究院检测中心

兹有我公司提供的如下表所示型号的电池 UN38.3 检验报告，
及 1.2 米落下试验报告，现授权 松下産業科技股份有限公司 使用。
特此证明。

型号	文书名称	文书编号
CR-2032L/BN	UN38.3 检验报告	CP0008-10
CR-2032L/BN	1.2 米落下试验报告	CPC160028-1

松下电器产业株式会社 检验报告

パナソニック株式会社
オートモーティブ & インダストリアルシステムズ社
エナジーデバイス事業部

Panasonic Corporation

No. CP0008-10

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样品名称 Name of Sample	中文 Chinese	锂电池 CR2032 (3.0V 225mAh)			
	英文 English	Lithium Battery CR2032 (3.0V 225mAh)			
送检单位 Consignor	松下电器产业株式会社/ Panasonic Corporation				
生产单位 Manufacturer	松下电器产业株式会社/ PT. Panasonic Gobel Energy Indonesia				
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"				
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"				
样品外觀 Appearance	硬币形 Coin type				
检测起迄日期 Test Date	2008/4/1-2008/8/5	样品编号 Sample No	/		
检测项目 Test Items	高度模拟试检; 热测试; 振动试检; 冲击试检; 外短路试检; 冲撞试检; 强制放电试检 Altitude simulation, Thermal test, Vibration test, Shock, External short circuit, Impact, Forced discharge				
检验结论 Conclusion	受检样品通过 UN38.3检测, 检测合格。 The sample has passed the test items of UN38.3. 日期(date): 2008年(y) 08月(m) 5日(d)				
备注 Remark	/				
受检单位地址 Consignor Address	日本: 大阪府守口市松下町1番1号 1-1 Matsushita-cho, Moriguchi City Osaka, Japan	邮政编码 Post Code	570-8511		

批准人职务(the title of approver):

- ☒ 质量保证部长(Director of Quality Assurance)
☐ 质量保证科长(Manager of Quality Assurance)
☐ 质量保证主任工程师(Chief Engineer of QA)

批准 Approver: J. Okamoto

审核 Checker: T. Shimizu

主检 Appraiser: Y. Matsuo

松下电器产业株式会社 检验报告

Panasonic Corporation

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序号 No	检测项目 Name of Test Items	标准要求或标准款号 Standard Requirement or the Clause Number of Standard	检验结果 Test Result	本项结论 Test Conclusion	备注 Remark
1	高度模拟试检 Altitude simulation	试检和标准手册38.3(4 th) 38.3 Test T-1 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-1	见附表1 See Appendix 1	合格 Passed	/
2	热测试检 Thermal test	试检和标准手册38.3(4 th) 38.3 Test T-2 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-2	见附表2 See Appendix 2	合格 Passed	/
3	振动试检 Vibration test	试检和标准手册38.3(4 th) 38.3 Test T-3 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-3	见附表3 See Appendix 3	合格 Passed	/
4	冲击试检 Shock	试检和标准手册38.3(4 th) 38.3 Test T-4 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-4	见附表4 See Appendix 4	合格 Passed	/
5	外短路试检 External short circuit	试检和标准手册38.3(4 th) 38.3 Test T-5 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-5	见附表5 See Appendix 5	合格 Passed	/
6	冲撞试检 Impact	试检和标准手册38.3(4 th) 38.3 Test T-6 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-6	见附表6 See Appendix 6	合格 Passed	/
7	强制放电试检 Forced discharge	试检和标准手册38.3(4 th) 38.3 Test T-8 UN Manual of Tests and Criteria Section (4 th) 38.3 Test T-8	见附表7 See Appendix 7	合格 Passed	/
检验环境条件 / Test Environment Condition		环境温度: 15-25°C / Ambient Temperature: 15-25°C			
分包检验状况 Subcontracted Test Condition	检测项目 Test Items	/			
	分包实验室 Subcontracted Laboratory	名称 Name	/	邮编 Post Code	/
		地址 Address	/	电话 Tel	/

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-----附表1

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Appendix 1

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序号 No.	T-1	检测项目名称 Name of Test Items		高度模拟试检 Altitude simulation				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.203	2.866	3.204	0.00	100.0	0
2	未放电 Undischarged	2.869	3.203	2.869	3.205	0.00	100.1	0
3	未放电 Undischarged	2.896	3.206	2.896	3.207	0.00	100.0	0
4	未放电 Undischarged	2.866	3.206	2.865	3.207	0.03	100.0	0
5	未放电 Undischarged	2.890	3.205	2.890	3.206	0.00	100.0	0
6	未放电 Undischarged	2.870	3.206	2.869	3.207	0.03	100.0	0
7	未放电 Undischarged	2.873	3.203	2.873	3.205	0.00	100.1	0
8	未放电 Undischarged	2.871	3.204	2.870	3.206	0.03	100.1	0
9	未放电 Undischarged	2.878	3.206	2.877	3.208	0.03	100.1	0
10	未放电 Undischarged	2.868	3.205	2.868	3.206	0.00	100.0	0
11	完全放电 Fully Discharged	2.869	—	2.868	—	0.03	—	0
12	完全放电 Fully Discharged	2.845	—	2.844	—	0.04	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.838	—	2.838	—	0.00	—	0
15	完全放电 Fully Discharged	2.900	—	2.899	—	0.03	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.842	—	2.842	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.881	—	0.00	—	0
20	完全放电 Fully Discharged	2.892	—	2.892	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

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-----附表2

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Appendix 2

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序号 No.	T-2	检测项目名称 Name of Test Items		热测试检 Thermal test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.204	2.866	3.233	0.00	100.9	0
2	未放电 Undischarged	2.869	3.205	2.869	3.232	0.00	100.8	0
3	未放电 Undischarged	2.896	3.207	2.895	3.233	0.03	100.8	0
4	未放电 Undischarged	2.865	3.207	2.865	3.234	0.00	100.8	0
5	未放电 Undischarged	2.890	3.206	2.890	3.234	0.00	100.9	0
6	未放电 Undischarged	2.869	3.207	2.869	3.235	0.00	100.9	0
7	未放电 Undischarged	2.873	3.205	2.873	3.234	0.00	100.9	0
8	未放电 Undischarged	2.870	3.206	2.870	3.234	0.00	100.9	0
9	未放电 Undischarged	2.877	3.208	2.877	3.236	0.00	100.9	0
10	未放电 Undischarged	2.868	3.206	2.867	3.235	0.03	100.9	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.844	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.838	—	2.839	—	0.00	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.842	—	2.843	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.881	—	2.880	—	0.03	—	0
20	完全放电 Fully Discharged	2.892	—	2.891	—	0.03	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

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-----附表3

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Appendix 3

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序号 No.	T-3	检测项目名称 Name of Test Items		振动试检 Vibration Test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.866	3.233	2.865	3.245	0.03	100.4	0
2	未放电 Undischarged	2.869	3.232	2.868	3.244	0.03	100.4	0
3	未放电 Undischarged	2.895	3.233	2.895	3.243	0.00	100.3	0
4	未放电 Undischarged	2.865	3.234	2.865	3.248	0.00	100.4	0
5	未放电 Undischarged	2.890	3.234	2.890	3.246	0.00	100.4	0
6	未放电 Undischarged	2.869	3.235	2.869	3.245	0.00	100.3	0
7	未放电 Undischarged	2.873	3.234	2.872	3.245	0.03	100.3	0
8	未放电 Undischarged	2.870	3.234	2.870	3.245	0.00	100.3	0
9	未放电 Undischarged	2.877	3.236	2.877	3.250	0.00	100.4	0
10	未放电 Undischarged	2.867	3.235	2.867	3.246	0.00	100.3	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.845	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.839	—	2.839	—	0.00	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.878	—	0.00	—	0
17	完全放电 Fully Discharged	2.843	—	2.843	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.880	—	0.00	—	0
20	完全放电 Fully Discharged	2.891	—	2.891	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

松下电器产业株式会社
检验报告

-----附表4

Panasonic Corporation

No. CP0008-10

Appendix 4

共9页第6页

序号 No.	T-4	检测项目名称 Name of Test Items		冲击试检 Shock Test				
样品 号码 Sample No.	样品状态 Sample State	试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
		质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.865	3.245	2.865	3.254	0.00	100.3	0
2	未放电 Undischarged	2.868	3.244	2.868	3.250	0.00	100.2	0
3	未放电 Undischarged	2.895	3.243	2.895	3.251	0.00	100.2	0
4	未放电 Undischarged	2.865	3.248	2.865	3.257	0.00	100.3	0
5	未放电 Undischarged	2.890	3.246	2.890	3.253	0.00	100.2	0
6	未放电 Undischarged	2.869	3.245	2.869	3.251	0.00	100.2	0
7	未放电 Undischarged	2.872	3.245	2.872	3.253	0.00	100.2	0
8	未放电 Undischarged	2.870	3.245	2.870	3.254	0.00	100.3	0
9	未放电 Undischarged	2.877	3.250	2.877	3.259	0.00	100.3	0
10	未放电 Undischarged	2.867	3.246	2.868	3.254	0.00	100.2	0
11	完全放电 Fully Discharged	2.868	—	2.868	—	0.00	—	0
12	完全放电 Fully Discharged	2.845	—	2.845	—	0.00	—	0
13	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
14	完全放电 Fully Discharged	2.839	—	2.838	—	0.04	—	0
15	完全放电 Fully Discharged	2.899	—	2.899	—	0.00	—	0
16	完全放电 Fully Discharged	2.878	—	2.877	—	0.03	—	0
17	完全放电 Fully Discharged	2.843	—	2.844	—	0.00	—	0
18	完全放电 Fully Discharged	2.863	—	2.863	—	0.00	—	0
19	完全放电 Fully Discharged	2.880	—	2.879	—	0.03	—	0
20	完全放电 Fully Discharged	2.891	—	2.891	—	0.00	—	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

松下电器产业株式会社 检验报告

-----附表5

Panasonic Corporation

No. CP0008-10

Appendix 5

共9页第7页

序号 No.	T-5	检测项目名称 Name of Test Items	外短路试检 External short circuit
样品号码 Sample No.	样品状态 Sample State	样品表面最高温度 Max. External Temperature(°C)	其他现象 Other Event
1	未放电 Undischarged	62.6	0
2	未放电 Undischarged	60.8	0
3	未放电 Undischarged	60.4	0
4	未放电 Undischarged	61.6	0
5	未放电 Undischarged	63.2	0
6	未放电 Undischarged	63.3	0
7	未放电 Undischarged	60.8	0
8	未放电 Undischarged	61.4	0
9	未放电 Undischarged	61.6	0
10	未放电 Undischarged	60.1	0
11	完全放电 Fully Discharged	57.2	0
12	完全放电 Fully Discharged	56.9	0
13	完全放电 Fully Discharged	57.5	0
14	完全放电 Fully Discharged	56.8	0
15	完全放电 Fully Discharged	56.7	0
16	完全放电 Fully Discharged	57.3	0
17	完全放电 Fully Discharged	57.9	0
18	完全放电 Fully Discharged	56.5	0
19	完全放电 Fully Discharged	56.3	0
20	完全放电 Fully Discharged	56.8	0
备注: D-解体, R-破裂, F-起火, 0-无解体, 无破裂, 无起火 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.			

松下电器产业株式会社
检验报告

-----附表6

Panasonic Corporation

No. CP0008-10

Appendix 6

共9页第8页

[illegible]

松下电器产业株式会社
检验报告

-----附表7

Panasonic Corporation

No. CP0008-10

Appendix 7

共9页第9页

序号 No.	T-8	检测项目名称 Name of Test Items	强制放电试检 Forced Discharge
样品号码 Sample No.	样品状态 Sample State	试检现象 Event	
31	完全放电 Fully Discharged	0	
32	完全放电 Fully Discharged	0	
33	完全放电 Fully Discharged	0	
34	完全放电 Fully Discharged	0	
35	完全放电 Fully Discharged	0	
36	完全放电 Fully Discharged	0	
37	完全放电 Fully Discharged	0	
38	完全放电 Fully Discharged	0	
39	完全放电 Fully Discharged	0	
40	完全放电 Fully Discharged	0	

备注：D-解体，F-起火，O-无解体，无起火

Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, O-No leakage, no venting,
no disassembly, no rupture & no fire.

松下电器产业株式会社
检验报告

パナソニック株式会社
オートモーティブ & インダストリアルシステムズ'社
エナジーデバイス事業部

Panasonic Corporation - Test Report

No .CPC160028-1

共2页第1页

样品名称 Name of Sample	中文 Chinese	锂电池 CR-2032L/BN			
	英文 English	Lithium Battery CR-2032L/BN			
送检单位 Consignor	松下电器产业株式会社/ Panasonic Corporation				
生产单位 Manufacturer	松下电器产业株式会社/ PT. Panasonic Gobel Energy Indonesia				
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS "				
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS "				
样品外观 Appearance	淡茶颜色直方形纸箱 Cardboard Box of Rectangular Solid of Light Brown				
检测起迄日期 Test Date	2014/11/27	样品编号 Sample No	/		
检测项目 Test Items	1.2米跌落试验、包装件毛重测试 1.2m Drop Test、Gross Weight Measure				
检验结论 Conclusion	受检样品通过所有项目检测，检测结果合格。 The sample has passed all of the testing items. 签发日期(date):2014年(y)11月(m) 28日(d)				
备注 Remark	/				
受检单位地址 Consignor Address	日本:大阪府守口市松下町1番1号 1-1 Matsushita-cho,Moriguchi City Osaka, Japan	邮政编码 Post Code	570-8511		

批准人职务(the title of approver):

- ☒ 质量保证部长(Director of Quality Assurance)
☐ 质量保证科长(Manager of Quality Assurance)
☐ 质量保证主任工程师(Chief Engineer of QA)

批准 Approver:

J. Chamoto

审核 Checker:

Handwritten signature

主检 Appraiser:

S. Arita

28. Nov. 2014 No.1

Panasonic Confidential

松下电器产业株式会社 检验报告

Panasonic Corporation - Test Report

No .CPC160028-1

共2页第2页

序号 No	检验项目名称 name of test items	标准要求或标准条款号 standard requirement or the clause number of standard	检测结果 test result		本项结论 test conclusion	备注 remark
1	1.2米 跌落试验 1.2m Drop Test	联合国《关于危险货物运输 的建议书规章范本》(15th) (以下简称: 规章范本) (15th) 3.3章188条款 Recommendations on the TRANSPORT OF DANGEROUS GOODS Model Regulations(15th) (for short: UN Model Regulations) SPECIAL PROVISION 188	面跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.	合格 Passed	/
			棱跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.		
			角跌落	包装未破裂, 内装物完好。 The package is not cracked, and the contents are not damaged and not shifted.		
2	包装件 毛重测试 Gross Weight Measure	规章范本 (15th) 3.3章188条款 UN Model Regulations(15th) SPECIAL PROVISION 188	Weight of 1box : 1.5kg(Gross)		合格 Passed	/
检验环境条件 test environment condition		环境温度: 25deg-C Ambient temperature: 25deg-C				
分包检验情况 Subcontracted test condition		检验项目 test item	/			
		分 包 实验室 Subcontracted Laboratory	名称 name	/	邮编 post code	/
			地址 address	/	电话 tel	/

28. Nov. 2014 No.2

Panasonic Confidential

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
		

Revision history		
No.	Date	Revision
1	Apr,4,2014	Issued
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

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 (Recommendable) Temperature : 5°C to 35°C, Humidity : 45~85%RH
- 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		20Ω	-
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

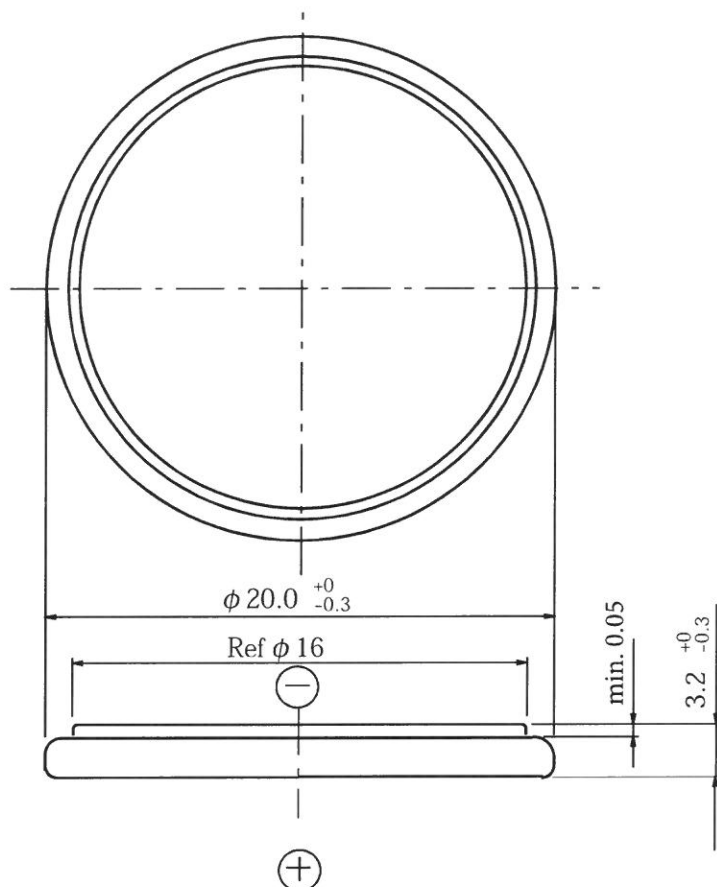
PT. Panasonic Gobel Energy Indonesia, Jl. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia

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

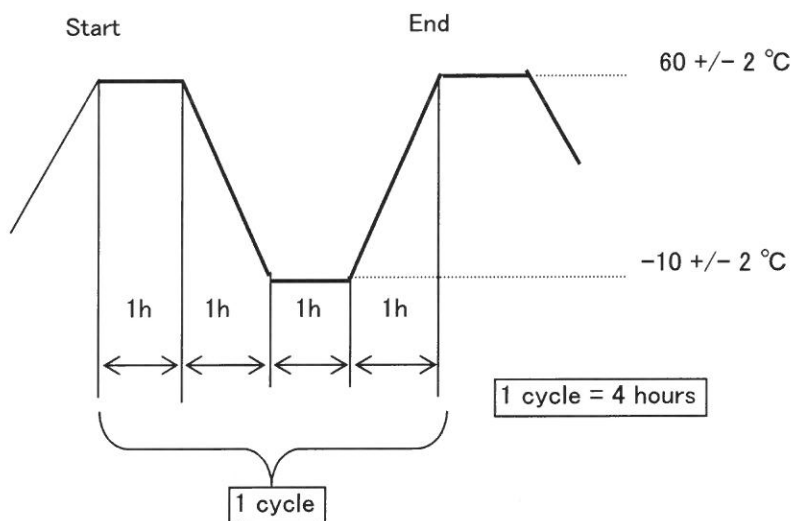


Terminal : Plus terminal material : Nickel plated stainless steel
Minus terminal material : Nickel plated stainless steel

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 interenal 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 $\pm$ 15 $^{\circ}$ C) and room humidity (65 $\pm$ 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°C.
- 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 $10^6 \Omega$, 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		13-323-10-03 (I)
MODLE NUMBER	LITHIUM BATTERY Panasonic Brand CR2032	
		SCALE 5 : 1



1/1

3					
2					
1	SEP-21-2005	INDONESIA ⇒ Made in Indonesia			
Sym.	Date of Revision	Remarks			
Date of stigation : APR - 4 - 2001		<table border="1"> <tr> <td>Described by 2006.3.21 <i>P. S. M. P. S.</i></td> <td>Checked by <i>[Signature]</i></td> <td>Approved by <i>A. Amari</i></td> </tr> </table>	Described by 2006.3.21 <i>P. S. M. P. S.</i>	Checked by <i>[Signature]</i>	Approved by <i>A. Amari</i>
Described by 2006.3.21 <i>P. S. M. P. S.</i>	Checked by <i>[Signature]</i>	Approved by <i>A. Amari</i>			

Packaging specification

Product No. : CR-2032L/BE

Drawing No.

232-BC-86

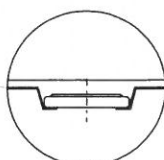
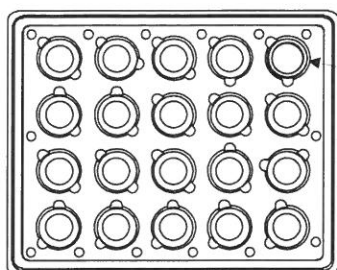
Product name : Lithium battery

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

1-Product

Refer to the product drawing

2-Tray for 20pcs.

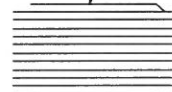


Arrange cells negative side up

× 10

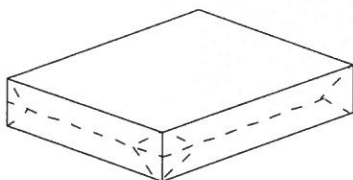


Empty tray as lid
(φ 20 type) 1pc.



10-stack piling

3-Shrink Packing for 200pcs.



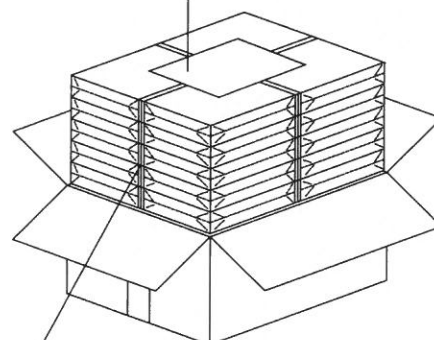
× 20



Alignment

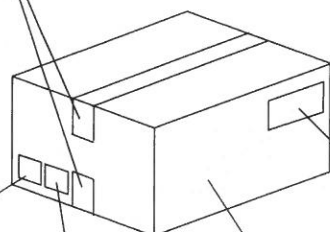
Product No.
Panasonic BRAND
200pcs. × 20
xxxx

Date of shrink packing
(4-digit)



4-Outer Carton for 4000pcs.

PP Tape (50mm)



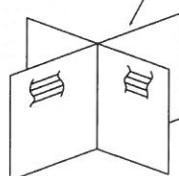
VTCP Mark

"UL Mark"
MH12210

"Dustbin Mark"



Case Mark



Packing List

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

PT. Panasonic Gobel Energy Indonesia

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
Date of stipulation	Stipulated
May . 4. 1994	Described
	<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)

Fig. 1 Short circuit

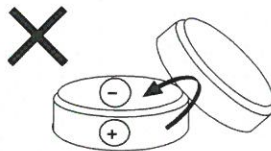


Fig. 2 stacked & jumble batteries



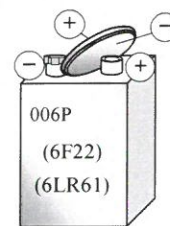
2. Do not stack and/or jumble batteries

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)



Fig. 3
Examples of forced discharge



Connection with battery charger

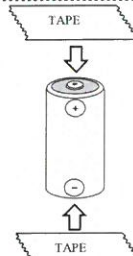
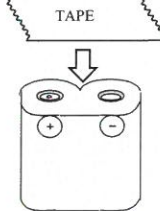
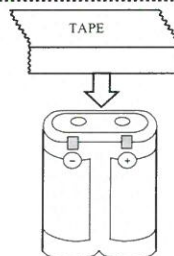
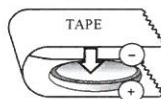
3. Do not make forced discharge batteries

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)

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



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°C (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.

Beware of Antistatic Conductive Materials

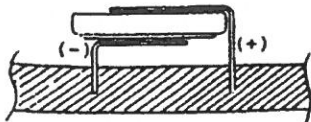
Whenever terminal-mounted backup batteries or coin-type lithium batteries contact conductive materials, they discharge. Measures to protect semiconductor parts from static damage have been implemented in plants that use such ICs and LSIs. A number of protective materials are presently being used, and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

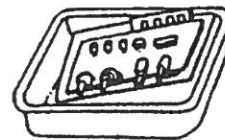
Examples

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.

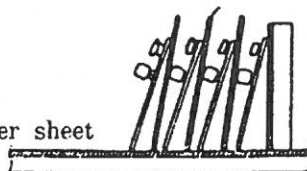


Conductive resin case

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

Spacer

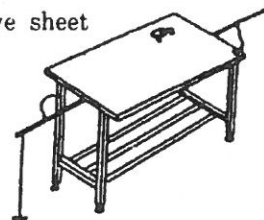
Conductive rubber sheet



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>

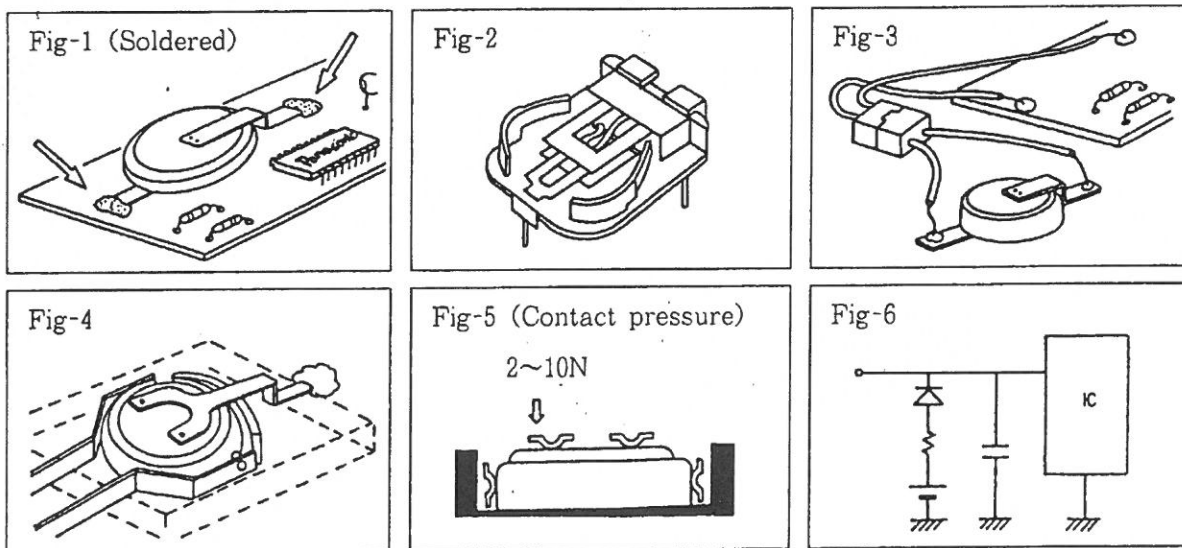
- Use a battery with solderable tab terminals, so that the battery can be permanently soldered to terminal pads on the circuit board (Fig. 1).
- If the battery requires periodic replacement, use a battery holder (Fig. 2) or a battery with in-line lead connectors (Fig. 3).

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.