Panasonic

FIND THE RIGHT BATTERY FOR YOUR APPLICATION

SHORT FORM CATALOG
INDUSTRIAL BATTERIES
FOR PROFESSIONALS

FIND THE RIGHT PAGE

ONE OF THE WORLD'S LARGEST BATTERY MANUFACTURERS

243,540
EMPLOYEES*1

54
BILLION
SALES*2
€

Panasonic Industry Europe
Headquarters in Ottobrunn
(near Munich)

Panasonic Industry
Europe Office in
Hamburg

Panasonic Industry Europe

Panasonic Industry Europe GmbH is part of the global Panasonic Group and provides industrial products and services in Europe. As a partner for the industry sector, Panasonic researches, develops, manufactures and supplies technologies that contribute to a better life and a better world. Looking back on over 100 years of engineering knowhow in electronics, Panasonic is the right supplier when it comes to engineering expertise combined with solution competence. The portfolio covers key electronic components such as batteries, devices and modules up to complete solutions and production equipment for manufacturing lines across a broad range of industries.

Panasonic Industry Europe

Batteries Automotive Industry

Panasonic Batteries

Panasonic offers a wide range of power solutions for portable and stationary applications. Our product range includes high reliability batteries such as Lithium-Ion, Lithium-Ion Pin-type, Lithium, Nickel-Metal Hydride, Nickel-Cadmium, Valve-Regulated-Lead-Acid (VRLA), Alkaline, and Zinc-Carbon. With this breadth and depth to the portfolio, we can power your business in virtually all applications.

Panasonic began manufacturing batteries in 1931 and is today the most diversified global battery producer worldwide, with an extensive network of manufacturing companies. The company employees are dedicated to research, development and production of batteries for an energised world.
Our battery production facilities use leading-edge manufacturing processes that meet the toughest quality standards. All our factories are certified to ISO standards – with ISO 9000 and ISO 14000 being the minimum benchmarks. This means each factory has its own quality and environmental management, delivers products that measure up to toughest standards of reliability.

Certifications

'Quality is our Business' – this is what Panasonic stands for. It is the principle for all our batteries and supporting services. This commitment is confirmed by numerous certifications.

*1 Employees of Panasonic Corporation
*2 Refers to the fiscal year ended March 2021
of Panasonic Corporation, based on exchange rate EUR/JPY 124.

YOUR TOOLS TO FIND

At Panasonic Batteries we offer diverse services intended to make the customer´s life easier. Find the right pictures and media files in our Mediapool, gain insight into battery technology in our handbooks and white papers and be entertained by watching amazing videos at our YouTube Channel. Finally, our Battery Finder will help you to find the right battery for your application. Test our services!

Mediapool

Download the right battery media files

The Panasonic Industry Mediapool is a complete online library of Panasonic battery images, videos, handbooks, press releases, and white papers, providing you with just the right material for all sorts of projects. The Mediapool is open to all visitors to the Panasonic website, and offers material for both print and web. The image files differ with respect to their resolution (image size) and colour space (CMYK or RGB). The library contains files in six formats: TIF, PNG, JPG, AI, PDF, and MP4. New files appear in the folder 'New files' for three months.

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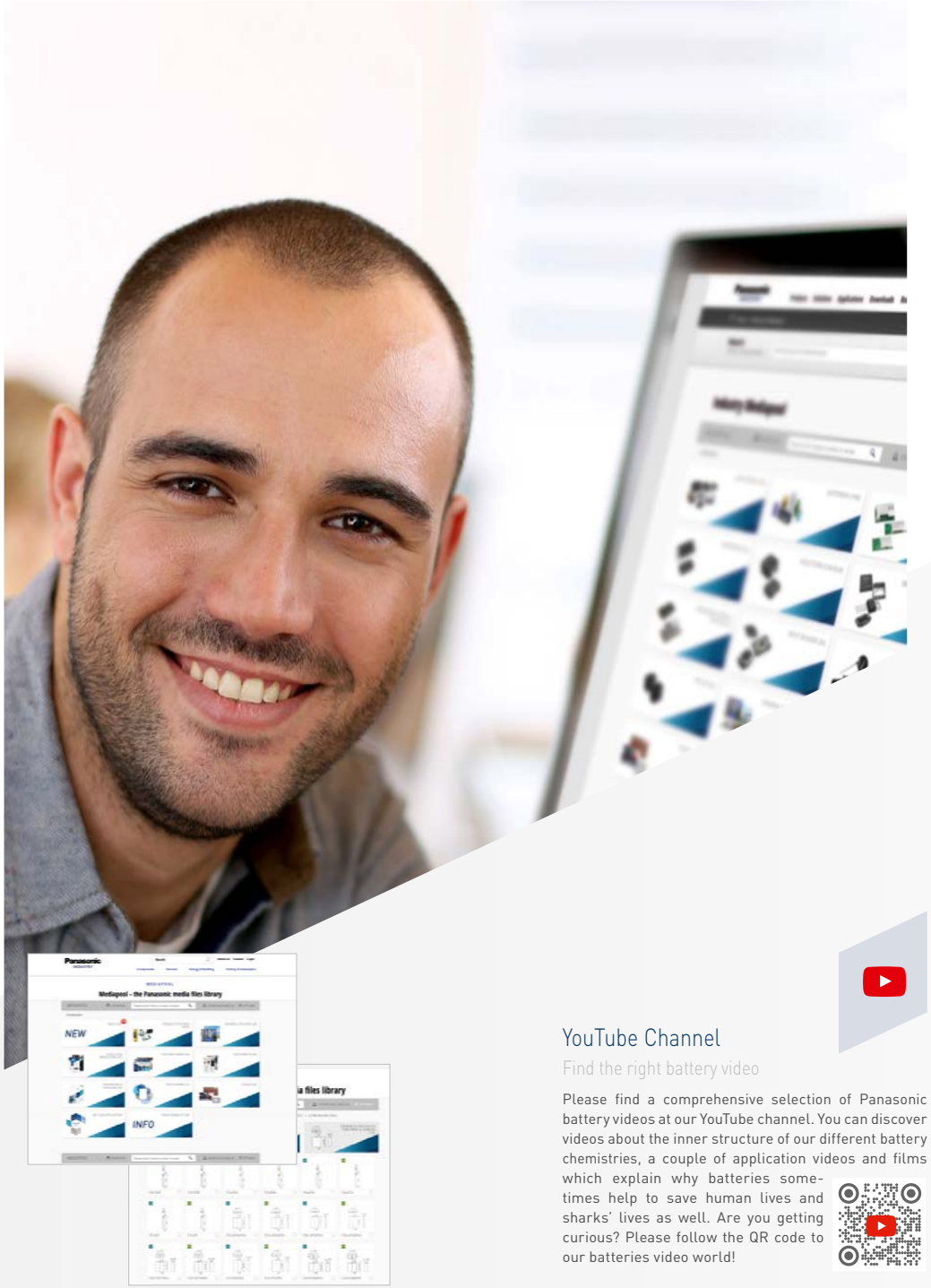

Short Form Catalog and Handbooks

Get the right product overview

Our range of digital tools to help you in your daily work are complemented by our 'classics' on paper: the Short Form Catalog and the technical handbooks on the various battery product groups. These remain popular with customers as valuable reference aids.

YouTube Channel

Find the right battery video

Please find a comprehensive selection of Panasonic battery videos at our YouTube channel. You can discover videos about the inner structure of our different battery chemistries, a couple of application videos and films which explain why batteries sometimes help to save human lives and sharks' lives as well. Are you getting curious? Please follow the QR code to our batteries video world!

White Paper

Find the right technical information

Our white papers give developers and technical professionals the opportunity to leverage the expertise of our specialists for their own projects. We have been manufacturing batteries for a number of decades, and over this time have accumulated considerable knowledge and experience that we wish to share.

NICKEL-METAL HYDRIDE

Ideal for professional applications in challenging environment

Suitable for nearly every application
High quality and reliability
Good balance in terms of capacity and lifetime
Excellent discharge characteristics

Scan QR code to view product series video.

This product shows a product with sample labeling. The same applies to all illustrations of the Ni-MH batteries on the following pages.

STANDARD TYPE N TYPE

Ni-MH battery technology is nowadays the Ni-Cd (Nickel-Cadmium) successor technology for rechargeable and portable devices. These batteries are ideal for less complex and cost sensitive applications. For example medical equipment and handheld devices.

FEATURES

- High versatility for various application
- Good balance in terms of capacity and lifetime
- Various sizes for wide range of applications

APPLICATIONS

- Medical
- Communication
- Shaver
- Toothbrush
- Navigation device
- Torchlight
- Measurement
- Two way radio
- Construction sites signaling
- UPS, etc.

MODEL NUMBER (EXAMPLE)

BK-70AA

- BK: Nickel-Metal Hydride battery
- 70: Multiply this by 10 to obtain the rated capacity (some exceptions)
- AA: Diameter: AAA, AA, A

Model number		Old model number	Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-70AAAJ		HHR-70AAAJ	AAA	AAA	1.2	700	730	10.5 +0/-0.7	44.5 +0/-1.5	12	HR11/45
BK-70AA		HHR-70AA	AA	AA	1.2	700	780	14.5 +0/-0.7	49.0 +0/-1.5	18	HR15/49
BK-110AAO		HHR-110AAO	AA	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	HR15/51
BK-150AA		HHR-150AA	AA	AA	1.2	1,500	1,580	14.5 +0/-0.7	50.5 +0/-1.5	25	HR15/51
BK-200AAP		-	AA	AA	1.2	1,900	2,000	14.5 +0/-0.7	50.5 +0/-1.5	28	HR15/51
BK-200A		HHR-200A	AA	4/5A	1.2	2,000	2,040	17.0 +0/-0.7	43.0 +0/-1.5	32	HR17/43
BK-210A		HHR-210A	A	A	1.2	2,100	2,200	17.0 +0/-0.7	50.0 +0/-2.0	36	HR17/50
BK-250A		-	A	A	1.2	2,450	2,600	17.0 +0/-0.7	50.0 +0/-2.0	37	HR17/50
BK-380A		HHR-380A	A	L-A	1.2	3,700	3,800	17.0 +0/-0.7	67.0 +0/-2.0	53	HR17/67
BK-450A		HHR-450A	LFat/A	LFat/A	1.2	4,200	4,500	18.2 +0/-0.7	67.5 +0/-1.5	61	-

BUTTON TOP TYPE B TYPE

The Panasonic button type batteries are compatible with dry batteries such as Alkaline and can be used up to 1,800 times based on IEC*1 standards. Besides they provide a high capacity level and a low self-discharge.

FEATURES

- Offers long charge / discharge cycle life, about 1,800 times
- Low self-discharge and long storage life (still have 90% capacity after storage for 1 year)
- Compatibility with Alkaline battery

APPLICATIONS

- Flash light
- Personal digital assistant
- Toothbrush
- Shaver
- Remote control, etc.

MODEL NUMBER (EXAMPLE)

BK-80AAAB

- Cap shape: button top type
- Diameter: AAA, AA
- Multiply this by 10 to obtain the rated capacity (some exceptions)
- Nickel-Metal Hydride battery

Model number	Old model number	Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-80AAAB*1	HHR-80AAAB	AAA	AAA	1.2	750	780	10.5 +0/-0.7	44.5 +0/-1.0	12	HR11/45
BK-200AAB*2	-	AA	AA	1.2	1,900	2,000	14.5 +0/-0.7	50.5 +0/-1.0	28	HR15/51

*1 Compatible with consumer AAA size.
*2 Compatible with consumer AA size.

INFRASTRUCTURE STANDARD TYPE H TYPE

The expected life of these back-up batteries is about 4 to 6 years and therefore approximately twice the lifetime compared to standard Ni-MH batteries. In addition they are capable of delivering excellent charge characteristics at high temperature (60°C). Recommended applications are for example emergency light, solar application and back-up for base station.

FEATURES

- Enables use in wide range of temperatures (-10 to +60)
- Small size with long operational life (4-6 years)

APPLICATIONS

- Medical equipment
- Emergency lighting
- POS system
- Solar window shutter
- Shaver, etc.

MODEL NUMBER (EXAMPLE)

BK-70AAH

- Infrastructure for standard
- Diameter: AAA, AA, A, F
- Multiply this by 10 to obtain the rated capacity (some exceptions)
- Nickel-Metal Hydride battery

Model number	Old model number	Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-70AAH	-	AA	AA	1.2	700	750	14.5 +0/-0.7	49.0 +0/-1.5	18	HR15/49
BK-110AAH	-	AA	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	HR15/51
BK-150AAH	-	AA	AA	1.2	1,450	1,530	14.5 +0/-0.7	50.5 +0/-1.5	25	HR15/51
BK-160AH	-	A	4/5A	1.2	1,600	1,720	17.0 +0/-0.7	43.0 +0/-1.5	29	HR17/43
BK-210AH	HHR-210AH	A	A	1.2	1,900	2,050	17.0 +0/-0.7	50.0 +0/-2.0	35	HR17/50
BK-370AH	HHR-370AH	LFat/A	LFat/A	1.2	3,500	3,700	18.2 +0/-0.7	67.5 +0/-1.5	60	-

HIGH RATE DISCHARGE & HIGH TEMPERATURE TYPE PH TYPE

These state-of-the-art back-up batteries deliver excellent current discharge characteristics at high temperature (60°C). They are able to power applications such as back-up for UPS, POS systems and solar window shutter.

FEATURES

- Long 4-6 years operational life
- High rate discharge (5lt discharge@20°C) available

APPLICATIONS

- Medical equipment
- Garden tool
- Robot cleaner
- Electric vehicle
- UPS
- POS system
- Solar window shutter, etc.

MODEL NUMBER (EXAMPLE)

BK-330APH

- BK: Nickel-Metal Hydride battery
- 330: Multiply this by 10 to obtain the rated capacity (some exceptions)
- A: Diameter: A, SC
- PH: Infrastructure for high rate discharge

Model number		Old model number	Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-330APH	Panasonic	HHR-330APH	LFat/A	LFat/A	1.2	3,200	3,300	18.2 +0/-0.7	67.5 +0/-1.5	59	-
BK-250SCH	Panasonic	HHR-250SCH	SC	SC	1.2	2,500	2,650	23.0 +0/-1.0	43.0 +0/-1.5	53	HR23/43

HIGH RATE DISCHARGE & RAPID CHARGE TYPE P TYPE

These battery types provide excellent current discharge characteristics and are designed for rapid charging. They are most suitable for power tools, robot cleaners and high power high cycle applications.

FEATURES

- Excellent large current discharge characteristics
- Rapid charge-capable

APPLICATIONS

- Medical equipment
- Power tool
- Garden tool
- Robot cleaner
- Electric vehicle, etc.

MODEL NUMBER (EXAMPLE)

BK-300SCP

- BK: Nickel-Metal Hydride battery
- 300: Multiply this by 10 to obtain the rated capacity (some exceptions)
- SC: Diameter: SC
- P: High rate discharge & rapid charge type

Model number		Old model number	Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-260SCP*1	Panasonic	HHR-260SCP	SC	SC	1.2	2,450	2,700	23.0 +0/-1.0	43.0 +0/-1.5	HR23/43	HR11/45
BK-300SCP*1	Panasonic	HHR-300SCP	SC	SC	1.2	2,800	3,050	23.0 +0/-1.0	43.0 +0/-1.5	HR23/43	HR15/51

*1 For high power use application such as power tools.

INFRASTRUCTURE FOR LONG LIFE TYPE U TYPE

These very tough Ni-MH batteries offer a very long service life when using intermittent charging at high ambient temperature conditions. Moreover, these batteries are ideal as a replacement for standard Ni-Cd batteries. They are recommended for use in applications such as emergency lighting, servers, elevators, automated teller machines (ATM), solar powered devices and as a back-up for base stations.

FEATURES

- Expected lifetime is about 8 to 10 years
- Superior charge efficiency under high temperature conditions
- Available in various sizes
- Very long service life when using intermittent charging at high ambient temperature conditions
- Excellent low self discharge characteristics

APPLICATIONS

- Solar powered application
- Server
- UPS system
- Elevator
- Emergency light, etc.

MODEL NUMBER (EXAMPLE)

BK-1100FHU

- BK- : Nickel-Metal-Hydride battery
- 1100 : Multiply this by 10 to obtain the rated capacity (some exceptions)
- F : Diameter: AAA, AA, C, F, SC
- H : High temperature & long life type
- U : Infrastructure for long life

Model number		Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-1100FHU		F	F	1.2	11,000	12,000	33.0 +0/-1.0	91.0 +0/-2.5	250	HR33/91
BK-120AAHU		AA	AA	1.2	1,200	1,280	14.5 +0/-0.7	50.5 +0/-1.5	24	HR15/51
BK-220SCHU		SC	SC	1.2	2,200	2,350	23.0 +0/-1.0	43.0 +0/-1.5	50	HR23/43
BK-310CHU		C	C	1.2	3,100	3,300	25.8 +0/-1.0	50.0 +0/-2.0	80	HR26/50
BK-60AAAHU		AAA	AAA	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	12	HR11/45

AUTOMOTIVE BACKUP TYPE W TYPE

This new Panasonic Ni-MH battery series is particulary designed for e-call systems. The long life reliability and the high discharge capability make these batteries ideal for these demanding applications. On the top our new batteries are eco-friendly designed and non-flammable.

FEATURES

- Excellent low temperature discharge performance
- Provides high safety battery pack
- Complies with automotive standard production (IATF, VDA6.3)

APPLICATIONS

- E-call
- ADAS back-up
- Low temperature data logger

MODEL NUMBER (EXAMPLE)

BK-60AAAWS

- BK- : Nickel-Metal Hydride battery
- 60 : Multiply this by 10 to obtain the rated capacity (some exceptions)
- AAA : Diameter: AAA, AA
- WS : Automotive backup type

Model number		Dia-meter	Size	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BK-60AAAWS		AAA	AAA	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	11	HR11/45
BK-120AAWS		AA	AA	1.2	1,100	1,180	14.5 +0/-0.7	50.5 +0/-1.5	24	HR15/51

BATTERY INSIDE*1

1 Exhaust gas hole
2 Safety vent
3 Insulation plate
4 Tube
5 Anode (hydrogen – absorbing alloy)
6 Separator
7 Cathode (Nickel Hydroxide)
8 Negative pole (cell can)
9 Positive pole
10 Top plate
11 Gasket
12 Collector

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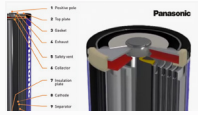


*1 The illustration shows only one example of Ni-MH battery structure.

NICKEL-CADMIUM

Well suited to tough conditions

Quality since 1964
Low internal resistance
Superior resistance to shock and vibration
Outstanding storage characteristics

Panasonic Nickel-Cadmium batteries have been well known for their quality since 1964. With exceptional discharge performance and durability, Cadnica batteries are well-suited to tough conditions, including power tools and emergency lighting systems. Likewise, many medical devices are powered by these rechargeable batteries. Panasonic Nickel-Cadmium batteries feature low internal resistance, are easy to handle, and offer superior resistance to shock and vibration, and last but not least, outstanding storage characteristics.

STANDARD TYPE

These basic Nickel-Cadmium battery types are characterised by their high capacity and good performance per cost unit.

Model number		Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
KR-10000M		1.2	10000	12000	M	43.1 +0/-1.0	91.0 +0/-1.4	395
KR-7000F		1.2	7000	7700	F	33.2 +0/-0.9	91.0 +0/-1.4	224

LONG-LIFE TYPE

These batteries exhibit superior performance over a long period in both continuous charge and cycle modes. They achieve significantly longer life than standard Cadnica batteries.

Model number		Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
N-600AAC		1.2	600	650	AA	14.3 +0/-0.5	50.2 +0/-1.0	22
N-600AACL		1.2	600	650	AA	14.3 +0/-0.5	48.9 +0/-1.0	22
N-700AAC		1.2	700	750	AA	14.3 +0/-0.5	50.2 +0/-1.0	23
N-700AACL		1.2	700	750	AA	14.3 +0/-0.5	48.9 +0/-1.0	23

HEAT-RESISTANT TYPE

These Panasonic Nickel-Cadmium batteries are designed for superior durability under severe rapid-charge conditions at temperatures as high as 70°C.

Model number		Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
N-1200SCK		1.2	1200	1350	SC	22.9 +0/-1.0	43.0 +0/-1.2	52
N-600AAK		1.2	600	650	AA	14.3 +0/-0.5	50.2 +0/-1.0	22

This product shows a product with sample labeling. The same applies to all illustrations of the Nickel-Cadmium batteries on the following pages.

RAPID CHARGE TYPE

These Panasonic Cadnica batteries are ready-charged in just one hour. During charging, the sharp temperature rise of the batteries makes it easy to detect where to cut off the charging process.

Model number	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
N-1250SCRL	1.2	1200	1250	4/5SC	22.9 +0/-1.0	34.0 +0/-1.2	43
N-1300SCR	1.2	1300	1400	SC	22.9 +0/-1.0	43.0 +0/-1.2	51
N-1700SCR	1.2	1700	1850	SC	22.9 +0/-1.0	43.0 +0/-1.2	55
N-3000CR	1.2	3000	3200	C	26.0 +0/-0.8	50.0 +0/-1.2	86

HIGH TEMPERATURE TYPE

These high temperature batteries offer excellent charge efficiency and long service life under severe temperature conditions. Emergency lighting devices, for example, can be powered for approx. four to six years.

Model number	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
KR-AAH	1.2	600	650	AA	14.3 +0/-0.5	48.9 +0/-1.0	23
KR-CH(2.0)	1.2	2000	2100	C	26.0 +0/-0.8	50.0 +0/-1.3	72
KR-CH(2.5)	1.2	2500	2600	C	26.0 +0/-0.8	50.0 +0/-1.3	75
KR-CH(3.0)	1.2	2900	3050	C	26.0 +0/-0.8	50.0 +0/-1.3	78
KR-FH	1.2	7000	7700	F	33.2 +0/-0.9	91.0 +0/-1.4	224
KR-MH	1.2	10000	12000	M	43.1 +0/-1.0	91.0 +0/-1.4	395
KR-SCH(1.2)	1.2	1200	1300	SC	22.9 +0/-1.0	43.0 +0/-1.2	47
KR-SCH(1.6)	1.2	1600	1650	SC	22.9 +0/-1.0	43.0 +0/-1.2	23

HEAT-RESISTANT & HIGH POWER TYPE

This Cadnica battery series was developed by improving upon the standard Nickel-Cadmium long-life series. This superior batteries are suitable for back-up applications where both high power and heat resistance are critical.

Model number	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
N-1600SCB	1.2	1550	1700	SC	22.9 +0/-1.0	42.9 +0/-1.2	57
N-2000CB	1.2	2000	2300	C	26.0 +0/-0.8	50.0 +0/-1.3	85

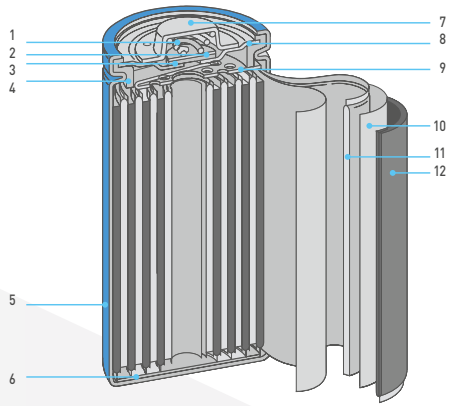
LOW TEMPERATURE TYPE

This Panasonic battery line-up is particulary designed to meet the very demanding needs from the infrastructure industry such as back-up power supplies, traffic signals, emergency lighting in cold-storage warehouses, etc. Our Cadnica GT series batteries are developed to operate at a wide range of temperatures, from extreme cold temperatures of -40°C to temperatures up to 60°C (140°F).

Model number	Nominal voltage (V)	Nominal capacity (mAh)	Typical capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
GT-2300C	1.2	2300	2500	C	26.0 +0/-0.8	50.0 +0/-1.3	73
GT-4000D	1.2	4000	4300	D	33.2 +0/-0.9	59.5 +0/-1.5	143

BATTERY INSIDE*1

1 Spring
2 Seal plate
3 Rubber plate
4 Gasket
5 Casing (negative terminal)
6 Negative current collector
7 Positive pole
8 Cover plate
9 Positive current collector
10 Separators
11 Positive electrode
12 Negative electrode



*1 The illustration shows only one example of Nickel-Cadmium battery structure.

LITHIUM-ION

Excellent battery safety and superior performance

Stable power supply with flat discharge voltage

Excellent reliability

Low self-discharge

High energy density

Scan QR code to view product series video.

This product shows a product with sample labeling. The same applies to all illustrations of the Lithium-Ion batteries on the following pages.

CYLINDRICAL SINGLE CELL

A perfect combination of high energy density (NNP technology), safety and long-life shows what is possible with Lithium-Ion battery technology from Panasonic. Excellent battery safety on one hand, and superior battery performance on the other: this is what Panasonic stands for.

FEATURES

- High energy density and high voltage ensure small battery dimensions
- Long-life, stable power supply with flat discharge voltage
- Use of Lithium-Ion batteries requires a safety unit
- Safety technologies such as HRL available

APPLICATIONS

- Power tool
- Garden tool
- UPS system
- Portable POS terminal
- GPS device
- Shaver
- E-bike
- Pedelec, etc.

MODEL NUMBER (EXAMPLE)

NCR-18650PF

- P: Appendix stands for battery performance characteristics
- 650: Divide this by 10 to obtain the approx. battery height (in mm)
- 18: Stands for approx. diameter (in mm) of the battery
- R: Round
- N: Lithium-Ion battery

UR-18650RX

- X: Appendix stands for battery performance characteristics
- 650: Divide this by 10 to obtain the approx. battery height (in mm)
- 18: Stands for approx. diameter (in mm) of the battery
- R: Lithium-Ion battery, round

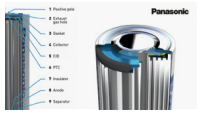
Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
NCR18500A		NNP*2, HRL*3	3.6	2040	18500	18.5	49.36	33.5
NCR18500B		Li-Ion High capacity type	3.6	2350	18500	18.25	49.36	35.5
NCR18650BD		Li-ion long cycle type	3.6	3180	18650	18.25	65.10	48.5
NCR18650BF		NNP*2, HRL*3	3.6	3350	18650	18.24	65.10	46.5
NCR18650GA		NNP*2, HRL*3, Li-Ion High power type	3.6	3450	18650	18.24	65.10	48.5
UR14500AC		Li-Ion Standard type	3.6	800	14500	13.90	49.20	18.6
UR14650R		Li-Ion High power type	3.6	1050	14650	13.90	64.80	26.6
UR18650A		Li-Ion Standard type	3.6	2250	18650	18.10	64.80	43.0
UR18650AA		Li-Ion Standard type	3.6	2250	18650	18.10	64.80	42.1

*1 4.20V charge *2 NNP - Nickel Oxide Based New Platform *3 HRL - Heat Resistance Layer

Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)
UR18650NSX		Li-Ion High power type	3.6	2600	18500	18.25	65.07	47.3
UR18650RX		Li-Ion High power type	3.6	2050	18650	18.24	65.10	46.5
UR18650ZM2		Li-ion long cycle type	3.6	2550	18650	18.24	65.10	45.4

BATTERY INSIDE*2

1 Exhaust gas hole
2 CID (Current Interrupt Device)
3 Insulator
4 Separator
5 Cathode
6 Anode
7 Negative pole (cell can)
8 Positive pole
9 PTC (Positive Temperature Coefficient Device)
10 Gasket
11 Collector



Scan QR code to view 3D animated video.

*1 4.20V charge
*2 Some batteries are not equipped with a PTC. Please consult Panasonic for further information. The illustration shows only one example of a Lithium-Ion battery structure.

PRISMATIC SINGLE CELL

A perfect combination of high energy density (NNP technology), safety and long-life shows what is possible with Lithium-Ion battery technology from Panasonic. Excellent battery safety on one hand, and superior battery performance on the other: this is what Panasonic stands for.

FEATURES

- High energy density and high voltage ensure small battery dimensions
- Long-life, stable power supply with flat discharge voltage
- Use of Lithium-Ion batteries requires a safety unit
- Safety technologies such as PSS and HRL available

APPLICATIONS

- Power tool
- Garden tool
- UPS system
- Portable POS terminal
- GPS device
- Shaver
- E-bike
- Pedelec, etc.

MODEL NUMBER (EXAMPLE)

NCA-752836A

- NCA: Lithium-Ion battery
- 7: Prismatic
- 52: Thickness of the battery (in mm)
- 83: Width of the battery (in mm)
- 6: Battery height (in mm)
- A: Appendix stands for battery performance characteristics

UF-103450P

- UF: Lithium-Ion battery, prismatic
- 10: Thickness of the battery (in mm)
- 34: Width of the battery (in mm)
- 50: Battery height (in mm)
- P: Appendix stands for battery performance characteristics

Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Width (mm)	Thick-ness (mm)	Total height (mm)	Weight (g)
CGA103450A		Co system	3.7	1950	33.80	10.50	48.50	39.2
CGA463443XA		High voltage charge system	3.8	910	33.80	4.60	42.45	15.5
CGA463450XA		High voltage charge system	3.8	1030	33.80	4.55	49.45	17.6
CGA553450XA		High voltage charge system	3.8	1310	33.80	5.70	49.65	21.5
CGA573442		Co system	3.7	960	33.80	5.60	41.80	18.5
NCA103450		NNP*2, HRL*3	3.6	2350	33.80	10.50	48.50	38.3
NCA463436A		NNP*2, HRL*3	3.6	720	34.30	4.60	35.50	12.4
NCA523436		NNP*2, HRL*3	3.6	840	34.30	5.15	35.50	14.1
NCA572742SA		NNP*2, HRL*3	3.6	890	41.50	5.70	41.50	14.5

*1 4.20V charge *2 NNP - Nickel Oxide Based New Platform *3 HRL - Heat Resistance Layer

Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Width (mm)	Thick-ness (mm)	Total height (mm)	Weight (g)
NCA573544		NNP*2, HRL*3	3.6	1190	34.60	5.80	44.0	19.9
NCA593446		NNP*2, HRL*3	3.6	1300	33.80	5.90	46.0	20.6
NCA596080SA		NNP*2, HRL*3	3.6	4530	60.0	5.95	79.95	68.0
NCA603134		NNP*2, HRL*3	3.6	730	31.10	6.60	34.45	13.7
NCA622944		NNP*2, HRL*3	3.6	1080	28.70	6.22	44.45	18.1
NCA622944SA		NNP*2, HRL*3	3.6	1170	28.70	6.22	44.45	18.0
NCA623535		NNP*2, HRL*3	3.6	1100	35.20	6.30	35.10	17.6
NCA653864		NNP*2, HRL*3	3.6	2200	38.10	6.50	64.35	36.6
NCA653864SA		NNP*2, HRL*3	3.6	2400	38.10	6.50	64.60	37.0
NCA673440		NNP*2, HRL*3	3.6	1265	33.80	6.75	40.35	20.3
NCA752836A		NNP*2, HRL*3	3.6	1010	27.90	7.80	35.70	16.7
NCA793540		NNP*2, HRL*3	3.6	1570	35.10	7.95	40.50	24.7
NCA843436		NNP*2, HRL*3	3.6	1300	33.90	8.70	35.70	23.0
NCA882936SA		NNP*2, HRL*3	3.6	1310	28.70	8.80	36.30	20.1
NCA903864A		NNP*2, HRL*3	3.6	3280	38.0	9.0	63.80	50.7
UF103450		LCO system*1	3.7	2000	33.80	10.50	48.80	38.5
UF463443		LCO system*1	3.7	850	33.85	4.55	42.60	16.0
UF463450		LCO system*1	3.7	960	33.85	4.45	49.60	18.5
UF553436		LCO system*1	3.7	830	33.85	5.50	35.60	15.6
UF553443		LCO system*1	3.7	1040	33.80	5.55	42.80	18.7

Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Width (mm)	Thick-ness (mm)	Total height (mm)	Weight (g)
UF553450		LCO system*1	3.7	1200	33.85	5.55	49.80	22.3
UF583136		LCO system*4	3.7	740	31.15	5.60	36.30	14.2
UF653450		LCO system*4	3.7	1300	33.85	6.35	49.80	25.1
UF673438		LCO system*4	3.7	1100	33.50	6.70	38.0	20.8
UF703450		LCO system*4	3.7	1480	33.85	7.0	49.80	28.1

BATTERY INSIDE*2

1 Anti-explosion valve
2 Anode cap
3 Terminal
4 Internal terminal
5 Lead
6 Cathode
7 Separator
8 Anode
9 Case
10 (Upper) Gasket
11 Sealing tap
12 (Lower) Gasket
13 Insulation frame body

NOTICE TO READERS

We are unable to support single cell business or accept orders from consumers. We design Lithium-Ion battery packs including a suitable safety unit device based on the technical specification of the customer. Due to the need for careful review when selecting Lithium-Ion battery solutions please contact your local Panasonic sales office. In order to avoid a lack of supply please check the battery availability with your Panasonic sales team before design-in.
Moreover this all Panasonic Lithium-Ion cells must always be equipped with a safety unit.

*1 LCO system - This Panasonic system uses a Cobalt-based cathode and offers high capacity.Some batteries are not equipped with a PTC. Please consult Panasonic for further information.
*2 The illustration shows only one example of a Lithium-Ion battery structure.

*1 4.20V charge *2 NNP - Nickel Oxide Based New Platform *3 HRL - Heat Resistance Layer

LITHIUM-ION PIN TYPE

Miniature rechargeable batteries – especially designed for wearables

Compact design
Extremely light & robust
Long-life
Quick charging
High reliability & safety

PIN TYPE

The industry's smallest-diameter cylindrical rechargeable battery has been developed using extremely fine components and materials compared to standard Lithium-Ion batteries. Its outstanding technical design makes this battery ideal for wearable devices with heavy power demands. Panasonic intends to expand this new battery line-up successively to meet the requirements of next-generation mobile communication devices.

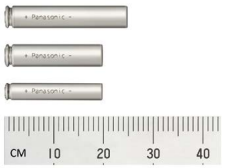
FEATURES

- Quite small diameter pin-shaped Lithium-Ion battery which expands design options for micro devices
- Rechargeable battery that can be used repeatedly and has the output capability required for near field communications
- High-strength metal exterior provides excellent reliability

APPLICATIONS

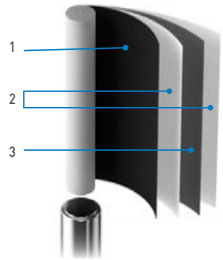
- Electric pen
- Wearables
- Hearing aid
- Wristband devices
- Smart glasses
- Industrial IoT applications
- Fitness trackers, etc.

Model number		Technology	Nominal voltage (V)	Typical*1 capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)
CG320B*2		Co system	3.8	16	3.65	20	0.5
CG420A*2		Co system	3.8	23	4.7	20	0.8
CG425A*2		Co system	3.8	32	4.7	25	1.0



BATTERY INSIDE*3

1 Positive electrode (Lithium Cobalt-Oxide)
2 Separator
3 Negative electrode (Graphite)



*1 4.35V charge
*2 This battery is supplied with tabs.
*3 The illustration shows only one example of a Lithium-Ion Pin Type battery structure.

This product shows a product with sample labeling. The same applies to all illustrations of the Lithium-Ion Pin Type batteries on the following page.

LITHIUM

State-of-the-art Lithium batteries

Low self-discharge
Decades of mass production experience
Superior designed battery ranges
Proven reliability

Scan QR code to view product series video.

PRIMARY BR AND CR

These days Lithium battery technologies are getting more and more important. Due to their high voltage, low self-discharge and proven reliability a broad range of applications can be powered. In particular the chemistries BR, CR and ER battery technologies are leading the industries. Please study the comparison overview below and find out why Panasonic is especially emphasizing on its famous BR and CR technology which is a proof for outstanding quality for years in the market.

COMPARISON OF LITHIUM PRIMARY CHEMISTRY*1

Chemistry			BR	CR	ER
Material	Cathode		CF	MnO_2	$SOCl_2$
	Anode		Lithium metal	Lithium metal	Lithium metal
	Electrolyte		Organic electrolyte	Organic electrolyte	Organic electrolyte
Performance	Nominal voltage		3V	3V	3.6V
	Discharge capacity		+	+	+
	Voltage during discharge (Initial)	Low current	+	+	++
		High current	+	++	–
	Voltage during discharge (End of capacity)	Low current	++	+	++
		High current	+	++	–
	Pulse performance at low temperature	Initial	+	++	–
		End of life	++	+	–
	Storage performance		++	+	++*2
	Reliability		++	+	–*2
	Safety		++	++	–
Environment	Eco friendly		++	++	–*3

++ Very good applicability
+ Good applicability
- Not good applicability

*1 Please contact Panasonic to get more detailed information about this technical comparison overview.
*2 Impedance is increasing due to the passivation phenomena.
*3 Harmful substances included.

LITHIUM BR CYLINDRICAL SERIES (NON-RECHARGEABLE)

Our Panasonic Poly-Carbonmonofluoride Lithium batteries (BR series) are ideal for applications such as meters or smoke detectors which demand either long-term power supply reliability or need to handle a wide temperature range.

FEATURES

- Operating temperature range: between -40°C ~ +85°C
- Self-discharge rate at 20°C is just 0.5% per year
- Superior long-term reliability
- 38+ years of experience in production

APPLICATIONS

- Heat cost allocators
- Water & gas meters
- Car alarm
- Smoke detectors
- Tracking & RFID
- Marine devices, etc.

MODEL NUMBER (EXAMPLE)

B R - 1 / 2 A A

- Battery diameter
- Battery size
- Round
- Poly-Carbonmonofluoride Lithium battery

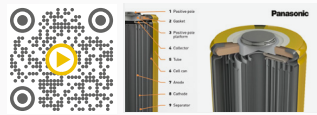
Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BR-1/2AA*2*3		3	1,000	1/2 AA	14.5	25.5	8	-
BR-2/3A*3		3	1,200	2/3 A	17.0	33.5	13	BR17335
BR-2/3AG*3		3	1,450	2/3 A	17.0	33.5	13	BR17335
BR-A*3		3	1,800	A	17.0	45.5	18	-
BR-AG*3		3	2,200	A	17.0	45.5	18	-
BR-C*3		3	5,000	C	26.0	50.5	41	-

*1 Capacity based on standard drain and cut off voltage down to 2.0V at 20°C.
*2 Operating temperature range is from -40°C ~ +100°C.
*3 Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.

BATTERY INSIDE*1

1 Positive pole
2 Gasket
3 Separator
4 Cathode (Carbonmonofluoride)
5 Anode (Lithium)
6 Insulator
7 Tube
8 Positive pole platform
9 Cell can
10 Collector
11 Negative pole

Scan QR code to view 3D animated video.



LITHIUM CR CYLINDRICAL SERIES (NON-RECHARGEABLE)

Panasonic Lithium CR type cylindrical batteries come as either single cells or dual cell packs. All cylindrical type Manganese Dioxide (CR series) Lithium batteries feature a spiral structure. With the enlarged electrode surface areas, they permit a current as high as several amperes to be drawn. In addition these batteries are convenient for equipments which are considered to replace the battery at the field.

FEATURES

- Operating temperature range: between -40°C ~ +70°C*2
- Good pulse discharge capability
- Stable operation voltage
- Self-discharge rate at 20°C just 1% per year

APPLICATIONS

- Medical equipment
- Door lock systems
- Marine devices
- Cameras
- High energy flashlights
- Sanitary equipment, etc.

MODEL NUMBER (EXAMPLE)

C R - 1 2 3 A

- Battery diameter
- Battery size
- Round
- Manganese Dioxide Lithium battery

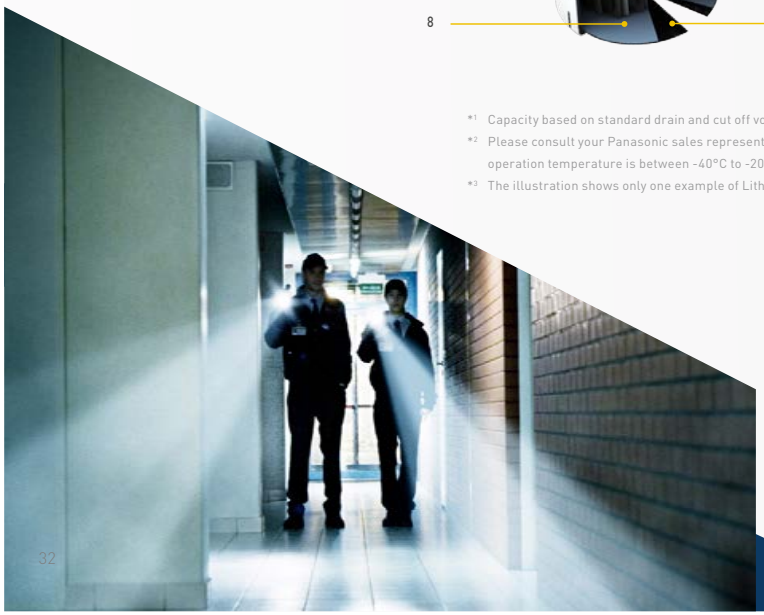
*1 The illustration shows only one example of Lithium battery structure.
*2 Please consult your Panasonic sales representative when anticipating usage in operation temperature is between -40°C to -20°C,

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
CR-2*2		3	850	15270	15.6	27.0	11	CR15H270
CR-123A*2		3	1,550	17345	17.0	34.5	16	CR17345
2CR-5*2		6	1,550	-	34.0 x 17.0	45.0	38	2CR5
CR-P2*2		6	1,550	-	35.0 x 19.5	36.0	37	CRP2

BATTERY INSIDE*3

1 Positive pole
2 Vent diaphragm
3 Gasket
4 Separator
5 Anode (Lithium)
6 Cathode (Manganese Dioxide)
7 Tube
8 Insulator
9 PTC (Positive Temperature Coefficient Device)
10 Collector
11 Cell can
12 Negative pole

*1 Capacity based on standard drain and cut off voltage down to 2.0V or 4.0V at 20°C.
*2 Please consult your Panasonic sales representative when anticipating usage in operation temperature is between -40°C to -20°C, or +60°C to +70°C.
*3 The illustration shows only one example of Lithium battery structure.



LITHIUM CR CYLINDRICAL SERIES FOR INDUSTRIAL (NON-RECHARGEABLE)

Ideal for industrial equipment, this series offers both excellent high-rate discharge performance and a service life of 15 years or more.

FEATURES

- Stable impedance throughout battery life
- Operating temperature range: between -40°C ~ +85°C*1
- Superior high drain discharge performance
- Long-term reliability
- Self-discharge rate at 20°C is just 1% per year

APPLICATIONS

- Medical equipment
- Automotive
- Smoke detectors
- Security devices and systems
- Marine devices
- Smart meter, etc.

MODEL NUMBER (EXAMPLE)

C R - 2 / 3 A Z

- Z: Stands for battery performance characteristics
- 3: Battery diameter
- A: Battery size
- 2: Round
- CR: Manganese Dioxide Lithium battery

Model number		Nominal voltage (V)	Nominal*2 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
CR-AAK		3	1,650	AA	14.5	50.5	18	-
CR-AAU		3	1,800	AA	14.5	50.5	18	-
CR-2Z		3	1,000	15270	15.6	27.0	11	-
CR-2U		3	1,000	15270	15.6	27.0	11	-
CR-2/3AU		3	1,600	2/3A	17.0	33.5	16	-
CR-2/3AZ		3	1,600	2/3A	17.0	33.5	16	-
CR-AG		3	2,400	A	17.0	45.5	22	-
CR-AGZ		3	2,700	A	17.0	45.5	23	-

*1 Please contact Panasonic when anticipating usage in operation temperature 70°C or above.
*2 Capacity based on standard drain and cut off voltage down to 2.0V at 20°C.

BATTERY INSIDE*1

1 Positive pole
2 Vent diaphragm
3 Tube
4 Anode (Lithium)
5 Separator
6 Cathode (Manganese Dioxide)
7 Insulator
8 PTC (Positive Temperature Coefficient Device)
9 Collector
10 Cell can
11 Negative pole

*1 The illustration shows only one example of Lithium battery structure.

LITHIUM BR COIN SERIES (NON-RECHARGEABLE)

Panasonic Lithium BR coin type batteries feature high energy density, and were developed and commercialized using Panasonic's extensive experience in battery technology. They exhibit stable performance under high ambient temperatures.

FEATURES

- Self-discharge rate at 20°C is just 1.0% per year
- Wide operating temperature range: between -30°C ~ +85°C
- Superior long-term reliability
- 42+ years of experience in production

APPLICATIONS

- Tracking & RFID
- Memory back-up
- Real Time Clock (RTC)
- Meters, etc.

MODEL NUMBER (EXAMPLE)

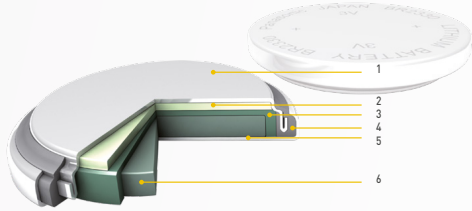
BR-2330

- Divide this by 10 to obtain the battery height in mm
- Battery diameter (in mm)
- Round
- Poly-Carbonmonofluoride Lithium battery

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BR-1220		3	35	1220	12.5	2.0	0.7	-
BR-1225		3	48	1225	12.5	2.5	0.8	BR1225
BR-1632		3	120	1632	16.0	3.2	1.5	-
BR-2032		3	200	2032	20.0	3.2	2.6	-
BR-2325		3	165	2325	23.0	2.5	3.0	BR2325
BR-2330		3	255	2330	23.0	3.0	3.2	-
BR-3032		3	500	3032	30.0	3.2	5.7	BR3032

BATTERY INSIDE*2

1 Negative pole
2 Anode (Lithium)
3 Separator
4 Gasket
5 Positive pole (cell can)
6 Cathode (Poly-Carbonmonofluoride)



*1 Based on standard drain and cut off voltage down to 2.0V at 20°C.
*2 The illustration shows only one example of Lithium battery structure.

LITHIUM BR-A SERIES COIN TYPE FOR HIGH TEMPERATURE USAGE
(NON-RECHARGEABLE)

The high energy density and the special material for gasket and separator make this battery series the ideal power supply in high ambient temperature applications.

FEATURES

- Superior design for high temperature applications -40°C ~ +125°C
- Outstanding long-term reliability
- 22+ years of experience in production
- Self-discharge rate at 20°C is just 0.5% per year

APPLICATIONS

- Tire Pressure Monitoring Systems (TPMS)
- Electric Toll Collection (ETC)
- Heat cost allocators, etc.

MODEL NUMBER (EXAMPLE)

B R - 2 4 7 7 A

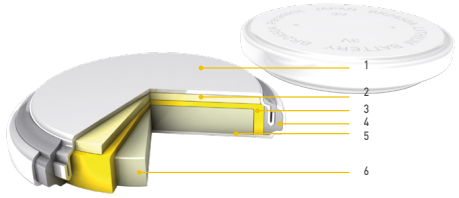
- A — High temperature type
- 77 — Divide this by 10 to obtain the battery height in mm
- 24 — Battery diameter (in mm)
- R — Round
- B — Poly-Carbonmonofluoride Lithium battery

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BR-1225A		3	48	1225	12.5	2.5	0.8	-
BR-1632A*2		3	120	1632	16.0	3.2	1.5	-
BR-2330A*2		3	255	2330	23.0	3.0	3.2	-
BR-2450A*2		3	550	2450	24.5	5.9	4.9	-
BR-2477A*2		3	1,000	2477	24.5	7.7	7.9	-

*1 Based on standard drain and cut off voltage down to 2.0V at 20°C.
*2 Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or yoursales contact.

BATTERY INSIDE*1

1 Negative pole
2 Anode (Lithium)
3 Separator
4 Gasket
5 Positive pole (cell can)
6 Cathode (Poly-Carbonmonofluoride)



LITHIUM CR COIN MANGANESE DIOXIDE SERIES (NON-RECHARGEABLE)

These batteries have a proven track record of excellence in equipment requiring high currents. Additionally Panasonic has many years of manufacturing experience with this battery technology.

FEATURES

- Good pulse capability
- Stable voltage level during discharge
- Long-term reliability
- Self-discharge rate at 20°C is just 1.0% per year
- Temperature range -30°C ~ +85°C*2

APPLICATIONS

- Remote Keyless Entry (RKE)
- Electricity meters
- Medical equipment
- Tracking & RFID
- Vending machines
- Price tags, etc.

MODEL NUMBER (EXAMPLE)

C R - 2 0 3 2

- 20 — Divide this by 10 to obtain the battery height in mm
- 32 — Battery diameter (in mm)
- R — Round
- C — Manganese Dioxide Lithium battery

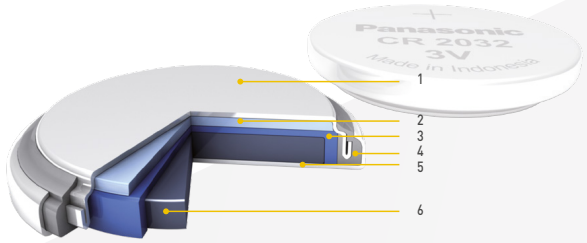
Model number		Nominal voltage (V)	Nominal*3 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
CR-1025		3	30	1025	10.0	2.5	0.6	CR1025
CR-1216		3	25	1216	12.5	1.6	0.7	CR1216
CR-1220		3	35	1220	12.5	2.0	0.9	CR1220
CR-1616		3	55	1616	16.0	1.6	1.0	CR1616
CR-1620		3	75	1620	16.0	2.0	1.3	CR1620

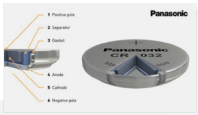
*1 The illustration shows only one example of Lithium battery structure.
*2 Please contact Panasonic when anticipating usage in operation temperature 70°C or above.
*3 Based on standard drain and cut off voltage down to 2.0V at 20°C.

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
CR-1632		3	140	1632	16.0	3.2	1.9	-
CR-2012		3	55	2012	20.0	1.2	1.4	CR2012
CR-2016		3	90	2016	20.0	1.6	1.6	CR2016
CR-2025		3	165	2025	20.0	2.5	2.3	CR2025
CR-2032		3	225	2032	20.0	3.2	2.8	CR2032
CR-2330		3	265	2330	23.0	3.0	3.7	CR2330
CR-2354		3	560	2354	23.0	5.4	5.7	CR2354
CR-2412		3	100	2412	24.5	1.2	2.0	-
CR-2450		3	620	2450	24.5	5.0	6.2	CR2450
CR-2477		3	1,000	2477	24.5	7.7	10.5	-
CR-3032		3	500	3032	30.0	3.2	6.9	CR3032

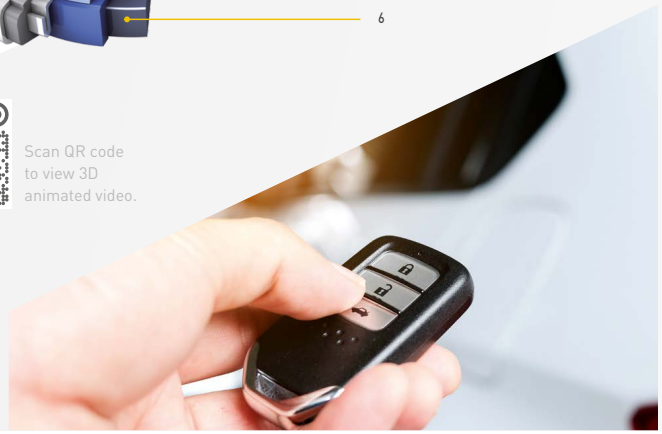
BATTERY INSIDE*2

1 Negative pole
2 Anode (Lithium)
3 Separator
4 Gasket
5 Positive pole (cell can)
6 Cathode (Manganese Dioxide)





Scan QR code to view 3D animated video.



*1 Based on standard drain and cut off voltage down to 2.0V at 20°C.
*2 The illustration shows only one example of Lithium battery structure.

LITHIUM CR-A/B COIN HIGH TEMPERATURE MANGANESE DIOXIDE SERIES

(NON-RECHARGEABLE)

Comprising key design elements of the BR-A high temperature series in combination with the benefits of the conventional CR coin series, these batteries offer the best of both worlds in a cost effective manner.

FEATURES

- Excellent durability in high temperature (up to 125°C*1) allows various devices such as automotive electrical components and outdoor devices to be used under severe environments
- Superior pulse discharging characteristics even at low temeratures and can be used in a wide operating temperature
- Excellent long-term reliability enables safe and long-term use

APPLICATIONS

- Tire Pressure Monitoring Systems (TPMS)
- Electronic Toll Collection (ETC)
- Connected meters, etc.

MODEL NUMBER (EXAMPLE)

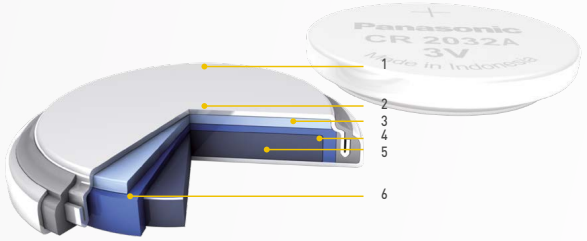
C R - 20 32 A (or B)

- Identification for applicable temperature range
- Divide this by 10 to obtain the battery height in mm
- Battery diameter (in mm)
- Round
- Manganese Dioxide Lithium battery

Model number*1		Nominal voltage (V)	Nominal*2 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
CR-2032A*3		3	210	2032	20.0	3.2	3.0	-
CR-2032B*3		3	210	2032	20.0	3.2	3.0	-
CR-2050A*3		3	345	2050	20.0	5.0	4.1	-
CR-2050B2*3		3	345	2050	20.0	5.0	4.1	-
CR-2450B*3		3	560	2450	24.5	5.0	6.2	-

BATTERY INSIDE*4

1 Negative pole
2 Anode (Lithium)
3 Separator
4 Gasket
5 Positive pole (cell can)
6 Cathode (Manganese dioxide)



*1 Max. operating temperature +120°C for „B" and +125°C for „A" type models (dia 20mm), +105°C for CR-2450B.
*2 Based on standard drain and cut off voltage down to 2.0V at 20°C.
*3 Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.
*4 The illustration shows only one example of Lithium battery structure.

LITHIUM VL, ML, MT COIN SERIES (RECHARGEABLE)

These Panasonic rechargeable Lithium coin batteries are designed chiefly for memory back-up applications. Their voltage ranges from 1.5V to 3V.

FEATURES

- Rechargeable Lithium technology
- Self-discharge rate at 20°C is only 2.0% per year for VL and ML battery types
- 1,000 charge-discharge cycles for VL and ML at 10% depth of discharge
- Superior long-term reliability
- Years of experience in production

APPLICATIONS

- Computers
- Remote Keyless Entry (RKE)
- Fax machines
- Mobile phones
- Watches, etc.

MODEL NUMBER (EXAMPLE)

V L - 2 0 2 0

- Divide this by 10 to obtain the battery height in mm
- Battery diameter (in mm)
- Round
- Vanadium Pentoxide Lithium battery

COIN VANADIUM PENTOXIDE LITHIUM (VL SERIES)

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
VL-621*2		3	1.5	621	6.8	2.1	0.2	-
VL-1220*2		3	7	1220	12.5	2.0	0.8	-
VL-2020*2		3	20	2020	20.0	2.0	2.1	-
VL-2330*2		3	50	2330	23.0	3.0	3.5	-
VL-3032*2		3	100	3032	30.0	3.2	6.3	-

*1 Based on standard drain and cut off voltage down to 2.0V at 20°C. State-of-Charge ex-factory: ~70%.

*2 Cells are supplied with tabs or lead-wires only. For available configurations please consult the Panasonic homepage or your sales contact.

COIN MANGANESE LITHIUM (ML SERIES)

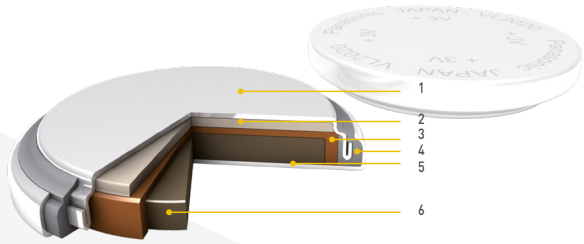
Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
ML-421		3	2.3	421	4.8	2.1	0.1	-
ML-614		3	3.4	614	6.8	1.4	0.2	-
ML-621		3	5	621	6.8	2.1	0.2	-
ML-920		3	11	920	9.5	2.0	0.4	-
ML-1220		3	17	1220	12.5	2.0	0.8	-
ML-2020		3	45	2020	20.0	2.0	2.2	-

COIN MANGANESE TITANIUM LITHIUM (MT SERIES)

Model number		Nominal voltage (V)	Nominal*2 capacity (mAh)	Size	Diameter (mm)	Total height (mm)	Weight (g)	IEC
MT-516		1.5	1.8	516	5.8	1.6	0.1	-
MT-621		1.5	2.5	621	6.8	2.1	0.2	-
MT-920		1.5	5	920	9.5	2.0	0.4	-

BATTERY INSIDE*3

1 Negative pole
2 Anode (Lithium Aluminium alloy)
3 Separator
4 Gasket
5 Positive pole (cell can)
6 Cathode (Vanadium Pentoxide)



*1 Based on standard drain and cut off voltage down to 2.0V at 20°C. State-of-Charge ex-factory: ~70%.

*2 Based on standard drain and cut off voltage down to 0.5V at 20°C. State-of-Charge ex-factory: ~70%

*3 The illustration shows only one example of Lithium battery structure.

PIN TYPE POLY-CARBONMONOFLUORIDE LITHIUM (BR SERIES)

(NON-RECHARGEABLE)

Panasonic offers a unique pin shape and space-saving design to meet the requirements of small-scale applications.

FEATURES

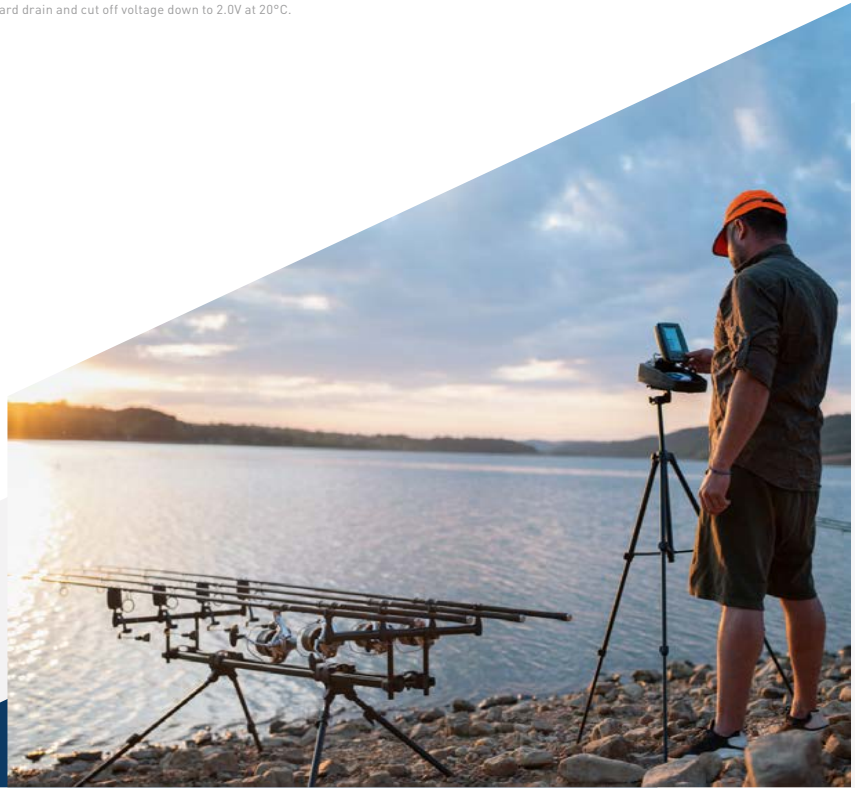
- Superior design for high temperature applications -30°C ~ +80°C
- Outstanding long-term reliability
- Years of experience in production
- Self-discharge rate at 20°C is just 0.5% per year

APPLICATIONS

- LED-type night fishing floats
- Various illumination products
- Fishing pole tip lights
- Toys, etc.

Model number		Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
BR-425		3	25	4.2	25.9	0.6	-
BR-435		3	50	4.2	35.9	0.9	-

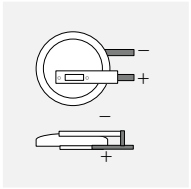
*1 Based on standard drain and cut off voltage down to 2.0V at 20°C.



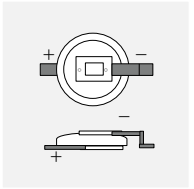
TERMINAL TYPES

Panasonic offers a broad range of different tabs for our Lithium batteries in order to meet all customer needs. In addition tailormade solutions are possible as well.

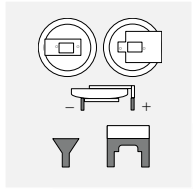
F TYPE
Surface mount (short distance)



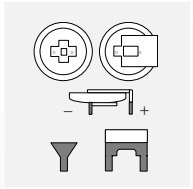
F TYPE
Surface mount (wide distance)



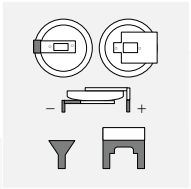
G TYPE
Through hole horizontal mount (normal distance)



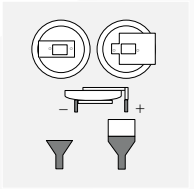
G TYPE
Through hole horizontal mount (short distance)



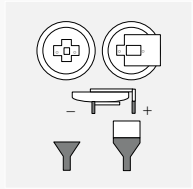
G TYPE
Through hole horizontal mount (wide distance)



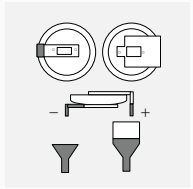
H TYPE
Through hole horizontal mount (normal distance)



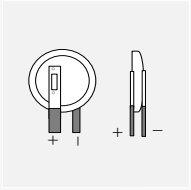
H TYPE
Through hole horizontal mount (short distance)



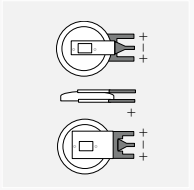
H TYPE
Through hole horizontal mount (wide distance)



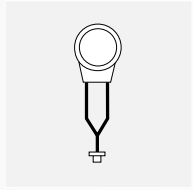
V TYPE
Through hole vertical mount (two pins)



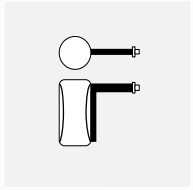
W TYPE
Through hole vertical mount (three pins)



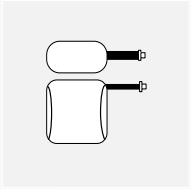
LEAD WIRE TYPE
Coin cell



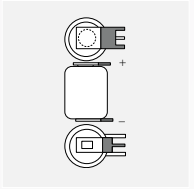
LEAD WIRE TYPE
Single cylindrical cell



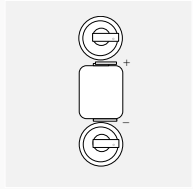
LEAD WIRE TYPE
2 to 6 cells of cylindrical batteries in parallel or in series



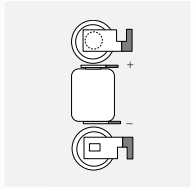
TAB TERMINAL
Cylindrical batteries for through hole mounting



TAB TERMINAL
Cylindrical batteries for lead wire attaching



TAB TERMINAL
Cylindrical batteries for hanging on PCB (hook type)



ALKALINE

Ideal for high-performance standard applications

High and medium drain applications
Continuously reliable energy provision
Long shelf life
Superior low temperature behavior

Scan QR code to view product series video.

ALKALINE

Panasonic Alkaline batteries are made from the same basic materials as Zinc-Carbon batteries, but deliver generally higher performance on all criteria. These batteries can therefore power high-performance standard applications. Our Alkaline batteries are mostly made in Europe and fulfill the highest quality standards.

FEATURES

- Developed for high and medium drain appliances
- Continuously reliable energy provision
- Long shelf life
- Excellent leakage resistance
- Superior low temperature behavior

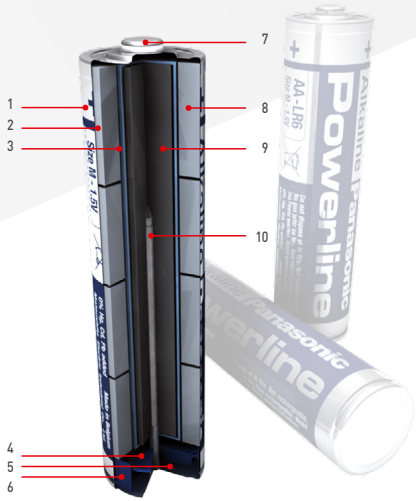
APPLICATIONS

- Smoke detectors
- Marine devices
- High energy flashlights
- Scales
- Cleaning and hygiene services
- Gas barbecue igniter
- Suitcase electronic pass, etc.

Model number		Size	Nominal voltage (V)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
LR03AD		AAA	1.5	10.5	44.5	11	LR03
LR6AD		AA	1.5	14.5	50.5	22	LR6
LR14AD		C	1.5	26.2	50.0	66	LR14
LR20AD		D	1.5	34.2	61.5	138	LR20
6LR61AD		9V	9	26.5 x 17.5	48.5	43	6LR61

BATTERY INSIDE*1

1 Label
2 Cell can
3 Separator
4 Safety vent
5 Negative pole
6 Sealing
7 Positive pole
8 Cathode (Manganese-Dioxide-Carbon)
9 Anode (Zinc-gel)
10 Nail



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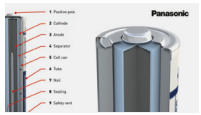


QUALITY CONTROL

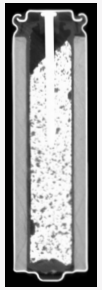
What is quality and how to secure the best quality level during the production process of tons of Alkaline batteries in our Belgian factory?

HIGH TECH IN QUALITY CONTROL

For us, the best possible product quality is indispensable. We therefore invest an extraordinary amount of effort in quality control of our batteries. It starts with the sophisticated construction of our batteries, followed by a high level material purchasing process and ends in state-of-the-art battery production. Furthermore, random samples are checked by means of a CT (computer tomography) scan, which renders the interior completely visible. It is then possible to see any defects immediately, or to identify batteries that are not evenly filled.

Panasonic battery LR6

Competitors battery

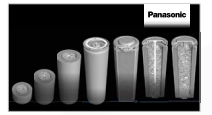


The CT-scan produces a series of many X-ray images that are computed into a 3D model. The batteries are random-tested using this complex technology, which gives our products a quality that is clearly above average compared to various competitors.

CT-SCAN PANASONIC LR6 VS. COMPETITOR

Differences in terms of battery construction (e.g. length of nail), open material spaces or bubbles and the filling level of material are easily recognized. All these parameters are proof of the different level of battery quality.

Scan QR code to view CT-scan video.

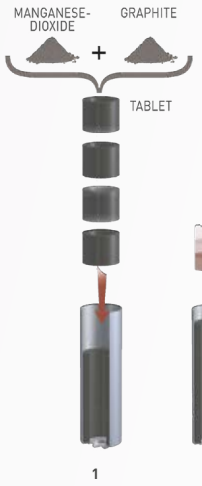


PRODUCTION PROCESS

CAN PRODUCTION PROCEDURE - STEEL CAN PRODUCTION

1 Can drawing
2 Can trimming
3 Washing
4 Carbon coating

CATHODE UNIT LR6 - MIXTABLETS (+) PRESSING



1 Manganese dioxide carbon tablet pressing (positive pole) and tablet inserting
2 Pressing
3 Can grooving

*1 The illustration shows only one example of Alkaline battery structure.

ZINC-CARBON

The solution for less complex and cost-sensitive applications

Excellent performance affordability
Continuously reliable energy provision
Long shelf life

ZINC-CARBON

This is a standard solution for applications which do not require high voltages but still benefit from extraordinary performance. With years of production experience to call on, Panasonic can deliver best-in-class performance for these technology parameters. Our Zinc-Carbon batteries are mostly made in Europe and fulfill the highest quality standards.

FEATURES

- Established, reliable battery technology
- Outstanding price and quality
- Excellent performance affordability (cost per hour)

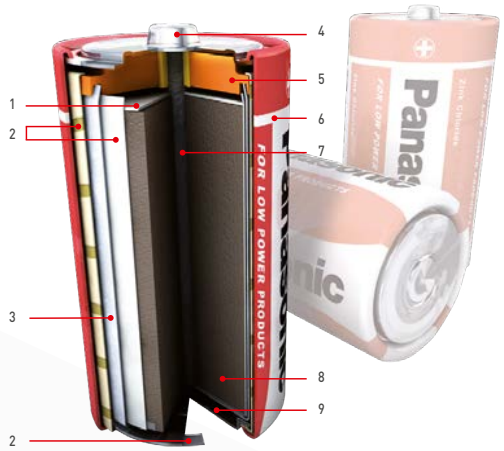
APPLICATIONS

- Alarm clocks
- Remote controls
- Radios
- Flashlights, etc.

Model number		Size	Nominal voltage (V)	Diameter (mm)	Total height (mm)	Weight (g)	IEC
R03		AAA	1.5	10.5	44.5	8	R3
R6		AA	1.5	14.5	50.5	19	R6
R14		C	1.5	26.2	50.0	49	R14
R20		D	1.5	34.2	61.5	106	R20
6F22		9V	9	26.5 x 17.5	48.5	38	6F22

BATTERY INSIDE*1

1 Paper plate
2 Insulator
3 Anode (Zinc can)
4 Positive pole
5 Polyethylene gasket
6 Tube
7 Carbon stick
8 Cathode (Manganese)
9 Negative pole



*1 The illustration shows only one example of Zinc-Carbon battery structure.

FIND THE RIGHT CONTACT

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E-mail and website for all European countries
battery-solutions@eu.panasonic.com
http://industry.panasonic.eu

Panasonic®

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