

EXCELLENT BATTERY SAFETY AND SUPERIOR PERFORMANCE



VIDEO



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CYLINDRICAL SINGLE CELL

A perfect combination of high energy density (NNP technology), safety (PSS technology) 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
- Emergency lighting
- UPS system
- Portable POS terminal
- GPS device
- Shaver
- E-bike
- Pedelec, other

MODEL NUMBER (EXAMPLE)

NCR-18650A

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

UR-18650ZT

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

Model	Technology*1	Nominal voltage [V]	Typical*2 capacity [mAh]	Dimensions (mm)		Approx. weight [g]
				Diameter	Height	
UR-14430P	Li-Ion Standard Type	3.7	700	13.9	42.9	17.5
UR-14500Y	Li-Ion Standard Type	3.7	710	13.9	49.2	19.4
UR-14500P	Li-Ion Standard Type	3.7	840	13.9	49.2	20.0
UR-14650P	Li-Ion Standard Type	3.7	980	13.9	64.7	26.0
UR-14650R	Li-Ion High Power Type	3.6	1,050	13.9	64.8	26.6
UR-16650ZT	High Voltage Charge System	3.7	2,200*3	16.4	64.9	40.0
UR-18500Y	Li-Ion Standard Type	3.7	1,400	18.1	49.3	31.9
UR-18500F	Li-Ion Standard Type	3.7	1,700	18.1	49.3	33.5
UR-18650SA	Li-Ion High Power Type	3.7	1,300	18.1	64.8	44.2
UR-18650W	Li-Ion High Power Type	3.7	1,600	18.1	64.8	46.1
UR-18650WX	Li-Ion High Power Type	3.7	1,600	18.1	64.8	45.9
UR-18650Y	Li-Ion Standard Type	3.7	2,000	18.1	64.8	43.3
UR-18650E	Li-Ion High Power Type	3.6	2,150	18.1	64.8	44.5
UR-18650A	Li-Ion Standard Type	3.6	2,250	18.1	64.8	43.0
UR-18650AA	Li-Ion High Power Type	3.6	2,250	18.1	64.8	42.1
UR-18650F	Li-Ion Standard Type	3.7	2,600	18.1	64.8	47.0
NCR-18500	NNP, HRL	3.6	2,000	18.2	49.4	34.0
UR-18650ZY	Li-Ion Standard Type	3.7	2,600	18.2	64.8	47.0
UR-18650RX	Li-Ion High Power Type	3.6	2,050	18.2	65.1	46.5
NCR-18650E	NNP, HRL, Li-Ion High Power Type	3.6	2,250	18.2	65.1	44.0
UR-18650EA	Li-Ion High Power Type	3.6	2,350	18.2	65.1	46.0
UR-18650NSX	Li-Ion High Power Type	3.6	2,600	18.3	65.1	46.4
UR-18650ZT	High Voltage Charge System	3.7	2,800*3	18.2	65.1	48.0
NCR-18650	NNP, HRL	3.6	2,900	18.2	65.1	45.5
NCR-18650F	NNP, HRL	3.6	2,900	18.2	65.1	45.0
NCR-18650PF	NNP, HRL, Li-Ion High Power Type	3.6	2,900	18.2	65.1	47.0
NCR-18650A	NNP, HRL	3.6	3,070	18.2	65.1	46.0
NCR-18650BF	NNP, HRL	3.6	3,350	18.2	65.1	46.5
UR-16650ZTA	High Voltage Charge System	3.7	2,500*4	16.4	64.9	39.6
UR-18650ZTA	High Voltage Charge System	3.7	3,000	18.2	65.1	48.0

*1 Please find the explanations of our technologies on the following pages. *2 4.2V charge *3 4.3V charge *4 4.35V charge

3D ILLUSTRATION*1



VIDEO



Scan QR code to view 3D animated video.

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 cells must always be equipped with a safety unit.



PRISMATIC SINGLE CELL

A perfect combination of high energy density (NNP technology), safety (IPSS technology) 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
- Emergency lighting
- UPS system
- Portable POS terminal
- GPS device
- Shaver
- E-bike
- Pedelec, other

MODEL NUMBER (EXAMPLE)

NCA-752836A

Appendix stands for battery performance characteristics
Battery height (in mm)
Width of the battery (in mm)
Thickness of the battery (in mm)
Prismatic
Lithium-ion battery

UF-103450P

Appendix stands for battery performance characteristics
Battery height (in mm)
Width of the battery (in mm)
Thickness of the battery (in mm)
Lithium-ion battery, prismatic

Model	Technology*1	Nominal voltage [V]	Typical*2 capacity [mAh]	Dimensions (mm)			Approx. weight [g]
				Diameter	Thickness	Height	
UF-553436G	LCO-System	3.7	830	35.60	5.50	33.85	15.6
UF-653436SU	LCO-System	3.7	930	35.70	6.30	33.85	17.8
UF-503436F	LCO-System	3.7	700	35.80	4.90	33.95	13.8
UF-593536F	LCO-System	3.7	920	35.95	5.74	34.45	16.9
UF-673438F	LCO-System	3.7	1,100	38.00	6.70	33.50	20.8
UF-653039SU	LCO-System	3.7	960	38.75	6.40	29.95	17.5
UF-533640S	LCO-System	3.7	950	39.80	5.20	35.90	17.6
UF-703141FU	LCO-System	3.7	1,090	40.70	7.05	30.50	20.9
UF-634042F	LCO-System	3.7	1,270	41.70	6.20	39.85	24.6
UF-423643F	LCO-System	3.7	730	42.40	4.10	35.95	14.8
UF-383543F	LCO-System	3.7	680	42.55	3.80	34.95	13.6
UF-463443GU	LCO-System	3.7	850	42.60	4.55	33.85	16.0
UF-553443ZU	LCO-System	3.7	1,040	42.80	5.55	33.80	18.7
UF-653445ST	High Voltage Charge System	3.8	1,260*3	44.50	6.30	33.80	22.3
UF-463446S	LCO-System	3.7	870	45.80	4.45	33.86	17.2
UF-533446Z	LCO-System	3.7	1,080	45.80	5.35	33.86	20.4
UF-504547F	LCO-System	3.7	1,290	46.60	5.00	44.90	25.0
UF-564447F	LCO-System	3.7	1,420	46.60	5.55	43.90	27.0
UF-624447F	LCO-System	3.7	1,580	46.60	6.15	43.90	29.9
UF-515148SX	High Voltage Charge System	3.8	1,710*3	47.50	5.05	50.90	28.7

*1 Some batteries are not equipped with a PTC. Please consult Panasonic for further information. The illustration shows only one example of a Li-ion battery structure.

*1 Please find the explanations of our technologies on the following pages. *2 4.2V charge *3 4.35V charge

Model	Technology*1	Nominal voltage (V)	Typical*2 capacity (mAh)	Dimensions (mm)			Approx. weight (g)
				Diameter	Thickness	Height	
UF-555148SX	High Voltage Charge System	3.8	1,870*3	47.50	5.45	50.90	31.2
UF-463048F	LCO-System	3.7	750	47.80	4.45	29.65	15.0
UF-553048F	LCO-System	3.7	930	47.80	5.40	29.65	17.9
UF-103450P	LCO-System	3.7	2,000	48.80	10.50	33.80	38.5
UF-514050F	LCO-System	3.7	1,260	49.50	5.00	39.80	23.7
UF-463450F	LCO-System	3.7	960	49.60	4.45	33.85	18.5
UF-553450Z	LCO-System	3.7	1,200	49.80	5.55	33.85	22.3
UF-653450S	LCO-System	3.7	1,300	49.80	6.35	33.85	25.1
UF-703450F	LCO-System	3.7	1,480	49.80	7.00	33.85	28.1
UF-383551FU	LCO-System	3.7	850	50.55	3.85	34.95	16.3
UF-404251S	LCO-System	3.7	1,060	50.80	3.90	41.90	20.3
UF-495252ST	High Voltage Charge System	3.8	1,720*3	51.50	4.90	51.90	30.3
UF-534553F	LCO-System	3.7	1,580	52.50	5.25	44.85	29.9
UF-644553F	LCO-System	3.7	1,960	52.50	6.40	44.85	36.6
UF-644553FT	High Voltage Charge System	3.8	2,060*3	52.50	6.40	44.85	35.2
UF-485155S	LCO-System	3.7	1,710	55.00	4.80	50.90	31.9
UF-495255ST	High Voltage Charge System	3.8	1,870*3	55.00	4.90	51.90	32.3
UF-515155SX	High Voltage Charge System	3.8	2,040*3	55.00	5.05	50.90	33.6
UF-555155SX	High Voltage Charge System	3.8	2,140*3	55.00	5.45	50.90	36.5
UF-575555SX	High Voltage Charge System	3.8	2,370*3	55.00	5.70	54.90	40.3
UF-613756F	LCO-System	3.7	1,450	55.40	5.80	36.65	28.6
UF-465156SX	High Voltage Charge System	3.8	1,790*3	55.50	4.55	50.90	30.5
UF-625556SX	High Voltage Charge System	3.8	2,690*3	55.50	6.20	54.95	44.6
UF-493856S	LCO-System	3.7	1,290	55.55	4.77	37.85	24.6
UF-514657FX	High Voltage Charge System	3.8	1,850*3	56.50	5.05	46.10	31.2
UF-405158SX	High Voltage Charge System	3.8	1,590*3	58.00	4.00	50.40	27.9
UF-555158SX	High Voltage Charge System	3.8	2,280*3	58.00	5.45	50.90	38.3
UF-575559SX	High Voltage Charge System	3.8	2,630*3	58.50	5.70	54.90	43.6
UF-464459F	LCO-System	3.7	1,450	58.70	4.50	43.60	27.9
UF-515761ST	High Voltage Charge System	3.8	2,720*3	60.50	5.10	56.95	42.0
UF-515161SX	High Voltage Charge System	3.8	2,160*3	60.60	5.05	50.40	37.5
UF-384461SU	LCO-System	3.7	1,280	60.70	3.80	43.55	24.6
UF-424261F	LCO-System	3.7	1,350	60.80	4.10	41.85	26.2
UF-433861F	LCO-System	3.7	1,170	60.80	4.30	37.85	23.4
UF-503861F	LCO-System	3.7	1,420	60.80	5.00	37.85	27.7
UF-384961S	LCO-System	3.7	1,450	61.00	3.80	48.80	27.5
UF-494961S	LCO-System	3.7	1,860	61.00	4.90	48.80	34.9
UF-464462F	LCO-System	3.7	1,520	61.40	4.50	43.60	29.1
UF-484462S	LCO-System	3.7	1,590	61.70	4.70	43.90	30.3
UF-484462SX	High Voltage Charge System	3.8	1,760*3	61.70	4.70	43.90	30.5
UF-534462S	LCO-System	3.7	1,860	61.70	5.30	43.90	34.7
UF-604462SW	High Voltage Charge System	3.8	2,480*3	61.70	6.00	43.90	39.2
UF-653864S	LCO-System	3.7	2,100	64.40	6.50	38.00	38.5
UF-544965SW	High Voltage Charge System	3.8	2,550*3	65.00	5.40	48.40	41.5

Model	Technology*1	Nominal voltage (V)	Typical*2 capacity (mAh)	Dimensions (mm)			Approx. weight (g)
				Diameter	Thickness	Height	
UF-575673SX	High Voltage Charge System	3.8	3,200*3	72.50	5.65	55.40	53.7
UF-475678SX	High Voltage Charge System	3.8	2,720*3	78.00	4.65	55.40	47.4
UF-426080SX	High Voltage Charge System	3.8	2,640*3	80.00	4.20	60.00	47.8
UF-496080SX	High Voltage Charge System	3.8	3,160*3	80.00	4.85	60.00	55.4
NCA-623535	NNP, HRL	3.6	1,080	35.10	6.30	35.20	17.7
NCA-473136	NNP, HRL	3.6	650	35.45	4.70	30.90	11.7
NCA-752836A	NNP, HRL	3.6	1,010	35.95	7.80	27.90	16.7
NCA-793540	NNP, HRL	3.6	1,570	40.50	7.90	35.10	25.8
CGA-504042	PSS	3.7	980	41.35	5.00	39.80	19.8
CGA-543442	PSS	3.7	900	41.55	5.40	33.80	17.6
NCA-593446	NNP, HRL	3.6	1,300	45.75	5.90	33.80	20.6
NCA-103450	NNP, HRL	3.6	2,350	48.80	10.50	33.80	38.4
NCA-523450	NNP, HRL	3.6	1,150	49.55	5.30	33.76	19.7
NCA-903864A	NNP, HRL	3.6	3,220	63.80	9.00	38.00	50.7
NCA-653864	NNP, HRL	3.6	2,200	64.35	6.50	38.10	36.4
NCA-596080	NNP, HRL	3.6	4,170	80.00	5.85	60.00	67.0

3D ILLUSTRATION*4

- 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



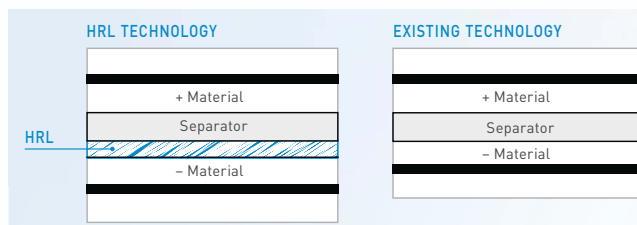
*1 Please find the explanations of our technologies on the following pages. *2 4.2V charge *3 4.35V charge

*4 Some batteries are not equipped with a PTC. Please consult Panasonic for further information. The illustration shows only one example of a Li-ion battery structure.

LI-ION TECHNOLOGIES

HEAT RESISTANCE LAYER (HRL)*1

Nowadays all electronic devices getting more powerful, sophisticated and feature-laden and therefore require more robust and safer batteries. Increasing energy density, however, raises the risk of overheating and ignition due to internal short-circuiting. Panasonic deploys the HRL (Heat Resistance Layer) technology to improve the safety of Lithium-Ion batteries significantly. This heat resistance layer consists of an insulating metal oxide on the surface of the electrodes which prevents the battery from overheating if an internal short-circuit occurs. Safety is the base for everything. Higher energy can be established based on safety technology.



HIGH POWER TYPE

These batteries are designed specifically for applications such as power tools: with optimised electrode material and cell structure for low internal resistance, these Panasonic batteries can drive high drain applications with huge power consumption such as cleaning machines and drills / drivers.

HIGH VOLTAGE CHARGE SYSTEM

Panasonic develops the High Voltage Charge technology: high capacity under the prerequisite of a charging voltage up to 4.35V. This technology is ideal to power devices such as laptops, notebooks, etc.

LCO SYSTEM

This Panasonic Li-Ion battery system uses a cobalt-based cathode, offers high capacity and is a standard solution for a variety of applications.

NICKEL OXIDE BASED NEW PLATFORM (NNP)

This new Lithium-Ion battery technology contains on one side a unique high capacity Nickel based positive electrode and on the other side a material and processing technology. The latter prevents deformation of the alloy-based negative electrode when subjected to repeated charge and discharge. This is what our Nickel Oxide Based New Platform stands for.*2

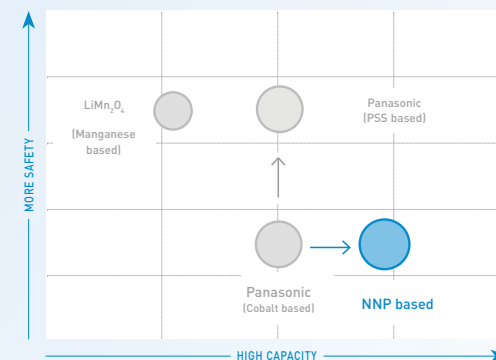
Characteristics of the Panasonic NNP technology:

- Good cycle life performance
- High energy density
- The new Nickel positive electrode excels in durability in actual use and charge retention
- Low self-discharge
- Long storage reliability through reduced metal elution

*1 A couple of our batteries are not provided with our HRL technology yet. Please contact Panasonic to be informed about the current situation.

*2 Panasonic Lithium-Ion cells must always be equipped with a safety unit.

COMPARISON BETWEEN CAPACITY AND SAFETY OF CATHODE MATERIALS



STANDARD TYPE

The Panasonic Li-Ion batteries feature a good mix of performance and safety, and can power a comprehensive range of applications.

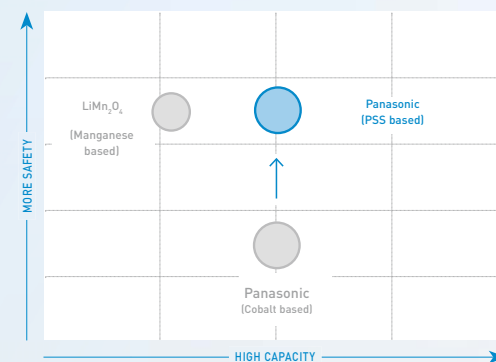
PANASONIC SOLID SOLUTION (PSS)

The Panasonic Solid Solution technology combines two major battery properties: capacity and safety. This technology provides the customer with a high capacity such as the standard Panasonic Lithium-Ion (Cobalt based) cells and also owns a high safety standard like the LiMn₂O₄ (Manganese based) Lithium-Ion batteries.*1

Characteristics of the Panasonic PSS featured Lithium-Ion battery:

- Thermal stability of cathode materials leads to high safety
- Same energy density as cobalt based Lithium-Ion batteries
- Excellent cycle life
- Less voltage drop at initial discharge than other Lithium-Ion batteries

COMPARISON BETWEEN CAPACITY AND SAFETY OF CATHODE MATERIALS



*1 Panasonic Lithium-Ion cells must always be equipped with a safety unit.

IDEAL FOR LESS COMPLEX AND COST-SENSITIVE APPLICATIONS



VIDEO



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H type

HIGH TEMPERATURE & LONG LIFE TYPE

The expected life of these back-up batteries is about 6 to 10 years and therefore approximately twice the life time 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, vending machines and back-up for base station.

FEATURES

- High charge efficiency at elevated temperatures
- Small size and light weight
- Long lifetime when using intermittent charge

APPLICATIONS

- Emergency call (E-Call)
- Medical equipment
- Emergency lighting
- Ticketing machine
- POS system
- Solar window shutter
- Shaver, other

MODEL NUMBER (EXAMPLE)

B K - 6 0 A A A H

High temperature & long life type
Diameter: AAA, AA, A
Multiply this by 10 to obtain the rated capacity
(some exceptions)
Nickel-Metal-Hydride battery

Model	Old Model No	Dia- meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm) Diameter	Height	Approx. weight (g)	IEC
BK-60AAAH	HHR-60AAAH	AAA	AAA	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	13	HR11/45
BK-70AAH	HHR-70AAH	AA	AA	1.2	700	750	14.5 +0/-0.7	49.0 +0/-1.5	18	HR15/49
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	36	HR17/50
BK-370AH	HHR-370AH	A	LFat/A	1.2	3,500	3,700	18.2 +0/-0.7	67.5 +0/-1.5	60	-



PH type

HIGH RATE DISCHARGE & HIGH TEMPERATURE 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

- Excellent large current discharge characteristics at 60°C
- Small size and light weight
- Energy saving, long life

APPLICATIONS

- Medical equipment
- Power tool
- Garden tool
- Robot cleaner
- Electric vehicle, others

MODEL NUMBER (EXAMPLE)

B K - 3 3 0 A P H

High rate discharge & high temperature type
Diameter: AAA, AA, A
Multiply this by 10 to obtain the rated capacity
(some exceptions)
Nickel-Metal-Hydride battery

Model	Old Model No	Dia- meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm) Diameter	Height	Approx. weight (g)	IEC
BK-330APH	HHR-330APH	A	LFat/A	1.2	3,200	3,300	18.2 +0/-0.7	67.5 +0/-1.5	60	-
BK-250SCH	HHR-250SCH	SC	SC	1.2	2,500	2,650	23.0 +0/-1.0	43.0 +0/-1.5	55	HR23/43
BK-310CH	-	C	C	1.2	3,100	3,300	25.8 +0/-1.0	50.0 +0/-2.0	80	HR26/50



B type

BUTTON TOP TYPE

The Panasonic button type batteries are compatible with dry batteries such as Alkaline and can be used up to 1800 times based on JIS standards. Besides they provide a high capacity level and a low self-discharge. Last but not least they can power applications which require superior low temperature characteristics.

FEATURES

- Offers long charge/discharge cycle life, about 1800 times
- High capacity level and low self-discharge (still have 90% capacity after storage for 1 year)
- Offers excellent temperature characteristics especially in low temperature

APPLICATIONS

- Flash light
- Personal digital assistant
- Toothbrush
- Shaver
- Remote control, others

MODEL NUMBER (EXAMPLE)

BK - 80 A A A B

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

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm) Diameter Height	Approx. weight (g)	IEC
BK-65AAAB ^{*1}	-	AAA	AAA	1.2	650	700	10.5 +0/-0.7 44.5 +0/-1.0	12	HR11/45
BK-80AAAB ^{*1}	HHR-80AAAB	AAA	AAA	1.2	750	780	10.5 +0/-0.7 44.5 +0/-1.0	13	HR11/45
BK-110AAB ^{*2}	HHR-110AAB	AA	AA	1.2	1,000	1,050	14.5 +0/-0.7 50.5 +0/-1.0	20	HR15/51
BK-200AAB ^{*2}	-	AA	AA	1.2	1,900	2,000	14.5 +0/-0.7 50.5 +0/-1.0	29	HR15/51



N type

STANDARD 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 distance meter.

FEATURES

- High quality and reliability
- Good balance in terms of capacity and lifetime

APPLICATIONS

- Medical
- Communication
- Shaver
- Toothbrush
- Navigation device
- Torchlight
- Measurement, others

MODEL NUMBER (EXAMPLE)

BK - 70 A A A

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

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm) Diameter Height	Approx. weight (g)	IEC
BK-65AAAK	HHR-65AAAK	AAA	AAA	1.2	650	700	10.5 +0/-0.7 44.5 +0/-1.5	12	HR11/45
BK-70AAAJ	HHR-70AAAJ	AAA	AAA	1.2	700	730	10.5 +0/-0.7 44.5 +0/-1.5	12	HR11/45
BK-90AAA	-	AAA	L-AAA	1.2	830	880	10.5 +0/-0.7 50.5 +0/-1.5	14	HR11/67
BK-120AA	HHR-120AA	AA	4/5AA	1.2	1,150	1,220	14.5 +0/-0.7 43.0 +0/-1.5	23	HR15/43
BK-70AA	HHR-70AA	AA	AA	1.2	700	780	14.5 +0/-0.7 49.0 +0/-1.5	18	HR15/49
BK-150AA	HHR-150AA	AA	AA	1.2	1,500	1,580	14.5 +0/-0.7 50.5 +0/-1.5	26	HR15/51
BK-110AAO	HHR-110AAO	AA	AA	1.2	1,100	1,180	14.5 +0/-0.7 50.5 +0/-1.5	26	HR15/51
BK-200A	HHR-200A	A	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	38	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	A	LFat/A	1.2	4,200	4,500	18.2 +0/-0.7 67.5 +0/-1.5	60	-



P type

HIGH RATE DISCHARGE & RAPID CHARGE 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 electric vehicles.

FEATURES

- Excellent large current discharge characteristics
- Rapid charge-capable

APPLICATIONS

- Medical equipment
- Power tool
- Garden tool
- Robot cleaner
- Electric vehicle, others

MODEL NUMBER (EXAMPLE)

BK - 300 S C P

High rate discharge & rapid charge type
Diameter: 4/5SC, SC, C
Multiply this by 10 to obtain the rated capacity (some exceptions)
Nickel-Metal-Hydride battery

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm) Diameter Height	Approx. weight (g)	IEC
BK-200SCP ^{*1}	HHR-200SCP	SC	4/5SC	1.2	1,900	2,100	23.0 +0/-1.0 34.0 +0/-1.5	42	HR23/34
BK-260SCP ^{*1}	HHR-260SCP	SC	SC	1.2	2,450	2,700	23.0 +0/-1.0 43.0 +0/-1.5	55	HR23/43
BK-300SCP ^{*1}	HHR-300SCP	SC	SC	1.2	2,800	3,050	23.0 +0/-1.0 43.0 +0/-1.5	57	HR23/43

^{*1} For high power use application such as power tools.



L type

LOW TEMPERATURE TYPE

This Panasonic battery type is especially designed for low temperature discharge at -30°C. Thus these batteries are ideal to power two way radios and other outdoor applications.

FEATURES

- Designed for applications which require low temperature discharge at -30°C

APPLICATIONS

- Two way radio
- UPS
- Construction sites signaling, others

MODEL NUMBER [EXAMPLE]

BK-130AA

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

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)	IEC
							Diameter	Height		
BK-130AA	-	AA	AA	1.2	1,250	1,400	14.5 +0/-0.7	50.5 +0/-1.5	26	HR15/51
BK-250A	-	A	A	1.2	2,450	2,600	17.0 +0/-0.7	50.0 +0/-2.0	40	HR17/50

3D ILLUSTRATION*1



VIDEO



Scan QR code to view 3D animated video.



INFRASTRUCTURE TYPE

These battery types offer high capacity on the one hand and an outstanding efficiency even at low temperature environments on the other. They are particular designed for power storage and automated guided vehicles (AGV).

FEATURES

- Realisation of lightweight and space-saving
- Alternative compared to VRLA batteries
- By using Nickel-Metal-Hydride battery, power supply provides high efficiency even at a low temperature

APPLICATIONS

- UPS
- Green energy
- Solar window shutter
- Wind turbine
- Energy storage
- Floating machine, others

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)	IEC
							Diameter	Height		
BK-10V1S	-	V	V	1.2	90,000	95,000	62.6 +1.0/-1.0	188.7 +1.0/-1.0	1,700	-
BK-10V10T	HHR-10V10T	Pack	Pack	12.0	90,000	95,000	428 x 159 x 270mm (WxDxH)		23,000	-



9V BLOCK

The Panasonic Ni-MH 9V block provides high energy density, good life cycle performance and no memory effect. It is versatile enough for a range of applications.

APPLICATIONS

- Personal digital assistant
- Multimeter
- Measurement
- Toy
- Pager, others

Model	Old Model No	Dia-meter	Size	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)	IEC
							Diameter	Height		
BK-9SRE/BA1	HHR-9SRE/BA1	E-Block	E-Block	8.4	170	175	26 x 16.3 x 48.5mm (WxDxH)		42	-

WELL SUITED TO TOUGH CONDITIONS



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 Ni-Cd 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	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
KR-7000F	1.2	7,000	7,700	33.2+0/-0.9	91.0+0/-1.4	224
KR-10000M	1.2	10,000	12,000	43.1+0/-1.0	91.0+0/-1.4	395



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	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
N-600AACL	1.2	600	650	14.3+0/-0.5	48.9+0/-1.0	22
N-600AAC	1.2	600	650	14.3+0/-0.5	50.2+0/-1.0	22
N-700AACL	1.2	700	750	14.3+0/-0.5	48.9+0/-1.0	23
N-700AAC	1.2	700	750	14.3+0/-0.5	50.2+0/-1.0	23



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	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
N-1250SCL	1.2	1,200	1,250	22.9+0/-1.0	34.0+0/-1.2	43
N-1300SCR	1.2	1,300	1,400	22.9+0/-1.0	43.0+0/-1.2	51
N-1700SCR	1.2	1,700	1,850	22.9+0/-1.0	43.0+0/-1.2	55
N-3000CR	1.2	3,000	3,200	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	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
KR-AAH	1.2	600	650	14.3+0/-0.5	48.9+0/-1.0	23
KR-1200SCH	1.2	1,200	1,300	22.9+0/-1.0	43.0+0/-1.2	47
KR-1600SCH	1.2	1,600	1,650	22.9+0/-1.0	43.0+0/-1.2	49
KR-2000CH	1.2	2,000	2,100	26.0+0/-0.8	50.0+0/-1.2	72
KR-2500CH	1.2	2,500	2,600	26.0+0/-0.8	50.0+0/-1.2	75
KR-3000CH	1.2	2,900	3,050	26.0+0/-0.8	50.0+0/-1.3	78
KR-FH	1.2	7,000	7,700	33.2+0/-0.9	91.0+0/-1.4	224
KR-5/3MH	1.2	20,000	22,000	43.1+0/-1.0	146.1+0/-1.5	648
KR-MH	1.2	10,000	12,000	43.1+0/-1.0	91.0+0/-1.4	395



HEAT-RESISTANT TYPE

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

Model	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
N-600AAK	1.2	600	650	14.3+0/-0.5	50.2+0/-1.0	22
N-1200SCK	1.2	1,200	1,350	22.9+0/-1.0	43.0+0/-1.2	52

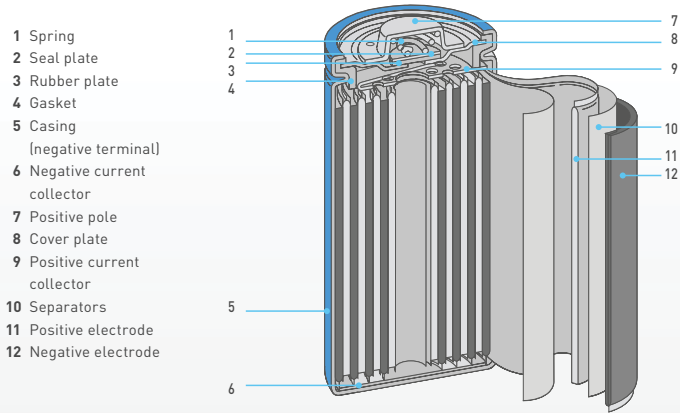


HEAT-RESISTANT & HIGH POWER TYPE

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

Model	Nominal voltage (V)	Rated capacity (mAh)	Average capacity (mAh)	Dimensions with tube (mm)		Approx. weight (g)
				Diameter	Height	
N-1600SCB	1.2	1,550	1,700	22.9+0/-1.0	42.9+0/-1.2	57
N-2000CB	1.2	2,000	2,300	26.0+0/-0.8	50.0+0/-1.3	85

3D ILLUSTRATION*



OUTSTANDING
QUALITY FOR
DEMANDING
APPLICATIONS



VIDEO



Scan QR code to view product series video.

BATTERY TYPES AND MODEL NUMBERS

Application	Series	Trickle design life (at 20°C)	Category	Standard ABS (UL94 HB)	FR ABS = Flame Retardant ABS (UL94 V-0)
Back up and main power	LC-R/RA	6 – 9 years	Trickle and cycle standard type	●	
	LC-P/PA/PB	10 – 12 years	Trickle long-life type		●
	LC-QA	15 years	Trickle super long-life type		●
Back up	LC-V/VA	6 – 9 years	Trickle standard type		●
	LC-X/XD/XB	10 – 12 years	Trickle long-life type	●	
	UP-PW	10 – 12 years	High power long-life type		●
Main power	UP-VW/VWA	6 – 9 years	High power type		●
	LC-CA/XC	-	Cycle long-life type	●	
	LC-T	-	Cycle long-life type for energy storage	●	

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



LC SERIES

The Panasonic LC series is a comprehensive range of high quality VRLA batteries serving the majority of VRLA battery applications. From batteries with a trickle design life of 6 – 9 years and 10 – 12 years to batteries of 15 years, the series includes solutions for every requirement. Various models are obtainable with flame retardant housing and with different terminals.

FEATURES

- State-of-the-art Absorbed Glass Mat (AGM) technology
- Superior design and low voltage spread gives excellent performance
- Enhanced lifespan due to low and stable charge current
- 100% inspection after final assembly and before shipment
- Almost 50 years of experience in production
- Selected batteries with flame-retardant battery containers according to UL94 V-0
- Various VdS approved batteries

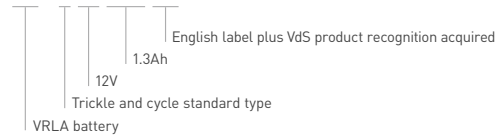
APPLICATIONS

- UPS
- Energy storage
- Communication infrastructure
- Wind turbines (pitch system)
- Alarm systems
- Medical equipment
- Emergency lights, other

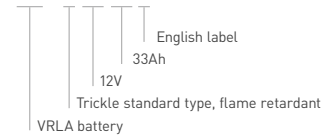
LC SERIES – TRICKLE DESIGN LIFE 6 – 9 YEARS

MODEL NUMBER (EXAMPLE)

LC - R 1 2 1 R 3 P G



LC - V 1 2 3 3 P



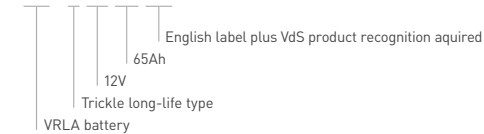
Model	Nominal voltage (V)	Rated capacity (Ah) 20 hours rate	Dimensions with tube (mm)			Approx. weight (g)	VdS N°
			Length	Width	Height		
LC-R061R3P	6	1.3	97.0	24.0	55.0	0.3	-
LC-R063R4P	6	3.4	134.0	34.0	66.0	0.6	-
LC-R064R5P	6	4.5	70.0	48.0	108.0	0.7	-
LC-R067R2P	6	7.2	151.0	34.0	100.0	1.3	-
LC-R0612P	6	12.0	151.0	50.0	100.0	2.0	-
LC-R121R3PG*1	12	1.3	97.0	47.5	55.0	0.6	G196049
LC-R122R2PG*1	12	2.2	177.0	34.0	66.0	0.8	G188151
LC-R123R4PG*1	12	3.4	134.0	67.0	66.0	1.2	G191053
LC-R124R5P*1	12	4.5	70.0	97.0	108.0	1.5	-

Model	Nominal voltage (V)	Rated capacity (Ah) 20 hours rate	Dimensions with tube (mm)			Approx. weight (g)	VdS N°
			Length	Width	Height		
LC-R127R2PG/P1*1	12	7.2	151.0	64.5	100.0	2.5	G193046
LC-RA1212PG/P1*1	12	12.0	151.0	98.0	100.0	3.8	G100001
LC-RA1215P/P1*1	12	15.0	151.0	98.0	100.0	4.2	-
LC-V1233P	12	33.0	195.6	130.0	180.0	11.1	-

LC SERIES – TRICKLE DESIGN LIFE 10 – 12 YEARS

MODEL NUMBER (EXAMPLE)

LC - X 1 2 6 5 P G



LC - X D 1 2 1 7 A P G



Model	Nominal voltage (V)	Rated capacity (Ah) 20 hours rate	Dimensions with tube (mm)			Approx. weight (g)	VdS N°
			Length	Width	Height		
LC-P067R2P/P1	6	7.2	151.0	34.0	100.0	1.3	-
LC-P0612P/P1	6	12.0	151.0	50.0	100.0	2.0	-
LC-P06200TA	6	200.0	407.0	173.0	250.0	41.0	-
LC-P122R2P	12	2.2	177.0	34.0	66.0	0.8	-
LC-P123R4P	12	3.4	134.0	67.0	66.0	1.2	-
LC-P127R2P/P1	12	7.2	151.0	64.5	100.0	2.5	-
LC-PA1212P/P1	12	12.0	151.0	98.0	100.0	3.7	-
LC-PA1216P/P1	12	16.0	151.0	98.0	105.0	4.1	-
LC-XD1217PG/APG	12	17.0	181.0	76.0	167.0	5.9	G104101
LC-P1220P/AP	12	20.0	181.0	76.0	167.0	6.6	-
LC-P1224P/APG	12	24.0	165.0	125.0	179.5/175.0	9.0	G198049
LC-P1228P/AP	12	28.0	165.0	125.0	179.5/175.0	11.0	-
LC-P1238PG/APG	12	38.0	197.0	165.0	180.0/175.0	13.0	G100002
LC-P1242P/AP	12	42.0	197.0	165.0	180.0/175.0	16.0	-
LC-X1265PG	12	65.0	350.0	166.0	175.0	23.5	G199090
LC-P1265PG	12	65.0	350.0	166.0	175.0	20.0	G199090
LC-P1275P	12	75.0	350.0	166.0	175.0	24.0	-
LC-XB12100P	12	100.0	407.0	173.0	236.0	36.5	-
LC-PB12100P	12	100.0	407.0	173.0	236.0	36.5	-
LC-P12120P	12	120.0	407.0	173.0	236.0	34.5	-
LC-P12150BP*2	12	150.0	532.0	183.0	214.0	43.0	-
LC-P12200BP*2	12	200.0	533.0	237.0	216.0	57.0	-

*1 This battery is also available with a flame retardant battery case resin (UL94 V-0).

*2 This battery is equipped with insert terminals.



LC CYCLIC SERIES

The Panasonic LC cyclic series is a main power source for electrical devices which require reliable power frequently. Based on our proven technology for stand-by and occasional back-up, this series uses different plate design and other tweaks to achieve long cycle life.

FEATURES

- State-of-the-art Absorbed Glass Mat (AGM) technology
- Superior design and low voltage spread gives excellent performance
- Enhanced lifespan due to low and stable charge current
- 100% inspection after final assembly and before shipment
- Years of experience in production
- Selected batteries with flame-retardant battery containers according to UL94 V-0
- Various VdS approved batteries

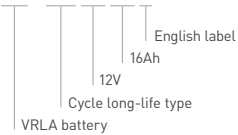
APPLICATIONS

- Solar street lighting
- Medical equipment
- Lawn mowers
- Automated guided vehicles
- Wheelchairs, other

LC CYCLIC – CYCLE LONG-LIFE AND CYCLE LONG-LIFE FOR ENERGY STORAGE

MODEL NUMBER (EXAMPLE)

LC - CA 12 16 P



Model	Nominal voltage (V)	Rated capacity (Ah) 20 hours rate	Dimensions with tube (mm)			Approx. weight (g)	VdS N°
			Length	Width	Height		
LC-CA1212P/P1	12	12.0	151.0	98.0	100.0	3.8	-
LC-CA1215P/P1	12	15.0	151.0	98.0	100.0	4.2	-
LC-CA1216P/P1	12	16.0	151.0	98.0	105.0	4.7	-
LC-XC1222P/AP	12	22.0	181.0	76.0	167.0	6.6	-
LC-XC1228P/AP	12	28.0	165.0	125.0	179.5	10.0	-
LC-XC1238P/AP	12	38.0	197.0	165.0	179.5	15.0	-
LC-T1270P*1	12	70.0	350.0	166.0	175.0	24.5	-
LC-T12105P*1	12	105.0	407.0	173.0	236.0	34.0	-



LC-QA SERIES

The hallmarks of the Panasonic LC-QA battery series are a very long service life of 15 years (at 20°C) and excellent product quality. The latest LC-QA models are the result of a research programme to prolong the service life of lead-acid batteries, which Panasonic started back in 1984.

FEATURES

- Innovative lead-calcium tin alloy minimises harmful corrosion to the positive electrode
- Reliable seal thanks to a rubber washer and epoxy resin
- Flame-retardant housing according to UL 94-V0

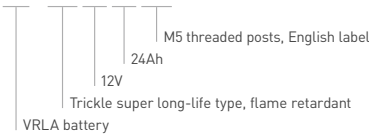
APPLICATIONS

- Mainly telecommunications industry
- Emergency light for trains
- UPS systems
- Energy distribution, other

LC-QA SERIES – TRICKLE DESIGN LIFE 15 YEARS

MODEL NUMBER (EXAMPLE)

LC - QA 12 24 AP



Model	Nominal voltage (V)	Rated capacity (Ah) 20 hours rate	Dimensions with tube (mm)			Approx. weight (g)	VdS N°
			Length	Width	Height		
LC-QA06210TP	6	210.0	407.0	173.0	250.0	36.5	-
LC-QA1224P/AP	12	24.0	165.0	125.0	175.0	10.0	-
LC-QA1242P	12	42.0	197.0	165.0	180.0	16.0	-
LC-QA1270P	12	70.0	350.0	166.0	175.0	23.5	-
LC-QA12110TP	12	110.0	407.0	173.0	236.0	36.0	-



UP-VW / -PW SERIES

The Panasonic UP-VW / -PW series offers up to 30% higher energy density compared to conventional VRLA batteries with the same dimensions. The series is ideal for UPS systems which require a short discharge time of about 30 minutes or less.

FEATURES

- 30% higher energy density compared to conventional VRLA batteries
- Superior quality
- 100% inspection after final assembly and before shipment
- Years of experience in production
- Batteries with flame-retardant battery container according to UL94 V-0

APPLICATIONS

- UPS systems
- Servers, other

UP-VW / -PW SERIES – TRICKLE DESIGN LIFE 6 – 9 AND 10 – 12 YEARS

MODEL NUMBER (EXAMPLE)

U P - P W 1 2 4 5 P

English label
The wattage per cell at 10 minutes rate discharge
12V
Watt
Trickle long-life type, flame retardant
VRLA battery – high power type

U P - V W 1 2 2 0 J 1

Terminal type (faston 250)
Japanese label
The wattage per cell at 10 minutes rate discharge
12V
Watt
Trickle type, flame-retardant
VRLA battery – high power type

Model	Nominal voltage [V]	Rated power [W] 10 minutes rate	Dimensions with tube (mm)			Approx. weight [g]	VdS N°
			Length	Width	Height		
UP-VW0645P1	6	135.0	151.0	34.0	100.0	1.3	-
UP-VW1220P1	12	120.0	140.0	38.5	100.0	1.4	-
UP-VW1228P1	12	200.0	151.0	64.5	100.0	1.9	-
UP-VWA1232P1/P2	12	192.0	151.0	51.0	100.0	2.0	-
UP-VW1236P1	12	224.0	151.0	64.5	100.0	2.1	-
UP-VW1245P1	12	270.0	151.0	64.5	100.0	2.6	-
UP-PW1245P1	12	270.0	151.0	64.5	100.0	2.6	-



EV SERIES

The Panasonic EV series is designed specifically for electric vehicles and long-term cyclic applications. In both cases, the high cycle stability is a particular highlight, achieved in a recommended 5-step charging procedure.

FEATURES

- High capacity
- Designed for deep discharges
- Extraordinary cycle stability
- Excellent discharge characteristics at low temperatures and high currents

APPLICATIONS

- Golf buggies
- Mobile floor sweepers
- Solar or wind powered street lighting and advertising displays, other

EV SERIES – CYCLE VERY LONG-LIFE FOR MOTIVE POWER

MODEL NUMBER (EXAMPLE)

E C - F V 1 2 3 8

38Ah
12V
Electric vehicle
VRLA battery – cycle long-life type for motive power

Model	Nominal voltage [V]	Rated capacity [Ah] 5 hours rate	Dimensions with tube (mm)			Approx. weight [g]	VdS N°
			Length	Width	Height		
EC-FV0890B1E	8	90.0	388.0	116.0	175.0	22.0	-
EC-FV1238	12	38.0	261.0	116.0	175.0	14.0	-
EC-FV1260	12	60.0	388.0	116.0	175.0	21.0	-

3D ILLUSTRATION^{*1}

- 1 Negative plate terminal
- 2 Seals
- 3 Positive plate terminal
- 4 Battery case
- 5 Positive electrode
- 6 Separator
- 7 Negative electrode
- 8 Valve



VIDEO



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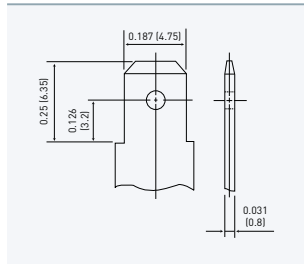
^{*1} The illustration shows only one example of VRLA battery structure.

TERMINAL TYPES

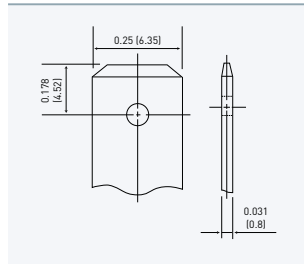
Panasonic offers the appropriate terminal type for each VRLA battery depending on the technical prerequisites. Additionally, some battery types are available with different terminal alternatives.

Unit: inch (mm)

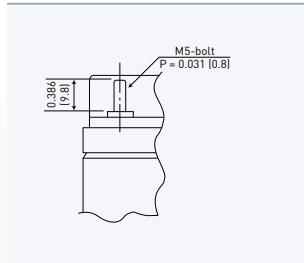
FASTON TAB TYPE 187 (P)



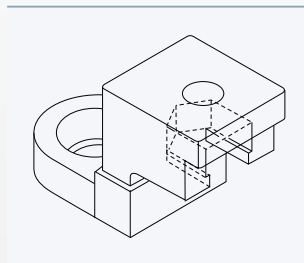
FASTON TAB TYPE 250 (P1)



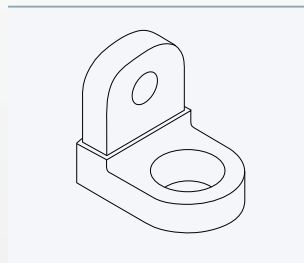
M5 THREADED POST TYPE (AP)



T-SHAPE TERMINAL (M10) (T)



L-SHAPE TERMINAL (M5, 6, 8)
(BOLT & NUT) (P)



STATE-OF-THE-ART LITHIUM BATTERIES



VIDEO



Scan QR code
to view product
series video.

PRIMARY BR - 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 at page 36 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	Li metal		Li metal	Li metal
	Electrolyte	Organic electrolyte		Organic electrolyte	Organic electrolyte
Performance	Nominal voltage		3V	3V	3V
	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}
Environment	Reliability		++	+	- ^{*2}
	Safety		++	++	-
	Eco friendly		++	++	- ^{*3}

++ Very good capability
+ Good capability
- Not good capability



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.

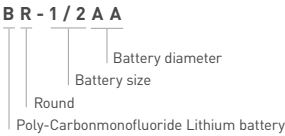
FEATURES

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

APPLICATIONS

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

MODEL NUMBER (EXAMPLE)



Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal ^{*1} capacity (mAh)	Diameter	Height		
BR-1/2AA ^{*2}	3	1,000	14.5	25.5	8.0	-
BR-2/3A	3	1,200	17.0	33.5	13.5	BR17335
BR-2/3AG	3	1,450	17.0	33.5	13.5	BR17335
BR-A	3	1,800	17.0	45.5	18.0	-
BR-AG	3	2,200	17.0	45.5	18.0	-
BR-C	3	5,000	26.0	50.5	42.0	-

3D ILLUSTRATION^{*3}

- 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



VIDEO



Scan QR code to view 3D animated video.



LITHIUM CR CYLINDRICAL SERIES FOR CONSUMER (NON-RECHARGEABLE)

Panasonic Photo-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.

^{*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.

^{*1} Capacity based on standard drain and cut off voltage down to 2.0V or 4.0V at 20°C.
^{*2} Operating temperature range is from - 40°C ~ + 100°C.
^{*3} The illustration shows only one example of Lithium battery structure.

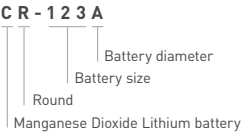
FEATURES

- Operating temperature range: between -40°C ~ +70°C
- Good pulse capability
- Stable voltage level during discharge
- 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)



Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
CR-2*2	3	850	15.6	27.0	11	CR15H270
CR-123A*2	3	1,400	17.0	34.5	17	CR17345
2CR-5*2	6	1,400	34.0	45.0	38	2CR5
CR-P2*2	6	1,400	35.0	36.0	37	CRP2
CR-V3*2	3	3,300	29.0 x 14.5	52.0	39	-

3D ILLUSTRATION*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 In case of usage below 20mA discharge please consult Panasonic.
*3 The illustration shows only one example of Lithium battery structure.



LITHIUM CR CYLINDRICAL SERIES FOR PROFESSIONALS
(NON-RECHARGEABLE)

Ideal for industrial equipment, this series offers both excellent high-rate discharge performance and a long service life of up to ten years.

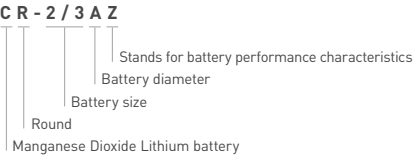
FEATURES

- Stable impedance throughout battery life
- Operating temperature range: between -40°C ~ +70°C
- High discharge characteristics
- Long-term reliability
- Self discharge rate at 20°C is just 1% per year

APPLICATIONS

- Medical equipment
- E-Call
- Tracking & RFID
- Smoke detectors
- Alarm systems
- Marine devices, etc.

MODEL NUMBER (EXAMPLE)



Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
CR-2/3AZ	3	1,600	17	33.5	17	-
CR-A6	3	2,400	17	45.5	24	-

3D ILLUSTRATION*2

- 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 Capacity based on standard drain and cut off voltage down to 2.0V or 4.0V at 20°C.
*2 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.

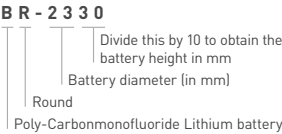
FEATURES

- Self discharge rate at 20°C is just 1.0% per year
- Wide operating temperature range: between -30°C ~ +80°C
- Superior long-term reliability
- Years of experience in production

APPLICATIONS

- Tracking & RFID
- Memory back-up
- Meters, etc.

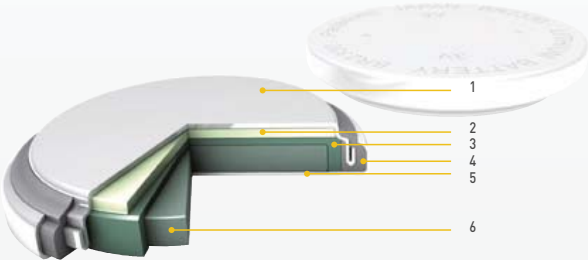
MODEL NUMBER (EXAMPLE)



Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
BR-1220	3	35	12.5	2.0	0.7	-
BR-1225	3	48	12.5	2.5	0.8	BR1225
BR-1632	3	120	16.0	3.2	1.5	-
BR-2032	3	200	20.0	3.2	2.5	-
BR-2325	3	165	23.0	2.5	3.0	BR2325
BR-2330	3	255	23.0	3.0	3.2	-
BR-3032	3	500	30.0	3.2	5.5	-

3D ILLUSTRATION*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.

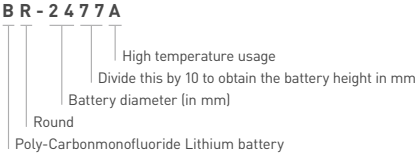
FEATURES

- Superior design for high temperature applications -40°C ~ +125°C
- Outstanding long-term reliability
- 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.

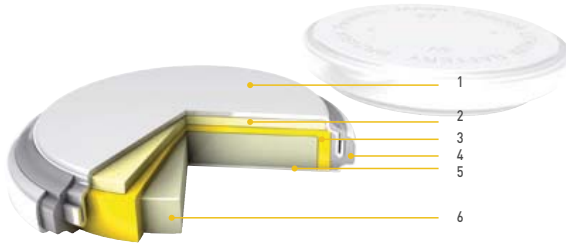
MODEL NUMBER (EXAMPLE)



Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
BR-1225A*2	3	48	12.5	2.5	0.8	-
BR-1632A*2	3	120	16.0	3.2	1.5	-
BR-2330A*2	3	255	23.0	3.0	3.2	-
BR-2450A*2	3	550	24.5	5.0	5.9	-
BR-2477A*2	3	1,000	24.5	7.7	8.0	-

3D ILLUSTRATION*3

- 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 Only batteries with terminals are available.
*3 The illustration shows only one example of Lithium battery structure.



LITHIUM CR COIN 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
- High discharge characteristics
- Stable voltage level during discharge
- Long-term reliability
- Self discharge rate at 20°C is just 1.0% per year
- Temperature range -30°C ~ +60°C

APPLICATIONS

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

MODEL NUMBER [EXAMPLE]

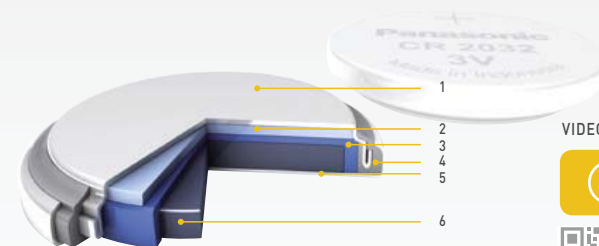
CR - 2 0 3 2

Divide this by 10 to obtain the battery height in mm
Battery diameter (in mm)
Round
Manganese Dioxide Lithium battery

Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
CR-1025	3	30	10.0	2.5	0.7	CR1025
CR-1216	3	25	12.5	1.6	0.7	CR1216
CR-1220	3	35	12.5	2.0	1.2	CR1220
CR-1612	3	40	16.0	1.2	0.8	-
CR-1616	3	55	16.0	1.6	1.2	CR1616
CR-1620	3	75	16.0	2.0	1.3	CR1620
CR-1632	3	140	16.0	3.2	1.8	-
CR-2012	3	55	20.0	1.2	1.4	CR2012
CR-2016	3	90	20.0	1.6	1.6	CR2016
CR-2025	3	165	20.0	2.5	2.5	CR2025
CR-2032	3	220	20.0	3.2	3.1	CR2032
CR-2330	3	265	23.0	3.0	4.0	CR2330
CR-2354	3	560	23.0	5.4	5.9	CR2354
CR-2412	3	100	24.5	1.2	2.0	-
CR-2450	3	620	24.5	5.0	6.3	CR2450
CR-2477	3	1,000	24.5	7.7	10.5	-
CR-3032	3	500	30.0	3.2	7.1	CR3032

3D ILLUSTRATION*1

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



VIDEO



Scan QR code to view 3D animated video.



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.

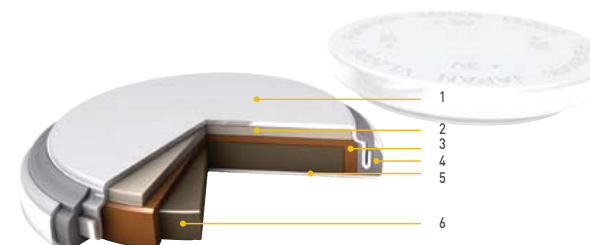
MODEL NUMBER [EXAMPLE]

VL - 2 0 2 0

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

3D ILLUSTRATION*1

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



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

VANADIUM PENTOXIDE LITHIUM (VL SERIES)

Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
VL-621	3	1.5	6.8	2.1	0.3	–
VL-1220	3	7.0	12.5	2.0	0.8	–
VL-2020	3	20.0	20.0	2.0	2.2	–
VL-2320	3	30.0	23.0	2.0	2.7	–
VL-2330	3	50.0	23.0	3.0	3.5	–
VL-3032	3	100.0	30.0	3.2	6.2	–

MANGANESE LITHIUM (ML SERIES)

Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*2 capacity (mAh)	Diameter	Height		
ML-421	3	2.3	4.8	2.1	0.1	–
ML-614	3	3.4	6.8	1.4	0.2	–
ML-621	3	5.0	6.8	2.1	0.2	–
ML-920	3	11.0	9.5	2.0	0.4	–
ML-1220	3	17.0	12.5	2.0	0.8	–
ML-2020	3	45.0	20.0	2.0	2.2	–

MANGANESE TITANIUM LITHIUM (MT SERIES)

Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*3 capacity (mAh)	Diameter	Height		
MT-516	1.5	1.8	5.8	1.6	0.2	–
MT-621	1.5	2.5	6.8	2.1	0.3	–
MT-920	1.5	5.0	9.5	2.0	0.5	–



PIN TYPE POLY-CARBONMONOFLUORIDE LITHIUM (BR SERIES)

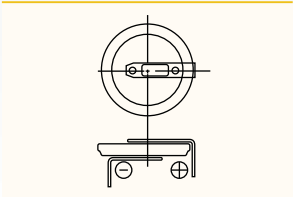
Model	Electrical characteristics at 20°C		Dimensions with tube (mm)		Approx. weight (g)	IEC
	Nominal voltage (V)	Nominal*1 capacity (mAh)	Diameter	Height		
BR-425	3	25.0	4.2	25.9	0.6	–
BR-435	3	50.0	4.2	35.9	0.9	–

*1 Based on standard drain and cut off voltage down to 2.0V at 20°C.
*2 Based on standard drain and cut off voltage down to 1.0V at 20°C.
*3 Based on standard drain and cut off voltage down to 0.5V at 20°C.

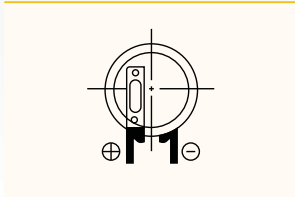
TERMINAL TYPES

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.

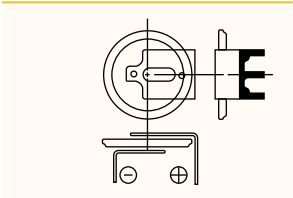
H TYPE



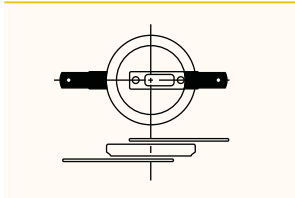
V TYPE



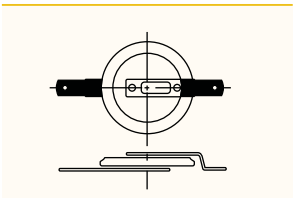
G TYPE



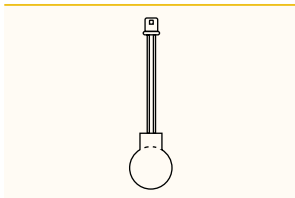
T TYPE



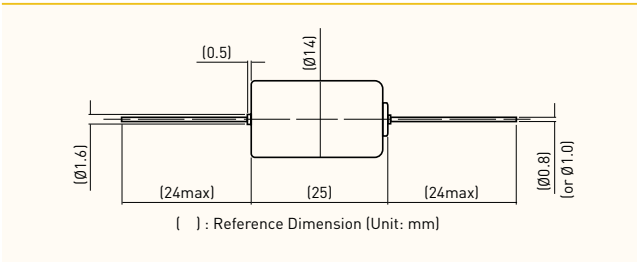
F TYPE



S TYPE



BR-1/2A WITH AXIAL PIN TERMINAL



IDEAL FOR HIGH-PERFORMANCE STANDARD APPLICATIONS



VIDEO



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 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

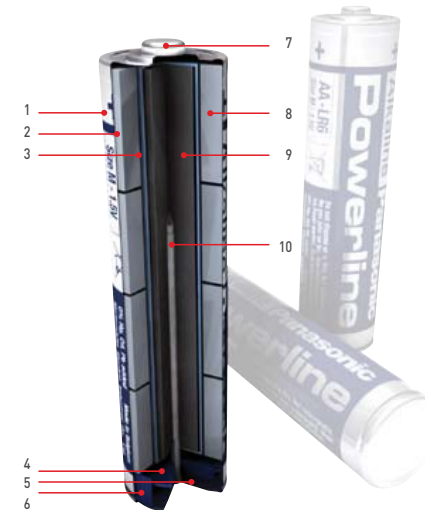
- Smoke detectors
- Marine devices
- High energy flashlights
- Scales
- Cleaning and hygiene services, other

Made in Europe

Model	Size	Nominal voltage (V)	Dimensions (mm) Diameter	Height	Approx. weight (g)	IEC
LR03AD	AAA	1.5	10.5	44.5	11.2	LR03
LR6AD	AA	1.5	14.5	50.5	23.3	LR06
LR14AD	C	1.5	26.2	50.0	69.5	LR14
LR20AD	D	1.5	34.2	61.5	142.7	LR20
6LR61AD	9V	9.0	17.5 x 26.5	48.5	44.3	6LR61

3D ILLUSTRATION*1

- Tube
- Cell can
- Separator
- Safety vent
- Negative pole
- Sealing
- Positive pole
- Cathode
(Manganese-Dioxide-Carbon)
- Anode (Zinc-gel)
- Nail



VIDEO



Scan QR code to
view 3D animated
video.



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 made in Europe.

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

FEATURES

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

APPLICATIONS

- Alarm clocks
- Remote controls
- Radios
- Flashlights, other

Made in Europe

Model	Size	Nominal voltage [V]	Dimensions (mm) Diameter	Height	Approx. weight (g)	IEC
R03	AAA	1.5	10.5	44.5	8.0	R3
R6	AA	1.5	14.5	50.5	19.0	R6
R14	C	1.5	26.2	50.0	49.0	R14
R20	D	1.5	34.2	61.5	106.0	R20
6F22	9V	9.0	17.5 x 26.5	48.5	38.0	6F22

3D ILLUSTRATION*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

