FIND THE RIGHT BATTERY FOR YOUR APPLICATION

SHORT FORM CATALOG
INDUSTRIAL BATTERIES FOR PROFESSIONALS
FIND THE RIGHT PAGE
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INDEX</td>
<td>2 – 3</td>
</tr>
<tr>
<td>COMPANY</td>
<td>4 – 5</td>
</tr>
<tr>
<td>MARKETING SERVICE TOOLS</td>
<td>6 – 7</td>
</tr>
<tr>
<td>NICKEL-METAL HYDRIDE</td>
<td>8 – 13</td>
</tr>
<tr>
<td>NICKEL-CADMIUM</td>
<td>14 – 17</td>
</tr>
<tr>
<td>VALVE-REGULATED-LEAD-ACID (VRLA)</td>
<td>18 – 24</td>
</tr>
<tr>
<td>LITHIUM-ION</td>
<td>25 – 29</td>
</tr>
<tr>
<td>LITHIUM</td>
<td>30 – 40</td>
</tr>
<tr>
<td>ALKALINE</td>
<td>41 – 43</td>
</tr>
<tr>
<td>ZINC-CARBON</td>
<td>44 – 45</td>
</tr>
<tr>
<td>CONTACT</td>
<td>46</td>
</tr>
</tbody>
</table>
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 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 GMBH (PIEU)

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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.

*1 Employees of Panasonic Corporation
*2 Refers to the fiscal year ended March 2018 of Panasonic Corporation, based on exchange rate EUR/JPY 131.
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.
MARKETING SERVICE TOOLS

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 HTML 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 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 five formats: TIF, PNG, JPG, AI, PDF, and MP4. New files appear in the folder ‘New files’ for three months.

You can assemble as many files as you need and download them directly to your computer. Here’s an overview of what you can do:

- Locate the material you need by product name or by clicking through the categories
- Preview file details – the preview function tells you the full name of the file, its size, format, and resolution
- Select the files you wish to download. You can take files from multiple folders, or select all the material in a particular folder or category in one-click operation – there’s no need to select each one individually
- Preview your personal ‘Download bag’ of the files you have selected
- The Mediapool zips your data into a file, which you then download to your computer. You unzip the file to the location of your choice simply by double-clicking the file name. The material is then ready for use.

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!

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.
Designed for engineers, electronics specialists and developers who need batteries for their projects, the Battery Finder Application provides an overview of what’s available in the Panasonic range of industrial batteries, and gives a recommendation on the type of battery that’s best suited to the user’s application. It also offers a wealth of information, graphics and videos on battery technology. All in all – it’s now easier than ever to find the right battery!

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.

The white paper ‘Lead acid battery containers made of ABS’ takes a detailed look at the experience of our engineers with the material ABS for VRLA containers.

Our white paper ‘Lithium primary battery characteristics’ is meant to give an overview about requirements and characteristics of current Lithium technologies in the field of Wireless and IoT (Internet of Things) applications.

We are looking forward to expand our range of white papers step by step.
NICKEL-METAL HYDRIDE

IDEAL FOR LESS COMPLEX AND WIDE OPERATING TEMPERATURE APPLICATIONS

SUITABLE FOR NEARLY EVERY APPLICATION
HIGH QUALITY AND RELIABILITY
GOOD BALANCE IN TERMS OF CAPACITY AND LIFETIME
EXCELLENT PERFORMANCE IN WIDE TEMPERATURE RANGE

*1 This product shows a product with sample labeling. The same applies to all illustrations of the Ni-MH batteries on the following pages.
HIGH TEMPERATURE & LONG-LIFE TYPE

The expected life of these back-up batteries is about 6 to 10 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, vending machines and back-up for base station.

MODEL NUMBER (EXAMPLE)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage [V]</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-60AAH</td>
<td>HHR-60AAAH</td>
<td>AAA</td>
<td>AAA</td>
<td>1.2</td>
<td>500</td>
<td>550</td>
<td>10.5 +/-0.7</td>
<td>44.5 +/-1.5</td>
<td>13</td>
<td>HR11/45</td>
</tr>
<tr>
<td>BK-60AAH*1</td>
<td>-</td>
<td>AAA</td>
<td>AAA</td>
<td>1.2</td>
<td>500</td>
<td>550</td>
<td>10.5 +/-0.7</td>
<td>44.5 +/-1.5</td>
<td>12</td>
<td>HR11/45</td>
</tr>
<tr>
<td>BK-70AAH</td>
<td>HHR-70AAH</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>700</td>
<td>750</td>
<td>14.5 +/-0.7</td>
<td>49.0 +/-1.5</td>
<td>18</td>
<td>HR15/49</td>
</tr>
<tr>
<td>BK-110AAH</td>
<td>-</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,100</td>
<td>1,180</td>
<td>14.5 +/-0.7</td>
<td>50.5 +/-1.5</td>
<td>24</td>
<td>HR15/51</td>
</tr>
<tr>
<td>BK-120AAH*1</td>
<td>-</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,200</td>
<td>1,280</td>
<td>14.5 +/-0.7</td>
<td>50.5 +/-1.5</td>
<td>24</td>
<td>HR15/51</td>
</tr>
<tr>
<td>BK-150AAH</td>
<td>-</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,450</td>
<td>1,530</td>
<td>14.5 +/-0.7</td>
<td>50.5 +/-1.5</td>
<td>25</td>
<td>HR15/51</td>
</tr>
<tr>
<td>BK-160AAH</td>
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<td>A</td>
<td>4/5A</td>
<td>1.2</td>
<td>1,600</td>
<td>1,720</td>
<td>17.0 +/-0.7</td>
<td>43.0 +/-1.5</td>
<td>29</td>
<td>HR17/43</td>
</tr>
<tr>
<td>BK-210AAH</td>
<td>HHR-210AAH</td>
<td>A</td>
<td>A</td>
<td>1.2</td>
<td>1,900</td>
<td>2,050</td>
<td>17.0 +/-0.7</td>
<td>50.0 +/-2.0</td>
<td>36</td>
<td>HR17/50</td>
</tr>
<tr>
<td>BK-370AH</td>
<td>HHR-370AH</td>
<td>LFat/A</td>
<td>A</td>
<td>1.2</td>
<td>3,500</td>
<td>3,700</td>
<td>18.2 +/-0.7</td>
<td>67.5 +/-1.5</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>BK-1100FHU*1</td>
<td>-</td>
<td>F</td>
<td>F</td>
<td>1.2</td>
<td>11,000</td>
<td>12,000</td>
<td>33.0 +/-1.0</td>
<td>91.0 +/-2.5</td>
<td>250</td>
<td>HR33/91</td>
</tr>
</tbody>
</table>

HIGH RATE DISCHARGE & HIGH TEMPERATURE TYPE

These state-of-the-art back-up batteries deliver excellent current discharge characteristics at a high temperature range. 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
- Making large discharging current possible, long-life and excellent charging performance at 75°C*1

APPLICATIONS

- Medical equipment
- Garden tool
- Robot cleaner
- Electric vehicle
- Solar street lighting*2
- Motive power*2
- Elevator*2
- Emergency light*2, etc.

*1: New back-up type which can be operated at high ambient temperatures up to 75 °C. BK-120AAHU and BK-1100FHU are already in mass production. The BK-60AAAHU not yet.

*2: New back-up battery types BK-60AAAHU, BK-120AAHU and BK-1100FHU are particular designed to power this application.

*3: New back-up battery types BK-220SCHU and BK-310CHU are particular designed to power this application.
APPLICATIONS
- Flash light
- Personal digital assistant
- Toothbrush
- Shaver
- Remote control, etc.

FEATURES
- Offers long charge / discharge cycle life, about 1,800 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

MODEL NUMBER (EXAMPLE)

B K - 3 3 0 A PH
- High rate discharge & high temperature type
- Diameter: A, SC, C
- Multiply this by 10 to obtain the rated capacity (some exceptions)
- Nickel-Metal Hydride battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-330APH</td>
<td>HHR-330APH</td>
<td>A</td>
<td>LFat/A</td>
<td>1.2</td>
<td>3,200</td>
<td>3,300</td>
<td>18.2 ±0/-0.7</td>
<td>67.5 ±0/-1.5</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>BK-220SCHU*1</td>
<td>-</td>
<td>SC</td>
<td>SC</td>
<td>1.2</td>
<td>2,200</td>
<td>2,350</td>
<td>23.0 ±0/-1.0</td>
<td>43.0 ±0/-1.5</td>
<td>50</td>
<td>HR23/43</td>
</tr>
<tr>
<td>BK-250SCH</td>
<td>HHR-250SCH</td>
<td>SC</td>
<td>SC</td>
<td>1.2</td>
<td>2,500</td>
<td>2,650</td>
<td>23.0 ±0/-1.0</td>
<td>43.0 ±0/-1.5</td>
<td>55</td>
<td>HR23/43</td>
</tr>
<tr>
<td>BK-310CH</td>
<td>-</td>
<td>C</td>
<td>C</td>
<td>1.2</td>
<td>3,100</td>
<td>3,300</td>
<td>25.8 ±0/-1.0</td>
<td>50.0 ±0/-2.0</td>
<td>80</td>
<td>HR26/50</td>
</tr>
<tr>
<td>BK-310CHU*1</td>
<td>-</td>
<td>C</td>
<td>C</td>
<td>1.2</td>
<td>3,100</td>
<td>3,300</td>
<td>25.8 ±0/-1.0</td>
<td>50.0 ±0/-2.0</td>
<td>80</td>
<td>HR26/50</td>
</tr>
</tbody>
</table>

*1 New back-up type which can be operated at high ambient temperatures up to 75 °C.

The mass production of the BK-310CHU has already started. For the battery BK-220SCHU not yet.

MODEL NUMBER (EXAMPLE)

B K - 8 0 A A A B
- Cap shape: button top type
- Diameter: AAA, AA
- Multiply this by 10 to obtain the rated capacity (some exceptions)
- Nickel-Metal Hydride battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-65AAAB*3</td>
<td>-</td>
<td>AAA</td>
<td>AAA</td>
<td>1.2</td>
<td>650</td>
<td>700</td>
<td>10.5 ±0/-0.7</td>
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<td>12</td>
<td>HR11/45</td>
</tr>
<tr>
<td>BK-80AAAB*3</td>
<td>HHR-80AAAB</td>
<td>AAA</td>
<td>AAA</td>
<td>1.2</td>
<td>750</td>
<td>780</td>
<td>10.5 ±0/-0.7</td>
<td>44.5 ±0/-1.0</td>
<td>13</td>
<td>HR11/45</td>
</tr>
<tr>
<td>BK-110AAAB*4</td>
<td>HHR-110AAAB</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,000</td>
<td>1,050</td>
<td>14.5 ±0/-0.7</td>
<td>50.5 ±0/-1.0</td>
<td>20</td>
<td>HR15/51</td>
</tr>
<tr>
<td>BK-200AAAB*4</td>
<td>-</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,900</td>
<td>1,980</td>
<td>14.5 ±0/-0.7</td>
<td>50.5 ±0/-1.0</td>
<td>29</td>
<td>HR15/51</td>
</tr>
</tbody>
</table>

*1 IEC: standard 61951-2 (2017) / 7.5.1.2
*3 Compatible with consumer AAA size
*4 Compatible with consumer AA size

B K T Y P E

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** 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 1,800 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, etc.

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### 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
- Two way radio*¹
- Construction sites signaling*¹
- UPS*¹, etc.

**MODEL NUMBER (EXAMPLE)**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter: AAA, AA, A</th>
<th>Multiply this by 10 to obtain the rated capacity (some exceptions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-70AAA</td>
<td>HHR-70AA</td>
<td>AAA</td>
<td>Nickel-Metal Hydride battery</td>
</tr>
</tbody>
</table>

### 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, etc.

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*¹ This Panasonic battery type BK-250A is particularly designed to power this application.
*² This Panasonic battery type is especially designed for low temperature discharge down to -30°C.
**NICKEL-METAL HYDRIDE**

### MODEL NUMBER (EXAMPLE)

#### BK-300SCP

- High rate discharge & rapid charge type
- Diameter: SC
- Multiply this by 10 to obtain the rated capacity (some exceptions)

Nickel-Metal Hydride battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-200SCP*1</td>
<td>HHR-200SCP</td>
<td>SC</td>
<td>4/SC</td>
<td>1.2</td>
<td>1,900</td>
<td>2,100</td>
<td>23.0 ±0/-1.0</td>
<td>34.0 ±0/-1.5</td>
<td>42</td>
<td>HR23/34</td>
</tr>
<tr>
<td>BK-260SCP*1</td>
<td>HHR-260SCP</td>
<td>SC</td>
<td>SC</td>
<td>1.2</td>
<td>2,450</td>
<td>2,700</td>
<td>23.0 ±0/-1.0</td>
<td>43.0 ±0/-1.5</td>
<td>55</td>
<td>HR23/43</td>
</tr>
<tr>
<td>BK-300SCP*1</td>
<td>HHR-300SCP</td>
<td>SC</td>
<td>SC</td>
<td>1.2</td>
<td>2,800</td>
<td>3,050</td>
<td>23.0 ±0/-1.0</td>
<td>43.0 ±0/-1.5</td>
<td>57</td>
<td>HR23/43</td>
</tr>
</tbody>
</table>

### WIDE TEMPERATURE TYPE

This new Panasonic Ni-MH battery series is particularly designed for automotive applications. 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

- High discharge performance
- Wide operating temperature range: -30°C – +85°C
- Especially designed for high safeness
- Long life reliability: 6 – 8 years at 40°C

#### APPLICATIONS

- E-call
- E-latch, etc.

### MODEL NUMBER (EXAMPLE)

#### BK-60AAAW

- Wide temperature type
- Diameter: AAA, AA
- Multiply this by 10 to obtain the rated capacity (some exceptions)

Nickel-Metal Hydride battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-60AAAW</td>
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<td>AAA</td>
<td>AAA</td>
<td>1.2</td>
<td>500</td>
<td>550</td>
<td>10.5 ±0/-0.7</td>
<td>44.5 ±0/-1.5</td>
<td>13</td>
<td>HR11/45</td>
</tr>
<tr>
<td>BK-120AAW</td>
<td>-</td>
<td>AA</td>
<td>AA</td>
<td>1.2</td>
<td>1,200</td>
<td>1,280</td>
<td>14.5 ±0/-0.7</td>
<td>50.5 ±0/-1.5</td>
<td>26</td>
<td>HR15/51</td>
</tr>
</tbody>
</table>

*1 For high power use application such as power tools.
The illustration shows only one example of Ni-MH battery structure.

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

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
- Railway and signaling
- Wind turbine
- Energy storage
- Floating machine, etc.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Old model number</th>
<th>Diameter</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-06V1S1</td>
<td>-</td>
<td>V</td>
<td>V</td>
<td>1.2</td>
<td>60,000</td>
<td>65,000</td>
<td>62.6 +1.0/- 1.0</td>
<td>136.9 +1.0/-1.0</td>
<td>1,100</td>
<td>-</td>
</tr>
<tr>
<td>BK-10V1S</td>
<td>-</td>
<td>V</td>
<td>V</td>
<td>1.2</td>
<td>90,000</td>
<td>95,000</td>
<td>62.6 +1.0/-1.0</td>
<td>188.7 +1.0/-1.0</td>
<td>1,700</td>
<td>-</td>
</tr>
<tr>
<td>BK-06V10T1</td>
<td>-</td>
<td>Pack</td>
<td>Pack</td>
<td>12.0</td>
<td>60,000</td>
<td>63,000</td>
<td>428.0 x 159.0</td>
<td>220.0</td>
<td>19,000</td>
<td>-</td>
</tr>
<tr>
<td>BK-10V10T</td>
<td>HHR-10V10T</td>
<td>Pack</td>
<td>Pack</td>
<td>12.0</td>
<td>90,000</td>
<td>95,000</td>
<td>428.0 x 159.0</td>
<td>270.0</td>
<td>23,000</td>
<td>-</td>
</tr>
</tbody>
</table>

*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

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

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KR-7000F</td>
<td>1.2</td>
<td>7,000</td>
<td>7,700</td>
<td>33.2 +0/-0.9</td>
<td>91.0 +0/-1.4</td>
<td>224</td>
</tr>
<tr>
<td>KR-10000M</td>
<td>1.2</td>
<td>10,000</td>
<td>12,000</td>
<td>43.1 +0/-1.0</td>
<td>91.0 +0/-1.4</td>
<td>395</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-600AAACL</td>
<td>1.2</td>
<td>600</td>
<td>650</td>
<td>14.3 +0/-0.5</td>
<td>48.9 +0/-1.0</td>
<td>22</td>
</tr>
<tr>
<td>N-600AAC</td>
<td>1.2</td>
<td>600</td>
<td>650</td>
<td>14.3 +0/-0.5</td>
<td>50.2 +0/-1.0</td>
<td>22</td>
</tr>
<tr>
<td>N-700AAACL</td>
<td>1.2</td>
<td>700</td>
<td>750</td>
<td>14.3 +0/-0.5</td>
<td>48.9 +0/-1.0</td>
<td>23</td>
</tr>
<tr>
<td>N-700AAC</td>
<td>1.2</td>
<td>700</td>
<td>750</td>
<td>14.3 +0/-0.5</td>
<td>50.2 +0/-1.0</td>
<td>23</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-1250SCRL</td>
<td>1.2</td>
<td>1,200</td>
<td>1,250</td>
<td>22.9 +0/-1.0</td>
<td>34.0 +0/-1.2</td>
<td>43</td>
</tr>
<tr>
<td>N-1300SCR</td>
<td>1.2</td>
<td>1,300</td>
<td>1,400</td>
<td>22.9 +0/-1.0</td>
<td>43.0 +0/-1.2</td>
<td>51</td>
</tr>
<tr>
<td>N-1700SCLR</td>
<td>1.2</td>
<td>1,700</td>
<td>1,850</td>
<td>22.9 +0/-1.0</td>
<td>43.0 +0/-1.2</td>
<td>55</td>
</tr>
<tr>
<td>N-3000CR</td>
<td>1.2</td>
<td>3,000</td>
<td>3,200</td>
<td>26.0 +0/-0.8</td>
<td>50.0 +0/-1.2</td>
<td>86</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KR-AAH</td>
<td>1.2</td>
<td>600</td>
<td>650</td>
<td>14.3 +/−0.5</td>
<td>48.9 +/−1.0</td>
<td>23</td>
</tr>
<tr>
<td>KR-SCH(1.2)</td>
<td>1.2</td>
<td>1,200</td>
<td>1,300</td>
<td>22.9 +/−1.0</td>
<td>43.0 +/−1.2</td>
<td>47</td>
</tr>
<tr>
<td>KR-SCH(1.5)</td>
<td>1.2</td>
<td>1,500</td>
<td>1,600</td>
<td>22.9 +/−1.0</td>
<td>43.0 +/−1.2</td>
<td>49</td>
</tr>
<tr>
<td>KR-SCH(1.6)</td>
<td>1.2</td>
<td>1,600</td>
<td>1,650</td>
<td>22.9 +/−1.0</td>
<td>43.0 +/−1.2</td>
<td>49</td>
</tr>
<tr>
<td>KR-CH(2.0)</td>
<td>1.2</td>
<td>2,000</td>
<td>2,100</td>
<td>26.0 +/−0.8</td>
<td>50.0 +/−1.3</td>
<td>72</td>
</tr>
<tr>
<td>KR-CH(2.5)</td>
<td>1.2</td>
<td>2,500</td>
<td>2,600</td>
<td>26.0 +/−0.8</td>
<td>50.0 +/−1.3</td>
<td>75</td>
</tr>
<tr>
<td>KR-CH(3.0)</td>
<td>1.2</td>
<td>2,900</td>
<td>3,050</td>
<td>26.0 +/−0.8</td>
<td>50.0 +/−1.3</td>
<td>78</td>
</tr>
<tr>
<td>KR-FH</td>
<td>1.2</td>
<td>7,000</td>
<td>7,700</td>
<td>33.2 +/−0.9</td>
<td>91.0 +/−1.4</td>
<td>224</td>
</tr>
<tr>
<td>KR-MH</td>
<td>1.2</td>
<td>10,000</td>
<td>12,000</td>
<td>43.1 +/−1.0</td>
<td>91.0 +/−1.4</td>
<td>395</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-1600SCB</td>
<td>1.2</td>
<td>1,550</td>
<td>1,700</td>
<td>22.9 +/−1.0</td>
<td>42.9 +/−1.2</td>
<td>57</td>
</tr>
<tr>
<td>N-2000CB</td>
<td>1.2</td>
<td>2,000</td>
<td>2,300</td>
<td>26.0 +/−0.8</td>
<td>50.0 +/−1.3</td>
<td>85</td>
</tr>
</tbody>
</table>

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.
LOW TEMPERATURE TYPE

This Panasonic battery line-up is particularly 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).

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (mAh)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight [g]</th>
</tr>
</thead>
<tbody>
<tr>
<td>GT-2300C</td>
<td>1.2</td>
<td>2,300</td>
<td>2,500</td>
<td>26.0 +0/-0.8</td>
<td>50.0 +0/-1.3</td>
<td>73</td>
</tr>
<tr>
<td>GT-4000D</td>
<td>1.2</td>
<td>4,000</td>
<td>4,300</td>
<td>33.2 +0/-0.9</td>
<td>59.5 +0/-1.5</td>
<td>143</td>
</tr>
</tbody>
</table>

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.
OUTSTANDING QUALITY FOR DEMANDING APPLICATIONS

STATE-OF-THE-ART AGM TECHNOLOGY
SUPERIOR DESIGN AND LOW VOLTAGE SPREAD
HIGHEST QUALITY CONTROL STANDARDS
ENHANCED LIFESPAN DUE TO EXCELLENT RECOMBINATION EFFICIENCY

Scan QR code to view product series video.
BATTERY TYPES AND MODEL NUMBERS

<table>
<thead>
<tr>
<th>Application</th>
<th>Series</th>
<th>Trickle design life (at 20°C)</th>
<th>Category</th>
<th>Standard ABS (UL94 HB)</th>
<th>FR ABS = Flame-retardant ABS (UL94 V-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back-up and main power</td>
<td>LC-R/RA</td>
<td>6 – 9 years</td>
<td>Trickle and cycle standard type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Back-up</td>
<td>LC-P/PA/PB/PD</td>
<td>10 – 12 years</td>
<td>Trickle long-life type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC-QA</td>
<td>15 years</td>
<td>Trickle super-long-life type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC-V/VA</td>
<td>6 – 9 years</td>
<td>Trickle standard type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC-X/XB/XD</td>
<td>10 – 12 years</td>
<td>Trickle long-life type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UP-PW</td>
<td>10 – 12 years</td>
<td>High power long-life type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>UP-VW/VWA</td>
<td>6 – 9 years</td>
<td>High power type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main power</td>
<td>LC-CA/XC</td>
<td>-</td>
<td>Cycle-long-life type</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC-T</td>
<td>-</td>
<td>Cycle-long-life type for energy storage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motive and hybrid</td>
<td>EC-FV/HV</td>
<td>-</td>
<td>Cycle-long-life type for motive power</td>
<td>*1</td>
<td>*1</td>
</tr>
</tbody>
</table>

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
- Enhanced lifespan due to excellent recombination efficiency
- Highest quality control standards
- 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, etc.

LC SERIES – TRICKLE DESIGN LIFE 6 – 9 YEARS

MODEL NUMBER (EXAMPLE)

**LC - R 121 R 3 P G**

<table>
<thead>
<tr>
<th>1.3Ah</th>
<th>Terminal type (faston 250)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>English label plus VdS product recognition acquired</td>
</tr>
<tr>
<td>Trickle and cycle standard type</td>
<td></td>
</tr>
<tr>
<td>VRLA battery</td>
<td></td>
</tr>
</tbody>
</table>

**LC - RA 121 2 P G 1**

<table>
<thead>
<tr>
<th>12.0Ah</th>
<th>Terminal type (faston 250)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V</td>
<td>English label plus VdS product recognition acquired</td>
</tr>
<tr>
<td>Trickle and cycle standard type</td>
<td></td>
</tr>
<tr>
<td>VRLA battery</td>
<td></td>
</tr>
</tbody>
</table>

*1 Polypropylene
**Model Number (Example)**

**LC - X D 1 2 1 7 A P G**

- Threaded posts, English label, VdS
- 17Ah
- 12V
- Trickle long-life type, advanced design
- VRLA battery

**LC - X D 6 5 P G**

- English label plus VdS product recognition acquired
- 65Ah
- 12V
- Trickle long-life type
- VRLA battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (Ah) 20 hours rate</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Total height (mm)</th>
<th>Weight (kg)</th>
<th>VdS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC-R061R3P*</td>
<td>6</td>
<td>1.3</td>
<td>24</td>
<td>97</td>
<td>55</td>
<td>0.25</td>
<td>-</td>
</tr>
<tr>
<td>LC-R063R4P*</td>
<td>6</td>
<td>3.4</td>
<td>34</td>
<td>134</td>
<td>66</td>
<td>0.60</td>
<td>-</td>
</tr>
<tr>
<td>LC-R064R5P*</td>
<td>6</td>
<td>4.5</td>
<td>48</td>
<td>70</td>
<td>108</td>
<td>0.70</td>
<td>-</td>
</tr>
<tr>
<td>LC-R067R2P/P1**</td>
<td>6</td>
<td>7.2</td>
<td>34</td>
<td>151</td>
<td>100</td>
<td>1.30</td>
<td>-</td>
</tr>
<tr>
<td>LC-R0612P/P1**</td>
<td>6</td>
<td>12.0</td>
<td>50</td>
<td>151</td>
<td>100</td>
<td>1.95</td>
<td>-</td>
</tr>
<tr>
<td>LC-R121R3P*</td>
<td>12</td>
<td>1.3</td>
<td>47.5</td>
<td>97</td>
<td>55</td>
<td>0.59</td>
<td>G196049</td>
</tr>
<tr>
<td>LC-R122R2P*</td>
<td>12</td>
<td>2.2</td>
<td>34</td>
<td>177</td>
<td>66</td>
<td>0.80</td>
<td>G188151</td>
</tr>
<tr>
<td>LC-R123R4P*</td>
<td>12</td>
<td>3.4</td>
<td>67</td>
<td>134</td>
<td>66</td>
<td>1.15</td>
<td>G191053</td>
</tr>
<tr>
<td>LC-R124R5P*</td>
<td>12</td>
<td>4.5</td>
<td>70</td>
<td>97</td>
<td>108</td>
<td>1.45</td>
<td>-</td>
</tr>
<tr>
<td>LC-R127R2P/PG1**</td>
<td>12</td>
<td>7.2</td>
<td>64.5</td>
<td>151</td>
<td>100</td>
<td>2.50</td>
<td>G193046</td>
</tr>
<tr>
<td>LC-RA1212P/PG1**</td>
<td>12</td>
<td>12.0</td>
<td>98</td>
<td>151</td>
<td>100</td>
<td>3.80</td>
<td>G100001</td>
</tr>
<tr>
<td>LC-RA1215P/P1**</td>
<td>12</td>
<td>15.0</td>
<td>98</td>
<td>151</td>
<td>100</td>
<td>4.15</td>
<td>-</td>
</tr>
<tr>
<td>LC-V1233P</td>
<td>12</td>
<td>33.0</td>
<td>130</td>
<td>195.6</td>
<td>180</td>
<td>11.5</td>
<td>-</td>
</tr>
</tbody>
</table>

**LC SERIES – TRICKLE DESIGN LIFE 10–12 YEARS**

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

This battery type is designed for energy storage applications.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (Ah) 20 hours rate</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Total height (mm)</th>
<th>Weight (kg)</th>
<th>VdS number</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC-P1228P/AP</td>
<td>12</td>
<td>28.0</td>
<td>125</td>
<td>165</td>
<td>179.5/175</td>
<td>9.40</td>
<td>-</td>
</tr>
<tr>
<td>LC-P1238P/APG</td>
<td>12</td>
<td>38.0</td>
<td>165</td>
<td>197</td>
<td>180/175</td>
<td>12.5</td>
<td>G100002</td>
</tr>
<tr>
<td>LC-P1242P/AP</td>
<td>12</td>
<td>42.0</td>
<td>165</td>
<td>197</td>
<td>180/175</td>
<td>13.5</td>
<td>-</td>
</tr>
<tr>
<td>LC-X1265PG*1</td>
<td>12</td>
<td>65</td>
<td>166</td>
<td>350</td>
<td>175</td>
<td>23.5</td>
<td>G199090</td>
</tr>
<tr>
<td>LC-P1275P</td>
<td>12</td>
<td>75</td>
<td>166</td>
<td>350</td>
<td>175</td>
<td>21.5</td>
<td>-</td>
</tr>
<tr>
<td>LC-XB12100P*1</td>
<td>12</td>
<td>100</td>
<td>173</td>
<td>407</td>
<td>236</td>
<td>36.5</td>
<td>-</td>
</tr>
<tr>
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</table>

**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 standby and occasional back-up, this series uses different plate design and other tweaks to achieve long cycle life.

**APPLICATIONS**

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

**FEATURES**

- State-of-the-art Absorbed Glass Mat (AGM) technology
- Superior design and low voltage spread gives excellent performance
- Enhanced lifespan due to excellent recombination efficiency
- Highest quality control standards
- Years of experience in production
- Selected batteries with flame-retardant battery containers according to UL94 V-0
- Various VdS approved batteries

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

**MODEL NUMBER (EXAMPLE)**

**L C - C A 1 2 1 6 P**

- English label
- 16Ah
- 12V
- Cycle long-life type
- VRLA battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal capacity (Ah) 20 hours rate</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
<th>Total height (mm)</th>
<th>Weight (kg)</th>
<th>VdS number</th>
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</table>

*1 This battery is equipped with insert terminals.

*2 This battery type is designed for energy storage applications.
LC-QA SERIES – TRICKLE DESIGN LIFE 15 YEARS

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, etc.

MODEL NUMBER (EXAMPLE)
LC-QA1224P
- MS threaded posts, English label
- 24Ah
- 12V
- Trickle super long-life type, flame-retardant

VRLA battery

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</table>

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

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, etc.

MODEL NUMBER (EXAMPLE)
UP-PW1245P
- English label
- The wattage per cell at 10 minutes rate discharge
- 12V
- Watt
- Trickle long-life type, flame-retardant
- VRLA battery – high power type
**EV SERIES - CYCLE VERY LONG-LIFE FOR MOTIVE POWER**

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, etc.

**MODEL NUMBER (EXAMPLE)***

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<th>Model number</th>
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<th>Rated power (W)</th>
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**EC-FV SERIES**

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<th>Nominal capacity (Ah)</th>
<th>Length (mm)</th>
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<td>388</td>
<td>175</td>
<td>21.0</td>
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</tr>
</tbody>
</table>
BATTERY INSIDE*

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

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.

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)

Unit: inch (mm)

*1 The illustration shows only one example of VRLA battery structure.
EXCELLENT BATTERY SAFETY AND SUPERIOR PERFORMANCE

STABLE POWER SUPPLY WITH FLAT DISCHARGE VOLTAGE
EXCELLENT RELIABILITY
LOW SELF-DISCHARGE
HIGH ENERGY DENSITY

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

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**

- 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-18650RX**

- 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

<table>
<thead>
<tr>
<th>Model number</th>
<th>Technology description</th>
<th>Nominal voltage (V)</th>
<th>Typical capacity (mAh)</th>
<th>Diameter (mm)</th>
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<th>Weight (g)</th>
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</table>

**1** 4.20V charge  **2** NNP - Nickel Oxide Based New Platform  **3** HRL - Heat Resistance Layer  **4** 4.30V charge
PRISMATIC SINGLE CELL

A perfect combination of high energy density (NPP 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)

**NC A - 7 5 2 8 3 6 A**

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

---

*1 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.
### Model Number and Technical Specifications

<table>
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<tr>
<th>Model number</th>
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<th>Typical** capacity (mAh)</th>
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<td>33.80</td>
<td>5.70</td>
<td>49.65</td>
<td>21.5</td>
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</tbody>
</table>

**1 4.20V charge  **2  NNP - Nickel Oxide Based New Platform  **3  HRL - Heat Resistance Layer  **4  LCO system - This Panasonic system uses a Cobalt-based cathode and offers high capacity.  **5  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.

---

**BATTERY INSIDE**

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
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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Technology</th>
<th>Nominal voltage (V)</th>
<th>Typical*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG-320A*2</td>
<td>LCO system*3</td>
<td>3.8</td>
<td>15</td>
<td>3.65</td>
<td>20.0</td>
<td>0.6</td>
</tr>
<tr>
<td>CG-425*2</td>
<td>Li-Ion Standard type</td>
<td>3.8</td>
<td>30</td>
<td>4.7</td>
<td>25.0</td>
<td>1.0</td>
</tr>
<tr>
<td>CG-435*2</td>
<td>Li-Ion Standard type</td>
<td>3.8</td>
<td>50</td>
<td>4.7</td>
<td>35.0</td>
<td>1.4</td>
</tr>
</tbody>
</table>

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 Li-Ion cells must always be equipped with a safety unit.

*1 4.35V charge
*2 This battery is supplied with tabs.
*3 LCO system - This Panasonic system uses a Cobalt-based cathode and offers high capacity.
LITHIUM BATTERIES

DECADES OF MASS PRODUCTION EXPERIENCE
SUPERIOR DESIGNED BATTERY RANGES
PROVEN RELIABILITY

LOW SELF-DISCHARGE

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*

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>BR</th>
<th>CR</th>
<th>ER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathode</td>
<td>CF</td>
<td>MnO₂</td>
<td>SOCl₂</td>
</tr>
<tr>
<td>Anode</td>
<td>Lithium metal</td>
<td>Lithium metal</td>
<td>Lithium metal</td>
</tr>
<tr>
<td>Electrolyte</td>
<td>Organic electrolyte</td>
<td>Organic electrolyte</td>
<td>Organic electrolyte</td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>3V</td>
<td>3V</td>
<td>3.6V</td>
</tr>
<tr>
<td>Discharge capacity</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Voltage during discharge (Initial)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low current</td>
<td>+</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>High current</td>
<td>+</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Voltage during discharge (End of capacity)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low current</td>
<td>++</td>
<td>+</td>
<td>++</td>
</tr>
<tr>
<td>High current</td>
<td>+</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Pulse performance at low temperature</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>+</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>End of life</td>
<td>++</td>
<td>+</td>
<td>–</td>
</tr>
<tr>
<td>Storage performance</td>
<td>++</td>
<td>+</td>
<td>++*2</td>
</tr>
<tr>
<td>Reliability</td>
<td>++</td>
<td>+</td>
<td>–*2</td>
</tr>
<tr>
<td>Safety</td>
<td>++</td>
<td>++</td>
<td>–</td>
</tr>
<tr>
<td>Environment</td>
<td>Eco friendly</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

*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
- Years of experience in production

#### APPLICATIONS
- Heat cost allocators
- Water & gas meters
- Car alarm
- Smoke detectors
- Tracking & RFID
- Marine devices, etc.
MODEL NUMBER (EXAMPLE)

BR-1/2AA

Battery diameter
Battery size
Round
Poly-Carbonmonofluoride Lithium battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal(^1) capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-1/2AA*2</td>
<td>3</td>
<td>1,000</td>
<td>14.5</td>
<td>25.5</td>
<td>8.0</td>
<td>-</td>
</tr>
<tr>
<td>BR-2/3A</td>
<td>3</td>
<td>1,200</td>
<td>17.0</td>
<td>33.5</td>
<td>13.5</td>
<td>BR17335</td>
</tr>
<tr>
<td>BR-2/3AG</td>
<td>3</td>
<td>1,450</td>
<td>17.0</td>
<td>33.5</td>
<td>13.5</td>
<td>BR17335</td>
</tr>
<tr>
<td>BR-A</td>
<td>3</td>
<td>1,800</td>
<td>17.0</td>
<td>45.5</td>
<td>18.0</td>
<td>-</td>
</tr>
<tr>
<td>BR-AG</td>
<td>3</td>
<td>2,200</td>
<td>17.0</td>
<td>45.5</td>
<td>18.0</td>
<td>-</td>
</tr>
<tr>
<td>BR-C</td>
<td>3</td>
<td>5,000</td>
<td>26.0</td>
<td>50.5</td>
<td>42.0</td>
<td>-</td>
</tr>
</tbody>
</table>

BATTERY INSIDE\(^3\)

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

Scan QR code to view 3D animated video.

*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.
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
- 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)

CR - 1 2 3 A

Battery diameter
Battery size
Round
Manganese Dioxide Lithium battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR-2*2</td>
<td>3</td>
<td>850</td>
<td>15.6</td>
<td>27.0</td>
<td>11.0</td>
<td>CR15H270</td>
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<tr>
<td>CR-123A*2</td>
<td>3</td>
<td>1,400</td>
<td>17.0</td>
<td>34.5</td>
<td>17.0</td>
<td>CR17345</td>
</tr>
<tr>
<td>CR-V3*2</td>
<td>3</td>
<td>3,300</td>
<td>28.4 x 14.4</td>
<td>52.0</td>
<td>39.0</td>
<td>-</td>
</tr>
<tr>
<td>2CR-5*2</td>
<td>6</td>
<td>1,400</td>
<td>34.0 x 17.0</td>
<td>45.0</td>
<td>38.0</td>
<td>2CR5</td>
</tr>
<tr>
<td>CR-P2*2</td>
<td>6</td>
<td>1,400</td>
<td>35.0 x 19.5</td>
<td>36.0</td>
<td>37.0</td>
<td>CRP2</td>
</tr>
</tbody>
</table>

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 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 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 ~ +70°C
- 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)**

**CR - 2 / 3 A Z**

Stands for battery performance characteristics
- Battery diameter
- Battery size

Round

Manganese Dioxide Lithium battery

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal**1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR-AAU**2</td>
<td>3</td>
<td>1,800</td>
<td>14.5</td>
<td>50.5</td>
<td>18.0</td>
<td>-</td>
</tr>
<tr>
<td>CR-2U</td>
<td>3</td>
<td>1,000</td>
<td>15.6</td>
<td>27.0</td>
<td>11.0</td>
<td>-</td>
</tr>
<tr>
<td>CR-ZZ</td>
<td>3</td>
<td>1,000</td>
<td>15.6</td>
<td>27.0</td>
<td>11.0</td>
<td>-</td>
</tr>
<tr>
<td>CR-2/3AZ</td>
<td>3</td>
<td>1,600</td>
<td>17.0</td>
<td>33.5</td>
<td>17.0</td>
<td>-</td>
</tr>
<tr>
<td>CR-AG</td>
<td>3</td>
<td>2,400</td>
<td>17.0</td>
<td>45.5</td>
<td>24.0</td>
<td>-</td>
</tr>
<tr>
<td>CR-AGZ</td>
<td>3</td>
<td>2,700</td>
<td>17.0</td>
<td>45.5</td>
<td>23.0</td>
<td>-</td>
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</tbody>
</table>

**BATTERY INSIDE**

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

**NEW**

**NEW**

**NEW**

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

*2 Operating temperature -40°C to 85°C.

*3 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
- Real Time Clock (RTC)
- Meters, etc.

MODEL NUMBER (EXAMPLE)

BR - 2 3 3 0

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal(^1) capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-1220</td>
<td>3</td>
<td>35</td>
<td>12.5</td>
<td>2.0</td>
<td>0.7</td>
<td>-</td>
</tr>
<tr>
<td>BR-1225</td>
<td>3</td>
<td>48</td>
<td>12.5</td>
<td>2.5</td>
<td>0.8</td>
<td>BR1225</td>
</tr>
<tr>
<td>BR-1632</td>
<td>3</td>
<td>120</td>
<td>16.0</td>
<td>3.2</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>BR-2032</td>
<td>3</td>
<td>200</td>
<td>20.0</td>
<td>3.2</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td>BR-2325</td>
<td>3</td>
<td>165</td>
<td>23.0</td>
<td>2.5</td>
<td>3.0</td>
<td>BR2325</td>
</tr>
<tr>
<td>BR-2330</td>
<td>3</td>
<td>255</td>
<td>23.0</td>
<td>3.0</td>
<td>3.2</td>
<td>-</td>
</tr>
<tr>
<td>BR-3032</td>
<td>3</td>
<td>500</td>
<td>30.0</td>
<td>3.2</td>
<td>5.5</td>
<td>BR3032</td>
</tr>
</tbody>
</table>

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
- 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)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-1225A*2</td>
<td>3</td>
<td>48</td>
<td>12.5</td>
<td>2.5</td>
<td>0.8</td>
<td>-</td>
</tr>
<tr>
<td>BR-1632A*2</td>
<td>3</td>
<td>120</td>
<td>16.0</td>
<td>3.2</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>BR-2330A*2</td>
<td>3</td>
<td>255</td>
<td>23.0</td>
<td>3.0</td>
<td>3.2</td>
<td>-</td>
</tr>
<tr>
<td>BR-2450A*2</td>
<td>3</td>
<td>550</td>
<td>24.5</td>
<td>5.0</td>
<td>5.9</td>
<td>-</td>
</tr>
<tr>
<td>BR-2477A*2</td>
<td>3</td>
<td>1,000</td>
<td>24.5</td>
<td>7.7</td>
<td>8.0</td>
<td>-</td>
</tr>
</tbody>
</table>

BATTERY INSIDE*1

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.
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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR-425</td>
<td>3</td>
<td>25</td>
<td>4.2</td>
<td>25.9</td>
<td>0.6</td>
<td>-</td>
</tr>
<tr>
<td>BR-435</td>
<td>3</td>
<td>50</td>
<td>4.2</td>
<td>35.9</td>
<td>0.9</td>
<td>-</td>
</tr>
</tbody>
</table>

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 – +60°C

APPLICATIONS

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

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR-1025</td>
<td>3</td>
<td>30</td>
<td>10.0</td>
<td>2.5</td>
<td>0.7</td>
<td>CR1025</td>
</tr>
<tr>
<td>CR-1216</td>
<td>3</td>
<td>25</td>
<td>12.5</td>
<td>1.6</td>
<td>0.7</td>
<td>CR1216</td>
</tr>
<tr>
<td>CR-1220</td>
<td>3</td>
<td>35</td>
<td>12.5</td>
<td>2.0</td>
<td>1.2</td>
<td>CR1220</td>
</tr>
<tr>
<td>CR-1612</td>
<td>3</td>
<td>40</td>
<td>16.0</td>
<td>1.2</td>
<td>0.8</td>
<td>-</td>
</tr>
<tr>
<td>CR-1616</td>
<td>3</td>
<td>55</td>
<td>16.0</td>
<td>1.6</td>
<td>1.2</td>
<td>CR1616</td>
</tr>
<tr>
<td>CR-1620</td>
<td>3</td>
<td>75</td>
<td>16.0</td>
<td>2.0</td>
<td>1.3</td>
<td>CR1620</td>
</tr>
<tr>
<td>CR-1632</td>
<td>3</td>
<td>140</td>
<td>16.0</td>
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<td>1.8</td>
<td>-</td>
</tr>
<tr>
<td>CR-2012</td>
<td>3</td>
<td>55</td>
<td>20.0</td>
<td>1.2</td>
<td>1.4</td>
<td>CR2012</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal*1 capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
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<tbody>
<tr>
<td>CR-2016</td>
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<td>CR-2025</td>
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<td>225</td>
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<td>CR-2330</td>
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<td>4.0</td>
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<td>CR-2412</td>
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<td>620</td>
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<td>CR-2477</td>
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<tr>
<td>CR-3032</td>
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<td>500</td>
<td>30.0</td>
<td>3.2</td>
<td>7.1</td>
<td>CR3032</td>
</tr>
</tbody>
</table>

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

---

**BATTERY INSIDE**

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

---

**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 – 2020**

1. Divide this by 10 to obtain the battery height in mm
2. Round

Vanadium Pentoxide Lithium battery

---

* The illustration shows only one example of Lithium battery structure.
**VANADIUM PENTOXIDE LITHIUM (VL SERIES)**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal(^*1) capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL-621</td>
<td>3</td>
<td>1.5</td>
<td>6.8</td>
<td>2.1</td>
<td>0.3</td>
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</tr>
<tr>
<td>VL-1220</td>
<td>3</td>
<td>7.0</td>
<td>12.5</td>
<td>2.0</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>VL-2020</td>
<td>3</td>
<td>20.0</td>
<td>20.0</td>
<td>2.0</td>
<td>2.2</td>
<td></td>
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<tr>
<td>VL-2320</td>
<td>3</td>
<td>30.0</td>
<td>23.0</td>
<td>2.0</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>VL-2330</td>
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<td>50.0</td>
<td>23.0</td>
<td>3.0</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>VL-3032</td>
<td>3</td>
<td>100.0</td>
<td>30.0</td>
<td>3.2</td>
<td>6.2</td>
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**MANGANESE LITHIUM (ML SERIES)**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal(^*2) capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
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<td>ML-421</td>
<td>3</td>
<td>2.3</td>
<td>4.8</td>
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<tr>
<td>ML-614</td>
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<tr>
<td>ML-621</td>
<td>3</td>
<td>5.0</td>
<td>6.8</td>
<td>2.1</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>ML-920</td>
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<td>11.0</td>
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<td>0.4</td>
<td></td>
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<tr>
<td>ML-1220</td>
<td>3</td>
<td>17.0</td>
<td>12.5</td>
<td>2.0</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>ML-2020</td>
<td>3</td>
<td>45.0</td>
<td>20.0</td>
<td>2.0</td>
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</tbody>
</table>

**MANGANESE TITANIUM LITHIUM (MT SERIES)**

<table>
<thead>
<tr>
<th>Model number</th>
<th>Nominal voltage (V)</th>
<th>Nominal(^*3) capacity (mAh)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT-516</td>
<td>1.5</td>
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<td>1.6</td>
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<tr>
<td>MT-621</td>
<td>1.5</td>
<td>2.5</td>
<td>6.8</td>
<td>2.1</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>MT-920</td>
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<td>5.0</td>
<td>9.5</td>
<td>2.0</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

**BATTERY INSIDE**

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.
\(^{*2}\) 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.
\(^{*4}\) The illustration shows only one example of Lithium battery structure.
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 ('HORIZONTAL MOUNT')

V TYPE ('VERTICAL MOUNT')

G TYPE ('3 LEGS')

F TYPE ('SURFACE MOUNT')

AXIAL PIN TERMINAL

THROUGH HALE TYPE

S TYPE (LEAD WIRE AND CONNECTOR)

LEAD WIRES AND CONNECTOR WITH MULTIPLE CELLS
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.
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.

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

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

**BATTERY INSIDE***

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

---

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

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.
THE SOLUTION FOR LESS COMPLEX AND COST-SENSITIVE APPLICATIONS

EXCELLENT PERFORMANCE
AFFORDABILITY
CONTINUOUSLY RELIABLE ENERGY PROVISION
LONG SHELF LIFE

ZINC-CARBON
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.

<table>
<thead>
<tr>
<th>Model number</th>
<th>Size</th>
<th>Nominal voltage (V)</th>
<th>Diameter (mm)</th>
<th>Total height (mm)</th>
<th>Weight (g)</th>
<th>IEC</th>
</tr>
</thead>
<tbody>
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<td>R03</td>
<td>AAA</td>
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<td>10.5</td>
<td>44.5</td>
<td>8.0</td>
<td>R3</td>
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<tr>
<td>R6</td>
<td>AA</td>
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<td>50.5</td>
<td>19.0</td>
<td>R6</td>
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<tr>
<td>R14</td>
<td>C</td>
<td>1.5</td>
<td>26.2</td>
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<td>49.0</td>
<td>R14</td>
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<td>R20</td>
<td>D</td>
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<td>38.0</td>
<td>6F22</td>
</tr>
</tbody>
</table>

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

Website for Panasonic HTML App Battery Finder
Get more information on Panasonic Battery Finder website.
https://eu.industrial.panasonic.com/battery-finder

YouTube Channel
Please find a comprehensive selection of Panasonic battery videos at our YouTube Channel.
https://www.youtube.com/user/panasoniceubatteries

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

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It is the responsibility of each user to ensure that every battery application is adequately designed safe and compatible with all conditions encountered during use, and in conformance with existing standards and requirements.
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