Power to Drive
Smart Society

Safety Precautions
Panasonic lithium batteries contain lithium and other flammable organic solvents which, if misused or mishandled, may result in electrolyte leakage, deformation, heat generation, rupture, and/or fire. Please be sure to observe the following safety precautions.

WARNING

Charging
- Never charge any battery other than rechargeable batteries
- Ensure device circuit design prevents current intrusion from other power sources

Heating
- Do not immerse batteries or heat them to high temperatures
- Avoid directly soldering batteries
- Do not drop batteries into solder bath

Disassembly
- Do not disassemble or deform batteries

Accidental Ingestion
- Keep out of reach of children. If swallowed, seek emergency medical care immediately

Short-Circuiting
- Do not short-circuit the positive and negative electrodes of lithium batteries
- Keep batteries isolated from each other and well protected when in storage. Avoid contact with metal objects

Reverse Connection
- Do not install batteries backwards (with terminal orientation reversed)

Devices Supporting Multiple Cells
- Avoid using new and old batteries together in the same device.
- Replace all batteries with new ones at the same time
- Do not use different types or different brands of batteries together

Please ensure that every battery application is designed safe in order to prevent accidental ingestion should end users access or replace batteries by themselves.

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The contents of this catalog are valid as of September, 2018.
Daily life is supported by all kinds of energy. In particular, electric power is essential for modern living. As IoT integrates more deeply into the fabric of our society, the need for the social infrastructure to become more efficient and secure becomes greater. Most of the things we depend on to continue running normally without interruption require electricity to operate. Panasonic lithium batteries boast the reliability to serve not only as a main power source in small devices, but also as a backup supply for use in emergency situations. In everyday use or under the pressure of a disaster, Panasonic contributes to society by supplying the necessary electricity in a way that protects people and reduces its impact on the environment.
Panasonic’s Lithium Primary Batteries Support Asteroid Exploration Missions with Stable Performance in Outer Space

After a seven-year journey covering six billion kilometers, the asteroid explorer Hayabusa returned home, its reentry capsule separating from the main spacecraft at an altitude of about 17,000 km to enter Earth’s atmosphere. Panasonic BR Series cylindrical lithium primary batteries were installed in the reentry capsule and played a vital role in its swift retrieval. BR Series batteries endured years in space, retaining power thanks to low-self-discharge performance and an unparalleled ability to operate in extreme environments.

Panasonic lithium primary batteries have since been equipped in a successor spacecraft, Hayabusa2. Multiple cells power four separate instruments, comprising a Small Carry-on Impactor (SCI) to blast a crater on the asteroid, enabling sub-surface sample collection; a deployable camera to film the SCI explosion; a flight-data instrument assisting with reentry; and a beacon for capsule retrieval. The presence of Panasonic technology is testament to the durability of our lithium primary battery technology as Hayabusa2 continues its 5.24-billion-kilometer voyage.

<table>
<thead>
<tr>
<th>Coin Type</th>
<th>CR2032</th>
<th>Diameter (20 mm)</th>
<th>Height (3.2 mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries</td>
<td>Primary Lithium Batteries (Non-rechargeable)</td>
<td>Manganese Dioxide Lithium Batteries (CR Series)</td>
<td>Manganese Dioxide Lithium Batteries (CR Series)</td>
</tr>
</tbody>
</table>

Batteries with Terminals

- **Tabbed type**
  - F-type
  - G-type
  - Mount type
  - Hook type
- **Lead wire type**
  - H-type
  - V-type
  - Pin type

Our lithium batteries are available in a selection of terminal shapes to meet your needs in a variety of applications. Typical types are shown above.

Please see the latest technical and product information on our website at: https://industrial.panasonic.com/ww/products/batteries/primary-batteries/lithium-batteries
Coin-Type Lithium Batteries

Panasonic coin-type lithium batteries are used in many places behind the scenes. They are known not only as a high-performance power source for small electric appliances, but also as a flexible solution for memory backup in electronic devices. Versatility is achieved with a choice of chemistries (CR/BR); a wide selection of cell sizes; a range of capacities up to 1,000 mAh; and operation over a wide temperature range up to 125°C.

### Manganese Dioxide Lithium Batteries (CR Series) 3V

**Features**
- Suitable for small electronic appliances requiring relatively high current, such as digital watches, card remote controls, and more
- Operating temperature range of -30°C to 60°C

<table>
<thead>
<tr>
<th>Model No.*1</th>
<th>Characteristics (20°C)</th>
<th>Dimensions (mm)</th>
<th>Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR1220</td>
<td>Voltage: 3.0</td>
<td>3.0 x 10 x 1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>CR1225</td>
<td>Voltage: 3.0</td>
<td>3.0 x 10 x 1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>CR1632</td>
<td>Voltage: 3.2</td>
<td>3.2 x 16 x 1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>CR2032</td>
<td>Voltage: 3.0</td>
<td>3.0 x 20 x 1.7</td>
<td>2.2</td>
</tr>
<tr>
<td>CR2050</td>
<td>Voltage: 3.0</td>
<td>3.0 x 20 x 1.7</td>
<td>2.2</td>
</tr>
<tr>
<td>CR2450</td>
<td>Voltage: 3.0</td>
<td>3.0 x 25 x 1.7</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Discharge Temperature Characteristics:**
- Load: 15 kΩ
- 60°C

*1 Tabbed-type batteries only.

### Manganese Dioxide Lithium Batteries for High Temperatures (CR "A" and "B" Series) 3V

**Features**
- Engineered for use in equipment operating in high temperatures (Max. 125°C)
- Operating temperature range of -40°C to 125°C
- CR2032A, CR2050A: -40°C to 125°C
- CR2032B, CR2050B: -40°C to 120°C
- CR2450A: -40°C to 105°C

**General Specifications**

<table>
<thead>
<tr>
<th>Model No.*1</th>
<th>Characteristics (20°C)</th>
<th>Dimensions (mm)</th>
<th>Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR2032A</td>
<td>Voltage: 3.0</td>
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<td>3.0 x 20 x 1.7</td>
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<tr>
<td>CR2050B</td>
<td>Voltage: 3.0</td>
<td>3.0 x 20 x 1.7</td>
<td>2.2</td>
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<tr>
<td>CR2450A</td>
<td>Voltage: 3.0</td>
<td>3.0 x 25 x 1.7</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Discharge Temperature Characteristics:**
- Load: 15 kΩ
- 60°C

*1 Tabbed-type batteries only.

### Poly-carbonmonofluoride Lithium Batteries for High Temperatures (BR "A" Series) 3V

**Features**
- Ideal for supporting equipment operating within a high temperature range (Max. 125°C)
- Operating temperature - 40°C to 125°C

**General Specifications**

<table>
<thead>
<tr>
<th>Model No.*1</th>
<th>Characteristics (20°C)</th>
<th>Dimensions (mm)</th>
<th>Mass (g)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Voltage: 3.0</td>
<td>3.0 x 12 x 1.5</td>
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<tr>
<td>BR1225</td>
<td>Voltage: 3.0</td>
<td>3.0 x 12 x 1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>BR1632</td>
<td>Voltage: 3.0</td>
<td>3.0 x 16 x 1.5</td>
<td>0.8</td>
</tr>
<tr>
<td>BR2032</td>
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<td>3.0 x 20 x 1.7</td>
<td>2.2</td>
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<tr>
<td>BR2050</td>
<td>Voltage: 3.0</td>
<td>3.0 x 20 x 1.7</td>
<td>2.2</td>
</tr>
<tr>
<td>BR2450</td>
<td>Voltage: 3.0</td>
<td>3.0 x 25 x 1.7</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Discharge Temperature Characteristics:**
- Load: 15 kΩ
- 60°C

*1 Tabbed-type batteries only.

* *Nominal capacity shown above is based on standard drain and cut-off voltage down to 2.0 V at 20°C.*
Coin-Type Rechargeable Lithium Batteries

Vanadium Lithium Batteries (VL Series) 3 V

Features
- Retains high discharge voltage
- Operating temperature range of -20°C to 60°C
- Constant-voltage recharging between 3.25 V to 3.55 V

Manganese Rechargeable Lithium Batteries (ML Series) 3 V

Features
- Ideal for long-term memory backup with extra-high capacity
- Operating temperature range of -20°C to 60°C
- Constant-voltage recharging between 2.8 V to 3.2 V for ML1220T, 2.8 V to 3.2 V for others

Manganese Silicon Rechargeable Lithium Batteries (MS Series) 3 V

Features
- Supports over 100 full charge-discharge cycles
- Constant-voltage charging between 2.8 V to 3.3 V

Manganese Titanium Rechargeable Lithium Batteries (MT Series) 1.5 V

Features
- High-current 1.5 V lithium rechargeable battery with sustained discharge endurance
- Operating temperature range of -10°C to 60°C
- Constant-voltage charging between 1.8 V to 2.6 V

Cobalt Titanium Rechargeable Lithium Batteries (CTL Series) 2.3 V

Features
- High-current 2.3 V lithium rechargeable battery with sustained discharge endurance
- Operating temperature range of -20°C to 60°C
- Constant-voltage charging between 2.5 V to 3.7 V

Memory backup
- Cameras
- Medical equipment
- Machines (PCs)

The data provided in this document is for descriptive purposes only and does not imply any guarantee or warranty.
Cylindrical-Type Lithium Batteries

Manganese Dioxide Lithium Batteries (CR Series) 3 V/6 V

Features
- Offers excellent high-rate discharge with ample power and extended life when used in security equipment, lights, etc.
- Operating temperature range of -40°C to 70°C
  * Please consult Panasonic before using these batteries at temperatures between -40°C to -20°C and 60°C to 70°C.
- Available on the consumer market

Poly-carbonmonofluoride Lithium Batteries (BR Series) 3 V

Features
- Excellent long-term storage characteristics position these cells as the most suitable power source for a wide variety of metering devices and memory backup applications
- Operating temperature range of -40°C to 85°C (BR-1/2AA -40°C to 100°C)

Pin-Type Lithium Batteries

Poly-carbonmonofluoride Lithium Batteries (BR Series) 3 V

Features
- Panasonic original battery design: a tiny device that can power LED lights
- Operating temperature range of -30°C to 80°C

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