Supporting your life and society with smart energy solutions that utilize safe and secure batteries.

Smart Energy
FDK started with the manufacture and sale of carbon zinc batteries. With the expertise we gained in related technologies, we have provided products that respond to the demands and changes of the times on a global scale. As a "Smart Energy Partner" we contribute globally to society with technology that efficiently uses electric energy. In addition, we provide support to solve the problems of society and our customers with products and services that bring together our strengths in battery technologies, circuit technologies and power electronics technologies.
## FDK Battery Chronology

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
</table>
| 1950 | Company founded  
Launched NOVEL brand  
carbon zinc batteries |
| 1953 | Capital alliance with Fuji Electric  
and Fuji Electric battery production started |
| 1958 | Company name changed to Fuji Electrochemical Co., Ltd |
| 1967 | Alkaline battery production started |
| 1983 | Launched lithium batteries |
| 1984 | Launched FUJITSU brand batteries |
| 2001 | Company name changed to FDK Corporation |
| 2010 | Acquired Sanyo Energy Twicell Co., Ltd.  
and Sanyo Energy Tottori Co., Ltd. |
| 2011 | Launched thin-type primary lithium batteries |
| 2012 | Launched FUJITSU brand Ni-MH battery and charger sets |
| 2014 | Launched FUJITSU brand  
"Premium", "High Power", and "Universal Power" alkaline batteries  
Launched FUJITSU brand low self-discharge "Premium High Capacity",  
and "Standard Capacity" Ni-MH batteries |
| 2019 | **Under development**  
- World’s highest standard small all-solid-state SMD batteries  
- Next-generation metal-hydride/air batteries |
FDK Product Lineup

Ni-MH BATTERY

Ni-MH are a type of rechargeable batteries. FDK batteries feature stable discharge voltage, high current discharge, are resistant to over-charge and over-discharge, and have excellent safety.

LITHIUM BATTERY

Taking advantage of lithium metal's high per-mass capacity in the negative electrode material, FDK's technology realizes a highly reliable and long-lasting power supply solution over a wide range of temperature conditions.

ALKALINE BATTERY

High power and superior performance batteries. Long duration for high power consumption equipment. FDK Alkaline batteries meet everyone's needs for various equipment with high reliability.

JAPAN Quality

FDK is proud of our battery performance. All are built in accordance with Japanese quality standards, which is truly the result of Japanese technology. Each of our factories, not only in Japan but also in Indonesia, utilize technologies engineered in Japan. We are committed to delivering to the world safe and secure batteries.

※ To better serve our customers' and fulfill their requirements (cost, delivery, quality) we offer some models made in Indonesia.
Ni-MH BATTERY
FDK Ni-MH batteries are resistant to over-charge and over-discharge, have excellent safety, and can be easily transported. In addition, Ni-MH batteries are easy to recycle because they contain a high nickel content.

Features of FDK nickel metal-hydride batteries

**Positive electrode material**

Nickel hydroxide coated with a highly conductive cobalt compound

Examples of long-term storage characteristics (Discharge state)

<table>
<thead>
<tr>
<th>Storage Period</th>
<th>Discharge Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>95</td>
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<tr>
<td>2</td>
<td>90</td>
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<td>3</td>
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<td>8</td>
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<td>9</td>
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<td>10</td>
<td>50</td>
</tr>
<tr>
<td>11</td>
<td>45</td>
</tr>
<tr>
<td>12</td>
<td>40</td>
</tr>
</tbody>
</table>

Temperature: 25°C

Temperature: 40°C

Suppressed capacity deterioration after long-term storage

Model: HR-AAUUTE Charge: 1000mA (4.8V-10mV) Best: 3hr. Discharge: 1000mA (End Voltage=1.8V) Ambient Temperature: 25°C

**Negative electrode material**

Super lattice hydrogen absorbing alloy

Examples of low temperature discharge characteristics (−40°C discharge)

<table>
<thead>
<tr>
<th>Discharge Time</th>
<th>Cell Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.6</td>
</tr>
<tr>
<td>60</td>
<td>1.5</td>
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<tr>
<td>120</td>
<td>1.4</td>
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<tr>
<td>180</td>
<td>1.3</td>
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<tr>
<td>240</td>
<td>1.2</td>
</tr>
<tr>
<td>300</td>
<td>1.1</td>
</tr>
<tr>
<td>360</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Can be used even at −40°C depending on usage conditions

Model: HR-AAUUT Charge: 1500mA (4.8V-10mV) Ambient Temperature: 25°C Best: 3hr. Discharge: 100mA (End Voltage=0.8V) Ambient Temperature: −40°C

Applications for FDK nickel metal-hydride batteries

FDK’s line-up of Ni-MH batteries offer an exceptional solution for your energy needs, and may be used in a wide variety of applications to enhance performance while extending runtime.

<table>
<thead>
<tr>
<th>High Durability for In-Vehicle Applications</th>
<th>High Durability</th>
<th>High-Rate Discharge</th>
<th>Standard</th>
<th>Dry Cell Compatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Security</td>
<td>security</td>
<td>electric bikes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 In-vehicle transportation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Emergency</td>
<td>emergency lighting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Medical &amp; health care</td>
<td>bedside monitors</td>
<td>electric wheelchairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Lighting</td>
<td>electric shavers</td>
<td>external camera flashes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Home appliances</td>
<td>electric shavers</td>
<td>vacuum cleaners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Information</td>
<td>UPS, base stations</td>
<td>wireless devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Construction</td>
<td>elevator landing devices</td>
<td>street lights, solar systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Toys</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Power tools</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

FDK cata_Eng_P05-14_NiMH_1106入稿.indd 6 2019/11/06 19:48
FDK Ni-MH batteries have a wide operating temperature range (-40 to +85°C) for in-vehicle applications. They work especially well in low temperatures, making them ideal for cold regions.

High Durability Ni-MH Battery for In-Vehicle Applications

The high durability type for in-vehicle applications allows a long life providing continuous usage over a wide temperature range.

Features

• **Usable in a wide temperature range**
  The high durability type for in-vehicle applications can be used in a wide temperature range (-40°C to +85°C) as is required for in-vehicle applications. The battery life is also significantly longer than the standard type. In addition, these batteries utilize a safe, water-based electrolyte and thus are suitable for in-vehicle applications.

Applications

• eCall, eToll, dashboard cameras etc.

### T series

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-2/3AAAUT</th>
<th>HR-AAAUT</th>
<th>HR-AAAUTE Lowtemp discharge</th>
<th>HR-AALUTU</th>
<th>HR-AAULT</th>
<th>HR-AAUTE Lowtemp discharge</th>
<th>HR-4/3FAUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td>Typical Capacity</td>
<td>220mAh</td>
<td>500mAh</td>
<td>500mAh</td>
<td>780mAh</td>
<td>1050mAh</td>
<td>1100mAh</td>
<td>3700mAh</td>
</tr>
<tr>
<td>Minimum Capacity</td>
<td>200mAh</td>
<td>460mAh</td>
<td>460mAh</td>
<td>700mAh</td>
<td>1000mAh</td>
<td>1000mAh</td>
<td>3500mAh</td>
</tr>
<tr>
<td>Quick-Charge Current</td>
<td>220mA</td>
<td>500mA</td>
<td>500mA</td>
<td>780mA</td>
<td>1050mA</td>
<td>1050mA</td>
<td>3000mA</td>
</tr>
<tr>
<td>Time</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.4h</td>
</tr>
<tr>
<td>Diameter (excl. tube)</td>
<td>10.5mm</td>
<td>10.5mm</td>
<td>10.5mm</td>
<td>14.2mm</td>
<td>14.2mm</td>
<td>14.2mm</td>
<td>18.0mm</td>
</tr>
<tr>
<td>Length (excl. tube)</td>
<td>30.0mm</td>
<td>44.5mm</td>
<td>44.5mm</td>
<td>49.0mm</td>
<td>49.0mm</td>
<td>50.0mm</td>
<td>67.5mm</td>
</tr>
<tr>
<td>Weight</td>
<td>8g</td>
<td>13g</td>
<td>13g</td>
<td>20g</td>
<td>25g</td>
<td>27g</td>
<td>58g</td>
</tr>
</tbody>
</table>

Notes:

1. Typical capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
2. Minimum capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
3. Consult FDK according to conditions of use.
4. Including label / heat shrink tube.
5. Including paper tube / heat shrink tube.

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**High Durability Ni-MH Battery**

**Long life / high reliability type.**

### Features
- **Long life**
  Excellent battery life in repeated charge/discharge conditions. Suitable for nickel cadmium battery replacement (for emergency lights, emergency exit lights, and security equipment), for solar power generation, and wind power generation batteries.

### Applications
- **T-series (highest grade long life type)**
  Suitable for emergency lights, emergency exit lights, security equipment, communication base stations, medical equipment, ATMs, POSs, traffic road studs and various backup power supplies. T-series batteries are MT-designated battery defined in IEC61951-2.

- **C-series**
  Suitable for home appliances (shavers, electric toothbrushes etc.), measuring instruments, medical equipment, elevator B/U, UPS, server backup systems, vending machines and various backup power supplies. C-series batteries can achieve excellent battery life by using an intermittent charging method or a timer charging method for maintenance charging after main charging.

### Specifications

#### T-series

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-2/3AAAUT</th>
<th>HR-2/3AAAUTU</th>
<th>HR-AAUTC</th>
<th>HR-AAAUTC</th>
<th>HR-AAULTE</th>
<th>HR-AAAUT</th>
<th>HR-AAULTU</th>
<th>HR-AAUT</th>
<th>HR-4/5AAUTC</th>
<th>HR-AUHPC</th>
<th>HR-4/3FAUTC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal Voltage</strong></td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td><strong>Typical Capacity</strong></td>
<td>220mAh</td>
<td>220mAh</td>
<td>500mAh</td>
<td>500mAh</td>
<td>780mAh</td>
<td>1050mAh</td>
<td>1580mAh</td>
<td>1650mAh</td>
<td>2200mAh</td>
<td>3250mAh</td>
<td>3700mAh</td>
</tr>
<tr>
<td><strong>Minimum Capacity</strong></td>
<td>200mAh</td>
<td>200mAh</td>
<td>460mAh</td>
<td>460mAh</td>
<td>700mAh</td>
<td>1000mAh</td>
<td>1500mAh</td>
<td>1500mAh</td>
<td>2000mAh</td>
<td>3000mAh</td>
<td>3500mAh</td>
</tr>
<tr>
<td><strong>Quick Charge Current</strong></td>
<td>220mA</td>
<td>220mA</td>
<td>500mA</td>
<td>500mA</td>
<td>780mA</td>
<td>1050mA</td>
<td>1580mA</td>
<td>1650mA</td>
<td>2200mA</td>
<td>3250mA</td>
<td>3000mA</td>
</tr>
<tr>
<td><strong>Dimensions (incl. tube)</strong></td>
<td>10.5mm</td>
<td>10.5mm</td>
<td>10.5mm</td>
<td>14.2mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
<td>11.1mm</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>44.5mm</td>
<td>44.5mm</td>
<td>49.0mm</td>
<td>49.0mm</td>
<td>50.0mm</td>
<td>50.0mm</td>
<td>43.2mm</td>
<td>50.0mm</td>
<td>50.0mm</td>
<td>67.5mm</td>
<td></td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>8g</td>
<td>8g</td>
<td>13g</td>
<td>13g</td>
<td>20g</td>
<td>25g</td>
<td>26g</td>
<td>37g</td>
<td>37g</td>
<td>69g</td>
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</tr>
</tbody>
</table>

#### C-series

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-AAAUC</th>
<th>HR-4/5AAUC</th>
<th>HR-AAUC</th>
<th>HR-4/5AUC</th>
<th>HR-4/3FAUHPC</th>
<th>HR-4/3FAUPC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal Voltage</strong></td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td><strong>Typical Capacity</strong></td>
<td>700mAh</td>
<td>1100mAh</td>
<td>840mAh</td>
<td>1200mAh</td>
<td>1700mAh</td>
<td>2700mAh</td>
</tr>
<tr>
<td><strong>Minimum Capacity</strong></td>
<td>650mAh</td>
<td>1000mAh</td>
<td>770mAh</td>
<td>1100mAh</td>
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<td>2500mAh</td>
</tr>
<tr>
<td><strong>Quick Charge Current</strong></td>
<td>700mA</td>
<td>1100mA</td>
<td>840mA</td>
<td>1200mA</td>
<td>1700mA</td>
<td>2700mA</td>
</tr>
<tr>
<td><strong>Dimensions (incl. tube)</strong></td>
<td>10.5mm</td>
<td>14.2mm</td>
<td>44.5mm</td>
<td>43.0mm</td>
<td>50.0mm</td>
<td>43.0mm</td>
</tr>
<tr>
<td><strong>Height</strong></td>
<td>14.2mm</td>
<td>17.0mm</td>
<td>43.0mm</td>
<td>67.0mm</td>
<td>50.0mm</td>
<td>67.0mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>12g</td>
<td>21g</td>
<td>18g</td>
<td>22g</td>
<td>31g</td>
<td>57g</td>
</tr>
</tbody>
</table>

The contents of this catalogue are not guaranteed.
High-Rate Discharge Ni-MH Battery

Features

• Superior high-rate discharge characteristics
	FDK’s original electrode manufacturing process, coupled with specialized current collectors minimize internal impedance, which in turn enables high-rate discharging and guarantees a stable discharge voltage.

Applications

• Power tools, vacuum cleaners, electric motor applications etc.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-4/5FAUP</th>
<th>HR-4/3FAUHPC</th>
<th>HR-SCU</th>
<th>HR-4/3FAUPC</th>
<th>HR-4/3FAUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td>Typical Capacity</td>
<td>1950mAh</td>
<td>2700mAh</td>
<td>3000mAh</td>
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</tr>
<tr>
<td>Minimum Capacity</td>
<td>1800mAh</td>
<td>2500mAh</td>
<td>2700mAh</td>
<td>3050mAh</td>
<td>3400mAh</td>
</tr>
<tr>
<td>Quick-Charge1</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
</tr>
<tr>
<td>Dimensions (incl.tube)11</td>
<td>Diameter 18.1mm</td>
<td>23.0mm</td>
<td>18.1mm</td>
<td>18.1mm</td>
<td>18.1mm</td>
</tr>
<tr>
<td>Weight</td>
<td>39g</td>
<td>57g</td>
<td>59g</td>
<td>59g</td>
<td>58g</td>
</tr>
</tbody>
</table>

1: Typical capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
2: Minimum capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
3: Consult FDK according to conditions of use.
4: Including heat shrink tube.
5: Including paper tube / heat shrink tube.

Standard Ni-MH Battery

Features

• High energy density

Standard Ni-MH batteries achieve a high energy density by using exclusively developed materials and construction. Standard Ni-MH batteries can allow for an extended run time in various applications.

Applications

• Audio / video equipment, information / communication devices, lighting equipment, measuring instruments, home appliances, toys etc.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-S/4AAAU</th>
<th>HR-AAUE Low-temp discharge</th>
<th>HR-AAU</th>
<th>HR-4/5AU</th>
<th>HR-AU Low-temp discharge</th>
<th>HR-AUE</th>
<th>HR-4/3AU</th>
<th>HR-4/3FAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td>Typical Capacity</td>
<td>850mAh</td>
<td>1400mAh</td>
<td>1650mAh</td>
<td>2150mAh</td>
<td>2700mAh</td>
<td>2700mAh</td>
<td>4000mAh</td>
<td>4500mAh</td>
</tr>
<tr>
<td>Minimum Capacity</td>
<td>760mAh</td>
<td>1250mAh</td>
<td>1500mAh</td>
<td>1950mAh</td>
<td>2450mAh</td>
<td>2450mAh</td>
<td>3600mAh</td>
<td>4100mAh</td>
</tr>
<tr>
<td>Quick-Charge1</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.1h</td>
<td>1.4h</td>
</tr>
<tr>
<td>Dimensions (incl.tube)11</td>
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<td>17.0mm</td>
<td>17.0mm</td>
<td>17.0mm</td>
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</tr>
<tr>
<td>Weight</td>
<td>14g</td>
<td>25g</td>
<td>27g</td>
<td>33g</td>
<td>37g</td>
<td>39g</td>
<td>53g</td>
<td>59g</td>
</tr>
</tbody>
</table>

1: Typical capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
2: Minimum capacity when a single cell is discharged at 0.2lt after being charged at 0.1lt for 16 hours.
3: Consult FDK according to conditions of use.
4: Including heat shrink tube.

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**Features**

- **Dry cell compatible form factor**
  Dry cell compatible Ni-MH batteries can be used in most equipment that use dry cells.

- **Cost effectiveness**
  Economical batteries with less waste due to being rechargeable unlike a dry cell.

- **Low self-discharge**
  Ready to use after purchasing, can be stored as emergency supplies.

**Applications**

- For digital cameras, PDAs, audio equipment, remote controls, clocks, radio-controlled hobby items, amateur two-way radio etc.

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>HR-4UTG</th>
<th>HR-4UQ</th>
<th>HR-4U</th>
<th>HR-3UTG</th>
<th>HR-3UQ</th>
<th>HR-3UWX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
<td>1.2V</td>
</tr>
<tr>
<td>Typical Capacity</td>
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<td>1000mAh</td>
<td>2000mAh</td>
<td>1000mAh</td>
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<td>930mAh</td>
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<td>10.5mm</td>
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<td>11g</td>
<td>13g</td>
<td>27g</td>
<td>19g</td>
<td>32g</td>
</tr>
</tbody>
</table>

*1: Typical capacity when a single cell is discharged at 0.2C after being charged at 0.1C for 16 hours.
*2: Minimum capacity when a single cell is discharged at 0.2C after being charged at 0.1C for 16 hours.
*3: Consult FDK according to conditions of use.
*4: Including heat shrink tube.
*5: Low self-discharge model

The contents of this catalogue are not guaranteed.
Battery Pack, Battery System

FDK provides options for battery packs and battery systems depending on the requirements of each application.

When batteries are used in equipment, most instances are as battery packs or battery systems. FDK has a wealth of experience with battery packs, as well as both custom designed and standard battery systems. We design and manufacture with consideration of battery safety and reliability for each application.

- Battery pack (assembly of multiple cells)
- Battery system (assembly of multiple cells with BMS that controls charge and discharge)

Custom designed battery system
Standard battery system

Incorporating Battery Packs

Standard Configuration

When using batteries in equipment, battery model, number of cells and shape will differ depending on rated power, space and usage conditions of equipment.

- Connection shape
- Terminal direction

Safety Device

When designing an assembled battery, it is necessary to install a safety device in case of charger failure and external short circuit. FDK recommends that the following parts are built into the assembled battery.

PTC, Breaker
Thermistor

Battery Pack Shape Example

FDK can produce battery packs with various shapes according to usage. Our cases can be made from heat shrink tubing, resin, metal etc. Please consult us regarding the electrical wiring and terminal types.

Usage of Battery Packs

Our products are used in various applications such as in-vehicle applications, emergency lighting, home-use, etc. Please contact us about the usage of applications, ambient temperature, charge and discharge conditions, etc.

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Battery System

FDK save our customers’ development resources by providing batteries with control functions according to the application.

Our battery packs include a battery management system (BMS) that controls charging and discharging. This brings out the best performance of Ni-MH batteries and contributes to improving the function of our customers’ products while reducing development time.

Battery Management System

FDK’s BMS is an original system that has functions to control charge and discharge, as well as diagnose and predict battery life etc.

- Charge/discharge control:
  Prevents over-charge and discharge, and minimizes battery performance degradation
- Self-diagnosis function:
  Diagnosis of charge circuit and discharge circuits
  High reliability (internal resistance and self-discharge rate) through battery diagnostics
- Lifetime prediction function(Options):
  Capable of predicting battery lifetime through usage and environmental history and giving advanced notice

<table>
<thead>
<tr>
<th>Battery Management</th>
<th>Custom Control</th>
<th>Function Development</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Custom Designed Battery System

Our battery systems have achieved use in many applications requiring high reliability such as medical equipment, infrastructure, and information equipment.

- Data centers
  - For medical equipment
    - DC12V 70W output
  - For servers
    - DC12V 280W output
  - For elevator automatic landings
    - DC48V 1kW output
  - For disaster response vending machines
    - DC48V 450W output
  - For base stations
    - DC48V 2kW output

Standard Battery System

We offer standard battery systems with DC12V, DC24V, and DC48V input and output.

<table>
<thead>
<tr>
<th>Model</th>
<th>BBUS-100012-01</th>
<th>BBUS-122024-01</th>
<th>BBUS-921048-01</th>
<th>BBUS-192048-01</th>
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</thead>
<tbody>
<tr>
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<td>DC12V</td>
<td>DC24V</td>
<td>DC48V</td>
<td></td>
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<tr>
<td>Capacity</td>
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<td>1200Wh</td>
<td>920Wh</td>
<td>1900Wh</td>
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<tr>
<td>Charge current</td>
<td>50W</td>
<td>15A</td>
<td>45A</td>
<td>1kW</td>
</tr>
<tr>
<td>Dimensions</td>
<td>W 101mm D 150mm H 20mm</td>
<td>W 250mm D 420mm H 250mm</td>
<td>W 375mm D 235mm H 191mm</td>
<td>W 448mm D 460mm H 85.8mm</td>
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<td>19.5kg</td>
<td>31kg</td>
</tr>
<tr>
<td>Utility</td>
<td>Power supply backup for industrial computers and surveillance cameras</td>
<td>Power supply backup for communication equipment, railway signal equipment, and surveillance cameras</td>
<td>Power supply backup for communication devices, base stations, and surveillance cameras</td>
<td></td>
</tr>
</tbody>
</table>

The contents of this catalogue are not guaranteed. Specifications are subject to change without notice to improve performance.
# Ni-MH Battery Charger for 10-20 Series Battery Packs

- Designed to charge 10-20 series Ni-MH battery pack.
- Please contact us if you have a request in regards to other series.
- Offers most suitable charge control.
- Includes refresh discharge function.
- Includes overcharging and overheating prevention function.

## Charging Method

- **Charging Control**
  - $\triangle V$, battery temperature detection, timer

- **Refresh Discharge Function**
  - Refresh discharge time: Approx. 9 hours
  - Capacity: 3200mAh

## Item Contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Contents</th>
<th>Item</th>
<th>Contents</th>
</tr>
</thead>
</table>
| Input             | AC100~240V 50-60Hz        | Indicators        | Charging: Red light
|                   |                           |                   | Fully charged: Green light
|                   |                           |                   | Refreshing: Orange light
|                   |                           |                   | Error: Blinking red light |
| Rating Output Voltage | 10 Cells: DC14V 20 Cells: DC28V | Safety Approval | PSE |
| Charging Current | 1.65A (Constant current) | Dimensions | 170(L) \times 95(W) \times 59(H) mm |
| Charging Time     | Approx. 2 hours (Capacity: 3200mAh) | Weight | 600g |
|                   | Approx. 2.5 hours (Capacity: 4000mAh) | Operating Temperature | 0°C ~ 40°C |
| Refresh Discharge | Function                  | Storage Temperature | -20°C ~ +60°C |
|                   | Refresh discharge time: Approx. 9 hours (Capacity: 3200mAh) |

## Charging Control

- **Overview**
  - V: Battery voltage
  - I: Charge current
  - T: Battery temperature

- **Main charging**
  - Peak voltage control charging
  - $\triangle V$ control charging

- **Low rate charging**
  - $\triangle V$ control charging
  - Timer control charging

- **Maintenance charging**
  - Pulse current charging
  - Intermittent charging

## Charging Time

- Constant current charging
  - 1~2h
  - 1~2h
  - 1~2h
  - 11~12h

- **Charging Current**
  - 0.5~1.0It
  - 0.5~1.0It
  - 0.5~1.0It
  - 0.1It
  - 1/20~1.0It (Avg. 1/500It)
  - 1/20~1.0It

## Notes

- Recommended: Suitable to exhibit battery performance.
- Available: Can be used depending on the specification of equipment.
- Capacity: $[\text{Ah}] = \frac{\text{Rated capacity} \times \text{It}}{1 \text{h}}$
- Proper charging method and charging condition are depending on the specification/usage of equipment or structure of battery pack. Please contact us for details.
- Charging current is just a reference, please contact us for details.
- Charging methods should not be applied to dry cell compatible batteries regardless of equipment specification. Please contact us for details.

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- FDK_cata_Eng_P05-14_NiMH_1106入稿.indd 13
- 2019/11/06 19:48
**Proper charging method and charging condition are depending on the specification/usage of equipment or structure of battery pack. Please contact us for details.**

**Handling Precautions**

1. **Ni-MH Batteries Handling Precautions for Safe Use**

   Carefully read these instructions before using Ni-MH batteries for the first time.

   For your safety and that of your customers, observe all cautionary information provided in this manual. Save this manual for future reference. The following materials should be incorporated into instruction manuals for Ni-MH batteries.

   1. **Ni-MH BATTERY**

      **Ni-MH batteries contain strong colorless alkaline solution (electrolyte).** If the skin or clothing comes in contact with fluid from a Ni-MH battery, Battery fluid can irritate the skin thoroughly wash the area immediately with clean water from the tap or another source.

      1. Do not remove the outer tube from a battery or damage it. Doing so will expose the battery to the risk of a short circuit, and may cause leakage of battery fluid, heat generation, bursting, and fire.

      2. If Ni-MH batteries leak fluid, change color, change shape, or change in any other way, do not use them, otherwise they may cause heat generation, bursting, and fire.

      3. Ni-MH batteries contain strong colorless alkaline solution (electrolyte). If the skin or clothing comes in contact with fluid from a Ni-MH battery, Battery fluid can irritate the skin thoroughly wash the area immediately with clean water from the tap or another source.

      4. When transporting Ni-MH batteries, pack them carefully so that the batteries inside the case are not moved.

   - Do not strike or drop Ni-MH batteries. Sharp impacts or concussions to Ni-MH batteries may cause leakage of battery fluid, heat generation, bursting, and fire.

   2. Store Ni-MH batteries out of the reach of infants and small children. When charging or using a battery, do not let infants or small children remove the battery from the charger or the equipment being used.

      3. Children should not use Ni-MH batteries unless they have been carefully instructed on the contents of this instruction manual and their parents or guardians have confirmed that the children understand and appreciate the proper usage and safety hazards presented by the batteries.

   3. Ni-MH batteries must be placed in a temperature range of 0 to 40°C (degrees Celsius). When used at temperatures outside this range (0 to 40°C) the batteries may cause leakage of battery fluid or heat generation. It could also impair performance or shorten the battery life of Ni-MH batteries.

      4. Do not charge or use Ni-MH batteries until they have been cooled to 0°C or below. Doing so may cause leakage of battery fluid, heat generation, bursting, and fire.

      5. Do not use or store Ni-MH batteries at high temperature, such as in strong direct sunlight, in cars during hot weather or directly in front of a heater. This may cause leakage of battery fluid. It could also impair performance and shorten battery life of Ni-MH batteries.

      6. Do not use old and new batteries mixed together, or batteries of different charge levels.

      7. Do not use Ni-MH batteries mixed together with a dry cell or other battery of a different capacity, type, or brand name. This may cause leakage of battery fluid and heat generation.

   - Do not charge Ni-MH batteries in parallel as this may cause leakage of battery fluid, heat generation, bursting, and fire.

      8. Do not charge Ni-MH batteries without proper cooling. Batteries have a limited lifetime. Even in the same equipment, the battery life varies depending on the ambient temperature during operation and number of charge/discharge cycles. Therefore, if the operating temperature of a Ni-MH battery becomes much shorter than its initial operating time, even after recharging, it is most likely near the end of its battery life and should be replaced with a new battery.
LITHIUM BATTERY
Typical Uses of Lithium Batteries
A reliable power source for a wide range of applications from every corner of society

FDK’s technology adds long-term reliability to lithium batteries’ original features such as high energy density and superior shelf life. No toxic substances restricted by the RoHS Directive are used in FDK’s environmentally-conscious lithium batteries.


FDK’s Lithium Battery Advantages
A variety of shapes and sizes make your application design easy. Stable and long-lasting power supply under a wide range of temperature conditions.

Typical Uses of Lithium Batteries
A reliable power source for a wide range of applications from every corner of society

Handling Precautions
Stable performance and long life
Long-term reliability proven in the market
Best fit for smart meter solutions

**Advantage ① Long-lasting reliability**
Optimized material design and laser-sealing ensure extended long life. This supports your application operating just as you would expect.

- 10 years 
- 20 years

**Advantage ② Excellent charge retention**
A very low self-discharge rate (0.5% per year at room temperature) means at least 95% or more capacity is retained after 10-year storage.

- Capacity 95% (10 years at RT)

**Advantage ③ Wide operating temperature range**
Non-aqueous electrolyte does not freeze easily. This supports your application’s operation across a wide temperature range.

- -40°C 
- +85°C

**Advantage ④ Long lasting high discharge current over a long period**
Spiral electrode structure and optimized electrolyte composition supply power for high demanding applications such as repeated radio communication and emergency valve shut-off operation.

Supporting the various needs of meters with a combination of high power and high capacity.

---

**RTC Back Up**  **Zigbee / WiSUN**  **LPWA / LTE**

<table>
<thead>
<tr>
<th>Capacity (mAh)</th>
<th>High Capacity</th>
<th>High Capacity</th>
<th>High Power</th>
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<tbody>
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<td>CR17450E-N</td>
<td>CR17450ESK</td>
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<tr>
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<td>CR17450E-R</td>
<td>CR17450ES</td>
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<td>CR17335E-R</td>
<td>CR17335EF</td>
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<tr>
<td>2500</td>
<td>CR17335E</td>
<td>CR17335HEF</td>
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<td>2000</td>
<td>CR1/2 6LHT</td>
<td>CR174450EP</td>
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<td>CR17450HE-N</td>
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<td>CR17335H</td>
<td>CR17450HE-N</td>
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</table>

**Max. Pulse Current (A)**

- Spiral electrode structure: Stainless steel can
- Spiral electrode structure: Ni-plated steel can
- Bobbin electrode structure: Stainless steel can

---

Non-aqueous electrolyte does not freeze easily. This supports your application’s operation across a wide temperature range.

-40°C to +85°C

Stable performance and long life
Long-term reliability proven in the market
Best fit for smart meter solutions
Cylindrical-type Primary Lithium Batteries - High Power

Utilizes a spiral electrode structure to provide a high discharge current. Laser sealing ensures an extended lifetime.

**Features**
- Spiral electrode structure ensures high-rate current discharge.
- Low self-discharge rate and long cell life. Self-discharge rate: less than 0.5% per year at room temperature.
- Usable over a wide temperature range
  - Operational temperature range: -40°C to +85°C (-4°F to +185°F) Consult with FDK when using batteries at temperatures exceeding -20°C to +60°C (-4°F to +140°F) range.
- UL recognition (File No. MH13421)

**Applications**
- Gas, electricity, and water meters
- Fire and gas alarms
- In-vehicle applications (ETCs, eCall systems, etc)

Please use tabs or connectors when connecting these batteries to applications.

**Specifications**

<table>
<thead>
<tr>
<th></th>
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<td>17.0mm</td>
<td>17.0mm</td>
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<td>50.0mm</td>
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<td>33.5mm</td>
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<td>17g</td>
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<td>17g</td>
<td>23g</td>
<td>23g</td>
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</tr>
</tbody>
</table>

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Note: Expected life at room temperature: CR17500EP 20 years, other models 10 years. Expected life is reference only and is not intended to imply any guarantee or warranty. Actual life depends on condition of use.

1. Consult with FDK when considering connection method and multiple-cell configuration.
2. CR17450ES (not shown in the table) has the same set of specifications as CR17450E.
3. CR17335HEF, CR17335EF, CR17335EG, CR17450HE-N, and CR17450EG have the outer can made of nickel plated steel.
4. Nominal capacity is determined at an end voltage of 2.0V when the battery is allowed to discharge at a standard current level at +23°C.
5. Current value for obtaining 1.0V cell voltage when pulse is applied for 15 seconds at 50% discharge depth (50% of the nominal capacity) at +23°C.
Cylindrical-type
Primary Lithium Batteries - High Capacity

Utilizes a unique bobbin electrode structure to provide high capacity.

Features

• Bobbin electrode structure ensures high-capacity performance.
• Low self-discharge rate and long cell life.
  Self-discharge rate: less than 0.5% per year at room temperature.
• Usable over a wide temperature range.
  Operational temperature range: -40°C to +85°C (-40°F to +185°F)
  Consult with FDK when using batteries at temperatures exceeding -20°C to +60°C (-4°F to +140°F) range.
• UL recognition (File No. MH13421)

Applications

• Electricity and water meters
• Fire alarms
• Memory backup power source

Other

• Please use tabs or connectors when connecting these batteries to application.

Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
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<td>0.5mA</td>
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<td>33.5mm</td>
<td>50.5mm</td>
<td>35.5mm</td>
<td>45.0mm</td>
<td>45.0mm</td>
<td>127mm H 17mm H 48.5mm</td>
</tr>
<tr>
<td>Approx. Weight</td>
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<td>9g</td>
<td>9g</td>
<td>12g</td>
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<td>19g</td>
<td>16g</td>
<td>23g</td>
<td>23g</td>
<td>32g</td>
</tr>
</tbody>
</table>

Expected life is 10 years at room temperature.
Expected life is reference only and is not intended to imply any guarantee or warranty. Actual life depends on condition of use.
Consult with FDK when considering connection method and multiple-cell configuration.
Nominal capacity is determined at an end voltage of 2.0V (6.0V for 9V model) when the battery is allowed to discharge at a standard current level at +23°C.
Thin-type Primary Lithium Batteries

For overall thickness and weight reduction in devices.

**Features**

- Low self-discharge rate and long cell life.
- Self-discharge rate: less than 3% per year at room temperature.
- Usable over wide temperature range.
- Operational temperature range: -10°C to +60°C (+14°F to +140°F)
- UL recognition (File No. MH13421)

**Applications**

- Credit cards with dynamic code display
- Card type security systems
- Electronic tags
- Gift cards

**Other**

- Can be connected via thermal compression bonding.
- Consult with FDK when using multiple cells.

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>CF042223 (N)</th>
<th>CF042722U (N)</th>
<th>CF042039 (N)</th>
<th>CF052722U (N)</th>
<th>CF052039 (N)</th>
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<td>Nominal Voltage</td>
<td>3V</td>
<td>3V</td>
<td>3V</td>
<td>3V</td>
<td>3V</td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>12mAh</td>
<td>15mAh</td>
<td>25mAh</td>
<td>22mAh</td>
<td>35mAh</td>
</tr>
<tr>
<td>Standard Discharge Current</td>
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<td>0.25mA</td>
<td>0.25mA</td>
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<tr>
<td>Dimensions Length</td>
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<td>L:25.5mm (L:22.5mm)</td>
<td>L:42.5mm (L:39.5mm)</td>
<td>L:25.5mm (L:22.5mm)</td>
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<td>Width</td>
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<td>27.5mm</td>
<td>20.5mm</td>
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<td>Thickness</td>
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<td>0.5g</td>
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<td>0.6g</td>
</tr>
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</table>

*Expected life is 5 years at room temperature.
*Expected life is reference only and is not intended to imply any guarantee or warranty. Actual life depends on condition of use.
*Consult with FDK about installation method.
*Nominal capacity is determined at an end voltage of 2.0V when the battery is allowed to discharge at a standard current level at +23°C.
Applications

- Electronic notebooks
- Electronic automobile keys (keyless entry)
- LED-related devices
- Memory backup power source

Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
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<td>1620</td>
<td>2016</td>
<td>2025</td>
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<td>Nominal Capacity</td>
<td>36mAh</td>
<td>80mAh</td>
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<td>2.7mA</td>
<td>2.7mA</td>
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<tr>
<td>Dimensions</td>
<td>Diameter</td>
<td>12.5mm</td>
<td>16.0mm</td>
<td>20.0mm</td>
<td>20.0mm</td>
<td>20.0mm</td>
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<tr>
<td>Height</td>
<td>2.0mm</td>
<td>2.0mm</td>
<td>1.6mm</td>
<td>2.5mm</td>
<td>3.2mm</td>
<td>10.8mm</td>
<td>25.2mm</td>
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<tr>
<td>Approx. Weight</td>
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<td>1.3g</td>
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<td>2.5g</td>
<td>3.0g</td>
<td>3.3g</td>
<td>9.1g</td>
</tr>
</tbody>
</table>

Features

- Low self-discharge rate and long cell life.
  Self-discharge rate: Approx. 1% per year at room temperature.
- Usable over wide temperature range.
  Operational temperature range: -20°C to +60°C (-4°F to +140°F) (CR-1/3N, 2CR-1/3N)
  -20°C to +70°C (-4°F to +158°F) (other models)
- UL recognition (File No. MH13421)

Other

- Available with secondary processing (multiple cells, tabs, connectors, etc) in accordance with use.
- Nickel-plated phosphor bronze or stainless steel should be used for battery contact terminal materials.
  To ensure stable contact conditions, contact pressure of several newtons is recommended when attaching.

Expected life is 5 years at room temperature.

Expected life is reference only and is not intended to imply any guarantee or warranty. Actual life depends on condition of use.

Consult with FDK when considering connection method and multiple-cell configuration.

Nominal capacity is determined at an end voltage of 2.0V (4.0V for 2CR-1/3N)
when the battery is allowed to discharge at a standard current level of +23°C.
Coin-type Rechargeable Lithium Batteries

Manganese composite oxide for the positive electrode material and lithium aluminium alloy for the negative electrode material.

Features

- Compatible with reflow soldering (Max. 260°C) (ML614R)
- Stable operating voltage of 2.5V.
- Capable of being charged at 2.8V.
- Low self-discharge rate and long cell life
  Self-discharge rate: Approx. 2% per year at room temperature.
- Usable over a wide temperature range.
  Operational temperature range: -20°C to +60°C (-4°F to +140°F)
- UL recognition (File No. MH13421)

Applications

- Memory backup power source for laptop PCs, dashboard cameras, cell phones, DSCs and camcorders. Electronic automobile keys (keyless entry)

Other

- Available with secondary tab processing in accordance with use.
  - ML614R is available with dedicated tab only.
- Nickel-plated phosphor bronze or stainless steel should be used for battery contact terminal materials.
  - To ensure stable contact conditions, contact pressure of several newtons is recommended when attaching.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ML614</th>
<th>ML621</th>
<th>ML614R</th>
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<tbody>
<tr>
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<td>3V</td>
<td>3V</td>
</tr>
<tr>
<td>Nominal Capacity ¹</td>
<td>3.4mAh</td>
<td>5.8mAh</td>
<td>2.5mAh</td>
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<tr>
<td>Standard Charge/Discharge Current</td>
<td>0.015mA</td>
<td>0.015mA</td>
<td>0.005mA</td>
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<tr>
<td>Max. Pulse Current ²</td>
<td>1.5mA</td>
<td>1.5mA</td>
<td>-</td>
</tr>
<tr>
<td>Charge/Discharge Cycle Characteristics</td>
<td>300 (Discharge depth of 20%)</td>
<td>300 (Discharge depth of 10%)</td>
<td></td>
</tr>
<tr>
<td>Charging Method</td>
<td>Constant voltage charge</td>
<td>2.8~3.25V</td>
<td>2.8~3.1V</td>
</tr>
<tr>
<td>Dimensions</td>
<td>Diameter</td>
<td>6.8mm</td>
<td>6.8mm</td>
</tr>
<tr>
<td></td>
<td>Height</td>
<td>1.4mm</td>
<td>2.1mm</td>
</tr>
<tr>
<td>Approx. Weight</td>
<td>0.16g</td>
<td>0.22g</td>
<td>0.19g</td>
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<tr>
<td>for Reflow Soldering</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

¹ Expected life is 5 years at room temperature.
² Expected life is reference only and is not intended to imply any guarantee or warranty. Actual life depends on condition of use.
³ Consult with FDK when considering connection method and multiple-cell configuration.
⁴ 1 Nominal capacity is determined at an end voltage of 2.0V when the battery is allowed to discharge at a standard current level at +23°C.
⁵ Current value for obtaining 2.0V cell voltage when pulse is applied for 15 seconds at 50% discharge depth (50% of the nominal capacity) at +23°C.
Lithium batteries Handling Precautions for Safe Use

Carefully read these instructions manual before using lithium batteries for the first time.

Lithium batteries contain flammable materials such as lithium metal, lithium alloy and organic solvent. Improper handling can lead to leakage, heat generation, explosion or fire. To prevent accidents, pay sufficient attention to the following precautions. Also refer to them when you are describing in your instruction manual how to handle lithium batteries used in your application.

Thin-type primary and coin-type primary/rechargeable lithium batteries

DANGER (Coin-type batteries)

1. Keep out of the reach of infants or children.
   - If a battery is swallowed, it can lead to chemical burns, penetration of mucosal tissue and, in the worst case, death. A swallowed battery must be removed urgently. Contact a doctor immediately for instructions.

WARNING

1. Do not use batteries for unspecified purposes.
   - Different terminal structure may suffer from contact failure. Differences in specifications may damage the battery or application, which can lead to leakage, heat generation, explosion or fire.

2. Do not charge (Primary batteries: CF and CR series).
   - When the battery is charged, gas is generated inside and it raises internal pressure, resulting in leakage, heat generation, explosion or fire.

3. Do not charge with unspecified conditions (Rechargeable batteries: MI series).
   - Doing so may generate gas inside the battery, resulting in leakage, heat generation, explosion or fire.

4. Do not throw batteries into fire. Do not heat or disassemble batteries.
   - Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.

5. Do not insert batteries with the positive and negative terminals reversed.
   - Make sure the polarities are in the right position when inserting the batteries into the application. When the polarities are reversed, the application may operate even though one of the batteries is improperly inserted but this may cause leakage, heat generation, explosion or fire.

6. If leaked liquid gets in the eyes, it can cause eye injury.
   - Wash the eye(s) with clean water and receive medical care immediately.

7. If leaked liquid gets into the mouth, rinse the mouth well and consult with a doctor immediately.

9. In case of leakage or a strange smell, move the battery away from possible sources of fire immediately.
   - Leaked electrolyte may catch fire.

10. Do not solder directly on the battery.
    - Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.

11. Do not apply strong pressure to the batteries nor handle roughly.
    - Doing so may cause leakage, heat generation, explosion or fire. Do not use a dropped battery as it may have been damaged.

12. Make sure to insulate battery terminals with vinyl tape when disposing of or storing them to avoid short circuit.
    - Piling batteries together disorderly or in contact with metal objects may cause short-circuit, resulting in leakage, heat generation, explosion or fire.

13. Do not use new and used batteries together. Do not use different types of batteries together.
    - Different characteristics cause leakage, heat generation, explosion or fire.

14. Do not stick batteries on the skin.
    - Doing so may cause skin injury.

CAUTION

1. Make sure to insert batteries in the application so that the positive and negative terminals may not come into contact with metal parts of the application.

2. Do not use or leave the batteries exposed to heat such as a front of window in direct sunlight or inside a car under sunlight.
   - Doing so may cause leakage, heat generation, explosion or fire.

3. Avoid contact with water.
   - Don’t use the batteries if they get wet. If wet, store in a dry place and keep for a while.

4. Read the application’s instruction manual and precautions carefully before use.
   - The specifications or performance of these batteries may not match some usages or types of application.

5. Store and use the batteries away from direct sunlight, high temperature and high humidity.
   - Otherwise, it can lead to leakage, heat generation, deformation or other abnormal situations while using or storing them.
   - These can lead to leakage, heat generation or explosion.

6. Do not store the batteries if you notice heat generation, deformation or other abnormal situations while using or storing them.

7. For proper disposal of batteries, refer to local regulations.

DANGEROUS (Cylindrical-type primary lithium batteries)

WARNING

1. Do not use batteries for unspecified purposes.
   - Different terminal structure may suffer from contact failure. Differences in specifications may damage the battery or application, which can lead to leakage, heat generation, explosion or fire.

2. Do not charge.
   - When the battery is charged, gas is generated inside and it raises internal pressure, resulting in leakage, heat generation, explosion or fire.

3. Do not throw batteries into fire. Do not heat or disassemble batteries.
   - Doing so may damage insulation, which can lead to leakage, heat generation, explosion or fire.

4. Do not insert batteries with the positive and negative terminals reversed.
   - Make sure the polarities are in the right position when inserting the batteries into the application. When using 3 or more batteries, the application may operate even though one of the batteries is improperly inserted but this may cause leakage, heat generation, explosion or fire.

5. If leaked liquid gets in the eyes, it can cause eye injury.
   - Wash the eye(s) with clean water and receive medical care immediately.

6. If leaked liquid gets into the mouth, rinse the mouth well and consult with a doctor immediately.

7. If leaked liquid gets into the nose, rinse the nose well and consult with a doctor immediately.

   - If the positive and negative terminals come into contact with metal objects, short circuit occurs and excessive current flows at once resulting in leakage, heat generation, explosion or fire.

10. Do not scratch nor peel off the thin film on the surface of the battery.
    - If the battery surface is covered with the thin film to prevent short-circuit. Cutting with an edged tool or peeling off this film may cause short-circuit, resulting in leakage, heat generation, explosion or fire.

11. Do not apply strong pressure to the batteries or handle roughly.
    - Doing so may cause leakage, heat generation, explosion or fire. Do not use a dropped battery as it may have been damaged.

12. Do not deform the battery in any way.

    - When a battery is fully discharged by an external power source, the voltage drops to 0 or below (voltage reversal) and gas is generated inside the battery. This may cause leakage, heat generation, explosion or fire.

CAUTION

1. Do not use or leave the batteries exposed to heat such as a front of window in direct sunlight or inside a car under sunlight.
   - Doing so may cause leakage, heat generation, explosion or fire.

2. Avoid contact with water.
   - Doing so may cause leakage, heat generation, explosion or fire.

3. Read the application’s instruction manual and precautions carefully before use.
   - The specifications or performance of these batteries may not match some usages or types of application.

4. Remove batteries from the application if you do not use it for a long time.

5. Store and use the batteries away from direct sunlight, high temperature and high humidity.
   - Otherwise, it can lead to leakage, heat generation, explosion or fire. If stored or used in such environment, batteries may suffer from deteriorated performance and life.

6. Do not use the batteries if you notice heat generation, deformation or other abnormal situations while using or storing them.
   - This can lead to leakage, heat generation or explosion.

7. Check batteries inside emergency-use applications periodically.
   - Applications may not work properly in emergency due to batteries’ deterioration, or may be damaged by leakage.

8. For proper disposal of batteries, refer to local regulations.

Requests Regarding Quality Assurance and Ensuring Safety

When considering the following please contact FDK beforehand to ensure quality and safety standards.

1. Connecting batteries in series or in parallel on circuits.

2. Molding batteries with resin.

3. Connecting batteries in series or in parallel on circuits.

4. Using the batteries for medical devices.

5. Using the batteries for medical devices.

6. Using the batteries for medical devices.

7. Using the batteries for medical devices.

Connection Terminal Specification

Each model is available with connectors, tabs, etc., which facilitate battery installation process onto user applications. Our standard connection terminal specifications are described in a separate document “Connection Terminal Specifications for Lithium Batteries and Key Circuit Design”. Please consult with FDK for details.

Notes on Transportation

Lithium metal batteries are classified as Class 9 dangerous goods in the United Nations Recommendations, and given UN numbers UN3090 and UN3091. All the relevant requirements of UN Recommendations as well as other related regulations such as IATA Dangerous Goods Regulation (IATA-DGR), International Maritime Dangerous Goods Code (IMSBC-Code) and, in the case of air transportation in the USA, Title 49 of Code of Federal Regulations (49 CFR) shall be met for transportation of Lithium metal batteries as described below. Please note that air transportation regulations for Lithium batteries will be amended irregularly as required and it is important to refer to the latest regulations.

Special Notes Regarding FDK Lithium Batteries

• All of our lithium batteries are categorized as lithium metal batteries from a transportation regulation perspective.

• Our lithium batteries and shipping packages meet the requirements of subsection 38.3, Part III, UN Manual of Tests and Criteria.

• Package specifications of our lithium batteries comply with all regulations set down in the above-mentioned transportation regulations and requirements. When you want to use our original package for shipping and require related certification, please contact our relevant department through your distributor or sales representative.

• If you pack lithium batteries for shipping, please note that you will be responsible for related tests and certificates.

• Shipping agents may set their own rules of transportation, so please contact them in advance.

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Air transportation of our lithium batteries

1. Transportation of batteries packed by themselves (UN3090)
   Air transportation of lithium cells and batteries by themselves is permitted on cargo aircraft only. The Packing Instruction 968 (PI 968) of the IATA Dangerous Goods Regulation (PI ADR) sets down these sections for transport of lithium metal batteries packed by themselves as follows.
   • Transport of batteries in accordance with Section IA
     Cells containing more than 1g of lithium or batteries (battery packs) containing more than 2g of lithium are applicable to Section IA, and it is permitted to transport them as Class 9 Dangerous Goods when they comply with all the requirements of the transport conditions of Section IA.
   • Transport of batteries in accordance with Section IB
     Cells containing more than 0.3g and less than 1g of lithium or batteries (battery packs) containing more than 0.3g and less than 2g of lithium are applicable to Section IB, and it is permitted to transport them without using a US Class 9 Dangerous Goods container (packing group 1) when they comply with all the requirements of the transport conditions of Section IB.
   • Transport of batteries in accordance with Section II
     Cells or batteries (battery packs) containing less than 0.3g of lithium are applicable to Section II, and it is permitted to transport them as exempted Class 9 Dangerous Goods when they comply with all the requirements of the transport conditions of Section II. In the case of cells or batteries applicable to Section II when the number of cells per one package is 8 pieces or less, or the number of batteries per package is 2 pieces or less, it is permitted to transport them as exempted Class 9 Dangerous Goods when they comply with all the requirements of the transport conditions of Section II. However, the number of packages prepared to transport in accordance with Section II with a single address is limited to one.

Sea transportation of our lithium batteries

If the lithium content of cells is 1g or less to total lithium content of batteries (battery packs) 2g or less, Special Provision 198, International Maritime Dangerous Goods Code (IMDG Code) applies to them and they are permitted for transport as exempted dangerous goods when they comply with all the requirements of the transport conditions.

Notes on Environmental Regulations

In line with the increasing awareness of the need to protect the global environment, unified environmental regulations such as RoHS, WEEE or REACH in EU countries and other local regulations in other countries have been established. In EU countries the RoHS Directive is not applicable to batteries used in Electrical and Electronic Equipment (EEE), whereas the Battery Directive (2006/66/EC) is applied. Batteries are subject to the WEEE Directive while they are mounted in EEE. Please note that regulations applicable to batteries are different from those for EEE. For further information, please consult with FDK. Our lithium batteries do not contain mercury, lead, cadmium, hexavalent chromium or other hazardous materials. However, lithium batteries contain flammable substances such as lithium metal and organic electrolyte, and safety requirements for lithium batteries may be set by local governments. Please confirm your local rules and regulations when you dispose of lithium batteries.

Certificate of Conformity to Battery Directive

We hereby certify that our lithium batteries delivered to you conform to Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and on waste electrical and electronic equipment (WEEE) and on battery labeling and on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and the WEEE/RoHS Directives (also known as EU environmental regulations), we confirm our compliance with the requirements of the relevant Directives. For further information about this Certificate of Conformity and how to obtain it, please contact our customer service department.

Response to RoHS 2 Directive

1. Basic view
   The recital 14 of RoHS 2 Directive explicitly states the following:
   “Batteries are not such articles that contain substances that are intended to be released, because they are not such articles that contain substances that are intended to be released, because they are not such articles that contain substances that are intended to be released.”

2. Restricted substances
   RoHS 2 Directive regulates the restriction of maximum concentration value by weight in homogeneous materials of “electrical and electronic equipement (EEE)” in Annex XVII contains a restriction shall not be manufactured, placed on the market or used unless it complies with the conditions of that restriction.”

3. CE marking (not applicable to batteries)
   Batteries are categorized as “articles” by REACH. Art 37 (1) and (5) of the CE marking label implying the products are compliant with the RoHS 2 Directive. However, as aforementioned, RoHS 2 Directive does not apply to batteries and accumulators, hence our batteries and accumulators do not bear CE marking.

Correlation between Battery Directive and WEEE/RoHS Directive

If you are concerned about the correlation between Battery Directive (applied to batteries and accumulators) and the WEEE/RoHS directives (also known as EU environmental regulations), we would like to introduce the website of the Battery Association of Japan (BAJ), where you can find BAJ’s official view on this matter. http://www.baj.or.jp/en/encyclo/vocabulary.htm

FDK Lithium Battery Models and Dimensions

<table>
<thead>
<tr>
<th>Cylindrical-type Primary Batteries</th>
<th>Coin-type Batteries</th>
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</thead>
<tbody>
<tr>
<td><strong>Diameter</strong></td>
<td><strong>Height</strong></td>
</tr>
<tr>
<td>CR1/2 1.6</td>
<td>11.6</td>
</tr>
<tr>
<td>CR2/3 2.5</td>
<td>16.0</td>
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<tr>
<td>CR14250SE 1.6</td>
<td>20.0</td>
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<tr>
<td>CR1/2 6</td>
<td>11.6</td>
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<tr>
<td>CR2/3 6L</td>
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<tr>
<td>CR17450HE-N 3.2</td>
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<tr>
<td>CR17335EF 2.5</td>
<td>12.5</td>
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<td>CR8LHT 1.6</td>
<td>8.8</td>
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<tr>
<td>CR9LHT 1.6</td>
<td>8.8</td>
</tr>
</tbody>
</table>

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ALKALINE BATTERY
These alkaline dry batteries are long lasting, easy to use, and safe.

Alkaline dry batteries are an active part of the devices in our lives with their high power and long duration which deliver high performance for different applications. Our batteries are made in Japan and Indonesia according to the highest quality standards.

Features of FDK's alkaline batteries

FDK's unique technology allows our alkaline batteries to maintain low impedance over long-term storage, and they include leak proof mechanisms.

FDK's new technology

Adoption of rare-earth metal coating

Rare-earth metal coating on the cathode can prevent the rise of internal resistance resulting from oxidation and also prevents gas generation resulting in corrosion inside the battery.

Contact connection

Anti-corrosion

Uses of FDK's alkaline batteries

FDK's alkaline batteries support various aspects of our daily lives.
Alkaline Batteries - Premium

Best Performance for All Devices.

Features

Maximum runtime for all devices.

- 10 years storage
- One-year warranty
- Leakage protection

Typical discharging curve

Applications

- Digital still cameras, electric razors, LED lanterns,
- Gaming devices, electronic dictionaries, LED flashlights, portable chargers,
- IC recorders, electric toothbrushes, remote controllers, wireless computer mice, clocks

Technical data & discharging times

<table>
<thead>
<tr>
<th>Model</th>
<th>LR20 Premium</th>
<th>LR14 Premium</th>
<th>LR6 Premium</th>
<th>LR03 Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.5V</td>
<td>1.5V</td>
<td>1.5V</td>
<td>1.5V</td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>15,500mAh (20Ω cont. discharge)</td>
<td>7,600mAh (20Ω cont. discharge)</td>
<td>2,875mAh (75Ω cont. discharge)</td>
<td>1,340mAh (300Ω cont. discharge)</td>
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<tr>
<td>Outer Dimensions</td>
<td>Height 60.9mm</td>
<td>49.6mm</td>
<td>50.1mm</td>
<td>44.2mm</td>
</tr>
<tr>
<td></td>
<td>Diameter 33.0mm</td>
<td>25.6mm</td>
<td>14.0mm</td>
<td>10.3mm</td>
</tr>
<tr>
<td>Weight</td>
<td>134g</td>
<td>65g</td>
<td>23g</td>
<td>11g</td>
</tr>
</tbody>
</table>

Typical Duration: 20°C

(Not guaranteed performance)

- CD/Game 250mA 1hr/day
- Portable stereo 16h
- Toy 26h
- 2.2Ω 4m on/11m off 8h/day (0.9V)
- Portable light 1348m
- Digital audio 96cycles

- Digital Still Camera (1500mA 2s on/650mA 28s on) 30/h
- Portable stereo 13h
- Toy 22h
- 3.9Ω 4m on/11m off 8h/day (0.9V)
- Portable light 1188m
- Digital camera 96cycles

- Portable light 246m
- Toy 276m
- 24Ω 15s on/45s off 8h/day (1.0V)
- Remote controller 22h
- 50mA 1h on/7h off Repeat (0.9V)
- Digital audio 22h

*Value in parentheses is end voltage of each discharge
Alkaline Batteries - High Power

Great for High Drain Devices.

Features

The perfect battery for any device (low to high drain).

10 years storage  One-year warranty  Leakage protection

Applications

- digital still cameras, electric shavers, LED lanterns, gaming devices, electronic dictionaries, LED flashlights, portable chargers, IC recorders, electric toothbrushes

Technical data & discharging times

<table>
<thead>
<tr>
<th>Model</th>
<th>LR20 High Power</th>
<th>LR14 High Power</th>
<th>LR6 High Power</th>
<th>LR03 High Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>1.5V</td>
<td>1.5V</td>
<td>1.5V</td>
<td>1.5V</td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>15,250mAh (20Ω cont. discharge)</td>
<td>7,550mAh (20Ω cont. discharge)</td>
<td>2,800mAh (75Ω cont. discharge)</td>
<td>1,300mAh (300Ω cont. discharge)</td>
</tr>
<tr>
<td>Outer Dimensions</td>
<td>Height 60.9mm</td>
<td>Height 49.6mm</td>
<td>Height 50.1mm</td>
<td>Height 44.2mm</td>
</tr>
<tr>
<td></td>
<td>Diameter 33.0mm</td>
<td>Diameter 25.6mm</td>
<td>Diameter 14.0mm</td>
<td>Diameter 10.3mm</td>
</tr>
<tr>
<td>Weight</td>
<td>131g</td>
<td>63g</td>
<td>23g</td>
<td>11g</td>
</tr>
</tbody>
</table>

Typical Duration: 20°C

(Not guaranteed performance)

- 600mA 2h/day (0.9V) Portable stereo 17h
- 2.2Ω 1h/day (0.8V) Toy 24h
- 2.2Ω 4m on/11m off 8h/day (0.9V) Portable light 1303m

- 400mA 2h/day (0.9V) Portable stereo 12h
- 3.9Ω 4h/day (0.8V) Toy 21h
- 3.9Ω 4m on/11m off 8h/day (0.9V) Portable light 1123m

- 3.9Ω 4h/day (0.8V) Toy 7.8h
- 250mA 1h/day (0.9V) CD/Game 8.3h
- 100mA 1h/day (0.9V) Digital audio 22h
- 1500W/650W Pulse (1.05V) Digital camera 91cycles

- 5.1Ω 4m on/56m off 8h/day (0.9V) Portable light 242m
- 5.1Ω 1h/day (0.8V) Toy 276m
- 24Ω 15s on/45s off 8h/day (1.0V) Remote controller 21h
- 50mA 1h on/7h off Repeat (0.9V) Digital audio 21h

*Value in parentheses is end voltage of each discharge.
Alkaline Batteries - Universal Power

Power for Everyday Life.

Features
Providing the best value for everyday-use devices.

7 years storage  One-year warranty  Leakage protection

Typical discharging curve

Applications
- remote controllers, wireless computer mice, clocks, educational items

Technical data & discharging times

Model          LR20 Universal Power          LR14 Universal Power          LR6 Universal Power          LR03 Universal Power

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>1.5V</th>
<th>1.5V</th>
<th>1.5V</th>
<th>1.5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Capacity</td>
<td>15,000mAh (2Q cont. discharge)</td>
<td>7,500mAh (2Q cont. discharge)</td>
<td>2,700mAh (75Q cont. discharge)</td>
<td>1,260mAh (300Q cont. discharge)</td>
</tr>
<tr>
<td>Outer Dimensions</td>
<td>60.9mm</td>
<td>49.6mm</td>
<td>50.1mm</td>
<td>44.2mm</td>
</tr>
<tr>
<td>Height</td>
<td>60.9mm</td>
<td>49.6mm</td>
<td>50.1mm</td>
<td>44.2mm</td>
</tr>
<tr>
<td>Diameter</td>
<td>33.0mm</td>
<td>25.6mm</td>
<td>14.0mm</td>
<td>10.3mm</td>
</tr>
<tr>
<td>Weight</td>
<td>128g</td>
<td>61g</td>
<td>22g</td>
<td>11g</td>
</tr>
<tr>
<td>Typical duration</td>
<td>0.6</td>
<td>0.8</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Duration: 20°C</td>
<td>0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/Duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD/Game</td>
<td>250mA 1h/Day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Still Camera</td>
<td>(1500mW 25 on/650mW 28s on) x 10/h</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>4m on/56m off</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>252m</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toy 20h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital audio 2h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital camera 78cycles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Value in parentheses is end point voltage of each discharge
**Alkaline Batteries Handling Precautions for Safe Use**

Carefully read these instructions manual before using alkaline batteries for the first time.

In normal use, alkaline manganese batteries provide a safe and dependable source of power. If they are misused or abused, leakage, heating or explosion in extreme cases may occur. Care must be taken according to the following precautions:

**DANGER**

1. Do not short-circuit the chemically and electrolyte from inside the batteries directly. Once alkaline solution is used in this battery system, there is a risk of not only damage to cloth and skin but also risk of leakage at the terminals.
2. In case of such an emergency where the solution gets into the eyes, wash immediately with plenty of water and medicate immediately by local agents.
3. If the solution gets to the skin and/or clothes, wash with water and consult a doctor.
4. These batteries are equipped with a metal mechanism that increases intercellular pressure to prevent explosion. During charging, the charger should be turned off when charging is complete, as the voltage can increase abnormally and risk in electrolyte leakage via venting; however, in extreme circumstances, the vent mechanism may not work normally and explosion can occur.
5. In the event of short-circuit, battery surface temperature may rise above 100°C.

**WARNING**

1. Always take care to insert batteries correctly according to the designation of polarity (+ and −) on the battery and the equipment. Batteries which are incorrectly placed into equipment may result in damage and fire generation.
2. Do not short-circuit batteries. When the positive + and negative − terminals of batteries come into direct contact with each other via Klein or similar metal object, short-circuit current can flow and batteries are short-circuited, excess current flows internally, which leads to heat generation, damaging the internal structure of the batteries, and causing risk of electrolyte leakage.
3. Do not charge batteries. Changing in electrolyte leakage and damage if charged, can be dramatically decreased inside of the cell, resulting in increased internal pressure, which may cause electrolyte leakage and damage to the battery. In case of charging is excessively larger, the risk of electrolyte leakage due to gas generation, when unused cells are charged the risk of electrolyte leakage, damage, explosion, etc. is especially higher.
4. Do not store batteries in wooden boxes and combustible materials. When a battery is kept connected with an electrochemical circuit even after the equipment is not used, there is a risk of explosion.
5. Use of rechargeable battery is not recommended. Battery is an electrochemical device using a long period.
6. The risk of electrolyte leakage, damage, explosion, etc. may increase due to generation gas. Therefore, such a condition may increase the risk of electrolyte leakage.

**Precautions during handling, transportation, display, storage, and disposal**

1. Avoid rough handling of battery cartons. Rough handling of battery cartons may lead to battery damage and impaired electrical performance and may result in leakage, explosion or heat generation.
2. Battery packs should not be stacked in layers for storage and should be stored on a flat surface. Batteries should not be stored near radiators, boilers or in direct sunlight.
3. Batteries should not be stored under high temperature and high humidity conditions. Storage of high temperature and high humidity leads to deterioration of the battery performance and electrolyte leakage. For normal temperature, the temperature range should be between +10°C and +25°C, and for lower temperature, the temperature range should be between -10°C and +25°C. (Humidity 60% or less for) to sustain prolonged shelf life. Batteries should be stored away from other electrochemical devices or other electrochemical material, avoid batteries and products should be avoided due to the risk of electrochemical reaction.
4. Batteries should be stored near conductors, avoid short-circuit when inserting batteries.

**Battery compartment guidelines**

1. Technical Liason
   - It is important that compartments containing battery powered equipment should maintain only loose battery with the battery industry. The capability of replacing batteries should be taken into account in design inception. Whenever possible, the battery type selected should be included in ISO 9296. The equipment should permenantly be marked with the EC designation, grade and name of battery which will offer optimum performance.
2. Battery Compartment
   - Battery compartments should be easily accessible. Design compartment so that the battery is easily inserted and not accidentally removed. The dimensions of the battery and its contacts should be such that batteries uniformly complying with the intended product are accepted in particular, the equipment designer should not ignore the size and even if standard batteries are expected to be used battery contains metal that may cause damage.
   - The design of the negative contact should make allowance for any excess of the battery terminal. In order to prevent possible short-circuiting, the entire battery should be connected properly using the conductors of the battery terminals and components design to prevent the excessive contact of battery. Positive + and negative -battery contacts should be easily different to avoid confusion when inserting batteries.

**Notes on Environmental Regulations**

We hereby certify that our alkaline batteries delivered by you conform to Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 concerning batteries and accumulators and waste batteries and accumulators (the “Battery Directive”). According to the Directive, the following restrictions concerning batteries and accumulators are described and are satisfied within our batteries.

**Certificate of Conformity to Battery Directive**

1. Alkaline batteries are evaluated as substances with more than from the designated content by weight are prohibited to be placed on or into market. Mercury / Alkaline. Not to promote the battery to contain any mercury that can have a negative impact on the environment.
2. Labeling (Article 20)
   - A marking shall be placed on each battery to indicate that it is a recycling symbol. All batteries should be clearly visible and not obscure the battery type.

3. Easy removal of waste batteries (Article 22)
   - A battery should be designed in such a way that waste batteries can be readily removed. This provision is deemed to be complied with in all cases where batteries can be removed by end users or independent qualified professionals.

**Response to 2002/96/EC directive**

- **Certification**
  - The CE marking is not applicable to alkaline batteries.

**Response to 2006/66/EC Battery Directive**

- **Marking (not applicable to alkalines)**
  - Article 1 (2) of the Batteries Directive does not apply as the alkaline batteries do not contain any of the substances defined in article 3 (20) of the Directive. Therefore condition a) is not applicable and there is no obligation to register to the agency. For this reason, we cannot submit a response to any queries regarding the Restriction of Use.

**Response to REACH Regulation**

- **If it is necessary to register to the agency in accordance with the REACH Regulation**
  - Batteries are categorized as ‘articles’ by REACH Article 1 (1) and 7 of the REACH Regulation states that an importer or an importer of articles should register to the agency any substances contained in those articles. If the following conditions are met, the substance is intended to be released under normal or reasonably foreseeable conditions of use, and the total weight of the substance contained in the article is more than 0.1 ton.
    - Batteries do not contain substances that are to be released, but batteries are intended to be released. Your registration on the list means that you are releasing the substance in the batteries. If you are releasing the substance, you must register to the agency.

**Response to SVHC Directives**

- **Addition to candidate list**
  - In order to prevent leakage resulting from battery being driven into reverse, the equipment voltage cut-off shall not be below the battery manual's recommended voltage.

**Correlation between Battery Directive and WEEE/RoHS Directives**

If you are concerned about the correlation between the Battery Directive (applied to batteries and accumulators) and the WEEE/RoHS Directive (applied to electronic and/or environmental regulations), we would like to introduce the website of the battery Association of Japan (hereinafter referred to as JBA) which creates a link for relevant regulations.

**Certification to WEEE/RoHS Directives**

- **Li battery is not regulated in the WEEE/RoHS Directive.**

- **Li battery is not regulated in the WEEE/RoHS Directive.**