Nickel Metal Hydride Battery

Feb, 2020
Panasonic Corporation
Features

1. Wide range of operating temperature
   Enables to use under severe condition from low to high temperature

2. Eco-friendly
   High recyclable, enables to be repeatedly charged and discharged

3. Suitable for replacing Ni-Cd batteries
   Achieves longer lifetime than Ni-Cd batteries
Market Sectors

✓ Nickel Metal Hydride Batteries are mainly used in automotive industry, Infrastructure industry.

Automotive
- Automotive electric component
- Drive recorder

Infrastructure
- Solar street light
- Ocean buoy
- Elevator
- Emergency / Guidance light

Others
- Medical device
- Electric power tool / Home Appliance
## Lineup

<table>
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<th>Nickel-Metal Hydride Batteries</th>
<th>High Current Discharge</th>
<th>Rapid Charging</th>
<th>Ultra-Rapid Charging</th>
<th>High-Temp. (60°C) Recharging</th>
<th>High-Temp. (75°C) Recharging</th>
<th>Long Life</th>
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<tr>
<td><strong>U</strong> Infrastructure Backup (Long-life Type)</td>
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<td><strong>H</strong> Infrastructure Backup (General Type)</td>
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<tr>
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<tr>
<td><strong>N</strong> Standard</td>
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<tr>
<td><strong>P</strong> High-rate Discharge</td>
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</tr>
</tbody>
</table>

*1 1-2 hours (dT/dt value)
*2 Within 1 hour (Step control charge system)
Note: for charge specification, please contact Panasonic.
*3 Standard model: 0-40°C
*4 Approx. 2,000 cycle (under Panasonic recommended charge/discharge condition)
U Infrastructure Backup (Long-life Type)

**Features**
- Long 8-10 operational life
- Excellent recharging performance in high temperature (up to 75°C)
- High rate discharge (3-5It discharge/20°C)
  * BK60AAAHU: Max. discharge current is 1It
- Suitable for replacing Ni-Cd batteries

**Applications**
Emergency lights, guidance lights, LED lights, wireless base stations, severs, elevators, ATM, POS, vending machines, medical devices, etc

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### Charge characteristics

- **Charge characteristics**
- **Discharge characteristics**

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### Specifications

| Size | Model No. | Nominal voltage (V) | Discharge capacity (mAh)**1 | Dimensions with tube (mm) | Mass (g) | Operating temperature range
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>BK60AAAHU</td>
<td>3.6</td>
<td>600</td>
<td>10.5×0.2×0.7</td>
<td>12</td>
<td>-10°C to 75°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>500</td>
<td>10.5×0.2×0.7</td>
<td></td>
<td>-20°C to 75°C</td>
</tr>
<tr>
<td>A</td>
<td>BK120AAHU</td>
<td>3.6</td>
<td>1,200</td>
<td>14.5×0.2×0.7</td>
<td>24</td>
<td>-20°C to 75°C</td>
</tr>
<tr>
<td>SC</td>
<td>BK2205CHU</td>
<td>3.6</td>
<td>2,200</td>
<td>23.0×0.2×1.0</td>
<td>32</td>
<td>-20°C to 75°C</td>
</tr>
<tr>
<td>C</td>
<td>BK310CHU</td>
<td>3.6</td>
<td>3,100</td>
<td>25.8×0.2×1.0</td>
<td>78</td>
<td>-20°C to 85°C</td>
</tr>
<tr>
<td>F</td>
<td>BK1100FHU</td>
<td>3.6</td>
<td>11,000</td>
<td>33.0×0.2×1.0</td>
<td>245</td>
<td>-20°C to 85°C</td>
</tr>
</tbody>
</table>

**Notes:**
1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
2. Lifespan compared to Panasonic standard type battery life cycle (3-5 years) charged using intermittent charging method
3. Please consult Panasonic when anticipating usage in operating temperature from 75 to 85°C

Note: 1lt(A) = rated capacity (Ah)/(hr.)
H Infrastructure Backup (Standard type)

**Features**
- Long 4-6 years operational life
- Enables to use in a wide range of temperature (-10 to 60°C)
- Suitable for replacing Ni-Cd batteries

**Applications**
Emergency lights, guidance lights, LED lights, wireless based stations, servers, elevators, ATM, POS, vending machines, medical devices, etc

**Charge characteristics**

**Discharge characteristics**

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)*1</th>
<th>Dimensions with tube (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
</tr>
</thead>
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<tr>
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</tr>
<tr>
<td>AA</td>
<td>BK70AAH</td>
<td>1.2</td>
<td>700</td>
<td>14.5 +0/-0.7</td>
<td>18</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>AA</td>
<td>BK110AAH</td>
<td></td>
<td>1,100</td>
<td>14.5 +0/-0.7</td>
<td>24</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>AA</td>
<td>BK150AAH</td>
<td></td>
<td>1,450</td>
<td>14.5 +0/-0.7</td>
<td>25</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>4/5A</td>
<td>BK160AAH</td>
<td></td>
<td>1,600</td>
<td>17.0 +0/-0.7</td>
<td>29</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>A</td>
<td>BK210AAH</td>
<td></td>
<td>1,900</td>
<td>17.0 +0/-0.7</td>
<td>35</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>Lr6/A</td>
<td>BK370AAH</td>
<td></td>
<td>3,500</td>
<td>18.2 +0/-0.7</td>
<td>60</td>
<td>-10 °C to 60 °C</td>
</tr>
</tbody>
</table>

*1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
*2. Lifespan compared to Panasonic standard type battery life cycle (3-5 years) charged using intermittent charging method
Note: 1lt(A) = rated capacity (Ah)/(hr.)
PH Infrastructure Backup (High rate Discharge Type)

**Features**
- Long 4-6 years operational life
- High rate discharge (5lt discharge/20°C)
- Suitable for replacing Ni-Cd batteries

**Applications**
Elevators, AGV, UPS, ATM, POS, vending machines, medical devices, etc

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)*1</th>
<th>Dimensions with tube (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
</tr>
</thead>
<tbody>
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<tr>
<td>SC</td>
<td>BK250SCH</td>
<td>1.2</td>
<td>2,500</td>
<td>23.0 +0/-1.0</td>
<td>53</td>
<td>-10 °C to 60 °C</td>
</tr>
<tr>
<td>Lfat/A</td>
<td>BK330APH</td>
<td></td>
<td>3,200</td>
<td>18.2 +0/-0.7</td>
<td>59</td>
<td>-10 °C to 60 °C</td>
</tr>
</tbody>
</table>

*1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
*2. Lifespan compared to Panasonic standard type battery life cycle (3-5 years) charged using intermittent charging method

Note: 1lt(A) = rated capacity (Ah)/(hr.)
# Large-type for Infrastructure Applications

**Features**
- Designed for extra-large power capacity
- Highly efficient power supply even in low temperature
- 5-stage LED indicates remaining battery life (BK-10V10T)

**Applications**
AGV, rail vehicle, wireless base stations, UPS, etc

## Charge characteristics (e.g. BK-10V1S)

![Charge characteristics](chart1.png)

## Discharge characteristics (e.g. BK-10T1S)

![Discharge characteristics](chart2.png)

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)*1</th>
<th>Dimensions with stud bolts (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Charge</td>
</tr>
<tr>
<td>V</td>
<td>BK-10V1S</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>
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<tr>
<td></td>
<td>BK-10V10T</td>
<td>12</td>
<td>90,000</td>
<td>100</td>
<td>428</td>
<td>159</td>
</tr>
</tbody>
</table>

*1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
Note: 1lt(A) = rated capacity (Ah)/(hr.)
W Automotive Backup

**Features**
- Enables to operate in a wide range of temperature (-30 to 85°C)
- Installable in severe conditions because electrolyte solution is aqueous
- Enables to control charge, and easy to do health check

**Applications**
TCU, eCall, drive recorder, anti-theft security systems, etc

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)*1</th>
<th>Dimensions with tube (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>BK60AAA</td>
<td>1.2</td>
<td>500</td>
<td>10.5+0/-0.7</td>
<td>12</td>
<td>-20°C to 45°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>550</td>
<td>10.5+0/-0.7</td>
<td>12</td>
<td>-30°C to 85°C</td>
</tr>
<tr>
<td>A</td>
<td>BK120AA</td>
<td>1.2</td>
<td>1,200</td>
<td>14.5+0/-0.7</td>
<td>24</td>
<td>-20°C to 60°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1,280</td>
<td>14.5+0/-0.7</td>
<td>24</td>
<td>-30°C to 85°C</td>
</tr>
</tbody>
</table>

*1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
*2. Temperature range where 0.5 to 1lt rapid charge is enabled
*3. Temperature range where 0.1lt rapid charge is enabled
*4. Temperature range where 0.2lt rapid charge is enabled
*5. Temperature range where 1lt rapid charge is enabled

Note: 1lt(A) = rated capacity (Ah)/(hr.)

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**Enables to use in a wide rage of temperature (-30 to 85°C)**

**Efficient discharge in low temperature (-30°C)**

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**Charge characteristics**

**Discharge characteristics**
B Button Top

Features

- Long charge/discharge cycle life about 1800 times※2
- Low self discharge and long storage life
- Excellent temperature resistance especially in low temperature

Applications

Electric toothbrushes, electric shavers, remote controllers, etc

Charge characteristics

Discharge characteristics

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)※1</th>
<th>Dimensions with tube (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>BK80AAAB</td>
<td>1.2</td>
<td>750</td>
<td>10.5 +0/-0.7, 44.5 +0/-1.0, 12</td>
<td>0 °C to 45 °C</td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>BK200AAAB</td>
<td>1.900</td>
<td>2,000</td>
<td>14.5 +0/-0.7, 50.5 +0/-1.0, 28</td>
<td>-10 °C to 65 °C</td>
<td></td>
</tr>
</tbody>
</table>

※1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
※2. Measured under condition complying with JIS C8708 2013(7.5.1.1). Actual capacity depends on usage condition.
※3. AAA size compatible
※4. AA size compatible
Note: 1lt(A) = rated capacity (Ah)/(hr.)
N Standard

**Features**
- High safety and reliability
- Wide product range

**Applications**
Radios, intercommunication systems, cordless phones, medical devices, etc

### Charge characteristics

<table>
<thead>
<tr>
<th>Operating temperature range</th>
<th>Charge</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 °C to 45 °C</td>
<td></td>
<td>-10 °C to 65 °C</td>
</tr>
</tbody>
</table>

### Discharge characteristics

- 0.2lt discharge capacity after charging at 0.1lt for 16 hours

Note: 1lt(A) = rated capacity (Ah)/(hr.)
P High-rate Discharge

Features
- Excellent high current discharge characteristics
- Rapid charging capacity

Applications
Power tools, cordless cleaners, electric toys (radio controlled cars), etc

Charge characteristics

Discharge characteristics

<table>
<thead>
<tr>
<th>Size</th>
<th>Model No.</th>
<th>Nominal voltage (V)</th>
<th>Discharge capacity (mAh)*1</th>
<th>Dimensions with tube (mm)</th>
<th>Mass (g)</th>
<th>Operating temperature range</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Diameter</td>
<td>Height</td>
<td>Charge</td>
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<tr>
<td>SC</td>
<td>BK260SCP</td>
<td>1.2</td>
<td>2,450</td>
<td>23.0</td>
<td>43.0 +/-1.5</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>BK300SCP</td>
<td></td>
<td>2,800</td>
<td></td>
<td></td>
<td>57</td>
</tr>
</tbody>
</table>

*1. 0.2lt discharge capacity after charging at 0.1lt for 16 hours
Note: 1lt(A) = rated capacity (Ah)/(hr.)
Please use appropriate voltage and temperature management to control battery temperature near the end of rapid charging.
Battery Pack

When battery packs are installed, the battery type, number of cells, pack shape, and constituent parts are determined by the application. Considerations include voltage and current; charging specifications; available space; and usage conditions. We design and manufacture to the most common industrial applications to best meet customer needs while maintaining safety, quality, and reliability as our central focus.

Compared to the consumer market, a higher standard of quality and reliability is expected in industrial battery applications, particularly where batteries are intended for vehicles where harsh vibration and huge temperature fluctuations are commonplace. To ensure quality and reliability in this environment, Panasonic selects components for battery packs with utmost care and applies stringent controls for structural assembly and battery production. Suitability for automotive use is evidenced by PPAP (Production Part Approval Process) certification and IATF16949 compliance.
Please feel free to ask a Panasonic sales person.

Panasonic Nickel Metal Hydride HP