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General description

Adaptable to compact sizes and high capacities according to applications

Nickel metal hydride batteries can offer well-balanced factors including high capacity, and high cost performance, and are most suitable for mobile equipment, video equipment, acoustic equipment, electrically-powered equipment, and other applications.

The battery is also applicable to various backup devices such as UPS, enabling the devices to achieve savings in space and weight.

Features

1. Available in five types adapted to applications.
 - Backup type
 - ① High temperature & long life type
 - ② High rate discharge & high temperature type
 - Button top type (Dry cell compatible)
 - Standard type
 - High rate discharge & rapid charge type
 - Infrastructure type
2. Capable of rapid charging
3. High safety and reliability
4. Environmentally Friendly

Applications

| Features | Applications | Type | | | | | |
|---|--------------|------------------------------|--|------------|----------|---------------------|----------------|
| | | High temperature & long life | High rate discharge & high temperature | Button top | Standard | High rate discharge | Infrastructure |
| High rate discharge | | | ● | | | ● | ● |
| Rapid charge ^{#1} | | ● | ● | ● | ● | ● | |
| Super rapid charge ^{#2} | | | | | | ● | |
| High temperature charge(60°C) ^{#3} | | ● | ● | | | | ● |
| Long Life | | ● | ● | | | | ● |
| Infrastructure | | | | | | | |
| Elevator | | ● | ● | | | | ● |
| UPS | | ● | ● | | | | ● |
| Railroad | | | | | | | ● |
| ATM | | ● | ● | | | | ● |
| Vending machine | | ● | ● | | | | ● |
| Robot | | ● | ● | | | | |
| Wireless base station | | ● | ● | | | | ● |
| Industrials | | | | | | | |
| Emergency lights, Guidance lights | | ● | ● | | | | |
| Street light | | ● | ● | | | | |
| Solar system | | ● | ● | | | | |
| Emergency light for construction work | | ● | ● | | | | |
| Power tool | | | | | ● | | |
| Torch Light | | | | | ● | | |
| Transceiver | | | | ● | | | |
| Ocean buoy | | ● | ● | | | | |
| POS | | ● | ● | | | | |
| Healthcare / medical | | | | | | | |
| AED | | ● | ● | | | ● | |
| Artificial dialysis machine | | ● | ● | | | | |

| Applications | Type | | | | | |
|-------------------------------|------------------------------|--|------------|----------|---------------------|----------------|
| | High temperature & long life | High rate discharge & high temperature | Button top | Standard | High rate discharge | Infrastructure |
| Healthcare / medical | | | | | | |
| Sphygmomanometer | ● | | | | | ● |
| Portable electrocardiograph | ● | | | | | ● |
| Medical equipment | ● | | ● | | | ● |
| Electric toothbrush | ● | | | | | ● |
| Electric shaver | ● | | | | | ● |
| Facial massager | ● | | | | | ● |
| Home appliances | | | | | | |
| Home Controller | ● | | ● | | | |
| Smart House sensor | ● | | | ● | | ● |
| Intercom | ● | | | | ● | ● |
| Fire alarm | ● | | | | ● | ● |
| Skylight | ● | | ● | | | |
| Cordless cleaner | | | | | | |
| Electric fan | ● | | | ● | | ● |
| AV/PC | | | | | | |
| Digital camera | | | | | ● | |
| Remote controller | | | | ● | | |
| Equipment using dry batteries | | | | ● | | |
| Electric toys | | | | ● | | |
| Cordless phone | | | ● | | ● | |
| Automotive | | | | | | |
| ECU | | | | ● | | |
| E-Call | | | | ● | | |
| Vehicle tracking device | | | | ● | | |
| Trunk Light | | | | ● | | |

* 1 1-2 hours(dT/dt value) * 2 Charge time within 1 hour (Step control charge system) Note : For charge specification, please consult Panasonic.

* 3 Standard model (0~45°C) * 4 Approx. 2000 cycles (under Panasonic recommended charge/discharge condition)

NiMH types according to applications above are only a guideline. Please consult Panasonic for more details you need.
 We are now developing higher performance products (charge-discharge temperature range : -20°C to 75°C, life expectancy : 10years)
 for high temperature & long life type and high rate discharge & high temperature type.

Back-up type

A design that achieves long life for back-up (Good for Emergency-use)

Features

- Best suited to a wide variety of equipment
- Small size, light weight and downsizing possible
- Energy saving, Long life

- Capable of delivering excellent charge characteristics at high temperature (60 °C)

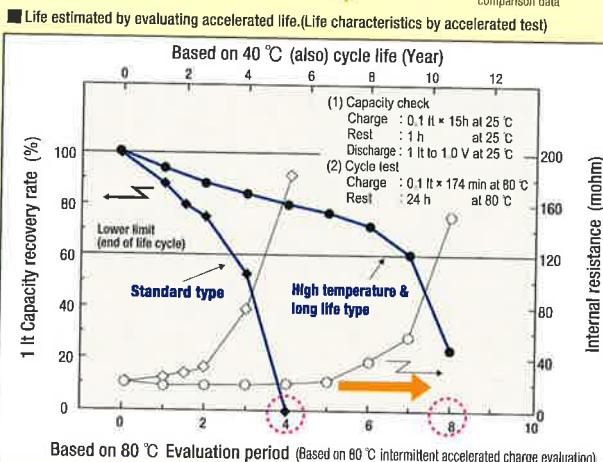
Long life or Expected life

Standard type
3 to 5 years

Expected life
About double

Backup type
6 to 10 years

※ Life expectancy based on our comparison data



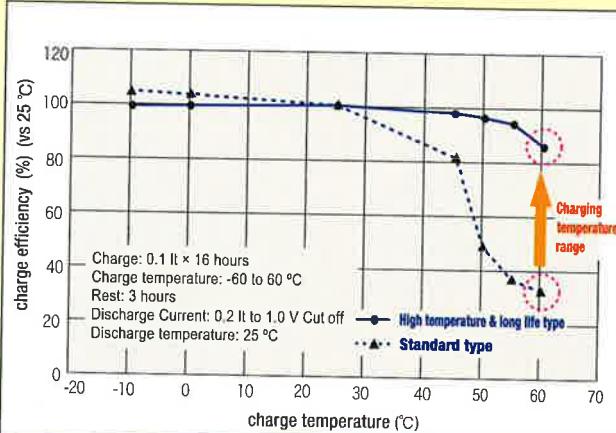
Capable of delivering excellent charge characteristics at high temperature (60 °C)

Standard type
34%

About
2.5 times

Backup type
86%

■ Charge characteristics



High temperature & long life type

Most suitable for guide lamps, emergency lamps, other nickel cadmium battery substitutions.

This type has a long-life and is capable of delivering excellent charge characteristics at high temperature(60°C)

- Application: Emergency light, Guidance light, Led light, Information equipment FTTX (HUB.ONRU), Back up base station, Security, Emergency light/Guidance light, Two way radio, Server, Memory backup, Automated Teller Machine (ATM), Point Of Sales system (POS), Vending machine, Medical equipment, other

| Size | Model Number | Nominal Voltage(V) | Discharge Capacity (mAh) ¹⁾ | | Dimensions with tube (mm) | | Approx Weight(g) | Temperature range | | Note |
|--------|--------------|--------------------|--|---------|---------------------------|--------------|------------------|-------------------|-----------|---|
| | | | Rated (min) | Average | Diameter | Height | | Charge | Discharge | |
| AAA | BK60AAAH | | 500 | 550 | 10.5 +0/-0.7 | 44.5 +0/-1.5 | 13 | | | |
| AA | BK70AAH | | 700 | 750 | 14.5 +0/-0.7 | 49.0 +0/-1.5 | 18 | | | |
| ○ AA | BK110AAAH | | 1,100 | 1,180 | 14.5 +0/-0.7 | 50.5 +0/-1.0 | 26 | | | |
| ○ AA | BK150AAH | 1.2 | 1,450 | 1,530 | 14.5 +0/-0.7 | 50.5 +0/-1.0 | 26 | | | Recommended for emergency lights or guidance lights |
| 4/5A | BK160AH | | 1,600 | 1,720 | 17.0 +0/-0.7 | 43.0 +0/-1.5 | 29 | | | |
| A | BK210AH | | 1,900 | 2,050 | 17.0 +0/-0.7 | 50.0 +0/-2.0 | 36 | | | |
| Lfat/A | BK370AH | | 3,500 | 3,700 | 18.2 +0/-0.7 | 67.5 +0/-1.5 | 60 | | | |

High rate discharge & high temperature type

This type has a long-life and is capable of delivering excellent large current discharge characteristics at high temperature(60°C)

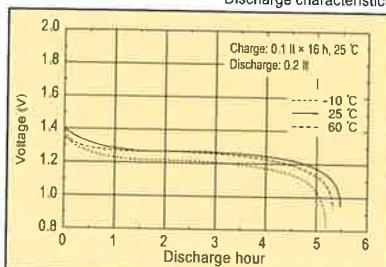
- Application: Power: Elevator, Automated Guided Vehicle (AGV), Back up: UPS / RAID, Point Of Sales system (POS).
Other: Streetlight, Vending machine, High capacity backup system, Solar power window shutter.

| Size | Model Number | Nominal Voltage(V) | Discharge Capacity (mAh) ¹⁾ | | Dimensions with tube (mm) | | Approx Weight(g) | Temperature range | | Note |
|--------|--------------|--------------------|--|---------|---------------------------|--------------|------------------|-------------------|--------------|---|
| | | | Rated (min) | Average | Diameter | Height | | Charge | Discharge | |
| SC | BK250SCH | | 2,500 | 2,650 | 23.0 +0/-1.0 | 43.0 +0/-1.5 | 55 | | | |
| C | BK310CH | 1.2 | 3,100 | 3,300 | 25.8 +0/-1.0 | 50.0 +0/-2.0 | 80 | -10°C ~ 60°C | -10°C ~ 60°C | |
| Lfat/A | BK330APH | | 3,200 | 3,300 | 18.2 +0/-0.7 | 67.5 +0/-1.5 | 60 | | | Recommended for emergency lights or guidance lights |

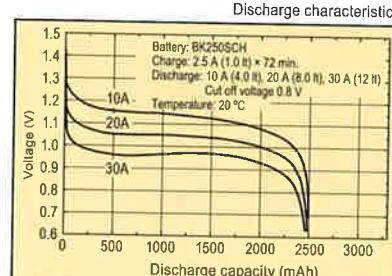
¹ 0.2 It discharge capacity after charging at 0.1 It for 16 hours 1 It (A) = rated capacity (Ah) / 1(h)

○ New Model

Discharge characteristics



Discharge characteristics



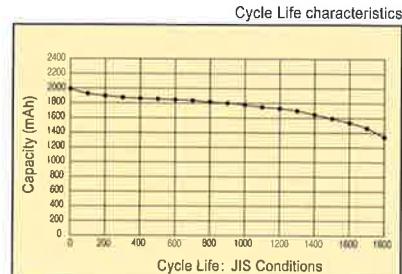
Button top type

A battery that is compatible with dry batteries and can be used again and again is friendly to the environment.

Features

- Offers long charge/discharge cycle life, about 1800 times! ²
- High capacity level and low self-discharge (still have 90% capacity after storage for 1 year)! ³
- Offers excellent temperature characteristics especially in low temperature!

● Application: Digital still camera, Electronic flash (strobe), Toothbrush, Shaver, Cellular phone charger, Electronic dictionary, Electronic game, Radio control car, IC recorder, Cordless mouse, Wireless headset, Medical equipment (Sphygmomanometer, Electronic frequency machine, Refractometer), Portable radios, Toy, Flash light, Remote control, Two way radio, other

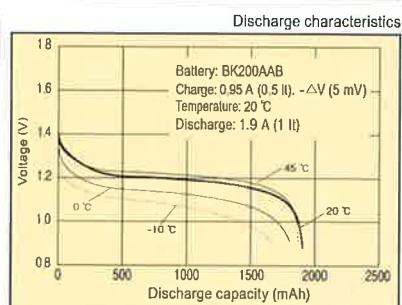


² measured under conditions- JIS C8708 2013 (7.5.1.1) (real capacity also depends on actual conditions).

³ measured below 20 °C after cells are charged to full capacity (please don't expose batteries to high temperature and high humidity, also remember to charge battery once a year even you don't use them).

*4: AAA size compatible.

*5: AA size compatible.

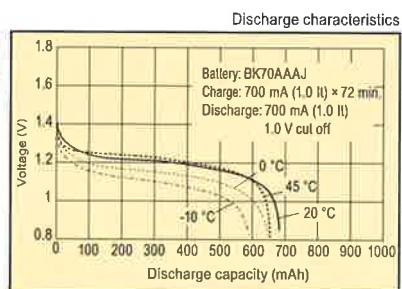


Standard type

Excellent cost performance, High-capacity and rapid charge-capable.

● Application: Small consumer electronic, Two way radio, Measuring instrument, Medical equipment, other

| Size | Model Number | Nominal Voltage (V) | Discharge Capacity (mAh) ⁴ | | Dimensions with tube (mm) | | Approx Weight (g) | Temperature range | |
|------------------|--------------|---------------------|---------------------------------------|---------|---------------------------|--------------|-------------------|-------------------|--------------|
| | | | Rated (min) | Average | Diameter | Height | | Charge | Discharge |
| AAA ⁴ | BK65AAAB | 1.2 | 650 | 700 | 10.5 +0/-0.7 | 44.5 +0/-1.0 | 12 | 0°C ~ 45°C | -10°C ~ 65°C |
| | BK80AAAB | | 750 | 780 | | | | | |
| AA ⁵ | BK110AAB | 1.2 | 1,000 | 1,050 | 14.5 +0/-0.7 | 50.5 +0/-1.0 | 20 | 0°C ~ 45°C | -10°C ~ 65°C |
| | BK200AAB | | 1,900 | 2,000 | | | | | |

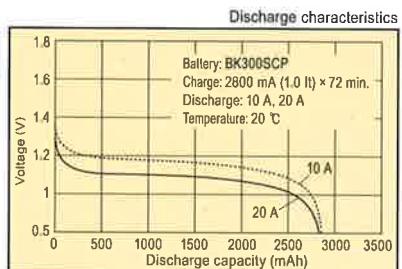


High rate discharge & rapid charge type

Excellent large current discharge characteristics and rapid charge-capable.

● Application: Power tool, E-Bike, Cordless cleaners, Electric toys (Radio control car, other).

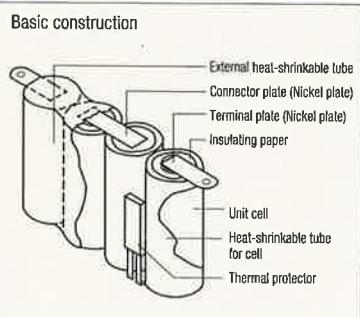
| Size | Model Number | Nominal Voltage (V) | Discharge Capacity (mAh) ⁴ | | Dimensions with tube (mm) | | Approx Weight (g) | Temperature range | | |
|--------|--------------|---------------------|---------------------------------------|---------|---------------------------|--------------|-------------------|-------------------|--------------|--|
| | | | Rated (min) | Average | Diameter | Height | | Charge | Discharge | |
| 4/5AA | BK65AAAK | 1.2 | 650 | 700 | 10.5 +0/-0.7 | 44.5 +0/-1.5 | 12 | 0°C ~ 45°C | -10°C ~ 65°C | |
| | BK70AAAJ | | 700 | 730 | | | | | | |
| | BK90AAA | | 830 | 880 | | | | | | |
| AA | BK70AA | 1.2 | 700 | 780 | 14.5 +0/-0.7 | 49.0 +0/-1.5 | 18 | 0°C ~ 45°C | -10°C ~ 65°C | |
| | BK10AAO | | 1,100 | 1,180 | | | | | | |
| 4/5AA | BK120AA | 1.2 | 1,150 | 1,220 | 14.5 +0/-0.7 | 43.0 +0/-1.5 | 23 | -10°C ~ 65°C | | |
| AA | BK150AA | 1.2 | 1,500 | 1,580 | 14.5 +0/-0.7 | 50.5 +0/-1.5 | 26 | 0°C ~ 45°C | | |
| ◎ AA | BK200AAP | 1.2 | 1,900 | 2,000 | 14.5 +0/-0.7 | 50.5 +0/-1.5 | 26 | 0°C ~ 45°C | | |
| 4/5A | BK200A | 1.2 | 2,000 | 2,040 | 14.5 +0/-0.7 | 43.0 +0/-1.5 | 32 | 0°C ~ 45°C | | |
| A | BK210A | 1.2 | 2,100 | 2,200 | 17.0 +0/-0.7 | 50.0 +0/-2.0 | 38 | -30°C ~ 65°C | | |
| ◎ A | BK250A | 1.2 | 2,450 | 2,600 | 17.0 +0/-0.7 | 50.0 +0/-2.0 | 40 | -30°C ~ 65°C | | |
| LA | BK380A | 1.2 | 3,700 | 3,800 | 17.0 +0/-0.7 | 67.0 +0/-2.0 | 53 | -10°C ~ 65°C | | |
| Lfat/A | BK450A | 1.2 | 4,200 | 4,500 | 18.2 +0/-0.7 | 67.5 +0/-1.5 | 60 | -10°C ~ 65°C | | |



Battery pack

If Since I have prepared the standard pack in our company, please ask.

Most batteries are used in the form of battery packs and installed in devices. When the battery pack is used, the type of battery, number of cells, shape of the pack, constituent parts of the pack, etc. are determined by the ratings (voltage, load current) of the device, charge specifications, space available in the battery compartment, use conditions, etc. At Panasonic, we are designing and manufacturing battery packs by taking the safety and reliability of the batteries into consideration.



It is recommended that a thermistor for temperature detection, and a thermal protector or PTC element for protection from temperature rises and external short-circuiting, are installed in a nickel-metal hydride battery pack. Also, safety protection circuits are required for safety purposes.

ex) Standard battery pack



► **Features**

- More lightweight and space-saving compared with VRLA battery.
- Enables you to check the state of charge by its remaining display on battery pack.
- Offers high efficiency performance even in low-temperature environment.

● Application Examples

- Main Power • Motive Power (Main Power/Automated Guided Vehicle (AGV) /Fork Lift)
- Independent Power Supply (Solar/Wind Power Storage), Other (UPS, Back-up Power Supply)

| Model Number | BK-10V1S1 | BK-06V1S1 |
|--------------------------------|--------------|--------------|
| Rated Discharge Capacity (min) | 90Ah | 60Ah |
| Average Discharge Capacity | 95Ah | 63Ah |
| Nominal Voltage | 1.2V | |
| Dimensions(mm) | H188.7xD62.6 | H136.9xD62.6 |
| Mass | About 1.7Kg | About 1.1Kg |
| Ambient Temperature | -20°C ~ 60°C | |



BK-10V1S

BK-10V10T

DE-V01J

| Model Number | BK-10V10T1 | BK-06V10T1 |
|-----------------------------------|---|----------------|
| Rated Discharge Capacity (min) | 90Ah | 60Ah |
| Nominal Voltage | 12V | |
| Max. continuous discharge current | 100A | 80A |
| Dimensions(mm) | W428xD159xH270 | W428xD159xH220 |
| Mass | About 23Kg | About 16Kg |
| Ambient Temperature | -20°C~60°C | -20°C~60°C |
| Volume | About 18.4 ℥ | About 15 ℥ |
| Display Function | Remaining capacity (5 stage display by LED) | |

| Model Number | DE-V01J |
|---------------------|--|
| Input Voltage | AC90~264V, Single-phase, 50/60Hz |
| Output Voltage | DC48V/24V/12V (Switchable) |
| Charge System | Constant Current Charging System (Normal charging, Top off charging) |
| Discharge Function | Selected by the switch, Discharging 6Ah after charging is completed. |
| Dimensions(mm) | W310 X D526 X H167 |
| Mass | About 13kg |
| Ambient Temperature | -20°C~40°C |
| Safety standard | Adapt to IEC60335-1 and 60335-2-29 (Degree of contamination : 3) |

► General comparison of various charging systems

* It [A] = Rated capacity [Ah]/1 [h]

| Charge system | Cycle (repetitive) use | | | | Standby (backup) use | | | |
|--|-----------------------------------|---|-----------------------------|--|--|---|---|---|
| | -ΔV cut-off charging method | dT/dt cut-off charging method *1 | Step charging method | Timer-controlled charging method *2 | Semi-constant-current charging method *3 | Trickle charging method | Intermittent charging method | Pulse charging method |
| <Operation overview> Vb: Battery voltage ICh: Charge current T: Battery surface temperature CV: Constant voltage | | | | | | | | |
| Features | Most common rapid charging method | The charging circuit costs slightly more than the others but can prevent overcharge, offering a longer cycle life than the -ΔV cut-off charging method. | Ultra-rapid charging method | • Charge reliability has been improved by the addition of a charge timer. • The charging circuit is relatively simple and low-cost. | The charging circuit is simple and low-cost. | • The charging circuit is simple and low-cost. • Applicable to devices to be charged continuously for a long period of time. | The charging circuit costs slightly more than the others, but enables a longer service life than the trickle charging method. | The charging circuit costs slightly more than the others, but enables a longer service life than the pulse charging method. |
| Charge time | 1 to 2 hours | 1 to 2 hours | Up to 1 hour | 6 to 8 hours | 15 hours | 30 hours or longer | 15 hours or longer | — |
| Charge current | 0.5 to 1 It | 0.5 to 1 It | Max. 5.0 It | 0.2 It | Max. 0.1 It | — | 0.1 to 0.5 It | Max. 1.0 It |
| Trickle charge current | 1/30 to 1/20 It | 1/30 to 1/20 It | — | 1/30 to 1/20 It | — | 1/30 to 1/20 It | — | — |
| Charge level at charge control | Approx. 110 to 120% | Approx. 100 to 110% | Approx. 100% | Approx. 120% | — | — | Approx. 120% | — |
| backup | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ |
| Button top | ○ | ○ | — | ○ | — | — | ○ | — |
| Standard | ○ | ○ | — | — | — | — | ○ | ○ |
| High capacity | ○ | ○ | ○ | — | — | — | ○ | ○ |

○ Recommended charging method: Enables Panasonic batteries to display full performance.

○ Acceptable charging method: Usable depending on the use conditions of the equipment.

* 1 It is necessary to adopt a battery pack construction that allows the temperature detection element (sensor) to reliably detect the battery temperature.

* 2 This method is not appropriate for applications in which the timer is frequently reset (charge is restarted).

• If frequent resetting of the timer is required, or if a charge rate higher than 0.2 It is adopted for equipment reasons (for example, timer-controlled charge at 0.3 It), it is necessary to combine this method with temperature control.

• Please note that the overcharge performance will vary according to the battery type.

* 3 Please note that, if a charge rate higher than 0.1 It is adopted for reason of equipment, the overcharge performance and temperature rise characteristics will vary according to the battery type. Consult Panasonic before defining the specifications.

• If a large number of battery cells are used, or if batteries having a high rated capacity are used, or if the heat dissipation of the battery pack is poor, the batteries may generate heat even when charged at 0.1 It.

In such cases, it is necessary to re-design the battery pack for better heat dissipation to lower the charge current. Design the battery pack so that the battery temperature rise at saturation is not higher than 50°C.

► Safety precautions

Nickel metal hydride batteries

| | |
|----------------|---|
| DANGER | <ul style="list-style-type: none"> Mishandling the battery may bring generate a short circuit, cause its insulation to melt, or cause damage to its safety valve or safety mechanism, which may in turn cause the battery to leak, generate heat, or explode. Be sure to follow the instructions listed below when using the battery: -Do not place the battery in fire or heat up the battery. -Never insert the battery with its positive and negative poles reversed. -The battery has a predetermined polarity. If, when setting the battery in a battery charger or appliance, it cannot readily be fitted, do not insert the battery by force, instead, check the battery's polarity. -Do not connect the battery to a power receptacle or directly to a car's cigarette lighter. -Do not connect the positive terminal and the negative terminal of the battery to each other with any metal object such as a wire. Do not carry or store the batteries together with necklaces or other metal objects. -Do not disassemble or modify the battery. -Do not solder any objects directly onto the battery. -When charging the battery, use the specified battery charger or observe the battery charging conditions specified by Panasonic. -The battery incorporates a gas-venting structure to discharge internal gases. For this reason, do not deform the positive electrode. ● Never install the battery into hermetically sealed equipment. The battery may generate gas depending on circumstances, which may result in rupture, or explosion caused by ignition. ● The battery contains an alkaline electrolyte. This electrolyte may result in the loss of eyesight if it comes into contact with an eye. In such cases, do not rub the eye, but immediately wash the eye with clean water and then consult a doctor. |
| WARNING | <ul style="list-style-type: none"> When electrolyte leakage, discoloration, deformation, or other unusual symptom is detected on the battery, do not use it. Do not expose the battery to water or salt water, or allow the battery to get wet. Doing so may cause the battery to generate heat or rust. Do not peel off or scratch the outer covering tube of the battery. Doing so can easily cause the battery to generate a short circuit, which may in turn cause the battery to leak, generate heat, or explode. When a battery charge exceeds the specified charge time, stop charging the battery. If charged beyond the specified charge time, the battery will become overcharged, which may cause the battery to leak or generate heat. The battery contains an alkaline electrolyte. When this electrolyte contacts the skin or clothes, immediately wash them with clean water. Otherwise, the skin or clothes may be damaged. Store the batteries in a location out of reach of infants. If an infant should swallow a battery, consult a doctor immediately. |

Notice to readers

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

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