Panasonic

Batteries catalog for OEM customers

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 four 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 chage type**
   - **Infrastructure type**
2. Capable of rapid charging.
3. High safety and reliability
4. Environmentally Friendly

Applications

Type		Applications	High rate discharge	Rapid charge *1	Super rapid charge *2	Hight temperature charge (60℃)*3	Long Life *4
Back UP	High temperature & long life	Emegency lights, Guidance lights, Main backup, Security goods, Disaster radio, other		●		●	●
	High rate discharge & high temperature	Information equipment, Power (Elevator, Automated Guided Vehicle (AGV)), High capacity backup system, Hydrid power supply with solar or wind power, other	●	●		●	●
Standerd		Small appliances, Small consumer electronic, Walkie-talkie, Measuring instrument, other		●			
High rate discharge		Power tools, E-bikes, Cordless cleaners, Electric toys, other	●	●	●		
Button top		Small consumer electronic,Toy, Walkie-talkie, Healthy appliance, other		●			
Infrastructure		Main Power, Motiv Power, Automated Guided Vehicle (AGV), UPS	●			●	●

* 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 ℃
* 4 Approx. 2000 cycles (under Panasonic recommended charge/discharge condition)

Safety precautions

Nickel metal hydride batteries

DANGER

- ● 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

- ● 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.

Back-up type

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

Features

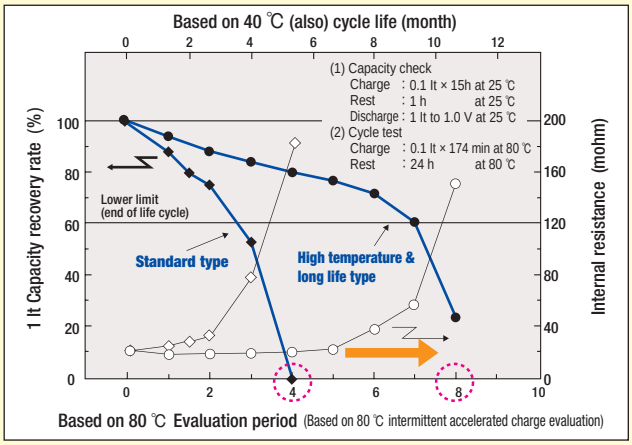
- Best suited to a wide variety of equipment
- Small size, light weight and downsizing possible
- Energy saving, Long life
- Capable of delivering excellent charge characteristics at high temperature (60 ℃)

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

■ Life estimated by evaluating accelerated life.(Life characteristics by accelerated test)

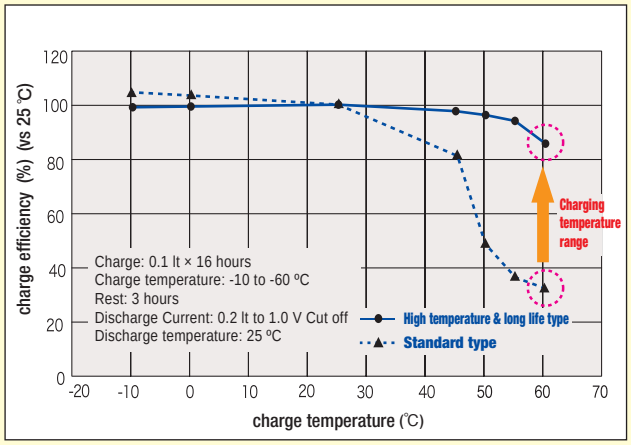


Capable of delivering excellent charge characteristics at high temperature (60 ℃)

Standard type **34%** → About **2.5 times** → Backup type **86%**

※ Comparison of Olympus batteries

■ Charge characteristics



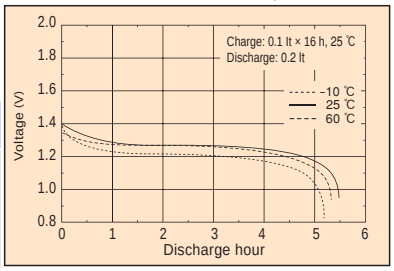
High temperature & long life type

Most suitable for guide lamps, emergency lamps, other nickel cadmium battery subsitutions.
This type has a long-life and is capable of delivering excellent charge characteristics at high temperature(60℃)

● 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	New Model Number	Old Model Number	Nominal Voltage(V)	Discharge Capacity (mAh)*1		Dimensions with tube (min)		Approx Weight (g)
				Rated (min)	Average	Diameter	Height	
AAA	BK60AAAH	HHR60AAAH	1.2	500	550	10.5 +0/-0.7	44.5 +0/-1.5	13
AA	BK70AAH	HHR70AAH		700	750	14.5 +0/-0.7	49.0 +0/-1.5	18
◎ 4/5A	BK160AH	–		1,600	1,720	17.0 +0/-0.7	43.0 +0/-1.5	29
A	BK210AH	HHR210AH		1,900	2,050	17.0 +0/-0.7	50.0 +0/-2.0	36
Lfat/A	BK370AH	HHR370AH		3,500	3,700	18.2 +0/-0.7	67.5 +0/-1.5	60

Discharge characteristics



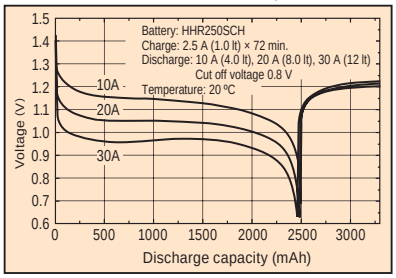
High rate discharge & high temperature type

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

● 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	New Model Number	Old Model Number	Nominal Voltage(V)	Discharge Capacity (mAh)*1		Dimensions with tube (min)		Approx Weight (g)
				Rated (min)	Average	Diameter	Height	
SC	BK250SCH	HHR250SCH	1.2	2,500	2,650	23.0 +0/-1.0	43.0 +0/-1.5	55
◎ C	BK310CH	–		3,100	3,300	25.8 +0/-1.0	50.0 +0/-2.0	80
Lfat/A	BK330APH	HHR330APH		3,200	3,300	18.2 +0/-0.7	67.5 +0/-1.5	60

Discharge characteristics



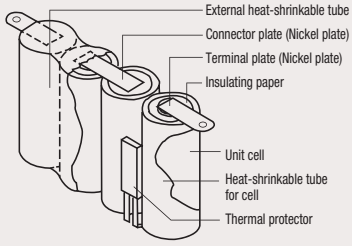
*1 0.2 It discharge capacity after charging at 0.1 It for 16 hours 1 It (A) = rade capacity (Ah) / 1(h)
◎ New Model

Battery pack

※ 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.

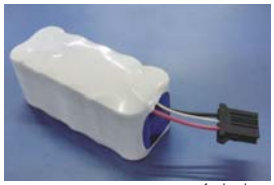
Basic construction



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


for cordless phone


for back-up

Button top type

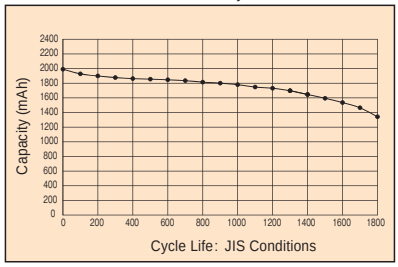
A battery that is compatible with dry batteries and can be used again and again is friendly to the environment.

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 conrol, Two way radio, other

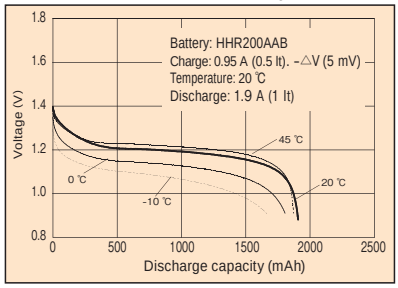
Cycle Life characteristics



Size	New Model Number	Old Model Number	Nominal Voltage (V)	Discharge Capacity (mAh)*1		Dimensions with tube (min)		Approx Weight (g)
				Rated (min)	Average	Diameter	Height	
AAA *4	BK65AAAB	–	1.2	650	700	10.5 +0/-0.7	44.5 +0/-1.0	12
	BK80AAAB	HHR80AAAB		750	780			13
AA *5	BK110AAB	HHR110AAB		1,000	1,050	14.5 +0/-0.7	50.5 +0/-1.0	20
	BK200AAB	–		1,900	2,000			29

*2. measured under conditions- JIS C8708 2007 (7.4.1 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.

Discharge characteristics



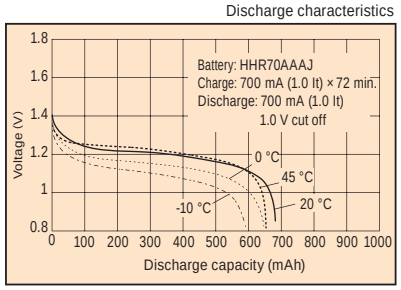
Standard type

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

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

Size	New Model Number	Old Model Number	Nominal Voltage (V)	Discharge Capacity (mAh)*1		Dimensions with tube (min)		Approx Weight (g)
				Rated (min)	Average	Diameter	Height	
AAA	BK65AAAK	–	1.2	650	700	10.5 +0/-0.7	44.5 +0/-1.5	12
	BK70AAAJ	HHR70AAAJ		700	730	10.5 +0/-0.7	44.5 +0/-1.5	12
LAAA	BK90AAA	HHR90AAA		830	880	10.5 +0/-0.7	50.5 +0/-1.5	14
AA	BK70AA	HHR70AA		700	780	14.5 +0/-0.7	49.0 +0/-1.5	18
	BK110AAO	HHR110AAO		1,100	1,180		50.5 +0/-1.5	26
4/5AA	BK120AA	HHR120AA		1,150	1,220	14.5 +0/-0.7	43.0 +0/-1.5	23
AA	BK150AA	HHR150AA		1,500	1,580		50.5 +0/-1.5	26
4/5A	BK200A	HHR200A		2,000	2,040		43.0 +0/-1.5	32
A	BK210A	HHR210A		2,100	2,200	17.0 +0/-0.7	50.0 +0/-2.0	38
LA	BK380A	HHR380A		3,700	3,800		67.0 +0/-2.0	53
Lfat/A	BK450A	HHR450A		4,200	4,500	18.2 +0/-0.7	67.5 +0/-1.5	60

Discharge characteristics



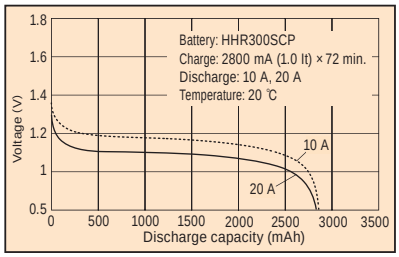
High rate discharge & rapid chage type

Excellent large current discharge characteristics and rapid charge-capable.

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

Size	New Model Number	Old Model Number	Nominal Voltage (V)	Discharge Capacity (mAh)*1		Dimensions with tube (min)		Approx Weight (g)
				Rated (min)	Average	Diameter	Height	
4/5SC	BK200SCP	HHR200SCP	1.2	1,900	2,100	23.0+0/-1.0	34.0 +0/-1.5	42
SC	BK260SCP	HHR260SCP		2,450	2,700		43.0 +0/-1.5	55
	BK300SCP	HHR300SCP		2,800	3,050			57

Discharge characteristics



It is necessary to control battery temperature near the end of rapid charging. Therefore, please use appropriate voltage and temperature management.

Caution : 1. The battery performance and cycle life greatly vary depending on how the battery is used.
2. In order to ensure battery safety, please contact Panasonic for charge and discharge specifications, equipment's construction, warning labels and other details when designing battery-powered equipment.
3. For some batteries, cells are not available on an individual basis.
4. The data in this document are for descriptive purposes only and not intended to make or imply any guarantee or warranty.

Infrastructure type

Proposing a high quality energy solution

Features

- Realization of lightweight and space-saving through adoption of Nickel-Metal Hydride Batteries.
- Comparison to VRLA batteries.
- By using Nickel-Metal Hydride Batteries, power supply provides high efficiency even at a low temperature environment.

● Application Examples: Residential Use (Solar/Late Night Power Storage), 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)

BK-10V1S

■ Main Specifications

Rated (min.)	90 Ah
Average	95 Ah
Voltage	1.2 V
Dimensions (mm)	188.7 × 62.6
Mass	1.7 kg
Ambient Temperature	-20 ℃ ～ 60 ℃

BK-10V10T

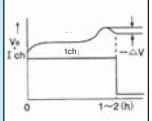
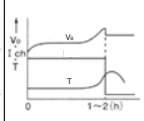
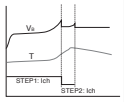
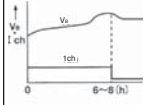
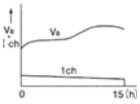
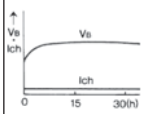
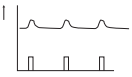
■ Main Specifications

Rated (battery pack)	12 V / 90 Ah
Discharge current	100 A
Ambient Temperature	-20 ℃ ～ 60 ℃
Dimensions (mm)	W: 428 × D: 159 × H: 270
Battey cell	BK-10V1S × 10 (cell)
Volume	18.4 ℓ
Mass	23 kg
Display function	Remaining capacity

* Specifications subject to change.
* Handle, excluding protrusions.
* Exclusive battery charger Under battery charger development.

General camparison of various charging systems

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

Charge system	Cycle (repetitive) use					Standby (backup) use		
	Constant-current charge				Semi-constant-current charging method *3	Trickle charging method	Intermittent charging method	Pulse charging method
	-ΔV cut-off charging method	dT/dt cut-off charging method* 1	Step charging method	Timer-controlled charging method *2				
<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 trickle 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	◎	○	—	○	—	—	○	—
standerd	◎	◎	—	—	—	—	○	○
Hight 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 or to lower the charge current. Design the battery pack so that the battery temperature rise at saturation is not higher than 50°C.

Please see latest information our web site

http://industrial.panasonic.com

Panasonic Corporation
Automotive & Industrial Systems Company
Energy Device Business Division

The contents of this catalog are valid as of March,2014.