Battery Handling and Precautions

Safety

- Never put the battery into the fire or water.
- Do not solder directly to the battery.
- Do not subject the battery to abnormal vibration and impact.
- When plugging the battery into the charger unit or the e-bike, ensure correct polarity.
- Do not contact the battery terminals with metal objects to avoid danger.
- Do not disassemble battery.
- Do not modify or remove the component from the battery.
- Do not mix GP batteries with other battery brands or batteries of a different type.
- Do not short circuit the battery. Permanent damage to the battery may result.

Charge and Discharge Conditons

- For charge and discharge procedures, please refer to the specifications and technical handbook.
- When using a new battery or a battery is stored for a long period, please recharge the battery before use.
- The charger must have the temperature cutoff device, which terminates the charge when the battery temperature reaches 55°C. Otherwise, overheating may cause damage to the battery.
- The charger must have appropriate charge termination controls to avoid overcharging.
- Overdischarge may shorten the cycle life of the battery. The battery cutoff voltage should not be lower than 1V per cell.

Battery Compartment Design

- Avoid airtight battery compartments. Ventilation should be provided in the plastic case of battery, otherwise oxygen and hydrogen gas generated inside may cause an explosion when exposed to fire sources, such as motors or switches.

Storage

- Store the battery in a cool dry place.
- Charge and discharge the battery once every half-year when storing at room temperature.
- If the battery will not be used for a long period, please charge up the battery before storage. Unplug and remove it from the charger or e-bike to avoid overdischarge.

Distributed by:

GPPA4EB-A 09/04

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GP Batteries

E-Bike
NiMH Rechargeable Batteries

E-Bike

NiMH Rechargeable Batteries

World demand for a lighter, environmentally friendly, high performance e-bike increases; in China alone, sales soared from under 100,000 units in 1998 to a staggering 4 million units in 2003.

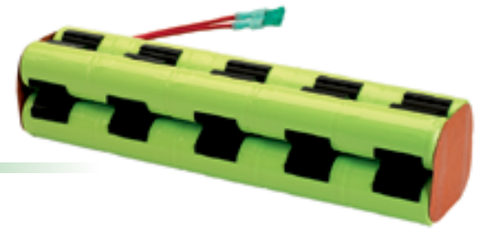
A major key to record-beating success lies in superior quality batteries. Especially designed for the e-bike, the full range of GP NiMH rechargeable batteries offers enhanced performance to the consumer and a more competitive edge to the manufacturer. What's more, from an environmental point of view, the ultra lightweight battery is superior than the bulky, health harming lead-acid battery.

GP Batteries makes the world's highest capacity battery series; the GP900DH, considered by many to be the best.

A subsidiary of the esteemed Gold Peak Group, GP Batteries is one of the ten most important battery manufacturers in the world. Pick wisely, go with the best, go with GP Batteries. The world demands the best - and it gets it with GP Batteries!

Major Features

- **Environmental friendly, non-toxic.**
- **Light in weight and half the size of lead-acid batteries.**
- **No memory effect.**
- **Wide range of operation temperature from -20˚C to 45˚C.**
- **Longer cycle life than lead-acid batteries.**
- **High charging efficiency, rapid charge is possible with suitable charger.**
- **No ill effects occur to the battery even after 1-year storage after charge.**



Champion's Choice

Sparta Ion*, **Bike of the Year 2004** elected in the Netherlands, is powered by GP Nickel Metal Hydride rechargeable batteries.

Outperforms Competitors

GP900DH is the World's Highest Capacity D-size Battery

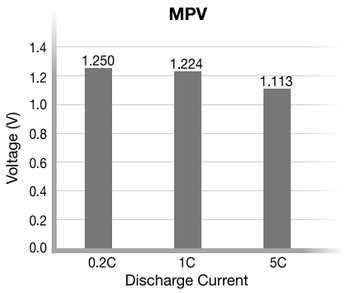
- Excellent high rate discharge for the best slope climbing performance.
- Excellent performance at very low temperature such as -20˚C.
- Excellent cycle life.

* Sparta Ion is manufactured and patented by Sparta B.V. The award is presented by 'Stichting Fiets' which is an independent organization for promoting use of bicycles.

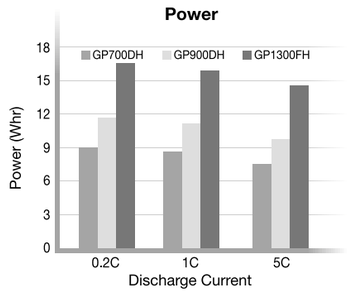
E-Bike NiMH Recharge able Batteries

Performance Characteristics

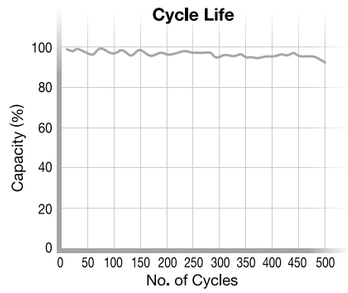
Single Cells



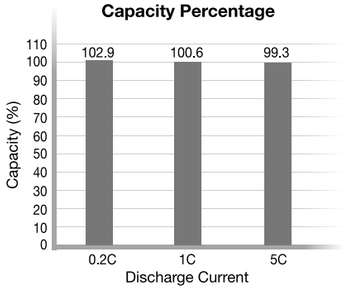
Charge: 0.1C x 16 hrs
Discharge: 0.2C, 1C, 5C to 1.0V
Temperature: 25˚C



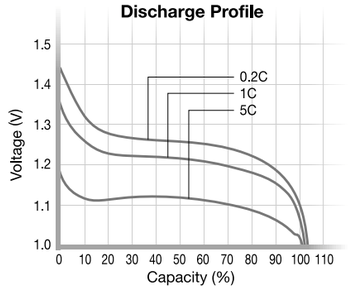
Charge: 0.1C x 16 hrs
Discharge: 0.2C, 1C, 5C to 1.0V
Temperature: 25˚C



Charge: 0.5C x 126 mins
Discharge: 0.5C to 1.0V
Temperature: 25˚C

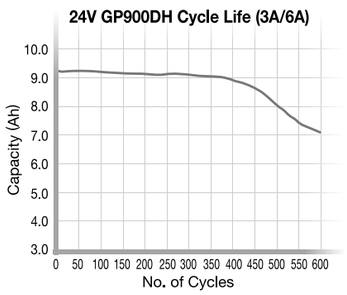


Charge: 0.1C x 16 hrs
Discharge: 0.2C, 1C, 5C to 1.0V
Temperature: 25˚C

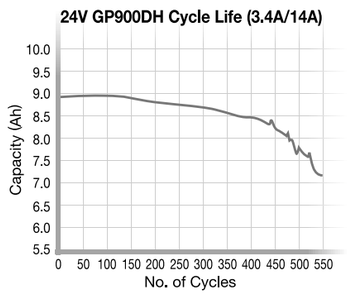


Charge: 0.1C x 16 hrs, rest 15 mins
Discharge: 0.2C, 1C, 5C to 1.0V
Temperature: 25˚C

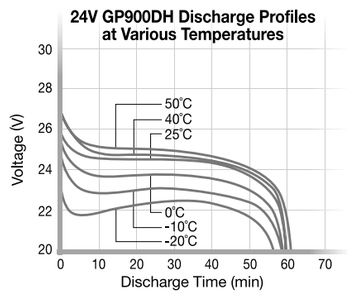
Battery Packs



Charge: 3A to -dV=40mV, rest 15 mins
Discharge: 6A to 20V
Temperature: 25˚C



Charge: 3.4A to -dV=120mV, rest 15 mins
Discharge: 14A to 20V
Temperature: 25˚C



Charge: 3.4A to -dV=100mV, rest 24 hrs
Discharge: 1C to 20V
Temperature: 0˚C, 25˚C, 40˚C, 50˚C,
-10˚C and -20˚C

Battery Specifications

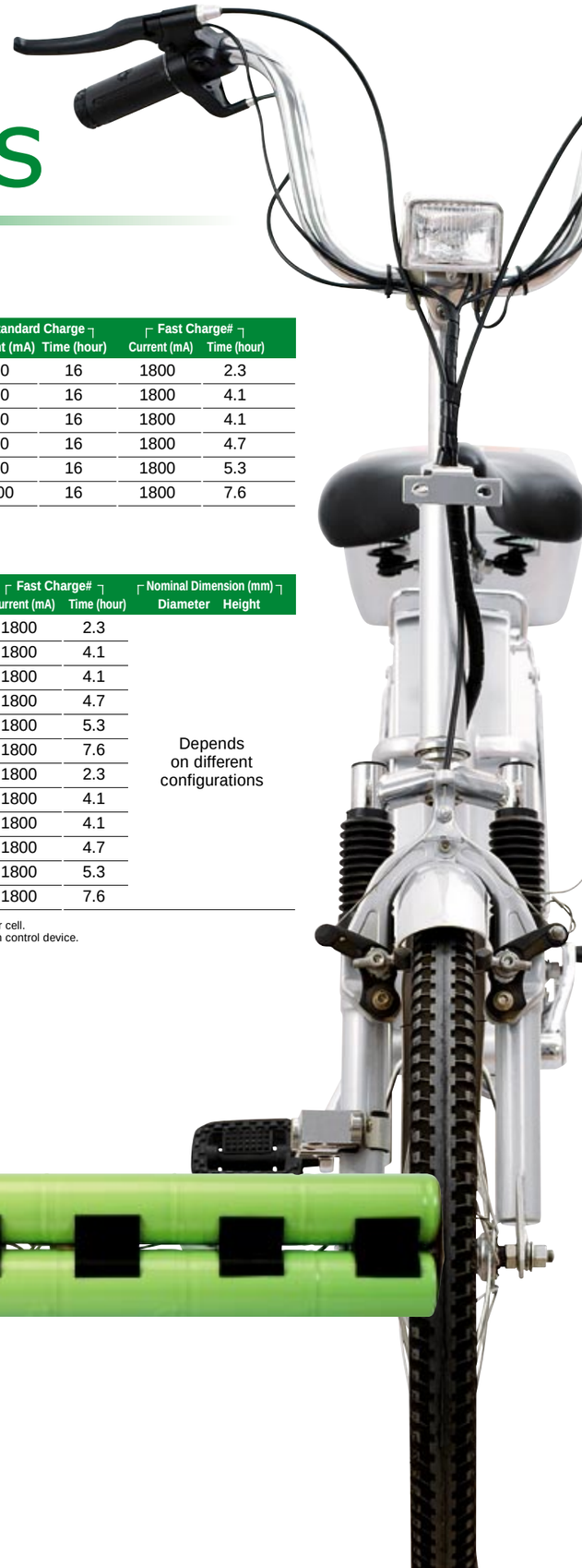
Single Cells

Model No.	Nominal Voltage (V)	Capacity* (mAh) Minimum	Capacity* (mAh) Typical	Nominal Dimension (mm) Diameter	Nominal Dimension (mm) Height	Weight (g)	Standard Charge Current (mA)	Standard Charge Time (hour)	Fast Charge# Current (mA)	Fast Charge# Time (hour)
GP400CH	1.2	4000	4200	25.8	50	82	400	16	1800	2.3
GP700CH	1.2	7000	7350	25.8	70	130	700	16	1800	4.1
GP700DH	1.2	7000	7350	33	60	155	700	16	1800	4.1
GP800DH	1.2	8000	8200	33	60	165	800	16	1800	4.7
GP900DH	1.2	9000	9225	33	60	170	900	16	1800	5.3
GP1300FH	1.2	13000	13660	33	90	247	1300	16	1800	7.6

Battery Packs

Model No.	Nominal Voltage (V)	Capacity* (mAh) Minimum	Capacity* (mAh) Typical	Weight (kg)	Standard Charge Current (mA)	Standard Charge Time (hour)	Fast Charge# Current (mA)	Fast Charge# Time (hour)	Nominal Dimension (mm) Diameter	Nominal Dimension (mm) Height
GP400CH20X	24	3920	4000	1.7	400	16	1800	2.3		
GP700CH20X	24	6860	7000	2.7	700	16	1800	4.1		
GP700DH20X	24	6860	7000	3.2	700	16	1800	4.1		
GP800DH20X	24	7840	8000	3.4	800	16	1800	4.7		
GP900DH20X	24	8855	9000	3.5	900	16	1800	5.3		
GP1300FH20X	24	12740	13000	4.8	1300	16	1800	7.6		
GP400CH30X	36	3920	4000	2.5	400	16	1800	2.3	Depends on different configurations	
GP700CH30X	36	6860	7000	4.0	700	16	1800	4.1		
GP700DH30X	36	6860	7000	4.6	700	16	1800	4.1		
GP800DH30X	36	7840	8000	4.8	800	16	1800	4.7		
GP900DH30X	36	8855	9000	5.0	900	16	1800	5.3		
GP1300FH30X	36	12740	13000	7.2	1300	16	1800	7.6		

Remarks: * Capacity test condition: charge at 0.1C for 16 hrs, rest 15 mins, then discharge at 0.2C to 1.0V per cell.
Fast charge is only applicable for charging with chargers equipped with reliable charge termination control device.
The approximate charge time is for reference only.

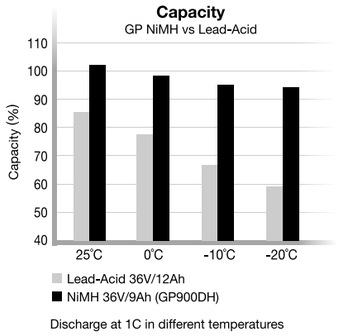


E-Bike NiMH Recharge able Batteries

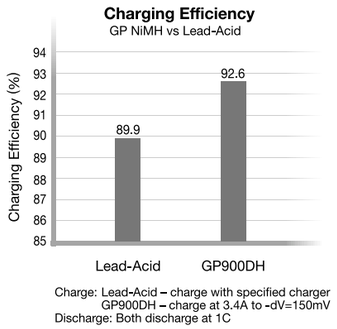
Battery Comparison - GP NiMH vs Lead-Acid

	⌐ NiMH (GP900DH) ¬ 24V/9Ah	36V/9Ah	Lead-Acid 36V/12Ah	Winner
Environmental Friendly	✔	✔	✘	GP NiMH
Weight of Bare Battery Pack	3.5kg	5kg	13kg	GP NiMH
Energy Density	65Wh/kg 230Wh/L	65Wh/kg 230Wh/L	36Wh/kg 85Wh/L	GP NiMH
Pack Volume	1,350cm³	1,950cm³	4,290cm³	GP NiMH
Travelling Distance				
• Per Ah (Capacity Rating)	–	3.5km	3.2km	GP NiMH
• Per kg (Battery Weight)	6.3km	6.3km	2.2km	GP NiMH
Cycle Life	> 500 times	> 500 times	~ 200 times	GP NiMH
Storage	12 months	12 months	3-6 months	GP NiMH
Capacity at High-rate Discharge	90% (discharge at 5C)	90% (discharge at 5C)	~ 50% (discharge at 2C)	GP NiMH
Endurance	> 1 year	> 1 year	< 1 year	GP NiMH

GP® NiMH offers **matchless advantages**



Discharge at 1C in different temperatures



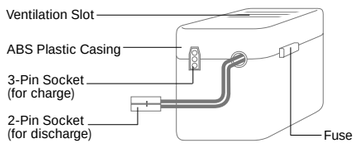
Charge: Lead-Acid – charge with specified charger
GP900DH – charge at 3.4A to -dV=150mV
Discharge: Both discharge at 1C

Battery Assembly

Generally consists of 20 or 30 pieces of NiMH unit cells, the normal battery voltage is therefore 24V and 36V respectively. The design may vary in consideration of space, battery pack configuration, dimension, and charge mode. GP Battery Pack offers the following advantages:

Battery Casing

- To protect from rainwater, a semi-permeable membrane is incorporated with the battery casing.
- The whole battery pack is firmly located inside the ABS plastic casing.
- The ventilation slot design enhances heat dissipation.
- Two separate sockets are used for charge and discharge respectively.
- During charge, the installed 3-pin socket is connected to the suitable charger. The colour of the LED indicator indicates the charge status, e.g. green light indicates that charging is complete.
- The 30A fuse may prevent possible damage caused by excessive current conducted through the battery pack. Customer may replace the fuse if it is damaged.



Operating Voltage

Provide more battery configuration options than lead-acid batteries. Besides the popular options of 24V and 36V, alternatives such as 25.2V battery packs are also available.

Heat Dissipation

The design of the battery pack configuration aims to maximise the area of heat dissipation, which helps to prolong the battery cycle life.

Matching

Precise matching such as capacity, internal resistance, and self-discharge rate etc., optimises the service-life of the battery.

Protection

The fuse and overcurrent protection may prevent excessive current. The thermistor and thermostat are able to monitor battery temperature and avoid overcharging. The protective design of voltage cutoff may prevent overdischarge.

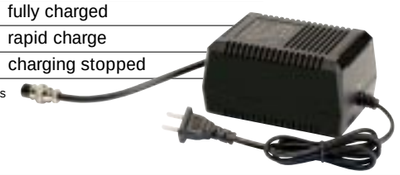
Warranty

All GP Batteries last for 500 cycles, with a warranty period of one-and-a-half years, provided the battery pack is handled properly.

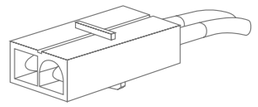
Charger Specifications

Charge Current	Rapid Charge	1.8A
	Trickle Charge	0.45A
Charge Termination Control	-delta V	0-5mV/cell
	dT/dt	0.8°C/min
	Maximum Temperature	55°C
	Maximum Voltage	1.59V/cell
	Timer Cutoff (Rapid Charge)	6.5 hours (130%)
	Timer Cutoff (Trickle Charge)	2 hours
Pre-charge Qualification	Battery Temperature	0-45°C
	Unit Cell Voltage V>1.35V	fully charged
	Unit Cell Voltage 0.6V<V<1.35V	rapid charge
	Unit Cell Voltage V<0.6V	charging stopped

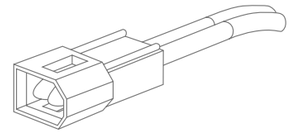
Note: The above specification applies to GP900DH Battery Pack only. For information related to other models and specifications, please contact our sales representatives for further clarification.



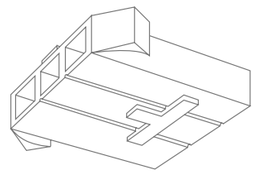
Battery Accessories



2-Pin Socket for Discharge

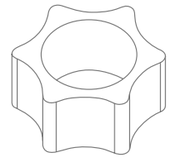


3-Pin Socket for Charge

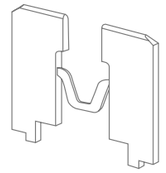


3-Pin Socket for Charge & Discharge

Socket Wire



Battery Holder



30A Fuse

Technical information listed in this catalogue is for reference only.