

# GP Batteries

**Product Specification**

**Model No.: GP400LAHT**

Document Number: MQS6845

Revision: 01

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## 1. SCOPE

This specification governs the performance of the following GP High Temperature Rechargeable Nickel Metal Hydride Cylindrical Cell and its stack-up batteries which constitute less than 20 unit cells.

**GP Model: GP400LAHT**  
**Cell Size: 7/5 LA**

## 2. RATINGS

Description	Unit	Specification	Conditions
Nominal Voltage	V	1.2	
Typical Capacity	mAh	4,120	Standard charge / discharge
Rated Capacity	mAh	4,000	
Standard Charge	mA	400 (0.1C)	T <sub>a</sub> = 0 ~ 50 °C (see Note 1)
	hr	16	
Permanent Charge	mA	120(0.03C)~200(0.05C)	T <sub>a</sub> = 0 ~ 50 °C
Trickle Charge	mA	120 (0.03C)	After standard charge T <sub>a</sub> = 0 ~ 50 °C
Maximum Discharging Current	A	4.0(1C)	T <sub>a</sub> = -20~70°C
Discharge Cut-off Voltage	V	1.0	
Storage Temperature	°C	-20 ~ 35	
Typical Weight	g	67.0 (Approx)	

## 3. PERFORMANCE

Before proceed the following tests, the cells should be discharged at 0.2C to 1.0V cut-off. Unless otherwise stated, tests should be done within one month of delivery under the following conditions:

Ambient Temperature, T<sub>a</sub> : 20 ±5 °C  
Relative Humidity : 65 ±20%RH

**Notes:** Standard Charge / Discharge Condition  
Charge: 400mA (0.1C) ×16hrs  
Discharge: 800mA (0.2C) to 1.0V

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Test	Unit	Specification	Conditions	Remarks
Capacity	mAh	$\geq 4,000$	Standard Charge / discharge	Up to 3 cycles are allowed
Open Circuit Voltage (OCV)	V	$\geq 1.25$	Within 1hr after standard charge	
Internal Impedance (Ri)	m $\Omega$	$\leq 25$	Upon fully charge At 1kHz	
High Rate Discharge (0.5C)	min	$\geq 108$	Standard Charge, 1hr rest before discharge	
High Rate Discharge (1C)	min	$\geq 48$	Standard Charge, 1hr rest before discharge	
Overcharge	mAh	$\geq 2000$	200 mA (0.05C) charge for 4yrs $T_a = 0 \sim 40^\circ\text{C}$	No conspicuous deformation and / or leakage
Charge Retention	mAh	$\geq 3200$	Standard Charge, Storage: 12months at $20^\circ\text{C}$ Standard Discharge	
IEC Cycle Life Test	cycle	>500	IEC61951-2(2011) 7.5.1.2	see Note 3
IEC Permanent Charge Endurance Test	hr	3.75 (Cycle No.2 & 3) 2.50 (Cycle No.8 & 9)	IEC61951-2 (2011) 7.5.2.3	see Note 4
Leakage	N/A	No leakage	Fully charged at 400mA(0.1C), Stand for 14 days.	
External Short Circuit	N/A	No fire and no explosion	After standard charge, short circuit the cell at $20 \pm 5^\circ\text{C}$ until the cell temperature returns to ambient temperature. (The resistance of the inter-connecting circuitry shall not exceed 0.1 $\Omega$ .)	
Vibration Resistance	N/A	$\Delta V < 0.02\text{V/cell}$ $\Delta R_i$ (Internal Impedance) < 5m $\Omega$ /cell	Charge at 0.1C for 16 hrs, and then leave for 24hrs,check battery before / after vibration Amplitude: 1.5mm Vibration: 3000CPM (any direction for 60mins)	Unit Cell
Impact Resistance	N/A	$\Delta V < 0.02\text{V/cell}$ $\Delta R_i$ (Internal Impedance) < 5m $\Omega$ /cell	Charge at 0.1C for 16 hrs, and then leave for 24hrs,check battery before / after drop Height: 50cm Thickness of wooden board: 30mm Direction is not specified Test for 3 times	Unit Cell

## 4. CONFIGURATIONS, DIMENSIONS AND MARKING

Please refer to attached Data sheet

## 5. EXTERNAL APPEARANCE

The cell / battery shall be free from crack, scars, breakage, rust, discoloration, leakage and deformation.



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Manufacturer reserves the right to alter or amend the design, model and specification without prior notice.

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## 6. WARRANTY

One year limited warranty against workmanship and material defects.

## 7. CAUTION

1. Batteries should be charged prior to use.
2. For charging methods please referred to our technical handbook.
3. Use the correct charger for Ni-MH batteries.
4. Do not reverse charge batteries.
5. Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive over charge/over discharge.
6. Avoid batteries being used in an airtight compartment. Ventilation should be provided inside the battery compartment; otherwise batteries may generate hydrogen gas, which could cause an explosion if exposed to an ignition source.
7. Do not attempt to take batteries apart or subject them to pressure or impact, Heat may be generated or fire may result. The alkaline electrolyte is harmful to eyes and skin, and it may damage clothing upon contact.
8. Keep away from children .If swallowed, contact a physician at once.
9. Do not short circuit batteries, permanent damage to batteries may result.
10. Do not incinerate or mutilate batteries ,may burst or release toxic material
11. Do not solder directly to cells or batteries.
12. Store batteries in a cool dry place.
13. If find any noise, excessive temperature or leakage from a battery, please stop its use.
14. When not using a battery, disconnect it from the device.
15. When using a new battery for the first time or after long term storage, please fully charge the battery before use.
16. Do not mix new batteries in use with semi-used batteries, over-discharge may occur.
17. When connecting a battery pack to a charger, ensure correct polarity.
18. When the battery is hot, please do not touch it and handle it, until it has cooled down.
19. Do not remove the outer sleeve from a battery pack nor cut into its housing.
20. When find battery power down during use, please switch off the device to avoid over discharge.
21. Unplug a battery by holding the connector itself and not by pulling at its cord.
22. After use, if the battery is hot, before recharging it, allow it to cool in a well-ventilated place out of direct sunlight.
23. Never put a battery into water or seawater.
24. In order to maintain satisfactory cell / battery performance when being stored under extending period of time, cycling (i.e. charging and discharging) of the cell / battery within 12 months period is highly recommended. At least one times cycling should be conducted within 15 months.

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Notes: 1. T<sub>a</sub>: Ambient Temperature

2. Approximate charge time from discharged state, for reference only.

3. IEC61951-2 (2011) 7.5.1.2 Cycle Life Test

Cycle No.	Charge	Rest	Discharge
1	0.1C ×16hrs	None	0.25C ×2hrs20mins
2-48	0.25C ×3hrs10mins	None	0.25C ×2hrs20mins
49	0.25C ×3hrs10mins	None	0.25C to 1.0V/cell
50	0.1C ×16hrs	1-4hr(s)	0.2C to 1.0V/cell
Cycle 1 to 50 shall be repeated until the discharge duration on any 50th cycle become less than 3hrs			

4. IEC61951-2 (2011) 7.5.2.3 Permanent Charge Endurance Test

Cycle No.	Ambient Temperature	Charge	Discharge	Requirement
1	40 °C	0.05C ×48hrs	0.2C to 1.0V/cell	N/A
2~3	40 °C	0.05C ×24hrs	0.2C to 1.0V/cell	Discharge Time: 3.75hrs
4	70 °C	0.05C ×60days	0.2C to 1.0V/cell	N/A
5~6	70 °C	0.05C ×60days	0.2C to 1.0V/cell	N/A
7	40 °C	0.05C ×48hrs	0.2C to 1.0V/cell	N/A
8~9	40 °C	0.05C ×24hrs	0.2C to 1.0V/cell	Discharge Time: 2.5hrs