

Lithium thionyl chloride batteries

ER14505-3P+HLC1020

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Customer Confirmation	Recognized by	Date
	Company Name:	
	customer seal:	

1. Scope of application

This product specification applies to ER14505-3P+HLC1020+Plug Wire Battery (Pack) supplied by Goldwheel Energy. and stipulates the performance indexes, test methods, quality control, and precautions for use of the product.

2. Product Type

Lithium-thionyl chloride batteries + hybrid coated capacitors

2. Basic Characteristics

Serial No.	Specification name	characterizations	note
3.1	Model	ER14505-3P+HLC1020+ Plugs Header Cord	Lithium-ion battery + HLC1020
3.2	nominal voltage	3.6V	Measured at +23°C
3.3	nominal capacity	8100mAh	Measured at 1 . 2 KΩ/3mA, +23°C, with a cutoff voltage of 2.0V. (The measured capacity value varies with discharge current, temperature, and cutoff voltage.)
3.4	Maximum Continuos Discharge Current	240mA	/
3.5	Maximum pulse current	3000mA	1s pulse at ambient 23±2°C
3.6	operating temperature	-40°C~+85°C	Use above ambient temperature may result in reduced capacity and low voltage readings during the initial pulse. If the continuous temperature is above +40°C or below -20°C, consult the GW.
3.7	dimensions	55*54*15.5mm	As picture
3.8	standard weight	about 60g	/

4. Appearance and structure

4.1 Appearance

When we observe the batteries (packs) with our naked eyes, there is no sign of scratches, bulging, deformation, corrosion or electrolyte leakage on the surface of the ER14505-3P+HLC1020+plug wire batteries (packs).

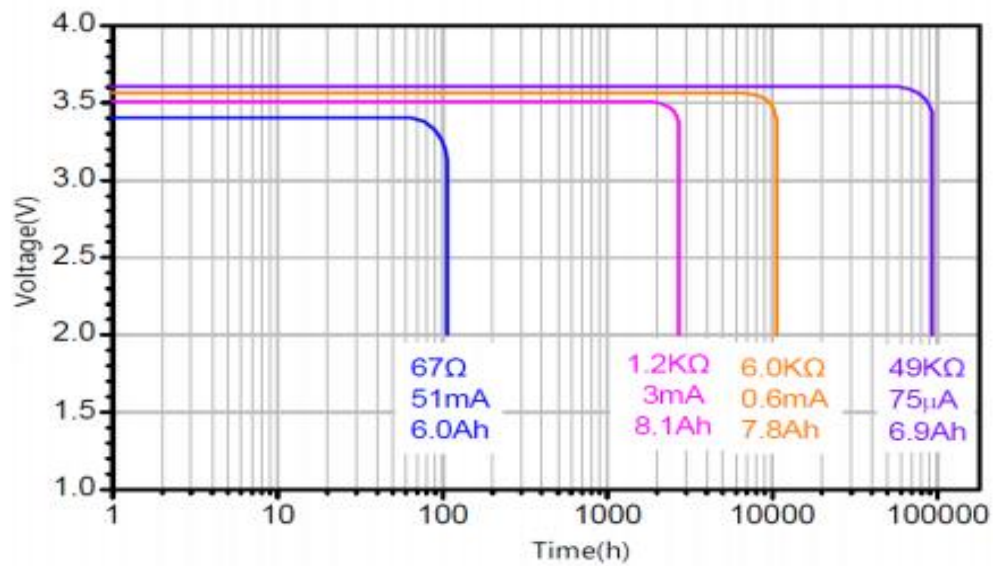
4.2. structure

The ER14505 cell is composed of "carbon wrapped" electrode technology. In order to ensure excellent sealing of the cell, the ER14505 utilizes glass/metal sealing technology (leakage rate $\leq 10^{-8}$ Pa.m³/sec at 1 standard helium pressure).

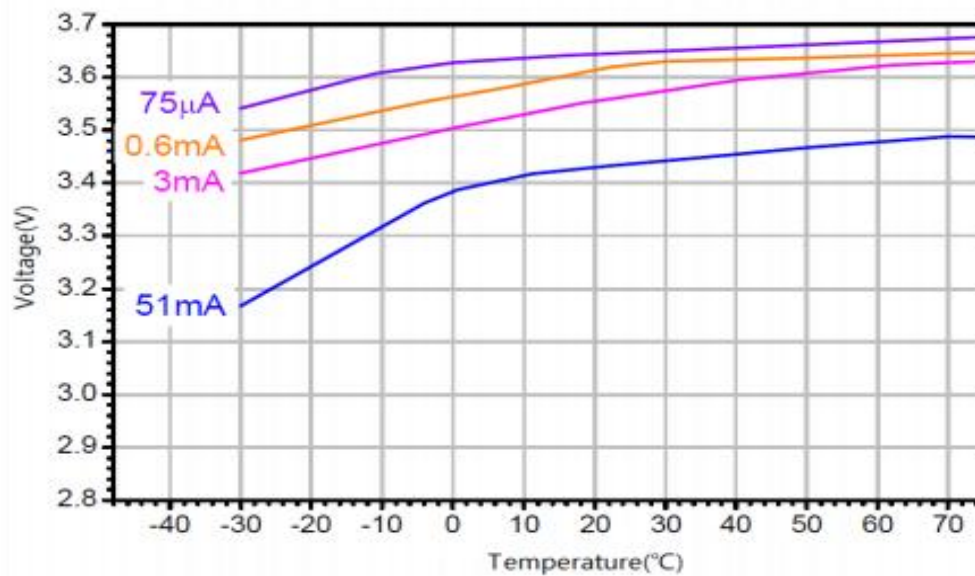
5. Typical Electrical Performance

Testing Program	Detection Methods	test condition	Testing Standards
open circuit voltage	Measured with a 3 1/2 digit voltmeter	-40±2°C	3.64 ~ 3.70V
		23±2°C	3.64 ~ 3.70V
		70±2°C	3.64 ~ 3.74V
operating voltage	Measured with a three-and-a-half digit voltmeter, resistance 50Ω , voltage at the end of 5 seconds.	-40±2°C	≥3.0V
		23±2°C	≥3.3V
		70±2°C	≥3.3V
standard discharge	1.2KΩ Continuous discharge to 2.0V (Battery upright positive up)	23±2°C	≥8100mAh
Rapid Discharge	67Ω Continuous discharge to 2.0V (battery upright positive up, starting after 16h of storage in ambient conditions.(Starting after 16h of storage in ambient conditions)	23±2°C	≥6000mAh
low temperature discharge	50Ω continuous discharge to 2.0V (battery upright positive side up, starting after 16h of storage in ambient conditions)	-40±2°C	≥2600mAh
high temperature discharge	50Ω continuous discharge to 2.0V (battery upright positive side up, starting after 16h of storage in ambient conditions)	70±2°C	≥5000mAh

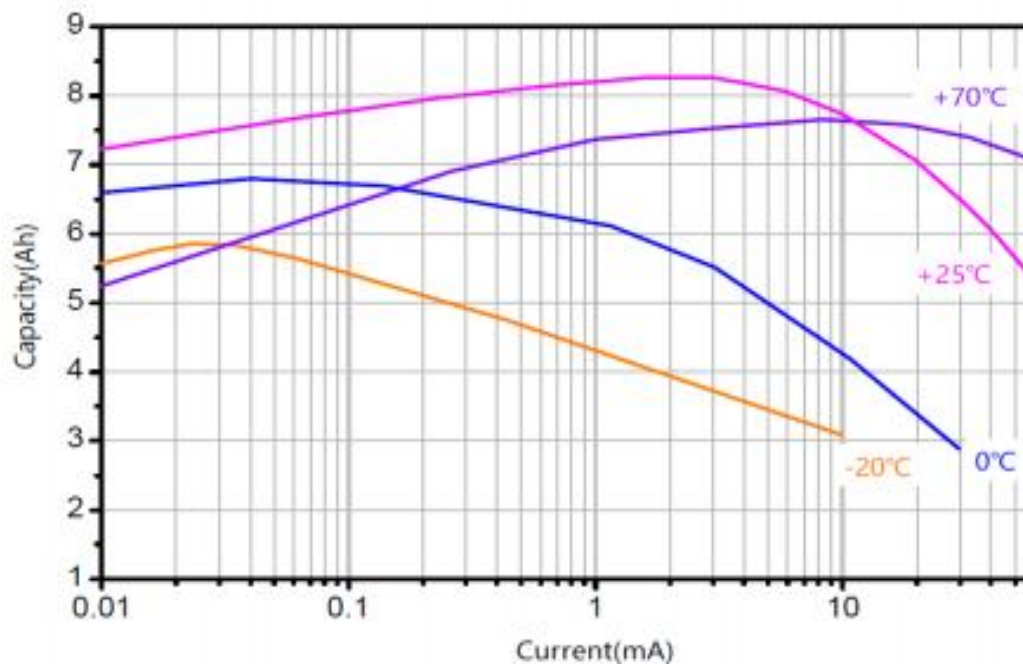
DISCHARGE CHARACTERISTICS (+25°C)



VOLTAGE VERSUS TEMPERATURE



CAPACITY VERSUS CURRENT



6. Safety and environmental performance

6.1. Environment and Adaptation

6.1.1. High-Low Temperature Cycle

According to UL★ test requirements: put the sample cell in a thermostat, warm up from $20\pm3^{\circ}\text{C}$ to $70\pm3^{\circ}\text{C}$ within 30min and keep it for 4h, then cool down to $20\pm3^{\circ}\text{C}$ with 30min and keep it for 2h, then cool down to $-40\pm3^{\circ}\text{C}$ with 30min and keep it for 4h, and finally warm up to $20\pm3^{\circ}\text{C}$ with 30min again. This cycle 10 times.

Judgment criteria: no explosion, no fire, no leakage.

6.1.2. Low pressure (altitude modelling)

According to the test requirements of UL★: the sample battery is stored for 6 hours under the condition of absolute pressure of 11.6kPa (1.68si) and temperature of $20\pm3^{\circ}\text{C}$ ($68\pm5^{\circ}\text{F}$), the judgment standard: the battery does not explode, does not catch fire, and has no leakage.

6.1.3. free-fall

According to IEC ★★★ test requirements: the battery test specimen will be dropped from a height of 1 meter on the concrete surface, each battery should be dropped 6 times, each axial direction 2 times.

Judgment criteria: no explosion, no fire, no leakage.

6.1.4. vibratory

In accordance with UL★ test requirements: the sample cell is clamped on the vibration platform, applied amplitude 0.8mm (double amplitude 1.6mm), frequency change rate 1Hz/min, frequency range 10Hz-55Hz, back-and-forth vibration $95\pm5\text{min}$. the sample cell is vibrated in three directions perpendicular to each other, and for the cell with only two axes of symmetry, vibration test is conducted in two directions perpendicular to each other. Judgment criteria: the battery does not explode, the battery does not explode.

Judgment criteria: the battery does not explode, does not catch fire, no leakage.

WARNING: The following tests have been performed under extreme conditions. They are intended to be illustrative only and should not be construed to mean that they can be applied in practice. If the requirements of the application exceed the standards or if the following types of tests are performed, they must be approved by GW.

7. Product Marking

7.1. The trademark of the battery contains the following contents::

① Model number ② Nominal voltage ③ Positive and negative terminal labeling ④ Date code ⑤ Safety warning

8. Incoming Material Inspection

1) GW tests 100% of the batteries for open circuit voltage (OCV) and load voltage prior to shipment from the factory. A sample of batteries is tested for capacity, visual appearance, and size.

9. shipment

- 1) During transportation, the battery should be protected from sunlight, fire, rain, flooding and being put together with corrosive substances. Shock and vibration during transportation and loading/unloading should be limited to a minimum.
- 2) The stacking height of paper packing boxes should not exceed 1.5 meters.
- 3) When batteries are transported over long distances, such as by ship, they should be placed far away from the engine; in summer, they should not be left in an unventilated environment for a long time.

10. store up

- 1) Batteries should be stored in an environment where the temperature does not exceed 30°C and the relative humidity is 45% ~ 75%.
- 2) Batteries should be stored away from heat sources, and should not be placed in direct sunlight, to ensure clean, cool, dry, ventilated, and not affected by the weather.
- 3) The stacking height of the batteries depends on the strength of the package, and it is generally stipulated that the stacking height of the cardboard boxes shall not exceed 1.5 meters.
- 4) Batteries to the original packaging storage and display batteries, remove the packaging of batteries can not be stacked, easy to cause short-circuit and damage to the battery.

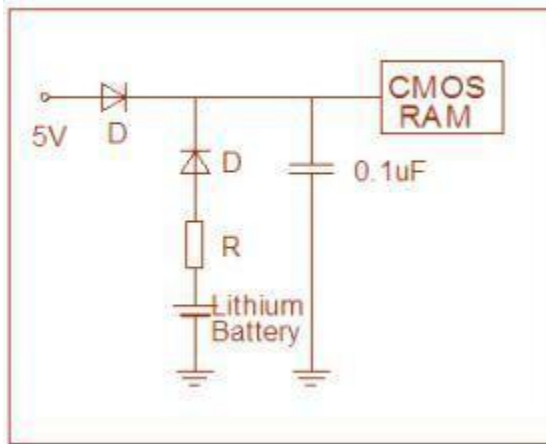
11. surety

Because there are some dangers in the transportation, storage and use of this product, incorrect operation may occur leakage, or even explosion, before you use this product, please read this product specification carefully, and please keep it for reference.

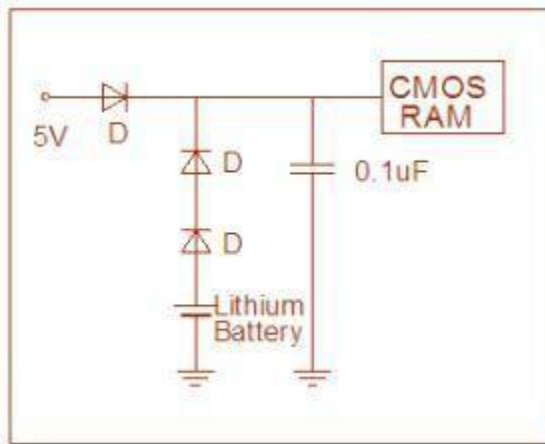
- 1) Over-discharging, crushing and burning of the battery is strictly prohibited.
- 2) It is strictly prohibited to short-circuit or charge the battery.
- 3) It is strictly prohibited to disassemble the battery by the user.
- 4) It is strictly prohibited to use or heat the battery outside the permitted temperature range.
- 5) It is strictly prohibited to weld directly on the surface of the battery.
- 6) It is strictly prohibited to use the battery with serious scars or deformation.
- 7) Do not use the battery together with dry cell batteries or other primary batteries, and do not use batteries of different packages, models or brands together.
- 8) Do not mix old and new batteries.
- 9) Be careful not to reverse the positive and negative terminals of the batteries when loading them into the equipment.
- 10) When the battery is used to the termination voltage, it should be taken out from the instrument in time.
- 11) When the battery is not used for a long time, take it out of the equipment and store it in a low temperature and low humidity environment.
- 12) Contact us for series and parallel connection of batteries.
- 13) Used batteries should be disposed of in accordance with local environmental regulations.
- 14) If you find any heat, odor, discoloration, deformation or other abnormalities in the battery during use or storage, please stop using it.

11.1. Backup Circuitry Designed to Prevent Battery Charging

Figure 10-1 shows a circuit diagram recommended by Underwriters Laboratories to protect memory backup circuits from reverse charging. If the resistor R is replaced by a diode, Figure 10-2 will work as well. It is absolutely necessary to provide such a safety device on a circuit board containing a backup battery connected in parallel with the power supply. The safety device should be as close as possible to the battery. Otherwise, unintentional short circuits in adjacent printed wires or poorly soldered joints or the like could bypass the safety device and allow the power supply to pass through the battery via a reverse (charging) current.



10.1



10.2

12. Recommendations for use

- 1) When the battery is used with the positive pole facing upwards, the energy utilization rate is the highest, and it is recommended to design the battery compartment in such a way that the battery is placed in an upright position.
- 2) The battery should be used in a location where the ambient temperature is relatively cool, avoiding high temperature and high humidity environments for long term use.

13. revisions

Revisions shall be subject to prior consultation between the parties, and any disputes resulting in problems that are neither defined nor described in these specifications shall be resolved by mutual agreement between the parties.

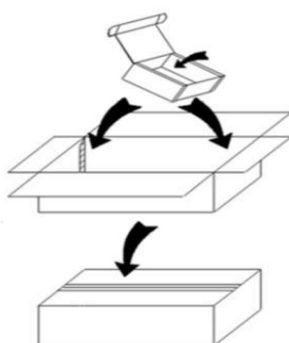
14. Important Notes

- 1) It is the customer's responsibility to verify and ensure the compatibility and reliability of the battery with the device in the actual application.
- 2) GW shall not be liable for any failure of the customer to properly handle, operate, test, maintain, or test the battery, or to follow the instructions, cautions, notes, and other instructions or recommendations provided by GW in this specification. The Customer fails to properly handle, operate, test, maintain, or inspect the Battery, or fails to follow the instructions, cautions, notes, and other instructions or recommendations of GW provided in this specification.
- 3) This specification shall be deemed to have been accepted by the Customer with effect from the date of issue if it is not returned within 6 months from the date of issue.

15. Product Liability Statement

Before using the battery, it must be operated in strict accordance with this product specification. Use above ambient temperature may result in reduced service life Low voltage readings at the beginning of the pulse should be evaluated before use. Misuse may cause the battery to heat up and explode, resulting in injury or property damage. The company will not be held responsible for any accidents caused by failure to follow the product specifications.

16. Product Packaging



17. Product Dimension Drawing

unit of measure (mm)

