

User Manual

Handling Instructions

The 5200 series Li-Polymer Battery features:

5-level power output.

Side-panel LED Safety light.

9-level electric capacity “Gas Gauge”

Output Control

Connect the battery to the device you want to power.

Note: The battery will not work without a load.

1. Press ON/UP: the “1” number appears on the LED Panel, indicating 20% output.
2. Press ON/UP again: the “2” number appears on the LED Panel, indicating 32% output.
3. Press ON/UP once again: the “3” number appears on the LED Panel, indicating 50% output.
4. Press ON/UP once again: the “4” number appears on the LED Panel, indicating 75% output.
5. Press ON/UP once again: the “5” number appears on the LED Panel, indicating 100% output.

To reduce power output (from full power)

6. Press OFF/DOWN: the “4” number appears on the LED Panel, indicating 75% output.
7. Press OFF/DOWN again: the “3” number appears on the LED Panel, indicating 50% output.
8. Press OFF/DOWN once again: the “2” number appears on the LED Panel, indicating 32% output.
9. Press OFF/DOWN once again: the “1” number appears on the LED Panel, indicating 20% output.
10. Press OFF/DOWN once again: the LED panel turns off, indicating the battery is turned off.

The Battery automatically shuts down if:

- If you disconnect the load
- If the attached device draws too much power.
(suggestion: try using the battery at a lower output level.)

LED Safety Light

Press and hold the ON/UP button for a few seconds, the side-panel LED Safety light turns on.

Press and hold the OFF/DOWN button for a few seconds, the side-panel LED Safety light turns off.

“Gas Gauge”

After setting the power output level, the LED Panel will revert to showing the amount of useable power left in the battery:

“9” indicates about 100% of capacity.

“8” indicates about 90% of capacity.

“7” indicates about 80% of capacity.

“6” indicates about 70% of capacity.

“5” indicates about 60% of capacity.

“4” indicates about 50% of capacity.

“3” indicates about 40% of capacity.

“2” indicates about 30% of capacity.

“1” indicates about 20% of capacity.

“0” indicates about 10% of capacity. At this level, the battery is almost exhausted. Please charge the battery with an approved charger.

Charging the Battery

Use an approved charger. Typical chargers have:

Input: alternating current (AC) 100V—240V, frequency: 50—60HZ.

Output: alternating current (AC) 8.6V, 1.2A.

On the Battery:

While charging, the “Gas Gauge” will move from “1” to “9”. When “9” appears on the LED Panel, the battery is at or close to full capacity.

On the Charger:

The LED indicator will be red while battery pack is charging.

When it turns green, the battery is fully charged. Recharging usually takes between 30 minutes and 1 hour.

Product Specification

for Polymer Lithium-ion Battery

Model Number: MPT-5200/30W

PRODUCT SPECIFICATION FOR Li-Polymer Battery

SCOPE

This document describes the performance characteristics and testing methods for Polymer Li ion batteries produced by Magic Protection Technology Co., LTD for Warm & Safe Heated Gear, LLC.

1. PRODUCT TYPE AND MODEL NUMBER

2.1 PRODUCT TYPE

Polymer Lithium-ion Battery

2.2 MODEL NUMBER

MPT-5200+

2. SPECIFICATION

No.	Item	Characteristics	Remarks
3.1	Nominal Capacity	Minimum:5200mAh Typical: 5300mAh	Fully charged @0.2C to 8.4V for 6 hrs, then discharge to 6.0V @ 0.2C.
3.2	Nominal Voltage	7.4V	
3.3	Charging Cut-off Voltage	8.40V	
3.4	Discharge Cut-off Voltage	6.0V	
3.5	Maximum Constant Charging Current	2080mA (0.25C)	
3.6	Maximum Continuous Discharging Current	4160mA (0.25C)	
3.7	Operating Temperature	Charge 0~45°C Discharge -20~60°C	
3.8	Storage Temperature	-20~45°C for 1Month -20~35°C for 6Months	
3.9	Weight	240g	Approximate value

3. Dimensions

Please refer the drawing in appendix.

4. Appearance

No scratches, dirt, defect, leakage of electrolyte or gassing should be observed as a new product.

5. Characteristics

6.1 Electrochemical performance characteristics

No.	Item	Testing Method	Requirements
1	Fully Charged State	CCCV or Constant current charge to 8.4V @0.25C follow by a constant voltage holding at 8.4V until current drops below 20±5mA.	
2	Rated Capacity	CCCV at 8.4V (per 6.1.1) at room temp. (20±5°C), rest for 1-2 hrs then discharge at a constant current of 0.2C to 6.0V, testing will be terminated by either 5 cycles or any one discharge time exceeds 5 hrs	≥5200mAh
3	Cycle Life @25°C	Discharge to 6.0V @0.25C, then CCCV charge to 8.4V, rest for 10 min. discharge @ 0.25C to 6.0V and rest for 10 min. Continue the charge/discharge cycles until discharge capacity lower than 80% of rated capacity.	Cycle life ≥300
4	Internal Impedance	Internal impedance is measured on a 50% charged battery at 1KHz AC at ambient temperature (20±2) °C.	≤200mΩ
5	Capacity Retention	Fully charge cells per 6.1.1, store them at (20±2)°C for 28 days, then discharge the cells to 6.0V at 0.2C.	Discharge capacity ≥4420mAh
6	High Temperature Characteristics	Fully charge cells per 6.1.1, store them at (55±2)°C for 2 hours, then discharge the cells to 6.0V at 0.2C.	Discharge capacity ≥4420mAh
7	Low Temperature Characteristics	Fully charge cells per 6.1.1, store them at (-10±2)°C for 16~24 hours, then discharge the cells to 6.0V at 0.2C.	Discharge capacity ≥3120mAh
8	Battery Voltage during Transportation	Check open circuit voltage (OCV) of cells prior to the delivery to customers	≥7.50V

6.2 Safety characteristic

No.	Item	Test Method	Requirements
1	Overcharge	Discharge Battery to 6.0V at 0.25C, then charge to 9.0V at 3C and rest for 8 hours.	No fire No explosion
2	Over Discharge	Fully charge cells per 6.1.1, then discharge the battery to 6.0V with 0.2CmA at room temperature, connect with external load of 30Ω for 24hours.	No fire No explosion

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3	Hot Oven Test	Put a fully charged battery in a forced air oven and raise the temperature at $5 \pm 2^\circ\text{C}/\text{min}$. to $130 \pm 2^\circ\text{C}$ Rest for 10 minutes.	No fire No explosion
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6.3 Reliability

No.	Item	Test Method	Requirements
1	High Temperature Test	Fully charged per 6.1.1, then stored the cells at $60 \pm 2^\circ\text{C}$ for 2 hours.	Electrochemical performance , visual test not changed
2	Low Temperature Test	Fully charge cells per 6.1.1, store them at $-20 \pm 2^\circ\text{C}$ for 2 hours. Then, cells are placed at room temperature for 3 hours.	No appreciable alternation electrochemically and visually
3	Humidity Test	Fully charge cells per 6.1.1, stored them at $40 \pm 2^\circ\text{C}$ with 90%~95RH% for 48 hours. Then the cells are placed at room temperature to "dry out" for 2 hours.	No appreciable alternation electrochemically and visually

6. Standard Testing Environment

Temperature : $25 \pm 2^\circ\text{C}$

Relative humidity : $45 \pm 20\%$ (unless specially requested)

7. Required Protective Functions

To ensure safety, the cells need to be assembled with PTC and protective circuitry to prevent abusive situations occur such as over charge and over discharge or over current. The charger and protective circuitry should be consistent with the requirements listed below:

No	Device	Items	Requirements
1	Charger	Charge termination voltage	$4.200 \pm 0.049\text{V}$
2	Protective Circuitry (For reference only)	Overcharge detection voltage	$4.275 \pm 0.025\text{V}$
3		Overcharge release voltage	$4.175 \pm 0.050\text{V}$
4		Discharge termination voltage	$3.00 \pm 0.10\text{V}$
5		Over discharge detection voltage	$3.0 \pm 0.08\text{V}$
6		Over discharge release voltage	$3.0 \pm 0.10\text{V}$
7		Over discharge detection value	$2.7 \pm 0.2\text{A}$

8. Warranty

Warranty period for this product is 6 months starting from the date when the products left the door of manufacturer.

10. Liability

The user is obligated to operate the products according to the instructions printed on the battery label or follow the advice described in this "Product Specification for Polymer Lithium Ion Batteries published by Warm & Safe Heated Gear, LLC. Warm & Safe Heated Gear, LLC. assumes no responsibility should the battery be damaged due to overheating, burning or explosion due to mishandling or failure to follow instructions printed on the battery, this set of specifications or the user manual. Furthermore, Warm & Safe Heated Gear, LLC will not be liable for any losses or damage caused by any of such mishandling.

11. Battery Packing Label

The following warnings should be indicated on the battery pack labels.

Use a specified charger.

Do not throw the battery into fire, or heat.

Do not short-circuit the battery terminals.

Do not disassemble the battery.

12. Warnings and Cautions in Handling the Lithium-ion Battery

To prevent potential leaking, overheating or explosion of batteries please be advised to take following precautions:

WARNINGS!

Do not immerse the battery in water or seawater, and store the battery in a cool dry environment.

Do not use or leave the battery near a heat source such as fire or heater.

When recharging, use the battery charger specifically for that purpose.

Do not reverse the position (+) and negative (-) terminals.

Do not connect the battery to an electrical outlet.

Do not dispose the battery in fire or heat.

Do not short-circuit the battery by directly connecting the positive (+) and negative (-) terminal with metal objects such as wire.

Do not transport or store the battery together with metal objects such as necklaces, hairpins etc.

Do not strike or throw the battery against hard surface.

Do not directly solder the battery or pierce the battery with a nail or other sharp object.

Do not allow metal to contact the aluminum layer under the AL laminate film. In particular avoid charged surfaces which may cause the battery pack to blister.

Do not hit the battery with sharp objects.

PRODUCT SPECIFICATION FOR Li-Polymer Battery

CAUTIONS!

Do not use or leave the battery at very high temperature (for example, at strong direct sunlight or in a vehicle in extremely hot weather). Otherwise, it can overheat, explode or have degraded performance and/or a shortened life-span.

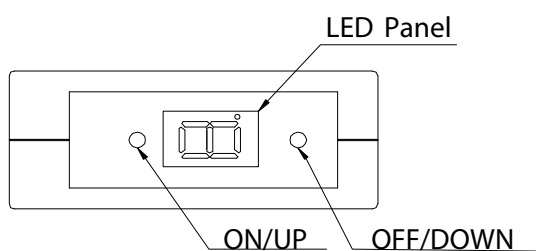
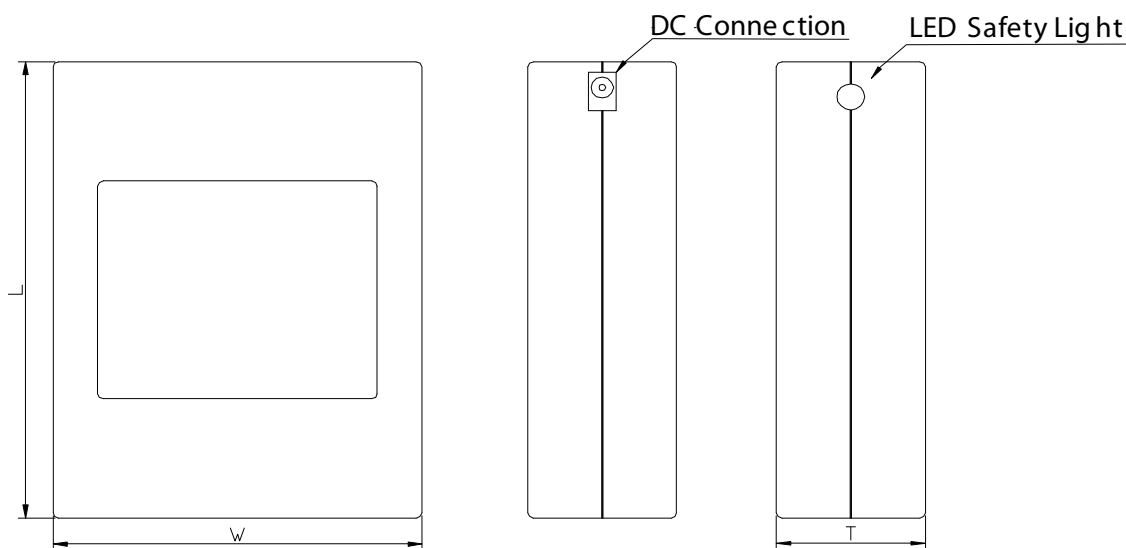
Do not use it in a location where static electricity is present, otherwise, the safety devices may be damaged, causing a harmful situation.

In case the electrolyte gets into the eyes due to the leakage of battery, do not rub the eyes! Rinse the eyes with clean running water, and seek medical attention immediately. Otherwise, it may injure eyes or cause a loss of sight.

If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the device or battery charger and place it in a contained vessel such as a metal box.

In case the battery terminals are contaminated, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection between the battery and the electronic circuitry of the instrument.

Be aware discarded batteries may cause fire, tape the battery terminals to insulate them before disposal.



Item	Description	Dimension and specification
T	Thickness	26.6~26.9mm
W	Width	66.00~66.20mm
L	Length	88.00~88.20mm
Cap	Capacity	5200mAh
Imp	Impedance	200mΩ Max
V	Voltage	7.5~8.4V