



Haicen
Advanced Lithium Batteries

BATTERY PACK-LFP-HC12V450



LiFePO4
Battery Specification

Preface

Thank you so much for buying lithium batteries from HAICEN
Be sure to finish reading before installation / use; So you can use the
lithium pack properly. After reading it, please keep it safe!

If there is any ambiguity about this specification, or if you need to
discuss technical issues, please contact our company!



1. General Information

This specification defines the performance of rechargeable LiFePO₄ battery pack **HC12V450** manufactured by **HAICEN**. describes the type, performance, technical characteristics, installation, warning and caution of the battery pack.

2. Battery Specification (@ 25±5°C)

NO	Items		Characteristics
2.1	Normal capacity		450Ah
2.2	Nominal energy		5.76KWh
2.3	Nominal voltage		12.8V (4Serial-cell)
2.4	Internal resistance		≤6mΩ @1kHz AC
2.5	Normal charge voltage		14.4±0.1V
2.6	Float charge voltage(for Standby use)		13.6±0.1V
2.7	Allowed MAX charge current		200A
2.8	Recommended charge current		≤90A
2.9	Allowed MAX discharge current		200A
2.10	End of discharge voltage		10V
2.11	Over current protection		800±50A
2.12	Dimension		Length 520±2 mm
			Height 259±2 mm
			Width 233±2 mm
2.13	Weight		Approx. 38kg
2.14	Self-discharge rate		≤3%/Month; ≤15%/ year
2.15	Operation temperature	Charging	-20~45°C(charging current less than 5A) 0~45°C(charging current over 5A)
		Discharging	-20~60°C
2.16	Storage environment	≤1month	-20~+35°C、45~75%RH
		Recommend environment	15~30°C、45~75%RH

3. Battery Performance

Testing Conditions: Ambient Temperature: 25±5°C; Humidity:45%~85%.

Normal charge: Charge battery under CC(0.2C)/CV(14.4V) mode until over charge protection or the charge current reduce to 0.02C, and then rest for 0.5h.

NO	Items	Criterion		Condition
3.1	Cycle life @DOD100%	≥2000cycles		After Normal charge, discharge @0.2C current to the end Of discharge voltage. Repeat above process until discharge capacity reduce to 80% of initial value.
	Cycle life @DOD70%	≥7500cycles		Charge the battery to 3.45V@0.2C current and hold for 0.5h, then discharge @0.2C current to 3.1V. Repeat above process until discharge capacity reduce to 80% of initial value.
3.2	Discharge temperature characteristic@ 0.33C	-20℃	≥70%	<u>Capacity @specified temperature</u> Capacity @ 25℃
		-0℃	≥80%	
		25℃	≥100%	
		55℃	≥95%	
3.2	Capacity retention rate	remain capacity ≥90%		After normal charge, store the battery @25±5℃ for two months., then discharge capacity @0.2C, the retention capacity accord with criterion.

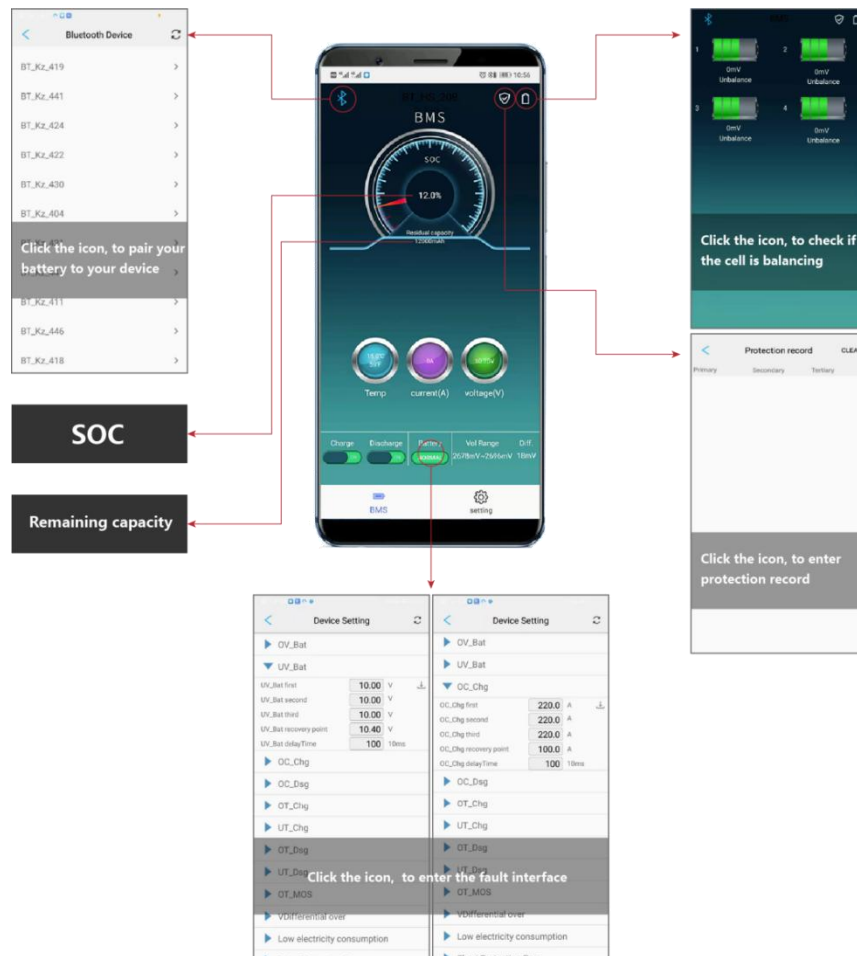
4. BMS function

This battery pack has a battery management system (BMS), which can monitor the operation status of the system through Bluetooth, providing over discharge, over charge, over current, short circuit, over temperature and low temperature protection , display , heating,CAN communication。

4.1 BMS parameters

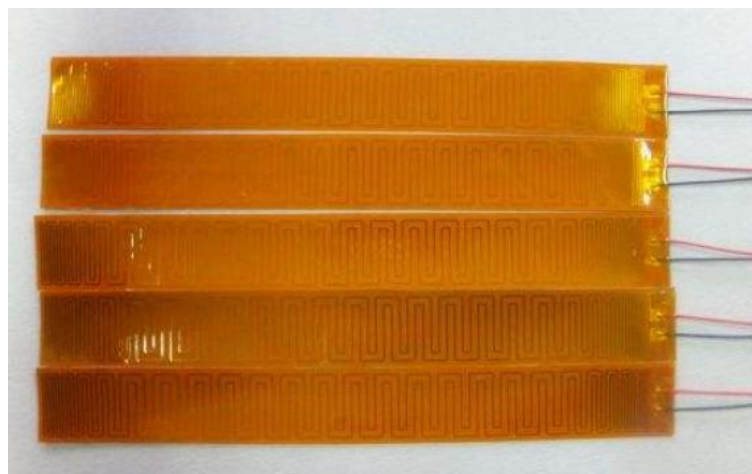
No	Item	Content	Criterion
4.1	Over charge	Over-charge protection for each cell	$3.75 \pm 0.05V$
		Over-charge release for each cell	$3.55 \pm 0.1V$
		Over-charge release method	Under the release voltage
4.2	Over discharge	Over-discharge protection each cell	$2.3 \pm 0.1V$
		Over-discharge release for each cell	$2.4 \pm 0.10V$
		Discharge over discharge release	Charge or Cut load
4.3	Over current	Discharge over current warning	$800 \pm 50A$
		Discharge over current delay	$\leq 100ms$
		Discharge over current release	Auto release or Cut load
4.4	Short circuit	Short circuit protection value	$900A (< 100\mu s)$
4.5	Internal resistance		$< 5m\Omega$
4.6	Cell balancing	Cell Balance Threshold	$\geq 3400mV$
		Cell Balance Current	$50 \pm 20mA$

4.2 Bluetooth function interface



5. Function description

5.1 Heating function

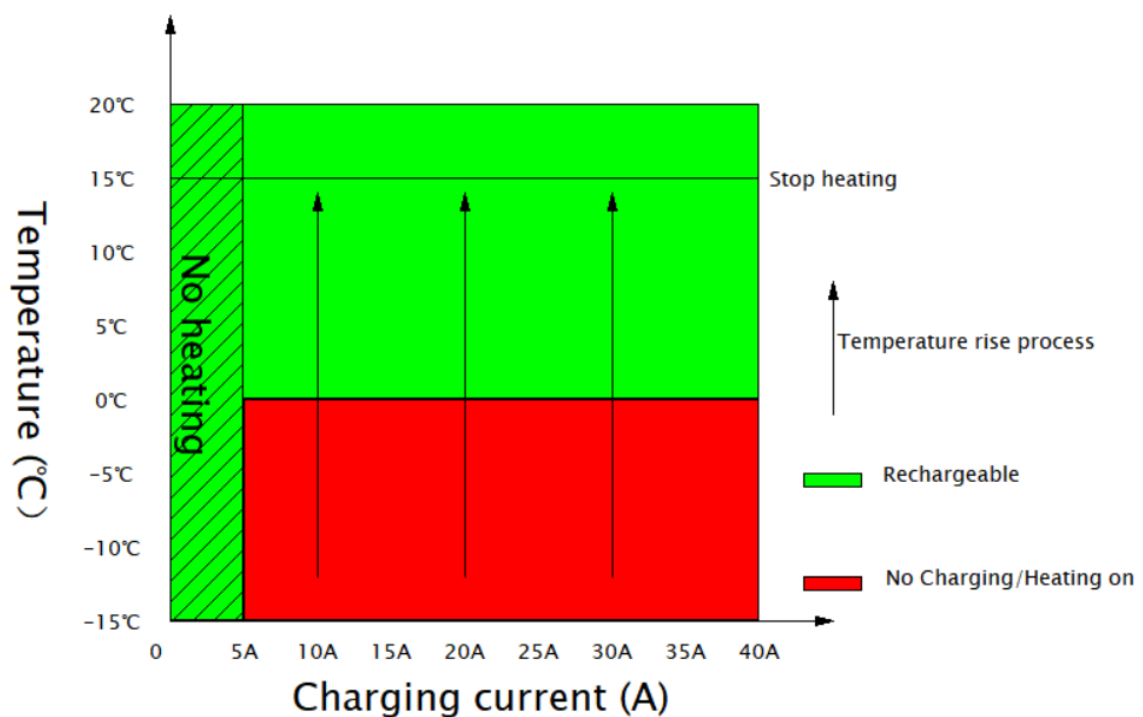


Heating film

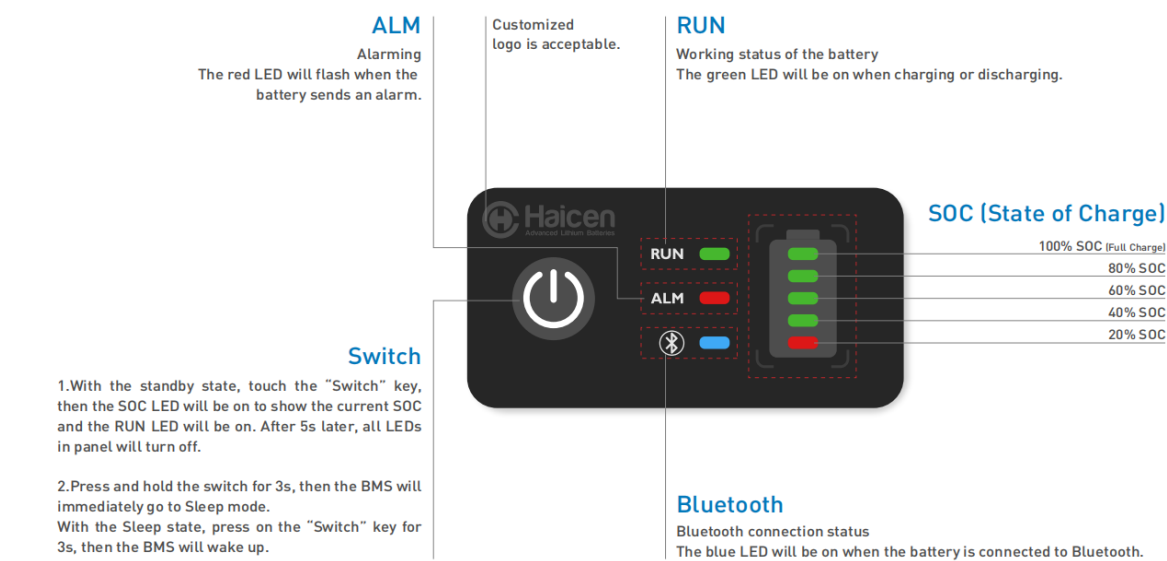
A. The heating function adopts BMS to control the heating film, and the protection plate can start the heating mode by collecting the temperature and current;

B. Heating film : The main cross-sectional structure of the diaphragm includes polyimide film (0.08), heating element (0.05), and polyimide in order Membrane (0.08), double-sided tape (0.11) with a total thickness of $0.36 \pm 0.1\text{MM}$, strong adhesion and no cracking after long-term use;

Working mode: Charging working mode: after the charging device is connected to the battery, the protection board performs current detection. If the current is less than 5A, the battery can be charged; if the current is more than 5A, the protection board needs to detect the temperature: a, when the temperature is less than 0 °C, turn on the heating film, the temperature When heated to above 0 °C, the battery can be recharged, continue to heat until the temperature ≥ 15 °C to stop heating. b. When the temperature is $\geq 0^\circ\text{C}$, it can be charged without heating.

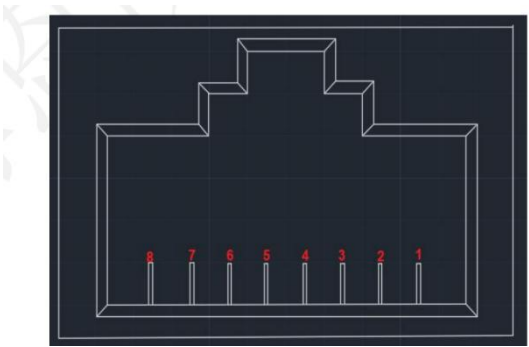


5.2. Display



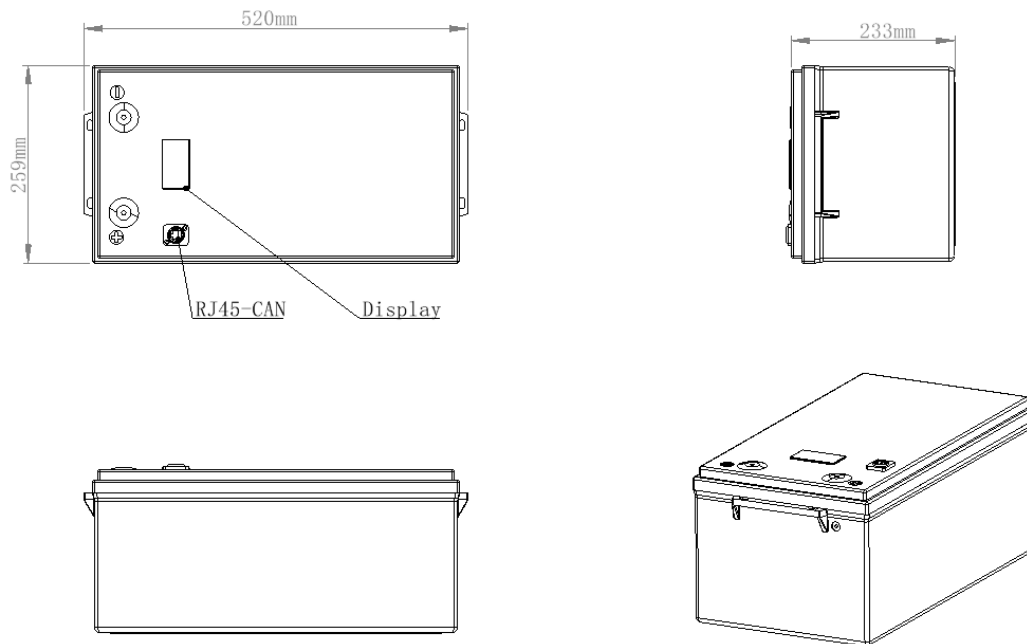
5.3. CAN

The BMS has the function of battery pack upload to CAN communication, 500K baud rate CAN communication interface adopts 8 P8C network interface. You can communicate with the Victron Cerbo GX box.



GND	Pin 3
CAN-L	Pin 8
CAN-H	Pin 7

6. Dimension



7. Transport & Store

- Lithium-ion batteries are hazardous goods. Therefore the following points must be observed when transporting the battery modules:
- Observe the general transport regulations based on the mode of transport as well as all legal regulations.
- No fall down, no pile up over 5 layers and keep face up.
- Check the battery immediately after transport the battery.

| If user finds shell deformation of the battery pack, don't use it and contact us.

Warning & Tips.

Please read and follow the handling instructions before use. Improper use may cause heat, fire, rupture, damage or capacity deterioration of the battery. **HAICEN** Describes is not responsible for any accidents caused by the usage without following our handling instructions.

Warning

- Battery must be far away from heat source, high voltage, and no exposed in sunshine for long time.
- Never throw the battery into water or fire.
- Never reverse two electrodes when use the battery.
- Never connect the positive and negative of battery with metal.
- Never knock, throw or trample the battery.
- Never disassemble the battery without manufacturer's permission and guidance.
- Never use mixed with other type of battery.

Tips

- Keep the battery against high temperature. Otherwise it will cause battery heat, get into fire or lose some function and reduce the life.
- When battery run out of power, please charge your battery timely (≤ 15 day).
- Please use the matched or suggested charger for this battery.
- If battery emit peculiar smell, heating, distortion or appear any abnormality, please stop using.
- If the battery leaks and get into the eyes or skin, do not wipe, instead, rinse it with clean water and see doctor immediately.
- Please far away from children or pets.