



DCX 12V7 Pro LiFePO₄ Battery System

Approved by	Checked by	Prepared by	Date
Jason Huang	Chris Ma	Maxine Zhu	2023NOV20

History of revisions

Edition	Checked by	Approved by	Date	Modification
A0	Chris Ma	Jason Huang	20231120	initial

Contents

1. Scope
2. Product Configuration
3. Product Dimension
4. Product Specification
5. PCM Specification
6. Storage and Transportation
7. Warning
8. Period of Warranty
9. Product responsibility
10. Others

1. Scope

This specification describes the design and development of the company's battery; it is the product of design, production and inspection basis. Its role is to understand the quality of the product and using the correct method for customers.

2. Product Configuration

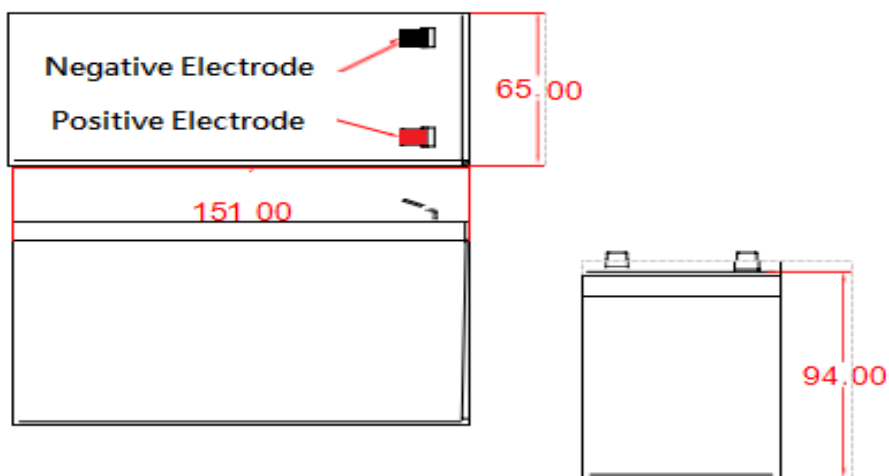
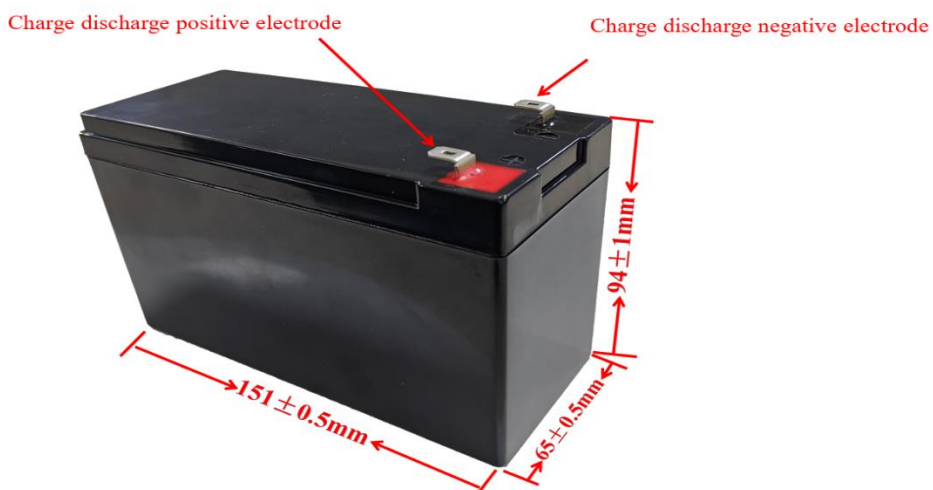
NO	Item	Criteria	Remark
1	Lithium-ion Battery Cell	TB	
2	PCM	PCM-F14.8V 30/150A	
3	Connector		

3. Product Dimension (L * W * H : 151 ± 0.5 * 65 ± 0.5 * 94 ± 1mm)

Length : 151 ± 0.5 mm

Width : 65 ± 0.5 mm

Height : 94 ± 1.0 mm



4. Product Specification

NO	Content	Testing method	Remark
1	Charge cut-off voltage	14.6V	
2	Discharge cut-off voltage	8.0V	
3	Standard charge	Under the condition of the ambient temperature of $25 \pm 2^{\circ}\text{C}$, Charge the battery at constant current of 0.2C to reach 14.6V. Then charge the battery at constant 14.6V voltage until the charging current decreasing to 0.02C.	
4	Standard discharge	After the standard charging, rest for hour then discharge to 8.0V@0.2C.	
5	Shipments voltage	12.6 ~ 13.2V	Capacity $\leq 30\%$
6	Maximum charge current	$\leq 30\text{A}$ Table 1 for charge conditions	Fast charge will reduce battery life. Charge must strictly follow the parameters in the table, otherwise it will shorten battery life much faster
7	Maximum continuous discharge current	$\leq 30\text{A}$	Disconnect when the surface temperature of the cells exceeds 70°C
8	Capacity	Typical capacity : 5880mAh Minimum capacity : 5586mAh	By Std. charge/discharge
9	Operation temperature range	Charge : $-40 \sim 60^{\circ}\text{C}$ Discharge : $-20 \sim 60^{\circ}\text{C}$	$60 \pm 25\% \text{R.H}$
10	Storage temperature	$-20 \sim 45^{\circ}\text{C}$ (≤ 1 month) $-10 \sim 30^{\circ}\text{C}$ (≤ 3 months) $0 \sim 30^{\circ}\text{C}$ (≤ 1 year)	$60 \pm 25\% \text{R.H}$ Best $10 \sim 25^{\circ}\text{C}$ for long-time storage
11	Impedance	$< 30\text{m}\Omega$	
12	Weight	Approx : $850 \pm 50\text{g}$	
13	Series and parallel function	Supports up to 4 strings and 10 parallels	
14	Reliability test	Design to conform UL1973, IEC62133 , UN38.3	

4.1 Table.1

Temperature (°C)	Current (A)	Cut-off voltage (V)	Temperature (°C)	Current (A)	Cut-off voltage (V)
60	1.5	14.2	10	30	14.6
55	3	14.2	5	20	14.6
50	6	14.2	0	6	14.6
45	10	14.2	-10	3	14.4
40	30	14.6	-20	1.5	14.4
30	30	14.6	-30	0.6	14.4
20	30	14.6	-40	0.2	14.4

5. Product Electric Performance Test

No.	Items	Test Conditions	Requirements
1	Cell Capability of Keeping electricity	Fully charge, store at $(20 \pm 5)^{\circ}\text{C}$ for 28 days, then discharge to $8.0\text{V}@0.2\text{C}$ (the residual capacity is above 85% of nominal capacity)	Discharge time $\geq 4.25\text{h}$
2	Cycle Life@ 25°C	Discharge to $8.0\text{V}@1\text{C}$, then charge the battery @ 1C to reach 14.6V . Then charge the battery at constant 14.6V voltage until the charge current decrease to 0.02C . Rest for 10min. Discharge to $8.0\text{V}@1\text{C}$ and rest for 10min. Continue the charge/discharge cycles until discharge capacity lower than 80% of rated capacity.	Cycles life ≥ 1000
3	Cell energy storage performance	Charge the battery to 20% ~ 50% of its rated capacity using standard charge mode, then keep it in a $20 \pm 5^{\circ}\text{C}$, humidity 45% ~ 85% room for 12 months, fully charge and discharge it @ 0.2C until voltage down to 8.0V . (The testing sample should be within 3months dated from production date)	Discharge time $\geq 4\text{h}$

6. PCM Specification

Item	Content	Criterion
Overcharge protection	Over charge detection voltage	3650 ± 50mV
	Detection delay time	1000 ± 500mS
	Over charge release voltage	3500 ± 50mV
Over discharge protection	Over discharge detection voltage	2000 ± 100mV
	Detection delay time	1000 ± 550mS
	Over discharge release voltage	2800 ± 100mV
	Release conditions of over discharge protection	Charge or cut load
Discharge Over-Current	Over-Current discharge protection 1	40 ± 4A
	Over-Current protection 1 delay time	2000 ± 250mS
	Over-Current discharge protection 2	120 ± 8A
	Over-Current protection 2 delay time	300 ± 50mS
	Over-Current protection 1/2 release	Charge or cut load
Short circuit protection	Short circuit discharge protection	> 240A
	Short circuit protection delay time	250 ± 100uS
	Short circuit protection release	Cut load
Temperature protection	Protection temperature	70 ± 5°C
Internal resistance PCB	Protection plate line resistance	≤ 30mΩ
Current consumption	Current consumption in normal operation	≤ 80μA (not include consumption of power switch and LCD power display)
NTC	10K (R= 10K±1% @25°C B=3435K±1%@25/85°C)	
Instrument voltage error		± 0.005V

7. Storage and Transportation

(1) Storage

- ① The Li-ion battery pack should be stored in a cool, dry and well ventilated area avoiding exposure to heat and high temperatures. Do not place the battery in direct sunlight or heat.
- ② The battery should be stored in accordance with the manufacturer 's specifications. Ideally, a temperature of 25 ± 5 ° C and humidity of $60 \pm 15\%$ is recommended.。
- ③ The battery should be stored within the recommended room temperatures with a charge of 20% - 40% of rated capacity. In order to avoid over-discharge, we suggest charging and discharging the batteries every three (3) months, then charge to 20% - 40% of rated capacity.

(2) Transportation

- ① Do not mix the battery products with other cargos.
- ② Do not immerse the battery products in water or allow it to get wet.
- ③ Do not stack battery cartons over 7 high or stack upside down.
- ④ The highest temperature in transportation is lower than 65°C .

8. Warning

- (1) Use proper Electrostatic Discharge (ESD) handling methods to avoid damaging the battery. Exposure to ESD may damage the battery protection devices which may lead to overheating, rupture, explosion and fire.
- (2) In the normal use of the following conditions, otherwise they will overheat and catch fire, performance and shorten the life.
Ambient condition: (Temperature)
Charge : $-40 \sim +60^{\circ}\text{C}$
Discharge : $-20 \sim +60^{\circ}\text{C}$
- (3) Batteries should be handled by qualified personnel only to avoid injuries or property damage. Keep the battery away from children and pets.
- (4) Avoid contact with leaking batteries as electrolytes may cause burns to skin and damage to clothing. In the event electrolytes make contact, wash effected areas with water and seek medical attention if necessary.
- (5) In order to avoid damage to the battery and devices, carefully read and understand the operating instructions for proper installation, use and removal of the battery in the device.



- (6) If the battery is not intended to be used for an extended period of time, remove the battery and store it in a cool dry place per the manufacturer 's specifications. This will prevent damage to the appliance while preserving the battery life and performance.
- (7) Ensure the battery connector contacts are clean and free of any contaminants to prevent damage to the battery and device. Use only approved cleaning products, such as a dry cloth, to clean surface and contacts.
- (8) Keep out of the reach of children , Do not allow children to replace batteries without adult supervision.

9. Period of Warranty

The warranty period is according to cycle life or 1 year from the date of delivery. If the damage caused by improper use is not caused by product quality problems, the manufacturer will not provide free services even within the warranty period.

10. Product responsibility

Must strictly adhere to our specifications and documentation comment later, due to the misuse of batteries can cause the battery to overheat, fire or explosion. For the specification for any accidental, I Secretary does not bear any responsibility.

If the specification, raw materials, production processes or production control system is changed, the change of information will vary depending on the quality and reliability data to inform consumers in writing.

11. Others

Because batteries utilize a chemical reaction, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, if the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage. If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate it is time to change the battery.