model	LF304	Specification No	RD-LF304-S01-LF	edition	A

Product delivery specification

Square aluminum-shell lithium-ion battery

Model number: LF 304

authorized strength	Product design review	quality audit	marketing audit	ratify
3/.S.2g				

Customer receiving bar

corporate name:

ratify:

date:

In May, 2021

Hubei Yiwei Power Co., LTD

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

Customer requirements

Ask customers to write their needs information and communicate with Yiwei Power in advance. If the customer has some special applications or operating conditions that are different from those described in this document, Yiwei Power can design and produce the product according to the special requirements of the customer.

customer code: ___ sign: _____ date: _____

order number	special requirements	standard
1		
2		
3		
4		
5		

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

Change the resume

edition	date	Change the content	Confirmation of the
A	2021.05.26	The first edition was released	He Meng

catalogue

model	LF304	Specification No	RDLF304-S01-LF	edition	A

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

Terms defined

Product: The "product" in this specification refers to the 304Ah rechargeable square aluminum shell lithium ion battery produced by Hubei Yiwei Power Co., LTD.

Customer: refers to the buyer in the Product Sales Contract of Hubei Yiwei Power Co., Ltd.

Ambient temperature: the ambient temperature of the battery.

Battery temperature: the temperature at the center of the large surface or side side measured by the temperature sensor connected to the battery.

Rate: the ratio of the charge / discharge current to the rated capacity value of the battery, indicated by the letter C. For example, the battery capacity is 304Ah, and when the charge or discharge current is 152A, the charge or discharge rate is 1 / 2Co

State of charge: the ratio of battery capacity state to rated capacity measured in ampere hour or watt hour with no load, abbreviated by SOC. For example, if the capacity is 304Ah, the state is 100% SOC, then the capacity is 0Ah, SOC is 0%.

Cycle: the battery is charged and discharged in one cycle according to the specified charging and discharging standard. The cycle includes a short period of normal charging or a combination of regenerative charging and discharge processes, during which there is sometimes only normal charging but no regenerative charging. A discharge can be formed by a combination of some partial discharges.

Standard Charging: the charging mode as described in Clause 3.5 of this specification.

Standard discharge: The discharge mode as described in Clause 3.6 of this specification.

Open circuit voltage: No voltage of the cell, abbreviated by SOC.

DC resistance: the ratio of the voltage change of the battery to the corresponding current change, abbreviated by DCR, test method as described in Article 3.83.8 of this specification.

Module: the intermediate product of battery and pack formed by lithium ion battery combined by series and parallel mode and installed with single battery monitoring and management device.

Pulse current: the recurrent current or voltage pulse is called pulse current, pulse current either in the same direction, or in the positive and negative alternating direction.

Compression force: the safety boundary that the battery can withstand the compression force when the module is assembled.

Test ■ unit: see the table below

order number	unit	write a Chinese character in simplified form	Unit type
1	The Volt (the Volt)	V	voltage unit
2	Ampere (Ampere)	A	unit of current
3	Ampere-Hours (Ampere-Hour)	Ah	volume unit
4	Watt-Hours (WatbHour)	Wh	energy unit
5	ohm (Ohm)	*Q*	unit of resistance
6	Milliohm (MilliOhm)	mQ	unit of resistance

7	Degree Celsius (degree Celsius)	℃	degree-day
8	Millimeter (millimeter)	mm	linear measure
9	Seconds (second)	s	hourly basis
10	Hertz (Hertz)	Hz	Frequency unit

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

1.essential information

1.1. scope of application

This product specification is applicable to the square aluminum shell lithium ion battery produced by Hubei Yiwei Power Co., LTD.

1.2. product type

Square aluminum-shell lithium-ion battery

1.3. product name

LF304

2.Battery specification parameters

2.1. Basic parameters of battery

project		standard	remarks
minimum capacity		304.0 Ah	1C , 25°C±2°C , 2.5-3.65V
least energy		972.0 Wh	1C , 25°C±2°C , 2.5-3.65V
Initial internal resistance		<0.5 mQ	AC , 1kHz , 30%T0%SOC
nominal voltage		3.2 V	0.5C , 25°C±2°C , 2.5-3.65V
Battery weight		5480 g± 164 g(±3%)	
Charge limit voltage (U_{niax})		3.65V	
Discharge cut-off voltage (Umin)		2.5V(T >0°C) 2.0V(T<0°C)	
Standard charging current		152.0A	0.5C
Standard discharge current		304.0A	1C
A 25V standard cycle		3500 Times	300 ± 20kgf clamping, 0.5C/1C,2.5∽3.65V, 280% capacity retention, or cycle as provided by EVE.
45. €: standard rating cycle		1800 Times	
working temperature	Charging	0-60°C	
	Discharge	·30∽609	
Storage temperature	In 1 year	0∽35°C	
	Three months	0-45°C	
	One month	-20-45°C	
Aluminum powder welding parame	Laser welding		
	The pole column	700N	The pole column bears the maximum
	The pole column	6Nm	The pole column the maximum distortion

	The pole column	130℃	The pole column bears the maximum temperature, and the plastic pad does not

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

2.2. Product specifications

2.2.1. Dimensions and weight index

order	project		standard	Section of test
1	size	altitude (H)	207.20±0.50mm	3.8.1
		Height (H1)	204.40±0.50mm	
		width (W)	173.70±0.50mm	
		thickness (T)	71.70±0.50mm (300kgf clamping force, 30%SOC ~40%SOC)	
2	weight	Weight (including blue film, top patch)	5480±164g(±3%)	3.8.2

2.2.2. Electrical performance index

order	project		standard	Section of test
1	capacity	1C capacity	>304.0Ah	3.83.2
2	energy	1C energy	>972.0Wh	3.83.2
3	Discharge performance	▪20. (: capacity retention ratio	>70%	3.83.3
		0。(?capacity retention ratio	>85%	3.83.4
		The 25V capacity retention rate	>100%	3.83.5
		45. (: capacity retention ratio	>97%	3.83.6
		55. (: capacity retention ratio	>95%	3.83.7
4	DCR	25°C , 50%SOC , 1C , lOsec	<1.2mQ	3.83.8
5	recurrence	25°C±2°C@O.5C / 1C cycle (3OOkgf clamping force) or follow the cycle mode provided	3,500 times, a capacity retention rate of 280%	3.8.3.9&3.8.3.11
		45°C±2°C@O.5C / 1C cycle (3OOkgf clamping force) or follow the cycle mode provided	1,800 times, capacity retention rate * 0%	3.8.3.10&3.8.3.11
6	The charge is maintained with Capacity recovery	25°C for 28 days	Capacity retention rate is 295%	3.8.3.12
			Capacity recovery rate of * 6%	
		45°C for 28 days	Capacity retention rate is N93%	3.8.3.13
			The recovery rate is 295%	
		55°C for 7 days	Capacity retention rate is N95%	3.8.3.14
			Capacity recovery rate is 296%	

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

2.2.3. Safety performance indicators

order number	project	standard	Section of test method
1	overdischarge	No fire, no explosion	3.8.4.1
2	over-charging	No fire, no explosion	3.8.4.2
3	crimp	No fire, no explosion	3.843
4	short	No fire, no explosion	3.8.4.4
5	heat	No fire, no explosion	3.8A5
6	temperature cycle	No fire, no explosion	3.846

2.3. Battery drawings

See the attached figure lo

2.4. surface

The battery shall be free of obvious abrasions, cracks, rust stains, discoloration, or electrolyte leakage that may affect the commercial value of the battery.

3. Test conditions

3.1. ambient condition

Unless otherwise specified, the test shall be conducted at a temperature of 25° C ± 2° C, relative humidity of 15% -90% RH, and atmospheric pressure of 86 kPa 106 kPa. The room temperature mentioned in this specification is 25° C ± 2° Co

3.2. measuring equipment

The accuracy of measuring instruments and instruments shall meet the following requirements:

(1) voltage measuring device: ± 0.1%;

(2) Current measuring device: ± 0.1%;

(3) temperature measuring device: ± 0.5.;

(4) Dimension measuring device: ± 0.01mm;

(5) Weight measuring device: ± 0.1 g0

3.3. Test fixture preparation

The single battery shall be fixed by steel plywood or aluminum alloy splint (thickness: 8mm) to cover the large surface of the battery with 6 M6 bolts between the plywood as shown in the figure below:

型号	LF304	规格书编号	RD-LF304-S01-LF	版本	A

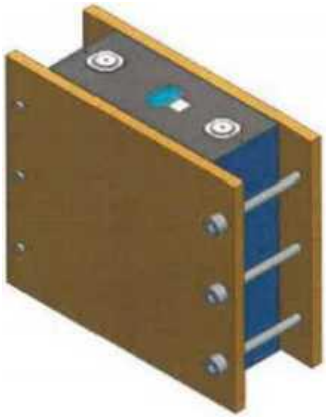
Schematic

Diagram of battery

3.4. Test fixture installation

Cover with blue film (material: PET, thickness 0.11mm) and top and bottom patch (material: PC, thickness (). The 3mm) battery (40% SOC) is ready, placed in the middle of the fixture, and the initial pretightening force of each bolt is 300kg to 20 kgf.

Schematic



Battery

3.5. Standard charging method

Standard charging is to charge the battery at a constant current of 152.0 A to 3.65 V at an ambient temperature of 25° C ± 2° C, and then transfer constant voltage at 3.65 V until the charging current is less than or equal to 15.2 A and shelved for 30min。

3.6. Standard discharge mode

Standard discharge is discharged at a constant current of 304.0 A at an ambient temperature of 25° C ± 2° C. Discharge to the voltage reaches a 2.5V cut-off,

Set aside at 30min。

3.7. Capacity calibration and energy calibration

The capacity calibration is to charge the battery at the ambient temperature of 25° C ± 25 ° C, and then

discharge according to 3.6 standard. Set aside at 30min。The standard charging mode and the standard discharge mode are repeated 5 times, and the average discharge capacity of the last three times is 1C discharge capacitor ■, and the discharge capacity is recorded as the calibrated capacity Co. The average discharge energy ■ of the last three times is the 1C discharge energy, and the discharge energy is recorded as the calibration energy Eoo

3.8, test method

3.8.1. size

Test equipment: automatic coating machine

experimental method:

a） Test the battery length, width, and height using an automatic envelope machine;

b） Battery thickness, test conditions: 30% 40% SOC, 300kg Shi 20kgf test.

* The battery thickness will increase with the increase of SOC, but will increase with the increase of use time. The thickness here indicates the thickness of the battery (30% -40% SOC at shipment) o

3.8.2. weight

Test equipment: electronic scale; Test method: Use the electronic scale to measure the weight of the battery.

3.8.3. Electric performance

3.8.3.】.0.5C, discharge capacity, and energy

At an ambient temperature of 25 ± 2° C, the battery is fully charged in the standard charging mode (3.5), and then a current of 0.5C is used to discharge the discharge capacity to 2.5V. The standard charging mode and the discharge mode of 0.5C are repeated for 5 times. When the extreme difference of the results of three consecutive tests is less than 3% of the rated capacity, the test can be finished in advance. The average discharge capacity of the last three times is 0.5C discharge capacity, and the average discharge energy of the last three times is 0.5C discharge energy.

3.83.2. 1C for the discharge capacity and energy

At the ambient temperature of 25° C ± 2° C, the battery is fully charged in the standard charging mode (3.5), then the current of 304.0A, shelved for 30min, and the discharge capacity and discharge energy are recorded. The above charge and discharge is repeated for 5 times. When the extreme difference of three consecutive tests is less than 3% of the rated capacity, the test can be finished in advance. The average discharge capacity of the last three times is the IC discharge capacity, and the average discharge energy of the last three times is 1C discharge energy.

3.8.33. -20°C, capacity retention rate

Capacity calibration (3.7) at ambient temperature of 25° C ± 2° C (C. m.). The battery is fully charged according to the standard charging mode (3.5), and then put aside for 24 h in-20° C ± 2° C, under-20 ± 2° C with a current of 304.0 A to 2.0 V, record the discharge capacitor G, G / Co is the capacity retention rate of-20.

3.8.34 0°C capacity retention rate

Capacity calibration (3.7) at ambient temperature of 25° C ± 2° C (C. m.). Charge the battery in standard charging mode (3.5) and then at 0 ± 2. (? In the context of setting aside for 24h, in ()± 2.. The current of 304.0A is discharged to 2.0V, and the discharge capacity C is recorded$_2$, C2 / C0 is the (TC capacity retention rate.

3.83.5. 25P Capacity retention rate

The battery is capacity calibrated (3.7) at an ambient temperature of 25° C ±. 2° C. The battery is fully charged according to the standard charging mode (3.5) and shelved

For 0.5 h, the current of 304.0 A was discharged to 2.5 V at 25°C of ± 2°C, and the discharge capacity C was recorded$_3$, C3 / C0 is the 25V capacity retention rate.

3.8.3.6.45。。capacity retention ratio

The battery is capacity calibrated (3.7) at an ambient temperature of 25° C ±. 2° C. The battery is fully charged according to the standard charging mode (3.5), then shelved at 45° C ± 2° C for 5h, and discharge constant current of 304.0A to 2.5 V at 45° C ± 2° C, recording the discharge capacity C_4,C_4/C_0That is, for the 45. (?capacity retention ratio.

383.7. 55。。capacity retention ratio

At the ambient temperature of 25° C ± 2° C, the battery (3.7) o fully charged the battery according to the standard charging mode (3.5), then shelved for 5h at 55° C ± 2° C, discharge with the current of 304.0A to 2.5 V at 55° C ± 2° C, record the discharge capacity C_5. CJ / CQ IS THEN CALLED 55. (7 CAPACITY RETENTION RATE.

3.83.8. internal resistance

a ）At the ambient temperature of 25° C ± 2° C, the frequency of AC 1kHz was tested and measured as ACR.

b ） At ambient temperature 25° C ± 2° C, calibrate the battery (3.7), then charge in standard charging mode (3.5) and then 1 / 3C_OThe current constant discharge for 30min (adjusted SOC to 50%) for 2h, record the shelved end voltage V, and then discharge the current constant 304.0A for 10s, record the discharge end voltage V_2, Calculate the DCR.DCR=（V|-V_2）*1000/304.0 mQ_0

3.8.39 25°C, the standard cycle

Before the test, prepare the clamp according to 3.3. At 30% T 0% SOC at room temperature, install the test clamp according to the 3.4 method.

Pre-cycle capacity test: discharge the battery at an ambient temperature of 25° C ± 2° C with constant current at 304 A to 2.5 V, rest for 30 min, then charge with constant current at 3.65 V, charge to cut-off current at 15.2A, hold for 30min and then discharge to 2.5 V at 304 A, record the discharge capacity C6.

Cycle test: ambient temperature 25° C ± 2° C;

a. The battery is charged to 152 A constant current to 3.65 V and then charged to constant voltage to 15.2A, and shelved for 30 min;

b. 304 A to 2.5 V, 30 min;

c. Repeat the a-b cycles.

Post-cycle capacity test: discharge the battery at the ambient temperature of 25° C ± 2° C with the current of 2.5 V, shelved for 30 min, then charge with the current of 3.65 V, turn constant to the cut-off current of 15.2A, shelved for 30min, then discharge the current of 304 A at the current of 304 A, and the discharge capacity C is recorded.5 $_7$, Capacity retention rate =C_7/C_6xl00%$_o$

3.8.3.10.45。。standard rating cycle

Before testing, prepare the fixture according to 3.3, at 30% 70% SOC elbow and install the method of

3.4.

Pre-cycle capacity test: at 25° C ± 2° C, the current at 2.5 V, shelved for 30 min, then charged to 3.65 V, charged to current at 15.2 A, shelved for 30min, and then discharged to 2.5 V at 304 A, record the discharge capacity Cg

Cycle test: ambient temperature: 45° C ± 2° C;

a. The battery is charged to 152 A constant current to 3.65 V and then charged to constant voltage to 15.2A, and shelved for 30 min;

b. 304 A to 2.5 V, 30 min;

c. repeat a-bo

The cycle back capacity is a test: discharge the battery at an ambient temperature of 25° C ± 2° C at a current of 304 A to 2.5 V, hold for 30 min, then charge a current to 3.65 V, stop current to 15.2 A, hold for 30min, and then discharge to 2.5 V at 304 A to record the discharge capacitor plate C_9, Capacity retention rate =C9 / C_8xl00%。

3.8.3.11. The EVE recommends the cycle mode

Prepare the fixture according to 3.3 before testing. At 30% 70%% SOC, install the test fixture according to the 3.4 method.

25。(? Step by step charging cycle step:

a. At the ambient temperature of 25°C ± 2°C, 200 kg, discharge to 2.5V with 304 A current, hold for 30min, charge to 250 A constant current constant pressure to 3.65V, cut-off current 0.05C, cycle for 5 weeks, when the extreme difference of 3 consecutive tests is less than 3% of the rated capacity, the test can be finished in advance, take the average value of the last 3 tests as the initial capacity Q;

b. Ambient temperature 25°C ± 2°C, 300kgf £20 kgf lower step charging cycle;

c. 1C (initial] C=250A) Constant current charge to X0% * Q;

d. 0.8C (initial 1C=25OA) Constant current charging to 3.5V;

e. 0.5C (initial 1C=25OA) constant current charging to 3.6V;

f. 0.1C (initial 1C=25OA) Constant current charging to 3.65V;

g. Hold 30min in open circuit state, discharge to 2.5V at 304A, and hold 30min;

h. Repeat steps c to g, when the circulation volume retention rate decreases by 5%, the 1C current value is adjusted to 1C * (1-5% * n), n= 1, 23, 4...; Ensure that the charging time reduced by 5% is consistent. For the specific steps, see the corresponding charge and discharge current meter of the step charging cycle;

i. Stop c ch cycle until discharge capacity is less than X ()% of rated capacity.

45。(? Step by step charging cycle step:

a. At the ambient temperature of 25° C ± 2° C, 300kg shi 20kgf, discharge to 2.5V with 304 A current, hold for 30min, charge to 250 A constant current constant pressure to 3.65V, cut-off current 0.05C, cycle for 5 weeks, when the result difference of 3 consecutive tests is less than 3% of the rated capacity, the test can be finished in advance, take the average value of the last 3 tests as the initial capacity Q;

b. Ambient temperature 45°C ± 2°C, 300kg shi 20 kgf lower step charging cycle;

c. 1C (initial 1C=25OA) Constant current charge to 80% * Q;

d. 0.8C (initial 1C=250A) Constant current charging to 3.5V;

e. 0.5C (initial IC=250A) Constant current charging to 3.6V;

f. 0.1C (initial 1C=25OA) Constant current charging to 3.65V;

g. Hold 30min in open circuit state, discharge to 2.5V at 304A, and hold 30min;

h. Repeat steps c to g, for the decay of 5%, the 1C current value is adjusted to 1C * (1-5% * n), n=1, 2,3,4...; Ensure that the charging time of each 5% attenuation is consistent. For the specific steps, see the corresponding charge and discharge current meter of the step charging cycle;

i. Step c-h until the discharge capacity is at least 80% of the rated capacity.

Step charging cycle corresponds to the charging current meter (initial 1C=250A)

project	Current / capacity	100% SOH current	95% SOH current	90%SOH current	85%SOH current	80% SOH current
charging current (A)	1C(A)	250	250	250	250	243.2
	0.8C(A)	200	200	200	200	194.6
	0.5C(A)	125	125	125	125	121.6
	0.1C(A)	25	25	25	25	24.3
discharge current (A)	1C(A)	304	304	304	304	304
1C constant current charge to	Calibration capacity Q	80%Q	76%Q	72%Q	68%Q	64%Q

3.8.3.12. 25。（? Charge retention along with capacity recovery

At an ambient temperature of 25° C ± 2° C, the battery is calibrated (3.7), then charged according to standard charging mode (3.5), then suspended for 28 days at 25° C ± 2° C, then 25° C ± 2° C with standard discharge (3.6), then charging according to quasi-charging mode (3.5) with standard discharge mode (3.6) (record discharge capacity Cn) o capacity holding rate =C_{10}/C_0% xlOO, capacity recovery rate =C_{11}/C_0xlOO%o

3.8.3.13. 45. (: Charge retention and capacity recovery

At ambient temperature of 25° C ± 2° C, the battery is calibrated (3.7), then charged in standard charging mode (3.5), then hold at ambient temperature of 45° C ± 2° C for 28 days, then hold for 5 h at ambient temperature of 25° C ± 25 ° C, and then discharge in standard discharging mode (3.6) (record discharge capacitor fiC_{10}), Then according to the quasi charging mode (3.5) after charging with standard discharge mode (3.6) discharge (record discharge capacitor fiCu) o capacity retention rate =C |$_2/C_o$% xlOO, capacity recovery rate =C_{15}/C_0xlOO%o

3.8.3.14. 55。€? Charge retention along with capacity recovery

At an ambient temperature of 25° C ± 2° C, the battery is calibrated (3.7), then charged for standard charging mode (3.5), then hold at ambient temperature of 55° C ± 2° C for 7 days, then set for ambient temperature of 25° C ± 2° C for 5 h, then discharge in standard discharging mode (3.6) (record discharge capacitor fiC_{I2}), Then discharge in the standard discharge mode (3.6) after charging (3.5) (record the discharge capacitor BC_{13}) O. Capacity retention rate =C_{I4}/C_o% xlOO, capacity recovery rate =C_{I5}/C_0xlOO%o

3.8.4. Safety performance

3.841. Over-discharge

At an ambient temperature of 25° C ± 2° C, fully charge the battery as per the standard charging mode (3.5) and install the test fixture as per 3.4. The battery was observed at 230A and constant current discharge 90 min for 1 h.(Refer to GB 38031-2020 Battery Safety Requirements for Electric Vehicles)

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

3.8.4.2. Overcharging

The Xt battery is fully charged at ambient temperature of 25° C ± 2° C per standard charging mode (3.5) and the test fixture is installed per 3.4. Stop charging the battery after charging at 1 / 3C (A) constant current to 1.1 times the termination voltage or 115%SOC. Observation 1 ho (refer to GB 38031-2020 Battery Safety Requirements for Electric Vehicles)

3.843. External short circuit

At an ambient temperature of 25° C ± 2° C, fully charge the battery in the standard charging mode (3.5) and then install the test fixture in the method of 3.4. In the safety test ambient temperature, observe the positive and negative electrodes of the battery through the external short circuit for 10 min, and the resistance value of the external line should be less than 5 mQo for 1 h. (Refer to GB 38031-2020 Battery Safety Requirements for Electric Vehicles)

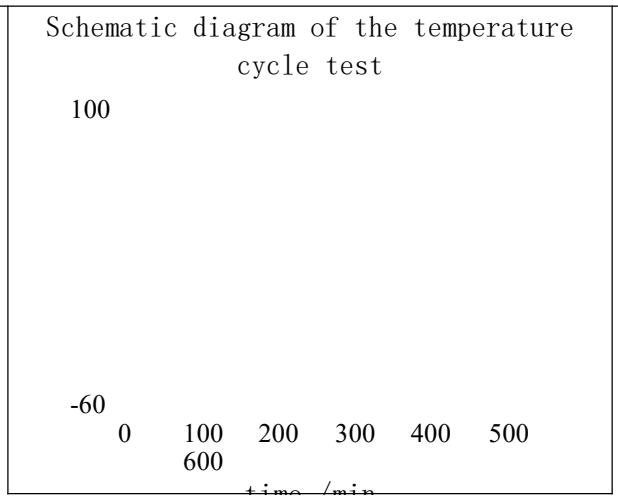
3.8.44 Force heat (130°C)

At an ambient temperature of 25° C ± 2° C, fully charge the battery in the standard charging mode (3.5) and then install the test fixture in the method of 3.4. Place the battery into a temperature chamber, rising from room temperature to 130 at a rate of 5 ° C/min.02 Yi, and maintain this temperature for 30min to stop heating. observe $1h_o$(Refer to GB 38031-2020 Battery Safety Requirements for Electric Vehicles)

3.8.4.5. Temperature cycle

At an ambient temperature of 25° C ± 2° C, fully charge the battery in the standard charging mode (3.5) and then install the test fixture in the method of 3.4. Put the battery into the temperature box, adjust the temperature box according to the following table and the following figure, and the cycle times are 5 times.(Refer to GB 38031-2020 Battery Safety Requirements for Electric Vehicles)

temperature (.0	Time increase (min)	Cumulative time (min)	Rate of Temperature Change (° C/min)
25	0	0	0
-40	60	60	13/12
-40	90	150	0
25	60	210	13/12
85	90	300	2/3
85	110	410	0
25	70	480	6/7


Schematic diagram of the temperature cycle test
100
-60
0
100
200
300
400
500
600
time /min

3.846. The extrusion

Fully charge the battery according to the standard charging mode (3.5) at an ambient temperature of 25 ± 5 ° C. Test at the safe test ambient temperature of 25 ± 5° C under the following conditions:

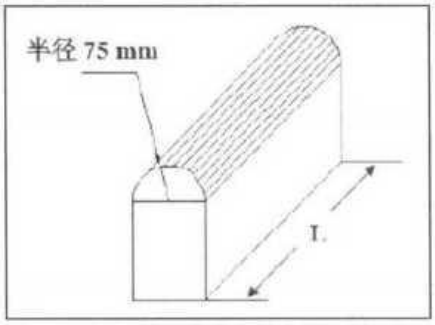
a) Extrusion direction: pressure perpendicular to the cell plate, or the same direction as the battery

b) plate that is most vulnerable to extrusion in the vehicle layout; extrusion plate form: half cylinder

c) with a radius of 75mm, the length (L) of the half cylinder is greater than the size of the squeezed

d) cell (as shown in the figure below); extrusion speed: not more than 2mm / s;

e) Extrusion degree: stop extrusion after voltage reaches 0V or deformation amount reaches 15% or squeeze



4. Charge and discharge parameters

The following data are the reference performance data of LF 304 battery for reference in BMS design. The actual use shall be subject to the use mode and conditions agreed by both parties.

4.1. Charging mode

parameter	size of product	condition
Standard charging current	0.5C	25°C±2°C
Maximum charge-sustainable	1C	25°C±2°C
Standard charging voltage	Single-cell cell 33.65V	
Standard charging mode	Refer to Section 3.5	
Standard charging temperature	25°C±2°C	
Absolute charging temperature (battery temperature)	0 ∽6(rc	Regardless of the charging mode of the battery, the battery temperature stops charging beyond the
Absolute charging voltage	Maximum of 3.85V	Regardless of what charging mode the battery is in, stop charging once the battery voltage exceeds the

4.2. Other charging modes

Maximum continuous charge rate / C unit:Grate										
SOC\T	o°c	2°C	5°C	7°C	10°C	25°C	45°C	55°C	60°C	65°C
0%	0	0.2	0.4	0.4	0.8	1	1	1	1	0

model	LF304	Specification No	RD-LF304-S01-LF					edition	A
5%	0	0.2	0.4	0.4	0.8	1	1	1	1	0
10%	0	0.1	0.2	0.2	0.6	1	1	1	1	0
20%	0	0.1	0.2	0.2	0.6	1	1	1	1	0
30%	0	0.1	0.2	0.2	0.6	0.8	1	1	1	0
40%	0	0.1	0.2	0.2	0.6	0.8	1	1	1	0
50%	0	0.1	0.2	0.2	0.4	0.8	1	1	\	0
60%	0	0.1	0.2	0.2	0.4	0.6	1	1	1	0
70%	0	0.1	0.2	0.2	0.4	0.6	1	1	1	0
80%	0	0.1	0.2	0.2	0.2	0.6	1	1	1	0
90%	0	0.06	0.12	0.12	0.2	0.4	0.8	0.8	0.8	0
95%	0	0.06	0.12	0.12	0.12	0.2	0.4	0.4	0.4	0
100%	0	0	0	0	0	0	0	0	0	0

43. The discharge mode

parameter	size of product	condition
Standard discharge current	1C	25°C±2°C
Maximum discharge sustainable current	1C	25°C±2°C
Therefore, the power cut-off voltage	2.5V	temperature 1'>0°C
	2.0V	temperature T<0°C
Standard discharge mode	Refer to Section 3.6	
Standard discharge temperature	25°C±2°C	
Absolute discharge temperature (battery temperature)	-35-65°C	Regardless of the charging mode of the battery, the battery temperature stops charging beyond the
Absolute discharge voltage	minimum I.75V	Regardless of what charging mode the battery is in, charging is stopped once the battery voltage is

4.4. Other discharge modes

	Persistent discharge rate / C										Unit: C-rate
SOC\ T	-35°C	-30°C	-20°C	-IO°C	0°C	10°C	25°C	45°C	55°C	60°C	65°C
100%	0	0.25	0.5	0.5	1	1	1	1	1	1	0
95%	0	0.25	0.5	0.5	1	1	1	1	1	1	0
90%	0	0.25	0.5	0.5	1	1	1	1	1	1	0
80%	0	0.25	0.5	0.5	1	1	1	1	1	1	0
70%	0	0.25	0.5	0.5	1	1	1	1	1	1	0
60%	0	0.25	0.5	0.5	1	1	1	1	1	1	0

model	LF304	Specification No	RD-LF304-S01-LF					edition		A
50%	0	0.25	0.5	0.5	1	1	1	1	1	0
40%	0	0.25	0.5	0.5	1	1	1	1	1	0
30%	0	0.25	0.5	0.5	1	1	1	1	1	0
20%	0	0.12	0.25	0.5	1	1	1	1	1	0
10%	0	0.06	0.12	0.3	0.5	0.5	0.8	0.8	0.8	0
5%	0	0.03	0.06	0.15	0.3	0.3	0.4	0.4	0.4	0
0%	0	0	0	0	0	0	0	0	0	0

4.5. Pulse mode

4.5.1. Pulse discharge mode

60s pulse discharge rate / C										Unit: C-rate	
SOC\T	-35°C	-30°C	-20°C	-10°C	0°C	10°C	25°C	45°C	55°C	60°C	65°C
100%	0.8	1.6	2	2	2	2	2	2	2	2	0
95%	0.8	1.6	2	2	2	2	2	2	2	2	0
90%	0.8	1.6	2	2	2	2	2	2	2	2	0
80%	0.8	1.6	2	2	2	2	2	2	2	2	0
70%	0.8	1.6	2	2	2	2	2	2	2	2	0
60%	0.8	1.6	2	2	2	2	2	2	2	2	0
50%	0.4	0.8	2	2	2	2	2	2	2	2	0
40%	0.4	0.8	1.6	2	2	2	2	2	2	2	0
30%	0.2	0.4	0.4	2	2	2	2	2	2	2	0
20%	0.1	0.25	0.25	0.8	2	2	2	2	2	2	0
10%	0.1	0.25	0.25	0.25	1.6	2	2	2	2	2	0
5%	0.05	0.15	0.15	0.15	0.8	1	1	1	1	1	0
0%	0	0	0	0	0	0	0	0	0	0	0

4.5.2. Pulse return mode

60s pulse charge rate / C									Bit: Crate	
SOC\T	-10°C	-5°C	o°c	5°C	10°C	25°C	45°C	55°C	60°C	65°C
0%	0	0.1	0.2	0.8	J .6	2	2	2	2	0
5%	0	0.1	0.2	0.8	1.6	2	2	2	2	0
10%	0	0.1	0.2	0.4	1.2	2	2	2	2	0
20%	0	0.1	0.2	0.4	1.2	2	2	2	2	0
30%	0	0.1	0.2	0.4	1.2	1.6	2	2	2	0
40%	0	0.1	0.2	0.4	1.2	1.6	2	2	2	0
50%	0	0.1	0.2	0.4	0.8	1.6	2	2	2	0
60%	0	0.1	0.2	0.4	0.8	1.2	2	2	2	0
70%	0	0.1	0.2	0.4	0.8	1.2	2	2	2	0

model	LF304	Specification No	RD-LF304-S01-LF					edition	A
80%	0	0.1	0.2	0.4	0.4	1.2	2	2	2	0
90%	0	0.05	0.1	0.25	0.4	0.8	1.6	1.6	1.6	0
95%	0	0.05	0.1	0.25	0.25	0.4	0.8	0.8	0.8	0
100%	0	0	0	0	0	0	0	0	0	0

5 . Security restrictions

5.1, Voltage limit

project	class	parameter	Protect the action
charging voltage	Charging termination	3.85V	Forced stop
	First-stage overcharge protection	3.80 V	Forecast police
	Second level of overcharge protection	3.85 V	Reduce or reduce power
discharge voltage	discharge off	1.85V	Temperature T> 0°C was forced to stop
		1.75V	Temperature T <0°C was forced to stop

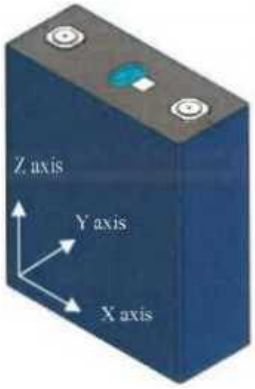
5.2. Temperature limit

project	numeric value	remarks
Recommended operating temperature range	1075。。	Battery temperature range is recommended.
maximum allowable operating temperature	60°C	If the battery service temperature exceeds the maximum operating temperature, the power needs to be reduced
Minimum operating temperature	·30°C	If the battery use temperature exceeds the minimum operating temperature, the power needs to be reduced
Maximum safety temperature	65°C	If the battery use temperature exceeds the maximum safety temperature, it will cause irreversible
Minimum safety temperature	-35°C	If the battery use temperature exceeds the minimum safe temperature, it will cause irreversible permanent

model	LF304	Specification No	RD-LF304-S01-LF	edition	A

6. Suggestions on module design parameters

6.1. Battery direction



6.2. Battery compression force

During the module assembly, the battery can withstand the safety boundary of the compression force.

test condition:

-Compressed area: l73.7mmx204.4mm (LxHI)

-Compression speed: 0.02 mm/sec

-Compression direction: Y direction

-Battery SOC: 100%

phenomenon	compressive force
Internal defects	30kN
weeping	> 100kN

As can be seen from the above table, the compression force of the battery should not exceed 30 kN, otherwise the battery may be damaged.

6.3, Battery expansion force

6.3.1. Test conditions:

Prepare the clamp according to 3.3 before the test, and install the expansion force test clamp at 40% SOC according to the 3.4 method.

At room temperature

-Charging: 152 A constant current and constant voltage charging to 3.65 V, cut-off current 15.2A(0.05C), put on hold for 30 min.-Discharge: 304 A constant discharge to 2.5 V, 30 min。

Record the battery expansion force before and after the cycle under charging and discharge conditions to X0% of the initial capacity ■.

6.3.2. Test results:

expansibility	BOL	$3kN

	EOL	，30kN

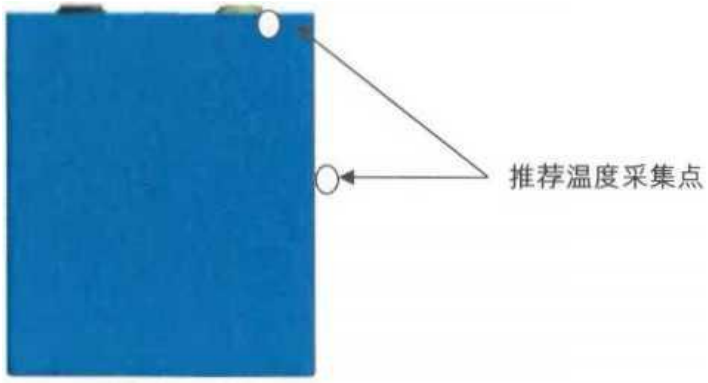
6.4. Thermodynamic parameters

Test method: Reference standard: GBfT 10295-2008. ASTM El269-2011

Mean of thermal conductivity	Thermal conductivity (W / mK)	
	X/Z direction	Y direction
	18∽20 W/mK	1 ∽2 W/mK
Mean heat capacity	Heat capacity (kJ / (kgK))	
	0.9-1.2	

6.5, Recommended temperature acquisition point

When collecting the temperature on the battery surface, it is recommended that the temperature acquisition point be arranged at the positive electrode column and the side center, as shown in the figure below.



7. Battery operating instructions and>

7.1. Product end of life management

The battery service life is limited, and the customer should establish an effective tracking system to monitor and record the internal resistance and capacity of the battery during each service life. The measurement and calculation methods of internal resistance and capacity require the discussion and agreement between the customer and Hubei Yiwei Power Co., Ltd. When the internal resistance of the used battery exceeds 150% of the initial internal resistance of this battery or less than 70% of the nominal capacity, the battery shall be stopped. Any violation of this requirement will exempt Hubei Yiwei Power Co., Ltd. from the product quality assurance liability according to the Product Sales Agreement and this Specification.

7.2. long term storage

After the battery is charged, it should be used as soon as possible to avoid the loss of available capacity due to self-discharge. If storage is required, the battery needs to be stored in a low SOC state. The recommended storage conditions are: 40% ± 10% SOC, 0-35° C, relative humidity <60%o

7.3. transport

Transportation of the product shall be cated at 30% 50% SOC. Prevent violent vibration, shock, extrusion and sun and rain during transportation. Suitable for car, train, ship, aircraft and other transportation.

74 Operation instructions

Do not the battery in water. When stored in use, it should be placed in a cool and dry environment.

model LF304 Specification No RD-LF304-S01-LF

It is forbidden to put the battery next to the hot and high temperature source, such as fire, heater, etc.

Please choose a special charger for lithium-ion battery when charging.

In the process of use, it is strictly prohibited to reverse the positive and negative poles of the battery.

Do not throw the battery on the fire or heat it.

It is forbidden to direct the positive and negative electrodes of the battery.

Do not transport or store batteries together with metal, such as hairpins, necklaces, etc.

Do not knocking or throwing, trampling, and bending batteries.

Direct battery welding is prohibited.

Do not puncture the battery with nails or other sharp tools.

Do not use batteries in extremely hot environments, such as direct sunlight or in hot cars.

Use in places with strong static electricity and strong magnetic field are prohibited.

If the battery leaks and the electrolyte splashes onto the skin or clothing, the affected area should be cleaned immediately, with flowing water.

If the battery appears odor, heat, discoloration, deformation or use, storage, charging in the process of any abnormal shall not be used.

7.5. disclaimer

If the product demand unit is not used according to the provisions in this manual, which causes social impact and affects the reputation of Hubei Yiwei Power Co., Ltd., Hubei Yiwei Power Co., Ltd. will investigate the responsibility of the product demand unit. According to the degree of the impact on Hubei Yiwei Power Co., LTD. The product demand unit shall provide compensation to Hubei Yiwei Power Co., Ltd.

7.6, else

Any matters not mentioned in this specification shall be determined by both parties through negotiation.

8. contact way

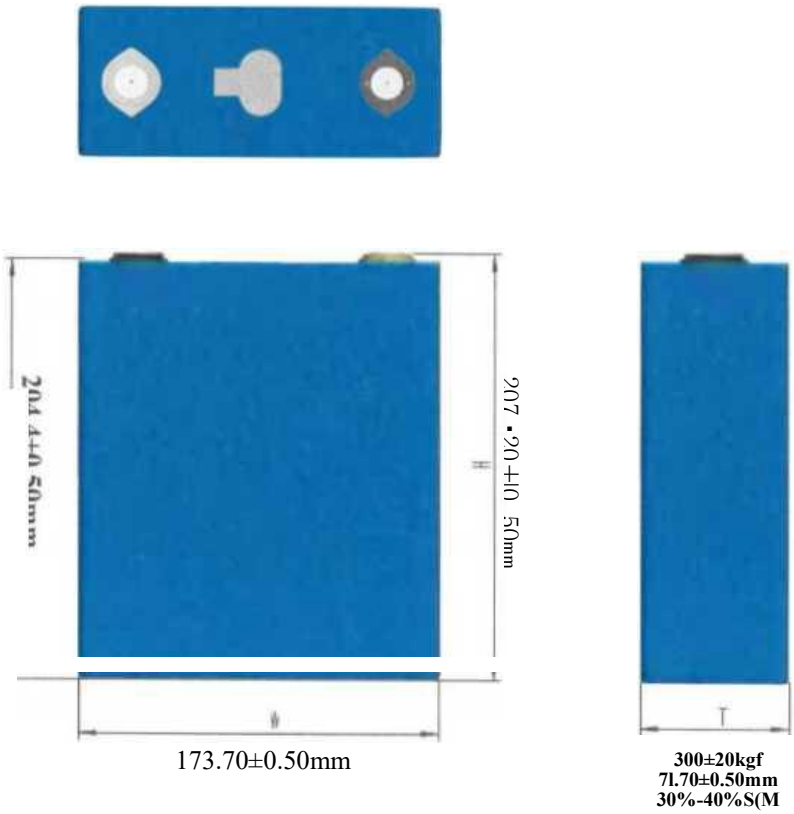
Address: No.68, Jingnan Avenue, High-tech Zone, Jingmen Economic Development Zone, Jingmen City, Hubei Province. Tel: 86-0724-6079699

Fax: 86-0724-6079688

Website: htm: "www".evcpower.com

9. LF 304 battery drawing

model	LF304	Specification No	RD-LF304-S01-LF	edition	A



The LF 304 battery