Lithium iron Phosphate Battery

Specification

LL-12V75-24 (12.8V 75Ah)

Prepared By/Date	Checked By/Date	Approved By/Date

Customer Approval	**Signature/Date**
	Company Name
	Company Stamp

Amendment Records				
Edition	Description	Prepared by	Approved by	Date
A0	Draft	Yadong Qin		2019-11-13

1. Scope

This specification is applied to the LiFePO4 battery pack distributed by Lifeine Batteries, Inc. There is a built-in BMS against over charge, discharge, current, temperature and short-circuit. Free smartphone app available to read battery information via Bluetooth.

2. Specification

No.	Item	General Parameter	Remark
1	Rated Capacity	76Ah	Standard discharge (0.2C) to 10V after standard charge (0.2C) to 14.6V
2	Minimal Capacity	75Ah	
3	Nominal Voltage	12.8V	
4	Life Expectation	Residual capacity is more than 60% of the rated capacity	1) Charge: CC@0.2C to 14.6V, then CV till current to 0.05C 2) Rest: 30min. 3) Discharge: 0.2C to 10.0V Temperature:20±5℃
5	Discharge cut-off voltage	2.0V/cell （≥8.0V）	10.0V recommended
6	Charging cut-off voltage	3.9V/cell （≤15.6V）	14.6V recommended
7	Assembly method	IFR26650EC-3.6AH	4S22P (FYI)
8	Housing material	ABS	
9	Standard charge	0.2C constant current (CC) charge to 14.6V,then constant voltage (CV) 14.6V charge till charge current decline to ≤ 0.05C	Charge time : Approx 7.0h

10	Standard discharge	Constant current 0.2C Cut-off voltage 10.0V	
11	Maximum Charge Current	75A@20℃	
12	Maximum Discharge Current	80A@20℃	
13	Operation Temperature Range	Charge: 0~45℃	60±25%R.H. 23 ± 5°C (recommended)
		Discharge: -20~60℃	
14	Storage Temperature Range	Less than 1 year: 0~25℃	60±25%R.H. at the shipment state
		Less than 3 months:-5~35℃	
15	Approx. Weight	9.6Kg (21.2 lbs)	
16	Max. Dimension	L260*W168*H218mm (Group 24)	
17	Terminals	T11	
18	Internal resistance	≤18 mΩ @ 50% SOC	
19	Batteries in series	Max. 4S	
20	Communication protocol	Bluetooth 4.0	

3. Performance And Test Conditions

3.1 Standard Test Conditions

Test should be conducted with new batteries within one week after shipment from our factory and the batteries shall not be cycled more than five times before the test. Unless otherwise specified, test and measurement shall be done under temperature of 20±5℃ and relative humidity of 45~85%. If it is judged that the test results are not affected by such conditions, the tests may be conducted at temperature 15~30℃ and humidity 25~85%RH.

3.2 Measuring Instrument or Apparatus

3.2.1 Dimension Measuring Instrument

The dimension measurement shall be implemented by instruments with equal or more precision scale of 0.01mm.

3.2.2 Voltmeter

Standard class specified in the national standard or more sensitive class having inner impedance more than 10kΩ/V

3.2.3 Ammeter

Standard class specified in the national standard or more sensitive class. Total external resistance including ammeter and wire is less than 0.01Ω.

3.2.4 Impedance Meter

Impedance shall be measured by a sinusoidal alternating current method (1kHz LCR meter).

3.3 Standard Charge/Discharge

3.3.1 Standard Charge : 0.2C

Charging at 0.2C constant current until the battery reaches 14.6V. The battery shall then be charged at constant voltage of 14.6V while tapering the charge current. Charging shall be terminated when the current has tapered to 0.05C. Charge time is approx 7.0 hours, The battery shall demonstrate no permanent degradation when charged between 0 ºC and 55 ºC.

3.3.2 Standard Discharge : 0.2C

Battery shall be discharged at a constant current of 0.2C to 10.0V @ 20 ± 5 ºC

3.3.3 If no otherwise specified, the rest time between charging and discharging is 30min.

3.4 Appearance

There shall be no such defect as crack, rust, leakage, which may adversely affect commercial value of battery.

4. Handling of battery

4.1 Prohibition short circuit

Never short circuit battery. It generates very high current which causes heating of the battery and may cause electrolyte leakage, gassing or explosion that is very dangerous.
The terminals may be easily short-circuited by putting them on conductive surface.
Such outer short circuit may lead to heat generation and damage of the battery.

4.2.Mechanical shock

Falling, hitting, bending, etc. may cause degradation of battery characteristics.

5. Period of Warranty

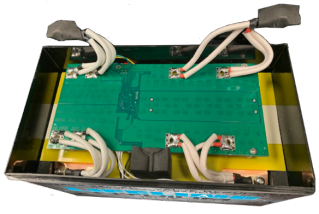
The period of warranty is 60 months from the date of shipment. Lifeline guarantees to give a replacement in case of battery with defects proven due to manufacturing process instead of the customer abuse and misuse.

6. Storing the Batteries (open circuit)

The batteries should be stored at room temperature, charged to about 30% to 50% of capacity. We recommend that battery to be charged once each three months to prevent over-discharge.

7. Photo (for reference only)

BMS - Battery Maintenance Sytem



8. Any other item which is not covered in this specification shall be agreed by both parties. Lifeline Batteries, Inc. is entitled to revise the specification without prior notice.

9. Specification of BMS

BQ4050	Min	Typical	Max	Time Delay	Protection mode	After Release
Cell over voltage protection						
Over voltage	3.85V	3.9V	3.95V	2S	Turn off the charging MOS	
Over voltage release	3.55V	3.6V	3.65V	2S		Turn on the charging MOS
Cell under voltage protection						
Under voltage	1.95V	2.0V	2.05V	2S	Turn off the discharging MOS	
Under voltage release	2.45V	2.5V	2.55V	2S		Turn on the discharging MOS
Over current (charge) protection						
1st over current (charge)	85A	90A	95A	10S	Turn off the charging MOS	
1st over current (charge) release		0A		15S		Turn on the charging MOS
2nd over current (charge)	115A	120A	125A	3S	Turn off the charging MOS	
2nd over current (charge) release		0A		15S		Turn on the charging MOS
Over current (discharge) protection						
1st over current (discharge)	115A	120A	125A	10S	Turn off the discharging MOS	
1st over current (discharge) release		0A		15S		Turn on the discharging MOS
2nd over current (discharge)	155A	160A	165A	3S	Turn off the discharging MOS	
2nd over current (discharge) release		0A		15S		Turn on the discharging MOS
3rd over current (discharge)	235A	240A	245A	31mS	Turn off the discharging MOS	
3rd over current (discharge) release		0A		15S		Turn on the discharging MOS

Short circuit protection						
1st short circuit	310A		330A	500μS	Turn off the discharging MOS	
1st short circuit release		0A		30S		Turn on the discharging MOS
2nd short circuit	380A		400A	250μS	Turn off the discharging MOS	
2nd short circuit release		0A		30S		Turn on the discharging MOS
Over temperature (charge) protection						
Over temperature (Battery, charge)	55℃	60℃	65℃	2S	Turn off the charging MOS	
Over temperature (Battery, charge) release	40℃	45℃	50℃	2S		Turn on the charging MOS
Low temperature (charge) Protection						
Low temperature (charge)	-2℃	0℃	2℃	2S	Turn off the charging MOS	
Low temperature (charge) release	0℃	2℃	4℃	2S		Turn on the charging MOS
Over temperature (discharge) Protection						
Over temperature (Battery,discharge)	60℃	65℃	70℃	2S	Turn off the discharging MOS	
Over temperature (Battery,discharge) release	50℃	55℃	60℃	2S		Turn on the discharging MOS
Over temperature (MOS,discharge)	80℃	85℃	90℃	2S	Turn off all the MOS	
Over temperature (MOS,discharge) release	65℃	70℃	75℃	2S		Turn on all the MOS
Low temperature (discharge) Protection						
Low Temperature (discharge)	-22℃	-20℃	-18℃	2S	Turn off the discharging MOS	
Low temperature (discharge) release	-20℃	-18℃	-16℃	2S		Turn on the discharging MOS

Balancing function				
Cell voltage measure interval	Condition 1 of Cell balancing begin at	Condition 2 of Cell balancing begin at	Cell balancing stop at	Cell balancing current
20 seconds	Any cell voltage ≥ 3.6V	Any two cells voltage difference ≥ 40mV	Any two cells voltage difference ≤ 20mV	58±5mA