



LL-12V100-27 (12.8V 100Ah)

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Lithium Iron Phosphate Battery Specification

LL-12V100-27 (12.8V100Ah)

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

Customer Approval	Signature/Date
	Company Name
	Company Stamp

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Amendment Records

Edition	Description	Prepared by	Approved by	Date
A0	Draft	Yadong Qin		2019-11-15
A1	Update photo and weight	Yadong Qin		2020-04-09

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1. Scope

This specification is applied to the LiFePO4 battery pack distributed by Lifeline 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	101Ah	Standard discharge (0.2C) to 10V after standard charge (0.2C) to 14.6V
2	Minimal Capacity	100Ah	
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°C
5	Discharge cut-off voltage	2.0V/cell ($\geq 8.0V$)	10.0V recommended
6	Charging cut-off voltage	3.9V/cell ($\leq 15.6V$)	14.6V recommended
7	Assembly method	IFR26650EC-3.6AH	4S30P (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 $\leq 0.05C$	Charge time : Approx 7.0h

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10	Standard discharge	Constant current 0.2C Cut-off voltage 10.0V	
11	Maximum Charge Current	100A@20°C	
12	Maximum Discharge Current	100A@20°C	
13	Operation Temperature Range	Charge: 0~45°C	60±25%R.H. 23 ± 5°C (recommended)
		Discharge: -20~60°C	
14	Storage Temperature Range	Less than 1 year: 0~25°C	60±25%R.H. at the shipment state
		Less than 3 months:-5~35°C	
15	Approx. Weight	12.2Kg	
16	Max. Dimension	L307*W168*H221mm (Group 27)	
17	Terminals	T11	
18	Internal resistance	≤30 mΩ @ 50% SOC	
19	Batteries in series	Max. 4S	
20	Communication protocol	Bluetooth 4.0	

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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 $20\pm 5^{\circ}\text{C}$ 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 $15\sim 30^{\circ}\text{C}$ 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 $10\text{k}\Omega/\text{V}$

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°C and 55°C .

3.3.2 Standard Discharge : 0.2C

Battery shall be discharged at a constant current of 0.2C to 10.0V @ $20 \pm 5^{\circ}\text{C}$

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.

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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)



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.

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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						
1 st over current (charge)	105A	110A	115A	10S	Turn off the charging MOS	
1 st over current (charge) release		0A		15S		Turn on the charging MOS
2 nd over current (charge)	145A	150A	155A	3S	Turn off the charging MOS	
2 nd over current (charge) release		0A		15S		Turn on the charging MOS
Over current (discharge) protection						
1 st over current (discharge)	145A	150A	155A	10S	Turn off the discharging MOS	
1 st over current (discharge) release		0A		15S		Turn on the discharging MOS
2 nd over current (discharge)	195A	200A	205A	3S	Turn off the discharging MOS	
2 nd over current (discharge) release		0A		15S		Turn on the discharging MOS
3 rd over current (discharge)	290A	300A	310A	31mS	Turn off the discharging MOS	
3 rd over current (discharge) release		0A		15S		Turn on the discharging MOS

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Short circuit protection						
1 st short circuit	420A		440A	500 μ S	Turn off the discharging MOS	
1 st short circuit release		0A		30S		Turn on the discharging MOS
2 nd short circuit	530A		550A	250 μ S	Turn off the discharging MOS	
2 nd short circuit release		0A		30S		Turn on the discharging MOS
Over temperature (charge) protection						
Over temperature (Battery, charge)	55°C	60°C	65°C	2S	Turn off the charging MOS	
Over temperature (Battery, charge) release	40°C	45°C	50°C	2S		Turn on the charging MOS
Low temperature (charge) Protection						
Low temperature (charge)	-2°C	0°C	2°C	2S	Turn off the charging MOS	
Low temperature (charge) release	0°C	2°C	4°C	2S		Turn on the charging MOS
Over temperature (discharge) Protection						
Over temperature (Battery, discharge)	60°C	65°C	70°C	2S	Turn off the discharging MOS	
Over temperature (Battery, discharge) release	50°C	55°C	60°C	2S		Turn on the discharging MOS
Over temperature (MOS, discharge)	80°C	85°C	90°C	2S	Turn off all the MOS	
Over temperature (MOS, discharge) release	65°C	70°C	75°C	2S		Turn on all the MOS
Low temperature (discharge) Protection						
Low Temperature (discharge)	-22°C	-20°C	-18°C	2S	Turn off the discharging MOS	
Low temperature (discharge) release	-20°C	-18°C	-16°C	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 $\geq 3.6V$		Any two cells voltage difference $\geq 40mV$		Any two cells voltage difference $\leq 20mV$	$58 \pm 5mA$