

# LiFePO4 Battery Specification

Model: JARO BT100.24



JAROCCELLS: Waldorpstraat 345, 2521 CJ The Hague, Holland

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Issued Date	07-03-2018		
Issued Version	V01		

Rev.	Date	Content	Revised	Remarks
V01	07-03-2018	First release	RH	

## 1. General Information

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This specification defines the performance of rechargeable LiFePO4 battery pack JARO BT100.24 describes the type, performance, technical characteristics, warning and caution of the battery pack.

## 2. Specification(@Battery initial Temp $25\pm 5^{\circ}\text{C}$ )

NO.	Items	48.200
2.1	Rated Capacity	100Ah
2.2	Energy	2,56Wh
2.3	Maximum power	3,84kW
2.4	Nominal Voltage	25,6V
2.5	Outgoing Voltage	20 – 29V
2.6	Internal resistance	$\leq 30\text{m}\Omega$
2.7	Limited charge voltage	$29,2\pm 0.2\text{V}$
2.8	Floating charge voltage	$27,8\pm 0.2\text{V}$
2.9	Maximum charge current	80A @ Battery initial temperature $25\pm 5^{\circ}\text{C}$
2.10	Standard discharge current	150A
2.11	Maximum discharge current	175A withstand 30 min @ Battery initial temp $25\pm 5^{\circ}\text{C}$
2.12	Pulse discharge current	300A withstand 3s
2.13	Discharge cut-off voltage	20,0V
2.14	Dimension	Length: 485 $\pm$ 3mm
		Width: 245 $\pm$ 3mm
		Height: 170 $\pm$ 3mm
2.15	Weight	Approx: 24,2Kg
2.17	Operating Temperature	Charging: 0~45 $^{\circ}\text{C}$
		Discharging: -20~60 $^{\circ}\text{C}$
		Recommended operating temperature: 15 $^{\circ}\text{C}$ ~35 $^{\circ}\text{C}$
2.18	Self-discharge rate	Residual capacity: $\leq 3\%$ / month; $\leq 15\%$ /years
		Reversible capacity: $\leq 1.5\%$ / month; $\leq 8\%$ / years
2.19	Storage Temperature & Humidity Range	Less than 1 month: -20 $^{\circ}\text{C}$ ~35 $^{\circ}\text{C}$ , 45%RH~75%RH
		Less than 3 months: -10 $^{\circ}\text{C}$ ~35 $^{\circ}\text{C}$ , 45%RH~75%RH
		Recommended storage environment: 15 $^{\circ}\text{C}$ ~35 $^{\circ}\text{C}$ , 45%RH~75%RH
<p>Long time storage: If the battery need be stored for a long time, the voltage should be 26.4V (50%SOC), and stored in the condition as storage proposal. It need at least one charge &amp; discharge cycle every six months</p>		

### 3. Test Conditions

#### 3.1 Standard Test Conditions

3.1.1 Unless otherwise specified, all performance tests is required conducted at temperature  $25^{\circ}\text{C}\pm 2^{\circ}\text{C}$ , Humidity less than 45%~75%RH.

3.1.3 Unless otherwise specified, the tested product is required unused within two month after outgoing.

#### 3.2 Standard Charge Mode

"Standard Charge" means at  $25\pm 2^{\circ}\text{C}$  charge to limit voltage with 0.33C constant current, then charge with constant voltage until current less than 2% of max. charger current.

#### 3.3 Quick Charge Mode

" Quick Charge" means at  $25\pm 2^{\circ}\text{C}$  charge to limit voltage with 0.5 C constant current, then charge with constant voltage until current less than 2% of max. charge current.

#### 3.4 Standard Discharge Mode

"Standard Discharge" means at  $25\pm 2^{\circ}\text{C}$  discharge to the cut-off voltage with 0.33C current.

#### 3.5 Quick Discharge Mode

"Quick Discharge" means discharge to the cut-off voltage with 0.5C current.

### 4. Product Performance

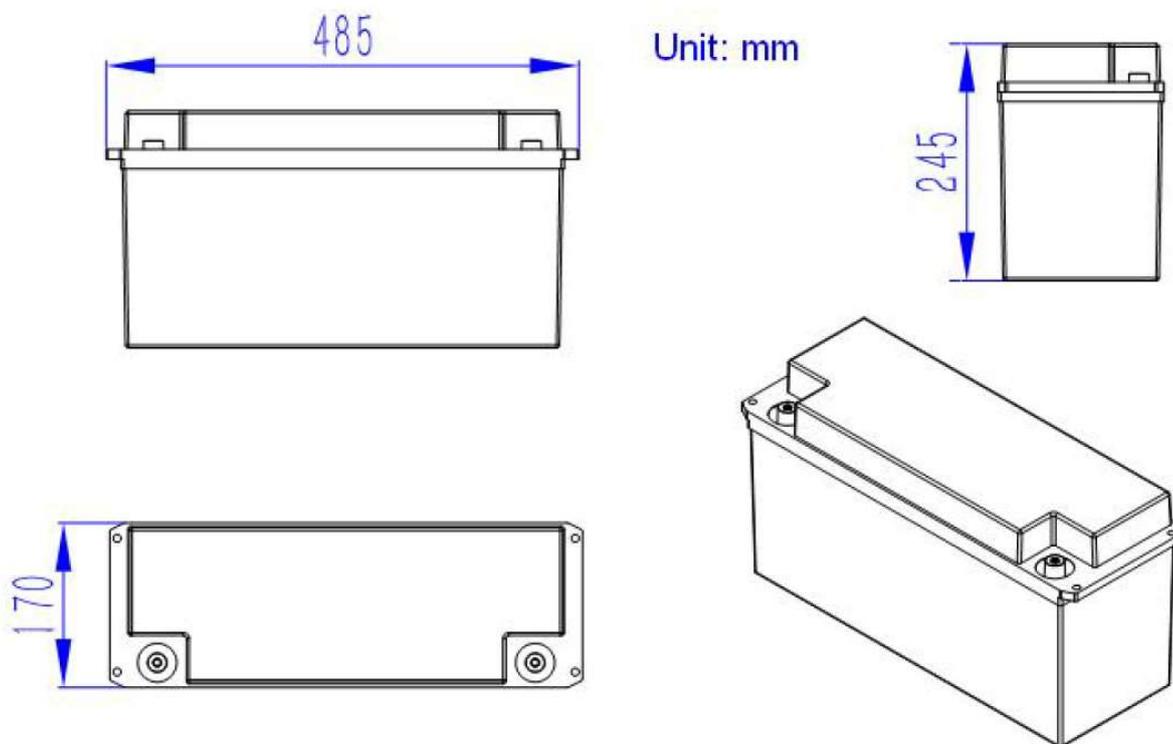
NO.	Items	Criteria		Test method
4.1	Rated Capacity	100Ah		Rest for 1 hour after fully charged, then discharge with 0.33C current until the battery reaches the discharge cutoff voltage. Repeat above process for three times, if the discharge time is not less than 120 minutes, you can stop and define the Discharging current*time value (Ah) as battery capacity.
4.2	Minimum Capacity	95Ah		
4.3	Internal resistance	$\leq 30\text{m}\Omega$		50% battery SOC state frequency of 1 KHZ ac resistance tester
4.5	Cycle life (DOD100%)	$\geq 2000\text{cycle}$		Discharge with the current of 0.33C until it can't discharge, and then rest it for 1h. Charge the battery following CC(0.33C)/CV mode to full capacity, and then rest it for 1h. Repeat above process until full charged capacity is no more than 80% of normal value. Accumulated times is defined as cycle life.
4.6	Discharge Temperature Characteristics	-20°C	$\geq 70\%$	At $25\pm 5^{\circ}\text{C}$ discharge the battery with the current of 0.33C to the cut-off voltage and record charge capacity. Store the battery at various temperatures for 2h and discharge the battery with 0.33C to the cut-off voltage.
		-0°C	$\geq 80\%$	
		25°C	$\geq 100\%$	
		55°C	$\geq 95\%$	

## 5. Protective circuit specification

The batteries are supplied with a LiFePO<sub>4</sub> Battery Management System (BMS) that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.

NO.	Items	Content	Specification
5.1	Over charge	Over-charge protection for each cell	3,90±0.03V
		Over-charge release for each cell	3.60±0.05V
		Over-charge release method	Under the release voltage
5.2	Over discharge	Over-discharge protection for each cell	2,30±0.1V
		Over-discharge release for each cell	2,80±0.1V
		Over-discharge release method	Charging recovery
5.3	Over current	Discharge over current protection	400±100A
		Protection delay time	50~100ms
		Over current release method	Release after cutoff the load.
5.4	Short	NO short cut protection.	Ban electrode short circuit
5.5	Battery temperature	Charge over temperature	Protection @65±5°C
			Release @55±5°C
		Discharge over temperature	Protection @65±5°C
			Release @55±5°C
		Charge lower temperature	Release @0±5°C
			Protection @-10±5°C
MOSFET over temperature	Protection @100±5°C		
	Release @70±5°C		

## 6. Dimensional Drawing



## 7. Transportation

- Based on the character of cell, proper environment for transportation of LiFePO<sub>4</sub> battery pack need to be created to protect the battery.
  - Battery should be stayed in the warehouse 15°C~35°C where it's dry, clean, shade, and well-ventilated.
  - The battery should be stored in 50% SOC during transportation. **(The suggest method: Charge the battery to 29,2V and discharge the battery until reaches the discharge cutoff voltage of 20V, then charge the battery up to 50% SOC and storage in proper circumstance according specification.)**
  - The battery need to be charged every 6 months if out of use
  - Keep the battery against dropping, turning over and serious stacking during loading.
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## 8. Warning & Tips

Please read and follow the specifications and caution remarks on battery surface before use the battery. Improper use may cause heat, fire, rupture, damage or capacity deterioration of the battery. The battery must be far away from heat source, high voltage, and avoid to be exposed in sunshine for long time.

- Never throw the battery in the water.
- Do not put the battery in a charger or equipment with wrong terminals connected.
- Never connect the positive and negative of battery with metal.
- Avoid excessive physical shock or vibration. don't hit, fall, stamp on the battery
- Without the permission of the manufacturer and guidance, forbidden to remove or to assemble the battery
- Do not use the battery mixed with other different manufacturer, type, or model batteries.
- 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 ( $\leq 15$ day).
- Please use the matched or suggested charger for this battery.
- If battery emit peculiar smell, heating, distortion or appear any abnormality during working or storage, please stop using and take it out from device.
- 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 keep the battery away from children or pets.
- It is strictly prohibited any series between the battery packs. Any requirements on serials connection, please contact JAROCeLLs for details.

## 9. Battery operation instruction

### 10.1 Charge and discharge

10.1.1 Charging current: Do not surpass the largest charging current

10.1.2 Charging voltage: Do not surpass the highest limited voltage

10.1.3 Charging temperature: within temperature scope of specification

10.1.4 Charge with constant current, then with the constant voltage, no reverse charge, which is dangerous

10.1.5 Special note:

If long time floating is required please use the recommended floating model specification. When the battery in used for a long time, because of its own self-discharge characteristics can also cause discharge, to prevent the occurrence of a discharge, battery should maintain a certain capacity, maintain the voltage at 50% state of SOC.

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## 10. Other Chemical Reaction

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.

