# TECHNICAL DATA SHEET

## D24-50




### Applications

CYCLIC STATIONARY SOLAR MARINE

### 1. General Information

This specification sheet defines the performance of rechargeable LiFePO4 battery pack LIT/D24-50 sold by Battery Supplies and describes the type, performance, technical characteristics, warning and caution of the battery pack.

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## 2. Battery Specification (@ 25±5 ℃)

| NO | Items | | Characteristics |
|---|---|---|---|
| 2.1 | Normal capacity | | 50Ah |
| 2.2 | Nominal energy | | 1.28kWh |
| 2.3 | Nominal voltage | | 25.6V |
| 2.4 | Output voltage range | | 20.0~29.2V |
| 2.5 | Internal resistance | | ≤40mΩ |
| 2.6 | Normal charge voltage | | 29.2±0.2V |
| 2.7 | Float charge voltage | | 27.6±0.2V |
| 2.8 | Allowed MAX charge current | | 50A |
| 2.9 | Recommended charge current | | ≤ 25A |
| 2.10 | Allowed MAX discharge current | | 50A (30mins @ 25±5℃) |
| 2.11 | Pulse discharge current | | 130A (3S) |
| 2.12 | End of discharge voltage | | 20.0V |
| 2.13 | Dimension | | Length 318 ±2mm |
| | | | Width 165 ±2mm |
| | | | Height 215 ±2mm |
| 2.14 | Weight (No accessories) | | About: 12.0±0.5Kg |
| 2.15 | Operation temperature | Charge | 0~45℃ |
| | | Discharge | -20~60℃ |
| 2.16 | Self-discharge rate | Residual capacity | ≤3%/Month; ≤15%/ year |
| | | Recover capacity | ≤1.5%/Month; ≤8%/ year |
| 2.17 | Storage environment | ≤1month | -20~+35℃, 45~75%RH |
| | | ≥3months | -10~+30℃, 45~75%RH |
| | | Recommended environment | 15~35℃, 45~75%RH |

## 3. Electrical Characteristics & Test Condition

**Standard Testing Conditions**

Ambient Temperature: 25±5℃

Humidity: less than 45%~75%.

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| NO | Items | Criteria | | Testing method |
|---|---|---|---|---|
| 3.1 | Rated Capacity | 50Ah | | 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 180minutes, you can stop and define the Discharging current*time value (Ah) as battery capacity. |
| 3.2 | Internal Resistance | ≤40mΩ | | 50% battery SOC state frequency of 1 KHZ ac resistance tester |
| 3.3 | Short circuit protection | / | | Not allowed |
| 3.4 | Max charge current | 50A | | Charging with this current for more than 0.5h and the added temperature of battery pack less than 20°C. |
| 3.5 | Max discharge current | 50A | | Discharging with this current for more than 0.5h and the added temperature of battery pack less than 35°C. |
| 3.6 | Cycle life @DOD100% | ≥2000 cycles | | Discharge with current of 0.5C until it can't discharge, and then let it rest for 1h. Charge the battery following CC(0.33C)/CV(29.2V) mode to full capacity, and then let it rest for 1h. Repeat above process until full charged capacity is no more than 80% of normal value. Accumulated times is defined as cycle life. |
| 3.7 | Discharge temperature characteristics | -20°C | ≥70% | At 25±5°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 | ≥80% | |
| | | 25°C | ≥100% | |
| | | 55°C | ≥95% | |
| 3.8 | Charge retention ability | Remain capacity ≥90% | | Charge the battery to full capacity and store it for 28 days. Then discharge with 0.33C to the cut-off voltage. |

## 4. Circuit Protection

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

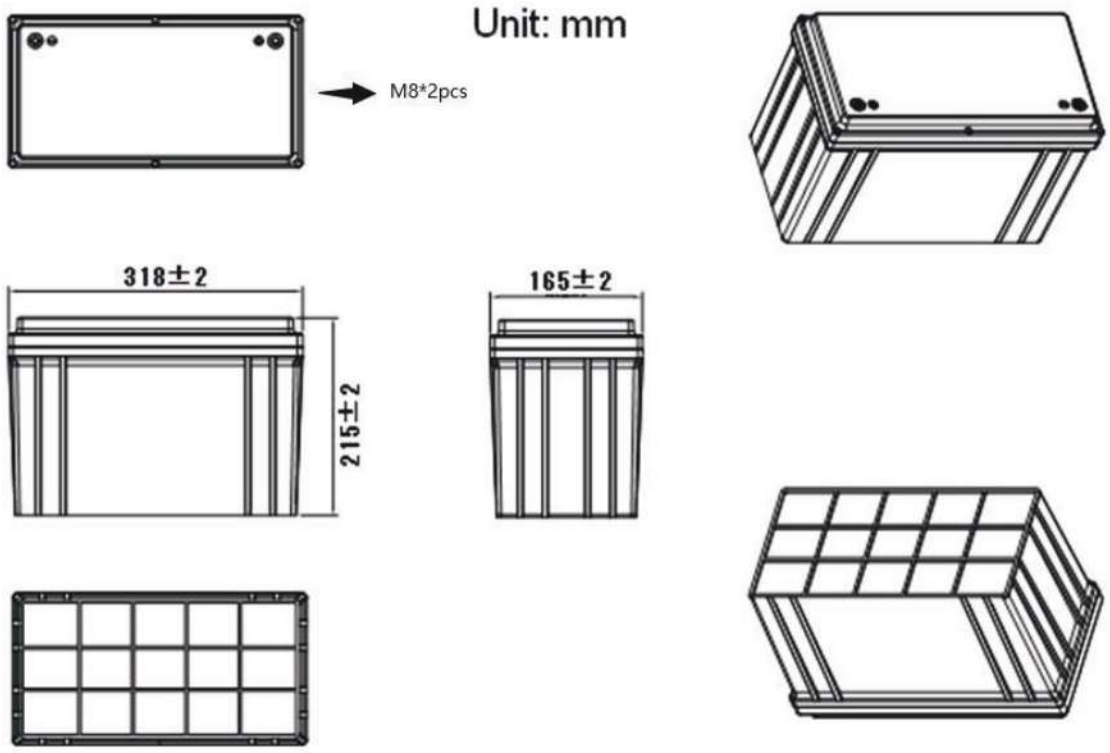
| No | Item | Content | Criterion |
|---|---|---|---|
| 4.1 | Over charge | Over-charge protection for each cell | 3.8±0.03V |
| | | Over-charge release for each cell | 3.6±0.05V |
| | | Over-charge release method | Under the release voltage |
| 4.2 | Over discharge | Over-discharge protection for each cell | 2.5±0.05V |
| | | Over-discharge release for each cell | 2.8±0.05V |
| | | Over-discharge release method | Release after charging(*) |
| 4.3 | Over current | Discharge over current protection | 150±20A |
| | | Protection delay time | 10~40ms |
| | | Over current release method | Release after cutoff the load |

| | | | |
|---|---|---|---|
| 4.4 | Battery Temperature | Over temperature | Protection 65±5°C |
| | | | Release 50±5°C |

(*) try to avoid over discharge. If charging is not enough to release the battery: please contact Battery Supplies for further advice.

## 5. Structure Dimension

**Battery Dimension**




## 6. Transport & Storage

Proper transportation and storage of Li-ion battery packs is critical. Ensure this section is followed carefully to avoid damage to the pack and injury to the user.

- The battery should be stored at 50% SOC during transport.
  Suggested method: charge the battery to 29.2V and discharge again until it reaches the discharge cutoff voltage of 20V. Then charge the battery up to 50% SOC and store in proper circumstances according to specification.
- Keep the battery out of the sun and rain during transport.
- Do not place any heavy objects on the battery during transport.
- Do not transport the battery with flammable material, explosives or sharp objects.
- Follow local regulations concerning transport of Li-ion batteries. Use the original packaging or make sure your packaging is in accordance with regulations of Li-ion transportation.
- Handle the battery pack and cells with care when assembling and disassembling, do not drop or excessively shake.
- Keep the battery safe from dropping and turning over. Do not stack over 6 layers.
- The battery should be stored in the warehouse between 15°C and 35°C in a dry, clean and well-ventilated environment without direct sunlight shining on the battery permanently.
- During storage, the battery needs to be charged every 6 months.

## 7. Warning & Tips

Please read and follow the operation instructions before use. Improper operation may cause overheating, fire, rupture, damage or capacity deterioration of the battery. Battery Supplies is not responsible for any accidents caused because of not following our instructions.

### Warning

- Battery must be kept away from heat sources, high voltage, and can't be exposed to direct sunlight for a long time.
- Never throw the battery into water or fire.
- Do not connect the battery to a charger or put the battery in equipment with terminals connected in reverse.
- Never connect the positive and negative terminal of the battery with metal.
- Avoid excessive physical shock or vibration. Don't hit, drop or crush the battery.
- Never disassemble the battery without manufacturer's permission and guidance.
- Never use the battery mixed with other batteries from different manufacturer or other types/models of batteries.

### Tips

- Keep the battery away from high temperature. It will cause the battery to heat, catch fire or lose function and reduce the life of the battery.
- When your battery has run out of power, charge immediately.
- Please use the matched or suggested charger for this battery (see: 9. Advised charger)
- If the battery emits a peculiar smell, heating, distortion or any abnormality appears, please stop using.
- If the battery leaks and substance gets into eyes or onto skin: do not wipe. Instead, rinse profusely with water and see a doctor immediately.
- Keep away from children and pet animals.

## 8. Series – parallel connections

### General

- Only connect batteries in parallel. Series connection is NOT allowed.
- Only connect new batteries from the same production batch.
- Only connect batteries of same capacity and voltage.
- Avoid differences in the distances and sections of the cables; place the cables diagonal.
- Always start by charging the batteries separately to 100%. Then disconnect from the charger and check if all batteries are 100% charged. If this is okay, then you may continue with connecting the batteries.

### Parallel connection

- Do not connect more than 4 batteries in parallel.
  Battery Supplies advises 2 batteries in parallel; max 4.
- Install a fuse on the positive side of each battery, corresponding with the max. discharge current.
- When parallel connected batteries are discharged (completely or partially), it's damaging to replace 1 battery with a fully charged battery.
  So first disconnect all batteries. Then charge all batteries separately to 100% and only then you may connect them in parallel again.
- Only use parallel connection to increase total capacity and autonomy. Do not increase

the total current: Max. current of the unity is equal to the max. current of 1 battery.

**Serial connection**
NOT allowed

## 9. Advised charger
LIT/04.01.0046
LAD/AQHF-WP SLA
In case of using a different charger than advised here above, please check the specifications of the battery very carefully.

## 10. Battery operation instructions
**Charge and discharge**
**Charging current:** Do not surpass the largest charging current stipulated in the specification.
**Charging voltage:** Do not surpass the highest limited voltage stipulated in the specification.
**Charging temperature:** use within temperature range stipulated in the specification
Charge with constant current, then with constant voltage. No reverse charge, which is dangerous.
**Special note:** over charge or over discharge can affect the functions of the battery and ultimately lead to battery failure or serious safety hazards. If long time floating is required, please use the recommended floating model specification. When the battery is not being used for a long time, it will self-discharge. It's important to maintain the batteries while being stocked or out of service. Always try to keep the voltage at 50% SOC (state of charge).

## 11. Other chemical reaction
Because of chemical reaction, the battery performance will deteriorate over time even if the battery is 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 withing the specified ranges, the life expectancy of the battery will be shortened.