

POWERTECH

Lithium

12.8V 100Ah

**Lithium Slimline Deep-Cycle Battery
with Metal Case**



SB2220

Instruction Manual

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WARNING:

Quality Statement

Proper use and maintenance will ensure that the battery (or battery system) will operate reliably and consistently for a long period of time.

- After receiving the product, please check if the packaging is in good condition. If the packaging is broken, there may be damage to the product. If there is damage, please contact your retailer or installer.
- Anyone who does not use or maintain the battery according to this owner's manual, gives up any right to warranty.

This battery is to be installed and serviced only by qualified personnel equipped with appropriate personal protective equipment and following safe electrical work practices.

Always wear eye protection, gloves, apron and mask when working with batteries. Also remove any metal / conductive jewelry. Refer to the materials safety data sheet (MSDS) for additional information including: hazards, identifications, electrolyte first aid measures and precautions for safe handling and use.

Precautions When Working With Batteries

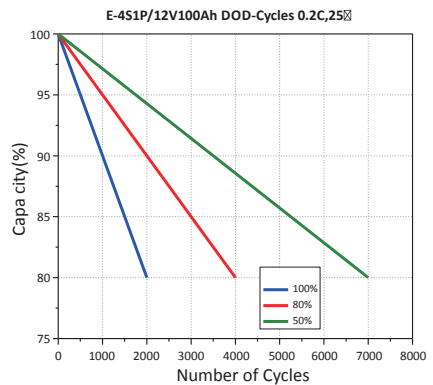
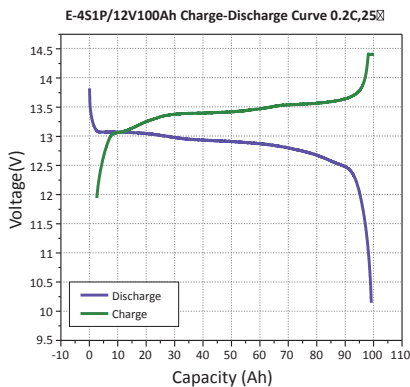
- Consider your access to emergency medical attention, and work safely.
- Use caution to eliminate the risk of dropping a metal tool on the battery. It could spark or short circuit the battery or other electrical parts and could cause an explosion.
- Insulated tools are strongly recommended anytime you are working around batteries.
- Never smoke or allow a spark or flame near the batteries.
- Remove all metal items, such as necklaces, rings, bracelets, and watches when working with batteries. Batteries can produce a short circuit current high enough to weld metal to skin, causing a severe burn.
- Ensure that someone is within range of your voice or close enough to come to your aid when you are working near a battery.
- Wear complete eye / face protection and gloves. Avoid touching your eyes while working near batteries.
- Never use or combine this battery with another dissimilar battery.
- Batteries are temperature sensitive. For optimum performance, they should be installed in a stable temperature environment.
- Always recycle old batteries. Contact your local recycling center for proper disposal information.
- Never wire the battery in series.

1. PRODUCT INDEX:

1.1 Product Parameter

Items	Lithium Slimline Deep Cycle Battery with Metal Case	
Product Manual	SB2220	
Normal Voltage	12V	
Nominal Capacity	100Ah	
Energy	1200Wh	
Internal Resistance	≤220mΩ	
Size (mm)	360 x 180 (210 including flange) x 115	
Weight	11Kg	
End of Charge Voltage	14.6V	
End of Charge Current	100mA	
End of Discharge Voltage	9.2V	
Change Method	0.2C (0.5A) CC/CV	
Max. Continuous Charge Current	50A	
Nominal Discharge Current	100A (safe)	
Max. Pulse Discharge Current	150A/10S	
Operating Temp.	Charge	0 ~ 45°C
	Discharge	-10 ~ 55°C
Storage Temp.	-10 ~ 45°C (60-80% SOC Storage)	
Capacity @ 1C rate 0.2C	≥100Ah	
Inverter Disconnect High	15V	
Inverter Disconnect Low	12.5V	

1.2 Product Parameter Graph



1. PRODUCT INDEX:

1.3 Battery Management System

Our lithium iron phosphate (LiFePO₄) battery pack includes an onboard digital battery management system (BMS). The BMS monitors voltage, current and temperature on both an individual cell and battery pack level. If any of these measurements deviate outside of their safe operating ranges, the BMS will actively work to correct the deviation. If the deviation cannot be corrected automatically, the BMS will initiate a self-protect shutdown by opening the internal contactor, disconnecting the battery from the charger and loads.

Overcurrent protection – If the charge or discharge current of the battery exceeds maximum permissible levels, the BMS will disconnect itself automatically. To recover from a high current shutdown, remove the load from the battery, and then rest the battery by turning the battery OFF and back ON.

Overcharge protection – If the battery's voltage exceeds permissible levels the BMS will disconnect itself automatically. To recover from a high voltage shutdown, remove the charge source from the battery. The battery will automatically reconnect once the charge source has been removed and the battery's voltage drops down to permissible levels.

Over discharge protection – If the battery's voltage drops below permissible levels the BMS will disconnect itself automatically. To recover from a low voltage shutdown, remove the load from the battery. At this point the battery should be charged immediately. If the battery does not start on its' own, you may need to put a charger on the battery. If the battery is so discharged that the Low Voltage Shutdown cannot be cleared, the battery must be returned for non-warranty service.

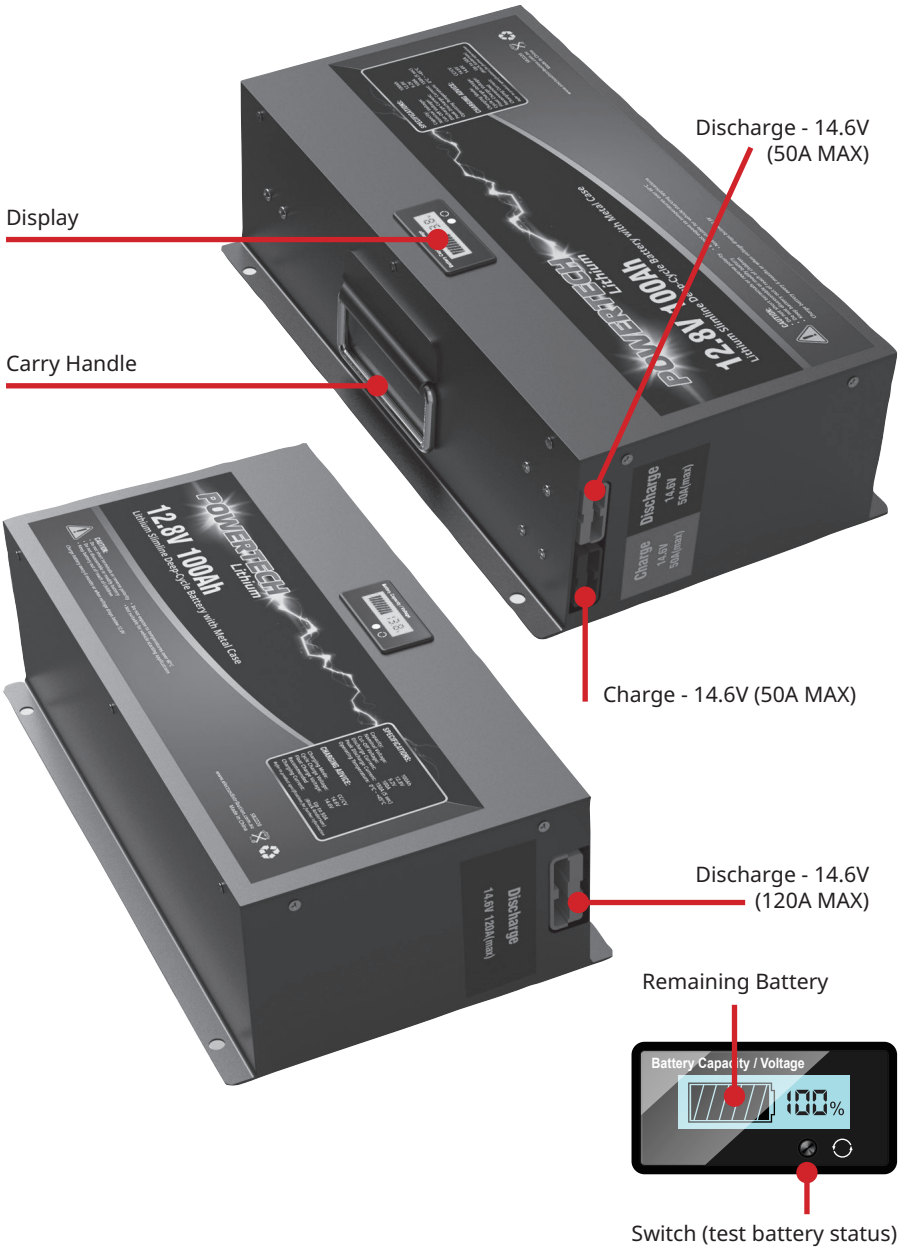
Short circuit protection – If the battery suffers from a short circuit, the BMS will automatically disconnect. The battery will resume normal operation after the short circuit is removed.

Temperature protection – If the battery's temperature exceeds permissible levels the BMS will disconnect itself automatically. The battery will automatically reconnect once the temperature has returned to permissible levels.

Safety shutdown features on your inverter(s) and charger(s) should be the first line of protection against overcurrent or over voltage situations. Set your system's max current, high battery cutoff (HBCO) and low battery cutoff (LBCO) according to the Charge / Discharge Parameters section of this manual. The Battery Management System's Shutdown is designed as a last resort self-protect shutdown, and should not be relied upon for managing charge voltage or currents. Doing so will significantly shorten the battery's life expectancy and could negatively impact your inverter(s) or charger(s).

1. PRODUCT INDEX:

1.4 Battery Part Identification



2. BATTERY USAGE:

2.1 Charge

Charging voltage is $14.4 \pm 0.15\text{V}$. Do not reverse polarity.

2.2 Discharge

Make sure loads are properly wired to the positive and negative connections as indicated on the battery case.

3. BATTERY SERVICE ENVIRONMENT:

Battery discharge ambient temperature is $-10^{\circ}\text{C} \sim +55^{\circ}\text{C}$ (When the ambient temperature $>45^{\circ}\text{C}$, please pay attention to the ventilation and heat dissipation). Charging temperature is $0^{\circ}\text{C} \sim +45^{\circ}\text{C}$. Ambient humidity RH is $\leq 85\%$. Pay attention to eliminate moisture when the ambient humidity is $>85\%$. Condensation on the surface of the battery should be avoided.

4. SPECIAL ATTENTION:

In order to make full use of the energy efficiency of the battery and prevent accidents such as leakage or heat generation, please prohibit the following:

- Do not immerse the battery in water. If the battery is immersed in water do not approach. Contact qualified personnel to remove the battery and dispose of it safely.
- Do not charge, discharge or leave the battery at temperatures over 60°C. Keep away from fire, hot temperatures or corrosive substances. Failure to do so can cause battery overheating. Battery overheating can lead to fires and potential danger and/or injury.
- Do not charge the battery at temperatures below 0°C.
- Do not wire the battery in series under any circumstances. Contact your supplier or qualified battery installer before wiring in parallel.
- Do not reverse polarity when attaching to a charger. Never attach the battery directly to any electrical outlet.
- Do not transport or store the battery together with metal objects such as hairpins, necklaces, etc.
- Do not strike, trample, impact, drop or shock the battery.
- Do not directly weld the battery connections. Do not pierce the battery with a nail or other sharp objects.
- Do not use the battery in any location where static electricity and magnetic field is strong. Doing so may damage the battery protection circuit.
- Do not overload the battery.
- Do not alter the circuit board. This could damage the internal circuits and cause battery failure.
- Do not deform or damage the outside of the battery case. Damage to the case may cause electrical component failures and lead to battery instability.
- Do not open or remove the case.
- Do not overcharge or over discharge the battery.
- Please only use chargers designed to work properly with this battery.
- Please charge the battery within 12 hours of a complete discharge. If the battery is not charged within 12 hours of a complete discharge, please test the battery voltage before charging. If the voltage of the battery is < 8.0V, do not attempt to charge the battery. Remove all wires and isolate the battery. Contact your installer or battery distributor or service person.
- If the battery leaks and fluid splashes into the eyes or on skin, do not rub the fluid. Wash off fluid with clean water, and immediately seek medical attention.
- In case of accidental fire, dry powder fire extinguisher or sand should be used.

4. SPECIAL ATTENTION:

- If the battery gives off a strange odor, generates heat, becomes discolored or deformed, or any abnormality appears during use, storage, or charging, stop the battery from charging and stop use of the battery immediately. Remove and isolate the battery from loads and charging sources and contact your battery supplier or distributor.
- The terminals of any discarded battery should be covered to reduce any potential safety hazard.
- Reversing the positive and negative terminals during charging will damage the circuit board. Do NOT reverse polarity.

5. BATTERY USE AND MAINTENANCE

5.1 Battery Storage

Storage temperature 0°C~40°C (Optimum storage temperature 15°C~25°C, low humidity). Battery performance is affected by temperature. Especially the change in battery capacity. This is a normal phenomenon. Avoid condensation caused by temperature changes during storage. Failure to do so can lead to corrosion, rust and internal battery failure.

5.2 Battery Check Before Use

- After receiving the battery, first check the packaging carefully. Make sure there has been no damage to the battery during shipment.
- Please check the battery exterior for any damage or leakage. If there is any damage or leaking, please contact your installer or distributor immediately.
- Make sure the battery voltage is within a normal range. Poor performance may occur due to poor wiring connections to the charger or the loads.

5.3 Battery Installation

- Please install the battery to ensure minimal dust, metal or other foreign materials. No smoking or fire during installation. Avoid a short-circuit of the battery to prevent equipment damage or personal injury.
- The battery should be installed in a well-ventilated space with no direct sunlight.
- Do not install where it could be submerged in water. The use and storage of the battery should be kept away from any flammable and explosive materials.
- After installation, clean the surface of battery with dry cloth. Please don't use oil or other volatile organic solvents to clean or it may damage the case.
- Please make sure that the positive (+) & negative (-) polarity is correctly connected. Failure to wire correctly may cause a fire or damage the battery and electrical appliances.
- After installation, test the battery and equipment. Observe whether the equipment and battery are working correctly.

5. BATTERY USE AND MAINTENANCE

5.4 Battery Operating Requirements

- The charge and discharge current of the battery shall not exceed the specified maximum charge and discharge current. Current input or output beyond recommended levels may affect the lifespan of the battery, damage the internal circuitry, or even cause a dangerous situation.
- When the battery is in a low state of charge, it should be charged quickly. This helps prolong battery life. If the battery is not charged quickly from an extremely low state of charge, battery life will be affected.
- LIFEP04 batteries prefer a shallow discharge and charge cycle. For longest life, a discharge of 20%, leaving 80% of the nominal capacity is recommended.

5.5 Battery Operation

- It is possible to over-discharge the battery if the battery is not used for long time. In order to prevent over-discharging, the battery shall be charged every 2 months to maintain a certain voltage range of 13.32V~13.6V . For best life, a SOC/ capacity calibration shall be performed. This calibration method charges the battery fully, then discharges slightly to prevent an a possible over-discharged state. Letting a battery sit for months without this procedure can lead to battery problems. Contact your installer or distributor for more information about this procedure.
- Don't use organic solvents to clean the battery case.
- A battery is a consumable product with limited cycle life. Please replace it before the diminished capacity can't meet the needs of the end user.
- In order to prevent failure of the overcharge protection board, do not charge for overly long periods of time. After the battery is fully charged, remove it from the charger. Only use acceptable battery chargers and operate the chargers according to proper voltages for recommended amounts of time. Failure to do so can damage the battery and possibly cause a potentially dangerous situation.
- A shallow charge and discharge of the battery ensures that the battery can be used optimally. Overcharge and over discharge may cause the battery to overheat, fire or failure, shorten life, or other possible dangerous situations.
- Battery switches, displays and USB ports are not considered warranty items. The battery can function fine without these items.
- Waste lithium batteries should be recycled and disposed in accordance with local laws.

5. BATTERY USE AND MAINTENANCE

5.6 Battery Troubleshooting

- **Battery voltage is too low after being fully charged.**
Solution: Contact your installer or distributor.
- **Battery is in long-term storage with no use and is not being maintained properly.**
Solution: Please test the battery voltage. If the battery voltage is $<8.0V$, it can't be charged and needs to be un-wired and isolated. Please consult your installer or distributor. If the voltage is $\geq 8.0V$, the battery can be isolated to its' own charger and checked to see if it can be charged normally.
- **Battery Disconnection.**
Solution: Battery is powered but no voltage is present. Contact your installer or distributor.
- **Battery has suffered a collision and has damage to the case or has an electrolyte odor.**
Solution: It's not in the end user to repair a damaged battery. Contact your installer or distributor.
- **Insufficient capacity.**
Solution: Charge fully and discharge to 50% SOC the battery with 3~5 cycles.
- **Battery voltage is not stable or the battery cannot charge or discharge normally.**
Solution: Contact your installer or distributor.
- **Connectors or terminals not making good contact.**
Solution: Clean or replace the connectors.
- **Any other problems not described in this manual.**
Solution: Contact your installer or distributor.

6. PRODUCTS DISCLAIMER

Before using the battery, please read the specifications, usage/ maintenance instructions and pay careful attention. Suppliers are not responsible for any incident caused by not installing and operating the battery according to this manual. Any problems from incorrect use, installation, connection, or input/output power, inconsistent with this manual, may cause damage to product. Improper use or installation can lead to battery damage and possible damage to the structure the battery is housed and cause injury.

The manufacturer and distributors are not responsible for incorrectly installed or used batteries. The manufacturer or distributors are not responsible for damage to equipment from improper use or installation of these batteries.

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