

LDHEB



# User Manual Model: LDHEB-4400/61





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#### **1 General Information**

This manual introduces the LDHEB-4400/6100 battery products. Please read this manual carefully before using the battery. For any questions, please contact us immediately for advice and clarification.

#### 1.1 Validity

This user manual is applicable to LDHEB-4400/6100

This manual contains LDHEB-4400/6100 information, usage, guidance, safety information, installation guide and details on common operation issues and subsequent maintenance measures.

#### 1.2 Intended Use

LDHEB-4400/6100 is an energy storage unit, that is designed for residential application scenarios with the capability of short-term backup.

#### Notes:

LDHEB-4400/6100 is not suitable for supporting life-sustaining medical devices. This product is intended for used only in accordance with the information provided in the enclosed documents and applicable local standards and regulations. Any other use may result in personal injury or property damage. The illustrations in this manual are only intended to help explain the concept of the system configuration, including use guidelines, safety precautions, common operating problems, and subsequent battery maintenance.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of SEEKENER. Unauthorized changes will not be allowed by warranty claims. SEEKENER shall not be liable for any damage

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resulting from such changes. Any use of the product other than described in the intended use section does not qualify as appropriate. The enclosed documentation is an integral part of this product. Please keep the documentation in a safe and convenient place for future reference. Product model labels (see Section 1.3) must be attached to the product.

### **1.3 Product Identification**

The type labels were attached on the product, which contain the product identification information. For safe usage, the user must be well-informed of the contents in the type labels.

The Labels include:









## **2 Safety Measures**

This section contains safety information that must always be observed when using or installing batteries. To prevent personal injury or property damage and ensure long-term operation of the batteries, please read this section carefully, always Watch for

warnings from all safety messages.



#### Environmental requirements:

- 1. Do not expose the battery to temperature above 50 °C;
- 2. Do not place the battery near any heat source;
- 3. Do not expose the battery to moisture or liquid;
- 4. Do not expose the battery to a corrosive gas or liquid;
- 5. Do not expose the battery to a combustible gas or liquid;
- 6. Do not expose the battery to direct sunlight for extended periods of time;
- 7. Battery power terminals are not allowed to contact conductive objects, such as electric wires;
- 8. Place the battery in safe place that away from children and animals;

#### **Operation Precautions:**

- 1. Do not disassemble the battery;
- 2. Do not touch the battery pack with wet hands;
- 3. Do not smash, fall, or puncture the battery;
- 4. Do not reverse the polar series connection battery;
- 5. Do not short-circuit the terminal, and remove all metal jewelry items that may produce a short-circuit before installation and repair;
- 6. Always handle the products in accordance with the local safety regulations;
- 7. Store and use the battery in the user's manual;
- 8. Ensure reliable grounding;
- 9. Disconnecting all batteries to the wires before installation and repair;
- 10. Do not stack batteries outside the protective packaging during storage or handling;
- 11. The stacking of packaging batteries shall not exceed the quantity specified on the packaging;
- 12. Continued operation of a damaged battery may lead to dangerous situations, causing serious injuries such as electric shock or combustion;

## **3** Technical parameters

Basic Parameters	Technical Specification				
Model	LDHEB-4400	LDHEB-6100			
Battery Type	LiFeP04	LiFeP04			
Nominal Capacity (Ah)	86A. h	120A. h			
Nominal Voltage (V)	51.2V	51.2V			
Total Energy	4400W.h	6100W.h			
Depth of Discharge	3960W.h	5490W.h			
Maximum Charging Voltage (V)	56.8V	56.8V			
End of Voltage (V)	49V	49V			
Nominal charging current (A)	40A	60A			
Maximum Charging Current (A)	50A	80A			
Maximum Charging Power (W)	2560W	4096W			
Rated discharge current (A)	50A	60A			
Rated discharge power (W)	2560W	3072W			
Maximum discharge	60A	80A			

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current (A)						
Maximum discharge power (W)	3072W	4096W				
Working Humidity	≪95	5%rh				
Store Humidity	≪95	5%rh				
Working Altitude	≤20	DOOm				
Maximum number of Parallel	Maximum of 16 are recommended					
Protection Level	IP20					
Net Weight (Kg)	46KG	60KG				
Dimensions (mm)	393*540*161	393*540*198				
Product Certificate	CE, ROHS , UN	N38.3, MSDS,				
Circle Life	≥5000次,80%DOD ,	/25℃/0.5C, 60%EOL				
Communication Port	CAN, RS48	35, RS232				
Operating temperature	−10°C	~ 55℃				
	≤25°C, 12	months ;				
Storage temperature	≤35°C, 6	months ;				
	≪45℃,	3 months				

Note: Operating current derating according to the cell voltage and temperature.



## **4** Technical Items

No.	Name	Comment
1	Discharge	Battery output power for load
2	Charge	Put the electricity into the battery through the charger
3	Full Charge	The battery is fully, charged with 100% SOC.
4	Standby	Ready for charging or discharging
5	Turn-off	Turn-off battery output
6	SOC	State of Charging (Useable Capacity)
7	Battery voltage	Voltage between the battery $B + /B$ -
8	Single-string Voltage	Single-cell voltage
9	Alarm	Indicates that the battery is in an abnormal state
10	Protection	Battery stops charging or discharging
11	Fault	Battery or BMS is damaged and need to be replaced
12	Over discharged	Battery is lack of electricity, and need to be charged in time



#### **5** Product Overview

#### 5.1 Brief Introduction.



LDHEB-4400/6100 is a lithium battery energy storage system with an operating voltage range of between  $49V^{56}$ . 8V, it is used for household energy storage applications, in cooperation with low voltage inverters to achieve home energy storage purpose.

LDHEB-4400/6100 has a built-in B M S (Battery Management System) which can manage and monitor cells information, including voltage, current and the temperature. In addition, the BMS can balances battery charging to extend lifespan. BMS has the protections including over-discharge, overcharge, over-current, high / low temperature, etc. The system can automatically manage the charging status, discharge state, balance state. Multiple batteries can be connected in parallel to expand storage capacity to meet larger capacity and continuous power support time,LDHEB-4400/6100 support up to 16 parallel operations.



#### 5.2 Interface Introduction



NO.	Ltem	NO.	Ltem
1	LED Indicator	6	CAN
2	power switch	7	RS485-2
3	RS485 Dial address	8	RS485-2
4	RS232	9	Positive/ negative pole
5	RS485-1	10	Grounding

#### 5.2.1 Start Button

Press the start button, release the button, and the button is locked.

The SOC LED lights up from left to right, The system enters the start precharge state, When inverter precharge is completed, SOC display normal capacity, RUN light shows the running status.

#### **5.2.2 Definition of LED indicator:**

**SOC Light:** 4 in total, Displays the battery level.

ALM Light: Fault lamp, Long on in case of failure or protection.

**RUN Light:** Running status light.



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## Instructions for use of LED indicator light

## LED Working status indication:

status	Normal/alarm,	Running light	Alarm lamp		explain			
	protection	Green	Red	Green L4	Green L3	Green L2	Green L1	
Shut down	dormancy	off	off	off	off	off	off	close all
Standby	normal	Flash 1	off	Display	according t	o electric	quantity	Standby
	alarm	Flash 1	Flash 3	refer to t	the power in bel	dication in low	the table	Battery low voltage
	normal	Always light	off	refer to t	the power in	dication in	the table	In case of over
	alarm	Always light	Flash 3		be	low		alarm indicator is off
charge	Overcharge protection	Always light	off	on	on	on	on	If the charger is not connected, the indicator display is consistent with that in the power standby state
	Temperature, over current protection	off	Always light	off off		off	off	Turn off charging
	normal	Flash 3	off	refer to t	the power in	dication in	the table	
	alarm	Flash 3	Flash 3		be	low		
dischargo	Over discharge protection	off	off	off	off	off	off	Turn off discharge
discharge	Temperature, over current and short circuit protection	off	on	off	off	off	off	Turn off discharge
invalid		off	on	off	off	off	off	Turn off charge and discharge



Flashing mode	Light on	Light off				
Flash 1	0.25S	3.75S				
Flash 2	0. 5S	0. 5S				
Flash 3	0. 5S	1.5S				

#### LED Flashing description:

Power indication description:

stat	е	charge discharge							
Capa indic	city ator	L4	L3	L2	L1	L4	L3	L2	L1
	$1\sim$ 25%	off	off	off	Flash 2	off	off	off	on
Electric quantity	$25\sim$ 50%	off	off	Flash 2	on	off	off	on	on
(%)	$50\sim$ 75%	off	Flash 2	on	on	off	on	on	on
	$75 \sim$ 100%	Flash 2	on	on	on	on	on	on	on

#### **5.2.3 Dial switch definition**



Schematic diagram of the dial-up switch

The code dialing switch is used to set the BMS address of each battery. The code dialing to the on position is 1, the code dialing to the 1234 position is 0, The host address is 0 and the slave address is  $1 \sim 15$ 



	Dia co loca	l-up de tion		Add ress	Dial-up code location			Add ress	Dial-up code location			Add ress	Add Dial-up ress location				Add ress		
1	2	3	4		1	2	3	4		1	2	3	4		1	2	3	4	
0	0	0	0	0	0	0	1	0	4	0	0	0	1	8	0	0	1	1	12
1	0	0	0	1	1	0	1	0	5	1	0	0	1	9	1	0	1	1	13
0	1	0	0	2	0	1	1	0	6	0	1	0	1	10	0	1	1	1	14
1	1	0	0	3	1	1	1	0	7	1	1	0	1	11	1	1	1	1	15

5.2.4 CAN Port



Interface	Definition Description
Pin1	NC (empty)
Pin2	NC (empty)
Pin3	NC (empty)
Pin4	CANH
Pin5	CANL
Pin6	NC (empty)
Pin7	NC (empty)
Pin8	NC (empty)

The CAN communication terminal (RJ45 port) follows the CAN protocol and is connected to the inverter for CAN communication.

- BMS controls the charging current / charging voltage or discharge current / discharge cut-off voltage of the inverter through can communication according to the battery voltage and battery temperature.
- If the battery capacity is less than 8%, BMS controls the inverter to forcibly charge through can communication to avoid damaging the battery due to deep discharge.
- If the SOC is lower than 97% for a continuous month, BMS controls the inverter through can communication to fully charge the battery to correct the SOC error.

#### 5.2.5 RS232 port



Interface	Definition Description
PIN1	NC (empty)
PIN2	NC (empty)
PIN3	RS232_tx
PIN4	RS232_rx
PIN5	GND
PIN6	NC (empty)

RS232 communication terminal (RJ45 port) follows RS232 protocol for

debugging or service by manufacturers or professional engineers.



## 5.2.6 RS485-1



Interface	Definition Description
Pin1	RS485–B
Pin2	RS485-A
Pin3	RS485-GND
Pin4	NC (empty)
Pin5	NC (empty)
Pin6	RS485-GND
Pin7	RS485-A
Pin8	RS485-B

Rs485-1 communication terminal (RJ45 port) follows RS485 protocol and is connected to inverter for RS485 communication.

#### 5.2.7 RS485-2。



Interface	Definition Description
Pin1	RS485-B
Pin2	RS485-A
Pin3	RS485-GND
Pin4	NC (empty)
Pin5	NC (empty)
Pin6	RS485-GND
Pin7	RS485-A
Pin8	RS485-B



Rs485-2 communication terminal (RJ45 port) follows RS485 protocol and

communicates internally when multiple batteries are combined.

## 6 Installation guide



#### Installation flow chart

#### 6.1 Inspection before installation

#### 6.1.1 Check the outer packaging

Packaging materials and components may be damaged during transportation. Therefore, please check the packaging material before installing the battery. Check the surface of packaging materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. It is recommended that you remove the packaging material within 24 hours before installing the battery.

#### 6.1.2 Check whether the accessories are complete

After opening the packing box, check whether the attached accessories are complete. If any damage or missing parts are found, contact your dealer.



The following table shows the attach components and mechanical components.







Packing list			
Item	Picture	Quantity	Description
1		1	Battery pack
2		4	Chassis fixing bracket
3		8	Chassis lug bolt (M10*80)
4		4	Chassis lug fixing expansion screw (M10*80)
5		1	Anderson port
6		2	Copper terminal 100A
7		1	Certificate
8		1	Inspection report
9		1	Quality guarantee





Manufacturing instructions for power cable terminals:

(A) Copper-core wire (B) The insulation layer (C) Heat-shrink

tube



- (A) Copper Core Line (B) Insulation layer (C) Protective cover
- (D) Hydraulic pliers



## 6.2 Tools

Туре	Tools		
	Knife	Hammer drill	Socket wrench
Installation Tools	Rubber mallet	Cross Screwdriver	
	Incinometer	Measuring tape	
Protective	ESD gloves	Safety goggles	Anti-dust respirator
Equipments	Safety shoes		



#### 6.3 Installation Requirements

#### 6. 3. 1 Installation environment requirements

- 1. Install the battery in an indoor environment.
- 2. Place the battery in a safe position away from children and animals.
- 3. Do not place the battery near any heat source, and avoid generating sparks.
- 4. Do not expose the battery to moist air or liquid.
- 5. Do not expose the battery to direct sunlight.
- 6. Do not expose the battery to a combustible gas or liquid.



#### **6.3.2 Installation Carrier requirements**

- 1. The mounting carrier shall be fire resistant. Do not install batteries on flammable buildings.
- 2. The mounting bracket surface shall meet the requirements of bearing requirements.





#### 6.4 Installation Instructions

#### 6.4.1 Overall Dimensions



Powerbox

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## **Step 1:** Fix the battery











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Step 3: connect the internal communication line









Please refer to 5.2.3: the dialing rule is to set the battery module address in sequence (from far to near: refers to the battery closer to the inverter)



#### 7 Cleaning and maintenance

#### 7.1 Cleaning work

Please note: please turn off the power supply of the system before cleaning. It is recommended to clean LDHEB regularly. If the shell is dirty, please use a soft and dry brush or dust collector to remove the dust. Do not use solvents, or corrosive liquids to clean the enclosure.

#### 7.2 Maintenance

#### 7.2.1 Recharging requirements during normal storage

The battery shall be stored in an environment with a temperature range of  $-10^{\circ}$ C  $\sim +45^{\circ}$ C and shall be maintained regularly according to the following table to 0.5C current is charged until 40% SOC after long storage.

Store the Ambient temperature	Relative humidity of the storage environment	Storage time	SOC
Below-10℃		Prohibit	/
-10~25℃	5%~70%	≤, deadline: 12	30%≤soc≤60%
25~35℃	5%~70%	≤, deadline for 6 months	30%≤soc≤60%
35~45℃	5%~70%	$\leq$ for 3 months	30%≤soc≤60%
Above4℃ above		Prohibit	

Charging conditions during storage



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## 7.2.2 Recharging requirements for excessive discharge

Charge the over-discharge (90%DOD) battery within the time of meeting the table below, otherwise the over-discharge battery module will be damaged.

## Charging requirements for excessive battery discharge

Storage Environment Tperature	Storage Time	Note:
-10~25℃	$\leq$ on Day 15	The battery
25~45℃	≤ Day 7:	Pack Disconnected to PCS
-10~45℃	<for 12="" hours<="" td=""><td>Battery pack Connect to the inverter</td></for>	Battery pack Connect to the inverter

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#### **8** Common Issues and Solutions

#### 8.1 Common Issues and solutions

The user can monitor the operating status, warning, and alarm information through the inverter LCD display.

1 The battery cannot be turned on, and the LED indicator lights all turn off the battery depth discharge and requires charging first. If the external charger supply voltage is 51V or above and the battery still cannot be opened, contact us.

2 The battery can be turned on but not charged or discharge If a red light indicates a system abnormality, check the following values:

1) Temperature: Above 55°C or below-10°C, the battery protection turns on. Solution: Move the battery to Normal operating temperature range between -10 °C to 55 °C.

2)Temperature: above 55 °C or below-10°C, the battery cannot discharge. Solution: Move the battery to Normal operating temperature range between -10 °C to 55 °C.

3) Current: if the current of LDHEB-4400 is greater than 60A/, if the current of LDHEB-6100 is greater than 80A, the battery protection device will open. Solution: if the working current is too large, please change the setting on the power side.

4) High voltage: if the battery voltage is higher than 57.6v or above, the battery charging protection will be turned on. Solution: if the battery is fully charged, please discharge it for a period of time. If the charging voltage is too high, please change the

setting on the power side.

5) Low voltage: when the battery is discharged to 49v or lower, the battery discharge protection will be turned on. Solution: charge the battery until the red light goes out. In addition to the above five points, if you still can't find the fault, please turn off the battery and contact us.

3. In multiple battery parallel systems, the SOC LED are different.

1) When the first installation, please charge in full first to balance the capacity gap;

2) If the minimum SOC LED indicator is less than 1 of the maximum SOCLED indicator, in operation and the SOC LED indicator is restored within 1 0 minutes, normal operation;

3) Before expanding the battery capacity, charge the online battery to 45%-50%SOC; After expanding the capacity, charge the battery system to balance the capacity gap. Ensure that the capacity difference before the parallel does not exceed 10%. If the capacity gap is large, it will take about two cycles to balance the capacity gap. The actual balance time depends on the capacity difference and the charge and discharge current. Excluding the above three points, if the SOC display still fails, contact us.

#### 8.2 Emergency

#### Please cut off the power supply and turn off the battery in case of emergency

1. If the battery pack is damp or immersed in water, do not get close to the battery, and then contact a light Science Company or an authorized dealer for technical support.

2. Do not use water to fire when a fire Only dry powder extinguishers; place the battery pack in a safe area if possible.

3. Battery leaking the electrolyte If the battery pack leaks the electrolyte, avoid

contact with the leaking liquid or gas. If someone is exposed to the leaking material,

do the following immediately.

Inhalation: evacuate the contaminated areas and seek medical treatment.

Contact: Rinse eyes with running water for 15 minutes and seek medical treatment

**Contact skin:** Wash the infected site with soap and water and seek medical treatment.

Swallow in: urge vomiting, and seek medical treatment.

Battery damage: Damaged battery is dangerous and must be treated with very

carefully. Battery cannot be used or may be dangerous to person or property. If the

battery pack is damaged, contact SEEKENER for handling.

#### 8.3 Handling of the battery system

(1) The system treatment must comply with the locally applicable disposal regulations of electronic waste and second-hand batteries

(2) Do not treat the battery system along with household waste.

- (3) Avoid exposing the battery to high heat or direct sunlight.
- (4) Avoid exposing the battery to high humidity or corrosive environments.
- (5) Do not expose the battery to a combustible gas or liquid.







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