



LV

**user
manual**

Product Model

ELS14K/16K-T

Lighting up every corner of the world with green energy

1	Basic Information	4
1.1	Description of contents	4
1.2	Scenarios of use	4
1.3	Product identification	5
2	Security measures	6
3	Technical parameters	9
4	Technical projects	10
5	Product Overview	11
5.1	Product Description	11
5.2	Introduction to Interfaces	11
5.2.1	BMUBMU/CAN Inverter Communication Port	12
5.3	Thermal management systems	14
5.4	LED Indicator Description	14
5.4.1	LED display in normal state	14
5.4.2	Charging LED display	15
5.4.3	Discharge LED display	15
5.4.4	Alarm status display	16
5.4.5	Fault status display	16
6	Installation Guide	17
6.1	Pre-installation checks	17
6.1.1	Checking the outer packaging	17
6.1.2	Checking the completeness of fittings	17
6.2	Tools used	17
6.3	Installation requirements	18
6.3.1	Installation environmental requirements	18
6.3.2	Mounting bracket requirements	19
6.4	Installation instructions	19
6.4.1	External dimensions	19
6.4.2	Minimum installation distance between the battery and the equipment:	20
6.4.3	Wall-mounted floor-mounted fixed batteries	20
6.5	Connection of all wires	21
6.5.1	Power cord connection	21
6.5.2	Connection of internal communication lines	21
6.5.3	Setting the BMS communication address	22
7	Cleaning and maintenance	23

User's Manual

ELS14K/16K-T

7.1 Cleaning.....	23
7.2 Maintenance.....	23
7.2.1 Recharging requirements during normal storage.....	23
7.2.2 Recharging requirements in case of overdischarge.....	23
8 Frequently Asked Questions and Solutions.....	24
8.1 Common Problems and Solutions.....	24
8.2 Emergencies.....	25
8.3 Handling of the battery system.....	26

1 Basic Information

This manual describes the ELS14K-T/ELS16K-T battery product. Please read this Manual thoroughly before using the battery. If you have any questions, please contact Lefor immediately for advice and assistance.

1.1 Content Description

This user manual applies to the ELS14K-T/ELS16K-T models.

This user's manual contains ELS14K-T/ELS16K-T product information, operating instructions, safety information, installation instructions, and detailed information on common operating problems and measures such as follow-up maintenance.

1.2 Usage Scenarios

The ELS14K-T/ELS16K-T is an energy storage unit designed to be used in residential grid application scenarios with short-term backup capability.

Notes on Usage:

The ELS14K-T/ELS16K-T is not intended for use with all life-sustaining medical devices. This product is to be used only in accordance with the information provided in the enclosed documentation and in accordance with applicable local standards and regulations. Any other over-the-range use may result in personal injury or property damage. The illustrations in this manual are intended only to help explain the concepts of the system configuration, including instructions for use, safety precautions, common operating problems, and subsequent battery maintenance.

Changes and modifications to the product are permitted only if, for example, express written permission is given by Intech. Unauthorized changes will not be subject to warranty and claims. Surplus Tektronix will not be liable for any damages resulting from such alterations. Any non-standard use of the product and use beyond that described in the terms and conditions will be considered a violation of the law. The attached documentation is an integral part of this product. Please keep the documentation in a safe and convenient place for future reference. The model number label (see Section 1.3) must remain on the product.

Transportation requirements





Batteries are shipped from the factory in good condition in terms of electrical, physical and cosmetic properties. During transportation, the battery modules must be placed in the same box as shipped from the factory or in another suitably sized box. The shipping company is responsible for any damage caused during transportation. Please make a complete inspection of the condition of the batteries when you receive the shipment. If you find any damage to the batteries when you receive the shipment, please notify the company responsible for the shipment immediately and, if necessary, request assistance from the installer or Lefor.





This product contains lithium batteries, which are classified as UN38.3 Class 9 Dangerous Goods, therefore, the loading and unloading of this product in the country of transportation must be in accordance with local regulations and industry standards. Rough loading and unloading may cause internal short-circuiting and damage to the battery, which may result in battery leakage, breakage, explosion and fire, so the battery must be handled gently during loading and unloading.

1.3 Product Identification

The label is attached to the product and contains product identification information. For safe use, the user must understand the contents of the label.

Tags:

 Rechargeable Li-ion Battery	
Model	ELS14K-T
Capacity (Wh)	14336
Configuration	1P16S
Rated voltage(V)	51.2
Operating voltage(V)	46.4~57.6
Max. operating current(A)	200A
Operating temperature(° C)	-20~60
Dimensions(mm)(H*W*D)	1169.5*640*196
Weight (kg)	137.5
Thermal management type	Liquid cooling/ Heating
Manufacturer	
Xiamen Lefor Energy Storage Technology Co.,Ltd.	
Unit 1104-1, No.365 Chengyi Street, Software Park Three, Torch High-tech Zone, Xiamen	
CAUTION!	
<ul style="list-style-type: none"> Do not disassemble Do not short-circuit Do not place in fire or near hot source Please read user manual carefully 	
Certification: CE,UN38.3,MSDS   	

 Rechargeable Li-ion Battery	
Model	ELS16K-T
Capacity (Wh)	16076
Configuration	1P16S
Rated voltage(V)	51.2
Operating voltage(V)	46.4~57.6
Max. operating current(A)	200A
Operating temperature(° C)	-20~60
Dimensions(mm)(H*W*D)	1169.5*640*196
Weight (kg)	158
Thermal management type	Liquid cooling/ Heating
Manufacturer	
Xiamen Lefor Energy Storage Technology Co.,Ltd.	
Unit 1104-1, No.365 Chengyi Street, Software Park Three, Torch High-tech Zone, Xiamen	
CAUTION!	
<ul style="list-style-type: none"> Do not disassemble Do not short-circuit Do not place in fire or near hot source Please read user manual carefully 	
Certification: CE,UN38.3,MSDS   	




DANGER !
CHEMICAL HAZARD &
SHOCK HAZARD

- Do not disassemble or repair by yourself.
- Do not drop, deform, impact, cut or spear with a sharp object.
- Do not place near open flame or incinerate.
- Do not put any objects onto the battery.
- Do not allow to contact with liquid.
- Keep out of reach of children, animals or insects.
- Contact the supplier within 24 hours if anything wrong.









WARNING !

Stop the battery operation immediately to secure the battery safety when environmental temperature is over working temperature (suitable operation temperature is 0~45°C). If battery is at high temperature usually, it will impact battery performance.



2 Security measures

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

"WARNINGS" in all safety messages.



Environmental requirements.

- Do not expose the battery to temperatures above 60° C;
- Do not place the battery near any heat source;
- Do not expose the battery to moisture or liquids;
- Do not expose the battery to corrosive gases or liquids;
- Do not expose the battery to flammable gases or liquids;
- Do not expose the battery to direct sunlight for long periods of time;
- Do not allow the battery power terminals to come into contact with conductive objects such as wires;
- Place the battery in a safe location away from children and animals;

Handling Precautions.

- Do not disassemble the battery;
- Do not touch the battery pack with wet hands;
- Do not crush, drop or puncture the battery;
- Do not connect batteries in series;
- Do not short-circuit the terminals, and remove all metal jewelry items that could create a short-circuit before installation and maintenance;
- Always handle products in accordance with local safety regulations;
- Store and use this battery as described in this user manual;
- Ensure reliable grounding;
- Disconnect all battery connection wires prior to installation and servicing;
- Do not stack batteries outside of their protective packaging when storing or

handling;

- Packaged batteries shall not be stacked in excess of the specified quantity specified on the package;
- Continued operation of a damaged battery may result in a hazardous situation causing serious injury such as electric shock or burning.

3 Technical parameters

Basic parameters	technical specification	
	ELS16K-T	ELS14K-T
model number	ELS16K-T	ELS14K-T
Battery Type	LiFeP04, lithium iron phosphate	LiFeP04, lithium iron phosphate
Rated capacity (AH)	314	280
Rated voltage (V)	51.2	51.2
Total energy (KWH)	16.07	14.33
Depth of discharge (100% DOD)	16KWH	14.33KWH
Maximum charging voltage (V)	57.9	57.9
Cut-off voltage (V)	46.4	46.4
Maximum discharge current (A)	200A	200A
Continuous discharge current	200A	200A
Maximum charging current (A)	200A	200A
Continuous charging current	200A	200A
Operating humidity	≤95%rh (non-condensing)	
Storage environment humidity	≤95%rh (non-condensing)	
Working altitude	≤2000m	
Maximum number of parallel	15	
protection class	IP65	
Net weight (Kg)	155KG	150KG
Dimension (mm)	1169.5*640*196	1169.5*640*196
accreditation	CE, IROHS, MSDS, IEC 62619, UN 38.3, CE-EMC	
Cycle life	≥6000 cycles /25°C/0.5C, 60%EOL	
communication port	CAN, RS485	
Thermal management methods	Liquid cooling/heating	
Display mode	LED+APP	
Installation	Floor to wall fixing	
Battery operation ambient	-20° C ~ 60° C	
Storage temperature	≤25° C for 12 months;	
	≤35° C for 6 months;	
	≤45° C for 3 months	

Note: Adjust the operating current according to the battery voltage and battery temperature.

4 Technical projects

serial number	noun (part of speech)	marginal notes
1	electrical discharge	Battery output power
2	fig. rest and recuperate	Power is injected into the battery via the charger
3	replenishment	The battery is fully charged and the SOC is 100%.
4	pragmatic	Ready to charge or discharge
5	cloture	Disconnect battery output
6	SOC	State of charge (available capacity)
7	Battery Voltage	Voltage between battery +/-
8	Single String Voltage	Single cell voltage
9	warning light	Indicates that the battery is in an abnormal state
10	safeguard	Battery stops charging and discharging
11	malfunctions	Battery or BMS is damaged and needs to be replaced
12	allow (sb. to act arbitrarily)	Battery is low and needs to be recharged in time

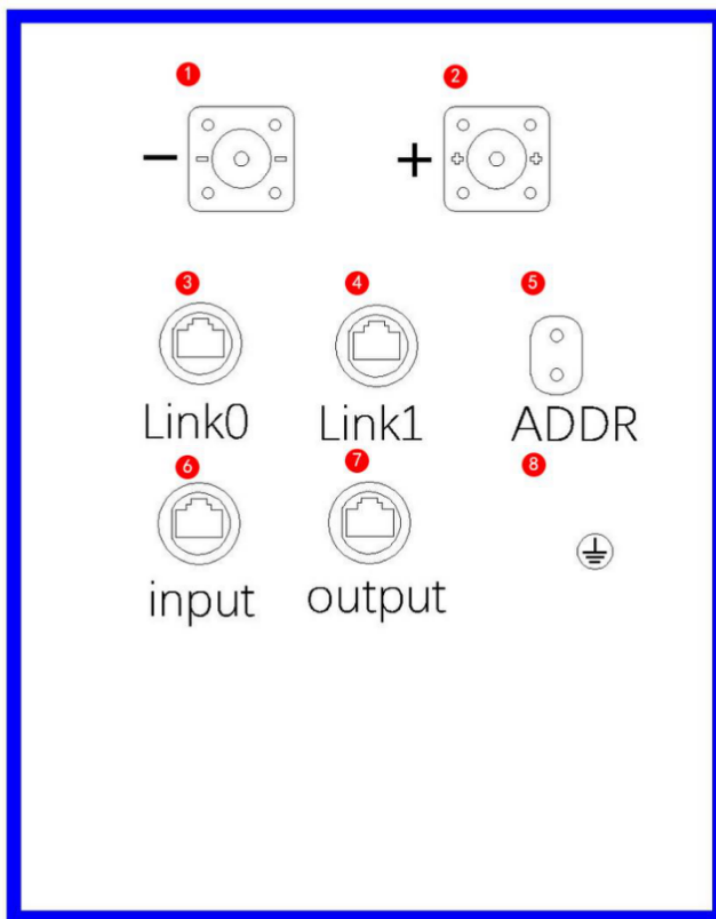
5 Product Overview

5.1 Product Profile

Product Overview: The ELS14K-T/ELS16K-T is a lithium battery energy storage system with an operating voltage range of 46.4V~57.9V, which is used for home energy storage applications and cooperates with low-voltage inverters for home energy storage purposes.

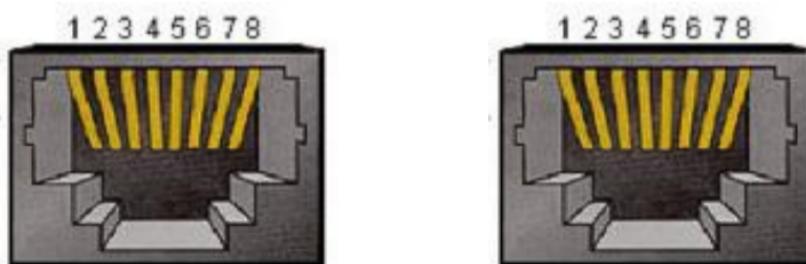
The ELS14K-T/ELS16K-T has a built-in BMS (Battery Management System) that manages and monitors battery information, including voltage, current and temperature. In addition, the BMS can balance the battery charge to extend the life of the battery, with protection functions such as over-discharge, over-charge, over-current, high/low temperature, etc., and the system automatically manages the charging state, discharging state and balancing state. Multiple batteries can be connected in parallel to expand storage capacity for greater capacity and sustained power support time, and the ELS14K-T/ELS16K-T supports 15 in parallel operation.

5.2 Introduction to the interface



serial	various	serial	various
1/2	Power negative/power positive	3	inverter port
4	host computer port	5	dial-up address port
6/7	Parallel access/output ports	8	grounding port

5.2.1 BMU/CAN inverter communication port



Interface 3	Description of	Interface 4	Description of
-------------	----------------	-------------	----------------

(Pin)	definitions	(pin)	definitions
1	Output voltage 12V+	1	/
2		2	/
3	Output Voltage 5V+	3	/
4	CAN H	4	CAN H
5	CAN L	5	CAN L
6	/	6	/
7	Output voltage 12V-	7	/
8		8	/

The communication terminal follows the CAN protocol and is connected to the inverter BMS for communication.

The BMU controls the charging current/charging voltage or the discharging current/discharging cutoff voltage of the inverter based on the battery voltage and battery temperature via CAN communication.

5.3 Thermal management systems

This series of batteries is equipped with a self-developed thermal management system, which can help the batteries work normally in more severe environments (ambient temperatures higher than -20°C or lower than 60°C) and control the temperature difference between the cells within 2°C . When the battery temperature is higher than 40°C , the thermal management system's automatically starts the cooling mode, cooling the battery cell to 38°C and then stops working until the battery temperature is maintained at $38\sim 40^{\circ}\text{C}$; when the battery temperature is lower than 10°C , the thermal management system automatically starts the heating mode, heating the battery cell to 15°C and then stops working until the battery temperature is maintained at $10\sim 15^{\circ}\text{C}$;

5.4 LED Indicator Description

5.4.1 LED display in normal state

Normal operation status indication						
state of affairs	Power indicator	warning indicator	SOC Indicator			
			L1	L2	L3	L4
turn off (a machine or device)	cloture	cloture	cloture	cloture	cloture	cloture
pragmatic	green light flashing	cloture	Depends on battery level percentage			
fig. rest and recuperate	Green light always on	cloture				
discharger	Blue light always on	cloture				

5.4.2 Charging LED display

SOC indicator display table during charging				
SOC value	SOC lamp			
	L1	L2	L3	L4
0%-5%	cloture	cloture	cloture	cloture
6%-25%	vague (of speech)	cloture	cloture	cloture
26%-50%	Ever Bright	vague (of speech)	cloture	cloture
51%-75%	Ever Bright	Ever Bright	vague (of speech)	cloture
76%-99%	Ever Bright	Ever Bright	Ever Bright	vague (of speech)
100%	Ever Bright	Ever Bright	Ever Bright	Ever Bright

5.4.3 Discharge LED display

SOC indicator display table during discharge				
SOC value	SOC lamp			
	L1	L2	L3	L4
76%-100%	Ever Bright	Ever Bright	Ever Bright	Ever Bright
51%-75%	Ever Bright	Ever Bright	Ever Bright	cloture
26%-50%	Ever Bright	Ever Bright	cloture	cloture
6%-25%	Ever Bright	cloture	cloture	cloture

0%-5%	cloture	cloture	cloture	cloture
-------	---------	---------	---------	---------

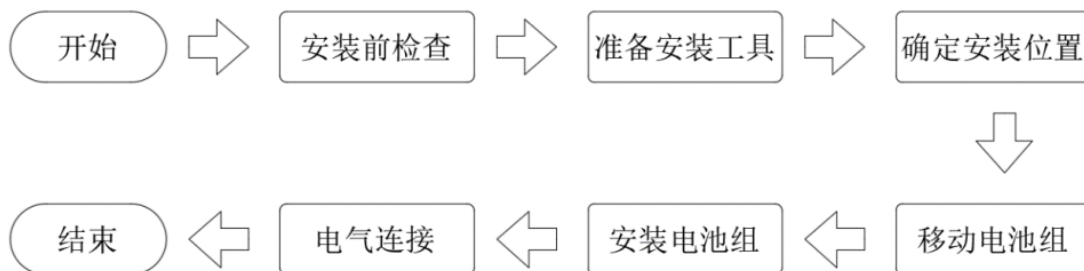
5.4.4 Alarm status display

Alarm status indication						
Alarm type	Power indicator	warning indicator	SOC Indicator			
			L1	L2	L3	L4
Over voltage alarm	cloture	red light flashing	Ever	cloture	cloture	cloture
Low voltage alarm	cloture	red light flashing	cloture	Ever	cloture	cloture
Overcurrent Alarm	cloture	red light flashing	cloture	cloture	Ever	cloture
Low insulation	cloture	red light flashing	cloture	cloture	cloture	Ever
Alarm for excessive cell	cloture	red light flashing	Ever	Ever	cloture	cloture
Alarm for excessive	cloture	red light flashing	Ever	cloture	Ever	cloture
Over Temperature Alarm	cloture	red light flashing	Ever	cloture	cloture	Ever
Low temperature alarm	cloture	red light flashing	cloture	Ever	Ever	cloture
Other Alarms	cloture	red light flashing	Ever	Ever	Ever	Ever

5.4.5 Fault status display

Fault status indication						
Fault type	Power indicator	warning indicator	SOC Indicator			
			L1	L2	L3	L4
Overvoltage protection	cloture	Red light always	Ever	cloture	cloture	cloture
Undervoltage protection	cloture	Red light always	cloture	Ever	cloture	cloture
Overcurrent protection	cloture	Red light always	cloture	cloture	Ever	cloture
Low insulation	cloture	Red light always	cloture	cloture	cloture	Ever
Differential voltage	cloture	Red light always	Ever	Ever	cloture	cloture
Failure of excessive	cloture	Red light always	Ever	cloture	Ever	cloture
Over Temperature	cloture	Red light always	Ever	cloture	cloture	Ever
Low temperature fault	cloture	Red light always	cloture	Ever	Ever	cloture
Intranet communication	cloture	Red light always	cloture	Ever	cloture	Ever
Other faults	cloture	Red light always	Ever	Ever	Ever	Ever

6 Installation Guide



Installation workflow diagram

6.1 Pre-installation checks




6.1.1 Checking the outer packaging





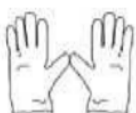



Packaging materials and components may be damaged during shipping. Therefore, please check the outer packaging materials before installing the battery. Check the packaging material for surface damage such as holes and cracks. If any damage is found, do not unbox the battery and contact your dealer as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

6.1.2 Checking for completeness of fittings

After opening the box, check that the random accessories are complete. If any damage is found or any parts are missing, contact your dealer.

6.2 Tools used by

typology	Tools used		
mounting tool	Knife 	Hammer drill 	Socket wrench 

	Rubber mallet 	Cross Screwdriver 	
	Incinometer 	Measuring tape 	
protective gear	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

6.3 Installation Requirements

6.3.1 Installation Environment Requirements

1. Drop the battery down against the wall type of mounting.
2. Place the battery in a safe location away from children and animals.
3. Do not place the battery near any heat source and avoid sparks.
4. Do not expose the battery to humid air or liquids.
5. Do not expose the battery to direct sunlight.
6. Do not expose the battery to flammable gases or liquids.

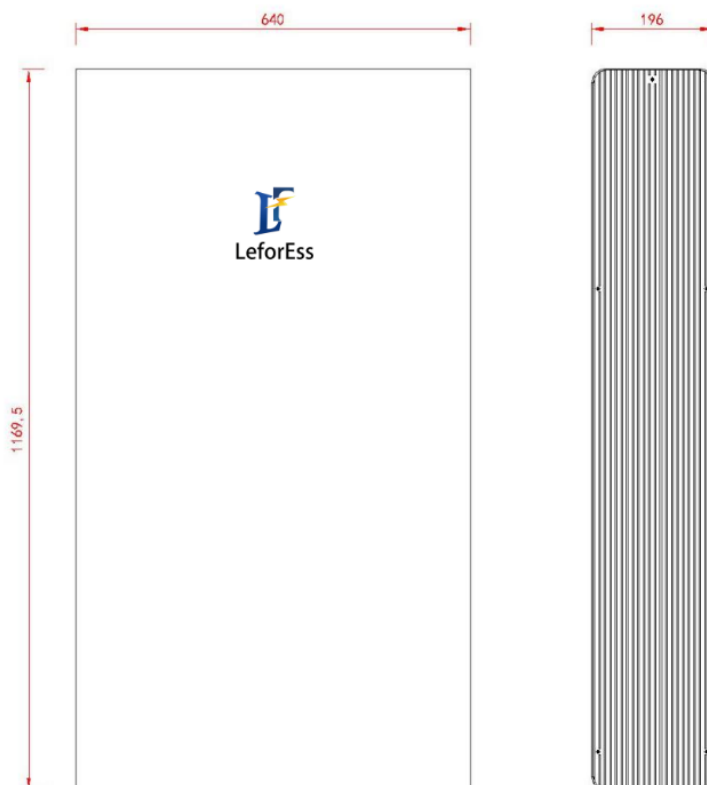
6.3.2 Mounting Bracket Requirements

1. The mounting bracket should be fire resistant. Do not mount the battery on a flammable building.
2. The surface of the mounting bracket should meet the requirements of the load bearing capacity.



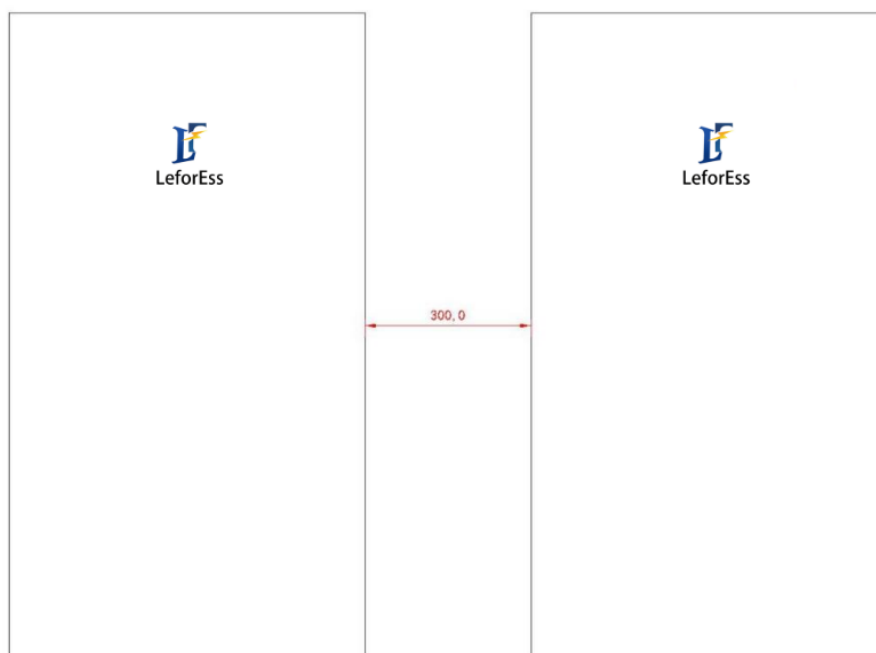
6.4 Installation of instructions for use

6.4.1 External Dimensions

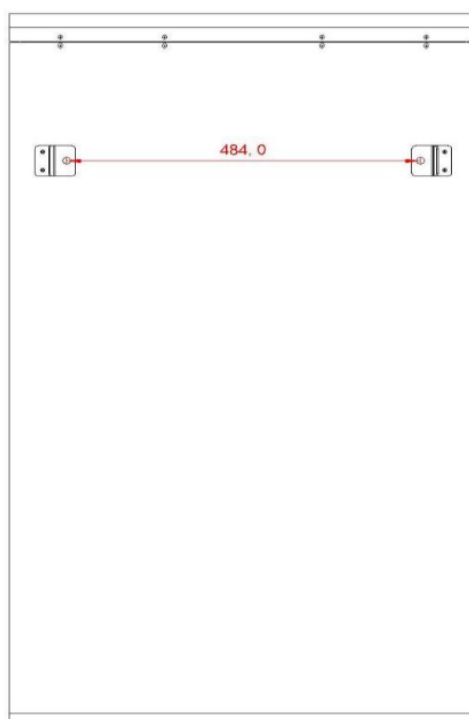


ELS14K-T/ELS16K-T

6.4.2 Minimum installation distance between the battery and the equipment:



6.4.3 Wall-mounted floor-mounted fixed batteries

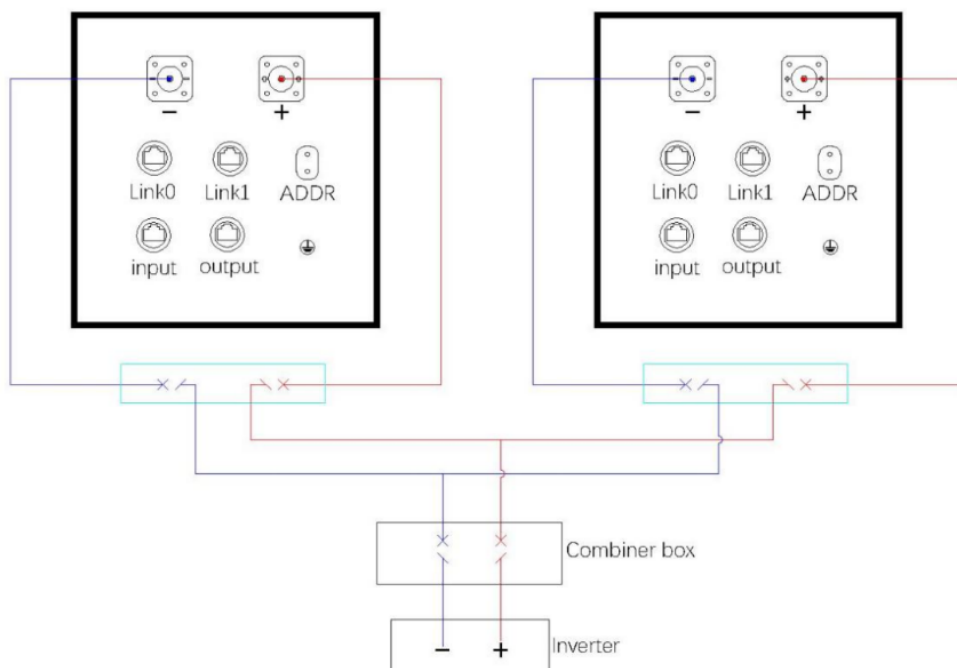


There is a positioning paper shell attached in the packing box, draw the mark

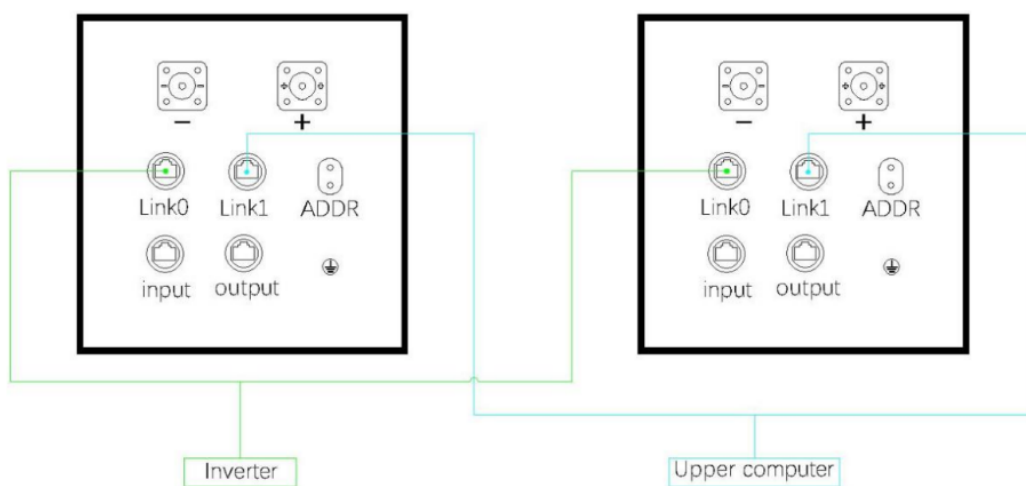
to punch the holes, lock the internal expansion screws to fix the wall mounted plate .

6.5 Connection of all wires

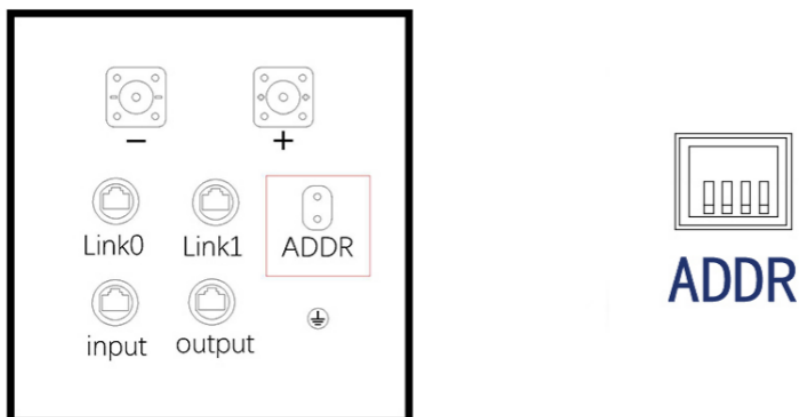
6.5.1 Power cord connection



6.5.2 Connection of internal communication lines



6.5.3 Setting the BMS communication address



请参照5. 2. 1地址拨码拨码规则是依次设定电池模块地址（从远至近顺序《近：指的是离逆变器更近的那一个电池》）

7 Cleaning and Maintenance

7.1 Cleaning

CAUTION: Turn off the power to the system before cleaning.

Regular cleaning of the product is recommended. If the housing is dirty, use a soft, dry brush or duster to remove dust. Do not use solvents, or caustic liquids to clean the housing.

7.2 Maintenance

7.2.1 Recharging requirements during normal storage

Batteries should be present at a temperature range between 5° C to 50° C and maintained periodically according to the table below, charged at 0.5C current until 40% SOC after extended storage.

Charging conditions for storage

Storage	Relative humidity of	storage time	SOC
below 0° C		prohibition	
-10~25°C	5%~70%	≤, Deadline:	30%≤soc≤60%
25~35°C	5%~70%	≤, deadline 6	30%≤soc≤60%
35~45°C	5%~70%	≤3 months	30%≤soc≤60%
Above 45° C		prohibition	

7.2.2 Recharging Requirements in the Event of Overdischarge

Charge an over-discharged (90% DOD) battery within a time frame that complies with the table below or the over-discharged battery module will be damaged.

Charging Requirements for Overdischarged Batteries

Storage ambient	storage time	Notes:
-10~25°C	≤ within 15	

25~45°C	≤ Day 7:	
-10~45°C	<12 hours	Battery pack connected to

8 Frequently Asked Questions and Solutions

8.1 Common Problems and Solutions

Users can monitor the operating status, warning and alarm messages through the inverter LCD and battery LCD.

1. Battery will not turn on, battery is deeply discharged and needs to be charged first. If the external DC charger power supply voltage is 51V or above and the battery still cannot be turned on, please contact Lefor.
2. Battery can be turned on, battery fault light flashing or always on, according to the fault checklist to check the specific cause of the fault, and contact Lefor after-sales service.
 - 1) Temperature: Above 60° C or below -20° C, battery protection will turn on. Solution: Move the battery to a normal operating temperature range between -20° C and 60° C.
 - 2) TEMPERATURE: Battery will not discharge above 60° C or below -20° C. Solution: Move the battery to the normal operating temperature range between -20° C and 60° C.
 - 3) CURRENT: If the current is greater than 50A, the battery protection will open. Solution: Please stop using appliances that exceed the maximum power load of the battery.
 - 4) High Voltage: If the battery voltage is higher than the maximum charging voltage, the battery charging protection will turn on. Solution: The inverter will stop charging the battery if the inverter is set to LI mode or set a reasonable charging voltage.
 - 5) LOW VOLTAGE: Battery discharge protection will turn on when the battery is

discharged to cutoff voltage or lower. Solution: Charge the battery until the red light goes out.

Excluding the above five points, if you still cannot find the fault, please turn off the battery and contact Lefor.

3. It is normal that the displayed SOC values are different in the parallel connection system of multiple batteries. Before installing the batteries in parallel, please measure the voltage of each battery first to ensure that the voltage difference between the parallel batteries is within 1V.

- 1) When installing for the first time, please charge it in full first to balance the capacity gap;
- 2) If the lowest SOC display percentage is compared to the highest SOC display percentage and the error is within 10%, the work is in progress and the SOC percentage display returns to the same within 10 minutes, then it is in normal operating condition;
- 3) Before expanding the battery capacity, charge and discharge the in-line battery to 45%–50% SOC; after expanding the capacity, charge the battery system to equalize the capacity difference. Ensure that the capacity difference before parallelization does not exceed 10%. If the capacity difference is large, it will take about 2 cycles to balance the capacity difference. The actual balancing time depends on the capacity difference and charging/discharging current. After eliminating the above three points, if the SOC still shows a fault, please contact Lefor.

8.2 emergencies

Please disconnect the power and turn off the battery in case of emergency.

1. **Damp Batteries** If the battery pack is damp or submerged in water, do not go near the batteries and then contact Lefor for technical support.
2. **Water may not be used to extinguish fire!** Use only a dry powder fire extinguisher; if possible, place the battery pack in a safe area.

3. **Batteries Leaking Electrolyte** If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If anyone comes into contact with the leaked substance, perform the following actions immediately.

INHALATION: Evacuate contaminated area and seek medical attention.

Contact with eyes: flush eyes with running water for 15 minutes and seek medical attention.

Contact with skin: wash infected area thoroughly with soap and water and seek medical attention.

SWALLOWED: Induce vomiting and seek medical attention.

Battery Damage : Damaged batteries are dangerous and must be handled with great care. Batteries must not be used further as they may pose a danger to people or property. If the battery pack is damaged, contact Lefor for disposal .

8.3 Handling of battery systems

- (1) The system must be handled in accordance with locally applicable regulations for the disposal of e-waste and used batteries.
- (2) Do not dispose of the battery system with household trash.
- (3) Avoid exposing the battery to high temperatures or direct sunlight.
- (4) Avoid exposing the battery to high humidity or corrosive environments.
- (5) Do not leave batteries exposed.



Xiamen Lefor Energy Storage Technology Co.,Ltd.

**Address: Unit 1104-1, No.365 Chengyi Street, Software Park Three,
Torch High-tech Zone, Xiamen**