



LEDVANCE USER MANUAL

Battery Energy Storage System

LES-HV-4K

LES-HV-SYS



CONTENTS

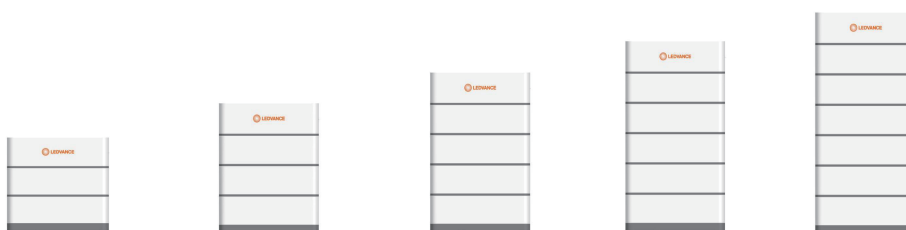
IMPORTANT INFORMATION IN THE MANUAL	1
Scope	1
Description of LES-HV-4K	1
Meaning of Symbols	2
General Safety Information	4
Disclaimer	4
Proper Use	5
SAFETY	6
Safety Rules	6
Safety Information	6
SCOPE OF DELIVERY	7
LES-HV-SYS Package	7
LES-HV-4K Battery Package	8
BATTERY SYSTEM INTRODUCTION	9
Installation Interface	10
Number of Battery Modules Supported by LES-HV-4K	11
INSTALLATION	12
Installation Circumstances Requirement	12
Tools & Installation	13
System Installation Steps	14
Selection of Installation Sites	16
Pin Definition of Interface	16
Batteries in Parallel	17
COMMISSIONING	18
Switch on the Battery System	18
Led Signal	19
Switch off the Battery System	19
SAFETY DESIGN	20
Electrical Schematic Diagram	20
MAINTENANCE AND STORAGE	21
Maintenance	21
Storage	21
Wi-Fi DISTRIBUTION NETWORK	23
DISPOSAL	28

IMPORTANT INFORMATION IN THE MANUAL

Scope

This installation and operation manual applies to the stackable battery energy storage system. Please carefully read this manual to guide installation, preliminary debugging, and maintenance of LES-HV-4K installation. Preliminary debugging and maintenance must be carried out by qualified and authorized engineer. Please keep this installation and operation manual and other applicable documents near the battery energy storage system, so that all engineer who involved in installation or maintenance can access this installation and operation manual at any time.

Description of LES-HV-4K



MODULE	LES-HV-4K 8 kWh	LES-HV-4K 12 kWh	LES-HV-4K 16 kWh	LES-HV-4K 20 kWh	LES-HV-4K 24 kWh
Battery Module Number	2	3	4	5	6
Nominal Voltage (V)	204.8	307.2	409.6	512	614.4
Operating Voltage (V)	179.2-233.6	268.8-350.4	358.4-467.2	448-584	537-700.8
Nominal Capacity (Ah)	40				
Nominal Energy (kWh)	8.192	12.288	16.384	20.48	24.576
Available Energy (kWh)	7.373	11.059	14.746	18.432	22.118
Recommended Discharge Current (A)	20				
Max. Discharge Current (A)	40				
Max. Charge Current (A)	40				
Discharge Rate	1C				
Depth Discharge (%)	90%				
Discharge Temperature (°C)	-18~ 58				
Charge Temperature (°C)	2 ~ 48				
Cycle Life	25°C ± 2°C, 0.5C / 0.5C, 90% DOD, EOL 70% ≥ 6000 cycles				
Warranty	Standard 10 years				

IMPORTANT INFORMATION IN THE MANUAL

MODULE	LES-HV-4K 8 kWh	LES-HV-4K 12 kWh	LES-HV-4K 16 kWh	LES-HV-4K 20 kWh	LES-HV-4K 24 kWh
Terminal	MC4				
Communication	CAN 2.0 / RS485 / WiFi / Bluetooth				
SOC Display	5 LEDs (20%, 40%, 60%, 80%, 100%)				
Installation	Floor mounting				
Dimension W*D*H (mm)	600*400*560	600*400*730	600*400*900	600*400*1070	600*400*1240
Battery Module (kg)	36.5±1				
High Voltage Control Box (kg)	13±1				
Battery Module Base (kg)	4.5±0.5				
Weight (kg)	92	129	166	203	240
Humidity	5% ~ 95% RH				
Altitude (m)	≤ 2000				
IP Rating of Enclosure	IP65				
Certificate	EC 62619/EMC/UN38.3/CE				
Extensibility	Up to 8 systems can be used in parallel				

Meaning of Symbols

This manual contains the following types of warnings:



DANGER!

It may cause an electric shock.

Even when the equipment is disconnected from the grid, the voltage-free state will have a time lag.



DANGER!

If the instructions are not observed, death or severe injury may occur.



WARNING!

If the instructions are not observed, a loss may occur.



ATTENTION!

This symbol represents information on the device use.

IMPORTANT INFORMATION IN THE MANUAL

The following types of warning, prohibition, and mandatory symbols is important.



ATTENTION! THE RISK OF CHEMICAL BURNS

If the battery is damaged or fails, it may lead to electrolyte leakage, which in turn causes the formation of a small amount of hydrofluoric acid, among other effects. Contact with these liquids can cause chemical burns.

- Do not subject the battery module to severe impact.
- Do not open, disassemble or mechanically change the battery module.
- In case of contact with an electrolyte, wash the affected area with clean water immediately and seek medical advice promptly.



ATTENTION! THE RISK OF EXPLOSION

Incorrect operation or fire may cause the lithium-ion battery unit to ignite or explode, leading to serious injury.

- Do not install or operate the battery module in explosive or high-humidity areas.
- Store the battery module in a dry place within the temperature range specified in the datasheet.
- Do not open, drill through or drop the battery cell or module.
- Do not expose the battery cell or module to high temperatures.
- Do not throw the battery cell or module into the fire.
- If there is a fire from the battery, please use the CO₂ extinguisher. If there is a fire near the battery, please use a dry powder extinguisher.
- Do not use defective or damaged battery modules.



CAUTION! HOT SURFACE

- If a malfunction occurs, the parts will become very hot, and touching them may cause serious injury.
- If the energy storage system is defective, please shut it down immediately.
- If the fault or defect becomes obvious, special care should be taken when handling the equipment.



NO OPEN FIRE!

- It is prohibited to handle open flames and ignition sources near the energy storage system.



Do not insert any objects into the opening in the housing of the energy storage system!

- No objects, such as screwdrivers, may be inserted through openings in the casing of the storage system.

IMPORTANT INFORMATION IN THE MANUAL



WEAR SAFETY GOGGLES!

Wear safety goggles when working on the equipment.



FOLLOW THE MANUAL!

When working and operating the equipment, the installation and operation manual provisions must be observed.

General Safety Information



DANGER!

Failure to comply with the safety information can lead to life-threatening situations.

1. Improper use can cause death. Operators of LES-HV-4K must read this manual and observe all safety information.
2. Operators of LES-HV-4K must comply with the specifications in this manual.
3. This manual cannot describe all conceivable situations. For this reason, applicable standards and relevant occupational health and safety regulations are always given priority.
4. In addition, the installation may involve residual hazards in the following circumstances: incorrect installation; the installation is carried out by personnel who did not receive relevant training or guidance; failure to observe the warnings and safety information in this manual.

If there are any questions, please contact LEDVANCE service.

Disclaimer

LEDVANCE POWER shall not be liable for personal injury, property loss, product damage and subsequent losses under the following circumstances.

- Failure to comply with the provisions of this manual.
- Incorrect use of this product.
- Unauthorized or unqualified personnel repair the product, disassemble the rack and perform other operations.
- Use of unapproved spare parts.
- Unauthorized modifications or technical changes to the product.
- System not connected to our cloud monitoring system.

IMPORTANT INFORMATION IN THE MANUAL

Proper Use

- The battery energy storage system can only be installed and operated under the eaves or indoors. The working environment temperature range of LES-HV-4K is -18°C ~ 58°C for discharging, and 2°C~48°C for charging) the maximum humidity is 95%. The battery module shall not be exposed to the sun or placed
- Directly beside the heat source.
- The battery module shall not be exposed to a corrosive environment.
When installing the battery energy storage system, ensure that it stands on a sufficiently dry and flat surface with sufficient bearing capacity. Without the manufacturer's written approval, the installation site's altitude
- shall not be higher than 2,000 meters. The rated output power of the battery will decrease with the altitude. In areas where flooding may occur, care must be taken to ensure that the battery module is installed at a
- suitable height to prevent contact with water.
The battery energy storage system must be installed in a fireproof room. This room must have no fire source and must be equipped with an independent fire alarm device, which complies with local applicable regulations and standards. Similar fire-proof requirements apply to other openings in the room (such as windows).

Compliance with the specifications in this manual is also part of proper use.

Requirements for Installation Personnel

All work shall comply with local applicable regulations and standards.

The installation of LES-HV-4K can only be completed by electricians with all following qualifications:

- Trained in dealing with hazards and risks associated with the installation and operation of electrical equipment, systems, and batteries.
- Trained on installation and rework with electrical equipment.
- Understanding and complying with the technical connection conditions, standards, guidelines, regulations, and laws applicable.
- Knowledge of handling lithium-ion batteries (transportation, storage, disposal, hazard source).
- Understanding and complying with this document and other applicable documents.

SAFETY

Safety Rules

To avoid property damage and personal injury, the following rules shall be followed when working on the hazardous live parts of the battery energy storage system:

- It is available for use.
- Ensure that it will not restart.
- Make sure there is no voltage.
- Grounding protection and short circuit protection.
- Cover or shield adjacent live parts.

Safety Information

Part damage or short circuit may cause electric shock and death. A short circuit can be caused by connecting battery terminals, resulting in current flow. This type of short circuit shall be avoided under any circumstances. For this reason, follow these instructions:

- Use insulated tools and gloves.
- Do not put any tools or metal parts on the battery module or high-voltage control box.
- When operating the battery, be sure to remove watches, rings, and other metal objects.
- Do not install or operate this system in explosive or high-humidity areas.
- When working on the energy storage system, first turn off the charging controller, then the battery, and ensure that they are not turned on again.

Improper use of the battery energy storage system can lead to death. The use of the battery energy storage system beyond its intended use is not allowed, because it may cause great danger.

Improper handling of the battery energy storage system can cause life-threatening risks, serious injury or even death.



Warning! Improper use can cause damage to the battery cell.

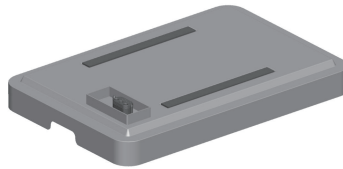
- Do not expose the battery module to rain or soak it in liquid.
- Do not expose the battery module to a corrosive environment (such as ammonia and salt).
- The battery energy storage system shall be installed no later than six months after delivery.
- Once the installation is performed, the battery should be connected within a month at the end user.

SCOPE OF DELIVERY

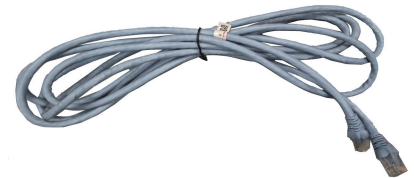
LES-HV-SYS Control Box & Base Package



LES-HV-SYS (control box) x 1



LES-HV-SYS base x 1



2M black external communication cable (RJ45-M19) x 1



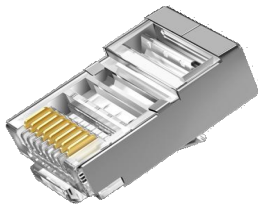
2M yellow-green grounding cable (8 AWG) x 1



Staubli-PV-KBT4-EVO ST/10II (Positive wire joint) x 1



Staubli-PV-KST4-EVO ST/10II (Negative wire joint) x 1



RJ 45 Crystal head x 2



LP-16-C/RJ45/015/ PE-42-001, RJ45 Public plug x 1



Unlock the tool PV-MS-MC4-EVO2 staubli x 1



Bracket x 2



Screw M4 x 4



Expansion bolt M6 x 2



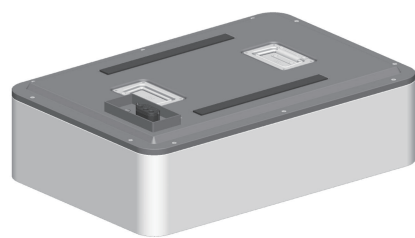
LEDVANCE USER MANUAL
Battery Energy Storage System
LES-HV-4K
LES-HV-SYS



User manual

SCOPE OF DELIVERY

LES-HV-4K Battery Package



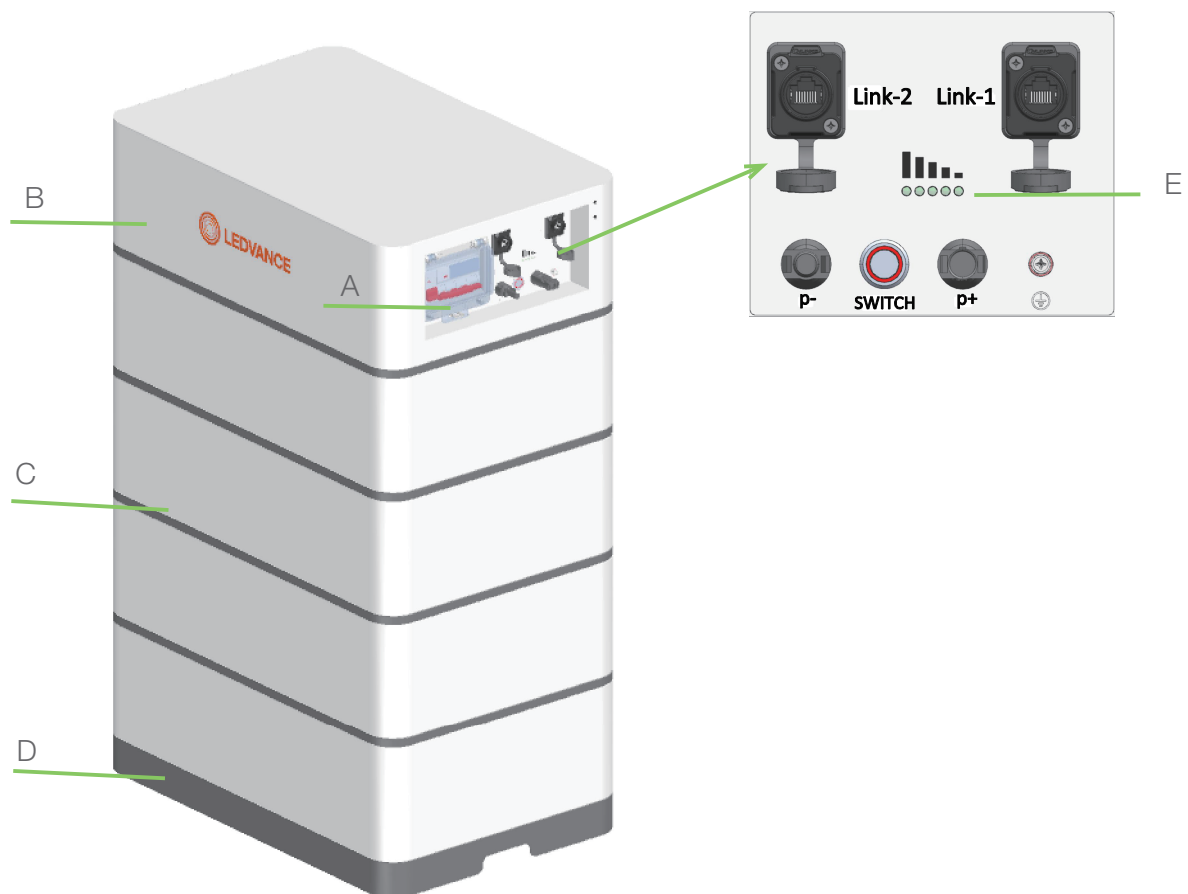
LES-HV-4K x 1

LES-HV-SYS Control Box & Base Package	
1	High voltage control box
2	Battery base
3	2M black external communication cable (RJ45-M19)
4	2M yellow-green grounding cable (8 AWG)
5	Staubli-PV-KBT4-EVO ST/10II (Positive wire joint)
6	Staubli-PV-KST4- EVO ST/10II (Negative wire joint)
7	RJ 45 Crystal head x 2
8	LP-16-C/RJ45/015/ PE-42-001, RJ45 Public plug
9	Unlock the tool PV-MS-MC4-EVO2 staubli
10	Bracket used to fix products on walls
11	Screw M4 x 4
12	Expansion bolt M6 x 2
13	User manual
LES-HV-4K Storage Battery Package	
Battery module LES-HV-4K	

BATTERY SYSTEM INTRODUCTION

The Battery System LES-HV-4K is used as a connected battery for the intermediate storage of excess PV energy in an inverter system.

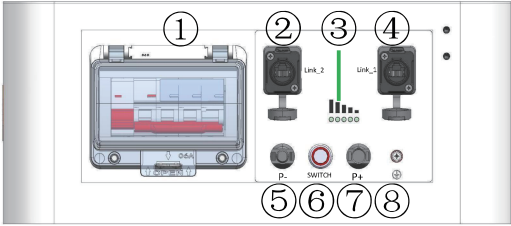
A	Installation interface
B	LES-HV-4K (high voltage control box)
C	LES-HV-4K (battery module)
D	LES-HV-4K (battery base)
E	LED



BATTERY SYSTEM INTRODUCTION

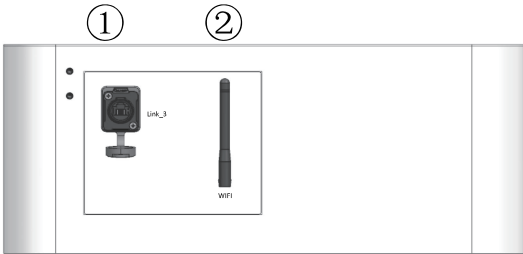
Installation Interface

Interface right side view



	Name	Description
①	DC Breaker	High voltage DC breaker
②	Link_2	Communication interface (for maintenance)
③	LED	SOC display
④	Link_1	Communication interface (for battery module)
⑤	P-	"DC-" terminal
⑥	Switch	Black Start Switch
⑦	P+	"DC+" terminal
⑧	Grounding	Grounding connection

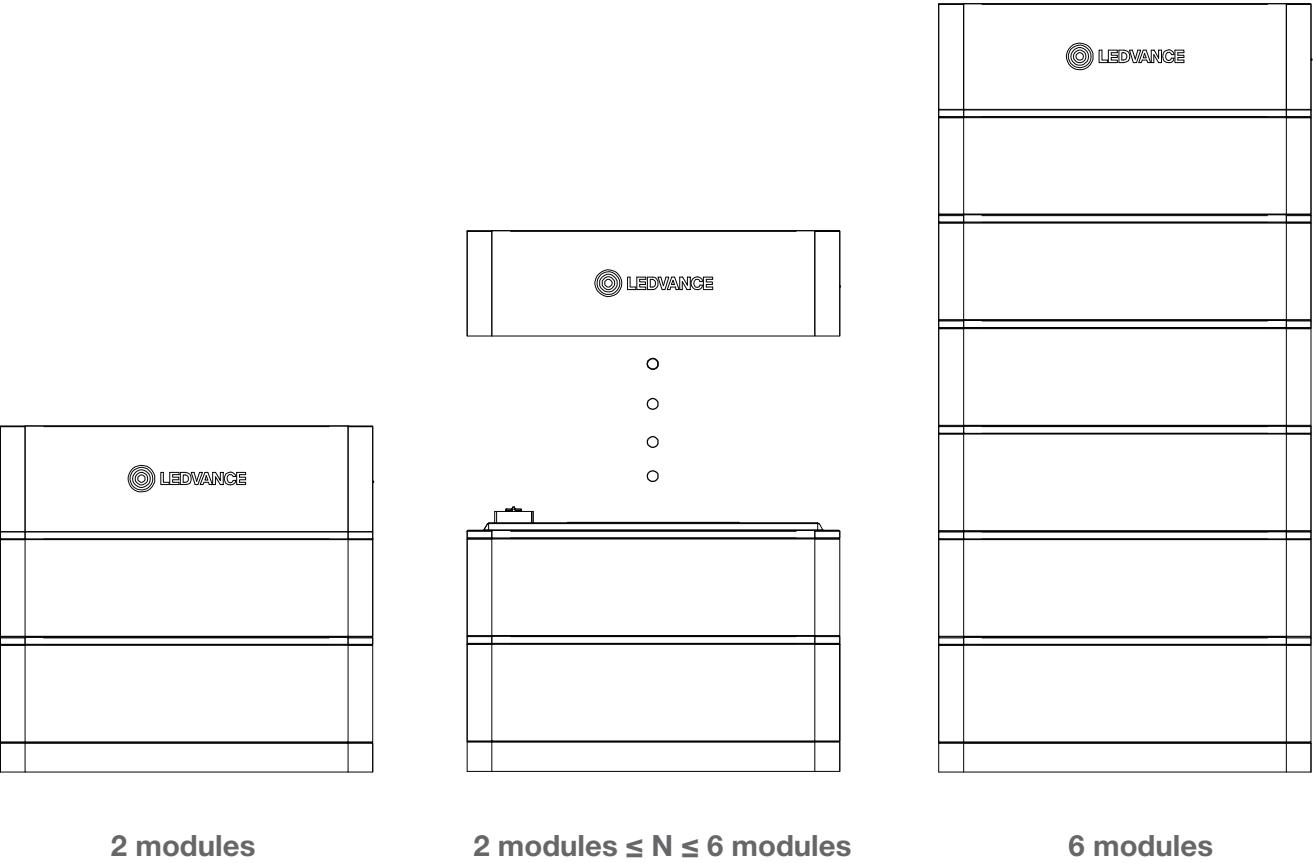
Interface left side view



	Name	Description
①	Link_3	Communication Interface (for batteries in parallel)
②	WiFi	WiFi Antenna

BATTERY SYSTEM INTRODUCTION

Number of Battery Modules Supported by LES-LV-4K

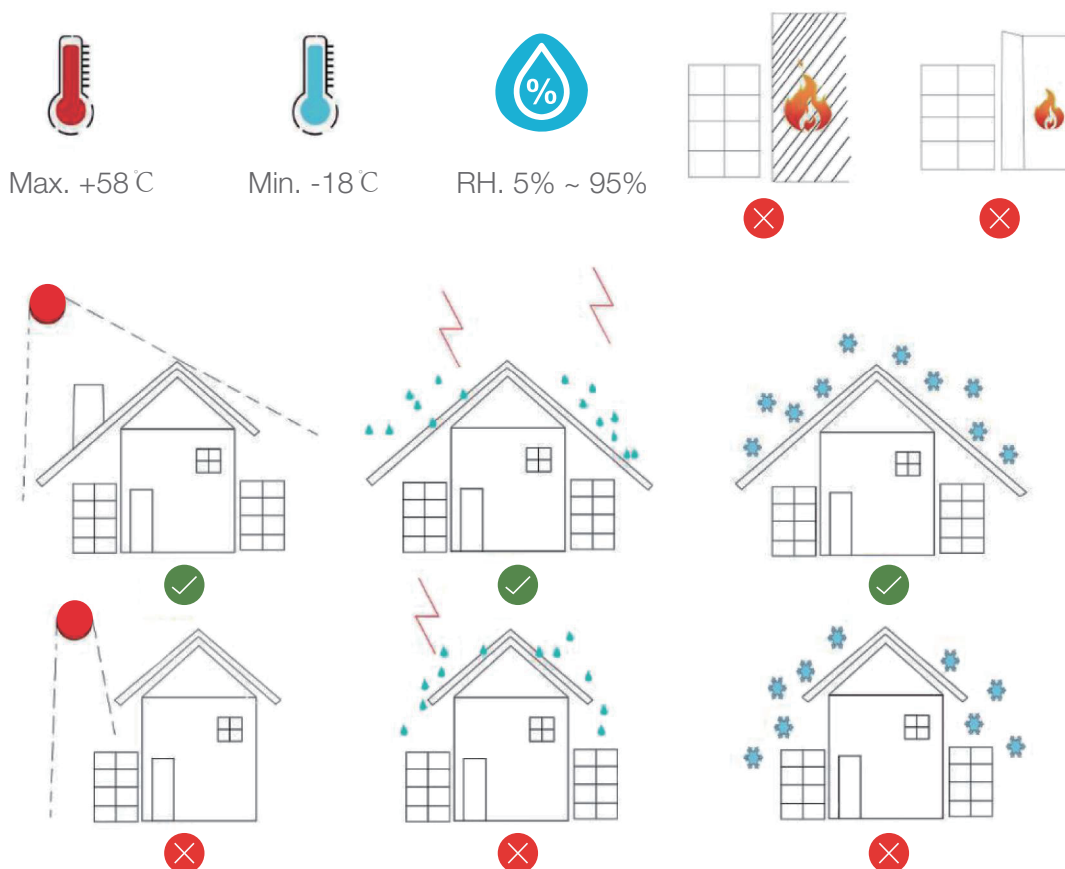


Note: Minimum two battery modules are required and maximum six modules in one parallel.

INSTALLATION

Installation Circumstances Requirement

- Installed on the surface with enough dryness, horizontal and flat, and has sufficient carrying capacity. For example, concrete or masonry.
- The altitude of the installation location must not be higher than 2000 meters. The output power of the battery will decrease with the height of the altitude.
- If in the flood area, you must pay attention to ensure that the battery is installed in an appropriate altitude to prevent contact with water.
- Ensure there is no fire source, and it must be equipped with an independent fire alarm device.
- Cannot be exposed to corrosive environments.
- The working temperature range should be -18°C to 58°C for discharging, and 2°C to 48°C for charging.
- The maximum environment humidity is 95%.
- Can't be exposed to the sun or beside the heat source directly.
- The installation site must be away from the children.
- The installation position must be compatible with the weight and size of the battery.



INSTALLATION

Tools

1. When installing the battery system, wear the following safety equipment.



Gloves



Goggles



Safety shoes

2. To install the battery system, you need the following tools



Socket head wrench



External hexagonal wrench



Electric drill

Attention!

- Because the DC cable or connector on the battery system may cause electric shock or threatening life, do not touch the end of the non-insulating cable.
- If the battery module incorrectly lifts or falls in the process of transportation or installation, it may cause the risk of injury due to the weight of the battery module.
- Carefully transport and lift the battery module. Consider the weight of the battery module.
- For those who work on the battery system, please wear qualified personal protection equipment.

Note: Before the battery is installed, please switch off the switch on the high voltage control box.

Note: Wear gloves, goggles and safety shoes before installation.

Installation



CAUTION!

- Before installation, please make sure to wear the safety shoes to prevent foot injury.
- The weight of a battery module is over 30 kg. please use the movable tools with two workers to complete stacking work.
- Do not use the movable handle tool to carry the battery module when the distance is ≥ 10 m.
- Before using the transport tools, check whether they are reliable.
- The installation humidity ranges from 5 % to 90 %

INSTALLATION

System Installation Steps

- Take out the base and battery module. Place the base on hard floor, lift the battery module on top of the base using a movable handle tool.

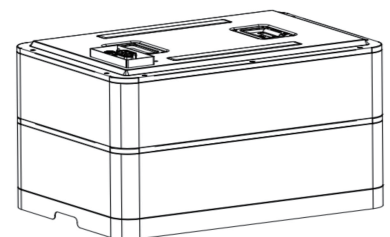
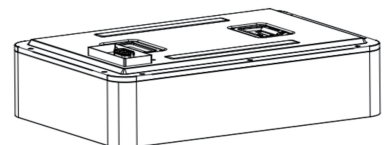
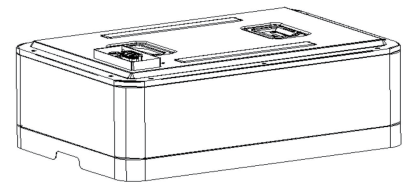
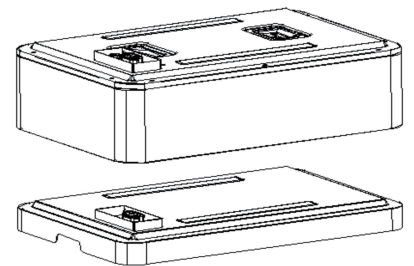


CAUTION!

After the battery module is connected to the base, the battery module plug-in port is electriferous. Take good insulation protection, pay attention to high voltage dangers and shot circuit dangers!

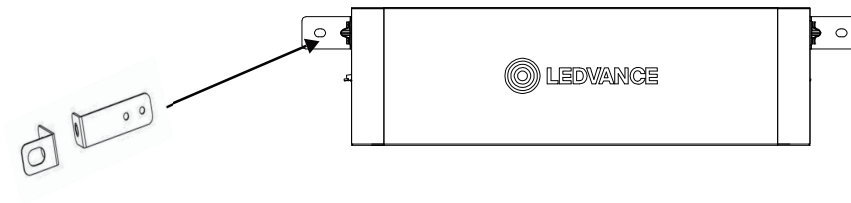
- Stack the corresponding connection ports at the bottom of the battery module. The number of stackable battery modules for a single battery system ranges from 2 to 6.

- Take out the high voltage box, and install the wall fixing plate on the pre-mounting hole of the high voltage box with M4 * 8 screws.

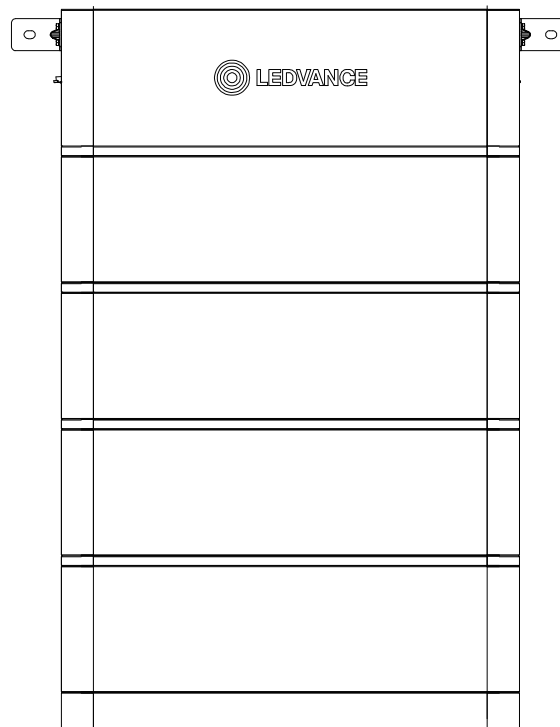


INSTALLATION

- Finally, install the high voltage box to the top layer of the battery module.



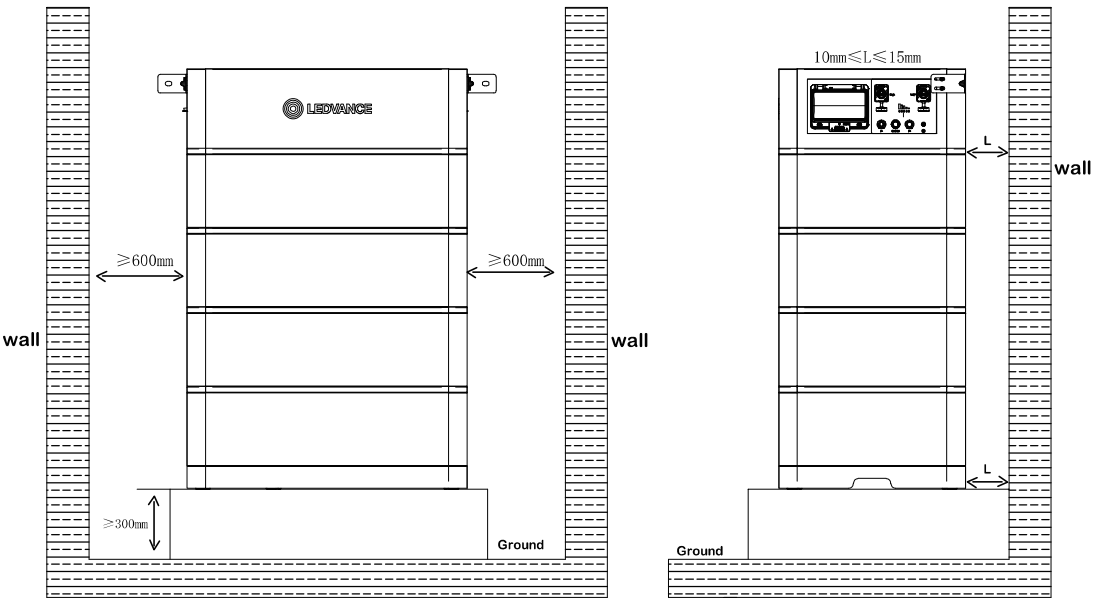
- Place the high voltage box on one side of the wall, mark the positions of fixing holes, drill two holes in the wall with a depth of 45-50 mm using the electrical drill, install expansion bolts in the holes and secure the high voltage box to the wall with a proper hammer.



INSTALLATION

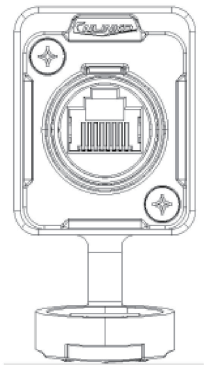
Selection of Installation Sites

The installation location is recommended to meet the size requirements of the figure below:



Pin Definition of Interface

Link_1		Link_2		Link_3
DI1_L	1	DC24V-	1	DC24V-
/	2	ADDR_DI	2	ADDR_DO
/	3	CAN2_S	3	CAN2_S
CAN3_H	4	CAN2_H	4	CAN2_H
CAN3_L	5	CAN2_L	5	CAN2_L
/	6		6	
RS485_1A	7		7	
RS485_1B	8		8	



INSTALLATION

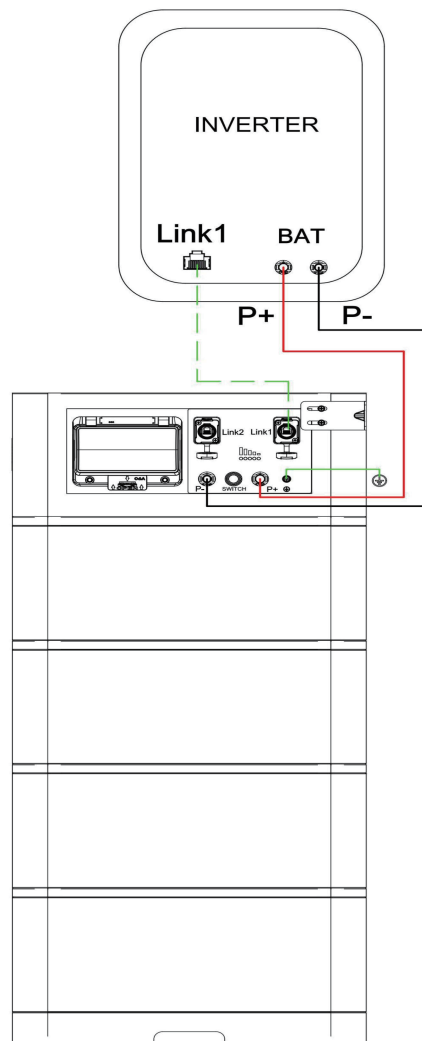
Batteries in Parallel



CAUTION!

- If the combiner box is not used, the parallel connection device should meet the following requirements.
 - a) No less than IP 55 for the outdoor use.
 - b) Maximum operating voltage: 700 V DC.
 - c) Maximum output current: 40 A DC.
 - d) Breaking current: 50 A DC.
- The total power cable length between each battery cluster and the inverter should be less than 10 meters.
- Battery stacks should have the same number of modules.

Single Battery System



The battery and the inverter must be:

- properly installed and fixed. All cables must be correctly connected.
- The BMS must be connected to the Ledvance RE monitoring system via an internal data logger. This ensures monitoring, remote updates and warranty maintenance.

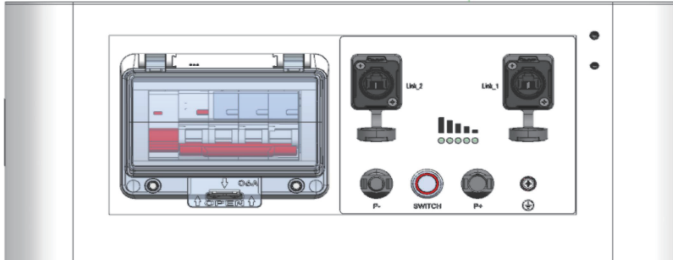
- Turn the external protection switch between the high voltage box and the inverter from OFF to ON.
- Turn the high voltage isolation switch of the high voltage box from OFF to ON.
- After startup, the system enters the self-check mode, the green LED is lit, and the light state corresponds to the current SOC power. Without other light indication, the battery system enters the high-voltage standby mode and can work normally.
- If the battery pack is connected in the "ready" state after the inverter, and cannot normally power on normally, at this time, you can press the black start switch for more than ten seconds, the state becomes "high voltage standby", force the power on.

Except special circumstances after consultation with the manufacturer.



COMMISSIONING

LED Signal



GREEN X 5 SHOW SOC

Note:

After successful power-on, cover the protective cover and tighten the nuts at both ends to keep the HVDC switch in the IP65 protective state.

Explain:

Because the high voltage box of the energy storage system is separated from the battery module before installation, SOC may deviate after the first installation, so it is necessary to connect the inverter for charging calibration after installation. Generally, after the battery is fully charged, BMS will calibrate the SOC through the power learning.

It is recommended to fully charge the battery once a month for SOC calibration.

Battery Forced Charging Function:

When the battery establishes normal communication and charge and discharge connection, the battery is in the discharge state. When the discharge SOC is less than 10%, the battery forced charging function is triggered until 20% ends the strong charging, and switch to the normal working state.

Switch off the Battery System

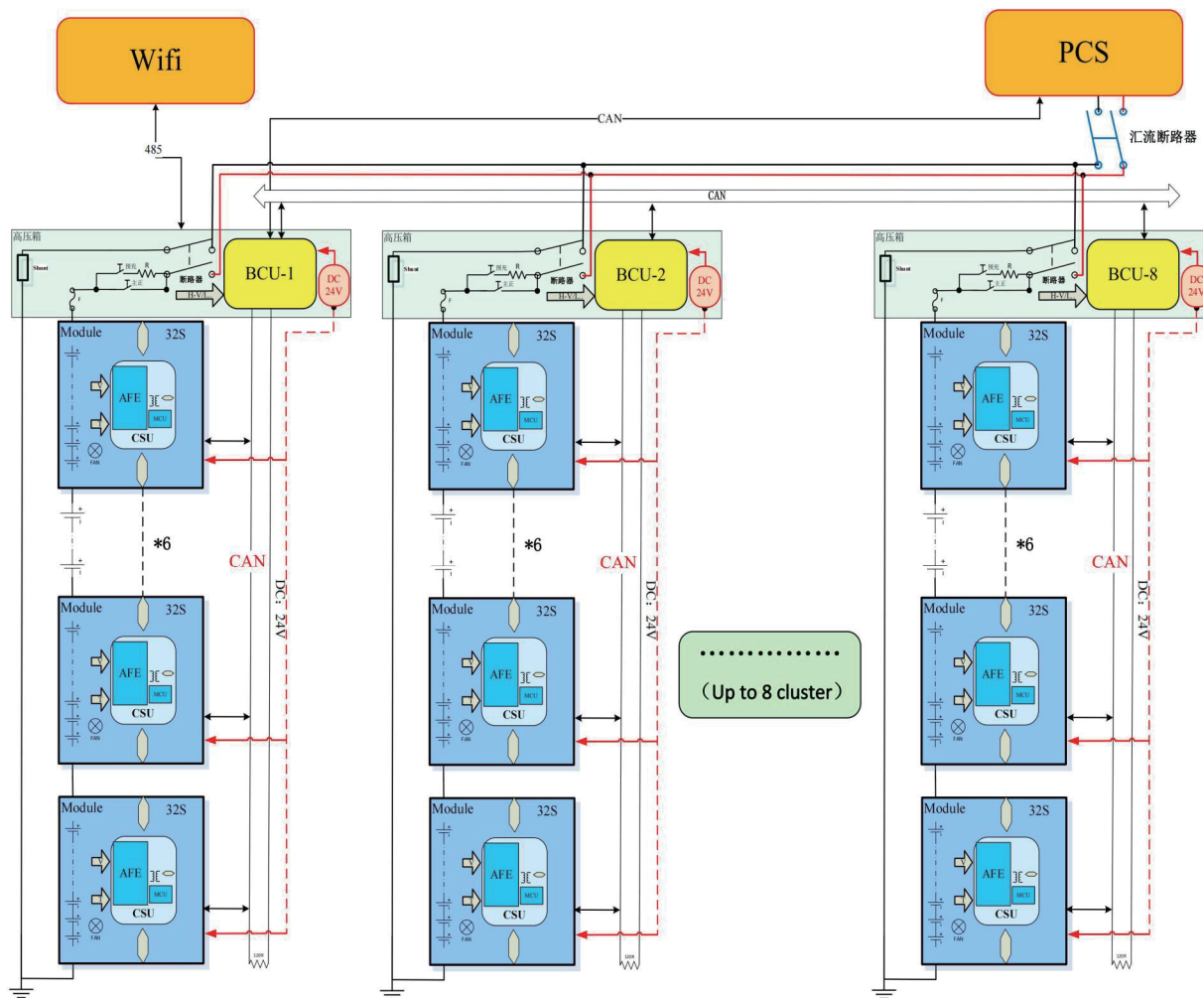
Steps

- Turn the high voltage isolation switch of the high voltage box from ON to OFF.
- Turn the external protection switch between the high voltage box and the inverter from ON to OFF. If two or three battery systems are connected in parallel, please firstly switch off the first battery which has a communication connection to the inverter, and then switch off all the other batteries.

SAFETY DESIGN

- The battery system cannot be turned on if the battery is incomplete or is not installed properly.
- The system will automatically shut down if the battery does not communicate with the inverter for 24 hours.
- The system will automatically shut down if the battery or inverter installation error occurs for 10 minutes.
- The system will automatically shut down if the voltage is too low within 60 seconds.

Electrical Schematic Diagram



MAINTENANCE AND STORAGE

Cleaning

We recommend to clean the battery system regularly. If the battery housing is dirty, use a soft dry brush or dust collector to remove the dust. Do not use solvents, abrasives, or corrosive liquids to clean the housing.

Storage

If the battery energy storage system will not be used for a long time, please refer to the following table to save the power. After charging, turn off all switches on the battery energy storage system to ensure the lowest system power consumption.

Storage Environment Temperature	Humidity of Storage Environment	StorageTime	SOC
Below -10 °C	/	Not allowed	/
-10 - 25 °C	5% - 80%	≤ 12 months	SOC ≥ 50%
25 - 35 °C	5% - 80%	≤ 6 months	SOC ≥ 50%
35 - 50 °C	5% - 80%	≤ 3 months	SOC ≥ 50%
Above 50 °C	/	Not allowed	/

Note: To ensure the battery service life, keep the storage temperature of the battery module between 0 °C and 35 °C.

Wi-Fi DISTRIBUTION NETWORK

Purpose:

The purpose is to describe how to use LEDVANCE RE App to network for the collector.
Instructions for using the Wi-Fi distribution network.
Download the following APP to register the distribution network respectively



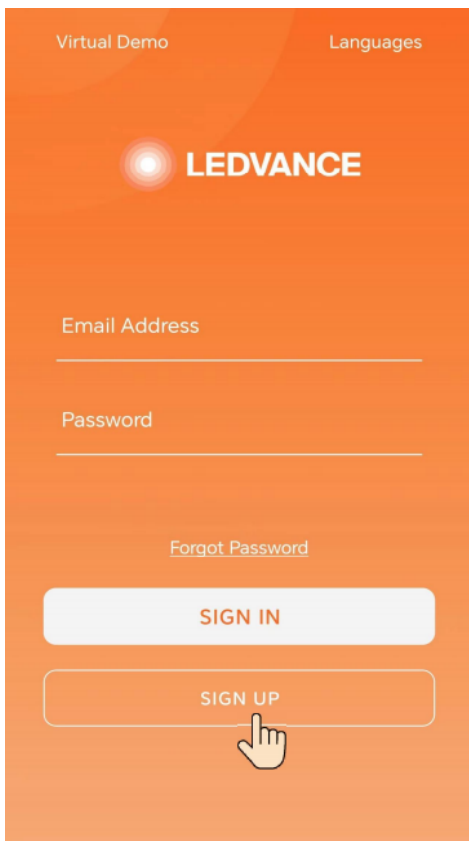
LEDVANCE RE

Scan the QR code below to download the LEDVANCE RE APP and register first.

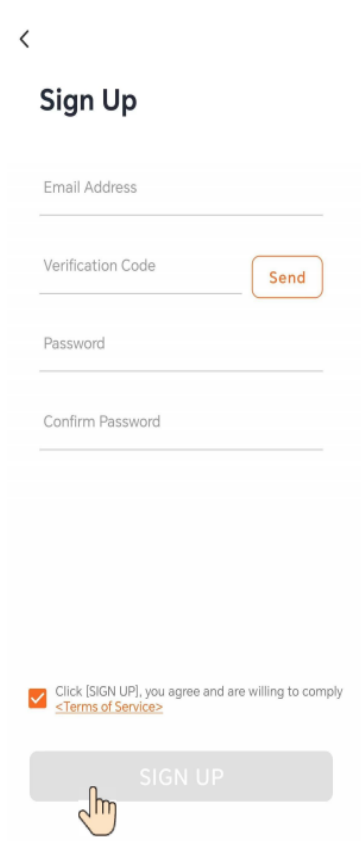


Download is complete to enter the registration, follow the instructions to complete the corresponding registration.

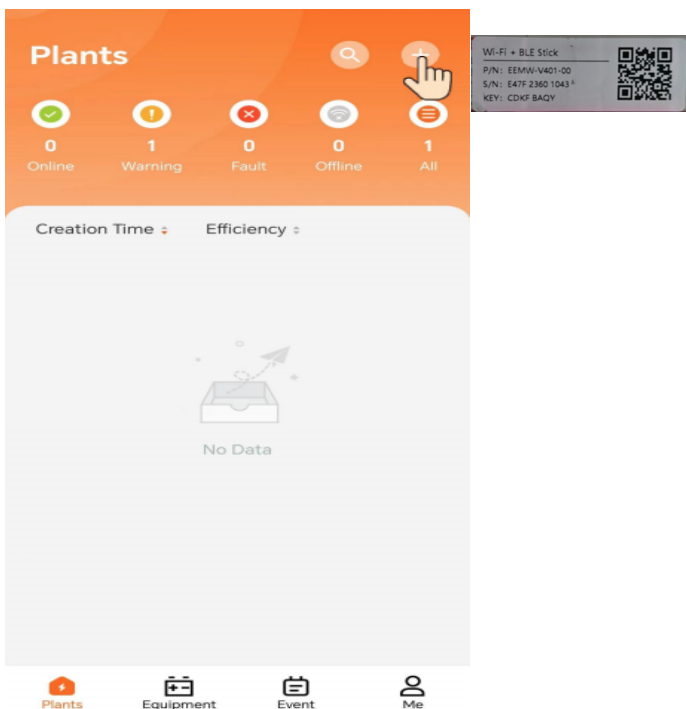
Wi-Fi DISTRIBUTION NETWORK



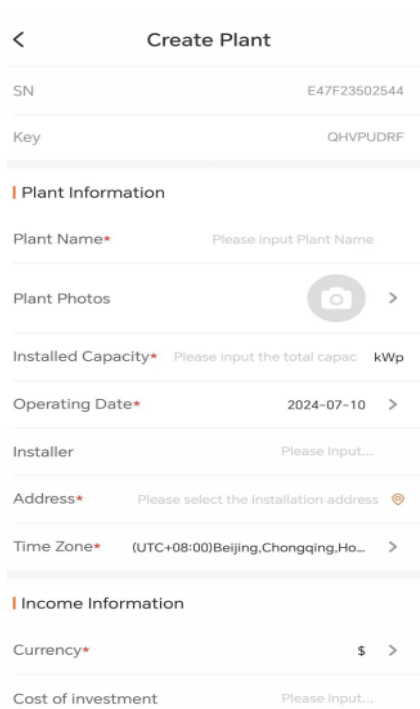
1.Click to register



2.Fill in the registration information



3.Click on the tracing QR code to establish the power station

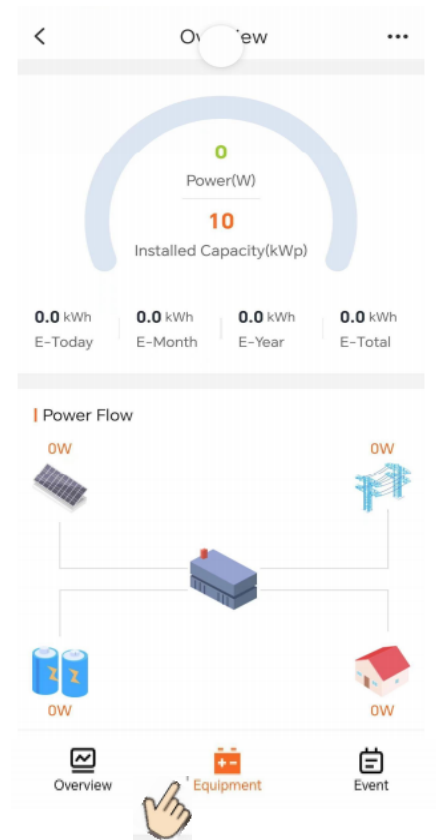


4.Fill in the power station information to create the power station

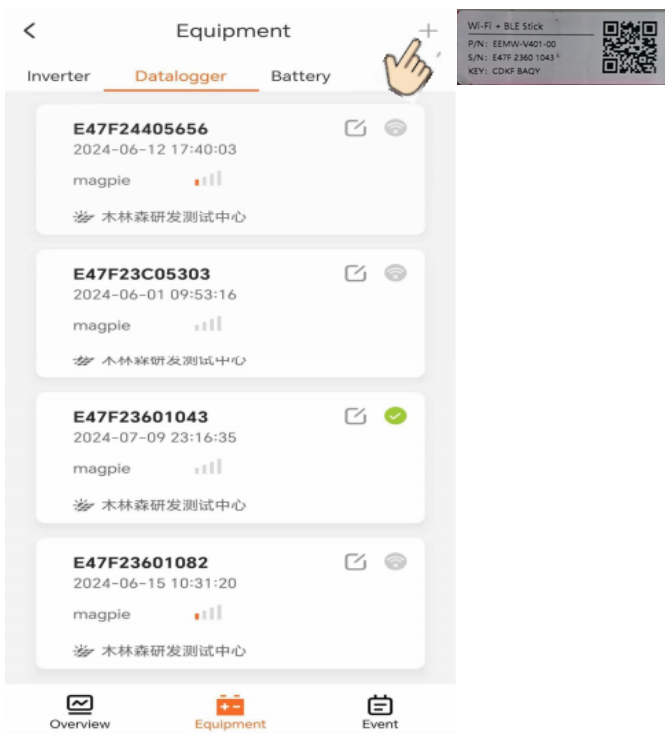
Wi-Fi DISTRIBUTION NETWORK



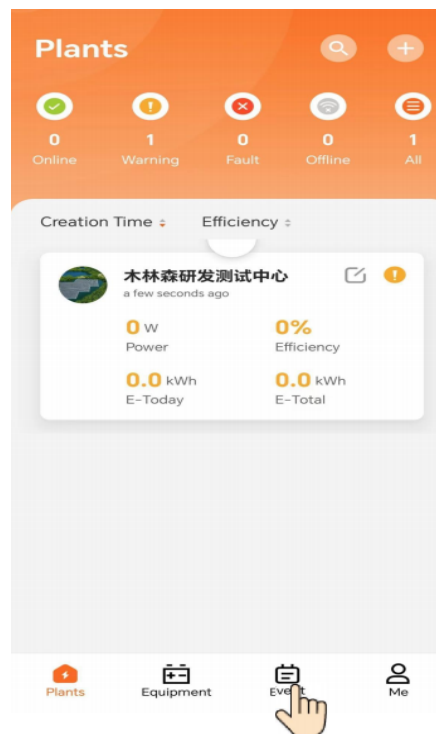
5. Click on the power station to enter the overview interface



6. Click Equipment

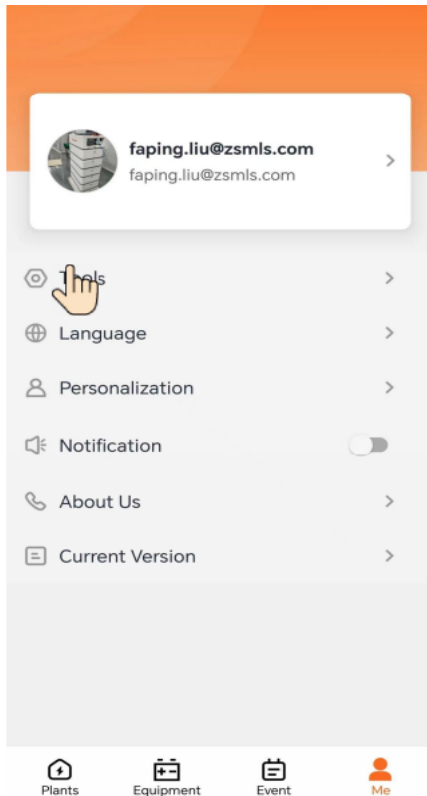


7. Click "+" and scan the QR code to add the datalogger. After the datalogger is successfully added, the WiFi signal lights up into a green.

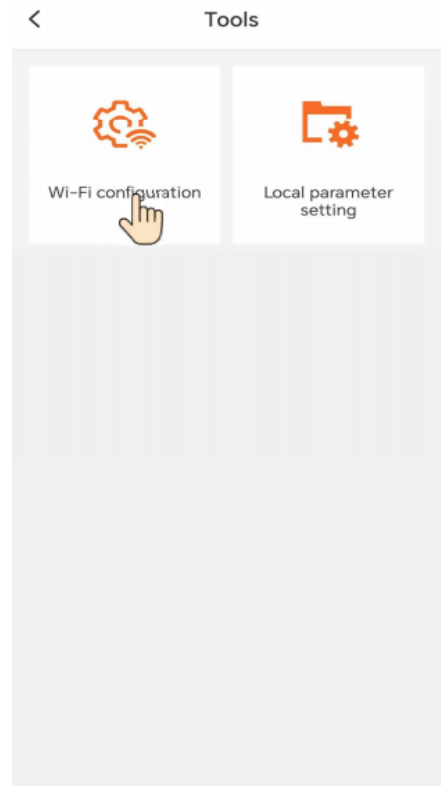


8. Return to the power station interface, click individual to enter the distribution network operation

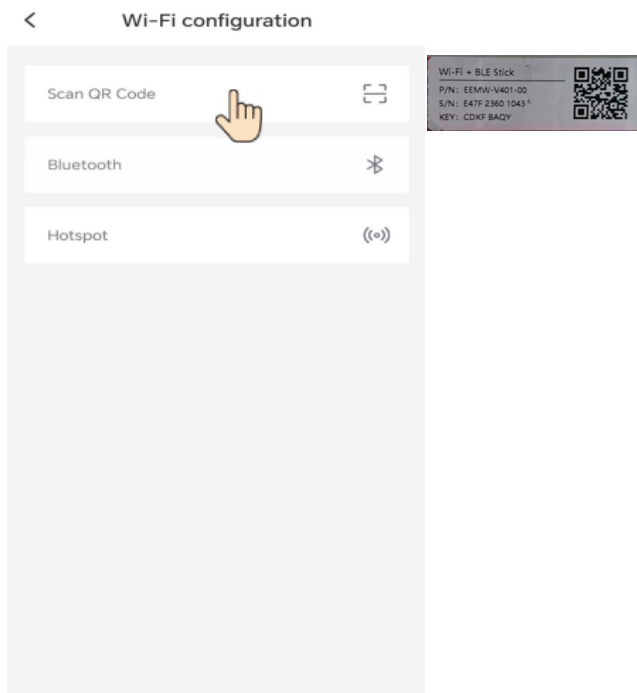
Wi-Fi DISTRIBUTION NETWORK



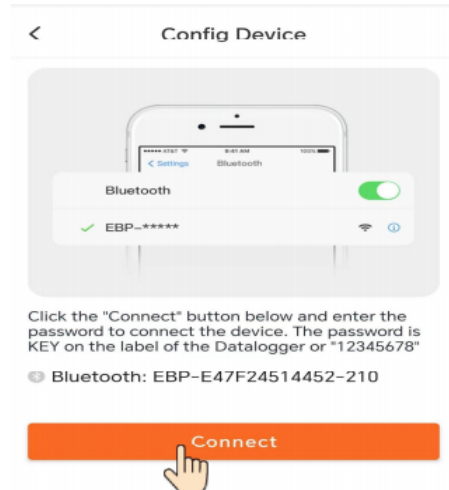
9. Click "Me" and next "Tools"



10. Click "Wi-Fi network configuration"

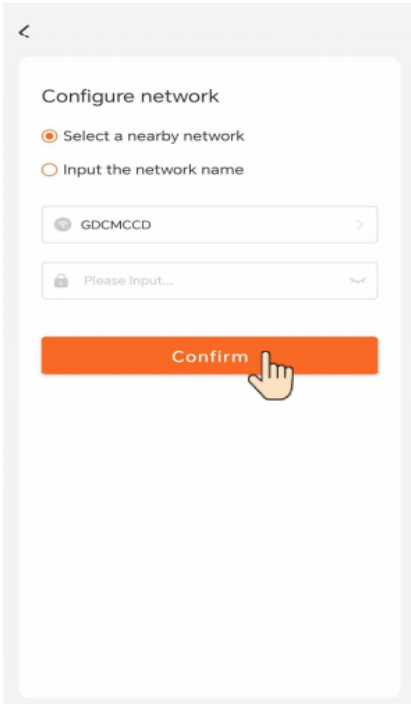


11. Click to scan the QR code of the BMS for the distribution network

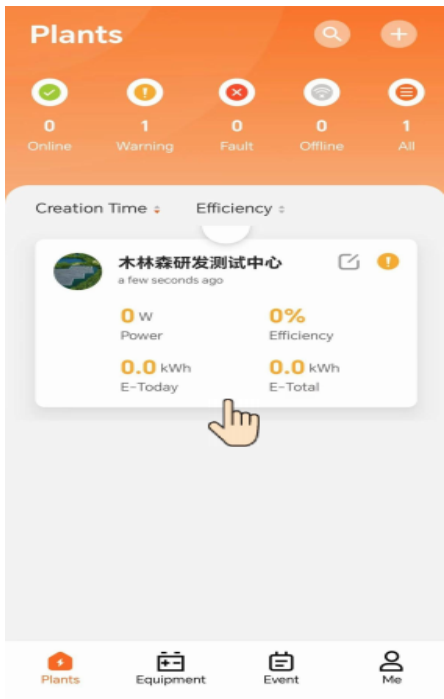


12. Click on Connect and enter the password: 123456

Wi-Fi DISTRIBUTION NETWORK



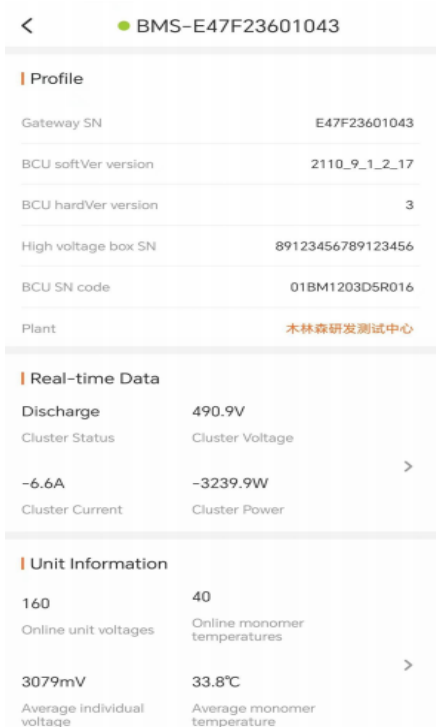
13. Select the router that the datalogger needs to be connected to the router and enter the password of the router networking. After completion, click OK, and the successful distribution network interface will pop up.



14. After connection with network is successful, return to the power station interface and click the created power station



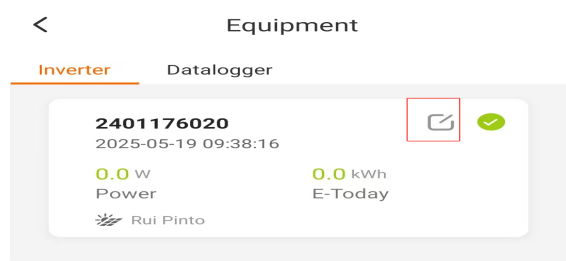
15. Enter the overview interface, click the device item and then click the battery bar, and enter the data viewing interface



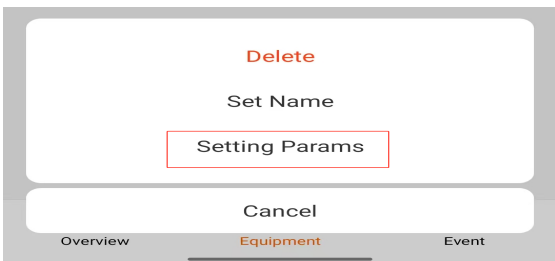
16. Data display interface, view the product SN, battery information and fault information.

Wi-Fi DISTRIBUTION NETWORK

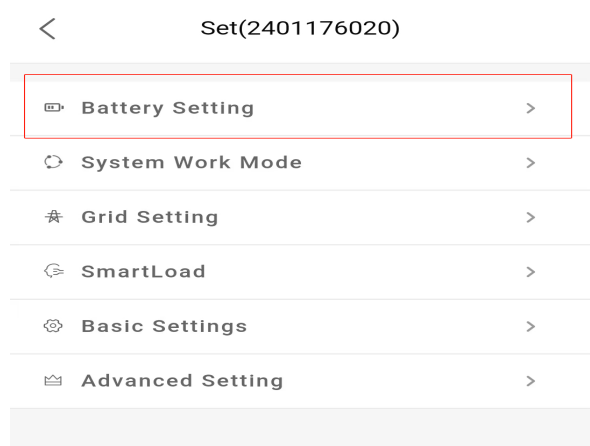
Inverter and battery protocol selection



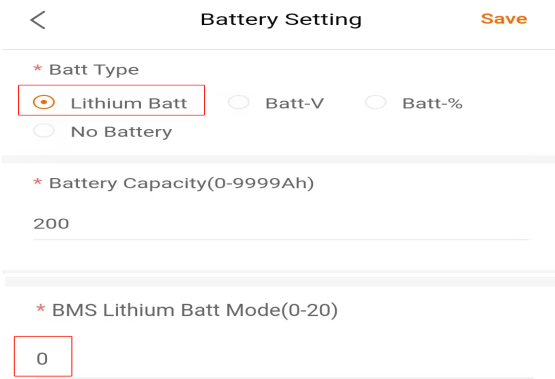
1. On the equipment interface, click the edit icon in the red box



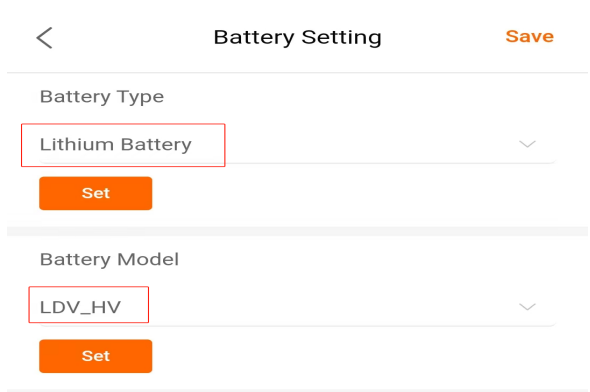
2. Click Setting Params



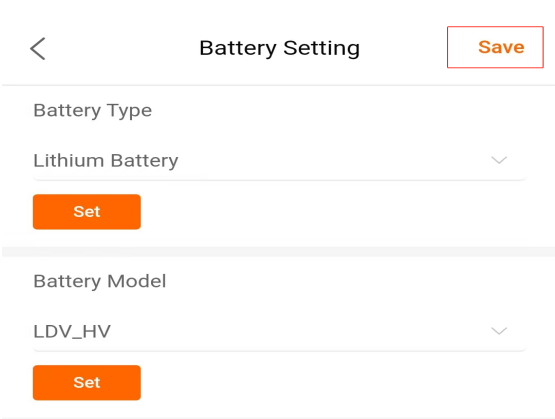
3. Click Battery Setting



4. If the inverter battery setting interface is the same as this interface, select according to this content: Batt Type Selection Lithium Batt, BMS Lithium Batt Mode(0-20) Selection 0



5. If the inverter battery setting interface is the same as this interface, select according to this content: Batt Type Selection Lithium Battery, Battery Model Selection LDV_HV



6. After selecting the protocol, click Save

DISPOSAL

For details related to the disposal of battery modules, please contact us.

Observe applicable regulations on waste battery disposal. Immediately stop the use of damaged batteries. Please contact your installer or sales partner before disposal. Ensure that the battery is not exposed to moisture or direct sunlight.



Attention:

- Do not dispose of batteries and rechargeable batteries as domestic waste!
You are legally obliged to return used batteries and rechargeable batteries.
- Waste batteries may contain pollutants that can damage the environment or your health if improperly stored or handled.
- Batteries also contain iron, lithium and other important raw materials, which can be recycled.

DO NOT DISPOSE OF BATTERIES AS HOUSEHOLD WASTE!



Corporate name: LEDVANCE GmbH
Company address: LEDVANCE SASU
CQM, 5 rue d'Altorf 67120 Molsheim France
Contact Information: Krzysztof Rytel
+48 734 134 386 k.rytel@ledvance.com